

# Utilization of High Cost Services 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 for ESRD on the utilization of potentially costly services including hospital admissions, total hospital days, length of hospital stays, readmissions, physician visits, emergency department visits and skilled nursing facility stays.

## 2. Background

• Previous studies of Disease Management programs 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 Disease Management Organizations (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 service utilization rates.

• The demonstration evaluates three ESRD-specific DMOs (DMO 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. Patient utilization was collected from DMO encounter data.

### Sample:

- The sample was restricted to patients who were enrolled in a DMO between January 1, 2006 and December 31, 2008. Patient months where the patient was not on hemodialysis the entire month or where Medicare was the secondary payor were excluded.
- Patients included in the analyses were also required to meet the following baseline data criteria: during the baseline month the patient must have ESRD, receive hemodialysis, reside in a DMO state, and have Medicare as the primary payor with record of a payment by Medicare during the month.

**Comparison Group:** Patients in traditional Medicare FFS in the states in which the Demonstration operated with Medicare as their primary payor. Patient-months where the patient was not on hemodialysis the entire month, or where Medicare was the secondary payor were excluded. The baseline criteria used to define the Demonstration sample were also used to define the comparison group.

• Propensity score matching was used to identify a comparison FFS population for each DMO and each year of the Demonstration to minimize the impact of selection bias that may influence the results.

• Logistic regression was used to predict enrollment. Predictors included demographics (age, sex, race, ethnicity), coverage (Medicaid enrollee status, new Medicare enrollee status), baseline service utilization, clinical variables (ESRD vintage, transplant status, CMS-HCC Risk Score, cause of renal failure), and state of residence. The variables were defined at a baseline of January for each year.

• FFS and DMO patients were matched to create a FFS control group with a distribution of propensity scores similar to the DMO patients. The propensity score matching was conducted separately for each year. The propensity score match was assessed by (1) comparing the propensity score distributions, (2) comparing demographic and clinical variables between the treatment and control groups, and (3) observing the changes in standardized differences between the treatment and control groups after matching.

### Methods:

• Utilization rates for each DMO and for each year of the evaluation, as well as rates for the propensity-score matched FFS population for each DMO and each year were calculated for all outcome measures. When calculating the differences in service rates for the DMO and propensity-score matched FFS a second-stage multivariate regression adjustment was performed adjusting for clinical and demographic factors using a negative binomial regression model thus accounting for residual differences remaining after the propensity-score methodology.

## 4. Results

After propensity score matching, the FFS matched sample was balanced compared to the DMO sample:

- Reduction in significant differences between treatment and control groups across demographic and clinical factors (exceptions: new enrollee status, CMS-HCC risk score)
- An overall reduction in standardized differences, with most reduced to less than 10% after matching (exception: new Medicare enrollee status)

### Utilization of Select Services in the Demonstration, by DMO

	DMO A				DMO B				DMO C				All DMOs			
	2006	2007	2008	All	2006	2007	2008	All	2006	2007	2008	All	2006	2007	2008	All
Hospital Admissions	1.57	1.78	1.80	1.74	2.03	1.46	2.12	1.85	1.92	1.82	1.77	1.82	1.81	1.77	1.84	1.80
Total Hospital Days	10.80	13.17	13.42	12.80	16.12	10.77	17.76	14.76	12.87	13.02	13.83	13.26	12.51	12.79	14.34	13.32
Readmissions	0.45	0.70	0.69	0.64	0.87	0.42	0.94	0.72	0.66	0.65	0.61	0.64	0.61	0.64	0.69	0.65
Length of Stay	6.90	7.41	7.47	7.34	7.93	7.37	8.37	7.99	6.72	7.15	7.80	7.27	6.90	7.24	7.80	7.39
Physician Visits	5.20	6.70	8.82	7.27	5.95	6.56	8.72	7.48	8.17	8.75	8.11	8.43	6.97	7.95	8.44	7.96
Emergency Department Visits	0.73	1.12	1.14	1.05	2.19	1.56	1.39	1.57	1.42	1.37	1.68	1.48	1.27	1.33	1.46	1.36
Skilled Nursing Facility Stays	0.33	0.30	0.36	0.33	0.19	0.16	0.42	0.29	0.18	0.29	0.32	0.28	0.23	0.28	0.35	0.30

### Utilization of Select Services Among Matched FFS Controls, by DMO

	FFS Controls for DMO A				FFS Controls for DMO B				FFS Controls for DMO C				FFS Controls for All DMOs			
	2006	2007	2008	All	2006	2007	2008	All	2006	2007	2008	All	2006	2007	2008	All
Hospital Admissions	1.45	1.61	1.77	1.64	1.73	1.52	1.82	1.68	2.05	1.87	2.02	1.96	1.85	1.76	1.90	1.83
Total Hospital Days	9.36	9.96	10.81	10.15	9.27	9.19	10.17	9.62	11.86	10.77	12.33	11.50	10.93	10.38	11.46	10.87
Readmissions	0.43	0.59	0.61	0.57	0.45	0.43	0.62	0.52	0.73	0.67	0.75	0.71	0.62	0.62	0.68	0.64
Length of Stay	6.46	6.19	6.10	6.21	5.35	6.04	5.60	5.71	5.79	5.77	6.11	5.87	5.89	5.90	6.03	5.94
Physician Visits	10.13	10.64	10.42	10.44	7.29	8.40	9.64	8.72	9.79	10.64	11.16	10.57	9.65	10.38	10.67	10.30
Emergency Department Visits	0.96	1.21	1.43	1.24	2.01	1.74	1.83	1.83	1.48	1.30	1.73	1.47	1.38	1.32	1.64	1.44
Skilled Nursing Facility Stays	0.55	0.48	0.46	0.49	0.17	0.33	0.39	0.33	0.43	0.67	0.63	0.60	0.44	0.58	0.54	0.53

### Utilization Differences between DMOs and Matched FFS as a Percent of Matched FFS, by DMO, with Second-Stage Regression Adjustment

	DMO A				DMO B				DMO C				All DMOs			
	2006	2007	2008	All	2006	2007	2008	All	2006	2007	2008	All	2006	2007	2008	All
Hospital Admissions	+5%	+6%	+17%	+9%	+7%	+0%	+24%	+12%	-2%	+2%	-8%	-3%	+1%	+4%	+4%	+3%
Total Hospital Days	-13%	+20%	+29%	+16%	+42%	+29%	<b>+60%</b>	<b>+47%</b>	+14%	+16%	+12%	<b>+15%</b>	+12%	<b>+20%</b>	<b>+27%</b>	<b>+20%</b>
Readmissions <sup>1</sup>	+23%	+15%	+37%	+21%	<b>+119%</b>	+16%	+65%	<b>+57%</b>	<b>+37%</b>	+6%	-11%	+6%	<b>+41%</b>	+11%	+13%	<b>+16%</b>
Length of Stay	+3%	+7%	+4%	<b>+6%</b>	+11%	<b>+15%</b>	<b>+13%</b>	<b>+14%</b>	<b>+11%</b>	<b>+9%</b>	<b>+12%</b>	<b>+11%</b>	<b>+8%</b>	<b>+10%</b>	<b>+11%</b>	<b>+10%</b>
Physician Visits	<b>-51%</b>	<b>-31%</b>	-11%	<b>-29%</b>	-14%	<b>-20%</b>	-10%	<b>-15%</b>	<b>-15%</b>	<b>-16%</b>	<b>-19%</b>	<b>-18%</b>	<b>-26%</b>	<b>-20%</b>	<b>-16%</b>	<b>-20%</b>
Emergency Department Visits	-20%	+2%	-10%	-8%	+3%	-17%	-14%	-12%	+2%	+2%	-4%	-1%	-3%	-1%	-7%	-4%
Skilled Nursing Facility Stays	-36%	<b>-48%</b>	-3%	<b>-34%</b>	-43%	<b>-70%</b>	+20%	-28%	<b>-49%</b>	<b>-59%</b>	<b>-43%</b>	<b>-53%</b>	<b>-42%</b>	<b>-55%</b>	<b>-24%</b>	<b>-45%</b>

Positive numbers mean higher utilization in the Demonstration; negative numbers mean lower utilization in the Demonstration (relative to the matched FFS control group).  
\*Bold text in red font indicates significant difference from FFS (p < 0.05).  
<sup>1</sup>Readmissions were defined as within 30 days.

- Although patterns of hospital admissions differed by DMO, overall, hospital admissions were not significantly different for the DMOs compared with FFS. Hospital readmission rates were higher for the DMOs than the FFS comparison groups in some cases, most notably in the pooled analysis of all DMOs and all years after second-stage multivariate regression modeling adjustment.
- Across all three DMOs, length of stay and total hospital days were significantly higher compared to FFS. However, it is likely that the DMOs negotiated flat hospitalization rates with their providers and metrics taking into account hospital days may be less appropriate as outcome measures.
- Physician visits and skilled nursing facility stays were generally lower in the DMOs as compared to FFS.
- ED visits were not significantly different for the DMOs compared with FFS after second-stage regression adjustment.
- The second stage adjustment is limited by the ability of statistical models to fit the data; model fit was generally adequate however goodness-of-fit was lowest for physician visits and SNF stays.

## 5. Summary

- The analysis of service utilization in this Demonstration found no evidence of a robust, systematic reduction in hospitalization rates.
- In DMO C there was an apparent reduction in hospitalization rates. However, either there were not adequate sample sizes or consistency across adjustment methodologies to confidently conclude these were more than random variations.
- Significantly fewer physician visits and SNF stays were noted for all DMOs compared with their FFS comparison groups. This is a promising finding and demonstrates the ability of care coordination at the dialysis facility. In particular, regular interaction during dialysis sessions may reduce the need for utilization of outpatient physician visits and other services.
- 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 hospitalization outcomes in DMO C.
- The lack of improvement in clinical outcomes for two of the DMOs may be due several factors:
  - 1) Programmatic changes observed in Disease Management components may have limited their potential impact.
  - 2) Disease Management which focuses on care coordination, modification of self-care behavior and prevention may be insufficient to effect change on clinical outcomes. Among patients with ESRD where patients typically have long-standing disease, modification of behavior may be challenging.
  - 3) Differences in degree and type 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 and the FFS sample was limited to the number of patients in the Demonstration. This can lead to insufficient statistical power to detect differences.
  - The propensity score methodology may not balance DMO and FFS groups with respect to unmeasured confounders.
  - Longitudinal effects of the program on utilization and cost cannot be inferred from these analyses since propensity score matching was performed separately for each year.

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