

Hospitalization, Survival and Transplant-Related Outcomes in the Centers for Medicare & Medicaid Services End-Stage Renal Disease (ESRD) Disease Management (DM) Demonstration

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1. Objective

The aim of this study was to evaluate the impact of Disease Management in the setting of Medicare Advantage (MA) plans on patient survival, hospitalization and transplant-related outcomes.

2. Background

• Previous studies of Disease Management programs in populations other than end-stage renal disease (ESRD) suggest their potential for improving processes of care. ESRD is conceptually an ideal target for Disease Management because of the co-existence of complex comorbidities, fragmentation of patient management, the associated high morbidity and mortality, and the high cost of care.

• The ESRD Disease Management Demonstration sought to evaluate whether DMOs in the setting of MA Plans could improve clinical outcomes and reduce Medicare expenditures. The current analyses evaluate the impact of disease management on patient survival, hospitalization, and transplant-related outcomes.

• The demonstration evaluates three ESRD-specific DMOs (A, B and C) operating in nineteen geographic areas. Each DMO developed its own DM programs with different clinical interventions and focus areas.

3. Methods

Data sources: For demonstration patients, enrollment data, demographic data, and date of death were collected from the CMS Member Beneficiary Database and the CMS 2728. Medicare records provided most data including state of residence and patient characteristics. Transplant referral data (and reasons for non-referral) were collected from data submitted by the DMOs. Hospitalization data were collected from DMO encounter data. Data on wait-listing and transplantation were extracted from data collected by the Organ Procurement and Transplantation Network and analyzed by the Scientific Registry of Transplant Recipients.

Sample:

• Patients who enrolled in the Demonstration at any time from January 1, 2006 through December 31, 2008.

• Exclusion criteria included patients with a functioning transplant at enrollment. The transplantation, wait-listing, and transplant referral analyses also excluded patients aged 70 years or older.

Comparison Group: Adult dialysis patients in traditional fee-for-service (FFS) Medicare from January 1, 2006 through December 31, 2008. Medicare records provided most data including state of residence and patient characteristics. Hospitalizations were identified using FFS claims. Data on wait-listing and transplantation were extracted from data collected by the Organ Procurement and Transplantation Network and analyzed by the Scientific Registry of Transplant Recipients.

Outcome: Primary outcomes included the percentage of patients hospitalized at one and two years, the percentage of patients who survived at one and two years, the percentage of patients transplanted at one and two years, and the percent of patients on the transplant wait-list in the Demonstration versus FFS.

Methods:

• Adjusted survival, hospitalization, and transplantation percentages were calculated using stratified Cox proportional hazards models.

➢ Adjusted for patient age, sex, race, Hispanic ethnicity, diabetes as cause of ESRD, time with ESRD, modality, previous failed transplant, state of residence, and CMS-HCC risk score.

• For Demonstration patients, follow-up time started at DMO enrollment and for FFS patients, this started on January 1, 2006 or the date of the first dialysis claim for patients new to ESRD and/or FFS Medicare. Patient time at risk ended at the first of Demonstration disenrollment, death, three days prior to transplant (so as not to include the hospitalization for transplantation), or December 31, 2008.

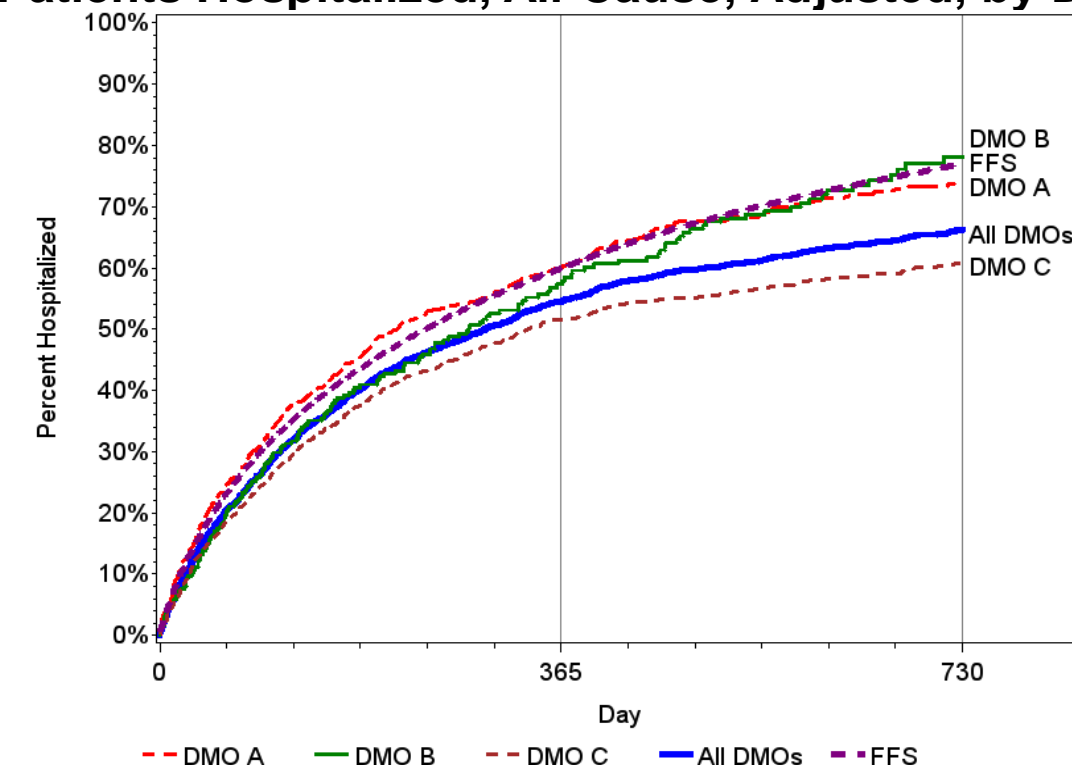
• Analyses presented in the Results section contain all FFS patients. Additional analyses were also performed restricting the FFS population to FFS patients in the same geographic areas where the DMOs operated. The results of these additional analyses are consistent with results presented here.

Sample Size: 722 dialysis patients in DMO A, 268 dialysis patients in DMO B, and 1,374 dialysis patients in DMO C.

• Demonstration patients were younger, had ESRD longer, reported Hispanic or Latino ethnicity more often, were more often receiving HD, and had similar levels of comorbidity according to the CMS-HCC risk score. Compared to FFS:

- DMO A had more males, more white patients, more patients with ESRD caused by diabetes, and more patients with previous failed transplants.
- DMO B had more black patients.
- DMO C had more females, more black patients, and more patients with previous failed transplants.

Patients Hospitalized, All-Cause, Adjusted, by DMO or FFS



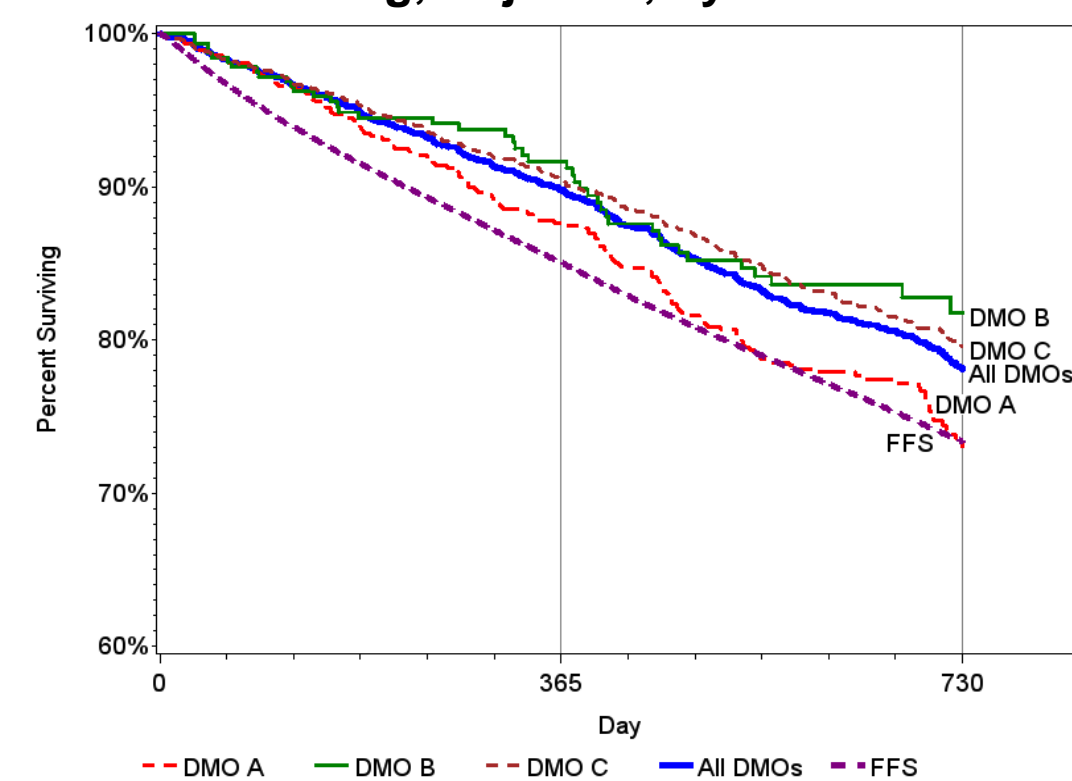
• A significantly lower percentage of patients in DMO C were hospitalized for the first time by one year and two years.

➢ A similar analysis found that a significantly lower percentage of patients in DMO C were hospitalized for cardiovascular disease by one and two years.

• The gap between the hospitalization percentage between patients in DMO C and FFS increased over the course of the evaluation such that about 15 percent fewer patients in DMO C were hospitalized for the first time by two years as compared to FFS.

• Adjusted analyses did not reveal significant differences between hospitalization percentages in DMO A or DMO B as compared to FFS.

Patients Surviving, Adjusted, by DMO or FFS



• Adjusted analyses demonstrated that a larger percentage of patients in DMO B and DMO C survived to these time points.

• Although unadjusted analyses demonstrated significantly improved survival among patients in DMO A, this was no longer apparent after statistical adjustment.

4. Results

Patients Referred for Transplant, by DMO

	DMO A	DMO B	DMO C	All DMOs
Referred Before Demonstration (%)	0	0	11	6
Referred in Demonstration (%)	39	15	24	28
Not Referred in Demonstration (%)	61	12	66	57
Unknown Status (%)	0	73	0	9
Total Patients in Transplant Analyses (n)	611	227	1,041	1,879

• The majority of patients who were not already transplanted were either not referred for transplant or had unknown referral status.

• DMO A had the highest percentage of patients referred for transplant evaluation.

• The most common reason for non-referral was patient refusal, followed by medical contraindication.

Predictors of Transplant Referral

	DMO A		DMO C		All DMOs	
	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value
Age: 18-44 Years Old	3.02	< 0.01	1.98	< 0.01	2.44	< 0.01
45-59 Years Old	2.74	< 0.01	1.44	0.03	1.83	< 0.01
60-69 Years Old	ref		ref		ref	
Sex: Female	0.87	0.43	1.04	0.80	0.95	0.66
Male	ref		ref		ref	
Time with ESRD: < 6 Months	1.25	0.47	0.69	0.27	0.88	0.54
6-11 Months	1.65	0.08	1.16	0.54	1.29	0.16
12-35 Months	ref		ref		ref	
36-79 Months	1.07	0.80	0.73	0.10	0.81	0.15
>= 80 Months	0.96	0.89	0.64	0.02	0.74	0.04
Cause of ESRD: Diabetes	0.92	0.67	1.50	< 0.01	1.27	0.04
Other Cause	ref		ref		ref	
Race: White	ref		ref		ref	
Black	0.87	0.64	1.15	0.42	1.07	0.62
Other Race	1.71	0.14	3.11	< 0.01	2.41	< 0.01
Ethnicity: Not Hispanic/Latino	ref		ref		ref	
Hispanic/Latino	1.02	0.93	1.57	0.02	1.30	0.06
Modality: Hemodialysis	Ref		ref		ref	
Peritoneal Dialysis	0.92	0.82	1.43	0.47	1.09	0.79
Previous Failed Transplant	1.01	0.98	1.29	0.26	1.20	0.32
CMS-HCC Risk Score	0.44	0.06	0.41	< 0.01	0.39	< 0.01

• Patients who were younger were more likely to be referred for transplant.

• Additionally in DMO C, patients with the following characteristics were more likely to be referred for transplantation: less time with ESRD, diabetes as cause of ESRD, other race (than white or black), Hispanic or Latino ethnicity, and less comorbidity as measured by the CMS-HCC risk score.

Patients Wait-Listed, Unadjusted, by DMO or FFS

	DMO A	DMO B	DMO C	FFS
Wait-Listed at Any Point (%)	54.7*	22.9*	43.6*	30.1
Wait-Listed in Demonstration (%)	26.1*	5.9*	16.7	14.7

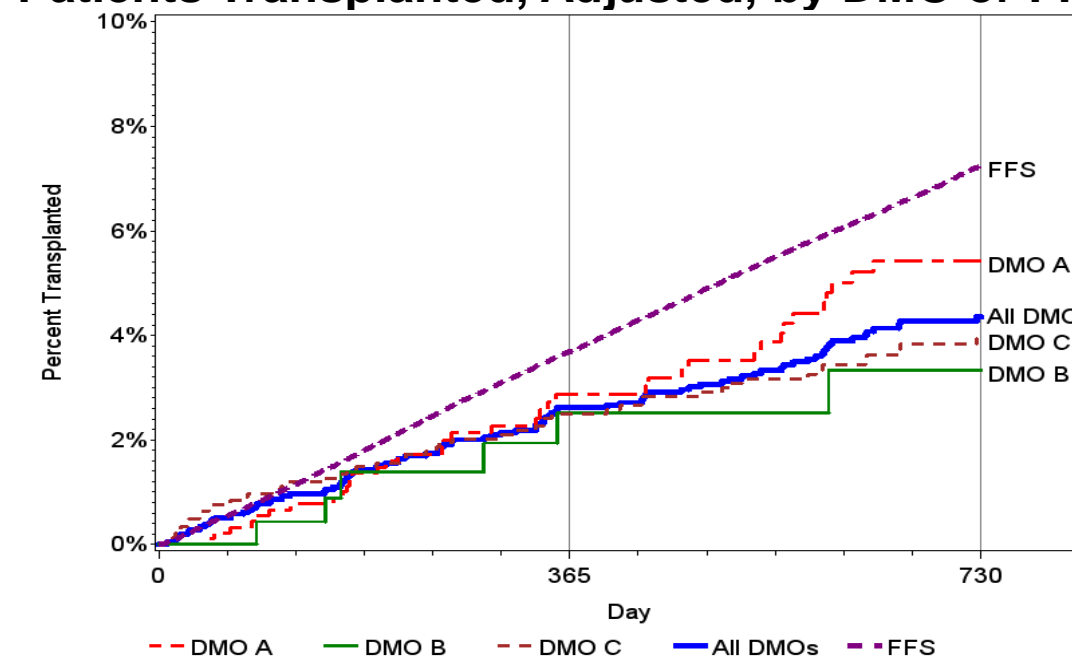
* Red font indicates significant difference from FFS (p < 0.05).

• DMO A had significantly higher percentages of patients wait-listed at any point compared with FFS.

• DMO C had a significantly higher percentage of patients wait-listed when the periods before or during the Demonstration were combined. This percentage wait-listed was no longer significant when limited to the Demonstration period.

• DMO B had significantly lower percentages of patients wait-listed compared to FFS.

Patients Transplanted, Adjusted, by DMO or FFS



In all DMOs the percent of patients transplanted was lower than FFS; however, the difference at one year was only significant for DMO C and the difference at two years was only significant in DMO B and DMO C.

5. Summary

• The results provide evidence that Disease Management may improve survival and both all-cause and cardiovascular hospitalization.

• Transplantation rates were not improved by the Disease Management program.

• The high frequency of patient refusal as a reason for non-referral for transplant evaluation suggests the need to strengthen patient education.

• The variation in findings across DMOs and years may be related to the differences in structure and implementation of Disease Management. DMO C incorporated two treatment interventions in addition to care coordination (oral nutritional supplements and home weight monitoring). These interventions may have translated to improved clinical outcomes in DMO C.

• The lack of improvement in clinical outcomes for two of the DMOs may be due to several factors:

- 1) Programmatic changes observed in Disease Management components may have limited their potential impact
- 2) Disease Management focuses on care coordination, modification of self-care behavior and prevention may be insufficient to effect change on clinical outcomes.
- 3) Differences in degree of interaction between patients and members of the health care team may influence the effectiveness of Disease Management.

Limitations:

- The DMO populations for some analyses were relatively small. This can lead to insufficient statistical power to detect differences.
- There was no random assignment of patients to DMO treatment, so while these analyses adjust for a wide set of demographic and clinical variables, unmeasured variables due to the lack of available data always represent a potential limitation in observational studies.
- DMO patients who disenrolled may have had a higher mortality rate, leaving healthier patients and impacting observed clinical outcomes.

Acknowledgements

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