

**Technical Appendix:**

**Supplemental Table S1: Codes Used for the Definition of Study Outcomes**

<b>Anemia Treatment</b>	<b>Procedure Codes</b>
Erythropoiesis-stimulating agents	Q0136, J0885, Q4055, Q4081, J0886, Q0137, J0880, J0881, Q4054, J0882
Intravenous iron products	J1750, J1760, J1770, J1780, J1751, J1752, J2915, J2916, S0098, W0231, J1755, Q0138, Q0139, J3490
Blood Transfusions	V37, P9903, P9904, P9010, P9011, P9016, P9021, P9022, P9038, P9039, P9040, 36430

**Supplemental Table S2: Prevalence Ratios of Pre-ESRD Use of any Erythropoiesis-Stimulating Agent**

		Complete Case (N=426,953)			Multiple Imputation (N=466,803)	
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
1995	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent
1996	1.34 (1.21-1.49)	1.35 (1.21-1.49)	1.35 (1.21-1.50)	1.59 (1.45-1.74)	1.59 (1.45-1.74)	1.58 (1.45-1.73)
1997	1.66 (1.50-1.84)	1.66 (1.51-1.84)	1.68 (1.52-1.85)	1.91 (1.75-2.09)	1.92 (1.76-2.09)	1.92 (1.76-2.09)
1998	2.01 (1.82-2.21)	2.01 (1.82-2.21)	2.04 (1.85-2.24)	2.31 (2.12-2.51)	2.31 (2.12-2.51)	2.33 (2.14-2.53)
1999	2.35 (2.14-2.58)	2.35 (2.14-2.58)	2.40 (2.18-2.63)	2.63 (2.42-2.85)	2.63 (2.42-2.85)	2.66 (2.45-2.89)
2000	2.85 (2.60-3.13)	2.84 (2.60-3.12)	2.93 (2.67-3.21)	3.18 (2.94-3.45)	3.19 (2.94-3.45)	3.25 (3.00-3.52)
2001	4.55 (4.16-4.97)	4.54 (4.15-4.96)	4.68 (4.29-5.12)	5.10 (4.72-5.51)	5.10 (4.73-5.51)	5.22 (4.83-5.64)
2002	5.27 (4.83-5.75)	5.27 (4.82-5.75)	5.46 (5.00-5.96)	5.92 (5.49-6.93)	5.94 (5.50-6.41)	6.10 (5.65-6.58)
2003	6.77 (6.21-7.39)	6.78 (6.22-7.40)	7.06 (6.47-7.70)	7.56 (7.01-8.15)	7.60 (7.04-8.19)	7.83 (7.26-8.44)
2004	9.46 (8.68-10.31)	6.46 (8.68-10.31)	9.87 (9.06-10.76)	10.63 (9.87-11.45)	10.76 (9.90-11.49)	11.01 (10.23-10.23)
2005	10.97 (10.07-11.95)	10.96 (10.06-11.94)	11.49 (10.55-12.52)	12.29 (11.42-13.23)	12.33 (11.45-13.28)	12.79 (11.88-13.77)
2006	11.36 (10.43-12.38)	11.34 (10.41-12.36)	11.95 (10.97-13.02)	12.75 (11.84-13.73)	12.78 (11.87-13.76)	13.31 (12.36-14.33)
2007	11.46 (10.52-12.48) <i>1.0 Referent</i>	11.45 (10.51-12.47) <i>1.0 Referent</i>	12.12 (11.12-13.20) <i>1.0 Referent</i>	12.85 (11.94-13.84) <i>1.0 Referent</i>	12.90 (11.98-13.89) <i>1.0 Referent</i>	13.50 (12.53-14.53) <i>1.0 Referent</i>
2008 <i>vs. 2007</i>	10.99 (10.09-11.98) <i>0.96 (0.94-0.98)</i>	10.98 (10.08-11.97) <i>0.96 (0.94-0.98)</i>	11.66 (10.70-12.71) <i>0.96 (0.94-0.98)</i>	12.30 (11.42-13.24) <i>0.96 (0.94-0.98)</i>	12.34 (11.46-13.29) <i>0.96 (0.94-0.98)</i>	12.95 (12.03-13.95) <i>0.96 (0.94-0.98)</i>
2009 <i>vs. 2007</i>	10.40 (9.54-11.33) <i>0.91 (0.89-0.93)</i>	10.40 (9.54-11.33) <i>0.91 (0.89-0.93)</i>	11.08 (10.16-12.07) <i>0.91 (0.90-0.93)</i>	11.63 (10.80-12.52) <i>0.91 (0.98-0.92)</i>	11.68 (10.85-12.58) <i>0.91 (0.89-0.92)</i>	12.29 (11.41-13.24) <i>0.91 (0.89-0.93)</i>
2010 <i>vs. 2007</i>	9.85 (9.04-10.74) <i>0.86 (0.84-0.88)</i>	9.86 (9.04-10.74) <i>0.86 (0.84-0.88)</i>	10.51 (9.65-11.46) <i>0.87 (0.85-0.89)</i>	11.03 (10.24-11.88) <i>0.86 (0.84-0.88)</i>	11.09 (10.29-11.94) <i>0.86 (0.84-0.88)</i>	11.68 (10.84-12.58) <i>0.87 (0.85-0.88)</i>

Model 1 – unadjusted; Model 2 – adjusted for age, sex, race, Medicaid eligibility; Model 3 – additionally adjusted for diabetes (reported comorbidity), estimated glomerular filtration rate, and body mass index. Red numbers indicate results from an otherwise identical model on the same data where 2007 instead of 1995 was the referent year. Models additionally adjusting for hypertension, coronary artery disease, heart failure, cerebrovascular disease, peripheral artery disease, chronic obstructive pulmonary disease, and cancer yielded very similar estimated to Model 3 and are not shown.

**Supplemental Table S3: Prevalence Ratios of Pre-ESRD Intravenous Iron Administration**

		Complete Case (N=426,953)			Multiple Imputation (N=466,803)	
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
1995	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent
1996	1.21 (1.02-1.44)	1.21 (1.01-1.44)	1.21 (1.01-1.44)	1.34 (1.15-1.56)	1.35 (1.16-1.57)	1.35 (1.16-1.57)
1997	1.29 (1.09-1.53)	1.29 (1.09-1.53)	1.28 (1.08-1.52)	1.42 (1.22-1.64)	1.42 (1.23-1.65)	1.41 (1.22-1.64)
1998	1.23 (1.03-1.45)	1.23 (1.04-1.46)	1.21 (1.02-1.43)	1.35 (1.16-1.57)	1.36 (1.17-1.58)	1.34 (1.15-1.55)
1999	1.51 (1.28-1.78)	1.52 (1.29-1.79)	1.48 (1.26-1.74)	1.65 (1.43-1.90)	1.66 (1.44-1.91)	1.62 (1.41-1.87)
2000	1.51 (1.28-1.78)	1.52 (1.29-1.79)	1.47 (1.25-1.73)	1.62 (1.40-1.86)	1.63 (1.41-1.88)	1.58 (1.37-1.82)
2001	2.02 (1.73-2.36)	2.04 (1.74-2.38)	1.96 (1.67-2.29)	2.17 (1.90-2.49)	2.20 (1.92-2.51)	2.11 (1.84-2.42)
2002	2.47 (2.12-2.87)	2.50 (2.14-2.91)	2.39 (2.05-2.78)	2.65 (2.32-3.03)	2.69 (2.36-3.07)	2.58 (2.26-2.94)
2003	3.22 (2.77-3.74)	3.26 (2.81-3.79)	3.11 (2.68-3.61)	3.45 (3.04-3.92)	3.51 (3.09-3.99)	3.35 (2.94-3.80)
2004	3.89 (3.36-4.50)	3.94 (3.40-4.56)	3.73 (3.22-4.32)	4.21 (3.71-4.77)	4.28 (3.77-4.85)	4.06 (3.58-4.60)
2005	4.93 (4.27-5.71)	5.01 (4.33-5.79)	4.72 (4.08-5.47)	5.38 (4.76-6.09)	5.48 (4.84-6.20)	5.17 (4.57-5.86)
2006	6.28 (5.44-7.25)	6.37 (5.51-7.35)	5.99 (5.18-6.92)	6.79 (6.01-7.68)	6.91 (6.12-7.82)	6.50 (5.75-7.35)
2007	6.97 (6.04-8.05)	7.09 (6.14-8.18)	6.63 (5.74-7.66)	7.58 (6.71-8.57)	7.74 (6.85-8.75)	7.24 (6.40-8.18)
2008	7.72 (6.69-8.91)	7.84 (6.79-9.05)	7.32 (6.33-8.45)	8.37 (7.41-9.46)	8.54 (7.56-9.65)	7.97 (7.05-9.01)
2009	8.12 (7.04-9.37)	8.28 (7.17-9.55)	7.70 (6.67-8.90)	8.78 (7.77-9.91)	8.98 (7.95-10.15)	8.36 (7.40-9.44)
2010	9.20 (7.97-10.61)	9.38 (8.13-10.82)	8.71 (7.55-10.06)	9.93 (8.80-11.21)	10.17 (9.01-11.48)	9.44 (8.36-10.66)

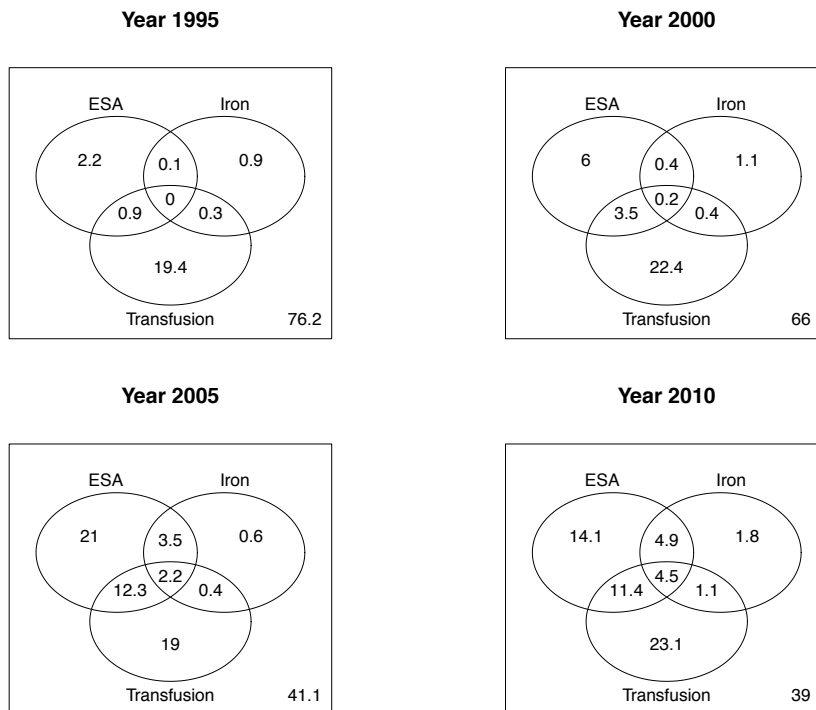
Model 1 – unadjusted; Model 2 – adjusted for age, sex, race, Medicaid eligibility; Model 3 – additionally adjusted for diabetes (reported comorbidity), estimated glomerular filtration rate, and body mass index. Models additionally adjusting for hypertension, coronary artery disease, heart failure, cerebrovascular disease, peripheral artery disease, chronic obstructive pulmonary disease, and cancer yielded very similar estimated to Model 3 and are not shown.

**Supplemental Table S4: Prevalence Ratios of Pre-ESRD Receipt of Any Blood Transfusion**

		Complete Case (N=426,953)			Multiple Imputation (N=466,803)	
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
1995	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent	1.0 Referent
1996	1.04 (1.00-1.08)	1.04 (1.00-1.08)	1.04 (1.00-1.09)	1.05 (1.01-1.09)	1.05 (1.02-1.09)	1.05 (1.02-1.09)
1997	1.09 (1.05-1.14)	1.10 (1.05-1.14)	1.10 (1.05-1.14)	1.12 (1.08-1.16)	1.12 (1.08-1.16)	1.11 (1.08-1.15)
1998	1.16 (1.12-1.21)	1.16 (1.12-1.21)	1.16 (1.12-1.21)	1.19 (1.16-1.23)	1.19 (1.15-1.23)	1.18 (1.14-1.22)
1999	1.19 (1.14-1.23)	1.19 (1.14-1.23)	1.19 (1.15-1.24)	1.22 (1.18-1.26)	1.21 (1.18-1.25)	1.21 (1.17-1.25)
2000	1.25 (1.20-1.30)	1.25 (1.20-1.29)	1.26 (1.21-1.31)	1.29 (1.25-1.33)	1.28 (1.24-1.33)	1.28 (1.24-1.32)
2001	1.37 (1.32-1.42)	1.37 (1.32-1.42)	1.38 (1.33-1.43)	1.41 (1.36-1.45)	1.40 (1.36-1.45)	1.40 (1.36-1.44)
2002	1.49 (1.44-1.54)	1.48 (1.43-1.54)	1.50 (1.45-1.55)	1.53 (1.48-1.58)	1.52 (1.48-1.57)	1.52 (1.47-1.57)
2003	1.52 (1.47-1.57)	1.51 (1.46-1.57)	1.53 (1.48-1.59)	1.56 (1.51-1.60)	1.55 (1.50-1.60)	1.55 (1.50-1.60)
2004	1.57 (1.52-1.63)	1.57 (1.52-1.63)	1.59 (1.53-1.64)	1.62 (1.57-1.67)	1.62 (1.57-1.67)	1.61 (1.57-1.66)
2005	1.59 (1.54-1.65)	1.59 (1.54-1.65)	1.61 (1.56-1.67)	1.64 (1.59-1.69)	1.64 (1.59-1.69)	1.64 (1.59-1.69)
2006	1.61 (1.55-1.67)	1.61 (1.55-1.67)	1.63 (1.58-1.69)	1.66 (1.61-1.71)	1.66 (1.61-1.81)	1.66 (1.61-1.71)
2007	1.67 (1.61-1.73)	1.67 (1.61-1.73)	1.70 (1.64-1.76)	1.72 (1.67-1.77)	1.72 (1.67-1.78)	1.73 (1.68-1.78)
2008	1.81 (1.75-1.88)	1.82 (1.75-1.88)	1.85 (1.78-1.91)	1.87 (1.82-1.93)	1.87 (1.82-1.93)	1.88 (1.82-1.94)
2009	1.86 (1.79-1.92)	1.86 (1.80-1.92)	1.89 (1.83-1.96)	1.91 (1.86-1.97)	1.92 (1.86-1.97)	1.93 (1.87-1.98)
2010	1.88 (1.82-1.95)	1.89 (1.83-1.96)	1.93 (1.86-1.99)	1.95 (1.90-2.01)	1.96 (1.90-2.02)	1.97 (1.91-2.03)

Model 1 – unadjusted; Model 2 – adjusted for age, sex, race, Medicaid eligibility; Model 3 – additionally adjusted for diabetes (reported comorbidity), estimated glomerular filtration rate, and body mass index. Models additionally adjusting for hypertension, coronary artery disease, heart failure, cerebrovascular disease, peripheral artery disease, chronic obstructive pulmonary disease, and cancer yielded very similar estimated to Model 3 and are not shown.

**Supplemental Figure S1: Venn Diagrams of Utilization among Anemia Treatments prior to End-Stage Renal Disease (1995, 2000, 2005, and 2010)**



ESA – erythropoiesis-stimulating agents. All numbers correspond to proportion of patients who received the corresponding anemia treatment(s) in the two years prior to reaching end-stage renal disease. The number in the bottom right indicates the proportion of patients who did not receive any of the three treatments.