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RESEARCH BRIEF

HSR Health Services Research

The Medicare Care Choices Model was associated with reductions in disparities in the use of hospice care for Medicare beneficiaries with terminal illness

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Abstract

Objective: To assess the effects of the Medicare Care Choices Model (MCCM) on disparities in hospice use and quality of end-of-life care for Medicare beneficiaries from underserved groups—those from racial and ethnic minority groups, dually eligible for Medicare and Medicaid, or living in rural areas.

Data Sources and Study Setting: Medicare enrollment and claims data from 2013 to 2021 for terminally ill Medicare fee-for-service beneficiaries nationwide.

Study Design: Through MCCM, terminally ill enrolled Medicare beneficiaries received supportive and palliative care services from hospice providers concurrently with curative treatments. Using a matched comparison group, we estimated subgroup-specific effects on hospice use, days at home, and aggressive treatment and multiple emergency department visits in the last 30 days of life.

Data Collection/Extraction Methods: The sample included decedent Medicare beneficiaries enrolled in MCCM and a matched comparison group from the same geographic areas who met model eligibility criteria at time of enrollment: having a diagnosis of cancer, congestive heart failure, chronic obstructive pulmonary disease, or HIV/AIDS; living in the community; not enrolled in the Medicare hospice benefit in the previous 30 days; and having at least one hospital stay and three office visits in the previous 12 months.

Principal Findings: Eligible beneficiaries from underserved groups were underrepresented in MCCM. MCCM increased enrollees' hospice use and the number of days at home and reduced aggressive treatment among all subgroups analyzed. MCCM also reduced disparities in hospice use by race and ethnicity and dual eligibility by 4.1 (90% credible interval [CI]: 1.3–6.1) and 2.4 (90% CI: 0.6–4.4) percentage points, respectively. It also reduced disparities in having multiple emergency department visits for rural enrollees by 1.3 (90% CI: 0.1–2.7) percentage points.

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Conclusions: MCCM increased hospice use and quality of end-of-life care for model enrollees from underserved groups and reduced disparities in hospice use and having multiple emergency department visits.

KEYWORDS
dual eligibility, end of life, health equity and disparities, hospice, Medicare Care Choices Model, quality, race and ethnicity, rural

What is known on this topic

- Underserved groups—people from racial and ethnic minority groups, dually eligible for Medicare and Medicaid, or living in rural areas—face disparities in hospice use and quality of end-of-life care.
- The Medicare Care Choices Model (MCCM) increased hospice use and improved the quality of end-of-life care among enrollees. However, underserved groups were underrepresented among model enrollees.

What this study adds

- We explore MCCM enrollment patterns and assess whether MCCM reduced disparities in hospice use and quality of end-of-life care by race and ethnicity and for dually eligible and rural enrollees.
- MCCM increased hospice use and improved quality of care among all subgroups analyzed.
- MCCM reduced disparities in hospice use by race and ethnicity and dual eligibility and disparities in having multiple emergency department visits for rural enrollees.

1 | INTRODUCTION

Medicare's hospice benefit covers comprehensive palliative and supportive services for terminally ill beneficiaries. Rather than aiming to cure terminal illness, hospice care focuses on symptom control, comfort, and quality of life and often includes emotional and spiritual support for patients and caregivers.[1] Palliative care can improve symptom control and pain management, increase satisfaction, avoid aggressive treatments that patients and families say they do not need or want, and reduce emotional distress.[2–5] Most terminally ill patients would rather die at home than in a hospital—a process that hospice providers can support.[6,7] To receive Medicare's hospice benefit, beneficiaries and their physicians must acknowledge the terminal nature of a beneficiary's illness, and beneficiaries must agree to waive Medicare payments for treating their terminal condition.[8] This requirement can reduce use of Medicare's hospice benefit (only about half of decedents in Medicare used hospice) or delay entry (many entered hospice in the last few days or weeks of life), especially among beneficiaries intending to receive curative treatments.[9–11]

Three groups of Medicare beneficiaries generally underserved by the U.S. health care system are racial and ethnic minority groups, those dually eligible for Medicare and Medicaid, and those living in rural locations.[12] For a range of health care access and health outcomes, there are well-documented disparities by race and ethnicity[13] rooted in historic or contemporary structural racism and mistrust of the health care system.[14,15] There are also many documented disparities by income or wealth[16,17] and by rural location.[18]

For various reasons, these disparities extend to patterns in hospice use and the quality of end-of-life care.[19–23] Racial and ethnic disparities may be associated with beliefs and preferences for aggressive care, knowledge of treatment options, and untrustworthiness of the healthcare system.[24] Disparities among dually eligible beneficiaries might stem from similar barriers plus additional challenges accessing care because of limited access to financial resources.[6] Disparities among rural beneficiaries might result from limited access to hospice or palliative care, given difficulties rural hospices face maintaining financial sustainability. Opportunities exist to achieve more equitable end-of-life outcomes for terminally ill Medicare beneficiaries by addressing these barriers to hospice and palliative care.[25,26]

Several recent initiatives at the Centers for Medicare & Medicaid Services (CMS) aim to improve care for beneficiaries with serious illness, including the Medicare Care Choices Model (MCCM).[27] Over 6 years, MCCM tested whether offering eligible Medicare fee-for-service beneficiaries the option to receive supportive and palliative care services through hospice providers without forgoing payment for the treatment of their terminal conditions would improve beneficiaries' quality of life and care and reduce Medicare expenditures.

CMS did not explicitly design MCCM to address health equity. Its launch predates CMS' 2021 strategic refresh, which elevated health equity as a core priority.[28–30] Nonetheless, MCCM could have differentially affected outcomes for model enrollees from each of the three underserved groups, given that MCCM addressed health needs, health-related social needs, and barriers to hospice care

disproportionately experienced by these groups. In addition, enrollees from these groups might have received different quantities or types of MCCM services (e.g., because of increased travel costs for rural locations). Our earlier research found MCCM worked as a stepping stone to Medicare's hospice benefit, increasing hospice use and days spent at home while reducing the likelihood of aggressive treatments, average utilization of acute care services, and average Medicare expenditures between enrollment and death.[31] We extend that work in this research brief by documenting subgroup differences in MCCM enrollment and model effects on enrollees' hospice use and quality of end-of-life care to study MCCM's implications for health equity.

2 | METHODS

2.1 | Intervention

CMS selected 141 qualified hospice providers nationwide who volunteered to participate in MCCM, and 81 hospices enrolled beneficiaries and received payments from CMS. These hospices were not representative of all hospices in the U.S. From January 1, 2016, to December 31, 2021, participating hospices' staff enrolled eligible beneficiaries in the model and provided them with select coordination and supportive services similar to, but typically less intensive than, those provided through hospice routine home care. MCCM services included assessing enrollees' health and health-related social needs, providing care coordination and case management, giving 24/7 access to the hospice's care team, person-centered care planning, shared decision making, pain and symptom management, and counseling services. Participating providers received a $400-per-month flat fee per enrolled beneficiary. The fee was reduced to $200 in the first month if a beneficiary was enrolled less than half a month. MCCM enrollees continued to receive full Medicare Part A and B coverage for curative treatments and other healthcare services; healthcare providers billed Medicare separately for providing those services.

To enroll, Medicare fee-for-service beneficiaries were required to meet certain criteria, including qualifying for hospice (i.e., having a prognosis of less than 6 months to live certified by a physician), and having cancer, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), or HIV/AIDS. Enrollees had to live in the community and not in a long-term care institution, such as a nursing home, could not have been enrolled in the Medicare hospice benefit in the 30 days before enrollment in MCCM, and had to satisfy minimum healthcare service use requirements (one hospital stay and three office visits in the previous 12 months). Enrollees could disenroll from MCCM at any time, including to elect Medicare's hospice benefit. However, they could not be enrolled in both hospice and MCCM at the same time.

2.2 | Data and study design

This study uses previously collected observational cross-sectional data from the MCCM evaluation.[31,32] These data were derived from research-identifiable Medicare enrollment and Part A, B, and D claims data for 2013 to 2021, accessed at the CMS Virtual Research Data Center and combined with rosters of participating hospice providers and enrolled beneficiaries, data on services provided under the model, and publicly available data from the Dartmouth Atlas and the American Community Survey. We identified beneficiaries enrolled in MCCM in claims data and a potential comparison pool consisting of Medicare fee-for-service beneficiaries who were eligible to enroll in MCCM, lived in the market areas of participating hospices, and were not referred to or enrolled in the model. To ensure complete data and facilitate matching, we restricted the sample to beneficiaries who died no later than December 31, 2021.

To create a matched comparison group, we selected up to three beneficiaries from the potential comparison pool for each MCCM enrollee. Matching covariates included pre-enrollment health care use, diagnoses, demographics, and survival time. Because we observed the date of death for each potential comparison beneficiary, we could match in a way that ensured balance on survival times (the number of days from entry into the study to death) between intervention and comparison beneficiaries. Balancing on survival time ensured that distributions of the length of follow-up between the intervention and comparison groups were similar, reducing the bias in impact estimates. We used an optimal matching technique well-suited to create a comparison group for an intervention with rolling enrollment.[33]

Then, we estimated variation in MCCM's effects between enrollees who identified as being from racial and ethnic minority groups (including non-Hispanic Black or African American, Asian or Pacific Islander, Hispanic ethnicity of all races, American Indian or Alaska Native, and all other races besides White) versus non-Hispanic White enrollees; dually eligible for Medicare and Medicaid versus Medicare-only enrollees; and enrollees living in rural versus non-rural areas. Medicare data can only reliably identify three racial and ethnic groups: (1) non-Hispanic White; (2) non-Hispanic Black or African American; and (3) all other racial and ethnic groups[34]; we had to combine the latter two groups into a single category of "racial and ethnic minority groups" because of limited sample sizes. For each subgroup, we estimated model effects as the regression-adjusted average difference in outcomes between enrollment and death for MCCM enrollees relative to outcomes over the same period for the matched comparison group.

2.3 | Outcomes

We examined four beneficiary outcome measures: (1) hospice use before death; (2) non-receipt of aggressive life-prolonging surgeries, procedures, or diagnostic testing in the last 30 days of life (procedures considered inappropriate at the end of life); (3) days spent at home; and (4) having no more than one emergency department (ED) visit in the last 30 days of life. We measured these outcomes from enrollment in MCCM (or pseudo-enrollment) to death. The fourth measure was not prespecified; we added it after detecting a disparity between comparison beneficiaries living in rural and non-rural areas.

2.4 | Analysis

Understanding variation in MCCM's effects across subgroups is challenging, because small subgroup sample sizes for underserved groups could lead to extreme, implausible estimates that reflect statistical noise rather than the effects of interest.[35] To address this challenge, we used Bayesian hierarchical modeling to estimate average treatment on the treated for subgroups, adjusting for beneficiary-level characteristics and pre-enrollment healthcare service use. Our model employed a data-driven framework to "borrow strength" across subgroups.[36] The Bayesian model makes structured assumptions about how subgroup impacts relate to each other and to the overall impact of the model—known as shrinkage estimation. Specifically, the Bayesian model includes group-specific impacts that account for the effects of membership in individual subgroup variables as well as the interaction among different subgroup variables (e.g., accounting for dually eligible enrollees who live in rural areas). By fitting a single, unified model that estimates impacts for all subgroups simultaneously, the Bayesian approach also guards against spurious findings due to multiple comparisons. Using a Bayesian model enabled us to directly estimate the probability that MCCM reduced disparities in outcomes. We report 90% credible intervals, which are the intervals the impacts fall into with 90% probability.

Appendix S1 provides supplemental details about the sample, data, and methodological approach. MCCM was exempt from the Common Rule (institutional review board review) per 45 CFR 46 104 (d)(5).

3 | RESULTS

The sample comprised 5153 MCCM enrollees at 79 participating hospices, a potential comparison pool of 1.9 million eligible beneficiaries, and 15,269 matched comparison beneficiaries. Two of the 81 participating hospices did not have any enrolled beneficiaries who met the study inclusion criteria outlined earlier (such as not meeting all MCCM eligibility criteria or not having died by December 31, 2021, based on Medicare claims and enrollment data), so we proceeded with the study sample of 79 participating hospices. In the study sample, 4451 MCCM enrollees identified as non-Hispanic White and 702 identified as being from racial and ethnic minority groups; 589 MCCM enrollees were dually eligible for Medicare and Medicaid and 4564 were eligible only for Medicare (i.e., not dually eligible); and 685 MCCM enrollees lived in rural areas and 4468 lived in non-rural areas. The enrollees were a small proportion of those eligible to participate and not necessarily representative of all those eligible to enroll. Notably, racial and ethnic minority, dually eligible, and rural beneficiaries were underrepresented among MCCM enrollees relative to the pool of potential comparison beneficiaries in the same regions who were not referred to MCCM (Table 1). Model enrollees resembled those who were referred to MCCM providers and eligible but did not choose to enroll, indicating that differences in beneficiary characteristics between enrollees and non-enrollees emerged in the referral process, rather than beneficiaries' enrollment choices.[32] After matching, the enrolled and comparison groups had similar survival times, demographics, health conditions, and healthcare service use in the year before enrollment, overall (Table 1) and within each of the six subgroups (Appendix S2, Table S2-1).

Because MCCM was a voluntary model, enrollees were free to exit at any time. Most MCCM enrollees (83% of enrollees in our analysis sample) transitioned to hospice and 3% left the model without choosing the hospice benefit; the remaining 13% stayed in the model until their death. Enrollees who transitioned to hospice were more likely to be non-Hispanic White and to have cancer and less likely to be dually eligible and to have CHF and COPD compared with those who stayed in the model or did not choose hospice.

Among comparison beneficiaries, hospice use and measures of the quality of end-of-life care differed between each underserved group and corresponding reference group (Table 2). Racial and ethnic minority beneficiaries in the comparison group used hospice less often, spent fewer days at home, and more often received aggressive treatments than non-Hispanic White comparison beneficiaries. There were similar disparities for dually eligible beneficiaries when compared with those eligible only for Medicare. However, dually eligible beneficiaries spent more days at home (due in part to having longer survival times). Rural comparison group beneficiaries had similar outcomes to non-rural beneficiaries but were more likely to have multiple ED visits in the last 30 days of life and spent more days at home.

MCCM increased hospice use and the number of days at home and reduced aggressive treatment for all subgroups, but model effects varied by subgroup (Table 2 and Figure 1). Specifically, MCCM reduced the racial and ethnic disparity in rates of hospice use by 4.1 percentage points (pp) (90% credible interval [CI]: 1.3–6.1 pp). This 32% reduction in the size of the disparity occurred because the model increased the rate of hospice use for racial and ethnic minority enrollees (+21.8 pp; 90% CI: 18.9–24.3 pp) to a larger degree than it did for non-Hispanic White enrollees (+17.7 pp; 90% CI: 16.3–19.1 pp). Our Bayesian analyses estimate a 98% probability that MCCM reduced this disparity.

MCCM increased the disparity in the use of aggressive treatment toward the end of life for racial and ethnic minority enrollees by 2.1 pp (90% CI: 0.2–5.6 pp)—a 45% increase in the disparity observed in the comparison group. Specifically, the model increased the percentage of enrollees without an aggressive treatment in the last 30 days of life among racial and ethnic minority MCCM enrollees (+13.6 pp; 90% CI: 10.4–15.8 pp) to a lesser degree than it did for non-Hispanic White enrollees (+15.7 pp; 90% CI: 14.2–17.3 pp). Thus, this outcome measure improved for both racial and ethnic groups, even if the size of the disparity increased. For days spent at home and having no more than one ED visit in the last 30 days of life, it is unlikely that MCCM's estimated effect varied by race and ethnicity.

For dually eligible enrollees, there is a 92% probability that MCCM reduced disparities in hospice use, with an estimated decrease in the disparity of 2.4 pp (90% CI: 0.6–4.4 pp). This represents a 20% reduction in the disparity in hospice use by dual-eligibility status. Both

TABLE 1 Baseline characteristics: Potential comparison pool, matched comparison beneficiaries, and MCCM enrollees.

Characteristic	Potential comparison pool (N = 1,934,407)	MCCM enrollees (N = 5153)	Matched comparison group (N = 15,269)	Standardized difference after matching
Demographics				
Race and ethnicity (%)				
Non-Hispanic White	81.9	86.4	87.7	−0.037
Black or African American	10.2	8.1	8.0	0.006
Other, unknown, missing race/ethnicity	7.9	5.5	4.4	0.049
Age (years)	79.0	77.3	77.1	0.025
Female (%)	49.5	50.5	47.9	0.052
Medicare enrollment				
Dual eligibility (%)	19.4	11.4	11.4	0.000
Medicare entitlement: Old-age and survivors insurance (%)	79.0	81.6	82.1	−0.013
Location				
Rural zip code (%)	21.8	13.3	13.7	−0.012
Region (%)				
Northeast	20.6	18.6	18.8	−0.007
Midwest	28.3	19.6	19.2	0.009
South	39.0	40.2	39.6	0.011
West	12.0	21.6	22.3	−0.016
Health status				
MCCM-qualifying diagnosis (%)				
Cancer	44.6	71.8	71.7	0.001
Advanced stage cancer	33.1	53.0	53.3	−0.005
Congestive heart failure	49.5	38.0	38.0	0.000
Chronic obstructive pulmonary disease	36.0	33.4	33.4	−0.001
HIV/AIDS	0.4	0.4	0.4	0.000
Hierarchical condition category score at enrollment	4.7	5.6	5.4	0.062
Days between enrollment and death[a]	184.5	198.8	196.5	0.009
Health care use before enrollment				
Medicare Part A and B expenditures ($), previous quarter	24,458	31,211	30,621	0.023
Inpatient admissions, previous quarter	0.8	1.1	1.0	0.049
Outpatient emergency department visits and observation stays, previous quarter	0.5	0.7	0.7	0.002
Skilled nursing facility days, previous quarter	5.0	3.7	3.4	0.033
Ambulatory visits with specialist physicians, previous quarter	3.4	4.2	4.0	0.052
Ambulatory visits with specialist physicians, previous quarter	2.8	4.9	4.8	0.028
Durable medical equipment in previous year (%)	59.3	72.6	71.5	0.025
Advance care planning visit in previous 2 years (%)	11.5	21.9	16.8	0.123

Note: The analysis is based on the MCCM enrollees and potential and matched comparison beneficiaries who met all criteria for inclusion in the analysis. The second, third, and fourth columns present the intervention or comparison group mean for continuous variables or the percentage of beneficiaries for binary and categorical variables. The second column, the potential comparison pool, is based on 23,687,256 observations (copies) for 1,934,407 unique beneficiaries, with beneficiaries weighted equally. All beneficiaries in the potential comparison pool met MCCM eligibility requirements as observed in Medicare fee-for-service claims and enrollment data and lived in the market areas of MCCM hospices. See Appendix S1 for a full list of variables and further details about the sample inclusion criteria and matching.
Abbreviation: MCCM, Medicare Care Choices Model.
[a]By construction, the average number of days between enrollment (or pseudo enrollment) and death was loosely balanced before matching and tightly balanced after matching.
Source: MCCM program data, Medicare Enrollment Database, Master Beneficiary Summary File, and Medicare claims data, January 1, 2013, to December 31, 2021.

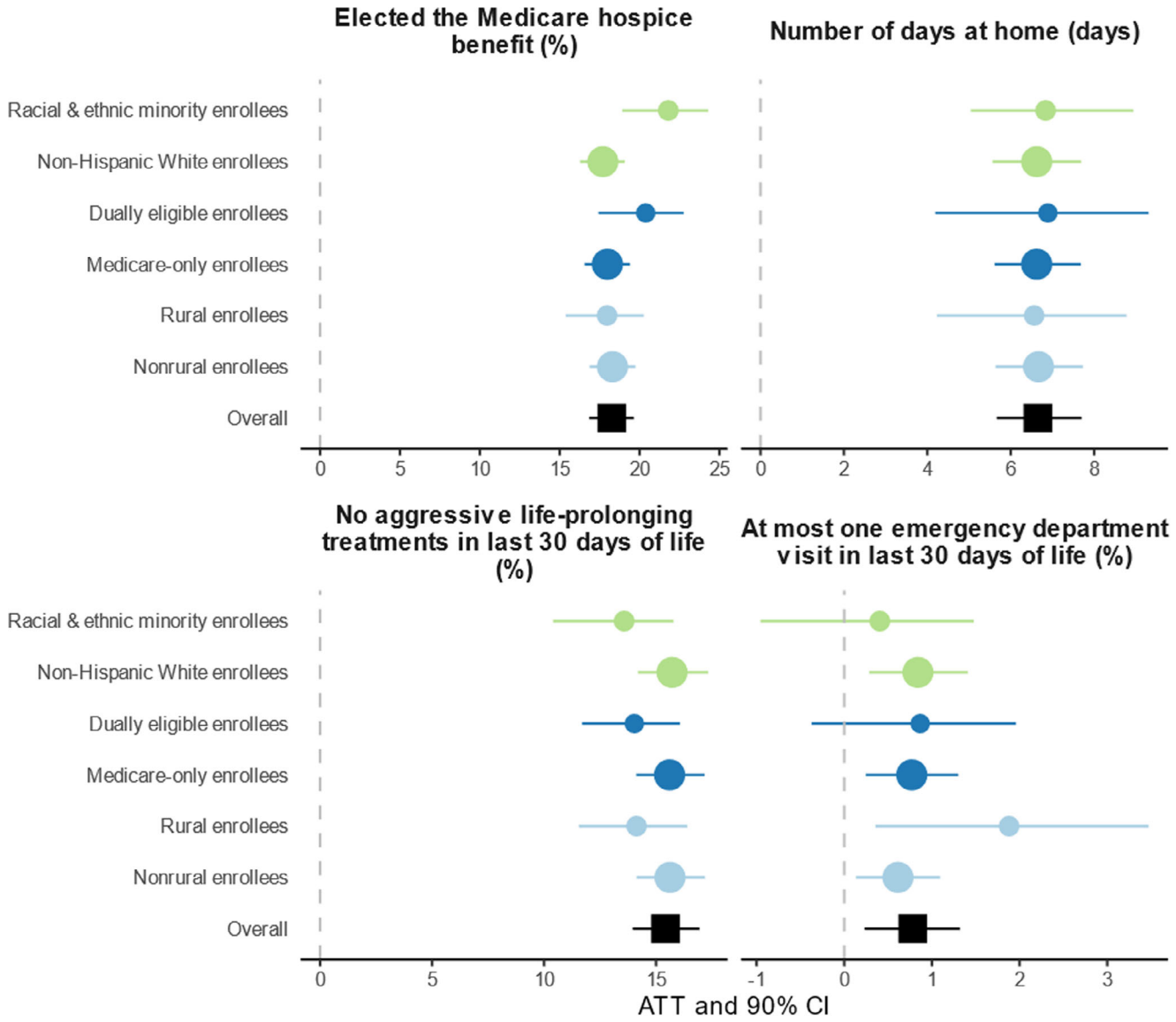

FIGURE 1 Estimated effects of Medicare Care Choices Model (MCCM), overall and in six subgroups. The analysis is based on the MCCM enrollees ($N = 5153$) and matched comparison beneficiaries ($N = 15,269$ before weighting) who met all criteria for inclusion in the analysis. There were 4451 MCCM enrollees who were non-Hispanic White and 702 who were from racial and ethnic minority groups. There were 13,418 matched comparison beneficiaries who were non-Hispanic White and 1851 who were from racial and ethnic minority groups. There were 589 MCCM enrollees who were dually eligible for Medicare and Medicaid and 4564 who were eligible only for Medicare (i.e., not dually eligible). There were 1757 matched comparison beneficiaries who were dually eligible for Medicare and Medicaid and 13,512 who were eligible only for Medicare. There were 685 MCCM enrollees living in rural areas and 4468 in non-rural areas. There were 2086 matched comparison beneficiaries living in rural areas and 13,183 in non-rural areas. *Source*: MCCM program data, Medicare Enrollment Database, Master Beneficiary Summary File, and Medicare claims data, January 1, 2013, to December 31, 2021.

dually eligible enrollees and Medicare-only enrollees increased their use of hospice, but the increase for dually eligible enrollees (+20.4 pp; 90& CI: 17.4–22.8) was larger than that for Medicare-only enrollees (+18.0 pp; 90% CI: 16.6–19.4).

There is a 95% probability that the dual-eligibility status disparity in aggressive treatments at the end of life increased; we estimated that the disparity increased by 1.6 pp (90% CI: −0.01–3.8 pp). This represents a 63% increase in the disparity in the percentage of enrollees without an aggressive treatment in the last 30 days of life, which was driven by the model having smaller impacts for dually eligible enrollees (+14.0 pp; 90% CI: 11.7–16.1) than Medicare-only enrollees (+15.6 pp; 90% CI: 14.1–17.2).

Effects on days spent at home and having no more than one ED visit in the last 30 days of life were similar for dually eligible and Medicare-only enrollees. Additional analyses suggest these patterns were largely explained by heterogeneity in model effects across other enrollee characteristics: after accounting for differences in effects attributable to differences in characteristics between dually eligible

TABLE 2 Regression-adjusted means and estimated effects of MCCM on each outcome, overall and six subgroups.

Population	Comparison group mean	MCCM mean	ATT (90% CI)	ATT difference (90% CI)	Probability disparity decreased (%)
Elected the Medicare hospice benefit (%)					
Race and ethnicity				4.1 (1.3, 6.1)	98
Racial & ethnic minority enrollees	53.6	75.4	21.8 (18.9, 24.3)		
Non-Hispanic White enrollees	66.6	84.3	17.7 (16.3, 19.1)		
Dual status				2.4 (−0.6, 4.4)	92
Dually eligible enrollees	55.4	75.9	20.4 (17.4, 22.8)		
Medicare-only enrollees	66.1	84.0	18.0 (16.6, 19.4)		
Geography				−0.3 (−2.8, 1.8)	43
Rural enrollees	63.0	80.9	18.0 (15.4, 20.3)		
Non-rural enrollees	65.2	83.4	18.3 (16.9, 19.7)		
Overall	64.9	83.1	18.3 (16.8, 19.6)		
No aggressive life-prolonging treatments in last 30 days of life (%)					
Race and ethnicity				−2.1 (−5.6, −0.2)	3
Racial & ethnic minority enrollees	19.4	33.0	13.6 (10.4, 15.8)		
Non-Hispanic White enrollees	24.0	39.7	15.7 (14.2, 17.3)		
Dual status				−1.6 (−3.8, 0.0)	5
Dually eligible enrollees	21.1	35.2	14.0 (11.7, 16.1)		
Medicare-only enrollees	23.7	39.3	15.6 (14.1, 17.2)		
Geography				−1.5 (−3.9, 0.4)	10
Rural enrollees	23.8	37.9	14.1 (11.5, 16.4)		
Non-rural enrollees	23.3	38.9	15.6 (14.1, 17.2)		
Overall	23.4	38.8	15.4 (14.0, 16.9)		
Number of days at home (days)					
Race and ethnicity				0.2 (−1.6, 2.4)	52
Racial & ethnic minority enrollees	167.3	174.2	6.8 (5.0, 8.9)		
Non-Hispanic White enrollees	178.4	185.0	6.6 (5.6, 7.7)		
Dual status				0.3 (−2.6, 2.5)	62
Dually eligible enrollees	218.1	225.0	6.9 (4.2, 9.3)		
Medicare-only enrollees	171.6	178.2	6.6 (5.6, 7.7)		
Geography				−0.1 (−2.5, 2.1)	48
Rural enrollees	197.2	203.7	6.6 (4.2, 8.8)		
Non-rural enrollees	173.8	180.5	6.7 (5.6, 7.7)		
Overall	176.9	183.6	6.7 (5.7, 7.7)		
At most one emergency department visit in last 30 days of life (%)					
Race and ethnicity				−0.4 (−1.9, 0.5)	32
Racial & ethnic minority enrollees	96.6	97.0	0.4 (−1.0, 1.5)		
Non-Hispanic White enrollees	96.8	97.6	0.8 (0.3, 1.4)		
Dual status				0.1 (−1.1, 0.9)	64
Dually eligible enrollees	95.2	96.1	0.9 (−0.4, 2.0)		
Medicare-only enrollees	96.9	97.7	0.8 (0.2, 1.3)		

(Continues)

TABLE 2 (Continued)

Population	Comparison group mean	MCCM mean	ATT (90% CI)	ATT difference (90% CI)	Probability disparity decreased (%)
Geography				1.3 (−0.1, 2.7)	94
Rural enrollees	92.2	94.0	1.9 (0.4, 3.5)		
Non-rural enrollees	97.4	98.0	0.6 (0.1, 1.1)		
Overall	96.7	97.5	0.8 (0.2, 1.3)		

Note: The analysis is based on the MCCM enrollees ($N = 5153$) and matched comparison beneficiaries ($N = 15,269$ before weighting) who met all criteria for inclusion in the analysis. There were 4451 MCCM enrollees who were non-Hispanic White and 702 who were from racial and ethnic minority groups. There were 13,418 matched comparison beneficiaries who were non-Hispanic White and 1851 who were from racial and ethnic minority groups. There were 589 MCCM enrollees who were dually eligible for Medicare and Medicaid and 4564 who were eligible only for Medicare (i.e., not dually eligible). There were 1757 matched comparison beneficiaries who were dually eligible for Medicare and Medicaid and 13,512 who were eligible only for Medicare. There were 685 MCCM enrollees living in rural areas and 4468 in non-rural areas. There were 2086 matched comparison beneficiaries living in rural areas and 13,183 in non-rural areas. *ATT* is the estimated average treatment effect on the treated. *ATT difference* is the difference in the *ATT* between the underserved and reference groups. *Probability* refers to the probability of reducing the disparity and is computed as the probability that the difference in ATTs between the underserved and reference groups is greater than zero. *CI* is the estimated credible interval for each for *ATT* or *ATT difference*. In our Bayesian framework, the bounds of a 90% CIs are calculated as the 5th and 95th percentiles of the posterior distribution.
Abbreviation: MCCM, Medicare Care Choices Model.
Source: MCCM program data, Medicare Enrollment Database, Master Beneficiary Summary File, and Medicare claims data, January 1, 2013, to December 31, 2021.

and other enrollees, MCCM neither increased nor decreased the disparity for dually eligible and Medicare-only enrollees for any outcomes (Appendix S2, Table S2-4).

For rural enrollees, there is a 94% probability that MCCM reduced disparity in the probability of having multiple ED visits in the last 30 days of life; we estimated the size of the reduction in disparity at 1.3 pp (90% CI: −0.1–2.7 pp). MCCM reduced this outcome to a larger degree for rural enrollees (−1.9 pp; 90% CI: −3.5 to −0.4 pp) than it did for non-rural enrollees (−0.6 pp; 90% CI: −1.1 to −0.1 pp), thereby reducing the disparity by 25%. For the other three outcome measures—hospice use, aggressive treatments, and days spent at home—it is unlikely that MCCM's effects differed for rural and non-rural enrollees.

4 | DISCUSSION

This study assessed whether MCCM—a CMS alternative payment model that allowed Medicare beneficiaries to receive supportive and palliative care services while continuing curative treatment of their life-limiting conditions—reduced disparities in hospice use and three measures of the quality of end-of-life care. We found, first, that MCCM enrollees were less likely to be from racial and ethnic minority groups, dually eligible for Medicaid, or living in a rural area than non-enrollees who appeared eligible for MCCM and lived in the areas served by participating hospices. Second, for all subgroups in our analysis, MCCM increased hospice use, increased days at home, and reduced the receipt of aggressive life-prolonging treatment. For enrollees in rural areas, MCCM reduced the probability of multiple ED visits in the last 30 days of life. Third, Bayesian hierarchical modeling shows that, with greater than 90% probability, MCCM reduced disparities in hospice use for enrollees from racial and ethnic minority groups and disparities in ED use at the end of life for enrollees in rural areas. Finally, MCCM likely increased disparities in receiving aggressive treatments in the last 30 days of life for racial and ethnic minority and dually eligible enrollees.

Racial and ethnic disparities in hospice use are widely documented and persistent over time.[10–12,19] Studies have shown race and ethnicity are among the strongest predictors of hospice enrollment; this association is only partially mediated by socioeconomic status.[37,38] Although MCCM was not explicitly designed to address these disparities, it nonetheless achieved larger increases in hospice use among enrollees from racial and ethnic minority groups. This outcome might have resulted in part from addressing barriers to hospice use that are more prevalent among racial and ethnic minority groups. First, comparison group beneficiaries from racial and ethnic minority groups initially had lower rates of hospice use, suggesting more opportunity to increase hospice use for this subgroup. Allowing beneficiaries to continue receiving curative treatments while in MCCM likely contributed. Second, MCCM likely increased enrollees' knowledge of the Medicare hospice benefit by providing similar palliative care in a home setting. Lower health literacy, perhaps due to limited outreach by hospice providers in racial and ethnic minority communities, may contribute to limited uptake of hospice services.[25,26] Third, hospice staff built rapport with MCCM enrollees while providing services, which has been shown to influence beneficiaries' opinions about hospice and is disproportionately a barrier in racial and ethnic minority communities.[25,26,39]

A sharper decline in aggressive treatments in the last 30 days of life among non-Hispanic White enrollees was somewhat counterintuitive, because we hypothesized hospice use, which increased the most for enrollees from racial and ethnic minority groups, would reduce such treatments.[31,32] These patterns might, instead, reflect the care preferences among groups of enrollees. In other settings, more Black patients expressed a desire for more aggressive treatment at the end of their lives, and sometimes did not receive this level of care.[26]

The reduced disparity between rural and non-rural enrollees in ED visits at the end of life might be due to MCCM improving pain and symptom management with palliative and supportive services. People from rural areas are generally more likely to use the ED, in part due to limited access to other outpatient services; MCCM likely addressed this gap by providing a palliative care alternative to ED visits.[18,40] Unlike in past studies, we did not find disparities in hospice use among rural and non-rural beneficiaries in our sample.[41]

This study has several limitations. First, the hospices participating in MCCM were not representative of all hospices nationwide and enrolled only a small fraction of all beneficiaries referred to and eligible for the model.[32] Second, our analysis included only Medicare beneficiaries who died, rather than measuring model effects for all enrollees. Both limitations affect the generalizability of our results. Third, because enrollment in the model was voluntary, we cannot rule out that MCCM enrollees differed from the comparison group along unobserved factors, biasing estimates of model effects for subgroups. Finally, sample sizes were limited. However, hierarchical Bayesian modeling enabled us to explore variation in effects across each underserved subgroup while achieving adequate statistical precision to reach informative conclusions about the model's effect on disparities. Our modeling approach "borrowed strength" across subgroups in a structured way, making the subgroup-specific estimates more reliable and interpretable. Despite using a Bayesian approach, we had to collapse several race and ethnicity categories into a single "racial and ethnic minority beneficiary" category; sample sizes did not support more granular analysis.

Altogether, this study's results indicate MCCM established a stepping stone to hospice care and improved enrollees' quality of end-of-life care, meeting an important need for terminally ill model enrollees from three underserved groups: (1) racial and ethnic minority beneficiaries, (2) dually eligible beneficiaries, and (3) beneficiaries living in rural areas. It also reduced some disparities in outcomes. Thus, CMS' experiences with MCCM provide valuable lessons about the benefits of offering supportive and palliative care services at the end of life concurrently with curative or chronic treatments. However, the model included relatively few beneficiaries from these three groups, likely because the groups were generally underrepresented among the beneficiaries served by hospices that volunteered to participate in MCCM. That, along with low overall enrollment in the model, means that the model had small aggregate effects on disparities in hospice use for the overall Medicare program. Recent CMS policy innovations to advance health equity might help organizations—including those providing support to underserved groups—ensure beneficiaries receive high-quality end-of-life care that addresses their needs.[42] CMS has created a health equity strategic plan to address underrepresentation in future models.[28–30,43]

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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