

Is Medicare Star Category Medication Adherence Associated with Lower Total Cost of Care and Medical Events?

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BACKGROUND

- Poor medication adherence is associated with increased hospitalization risk, worse health care outcomes and increased overall health care costs.^{1,2}
- To improve chronic medication adherence, CMS started including medication adherence as part of the Medicare Star Rating Program in 2011.
- There are three medication adherence Medicare Star Rating quality performance measure categories: hypertension medications (renin angiotensin system [RAS] antagonists), cholesterol lowering medications (statins) and diabetes medications (excluding insulin).
- The three medication adherence Medicare Star Rating categories comprise 28% of the Part D plan (PDP) sponsor and 11% of the Medicare Advantage (MAPDP) total Star score.³
- Although the medication adherence Medicare Star measures are an important component of the overall Plan's Star score, there is minimal objective data quantifying the relationship between Medicare recipients' medication adherence and total cost of care (TCC) or medical resource use among these drug categories.

METHODS

- This retrospective concurrent cohort study utilized integrated administrative medical and pharmacy claims data from 20 Medicare Advantage contracts with 567,042 members receiving pharmacy benefits from Prime Therapeutics with at least one month of eligibility during January 2017 to December 2018.
- Medicare Advantage enrolled members were required to be continuously enrolled from Jan. 1, 2017 through Dec. 31, 2018.
- Members were required to meet CMS drug category Star proportion of days covered (PDC) adherence measurement criteria of having identified at least two medication claims within the drug category each year and at least one medical claim in each year.
- Adherence was assessed using the proportion of days covered (PDC) method, which was evaluated as both an absolute value and quintile.^{3,4}
- Total cost of care was calculated as the sum of all medical and pharmacy claims total allowed amounts (plan, member, and third-party payer) and represented as per patient per year (PPPY).
- Members were excluded when their total medical costs were \$0 during the two-year follow-up period or their characteristics data was missing.
- Cost data underwent logarithmic transformations to achieve normality.
- The following member characteristics were derived and used as covariates: age; gender; zip code-derived income and education; Charlson Comorbidity score;⁵ OptumTM Impact Pro Symmetry[®] episode risk score;⁶ drug claim counts; and pharmacy benefit design.
- Linear regression modeling was performed for cost analyses and adjusted for above mentioned covariates.
- A logistic regression model was used for binary outcome medical event variables, hospitalizations and ED visit adjustments for the same covariates.

RESULTS

Analytic Population Characteristics (Figure 1)

- Diabetes Mellitus (DM) drug category
 - 40,407 members met DM analytic criteria, average age 71.46 years, 50.9% male, Charlson score mean 2.14 (standard deviation [SD]) 1.72, Optum Symmetry score mean 1.09 SD 1.21, and number of DM pharmacy claims/year mean 6.72 SD 5.01.
- Cholesterol Lowering (Statin) drug category
 - 145,038 members met Statin analytic criteria average age 72.52 years, 47.25% male, Charlson score mean 1.22 SD 1.61, Optum Symmetry score mean 1.03 SD 1.21, and number of Statin pharmacy claims/year mean 4.44 SD 2.43.
- Hypertension (RAS) drug category
 - 132,358 members met RAS analytic criteria average age 72.74 years, 46.40% male, Charlson score mean 1.24 SD 1.60, Optum Symmetry score mean 1.02 SD 1.17, and number of RAS pharmacy claims/year mean 4.72 SD 2.57.

Adherence rates (Table 1)

- The mean (SD) PDC was:
 - 81.99% (SD 23.05%) for the DM category;
 - 83.24% (SD 21.68%) for the Statin category; and
 - 84.61% (SD 21.29%) for the RAS category

Total Cost of Care Association with Adherence — Linear Regression Analyses (Table 2)

- After covariate adjustment, a one percentage point PDC increase was statistically significant ($p < 0.001$ for all drug categories) associated with a TCC decrease for:
 - DM of -\$46 PPPY TCC (95% CI -\$51, -\$41);
 - Statin of -\$21 PPPY TCC (95% CI -\$24, -\$18); and
 - RAS of -\$38 PPPY TCC (95% CI -\$41, -\$35)

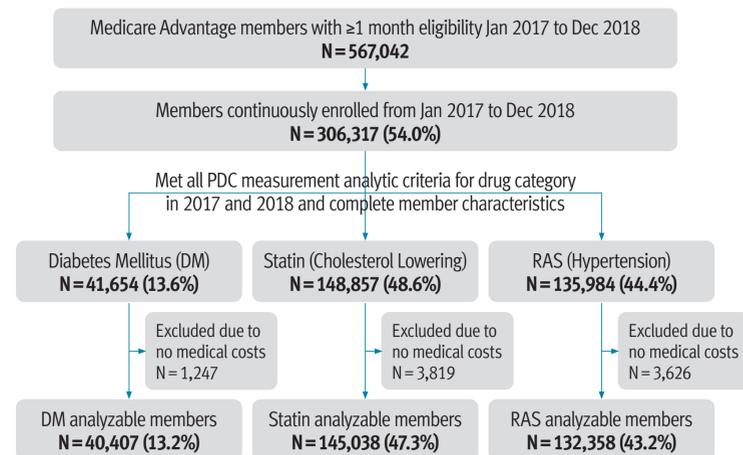
- With each progressively improving adherence group (PDC 1% to <50%, 50% to <80%, 80% to <95%, 95% to <99%, 99% to 100%), for all three Star drug categories, there was a statistically significant TCC PPPY decrease ($p < 0.005$).
- DM members in the 80% to <95% PDC group had \$2,164 lower TCC PPPY compared to the 1% to <50% PDC group; Statin members in the 80% to <95% PDC group had \$676 lower TCC PPPY compared to the 1% to <50% PDC group; and RAS members in the 80% to <95% PDC group had \$1,575 lower TCC PPPY compared to the 1% to <50% PDC group.

Medical Events Odds Association with Adherence — Logistic Regression Models (Table 3)

- The odds of hospitalizations and ER visits decreased with each increasing PDC categorical group, which followed the same pattern as the TCC PPPY findings for all Star three drug categories, $p < 0.005$.

FIGURE 1

Analytic Population Identification



PDC = Proportion of Days Covered; DM = Diabetes; RAS = Renin Angiotensin System. Members were required to meet CMS drug category Star PDC adherence measurement criteria of having identified at least two medication claims within the drug category each year and at least one medical claim in each year. Adherence was assessed using the CMS PDC method.³

TABLE 1

Adherence Rates by CMS Star Categories

Continuous PDC	DM n = 40,407	Statin n = 145,038	RAS n = 132,358
Mean (SD)	81.99% (23.05)	83.24% (21.68)	84.61% (21.29)
Median (range)	94.05% (3.17% – 100%)	93.86% (0.66% – 100%)	95.20% (0.76% – 100%)
Categorical PDC Group	n (%)	n (%)	n (%)
1% to <50%	6,066 (15.01)	19,149 (13.20)	15,720 (11.88)
50% to <80%	6,171 (15.27)	20,057 (13.83)	16,926 (12.79)
80% to <95%	9,113 (22.55)	39,959 (27.55)	32,385 (24.47)
95% to <99%	8,967 (22.19)	41,083 (28.33)	39,091 (29.53)
99% to 100%	10,090 (24.97)	24,790 (17.09)	28,236 (21.33)

PDC = Proportion of Days Covered; DM = Diabetes; RAS = Renin Angiotensin System; SD = standard deviation. Medicare Advantage enrolled members continuously enrolled from Jan. 1, 2017 through Dec. 31, 2018. Members were required to meet CMS drug category Star PDC adherence measurement criteria of having identified at least two medication claims within the drug category each year and at least one medical claim in each year. Adherence was assessed using the proportion of days covered (PDC) method.³

LIMITATIONS

- Limitations include the retrospective study design and potential confounding by the healthy adherer effect.⁷ Differences found in medical events and costs between the adherent and non-adherent populations may be influenced by healthier lifestyles associated with higher adherence.
- Administrative pharmacy and medical claims have the potential for miscoding and include assumptions of member actual medication use and diagnosis; therefore, the data may represent information that was false-positive or -negative.
- Data are limited to a Medicare Advantage plan population in the Central U.S.; therefore, findings may not be generalized to commercial or Medicaid populations or other geographic regions.

TABLE 2

CMS Star Medication Categories — Total Cost of Care Association with Adherence

PDC Categorical Group	DM n = 40,407 Change in PPPY TCC with (95% CI) comparing to PDC < 50% group	Statin n = 145,038 Change in PPPY TCC with (95% CI) comparing to PDC < 50% group	RAS n = 132,358 Change in PPPY TCC with (95% CI) comparing to PDC < 50% group
1% to <50% (Reference Group)	Mean \$14,643 (SD \$27,704)	Mean \$12,895 (SD \$24,946)	Mean \$15,837 (SD \$30,036)
50% to <80%	-\$888* (-1,321, -\$441)	-\$262* (-\$490, -\$30)	-\$421* (-\$731, -\$104)
80% to <95%	-\$2,164* (-\$2,530, -\$1,788)	-\$676* (-\$878, -\$470)	-\$1,575* (-\$1,839, -\$1,307)
95% to <99%	-\$2,910* (-\$3,262, -\$2,547)	-\$1,236* (-\$1,432, -\$1,036)	-\$2,799* (-\$3,038, -\$2,555)
99% to 100%	-\$3,365* (-\$3,713, -\$3,005)	-\$1,563* (-\$1,770, -\$1,353)	-\$2,901* (-\$3,151, -\$2,647)

PDC = Proportion of Days Covered; DM = Diabetes; RAS = Renin Angiotensin System; CI = Confidence Interval; TCC = Total Cost of Care; PPPY = Per Person Per Year; SD = Standard Deviation. *P-value < 0.005. P-value from linear regression model adjusted for age; gender; zip code-derived race, income, and education; Charlson Comorbidity score; drug claim counts; and pharmacy benefit design. Medicare Advantage enrolled members continuously enrolled from Jan. 1, 2017 through Dec. 31, 2018. Members were required to meet CMS drug category Star PDC adherence measurement criteria of having identified at least two medication claims within the drug category each year and at least one medical claim in each year. Adherence was assessed using the CMS PDC method.³

TABLE 3

CMS Star Medication Categories — Medical Events Odds Association with Adherence

PDC Categorical Group	DM n = 40,407		Statin n = 145,038		RAS n = 132,358	
	Hospitalization	ER	Hospitalization	ER	Hospitalization	ER
1% to <50% (Reference Group)	1.00 (ref)					
50% to <80%	0.81* (0.74, 0.89)	0.95 (0.88, 1.03)	0.88* (0.83, 0.92)	0.87* (0.83, 0.91)	0.83* (0.79, 0.88)	0.86* (0.82, 0.90)
80% to <95%	0.68* (0.62, 0.74)	0.75* (0.70, 0.81)	0.73* (0.70, 0.77)	0.70* (0.67, 0.73)	0.65* (0.62, 0.69)	0.65* (0.62, 0.68)
95% to <99%	0.57* (0.52, 0.62)	0.65* (0.60, 0.70)	0.57* (0.54, 0.59)	0.58* (0.56, 0.61)	0.47* (0.44, 0.49)	0.51* (0.49, 0.54)
99% to 100%	0.45* (0.41, 0.49)	0.57* (0.53, 0.61)	0.50* (0.47, 0.52)	0.54* (0.51, 0.56)	0.40* (0.38, 0.42)	0.48* (0.46, 0.50)

OR = Odds Ratio; PDC = Proportion of Days Covered; DM = Diabetes; RAS = Renin Angiotensin System; CI = Confidence Interval; ER = Emergency Room. *P-value < 0.005. P-value from logistic regression model adjusted for age; gender; zip code-derived race, income, and education; Charlson Comorbidity score; drug claim counts; and pharmacy benefit design. Medicare Advantage enrolled members continuously enrolled from Jan. 1, 2017 through Dec. 31, 2018. Members were required to meet CMS drug category Star PDC adherence measurement criteria of having identified at least two medication claims within the drug category each year and at least one medical claim in each year. Adherence was assessed using the proportion of days covered (PDC) method.³

CONCLUSIONS

- In this real world, large Medicare integrated medical and pharmacy claims study, we found a statistically significant association between increasing adherence within Medicare Star Rating drug categories and lower total cost of care, as well as lower odds of hospitalizations and emergency department visits.
- The total cost of care financial value of improved adherence was estimated at between \$21 and \$46 per one percentage point improvement in PDC measure, by drug category.
- The association between lower total cost of care and medical events persisted past the standard adherence measure annual PDC of 80% threshold, with continued potential benefit of improved adherence beyond 95% for all three CMS Star drug categories.
- These findings should be confirmed and are limited by potential healthy adherer effect confounding.

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