Evaluation of a pharmacist-driven medication adherence enhancement service

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What is already known about this subject

- Part D star ratings for the 3 adherence measures are evaluated on the percentage of beneficiaries with a proportion of days covered (PDC) of 80% or more per therapeutic class.
- Cut points have increased annually, so plans must continue innovative efforts to attain the higher star ratings.
- Small numerical differences may account for the difference between a 4- or 5-star rating.

What this study adds

- Pharmacist-driven interventions can have a meaningful effect on PDC and can ultimately affect Medicare Advantage Part D star rating measures.
- While PDC decline throughout the year is anticipated, contact with pharmacists can mitigate this trend.
- Investing pharmacy resources in quality measure programs may result in positive financial return through value-based contract incentives that are achieved with higher performance.

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ABSTRACT

BACKGROUND: There are limited data that evaluate how pharmacists who are integrated within primary care clinics influence proportion of days covered (PDC) and Part D star ratings for the 3 adherence measures: diabetes, hypertension (renin-angiotensin-system antagonists), and cholesterol (statin) medications.

OBJECTIVE: To assess the difference in percentage of beneficiaries with a prescription with a PDC of 80% or higher in the adherence prioritization group versus control group.

METHODS: A retrospective cohort study was conducted that collected data from 2019 monthly and end-of-year files provided by Humana Medicare Advantage (MA) Part D for patients attributed to a Banner Medical Group (BMG) primary care provider who filled at least 1 prescription for a medication included in any of the medication adherence classes.

The Banner Pharmacy Services population health team prioritized beneficiaries and provided worklists to pharmacists embedded in the BMG primary care clinics in Colorado. The pharmacists performed telephonic outreach, which included patient education, along with leveraging of pharmacist-provider collaborative practice agreements to address barriers, facilitate refills, and convert prescriptions to 90-day supply and mail order. Outreach status was tracked. Colorado patients reached at least once during the study time frame served as the adherence prioritization group, while Arizona patients were propensity score matched and served as the control group. We evaluated the effects of contact with the pharmacist on adherence between the adherence prioritization and control groups with PDC as a binary variable ($\geq 80\%$ vs. not) and a continuous variable (0%-100%). Analysis with PDC as a binary variable was also completed for the entire Humana MA Part D cohort.

RESULTS: A total of 881 unique patients with prescriptions that fell into one of the medication adherence classes were included in the analysis—294 in the adherence prioritization group and 587 in the control group. Baseline demographics were well balanced between groups. Across the 3 medication classes, the adherence prioritization group had a higher percentage of patients with PDC of 80% or higher (71.0%) versus the matched control group (62.3%), a difference of 8.6% (95% CI = 3.47-13.82, $P < 0.001$). End-of-year data for the adherence prioritization population shows the percentage of patients who passed the medication adherence measure for diabetes, hypertension, and cholesterol was 88%, 89%, and 89%, respectively, while in the control population passing rates were 85%, 88%, and 87%, respectively.

CONCLUSIONS: Pharmacist-driven interventions can have a meaningful effect on PDC for medication adherence and can ultimately affect star rating measures. Since 2019 data

are used for 2021 star rating measures, even small numerical differences as seen in this study may account for the difference between a 4- or 5-star rating. Moving the needle in the right direction can be significant, since the cut point is yet to be determined.

Adherence to prescribed medications is crucial in achieving positive outcomes for therapeutic regimens involving drug therapy. Common chronic disease states associated with negative outcomes or requiring integrated and multifaceted approaches can be primary targets for interventions.¹ Thus, the Centers for Medicare & Medicaid Services (CMS) incorporated 3 adherence measures for diabetes medications (noninsulin diabetes medications), hypertension medications (renin-angiotensin-system antagonists), and cholesterol medications (statins) in the Part D star ratings. Star ratings are reported publicly on a scale of 1 to 5, with 5 being the most desirable. Plan ratings are calculated as weighted measures, where a measure with a weight of 3 counts 3 times as much as a measure with a weight of 1.² The 3 separate adherence quality measures each carry a weight of 3, so contribute heavily to a Part D plan's overall star rating; combined, they make up almost one third of a plan's rating as 9 out of 27.5 total measure weights. Plans performing at an overall rating of 4 to 5 stars receive CMS bonus payments approximating \$500 per beneficiary.³ Higher star ratings are also associated with other benefits to a Part D or Medicare Advantage (MA) Part D plan, including greater rebate levels, enhanced benefit offerings, and lowered premiums, which ultimately affect enrollment and market share growth.⁴

Each medication adherence measure is assessed using proportion of days covered (PDC), which is calculated using prescription claims, dividing the number of covered days by the number of days. The beneficiary is included in the measurement period, and MA Part D plans are evaluated on the percentage of beneficiaries with a PDC of 80% or more per therapeutic class (often referred to as passing the measure).² A 1-month lag time for CMS to report plan PDC rates is common due to data transfer time, adjustments, and exclusions. Plans desiring a preliminary view use analytic software that may not apply adjustments and exclusions yet generates actionable data on adherence trends and opportunities.

Cut points for medication adherence star ratings identify the percentage of passing beneficiaries needed to attain a rating between 1 and 5. Cut points increase annually, so plans must continue innovative measures to attain high star ratings.⁵ Cut points are released retrospectively the

following year; therefore, plans do not have published targets. For example, 2021 plan performance is based on 2019 prescription claims data, and cut points are published in 2020.⁶

Given the increased difficulty of attaining top performance, MA Part D plans partner with network health care systems and provider groups to develop innovative, data-driven approaches to enhance medication adherence. Since medication nonadherence is multifactorial, multidisciplinary interventions are often needed.^{1,7} Accordingly, CMS describes medication adherence as a responsibility of the plan, providers, and beneficiaries.² While provider and pharmacy personnel outreach are associated with higher rates of PDC, time and resources are limited.^{8,9} Although published data has demonstrated the positive effect of outreach on PDC, there is a paucity of information on how it affects the MA Part D plan's star ratings. There is also a lack of information on how pharmacists who are integrated within primary care clinics may influence these ratings or how to prioritize opportunities into actionable, manageable worklists.¹⁰

Humana MA shares value-based contracts with Banner Health's networks in Arizona and Colorado, covering 21,000 and 2,200 beneficiaries, respectively, where there is incentive to improve quality measure performance. To meet contractual expectations, Banner Pharmacy Services (BPS) implemented a medication adherence enhancement service designed to address quality measures by leveraging integrated pharmacists within Banner Medical Group (BMG) primary care practices. An understanding of the program's effect on adherence rates and other related interventions is warranted to provide justification of continued services, additional resources needed for refined services, and substantiate value-based contracts with other payers.

The primary objective of this study was to assess the difference in percentage of beneficiaries with a prescription with a PDC of 80% or higher in the adherence prioritization group versus a matched control group.

Methods

STUDY DESIGN

This retrospective cohort study was conducted to evaluate the outcomes of the medication adherence enhancement service in a Humana MA Part D population. Data were collected from 2019 monthly files (beginning in April) and end-of-year files generated and provided by Humana MA Part D, with additional intervention documentation tracked by the BPS team. This study was reviewed and approved by the Banner Health Institutional Review Board.

ADHERENCE PROGRAM DESIGN

Humana MA Part D provided monthly datasets of patients aged at least 18 years attributed to a BMG primary care provider and filled at least 1 prescription for a medication included in any of the 3 medication adherence classes: diabetes, hypertension, or cholesterol. The number of medication adherence classes in which a patient fills at least 1 prescription signifies the condition count for that patient.

The BPS population health team stratified prescriptions in the datasets provided by Humana according to prioritization criteria: overdue for prescription refill (priority 1), opportunity for 30- to 90-day prescription conversions (priority 2), and prescriptions for patients who failed the measure the previous year (2018) and were due for a refill within the next 7 days (priority 3). Worklists of beneficiaries with prioritized prescriptions were prepared, which maintained the order of beneficiaries as provided by Humana. Worklists were provided to pharmacists embedded in a BMG primary care clinic with Humana MA Part D attributed providers.

The BMG pharmacist model of care is consistent across Colorado and Arizona. Because of overall lower patient volume in the Colorado region, pharmacist resources were limited to the Colorado region during the study period. Colorado patients contacted by a pharmacist at least once during the study time frame served as the adherence prioritization group, while Arizona patients served as the control group.

Pharmacists contacted patients with prioritized prescriptions by telephone, working sequentially from priority 1 through 3. Outreach was intended to increase medication adherence through patient education and leveraging pharmacist-provider collaborative practice agreements. Before outreach, pharmacists reviewed patient charts to identify factors contributing to nonadherence. Pharmacists had access to sample scripting to use along with motivational interviewing and professional judgment. Documentation in the patient medical record was standardized to inform providers of the outreach and coordinate care as necessary.

Pharmacists tracked outreach status on the worklist as one of the following: attempt 1, attempt 2, called patient within past 3 months, do not call, drug discontinued, incorrect provider attributed, no action taken, provider contacted, patient has medication, spoke with patient, or unable to reach. In general, for those marked no action taken, the outreach opportunity was not completed for the month due to either (a) medication class not prioritized (but patient information was left on the worklist if the patient had medication in another adherence category prioritized for that month) or (b) staffing limitations (personnel

changes or inability to complete list as a result of other responsibilities).

Patients were considered contacted and included in the adherence prioritization group if the status was documented as (a) patient had medication, (b) provider contacted, or (c) spoke with patient. There were no exclusion criteria for patients before prioritization; however, if patients were unable to be contacted, they were not included in the final adherence prioritization group analyses. Beginning in September, dataset content provided by Humana MA Part D included only patients who were still able to pass the measure for the year; patients for whom additional refills would not increase PDC to 80% or higher for the year were no longer considered for prioritization.

Because patients commonly take multiple diabetes medications concurrently, the CMS calculation for end-of-year PDC for these patients is complex. Humana's reporting therefore is simplified to the closest possible estimate for the diabetes measure and reported as 2 numbers: patients and medications. For patients, the overall PDC is calculated by averaging the PDC for each prescription filled, whereas for medications, overall PDC for each prescription stands alone.

STATISTICAL ANALYSIS

Baseline and year-end characteristics were compared between the Colorado adherence prioritization and Arizona control groups. To evaluate the effect of outreach on adherence within the adherence prioritization and control groups, the PDC was evaluated as a binary variable ($PDC \geq 80\%$ vs. not), using a 2-proportion test and logistic regression model, and continuous variable (0%-100%), using a Student's t-test. The analysis with PDC as a binary variable was also completed for the entire cohort versus just those prioritized in the study. The sample size was predetermined by the number of Humana MA Part D beneficiaries. However, applying a post hoc analysis using a power of 80%, a sample size of 460 patients each was needed in the adherence prioritization and control group for the composite primary objective.

Propensity score matching without replacement was done at a 1:2 ratio to balance differences in baseline characteristics available in the dataset between the adherence prioritization and control groups, respectively, including age, sex, unique medication count, number of days in the measure, days supply, and number and category of CMS measure medications. Nearest neighbor caliper matching was used to match patients based on the logit of the propensity score with a caliper of 0.25 of the standard deviation of the propensity score. Standard mean differences of ≤ 0.1 were considered well matched.

FIGURE 1 Population Flowchart

^aPrioritization criteria: overdue for prescription refill, opportunity for 30- to 90-day prescription conversions, and/or patients who failed the measure the previous year and will be due for a refill within the next 7 days.

^bDefinitions by CMS and for this study are medications in the following classes: Diabetes: biguanide, sulfonylurea, thiazolidinedione, dipeptidyl peptidase-4 inhibitor, incretin mimetic, meglitinide, or sodium glucose co-transporter 2 inhibitor; plan beneficiaries who take insulin are not included; patients may be on more than 1 diabetes medication. Hypertension: angiotensin-converting enzyme inhibitor, angiotensin receptor blocker, or direct renin inhibitor; plan beneficiaries who take sacubitril/valsartan are not included. Cholesterol: statins.

CMS=Centers for Medicare & Medicaid Services; MA Part D=Medicare Advantage Part D.

A logistic regression model was used to evaluate the effect of various characteristics on PDC $\geq$ 80% at final evaluation using backward stepwise elimination, with initial model including adherence prioritization versus control group, and other electronic prescription claims characteristics available from propensity score matching. Data were initially imported into Microsoft Access for organization, with statistical analyses completed using R (R Foundation for Statistical Computing, Vienna, Austria) and Minitab version 19 (Pennsylvania State University, State College, PA) at a priori significance level of $\alpha = 0.05$.

Results

The study population is shown in Figure 1. From the initial datasets prioritized by the BPS population health team, Colorado pharmacists received worklists containing 536

unique beneficiaries, which represented 1,203 prescriptions meeting at least 1 of the 3 prioritization categories. Some patients met multiple adherence measures or met prioritization criteria in subsequent months. The majority (66%) of prioritized cases met the primary prioritization criteria of overdue for prescription refill. Of these, pharmacists were able to contact 294 unique patients during the adherence prioritization period of April-December 2019 who were included in the analysis. In Arizona, 1,075 patients met prioritization criteria, and after propensity score matching, 587 patients were included in the control group.

Table 1 shows baseline demographics; overall, patients were well balanced between groups with a mean age of 74 years and majority female, and the average patient was included in the denominator for 1.6 of the 3 adherence measures; therefore, there are more prescriptions than patients. At baseline, most prescriptions were for a 90-day supply

TABLE 1 Baseline Demographics of Included Patients After Propensity Score Matching

Characteristic	Colorado Mean [SD] (n = 294)	Arizona Mean [SD] (n = 587)	Standard Mean Difference
Age in years	74.9 [9.0]	74.4 [8.9]	0.0580
Sex – Male	47.6% (140)	47.4% (278)	0.0068
Unique medication count	12.1 [8.8]	12.1 [8.4]	–0.0004
Number of days in the measure	311.8 [48.8]	310.6 [55.0]	0.0242
Condition count ^a	1.6 [0.6]	1.6 [0.6]	–
PDC ≥80% in 2018			
Diabetes	92.0% [11.7%] (55)	92.4% [11.8%] (84)	–
Hypertension	90.9% [16.1%] (160)	88.4% [16.4%] (298)	–
Cholesterol	89.4% [16.1%] (164)	89.4% [15.8%] (304)	–

^aCondition count refers to the average number of adherence measures a patient falls into.
PDC = proportion of days covered.

(80.2% in the adherence prioritization group and 75.4% in the control group). There was no statistically significant difference between groups for 90-day supply prescriptions for any individual disease state category.

DICHOTOMOUS OUTCOME FOR ADHERENCE: PDC ≥ 80%

PDC results are outlined in Table 2. For the primary outcome, the percentage of prescriptions passing 2019 adherence measures with PDC ≥ 80% was 71.0% in the adherence prioritization group versus 62.3% in the control group (difference of 8.6%, 95% CI = 3.47–13.82, $P < 0.001$). There was also a statistically significant difference in the cholesterol subcategory, which contained the largest number of prescriptions for any of the 2 categories. While numerically more adherence prioritization patients passed the diabetes (11.5%) and hypertension (6.2%) measures, this did not achieve statistical significance.

CONTINUOUS MEASURE OF ADHERENCE

An analysis of the PDC average (0%–100%) for each group was also

conducted, demonstrating similar results; statistical significance was found when all prescriptions were included, as well as in the cholesterol measure. Again, all measures had a higher PDC in the adherence prioritization group. The change in PDC was also evaluated on the individual beneficiary level. This change was calculated by comparing PDC at time of the beneficiary's first appearance on outreach opportunity lists from Humana to PDC at the end of the year. PDC in both groups declined, as is expected throughout the course of the year. Although not statistically significant between groups, the PDC decline of the adherence prioritization group was mitigated by 0.14% (hypertension) to 4.3% (diabetes).

POPULATION-WIDE ADHERENCE AT END OF YEAR

Humana MA Part D has year-end data outlining the percentage of patients who passed the measure in 2019 with a PDC of 80% or higher for the entire population. In the Colorado population, the percentage of patients passing the medication adherence measure for diabetes, hypertension,

and cholesterol was 88%, 89%, and 89%, respectively. In the Arizona population, the percentage of patients passing the medication adherence measure for diabetes, hypertension, or cholesterol was 85%, 88%, and 87%, respectively.

One of the prioritization categories was 30-day prescriptions targeted for conversion to a 90-day supply. At the end of the year, 20 of 92 (21.7%) prescriptions in the adherence prioritization group began as a 30-day supply and were converted to a 90-day supply; this was not statistically different from the percentage of eligible prescriptions in the control group that were converted to a 90-day supply.

LOGISTIC REGRESSION

The logistic regression model results are outlined in Table 3. Controlling for the other covariates shown in Table 3, those with a first of 2019 PDC ≥ 80% were 7.9 times ($P < 0.001$) more likely to pass the measure at the end of the year. Other factors included adherence prioritization group (Colorado) versus control group (Arizona), whether the patient passed the measure the previous year, adherence condition assessed, and days supply of the prescription. Other factors (such as condition count) were removed through backward stepwise elimination (e.g., individual factors with $P > 0.25$, overall P value in model, and low concordance); sensitivity analyses adjusting for age and sex did not significantly vary the findings.

Discussion

Optimal medication adherence can affect quality of care. To reduce overall long-term health care costs, CMS incentivizes MA Part D plans to improve population-level medication adherence, with published adherence rates affecting financial bonuses and enrollment numbers. Up to 50% of

TABLE 2 Proportion of Days Covered in 2019

PDC ≥ 80% ^a	Colorado ^b % (n)	Arizona ^c % (n)	Difference %	95% CI	P Value
All	71.0 (465)	62.3 (921)	8.6	3.47-13.82	0.001
Diabetes medications	71.0 (62)	59.5 (116)	11.5	-2.92-25.89	0.118
Diabetes patients	69.0 (58)	59.3 (108)	9.7	-5.38-24.79	0.207
Hypertension	68.7 (195)	62.5 (392)	6.2	-1.86-14.30	0.132
Cholesterol	73.1 (208)	63.0 (413)	10.1	2.51-17.74	0.009
PDC Average ^d	Colorado Mean (SD)	Arizona Mean (SD)	Difference	95% CI	P Value
All	84.4 (18.6)	79.9 (22.3)	4.6	2.35-6.79	<0.001
Diabetes medications	85.2 (17.4)	79.8 (23.4)	5.4	-0.76-11.49	0.086
Diabetes patients	85.0 (17.6)	79.3 (23.9)	5.8	-0.69-12.21	0.080
Hypertension	83.6 (19.5)	80.5 (21.4)	3.1	-0.34-6.60	0.077
Cholesterol	84.9 (18.1)	79.2 (23.0)	5.8	2.45-9.08	0.001

^aPrimary objective: dichotomous.^bAdherence prioritization group.^cControl group.^dSecondary objective: continuous.

PDC = proportion of days covered.

a plan's 2019 star rating is linked to medication-related measures, including, but not limited to, the 3 specific medication adherence measures.¹¹ Value-based contracts are often designed to hold MA Part D plans and health systems accountable for improving quality of care across shared populations. They must together seek creative interventions, given the ever-increasing metrics required to improve or maintain quality measure ratings. Because adherence is a modifiable patient behavior, leveraging multidisciplinary resources appropriately is ideal. Pharmacists with access to patient electronic health records, particularly those embedded within primary care provider clinics, have a unique opportunity to assist with this multifaceted aspect of patient care. This study provides data on star rating outcomes when MA Part D plans and health-system pharmacy personnel partner to improve adherence and can

provide justification for expansion of these relationships.

Study findings are promising in supporting the use of pharmacy resources within an integrated health care system to improve MAPD plan medication adherence rates. For the aggregate of all 3 adherence measures, the Colorado adherence prioritization group had a clinically meaningful, and statistically significantly, higher percentage of patients who passed the measures with a PDC of 80% or greater.

Based on cut points for the 2019 measurement year (2021 star ratings), all 3 Colorado population measures achieved the 5 stars cut point, while all 3 Arizona population measures attained the 4 stars cut point. This demonstrates that while the diabetes and hypertension measures were not statistically significant for our primary outcome, small numerical differences can still move the needle in a clinically meaningful way. For

example, within the hypertension measure in the Arizona group, if only 9 more of the 940 patients who failed the measure had passed, the passing percentage would have moved from 88% to 89% and led to a 5-star rating.

The results of this study align with those of a previous study that used pharmacy students trained in motivational interviewing to conduct patient outreach for statin medications and found that these patients were more likely to be adherent, with overall higher PDC at 6 months postintervention.⁸ Similarly, in another study specific to the Humana MA Part D population, pharmacy student outreach interventions converted 35% of patients with PDC less than 80% for their statin medication to 80% or greater; the mean PDC increased by 13%, yet the mean PDC after intervention remained below 80% in the targeted population.¹²

This study is unique because it highlights a partnership between a health plan and an integrated health care system, where each can leverage access to beneficiary information (claims data and electronic health records, respectively). The pharmacists involved in this study are embedded in the primary care clinics and able to leverage relationships working alongside primary care providers to make meaningful contacts to discuss and resolve barriers, allowing for a unique way to improve clinical quality outcomes.

In addition, this study looks across all 3 medication adherence classes, since there is a large degree of overlap. CMS assigns star ratings separately, rather than as a composite; however, beneficiaries are often in multiple measures, since these disease states are common comorbidities of each other. Affecting the beneficiary in one measure may also improve adherence in another measure, which may not have been specifically discussed

TABLE 3 Characteristics from Logistic Regression Model Associated with Final PDC $\geq 80\%$

Characteristic	Likelihood of Final PDC≥80% (OR)	95% CI	P Value
First fill of 2019 PDC ≥80% ^a	7.936	(2.380-8.500)	<0.001
Group (adherence prioritization vs. control)	1.136	(0.873-1.480)	0.342
2018 PDC≥80% (yes vs. no)	2.021	(1.571-2.600)	<0.001
Condition			
HLD vs. DM	1.257	(0.862-1.832)	0.483
HTN vs. DM	1.160	(0.794-1.695)	
HTN vs. HLD	0.923	(0.711-1.198)	
Days supply change			
30 to 90 vs. remained 30	1.779	(0.884-3.581)	0.184
90 at baseline vs. remained 30	0.964	(0.696-1.335)	
90 at baseline vs. 30 to 90	0.542	(0.282-1.041)	

Note: $R^2=12.58\%$, Hosmer-Lemeshow $P=0.116$, Concordant = 71.0%.

^aFirst 2019 PDC available, which may have been from 30- or 90-day prescriptions.

DM = diabetes; HLD = hyperlipidemia; HTN = hypertension; OR = odds ratio; PDC = proportion of days covered.

during the outreach; this would be a point of interest for future research.

While using prescription claims data to calculate PDC as a measure of adherence has its limitations, it is the method used by CMS to assign star ratings and therefore the metric of interest for MA Part D plans. Claims data also provide useful information, such as how long a prescription will last if taken as prescribed. As the calendar year progresses, it is typical for PDC numbers to downtrend. When a patient first fills a medication for the calendar year, PDC is automatically 100%; then, if subsequent fills are even a few days late, there is an increase in the cumulative days missed, and throughout the year PDC continues to decline. According to Humana MA Part D records for 2018, at the entire plan population level, PDC passing rates followed industry trends of 1%- to 2%-point monthly decreases. For 2019, the Colorado population did not follow this negative trend; the

anticipated monthly PDC decline was mitigated.

While our study was not designed to evaluate the monthly rate changes, this observation warrants further investigation of interventions that may mitigate the monthly rate drop as an alternate measure of success. This improvement is likely due in part to the interventions of this program, where patients with a history of suboptimal adherence or who were overdue for their refills were prioritized. Using claims data, combined with information available in the electronic health record, pharmacy personnel can proactively monitor patients who initiate new medications and perform interventions in a timely fashion before the cumulative days missed exceeds the allowable limit for the year.

The results of the logistic regression model shown in Table 3 highlight the importance of capturing patients with suboptimal adherence early in the measurement year. For every percentage increase in PDC at the time of

the second fill for the year, the odds of the PDC meeting 80% or greater at the end of the year was 7.9 times higher, compared with no percentage increase.

Surprisingly, it appears for the study population that the conversion of prescriptions from 30- to 90-day supplies was unlikely to significantly contribute to increasing PDCs to 80% or higher, which is in contrast to previous findings.¹³ This may be due in part to the overall high percentage of patients starting the year with 90-day prescriptions, as well as the limited emphasis placed on this conversion work, given staffing changes during the study period. Further studies on 90-day conversion efforts may address if this can result in significant change.

Based on study results, future direction for program improvement may include prioritizing patients who failed the measure the previous year or have PDC less than 80% for the current year, with an upcoming refill due yet are still able to pass the measure. By prioritizing patients already overdue for refills, outreach attempts are playing catch up; however, a proactive outreach early in the year for patients with a history of nonadherence may help patients overcome individual barriers to adherence and likely affect year-end PDC in a larger way. This suggests that prioritization may require refinements throughout the year to ensure that interventions have the greatest opportunity for effect; hence, Humana's dataset change in September did not include beneficiaries exceeding the allowable number of cumulative days missed and could no longer achieve a PDC of 80% or higher for the year.

The pharmacists in this study attempted to address the root cause of nonadherence during outreach. Future analysis of notable barriers experienced by patients and the

solutions provided by pharmacists would guide program improvement to tailor patient-specific interventions. This information may be useful for physicians to initiate conversations with patients to better understand concerns.

This project is important for the health care system, since it can be used as justification for increased health-system pharmacist resources at the population health and embedded clinic level. Future analysis may assess if investing pharmacy resources in quality measure programs results in positive financial return through value-based contract incentives associated with higher performance.

LIMITATIONS

This study has some limitations to consider. There are wide CIs in the primary and secondary objectives due to variability in data and a relatively small population evaluated. Because the prioritized population was limited by the size of the Humana MA Part D beneficiary population, a prospective sample size calculation was not incorporated; for the primary composite endpoint, adherence prioritization and control groups surpassed the sample size necessary when calculated post hoc, with 465 and 921 patients, respectively.

In addition, the study outreach was truncated to begin in May 2019, based off claims data from the end of April, therefore, the effect may be underestimated. Ideally, medication adherence outreach would occur early to reach patients well before exceeding the allowable number of days without medication to achieve PDC of 80% or greater for the year.

Outreach was conducted by 4 pharmacists over the study time frame. Differences in counseling techniques using the sample script available, as well as time spent conducting the outreach, may have affected the results. There were limited embedded

pharmacist resources, particularly from July to October, because of staffing changes; therefore, there was less emphasis on the 90-day supply conversions that may have led to the lack of significant results. In the last 4 months of the year, pharmacists focused on patients who still had the ability to meet the 80% threshold, since this was the dataset provided by Humana; therefore, there may have been selection bias in a small part of the Colorado group.

Using patients in Colorado as the adherence prioritization group and patients in Arizona as the control group is a source of potential confounding. While propensity score matching and using patients within the same health plan and health system reduces baseline differences, controlling for simple demographics may not account for all differences affecting results.

PDC calculations have several limitations factored in as the margin of error from CMS. The percentage of patients within a plan passing a measure cannot reach 100%, since PDC cannot differentiate nonadherence from other situations such as a change in therapeutic regimen due to provider-directed discontinuation, use of samples, prescriptions paid for without insurance, and incorrect provider attribution. CMS's calculation adjusts for beneficiary stays in inpatient settings, but this was not accounted for in the study analysis, given the data provided. Ignoring hospitalizations from data analysis would underestimate the PDC and is therefore a more conservative approach.¹⁴

Finally, using PDC as a baseline characteristic is a limitation, since it does not account for beneficiaries newly enrolled in the plan nor those newly included in a specific adherence measure, thus, underrepresenting the population set. In the study data, 2018 PDC for beneficiaries included only

those who continued in the Humana plan from 2018 into 2019 and remained in the applicable adherence measure.

Conclusions

The adherence prioritization group had a higher proportion of patients with a PDC of 80% or higher versus the matched control group. This implies that pharmacist-driven interventions can have a meaningful effect on PDC for medication adherence and can ultimately affect star rating measures. Because 2019 data was used for 2021 star rating measures, even small numerical differences as seen in this study may account for the difference between a 4- or 5-star rating. Moving the needle in the right direction can be significant, since the cut point is yet to be determined.

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