Original Investigation

Comprehensive Medication Review Completion Rates and Disparities After Medicare Star Rating Measure

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Abstract

IMPORTANCE Comprehensive medication reviews (CMRs) are offered to qualifying US Medicare beneficiaries annually to optimize medication regimens and therapeutic outcomes. In 2016, Medicare adopted CMR completion as a Star Rating quality measure to encourage the use of CMRs.

OBJECTIVE To examine trends in CMR completion rates before and after 2016 and whether racial, ethnic, and socioeconomic disparities in CMR completion changed.

DESIGN, SETTING, AND PARTICIPANTS This observational study using interrupted time-series analysis examined 2013 to 2020 annual cohorts of community-dwelling Medicare beneficiaries aged 66 years and older eligible for a CMR as determined by Part D plans and by objective minimum eligibility criteria. Data analysis was conducted from September 2022 to February 2024.

EXPOSURE Adoption of CMR completion as a Star Rating quality measure in 2016.

MAIN OUTCOME AND MEASURES CMR completion modeled via generalized estimating equations.

RESULTS The study included a total of 561,950 eligible beneficiaries, with 253,561 in the 2013 to 2015 cohort (median [IQR] age, 75.8 [70.7-82.1] years; 90,778 male [35.8%]; 6,795 Asian [2.7%]; 24,425 Black [9.6%]; 76,74 Hispanic [3.0%]; 208,621 White [82.3%]) and 308,389 in the 2016 to 2020 cohort (median [IQR] age, 75.1 [70.4-80.9] years; 126,730 male [41.1%]; 89,222 Asian [2.9%]; 27,915 Black [9.1%]; 76,35 Hispanic [2.5%]; 252,781 White [82.0%]). The unadjusted CMR completion rate increased from 10.2% (7,739 of 72,225 individuals) in 2013 to 15.6% (14,185 of 90,847 individuals) in 2015 and increased further to 35.8% (18,376 of 51,386 individuals) in 2020, in part because the population deemed by Part D plans to be MTM-eligible decreased by nearly half after 2015 (90,487 individuals in 2015 to 51,386 individuals in 2020). Among a simulated cohort based on Medicare minimum eligibility thresholds, the unadjusted CMR completion rate increased but to a lesser extent, from 4.4% in 2013 to 12.6% in 2020. Compared with White beneficiaries, Asian and Hispanic beneficiaries experienced greater increases in likelihood of CMR completion after 2016 but remained less likely to complete a CMR. Dual-Medicaid enrollees also experienced greater increases in likelihood of CMR completion as compared with those without either designation, but still remained less likely to complete CMR.

CONCLUSION AND RELEVANCE This study found that adoption of CMR completion as a Star Rating quality measure led to higher completion rates, and reductions in, but not elimination of, disparities for Asian, Hispanic, and low-income beneficiaries.

Key Points

Question How did US nationwide comprehensive medication review (CMR) completion rates and disparities change after implementation of a 2016 Medicare Star Rating quality measure?

Findings This observational study of 561,950 Medicare beneficiaries using interrupted time-series analysis found that CMR completion rates increased in part due to plans reducing the size of the medication therapy management-eligible population by redefining their eligibility criteria. Asian, Hispanic, and low-income beneficiaries experienced greater increases in CMR completion rates, but rates remained lower than White beneficiaries and non–low-income beneficiaries.

Meaning Adoption of CMR completion as a Star Rating quality measure led to higher completion rates, and reductions in, but not elimination of, disparities for Asian, Hispanic, and low-income beneficiaries.

Supplemental content

Author affiliations and article information are listed at the end of this article.
seen, but not eliminated. These findings suggest that quality measures can inform plan behavior and could be used to help address disparities.


Introduction

Each year, millions of US Medicare beneficiaries nationwide are eligible for medication therapy management (MTM) services provided by Part D plans through the Medicare-mandated MTM program to optimize medication regimens and therapeutic outcomes.1,2 A core MTM service is the comprehensive medication review (CMR), in which a pharmacist or other qualified health care clinician initiates contact with a patient (often a telephone call, but it could also be face-to-face, or part of a telehealth visit), reviews all of the medications a patient is taking, identifies any medication-related problems, discusses with the patient, documents a written summary in the Medicare standardized format,3 and follows up with the prescriber as needed.4-5 CMRs have been shown to reduce medication-related problems, and in some cases, can lead to reductions in hospitalization and all-cause mortality.4,6,7

Since the inception of Medicare Part D in 2006, Medicare has required that Part D plans offer a CMR annually to beneficiaries who meet eligibility criteria. Medicare sets minimum eligibility thresholds as (1) having at least 2 to 3 chronic conditions, (2) taking at least 2 to 8 prescription drugs, and (3) having high annual Part D drug spending (at least $4935 in 2023).8,9 Each Part D plan then sets their own MTM eligibility criteria based on these thresholds to determine to whom they offer a CMR. Prior studies10,11 have examined patient characteristics associated with offer and completion of a CMR in 2013 to 2016 as well as racial, ethnic, and socioeconomic disparities in Medicare minimum thresholds for MTM eligibility criteria.12-14 Specifically, Black and Hispanic beneficiaries were found to be less likely to meet Medicare minimum thresholds for MTM eligibility criteria,12-14 and low-income beneficiaries were less likely to be offered a CMR, as well as complete a CMR, if offered.10,11

CMRs have been underutilized historically, with only 17% of eligible Medicare beneficiaries receiving CMRs in 2014.1 To encourage utilization, Medicare added CMR completion as a Star Ratings measure starting in 2016, where CMR completion is defined as receipt of at least 1 CMR during the measurement year15 and requires documentation (with a written summary in Medicare standardized format). Individual Star Ratings measures contribute to the final summary star rating for each Part D plan that is shown on the Medicare Plan Finder website when beneficiaries are choosing Part D plans, are tied to financial incentives, and can influence beneficiary choice in plan (eAppendix in Supplement 1).16 To our knowledge, no studies have examined nationwide CMR completion rates following the 2016 adoption of CMR completion as a Star Ratings quality measure, and whether disparities have changed. To address this gap, this study assesses changes in CMR completion rates after the adoption of the 2016 Star Rating quality measure, and whether disparities in CMR completion changed across racial, ethnic, or socioeconomic group.

Methods

Study Population and Measures

This observational study using interrupted time-series analysis was approved by the institutional review board at Duke University Health System and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline. A waiver of informed consent was approved by the Duke University Health System because this was secondary analysis that met the requirements of the Common Rule. The primary study cohort was derived from 2013 to 2020.
Medicare 5% administrative claims data linked to 100% Part D MTM data. Patients consisted of community-dwelling Medicare Part D beneficiaries aged 66 years and older who met MTM eligibility criteria (as defined by each Part D plan) for at least 1 year in the study period and were continuously enrolled in Medicare Parts A, B, and D in the year prior to eligibility (eFigure 1 in Supplement 1). Identification of community-dwelling beneficiaries was based on excluding long-term care nursing home residents per a previously published Medicare claims-based algorithm.17 Beneficiaries were also excluded if they were enrolled in a plan that participated in the enhanced MTM model, which provided further flexibility in services and eligibility criteria and was being tested by Medicare between 2017 and 2021 in 5 regions by 6 plan sponsors.18 Similar to actual practice with the MTM program, beneficiaries could be represented in multiple years within the 2013 to 2020 study period if they were deemed eligible for MTM services in multiple years.

In additional analyses, we identified a secondary cohort by simulating an objective MTM-eligible population based on Medicare minimum eligibility criteria (ie, ≥3 common conditions, ≥8 Part D drugs, and $4255 in Part D drug spending for the year based on the 2020 threshold; see the eMethods in Supplement 1).19 Plans changed their eligibility criteria over time, so this cohort allowed us to also report CMR completion rates using a consistent and objective denominator for the entire study period.

The primary outcome in both cohorts was CMR completion, defined as receipt of at least 1 CMR in the measurement year as reported in the Medicare MTM data file, which is based on information submitted by Part D plan sponsors to the CMS Health Plan Management System.20 This definition is in accordance with the Star Rating quality measure.15 The patient characteristics of interest included age, sex, race and ethnicity (as ascertained from the Centers for Medicare & Medicaid Services [CMS] Common Medicare Environment and originally sourced from Social Security Administration data), dual-Medicaid enrollment or low-income subsidy (LIS; categorized as dual-Medicaid enrollment which automatically includes LIS, LIS-only, and neither dual-Medicaid enrollment nor LIS) in the year prior to date of eligibility, geographic region, rural residence,21 Charlson Comorbidity Index score, individual comorbidities, health care utilization, and medication utilization. Race and ethnicity categories included Asian, Black, Hispanic, North American Native, White, unknown, and other (defined as any other race or ethnicity not otherwise specified). Comorbidities (ie, diabetes, heart failure, hyperlipidemia, hypertension, chronic obstructive pulmonary disease, asthma, osteoporosis, depression, chronic kidney disease, dementia, and hearing loss) were identified based on Medicare Chronic Conditions Data Warehouse indicators in the year prior to the date of MTM eligibility,22 except for dementia and hearing loss, which were not available for the entire 2013 to 2020 time frame and were instead based on algorithms used in prior studies.23,24 Health care utilization was constructed as any inpatient stay, any emergency department visit, number of outpatient visits, and total costs to Medicare in the year prior to MTM eligibility. Medication utilization was constructed as the number of unique medications filled, number of prescription fills, out-of-pocket medication costs, number of unique potentially inappropriate medications (PIMs) filled, and number of PIM prescription fills measured in the year prior to MTM eligibility. PIMs were defined based on the Use of High-Risk Medications in the Elderly quality measure.25

Statistical Analysis
Patient characteristics among those who met MTM eligibility criteria from 2013 to 2015 vs from 2016 to 2020, as well as those who completed vs those who did not complete CMR, were compared using standardized mean differences (SMDs). SMDs less than 10% indicate negligible difference between groups.26

Unadjusted annual CMR completion rates were reported from 2013 to 2020. In adjusted analyses applying an interrupted time series design to evaluate time trends and patient factors associated with CMR completion, models fit with generalized estimating equations with binomial error distributions and log links pooled yearly subcohorts with clustering by patient (because the same patient could be included in different yearly subcohorts). To determine whether there was a
change in probability of CMR completion after introduction of the Star Rating quality measure, we modeled time continuously, allowing for a 1-time jump (ie, change in intercept) at 2016, corresponding to the introduction of the Star Rating quality measure, and a change in slope beginning at that time to allow differential trends to occur after that change. For easier interpretation, we reported annual adjusted risk ratios (aRRs) for the 2 slopes (2013-2015 and 2016-2020), and a 1-time aRR representing the 1-time incremental difference seen from 2015 to 2016 corresponding to the immediate change in policy (ie, change in intercept at 2016). In addition to these time terms, adjusted analyses included the aforementioned patient characteristics and included the Charlson Comorbidity Index score instead of individual comorbidities. In sensitivity analyses, the Charlson Comorbidity Index score was replaced by individual comorbidities and the time term parameter estimates were found to be robust (ie, not substantially change; data not shown).

To determine whether the Star Rating quality measure was associated with CMR completion differently across racial, ethnic, or socioeconomic groups, we ran 2 additional models that included interaction terms between all time terms and subgroup indicators (model 1, race and ethnicity; model 2, dual-Medicaid, LIS-alone, or neither). We compared the aRRs for the 2013 to 2015 slope, 2016 to 2020 slope, and change in intercept at 2016 between each subgroup and the reference group, and also compared the model-estimated probability that an individual in each subgroup completed CMR each year from 2013 to 2020 using tests of the asymptotic χ² distribution of the likelihood ratio statistic. Model-estimated probabilities were calculated at the means values of all adjustment covariates. A statistically significant difference was defined at an α level of .05 or a 2-sided P value < .05. All analyses were conducted in SAS version 9.4 (SAS Institute). Data analysis was conducted from September 2022 to February 2024.

## Results

**Characteristics of Beneficiaries Deemed MTM-Eligible by Part D Plans**

The study included a total of 561,950 MTM-eligible beneficiaries, with 253,561 in the 2013 to 2015 cohort (median [IQR] age, 75.8 [70.7-82.1] years; 90,778 male [35.8%]; 67,995 Asian [2.7%]; 24,425 Black [9.6%]; 76,744 Hispanic [3.0%]; 208,621 White [82.3%]) and 308,389 in the 2016 to 2020 cohort (median [IQR] age, 75.1 [70.4-80.9] years; 126,730 male [41.1%]; 89,222 Asian [2.9%]; 27,915 Black [9.1%]; 76,354 Hispanic [2.5%]; 252,781 White [82.0%]) (Table 1). The majority of participants across time frames had neither dual-Medicaid enrollment nor LIS (158,366 beneficiaries [62.5%] in 2013-2015 and 205,275 beneficiaries [66.6%] in 2016-2020). Over three-quarters had hyperlipidemia (190,257 [75.0%] in 2013-2015 and 242,223 [78.5%] in 2016-2020) and nearly one-half had a prior-year emergency department visit (120,488 [47.5%] in 2013-2015 and 152,876 [49.6%] in 2016-2020). Patients filled a median (IQR) of 15.0 (12.0-20.0) unique medications in 2013 to 2015 and 16.0 (13.0-20.0) unique medications in 2016 to 2020; a median (IQR) of 1.0 (0.0-1.0) PIMs in 2013 to 2015 and 0.0 (0.0-1.0) PIMs in 2016 to 2020; and paid a median (IQR) of $177.40 ($163.90-$1609.80) in 2013 to 2015 and $824.90 ($150.80-$1745.10) in 2016 to 2020 in annual out-of-pocket medication costs in the prior year (eTable 1 in Supplement 1).

When comparing across time periods, beneficiaries deemed MTM-eligible by Part D plans in 2016 to 2020 (vs 2013-2015) were more likely to be male (126,730 beneficiaries [41.1%] vs 90,778 beneficiaries [35.8%]; SMD, 10.9%), have a higher Charlson Comorbidity Index score (median [IQR] of 2.0 [0.0-4.0] vs 1.0 [0.0-3.0]; SMD, 10.8%), have diagnosed hearing loss (14,023 beneficiaries [4.5%] vs 5427 [2.1%]; SMD, 13.4%), and use fewer PIMs (median [IQR] of 0.0 [0.0-1.0] vs 1.0 [0.0-1.0]; SMD, 17.1%), and have fewer fills of those PIMs (median [IQR] of 0.0 [0.0-4.0] vs 1.0 [0.0-5.0]; SMD, 17.6%) (Table 1 and eTable 1 in Supplement 1). There were also slight decreases in the proportion of Hispanic beneficiaries (76,744 beneficiaries [3.0%] to 76,354 beneficiaries [2.5%]; overall SMD, 10.2%), dual-Medicaid beneficiaries (84,422 beneficiaries [33.3%] to 91,937 beneficiaries [29.8%]; overall SMD, 8.6%), and LIS-only beneficiaries (10,773 beneficiaries [4.2%] to 11,177 beneficiaries [3.6%]).
[3.6%]; overall SMD, 8.6%) who were deemed MTM-eligible. Similar trends were seen for the second (simulated) study cohort except that they had a higher Charlson Comorbidity Index score (median [IQR] of 4.0 [2.0-6.0] in 2013-2015 and 4.0 [3.0-6.0] in 2016-2020 in the simulated cohort versus 1.0 [0.0-3.0] in 2013-2015 and 2.0 [0.0-4.0] in the primary cohort) (Table 1 and eTable 2 in Supplement 1). Prior to 2016, the simulated cohort was also less likely to be dual-Medicaid or LIS-only beneficiaries (107 441 beneficiaries [47.7%] with neither designation in simulated cohort versus 158 366 [62.5%] in primary cohort) (Table 1 and eTable 2 in Supplement 1).

Characteristics of Beneficiaries Completing CMRs

In adjusted analyses (which also adjusted for time trends), patient characteristics associated with lower likelihood of completing CMR among the population deemed MTM-eligible by plans from 2013 to 2020 included older age; male sex; Asian, Hispanic, North American Native, other, and unknown race and ethnicity (as compared with White race); dual-Medicaid enrollment (as compared with no dual-Medicaid enrollment or LIS); all regions (as compared with the Northeast); and greater number of comorbidities (eTable 3 in Supplement). Patient characteristics associated with increased

Table 1. Characteristics of MTM-Eligible Beneficiaries and Completers vs Noncompleters of CMRs Before vs After 2016 Star Rating Measure

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Age at date of MTM eligibility, median (IQR), y</td>
<td>75.8 (70.7-82.1) 75.9 (70.7-82.3) 75.3 (70.5-81.0) 9.9</td>
<td>75.1 (70.4-80.9) 75.1 (70.5-81.0) 74.9 (70.4-80.5) 5.5</td>
<td>75.1 (70.4-80.9) 75.1 (70.5-81.0) 74.9 (70.4-80.5) 5.5</td>
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<tr>
<td>Male sex</td>
<td>90 788 (35.8) 79 999 (36.0) 10 789 (34.3) 3.5</td>
<td>126 730 (41.1) 92 565 (41.3) 34 165 (40.4) 1.9</td>
<td>107 441 (47.7) 79 999 (41.3) 27 442 (30.4) 1.9</td>
<td></td>
</tr>
<tr>
<td>Race and ethnicity</td>
<td>24 425 (9.6) 21 344 (9.6) 3081 (9.8) 27 915 (9.1) 20 295 (9.1) 7620 (9.0) 17.0</td>
<td>252 781 (82.0) 182 142 (81.4) 70 639 (83.6) 8.7</td>
<td>205 275 (66.6) 147 455 (65.9) 57 820 (68.4) 8.6</td>
<td></td>
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<tr>
<td>Dual-Medicaid enrollment/LIS</td>
<td>6795 (2.7) 6356 (2.9) 439 (1.4) 8922 (2.9) 6944 (3.1) 1978 (2.3) 15.3</td>
<td>8922 (2.9) 6944 (3.1) 1978 (2.3) 15.3</td>
<td>8922 (2.9) 6944 (3.1) 1978 (2.3) 15.3</td>
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</tr>
<tr>
<td>No dual-Medicaid enrollment and no LIS</td>
<td>158 366 (62.5) 136 833 (61.6) 21 533 (68.5) 17.0</td>
<td>205 275 (66.6) 147 455 (65.9) 57 820 (68.4) 17.0</td>
<td>205 275 (66.6) 147 455 (65.9) 57 820 (68.4) 17.0</td>
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</tr>
<tr>
<td>LIS only</td>
<td>10 773 (4.2) 919 (4.2) 1354 (4.3%) 11 177 (3.6) 7974 (3.6) 3203 (3.8) 15.3</td>
<td>11 177 (3.6) 7974 (3.6) 3203 (3.8) 15.3</td>
<td>11 177 (3.6) 7974 (3.6) 3203 (3.8) 15.3</td>
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<tr>
<td>Geographic region</td>
<td>62 022 (24.5) 54 045 (24.3) 7977 (25.4) 9.2</td>
<td>72 024 (23.4) 52 297 (23.4) 19 727 (23.3) 9.2</td>
<td>72 024 (23.4) 52 297 (23.4) 19 727 (23.3) 9.2</td>
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<tr>
<td>Northeast</td>
<td>74 455 (18.7) 41 268 (18.6) 6187 (19.7) 9.2</td>
<td>63 554 (20.6) 45 447 (20.3) 18 107 (21.4) 9.2</td>
<td>63 554 (20.6) 45 447 (20.3) 18 107 (21.4) 9.2</td>
<td></td>
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<tr>
<td>Midwest</td>
<td>274 (0.1) 242 (0.1) 32 (0.1) 9.2</td>
<td>399 (0.1) 326 (0.1) 73 (0.1) 9.2</td>
<td>399 (0.1) 326 (0.1) 73 (0.1) 9.2</td>
<td></td>
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<tr>
<td>South</td>
<td>105 155 (41.5) 91 847 (41.3) 13 308 (42.3) 9.2</td>
<td>118 335 (38.4) 87 052 (38.9) 31 283 (37.0) 9.2</td>
<td>118 335 (38.4) 87 052 (38.9) 31 283 (37.0) 9.2</td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>38 655 (15.2) 34 732 (15.6) 3923 (12.5) 9.2</td>
<td>54 077 (17.5) 38 737 (17.3) 15 340 (18.1) 9.2</td>
<td>54 077 (17.5) 38 737 (17.3) 15 340 (18.1) 9.2</td>
<td></td>
</tr>
<tr>
<td>Rural residence</td>
<td>68 198 (26.9) 58 787 (26.5) 9411 (29.9) 7.7</td>
<td>79 925 (25.9) 56 723 (25.3) 23 202 (27.4) 7.7</td>
<td>79 925 (25.9) 56 723 (25.3) 23 202 (27.4) 7.7</td>
<td></td>
</tr>
<tr>
<td>Charlson Comorbidity Index score, median (IQR)</td>
<td>1.0 (0.0-3.0) 1.0 (0.0-3.0) 1.0 (0.0-3.0) 10.5</td>
<td>2.0 (0.0-4.0) 2.0 (0.0-4.0) 1.0 (0.0-4.0) 10.5</td>
<td>2.0 (0.0-4.0) 2.0 (0.0-4.0) 1.0 (0.0-4.0) 10.5</td>
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</tbody>
</table>

Abbreviations: CMR, comprehensive medication review; LIS, low-income subsidy; MTM, medication therapy management; SMD, standardized mean difference. Other race and ethnicity was defined as any other race and ethnicity not otherwise specified.
likelihood of completing CMR included rural residence and use of a greater number of medications in the prior year.

**CMR Completion Before and After 2016**

From 2013 to 2020, the number of CMR recipients increased from 7379 to 18376 (Figure 1A). While the number of beneficiaries deemed MTM-eligible by plans increased from 2013 to 2015, this number decreased from 90 847 in 2015 to 51 386 in 2020 (Figure 1A). As a result, among the population deemed MTM-eligible by plans, the unadjusted CMR completion rate increased from 10.2% in 2013 (7379 of 72 225) to 15.6% in 2015 (14 185 of 90 847) and then to 35.8% (18 376 of 51 386 individuals) in 2020 (Figure 1B), representing an increase of 3.5 times across the entire study period. Among a simulated MTM-eligible population based on applying CMS minimum eligibility thresholds consistently across years (ie, no changes in the eligibility criteria from year to year such as was evident by plans), the unadjusted CMR completion rate increased as well, but to a lesser extent, from 4.4% to 8.1% from 2013 to 2015 and then to 12.6% in 2020 (Figure 1B), representing an increase of 2.9 times across the entire study period. The size of the simulated MTM-eligible population increased year over year from 2013 to 2020 (eTable 4 in Supplement 1).

In adjusted analyses (Table 2), among the population deemed MTM-eligible by plans, CMR completion rates increased each year prior to the Star Rating measure (aRR each year compared with the prior year, 1.30; 95% CI, 1.28-1.31) but moderated slightly (aRR each year, 1.26; 95% CI, 1.22-1.30) after a 1-time increase in 2016 (aRR, 1.07; 95% CI, 1.04-1.09). Similar results were seen for the simulated MTM-eligible population (based on Medicare minimum thresholds), but with a much flatter slope after 2016 (aRR each year, 1.13; 95% CI, 1.08-1.19) (eTable 5 in Supplement 1).

**Reduction in Racial and Ethnic Disparities in CMR Completion Rates After 2016**

Compared with White beneficiaries, Hispanic beneficiaries had a greater 1-time jump at 2016 (aRR, 1.38; 95% CI, 1.11-1.70 vs aRR, 1.07; 95% CI, 1.04-1.10; P = .006) and slope after 2016 (aRR, 1.32; 95% CI, 0.99-1.77 vs aRR, 1.25; 95% CI, 1.21-1.30; P = .007) and Asian beneficiaries had greater slopes before 2016 (aRR = 1.54; 95% CI, 1.33-1.78 vs aRR, 1.29, 95% CI, 1.27-1.31; P = .006) and after 2016 (aRR, 1.33; 95% CI, 0.99-1.80 vs aRR, 1.25; 95% CI, 1.21-1.30; P = .001) (Table 2). However, Asian and Hispanic beneficiaries continued to have lower estimated year-to-year CMR completion rates compared with White beneficiaries both before and after 2016 (Figure 2 and eTable 6 in Supplement 1).

Compared with White beneficiaries, Black beneficiaries had a smaller 1-time jump at 2016 but a greater post-2016 slope (Table 2), and model-estimated probabilities did not differ between Black beneficiaries and White beneficiaries (Figure 2 and eTable 6 in Supplement 1). Similar results across race and ethnicity were seen in the simulated MTM-eligible cohort (eTable 5 in Supplement 1).

The figures show the unadjusted number of Medicare Part D beneficiaries who were MTM eligible (A) and the unadjusted MTM comprehensive medication review (CMR) completion rates (B). CMS indicates the Centers for Medicare & Medicaid Services.
Reduction in Socioeconomic Disparities in CMR Completion Rates After 2016

Compared with those without Medicaid or LIS, dual-Medicaid enrollees and LIS-only enrollees both had smaller pre-2016 slopes (aRR for neither Medicaid nor LIS, 1.32; 95% CI, 1.30-1.35; aRR for dual-Medicaid, 1.24; 95% CI, 1.18-1.31; P < .001; aRR for LIS-only, 1.21; 95% CI, 1.10-1.32; P = .01) and greater change in intercept at 2016 (aRR for dual-Medicaid, 1.03; 95% CI, 0.95-1.12; P < .001; aRR for LIS-only, 1.07; 95% CI, 0.96-1.18; P = .03) compared with those without Medicaid or LIS. A linear trend was observed after 2016 in both groups (aRR for dual-Medicaid, 1.25; 95% CI, 1.18-1.32; P < .001; aRR for LIS-only, 1.20; 95% CI, 1.05-1.36; P = .01).

Table 2. Change in Medication Therapy Management Comprehensive Medication Review Completion Rates Before vs After 2016 Star Rating Measure (N = 561 950)

<table>
<thead>
<tr>
<th>Modela</th>
<th>Adjusted risk ratio (95% CI)</th>
<th>P valueb</th>
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</thead>
<tbody>
<tr>
<td><strong>Model 1 (averaged over all populations)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Slope 2013-2015</td>
<td>1.30 (1.28-1.31)</td>
<td>NA</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.07 (1.04-1.09)</td>
<td>NA</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.26 (1.22-1.30)</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Model 2 (by race and ethnicity)</strong></td>
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<tr>
<td>Asian beneficiaries</td>
<td></td>
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</tr>
<tr>
<td>Slope 2013-2015</td>
<td>1.54 (1.33-1.78)</td>
<td>.006</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.16 (0.95-1.41)</td>
<td>.36</td>
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<tr>
<td>Slope 2016-2020</td>
<td>1.33 (0.99-1.80)</td>
<td>.001</td>
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<tr>
<td>Black beneficiaries</td>
<td></td>
<td></td>
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<tr>
<td>Slope 2013-2015</td>
<td>1.28 (1.19-1.37)</td>
<td>.67</td>
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<tr>
<td>Change in intercept at 2016</td>
<td>0.98 (0.88-1.09)</td>
<td>.03</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.30 (1.12-1.50)</td>
<td>.001</td>
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<tr>
<td>Hispanic beneficiaries</td>
<td></td>
<td></td>
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<tr>
<td>Slope 2013-2015</td>
<td>1.31 (1.13-1.51)</td>
<td>.86</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.38 (1.11-1.70)</td>
<td>.006</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.32 (0.99-1.77)</td>
<td>.007</td>
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<tr>
<td>North American Native beneficiaries</td>
<td></td>
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<tr>
<td>Slope 2013-2015</td>
<td>1.12 (0.86-1.47)</td>
<td>.28</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.02 (0.66-1.59)</td>
<td>.82</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.26 (0.71-2.23)</td>
<td>.95</td>
</tr>
<tr>
<td>White beneficiaries (reference group)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope 2013-2015</td>
<td>1.29 (1.27-1.31)</td>
<td>NA</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.07 (1.04-1.10)</td>
<td>NA</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.25 (1.21-1.30)</td>
<td>NA</td>
</tr>
<tr>
<td>Unknown race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope 2013-2015</td>
<td>1.36 (1.05-1.75)</td>
<td>.68</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.14 (0.85-1.52)</td>
<td>.64</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.33 (0.80-2.24)</td>
<td>.008</td>
</tr>
<tr>
<td>Other racec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope 2013-2015</td>
<td>1.31 (1.11-1.54)</td>
<td>.86</td>
</tr>
<tr>
<td>Change in intercept at 2016</td>
<td>1.28 (1.01-1.64)</td>
<td>.01</td>
</tr>
<tr>
<td>Slope 2016-2020</td>
<td>1.25 (0.89-1.75)</td>
<td>.85</td>
</tr>
</tbody>
</table>

Abbreviations: LIS, low-income subsidy; NA, not applicable.

* All 3 models were adjusted for age, sex, race and ethnicity, dual-Medicaid enrollment and low-income subsidy, region, rural residence, Charlson Comorbidity Index score, and prior-year utilization (eg, had inpatient stay, had emergency department visit, number of outpatient visits, inflation-adjusted costs, number of unique medications, number prescription fills, inflation-adjusted out-of-pocket medication costs, and number of potentially inappropriate medications). Models 2 and 3 included interaction terms among each of the time terms and each of the racial and ethnic socioeconomic subgroups, respectively.

b Test between subgroup and reference group for a given time term.

c Other race and ethnicity was defined as any other race and ethnicity not otherwise specified.
post-2016 slopes (aRR for neither, 1.23; 95% CI, 1.18-1.28; aRR for dual-Medicaid, 1.35; 95% CI, 1.21-1.50; \( P < .001 \); aRR for LIS only, 1.27; 95% CI, 1.05-1.54; \( P = .02 \)). Similar results by socioeconomic status were seen in the simulated MTM-eligible cohort pertaining to the post-2016 slopes, with differences pertaining to the pre-2016 slopes and intercepts (eTable 5 in Supplement 1). Model-estimated probabilities for CMR completion were still lower for dual-Medicaid enrollees and similar for LIS-only enrollees when compared with those with neither Medicaid nor LIS both before and after 2016 (Figure 3 and eTable 6 in Supplement 1).

**Discussion**

This observational study using interrupted time-series analysis found that following the adoption of CMR completion as a Star Rating measure in 2016, CMR completion increased from 10.2% in 2013 to 35.8% in 2020. However, this CMR completion increase was in part due to Part D plans dramatically decreasing the size of the population they deemed to be MTM-eligible. After 2016, Part D plans were more likely to use the most limiting eligibility thresholds set by Medicare (e.g., the proportion of plans requiring beneficiaries to have at least 3 chronic conditions increased from 80% in 2016 to 90% in 2019 and the proportion of plans requiring beneficiaries to have at least 8 medications increased from 57% in 2016 to 78% in 2019). When we simulated a cohort using minimum eligibility thresholds, CMR completion increased to a lesser extent, from 4.4% in 2013 to 12.6% in 2020. This finding suggests that the adoption of CMR completion as a Star Rating measure created strong incentives for Part D plans to take actions that could impact the rates, which they appeared to act on by shrinking the denominator (eligible population) instead of focusing only on growing the numerator (number of CMRs provided).

Likely in part to address this shrinkage in the MTM-eligible population, Medicare proposed changes in December 2022 to their minimum thresholds for MTM eligibility criteria. These changes included lowering the Part D drug cost threshold from $4935 in 2023 to be commensurate with the average annual cost of 5 generic drugs ($1004 in 2020), lowering the minimum number of covered Part D drugs required from a range of 2 to 8 drugs to 2 to 5 drugs, and requiring that Medicare Part D plans target 10 specified core chronic diseases. The goal of these changes is “to promote
consistent, equitable, and expanded access” to MTM. On April 5, 2024, CMS issued a final ruling on the proposed changes in MTM eligibility criteria that will take effect starting in 2025. The Part D drug cost threshold was lowered to $1623 (and is based on the average annual cost of eight generic drugs), and Part D plans must target all 10 core chronic diseases. The number of Part D drugs was not lowered, but may be lowered in the future. Given these changes, the estimated expansion in beneficiaries eligible for MTM is from approximately 3.6 million (7%) to 7.1 million (13%).

Despite increases, CMR completion rates remained relatively low from 2013 to 2020, suggesting room for improvement and the need for additional strategies to help increase uptake. Even though the MTM program has been around since 2006, a key barrier to CMR completion is patient and clinician lack of awareness of the MTM program and the benefits of a CMR. Patient- and clinician-centered materials that educate on the value of CMRs, introduce the pharmacist who will conduct the CMR, and clarify that the CMR is covered by the Part D plan (ie, of no charge to the patient) could help increase CMR completion rates. Because clinicians are often overburdened, reporting time pressure and even greater burnout after the COVID-19 pandemic, a CMR that is already being conducted by a third-party pharmacist may provide valuable information for clinicians and represent an efficient use of limited resources. Another reported barrier is the lack of a relationship between the clinician and the MTM practitioner (who is typically a pharmacist) performing the CMR, because this MTM practitioner generally works for a community pharmacy, MTM vendor, or the Part D plan, and not directly in the clinician’s clinic. To address this barrier, novel approaches are needed. Perhaps one idea would be to contract MTM services to pharmacists who already work within a clinic and have established relationships with clinicians. When this is not feasible, another approach includes grouping MTM-eligible beneficiaries with the same prescriber to be assigned to the same MTM practitioner, thus encouraging the development of relationships over time. Further research is needed to explore ways to overcome barriers at the level of the patient, MTM practitioner, clinician, health system, Part D plan, pharmacy, MTM vendor, and the Medicare program.

We also examined whether the Star Rating measure was associated with CMR completion rate disparities by race, ethnicity, and socioeconomic status, given that prior studies have found that Black and Hispanic beneficiaries are less likely to meet Medicare minimum thresholds for MTM
eligibility criteria and that among those offered a CMR, Black beneficiaries do not differ in their likelihood of CMR completion but other racial and ethnic minority groups are less likely to complete a CMR. Consistent with this prior work, we found that Black beneficiaries did not differ in likelihood of completing a CMR compared with White beneficiaries, but that Asian and Hispanic beneficiaries were less likely to complete a CMR than White beneficiaries. Asian and Hispanic beneficiaries’ completion rates did increase more than White beneficiaries over time, but overall remained lower, indicating that disparities were not eliminated and suggesting the need for additional strategies. Prior studies have also found that low-income beneficiaries were less likely to be offered a CMR, as well as complete a CMR if offered. Aligned with these prior findings, we saw that dual-Medicaid enrollees were less likely to receive a CMR and that prior to the Star Rating measure in 2016, dual-Medicaid enrollees and LIS-only enrollees had slower CMR completion growth rates. However, after 2016, dual-Medicaid enrollees and LIS-only enrollees’ CMR completion rates increased faster than that of non-low-income beneficiaries. Nonetheless, dual-Medicaid enrollees had lower CMR completion rates compared with non-low-income beneficiaries both before and after 2016, indicating that although this disparity was reduced, it was not completely resolved. Medicare’s focus on health equity, such as through new health equity quality measures and requirements to provide materials in non-English languages, may help to further reduce these disparities.

While the present study focused on CMR completion rates, it is important to note that this type of quality measure is limited in that it is a process measure. New initiatives by measure development organizations are underway to develop the next generation of CMR-related quality measures, such as outcome measures that focus on what goal was achieved from the CMR. Furthermore, CMR completion rate is only 1 of 13 to 18 Star Rating measures depending on the calendar year (as described in the eAppendix in Supplement 1), so is only 1 consideration for Part D plans.

Limitations and Strengths

There are several study limitations we must report. First, there was no comparator group because CMR completion was adopted as a Star Rating measure for all Medicare Part D plans. Additionally, there could be residual unobserved confounding due to the study being observational in design and there being unobserved factors, such as patient activation. Second, information on race and ethnicity was derived from Medicare data, which is more likely to be inaccurate as compared with self-reported data; however, information on race and ethnicity was not available from self-reported data (eg, beneficiary surveys) for the entire study population. Third, we excluded beneficiaries enrolled in plans involved in a Medicare model testing Enhanced MTM, so the results are only generalizable to CMRs provided through traditional MTM programs (which represent the vast majority). A key strength of this study is examination of the long-term 2013 to 2020 trends in CMR completion.

Conclusions

In conclusion, this observational study using interrupted time-series analysis found that the adoption of CMR completion rate as a Star Rating quality measure was associated with higher CMR completion rates, in part because Part D plans used stricter eligibility criteria to define eligible patients. Disparities in CMR completion rates were reduced for Asian, Hispanic, and dual-Medicaid enrollees, but not eliminated. These findings suggest that quality measures can inform plan behavior and could be used to help address disparities.
ARTICLE INFORMATION
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Acquisition, analysis, or interpretation of data: Hung, Hung, Wilson, Wilson, Smith, Smith, Pavon, Pavon, Sloan, Sloan, Hastings, Hastings, Maciejewski, Maciejewski.
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Critical review of the manuscript for important intellectual content: Wilson, Smith, Pavon, Sloan, Hastings, Farley, Maciejewski.
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REFERENCES


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eTable 1. Additional Characteristics of MTM-Eligible Beneficiaries and Completers vs Noncompleters of CMRs Before vs After 2016 Star Rating Measure
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SUPPLEMENT 2.
Data Sharing Statement