Appendix

1. Supplemental methods for identifying non-ESRD decedents in MDS and for propensity matched analysis
2. Table A1. ICD-9 and CPT codes used to identify end-of-life treatments
3. Table A2. Propensity matched analysis of the association between treatment limiting directive and surrogate decision maker with treatments in the last month of life and site of death.

Methods for identifying non-ESRD decedents in MDS

From a random 10% sample of patients in the MDS we identified 87,830 patients who died between the years 2006-2007 and had a non-missing advance directive assessment between 31 and 365 days before death. From this sample, we identified three mutually exclusive groups of patients with serious illness in hierarchical fashion using information from the MDS about disease diagnoses and treatments administered in the prior 14 days before the MDS assessment. We defined cancer as a diagnosis of cancer and receipt of chemotherapy or radiation therapy (N=2286). We defined advanced chronic obstructive pulmonary disease (COPD) as a diagnosis of COPD with receipt of oxygen or ventilator therapy (N=17,560). We defined advanced dementia as a diagnosis of dementia and a cognitive performance scale score of five or more, from a maximum score of six (N=10,979). Patients with cancer were identified first, followed by advanced dementia, and finally COPD. Thus, no patients with COPD were permitted to have cancer or advanced dementia.

Methods for propensity matched analysis

We used logistic regression to construct separate propensity scores for treatment limiting directives and surrogates, using the variables presented in Table 1. Using the propensity score, we matched patients with a treatment limiting directive to patients without a treatment limiting directive using a caliper of 0.01 (N=16,618). We assessed match quality with standardized differences. The largest standardized difference was 1.3, indicating a good match quality. We used a similar procedure to obtain a matched cohort of patients with and without a surrogate (N=10,820). The largest standardized difference was 3.1, indicating a good match quality. We used modified Poisson

regression to determine the association between treatment limiting directives and

surrogates with end-of-life health care using the matched cohorts. The results of these

analyses are presented in Appendix Table A2.

Table A1. ICD-9 and CPT codes

Diagnosis	Diagnosis and procedure codes
Diabetes	249.x, 250.x, 357.x, 362.x
Ischemic heart disease	414.x
Heart failure	398.91, 402.x, 404.x, 428.x,
Stroke	430, 431, 432.x, 433.x, 433.x, 434.x, 437.x, 438.x,
Chronic liver disease	070.x, 456.x, 571.x, 572.x, 573.x, v42.7
Chronic lung disease	490, 491.x, 492.x, 493.x, 494.x, 495.x, 496, 500, 501, 502, 503, 504, 505, 506.4, 516.x
Cancer	140.x-172.x, 174.x, 175.x, 179, 180.x,-209.x, 238.6, 273.3
Depression	296. x, 300.4, 301.12, 309.x, 311
Dementia	290.x, 294.x, 331.x
Cardiopulmonary resuscitation	99.60, 99.62, 99.63, 93.93, 37.91, 37.92
Intubation and mechanical ventilation	96.04, 96.05, 96.7x,
Placement of gastrostomy tube	43.2, 43.11, 43.19, 44.32
Intensive care unit	revenue codes 200-212, 214, and 219

Table A2. Propensity matched analysis of the association between treatment limiting directive and surrogate decision maker with treatments in the last month of life and site of death among patients with end-stage renal disease. There were N=16,618 patients included in the treatment limiting directive analysis, and N=10,820 included in the surrogate decision maker analysis.

Treatment	Treatment limiting directive		Adjusted Risk Difference (%) (95% CI)	Surrogate decision maker		Adjusted Risk Difference (%) (95% CI)
	Absent %	Present %		Absent %	Present %	
Hospitalization	70	64	-7 (-8, -5)	67	63	-4 (-6, -2)
Intensive care unit admission	44	34	-10 (-12, -9)	39	35	-4 (-6,-2)
Mechanical ventilation	16	7	-9 (-10, -8)	11	10	-1 (-2,0)
CPR	5	3	-2 (-3, -2)	4	3	-1 (-1, 0)
Gastrostomy tube	2	1	-1 (-1, 0)	2	2	0 (0, 1)
Inpatient death	43	35	-8 (-10, -7)	39	35	-4 (-5, -3)
Hospice admission	27	32	5 (4, 7)	30	31	1 (-1, 3)
Dialysis discontinuation	34	40	6 (4, 7)	38	40	3 (1, 4)

Abbreviations: CI – confidence interval, CPR – cardiopulmonary resuscitation.