

## FINAL REPORT

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# Impact of Transitional Care Management Services on Utilization, Health Outcomes, and Spending Among Medicare Beneficiaries, 2018-2019

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# Impact of Transitional Care Management Services on Utilization, Health Outcomes, and Spending Among Medicare Beneficiaries, 2018-2019

The Physician-Focused Payment Model Technical Advisory Committee (PTAC) conducted a theme-based discussion on improving management of care transitions in population-based models during the Committee's June 12-13, 2023, public meeting. Prior to the June 2023 public meeting, the Office of the Assistant Secretary for Planning and Evaluation (ASPE) requested the development of a report on the "Impact of Transitional Care Management Services on Utilization, Health Outcomes, and Spending among Medicare Beneficiaries, 2018 - 2019" to provide additional context on the role care transition management activities can play in optimizing care transitions and value-based transformation under Alternative Payment Models (APMs) in Medicare. This quantitative analysis<sup>i</sup> provides information on the effect of transitional care management (TCM) services on rehospitalizations, total cost of care (TCOC), and selected health outcomes (healthy days at home, and mortality) for fee-for-service (FFS) Medicare beneficiaries. This report builds on the "*Analysis of 2019 Medicare Fee-for-Service Claims for Chronic Care Management (CCM) and Transitional Care Management (TCM) Services*" that was conducted as a follow-up to the Physician-Focused Payment Model Technical Advisory Committee's (PTAC's) June 2021 theme-based discussion on care coordination in the context of APMs.

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# Executive Summary

The transition from hospital discharge to home or another community-based setting can be a vulnerable time for patients as they undergo changes in health care settings and the individuals responsible for their care. As a result, transitions of care out of the hospital can lead to negative health outcomes<sup>1</sup> and higher health care costs.<sup>2</sup> In 2013, the Centers for Medicare & Medicaid Services (CMS) created care management codes to reimburse providers for their time spent on care coordination activities that go beyond a traditional evaluation and management visit. At this time, CMS created two codes for transitional care management (TCM) services to ensure that providers were reimbursed for managing patients' care during their transition from an approved inpatient setting (such as a hospital, skilled nursing facility, or community mental health center) to a community setting.

TCM is an evidence-based intervention that improves care transitions for older adult patients with chronic health conditions by supporting patients' health goals and encouraging continuity of care across settings and providers.<sup>3</sup> Day-to-day delivery of TCM services is coordinated by a physician or a qualified non-physician practitioner who works with patients and their families, caregivers, and clinicians to provide patient-centered care. The TCM service period is 30 days following discharge from an approved inpatient setting. During this timeframe, providers must (1) contact patients and/or patients' caregivers within two business days following discharge; (2) provide patients with non-face-to-face services (e.g., reviewing discharge documents); and (3) provide patients with one face-to-face office or telehealth visit within seven days (high complexity) or 14 days (moderate complexity) following discharge. Evidence shows that, within the first three years that TCM services were covered by Medicare, receiving TCM services was associated with lower health care costs and reduced mortality among Medicare beneficiaries 31 to 60 days after discharge.<sup>4</sup>

The objective of this report is to assess the extent to which the integration of TCM services 31 to 60 days post-discharge following an inpatient stay in a short-term acute care hospital is associated with fewer rehospitalizations and mortalities, lower total cost of care, and more healthy days at home, relative to usual care among Medicare fee-for-service (FFS) beneficiaries. Two-level hierarchical multivariate regression models were run that accounted for patient-level and hospital-level characteristics to assess the impact of TCM services relative to a propensity score weighted comparison group. Rehospitalization, mortality, rehospitalization or mortality, healthy days at home, and total cost of care within 31 to 60 days following discharge from index hospitalization served as the outcome variables.

Overall, results suggest that TCM services improve utilization, health outcomes, and spending for Medicare FFS beneficiaries. During the second month after discharge, beneficiaries who received TCM services following a short-term acute care hospital stay had a 5.6 percent lower rate of rehospitalization, 7.8 percent lower total Medicare spending under Parts A and B, and almost one-third of an additional healthy day at home relative to beneficiaries who did not receive TCM services.

# Introduction

This report summarizes key findings from an analysis of the impact of transitional care management services on outcomes measured using Medicare claims. This report builds on the *“Analysis of 2019 Medicare Fee-for-Service Claims for Chronic Care Management (CCM) and Transitional Care Management (TCM) Services”* that was conducted as a follow-up to the Physician-Focused Payment Model Technical Advisory Committee’s (PTAC’s) June 2021 theme-based discussion on care coordination in the context of Alternative Payment Models (APMs).

TCM is a service offered to assist eligible Medicare FFS beneficiaries during the transition from an approved inpatient setting, such as an inpatient acute care hospital, inpatient psychiatric hospital, inpatient rehabilitation facility, long-term care hospital, skilled nursing facility, hospital outpatient observation or partial hospitalization, or partial hospitalization at a community mental health center to a community setting.<sup>ii</sup> The 30-day TCM service period begins immediately upon discharge from an approved inpatient setting. Requirements for health professionals providing TCM services to patients include:

- Accepting patients at the time of post-facility discharge, without a service gap;
- Taking responsibility for a patient’s care;
- Communicating with the patient or caregiver within two business days of discharge;
- Making a medical decision of at least moderate complexity (CPT 99495) or high complexity (CPT 99496) for patients with medical or psychosocial conditions; and
- Having a face-to-face visit within 14 days (CPT 99495) or seven days (CPT 99496).

Our prior study found that only 17.9 percent of eligible Medicare beneficiaries discharged from short-term acute care hospitals in 2019 received TCM services. Beneficiaries who were women, white, older, and aligned with Accountable Care Organizations (ACOs) were more likely to have received TCM services. This study used a cross-sectional design to assess the impact of receiving TCM services after an initial hospital discharge on important outcomes, relative to a propensity score weighted comparison group getting usual care without TCM services after initial hospital discharge. The following five outcomes were measured between the 31<sup>st</sup> and 60<sup>th</sup> days following discharge from index hospitalization in 2018 and 2019:

- Rehospitalization;
- Mortality;
- Rehospitalization or mortality;
- Total cost of care for Medicare Part A and Part B services; and

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<sup>ii</sup> For the purpose of this study, we focused on TCM services provided after a short-term acute care hospital stay.

- Healthy days at home (HDAH).<sup>iii</sup>

Based on this analysis, Medicare FFS beneficiaries receiving TCM services following a short-term acute care hospital stay have statistically lower rehospitalization rates (0.6 percentage points) and total cost of care (\$236 per episode), and statistically higher healthy days at home (0.32 days) relative to the comparison group. The mortality rate for Medicare beneficiaries receiving TCM services following a short-term acute care hospital stay is slightly higher (0.10 percentage point) compared to the comparison group, but the difference is not statistically significant.

## Background

In 2013, Medicare introduced two CPT codes, 99495 and 99496<sup>iv</sup> for transitional care management to reimburse providers for assisting patients during the transition from an approved inpatient setting (such as a hospital, skilled nursing facility [SNF], or community mental health center) to a community setting. CPT 99496 covers TCM services for patients with higher complexity.

To be eligible to use TCM codes, a provider must support a beneficiary's transition to a community setting after discharge from an approved inpatient setting, accept responsibility for the beneficiary's care immediately following their discharge from the inpatient facility, and engage in high complexity medical decision-making in caring for the beneficiary receiving TCM services. Providers billing Medicare for TCM must complete the following specific activities:<sup>v</sup>

1. Communicate with the patient or caregiver within two business days of discharge;
2. Make a medical decision of at least moderate complexity (CPT 99495) or high complexity (CPT 99496); and
3. Have a face-to-face visit within 14 days (CPT 99495) or seven days (CPT 99496) of their discharge from an inpatient facility.

Although TCM services have been covered by Medicare since 2013, the adoption rate of TCM has been relatively slow. For example, only 9.3 percent of eligible Medicare FFS beneficiaries received TCM services in 2016, three years after the creation of the TCM codes. This slow uptake rate could be due to several reasons, such as inadequate compensation for the infrastructure required for TCM services. Prior to implementing TCM services, health care settings may need to invest a considerable

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<sup>iii</sup> Healthy days at home is a population-based measure that is calculated by subtracting the following days from the total observation period of 31 to 60 days: mortality days; the total number of days spent in inpatient, observation, skilled nursing facilities (SNF), inpatient psychiatry, inpatient rehabilitation, and long-term hospital settings; and days with outpatient emergency department and home health visits.

<sup>iv</sup> CPT code 99495 – moderate medical complexity requiring a face-to-face visit within 14 days of discharge. CPT code 99496 – high medical complexity requiring a face-to-face visit within seven days of discharge.

<sup>v</sup> <https://www.cms.gov/outreach-and-education/medicare-learning-network-mln/mlnproducts/downloads/transitional-care-management-services-fact-sheet-icn908628.pdf>

amount of up-front resources to support the delivery of TCM services (e.g., staffing, information technology) and ensure compliance. In addition, TCM codes often have specific criteria, documentation requirements, and billing formats that can place administrative burden on providers. Although leveraging health information technology could reduce the burden placed on providers delivering TCM services by increasing automation and efficiency, integration of technology in transitional care models remains suboptimal. For example, the lack of interoperability among electronic health records across practices and health systems could introduce barriers for community-based providers responsible for contacting patients within two business days following discharge. In spite of these barriers, recent evidence suggests that use of TCM has increased since 2013, potentially due to Medicare's focus on reimbursing care coordination services. For example, while 9.3 percent of eligible beneficiaries received TCM services in 2016, 17.9 percent of eligible beneficiaries received TCM services in 2019.<sup>8</sup>

In June 2021, PTAC conducted a theme-based discussion on care coordination as it relates to alternative payment models (APMs), and physician-focused payment models (PFPMs) in particular. Following the public meeting, the Office of the Assistant Secretary for Planning and Evaluation (ASPE) requested the development of an "Analysis of 2019 Medicare Fee-for-Service Claims for Chronic Care Management (CCM) and Transitional Care Management (TCM) Services" to provide additional context on the role care coordination can play in optimizing health care delivery and value-based transformation under APMs in Medicare. This report provided a baseline assessment of the use of CCM and TCM codes for Medicare FFS beneficiaries in 2019, including trends in beneficiary- and practice-level utilization of TCM services. The current report builds on the previous analysis by estimating the impact of TCM on the abovementioned health and spending outcomes after adjusting for patient and hospital characteristics.

## Methodology

This analysis used adjudicated claims for Medicare FFS beneficiaries who received TCM services from January 1, 2018, through December 31, 2019, to construct the treatment group. As shown in Figure 1, the unit of analysis for this study was episodes that start from discharge to home or community after a short-term acute care hospital stay<sup>vi</sup> (index hospitalization) and end 60 days after discharge. A Medicare beneficiary could have more than one episode depending on the number of inpatient hospitalizations during the study period. The treatment group included episodes where the beneficiary received TCM services within 30 days, and a similar propensity-score weighted comparison group comprised of episodes that did not receive TCM after an index hospitalization in this time period from 2018 to 2019. The index hospitalizations in the comparison group were selected based on the eligibility requirement for TCM services and weighted by propensity score for episodes in the treatment and comparison groups (see Figures A2 and A3 in the Appendix). The study estimated the impact of TCM on five outcomes within 31 to 60 days after discharge: (1) rehospitalization; (2) mortality; (3)

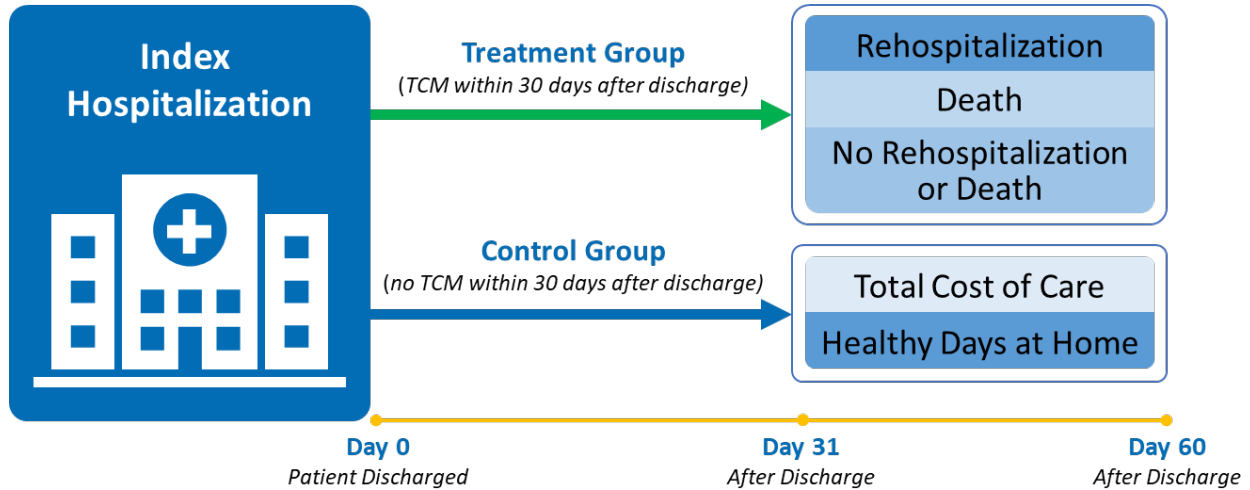
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<sup>vi</sup> For the purpose of this study, we focused on TCM services provided only after a short-term acute care hospital stay and not the other approved settings.



rehospitalization or mortality; (4) total cost of care; and (5) healthy days at home.<sup>vii</sup> The current Medicare coverage policy does not allow the provider to bill for TCM services if the patient dies within 30 days after discharge, and this limited our ability to examine the differences in 30-day mortality between TCM and non-TCM patients. We also estimated the impact of TCM on total cost of care for 60 days following discharge from index hospitalization.

**Figure 1.** Schematic Diagram for Study Design



This analysis used two-level Mixed-Effects regression models with patient/episode and hospital/community characteristics to assess the impact of TCM on the five study outcomes. These models included a logistic model for binary outcomes, including rehospitalization, mortality, and rehospitalization or mortality; generalized linear model with Tweedie distribution for total cost of care; and negative binomial model for healthy days at home. The regression models included hospital-level random effects to improve generalizability of findings. The regression models were run across all episodes (using a 5 percent sample), as well as by diagnosis-related group (DRG) for index hospitalization (using 100 percent Medicare Part A and Part B claims). The results for the overall model are included in the next section. The results of DRG-level regressions for the top 20 index hospitalization DRGs are included in Appendix B.<sup>viii</sup> A detailed description of the methodology is provided in Appendix A.

<sup>vii</sup> Burke LG, Orav EJ, Zheng J, Jha AK. Healthy Days at home: A novel population-based outcome measure. *Healthc (Amst)*. 2020 Mar;8(1):100378. doi: 10.1016/j.hjdsi.2019.100378. Epub 2019 Nov 8. PMID: 31708403.

<sup>viii</sup> The top 20 DRGs are defined as DRGs that account for highest volume of treatment group episodes in descending order.

# Results

This section summarizes findings related to the overall impact of TCM.

## Number and Characteristics of TCM Episodes

During the study period of 2018 and 2019, there were 8.4 million episodes<sup>ix</sup> that qualified for the analysis based on the criteria described in Appendix A.<sup>x</sup> Of the 8.4 million episodes qualifying for TCM services, 16 percent (1.36 million episodes) received TCM services. **Table 1** provides descriptive statistics related to patient and clinical characteristics for patients with episodes in the treatment and comparison groups. Within the treatment group of Medicare beneficiaries receiving TCM services following a short-term acute-care hospital stay, there was a higher proportion of females (a 2.1 percentage point difference), non-Hispanic whites (a 4.4 percentage point difference), and beneficiaries who were aligned with a Medicare ACO (a 14.3 percentage point difference), relative to the comparison group. Almost 53 percent of the treatment group of Medicare beneficiaries were aligned with a Medicare ACO, compared to only 38.5 percent of the comparison group of Medicare beneficiaries. Compared to the comparison group, the treatment group also included a lower proportion of beneficiaries with dual eligible status (a 3.8 percentage point difference), with end-stage renal disease (a 1 percentage point difference), and located in rural areas (a 3.9 percentage point difference).

**Table 1.** Difference between Treatment and Comparison Groups based on Patient Demographic and Clinical Characteristics

Description	Observed		Standardized		Difference of Standardized Variables
	Non-TCM	TCM	Non-TCM	TCM	
<b>Total Number of Episodes*</b>	7,031,024	1,363,998	7,031,024	1,363,998	N/A
<b>Patient Demographic Characteristics</b>					
<b>Sex</b>					
Male	46.90%	44.80%	46.6%	46.4%	0.00
Female	53.10%	55.20%	53.4%	53.6%	(0.00)
<b>Age Category</b>					

<sup>ix</sup> The unit of analysis for this study was episodes that begin from discharge after a short-term acute care hospital stay (index hospitalization) and end 60 days after discharge.

<sup>x</sup> The analysis includes qualifying episodes for Medicare FFS beneficiaries who were discharged from an inpatient hospital setting to a community setting (e.g., discharge to home [including self-care or home care with services from an organized home health service organization], nursing facility, assisted living facility, or domiciliary).

Description	Observed		Standardized		Difference of Standardized Variables
	Non-TCM	TCM	Non-TCM	TCM	
65-69 years	23.80%	17.30%	22.7%	22.7%	0.00
70-74 years	24.40%	21.50%	23.9%	23.9%	0.00
75-79 years	20.20%	21.10%	20.3%	20.3%	0.00
80-85 years	15.00%	18.10%	15.5%	15.6%	(0.00)
85-89 years	10.00%	13.20%	10.5%	10.6%	(0.00)
>=90 years	6.60%	8.80%	7.0%	7.0%	(0.00)
<b>Race</b>					
Unknown	1.20%	1.00%	1.2%	1.3%	(0.00)
Non-Hispanic White	81.00%	85.40%	81.7%	81.7%	(0.00)
Black (or African American)	8.90%	7.00%	8.6%	8.6%	(0.00)
Other	0.70%	0.60%	0.7%	0.7%	(0.00)
Asian/Pacific Islander	2.00%	1.80%	2.0%	2.2%	(0.00)
Hispanic	5.40%	4.00%	5.2%	5.2%	0.00
American Indian/Alaska Native	0.70%	0.20%	0.7%	0.3%	0.00
<b>Other Characteristics</b>					
Dual Eligible Status	17.30%	13.50%	16.7%	16.8%	(0.00)
Disabled Status	16.60%	15.10%	16.4%	16.5%	(0.00)
End-Stage Renal Disease	3.50%	2.50%	3.4%	3.4%	0.00
Rural	26.00%	22.10%	25.4%	25.7%	(0.00)
Medicare ACO Alignment*	38.50%	52.80%	38.7%	52.2%	N/A
<b>Prior Health Care Utilization</b>					
Emergency department visit six months prior to index hospitalization	36.20%	35.00%	36.6%	33.7%	N/A

Description	Observed		Standardized		Difference of Standardized Variables
	Non-TCM	TCM	Non-TCM	TCM	
Inpatient admission six months prior to index hospitalization	33.60%	33.60%	34.2%	31.2%	N/A

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Note: The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

\* This analysis focused on TCM services provided only after a short-term acute care hospital stay, and not the other approved settings. We applied propensity score weighting to balance groups on demographic characteristics.

\*\*Medicare ACO Alignment is defined as Medicare beneficiaries participating in any of the following value-based models: Medicare Shared Savings Program (MSSP), Next Generation Accountable Care Organization (NGACO), Comprehensive ESRD Care (CEC) Model, Vermont All-Payer ACO Model, and Maryland’s Total Cost of Care Model.

## Overall Impact of TCM

As shown in **Table 2**, for 31 to 60 days following discharge from index hospitalization, treatment group beneficiaries experienced 5.6 percent lower rate of rehospitalization (10.09 percent versus 10.69 percent, respectively, a difference of -0.6 percentage points), 7.8 percent lower total Medicare spending under Parts A and B (\$2,803.15 versus \$3,039.26 respectively, a difference of \$236.11/episode), and 1.3 percent increase or almost one-third of an additional day of healthy days at home (25.88 versus 25.56, respectively, a difference of 0.32). The differences between the treatment and comparison groups for rehospitalization, rehospitalization or mortality, total cost of care, and healthy days at home were statistically significant ( $P < 0.001$ ). Post-discharge mortality within 31 to 60 days was 0.10 percentage points higher for the treatment group (1.63 percent versus 1.53 percent, respectively), but the difference was not statistically significant.

**Table 2.** Difference between Treatment and Comparison Groups Risk-Adjusted Rehospitalization Rate, Mortality, Rehospitalization or Mortality, Total Cost of Care, and Healthy Days at Home

Outcome Variables	Unadjusted Average		Regression Adjusted Means (95% Confidence Interval [CI])		
	Treatment	Comparison Group	Treatment	Comparison Group	Difference
Rehospitalization (31 to 60 days) %	10.05	10.13	10.09 (9.72-10.46)	10.69 (10.38-11.00)	(0.60)**
Mortality (31 to 60 days) %	1.61	1.39	1.63 (1.48-1.79)	1.53 (1.41-1.65)	0.10
Rehospitalization or Mortality (31 to 60 days) %	10.98	10.94	11.22 (10.84-11.62)	11.81 (11.49-12.15)	(0.59)**
Total Cost of Care (31 to 60 days) \$	2933.67	3278.86	2803.15 (2749.59-2857.75)	3039.26 (2994.43-3084.76)	(236.11)**
Total Cost of Care (1 to 60 days) \$	6520.80	7702.13	6303.53 (6206.73-6401.85)	7300.63 (7214.19-7388.10)	(997.10)**
Healthy Days at Home (31 to 60 days)	26.65	26.59	25.88 (25.81-25.95)	25.56 (25.52-25.61)	0.32**

Notes: The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay. Total cost of care is defined as Medicare Parts A and B spending between the 31st and 60th day following index hospitalization. It does not include Medicare spending for Part D services. Healthy days at home was calculated by subtracting the following days from the total observation period of 31 to 60 days: mortality days; the total number of days spent in inpatient, observation, skilled nursing facilities (SNF), inpatient psychiatry, inpatient rehabilitation, and long-term hospital settings; and days with outpatient emergency department and home health visits. Source: Analysis of 5% sample of Medicare Part A and Part B claims for 2018 and 2019. Statistical significance is shown at the 1% (\*\*) level.

We also examined the difference in total Medicare spending under Parts A and B during the entire period of 60 days following discharge from index hospitalization and found that per-episode Medicare spending on care for the treatment group was almost 13 percent lower or \$997.10 lower than Medicare spending for the comparison group. The wide gap between the Medicare spending for 31 to 60 day versus 1 to 60 day is likely due to the high rate of rehospitalization among the comparison group during the first 30 days after discharge from acute care hospitalization. We examined only the total cost of care for 60 days following discharge from index hospitalization as the other outcome variables of mortality, rehospitalization, and healthy days at home for 30 days following discharge might be biased due to the exclusion of beneficiaries who died within 30 days following discharge.

## Reduction in Medicare Spending Due to TCM

Based on our findings (see **Table 2**), the two-year (2018 and 2019) Medicare reduction in spending under Parts A and B (TCOC) associated with TCM services provided after qualifying short-term acute care hospital stays was estimated to be approximately \$321 million (1.36 million TCM episodes times \$236.11) for 31 to 60 days and approximately \$1.36 billion (1.36 million TCM episodes times \$997.10) for 60 days after discharge from index hospitalization. On a yearly basis, Medicare cost savings due to TCM were estimated to be approximately \$160 million for 31 to 60 days and approximately \$680 million for 60 days following discharge from index hospitalization.

The reduction in the rehospitalization rate due to TCM could have largely contributed to the Medicare cost savings. The average Medicare spending per rehospitalization was \$15,500 in 2018.<sup>5</sup> The lower 31-to-60-day rehospitalization rate for Medicare beneficiaries receiving TCM services was estimated to yield Medicare cost savings of approximately 127 million (1.36 million TCM episodes times \$15,500 times the -0.6 percentage point difference in the 31-to-60-day rehospitalization rate) over the two-year period or approximately \$68 million on a yearly basis. Medicare cost savings due to reduction in 31-to-60-day rehospitalization comprised 39.5 percent (\$127 million divided by \$321 million) of the overall 31-to-60-day two-year Medicare cost savings due to TCM.

The current adoption rate of 16.2 percent for TCM services following qualifying short-term acute care hospital stays resulted in two-year Medicare cost savings of approximately \$321 million and annual Medicare cost savings of approximately \$160 million for 31-to-60 days following discharge from index hospitalization, as stated above. If the adoption rate were to increase by one percent (resulting in approximately 1.45 million TCM episodes over two years), two-year Medicare cost savings for 31 to 60 days following index hospitalization would increase to approximately \$341.9 million (1.45 million TCM episodes times \$236.11) and the annual Medicare cost savings following index hospitalization would increase to approximately \$170.9 million (\$341.9 divided by 2).

Based on our propensity score model, we found approximately seven million qualifying episodes in 2018 and 2019 that were eligible to receive TCM services but did not receive TCM services. As an upper bound, if this entire eligible population of approximately seven million qualifying episodes received TCM services, there would be additional 31-to 60 day two-year Medicare cost savings of

approximately \$1.66 billion (7.03 million total qualifying episodes that did not receive TCM services times \$236.11).<sup>xi</sup> As a lower bound, if the weighted comparison group (representing 1.36 million qualifying episodes) received TCM services, the 31-to-60-day two-year Medicare cost savings would increase by approximately \$321 million (1.36 million qualifying episodes from the comparison group that did not receive TCM services times \$236.11).

## Study Limitations

This study was subject to several limitations.

Analyses were limited to hospital discharges specifically from inpatient hospital settings as part of study design. Confining the study population to hospitals allowed us to control for hospital characteristics, as well as clinical characteristics, such as DRGs. However, TCM services can be provided after discharges from other settings, including inpatient psychiatric hospitals, inpatient rehabilitation facilities, long-term care hospitals, skilled nursing facilities, hospital outpatient observation or partial hospitalizations, and partial hospitalizations at community mental health centers.<sup>xii</sup> Of the total episodes that received TCM services across these settings in 2018 and 2019, approximately 64 percent were for short-term acute care hospital discharges.

Practice-level covariates were not included in the analysis. The analysis used patient-level and hospital-level characteristics as covariates in the regression models to determine the impact of TCM on the outcome variables. Although characteristics of physician practices providing TCM services could influence patient-level outcomes, the analysis did not include physician characteristics due to data limitations. TCM is typically provided by primary care physicians.<sup>6</sup> However, recent trends indicate that TCM services are also provided by specialists. Given this situation, it would have been difficult for us to assume that the comparison group could have potentially received TCM services from a primary care practice. Consequently, we could not include the practice-level covariates for the comparison group's primary group practice.

Physicians and qualified non-physicians can bill for TCM services only within 30 days from discharge. This restriction limits the possibility of including data on TCM services for patients who died within 30 days from discharge. Thus, this analysis could not assess the impact of TCM services for patients who died within 30 days of discharge from index hospitalization. If a greater proportion of beneficiaries who received TCM services died within the first 30 days following discharge compared to beneficiaries who

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<sup>xi</sup> This represents estimated two-year savings associated with reductions in 31-to-60-day rehospitalizations due to TCM services provided after a short-term acute care hospital stay. It does not include potential savings related to reductions associated with provision of TCM services during the transition from another approved inpatient setting.

<sup>xii</sup> For the purpose of this study, we focused on TCM services provided only after a short-term acute care hospital stay and not the other approved settings.

did not receive TCM services, results may overestimate the beneficial impact of TCM services on rehospitalization, healthy days at home, and/or total cost of care.

The analysis focused on the impact of TCM between the 31st and 60th day following discharge from index hospitalization. However, the impact of TCM services on rehospitalizations, total cost of care, and healthy days at home could extend beyond 60 days after discharge. For example, results from a randomized clinical trial showed that the benefits of similar transitional care management services on preventing rehospitalization could extend to 24 weeks following discharge.<sup>7</sup>

Other interventions, such as family and caregiver engagement, could have as strong of an influence on the patient outcomes as TCM services but were not included due to lack of available data.

## Discussion and Conclusion

Overall results of this report suggest that use of TCM services is associated with lower rehospitalization rates, more healthy days at home, and lower total cost of care relative to usual care without TCM services. Despite these promising findings, only 16 percent of discharges from short-term acute care hospitals received TCM services in 2018 and 2019. Further investigation of patient-level and practice-level characteristics associated with use and delivery of TCM services could help to identify where additional efforts should be made to increase uptake of TCM services, as well as identify patients who would benefit the most from TCM services.

Based on our analysis, Medicare beneficiaries who were women, white, older, non-dually eligible for Medicaid and Medicare services, and residents of metropolitan areas were more likely to have received TCM services in 2018 and 2019. About 53 percent of TCM services were provided to Medicare beneficiaries who were aligned with a Medicare ACO, compared to 38.5 percent for the comparison group. Given this finding, it will be valuable to understand the effect of TCM services in value-based care models, such as Medicare ACOs. Reducing patient-level barriers to receiving care coordination services, such as eliminating patient co-payments for care coordination services,<sup>8</sup> could potentially increase adoption of TCM.

Although the current analysis did not include practice-level covariates, use of TCM services varied by practice-level characteristics. Previous analyses showed that, compared to practices that did not deliver TCM services, primary care practices, larger practices (i.e., practices with 25 or more providers), and practices affiliated with an ACO were more likely to bill services as TCM.<sup>7</sup> When compared to smaller practices, larger practices were likely to have more beneficiaries eligible for TCM services and may be more likely to have the necessary resources to develop the infrastructure to provide TCM services. Although the TCM codes were originally intended by CMS to be used most frequently by primary care providers, 21.2 percent of TCM claims in 2016 were billed by a practice other than the patient's primary care practice.<sup>8</sup> Increasing specialists' delivery of TCM services could increase adoption of TCM



services. In addition, increasing the delivery of TCM services in settings outside the office, such as home-based care, could increase uptake of TCM services.<sup>9</sup>

There may be a dose-response relationship between exposure to TCM services and patient outcomes, such that increased use of TCM services improves care coordination and therefore reduces risk for rehospitalization and other adverse events. For example, a recent study focused on the impact of TCM services on rehospitalization in a rural primary care system showed that patients who received complete TCM services (tracking episodes, calls, visits) had significantly fewer rehospitalizations compared to patients who did not receive complete TCM services. Findings suggested that the delivery of all three TCM services may be necessary to observe the benefits of TCM services.<sup>10</sup>

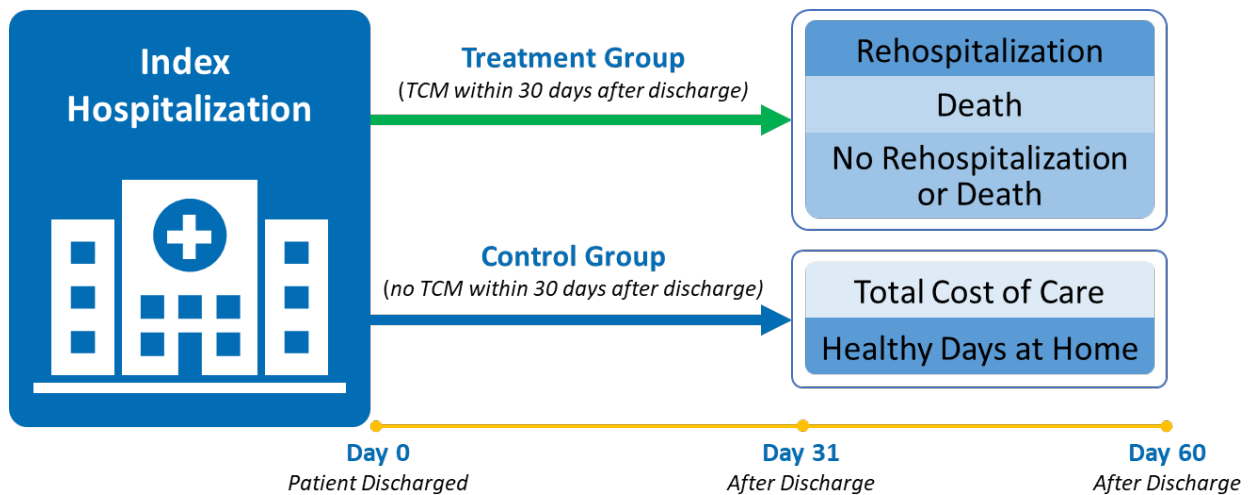
Results from this report suggest that TCM services have a positive impact on reducing rehospitalizations, increasing healthy days at home, and reducing total cost of care relative to usual care without TCM services following a qualifying short-term acute care hospital stay. These benefits were observed in the second month following discharge from index hospitalization.

# Appendix A: Methodology

## Study Population

This analysis was limited to Medicare FFS beneficiaries who were discharged from an inpatient hospital setting to a community setting<sup>xiii</sup> (discharge to home or nursing facility, assisted living facility, or domiciliary). The unit of analysis for this study was episodes that begin from discharge after a short-term acute care hospital stay (index hospitalization) and end 60 days after discharge (see **Figure A1**). The treatment group was comprised of episodes that received TCM within 30 days after index hospitalization discharge, and a control group was comprised of episodes that did not receive TCM in this time period. This analysis measured the following outcomes for the two groups 31 to 60 days after discharge: 1) rehospitalization; 2) mortality; 3) rehospitalization or mortality; 4) total cost of care; and 5) healthy days at home. Index hospitalizations where discharge was a direct transfer, i.e., the discharge date from the prior inpatient hospitalization preceded the admission to the index hospitalization by one calendar day or less, were not considered as rehospitalizations and were combined with prior index hospitalizations as one hospitalization in this analysis.

**Figure A1.** Schematic Diagram for Study Design



The eligible index hospitalizations were those for patients discharged to home/self-care (patient discharge status code 01), home care with services from an organized home health service organization (patient discharge status code 06), or intermediate care facility (patient discharge status code 04). They excluded discharges for beneficiaries who:

- Did not have at least 60 days of post-discharge enrollment in Medicare FFS;

<sup>xiii</sup> <https://www.cms.gov/outreach-and-education/medicare-learning-network-mln/mlnproducts/downloads/transitional-care-management-services-fact-sheet-icn908628.pdf>

- Were aged <65 years;
- Received hospice care services within 30 days of discharge; or
- Died within 30 days after discharge (based on the Master Beneficiary Summary File [MBSF]).

Theoretically, 30-day mortality could differ between TCM and non-TCM patients, but according to Medicare payment policy, TCM services are paid as office visits if the patient dies within 30 days. This will limit the feasibility of identifying claims for TCM services for patients who died within 30 days.

## Data Source

This analysis used Medicare FFS claims and MBSFs from June 2017 to Feb 2020. Claims from 2018 and 2019 were used to construct treatment and comparison episodes. Claims from 2017 were included to identify beneficiaries' utilization on inpatient hospitalizations and emergency department (ED) visits. The first two months of 2020 claims were used to follow index hospitalization up to 60 days to create outcome variables.

## Identification of TCM Services

TCM was identified by a claim with one of the relevant CPT codes (99495 and 99496<sup>xiv</sup>) and a service date within 30 days after discharge of index hospital admission. CPT 99496 covers TCM services for patients with high complexity, compared to CPT 99495.

## Selection of Comparison Group based on Propensity Score Weighting

The comparison group included episodes when beneficiaries were discharged from a short-term acute care hospital to a community setting and did not receive any TCM services within 30 days after discharge. Beneficiaries were not randomized to the TCM treatment and non-TCM comparison group. Propensity score weighting was applied to ensure that treatment and comparison group episodes were similar on observed characteristics. We used logit models to predict the probability (propensity score) of an episode being in the treatment group by DRG. The beneficiary- and community-level confounding variables used in propensity score weighting are shown in **Table A1**. The propensity score was used in an Average Treatment Effect on the Treated (ATT) weighting<sup>xv</sup>. TCM beneficiaries were assigned a

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<sup>xiv</sup> CPT code 99495 – moderate medical complexity requiring a face-to-face visit within 14 days of discharge. CPT code 99496 – high medical complexity requiring a face-to-face visit within seven days of discharge.

<sup>xv</sup> Applying Propensity Score Methods in Clinical Research in Neurology Peter C. Austin, PhD, Amy Ying Xin Yu, MD, MSc, Manav V. Vyas, MD, PhD, and Moira K. Kapral, MD, MSc Neurology© 2021;97:856-863. doi:10.1212/WNL.0000000000012777

weight of one, and comparison beneficiaries were assigned a weight of  $\Psi/(1-\Psi)$ , where  $\Psi$  is the beneficiary’s propensity score.<sup>xvi</sup>

**Table A1.** Covariates for Propensity Score Weighting

Variable	Description
Age	Age at the end of year
Race	RTI race code
ESRD	End-stage renal disease status
Disability	Disability status
Dual eligible	Dual eligible status
Chronic Condition Flags	<b>Thirty chronic conditions:</b> Acute Myocardial Infarction; Alzheimer’s Disease; Anemia; Asthma; Atrial Fibrillation and Flutter; Benign Prostatic Hyperplasia; Breast Cancer; Colorectal Cancer; Endometrial Cancer; Lung Cancer; Prostate Cancer; Urologic Cancer; Cataract; Chronic Kidney Disease; Chronic Obstructive Pulmonary Disease; Depression, Bipolar, or Other Depressive Mood Disorders; Diabetes; Glaucoma; Heart Failure and Non Ischemic Heart Disease; Hip/Pelvic Fracture; Hyperlipidemia; Hypertension; Hypothyroidism; Ischemic Heart Disease; Non-Alzheimer’s Dementia; Osteoporosis; Parkinson’s Disease; Pneumonia; Rheumatoid Arthritis/ Osteoarthritis; and Stroke/Transient Ischemic Attack. <sup>xvii</sup>
Rural flag	The rural designation uses the rural ZIP codes file that the Federal Office of Rural Health Policy (FORHP) created <sup>xviii</sup> .
Health Professional Shortage Area	Health professional shortage areas from Area Health Resources Files (2019): Whole county or partial county
Primary Care Providers per 10,000 population	County-level primary care providers per 10,000 population derived from Area Health Resources Files (2019)
Median Household Income	County-level median household income from Agency for Healthcare Research and Quality (AHRQ) Social Determinants of Health (SDOH 2019) file
Licensed nursing home (NH) beds count	County-level licensed NH beds count from AHRQ Social Determinants of Health (SDOH 2019) file
Social deprivation index (SDI)	County-level rankings of neighborhoods by socioeconomic disadvantage <sup>xix</sup>
Medicare Severity Diagnosis-Related Groups (MS DRG)	MS DRG of index hospitalization; DRGs that had <500 episodes in treatment group were divided into 10 groups based on the combination of DRG type (Medical and Surgical) and quintile distribution of DRG relative weights.
Length of stay (LOS)	LOS for index hospitalization reflects patient acuity

<sup>xvi</sup> Imai, Kosuke, and Marc Ratkovic. "Covariate balancing propensity score." *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 76, no. 1 (2014): 243-263.

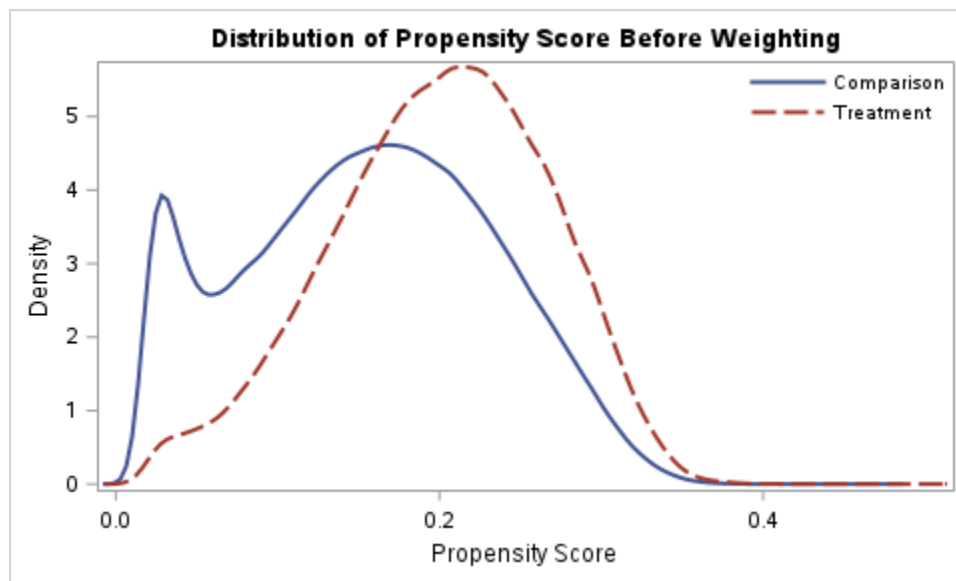
<sup>xvii</sup> <https://www2.ccwdata.org/web/quest/condition-categories-chronic>

<sup>xviii</sup> <https://www.hrsa.gov/rural-health/about-us/what-is-rural/data-files>

<sup>xix</sup> <https://www.graham-center.org/maps-data-tools/social-deprivation-index.html>

After propensity scores were estimated, we implemented additional checks to assess the weighting in the comparison group. First, we examined the propensity score common support (Kernel plots) before and after weighting. As shown in **Figure A2**, we confirmed that there were fewer than 10 comparison group episodes that had weights greater than three, which were considered as outliers and trimmed. Second, we calculated the standardized mean difference (SMD) of individual covariates before and after weighting<sup>xx</sup>. The SMD (<0.1) indicates a balance of covariate distribution between treatment and comparison groups as shown in Figure A3. All covariates in the propensity score model were included in the subsequent analysis of weighted regression models for the outcomes to increase the robustness of the regression adjustment.<sup>xxii</sup>

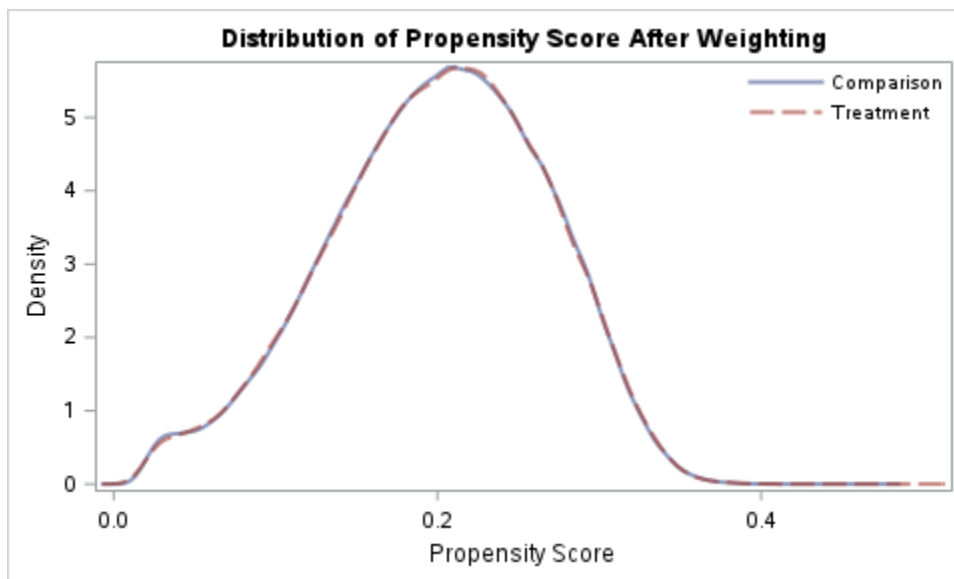
**Figure A2.** Distribution of Propensity Score



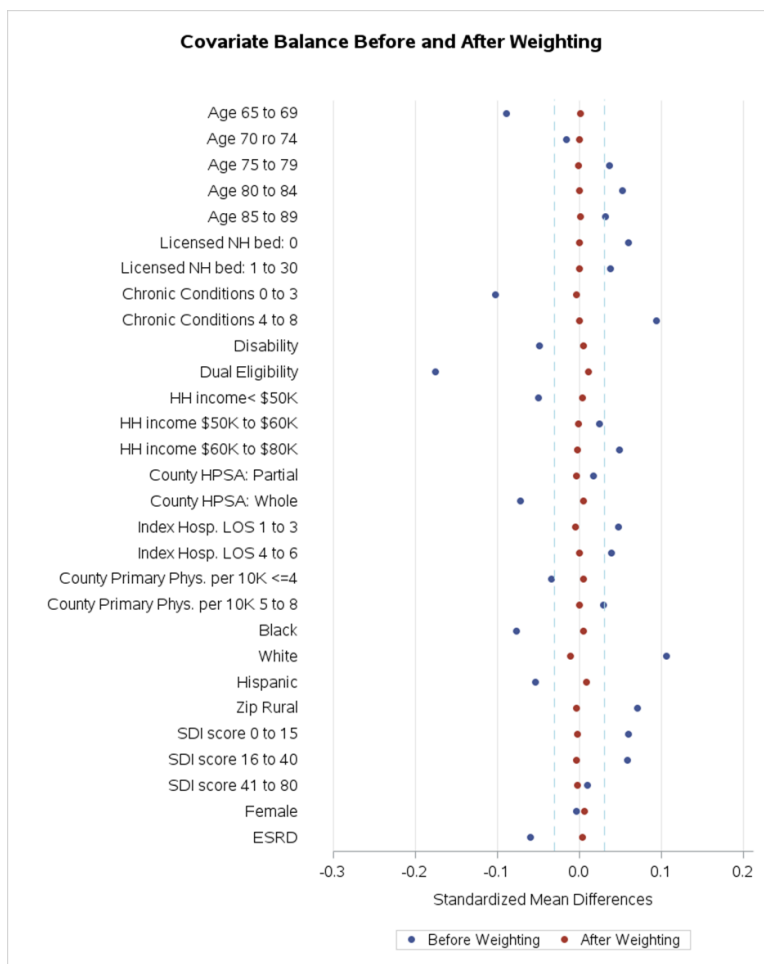
<sup>xx</sup> Austin, P. C. (2009). "Balance Diagnostics for Comparing the Distribution of Baseline Covariates between Treatment Groups in Propensity-Score Matched Samples." *Statistics in Medicine* 28:3083–3107.

<sup>xxi</sup> Zhang Z, Kim HJ, Lonjon G, Zhu Y; written on behalf of AME Big-Data Clinical Trial Collaborative Group. Balance diagnostics after propensity score matching. *Ann Transl Med.* 2019 Jan;7(1):16. doi: 10.21037/atm.2018.12.10. PMID: 30788363; PMCID: PMC6351359.

<sup>xxii</sup> Stuart EA. Matching methods for causal inference: A review and a look forward. *Stat Sci.* 2010 Feb 1;25(1):1-21. doi: 10.1214/09-STS313. PMID: 20871802; PMCID: PMC2943670.



**Figure A3.** Propensity Score Covariate Balance: Standardized Mean Differences Before and After Weighting



## Dependent Variables

1. **31-to-60-Day Rehospitalization:** The primary dependent variable for the logistic regression was 31-to-60-day rehospitalization. For each episode, a dichotomous variable indicating rehospitalization within 31 to 60 days after discharge from index admission was created. This analysis leveraged the CMS methodology for the hospital-wide risk standardized rehospitalization measure to define planned rehospitalizations, which were not counted in the outcome.<sup>xxiii</sup> Recent trends indicate that more than 50 percent of the decline in rehospitalizations for certain conditions can be attributed to the recategorization of inpatient stays to observation stays.<sup>11</sup> Given this phenomenon, the number of observation days during the same period of 31 to 60 days after discharge from index hospitalization was separately examined.
2. **31-to-60-Day Mortality:** The 31-to-60-day mortality variable was based on the date of mortality in the MBSF and patient discharge status of mortality for the rehospitalization within 31 to 60 days.
3. **31-to-60-Day Rehospitalization or Mortality:** In addition, this analysis included a third dependent variable, which was a combination of the aforementioned dependent variables. Since mortality and rehospitalization often trade off against each other (i.e., higher mortality leads to lower rehospitalizations), a combined dependent variable can capture the effect on either mortality or rehospitalization.
4. **Total Cost of Care:** This variable, defined as Medicare Part A and Part B spending for beneficiaries 31 to 60 days after index hospitalization, was included as a cost outcome. Values for total cost of care were winsorized at 99.5<sup>th</sup> percentile.
5. **Healthy Days at Home:** This is a new population-based measure that is calculated by subtracting the following measure components from 365 days: mortality days; the total number of days spent in inpatient, observation, skilled nursing facilities (SNF), inpatient psychiatry, inpatient rehabilitation, and long-term hospital settings; and the number of outpatient emergency department and home health visits.<sup>12</sup> Since this study primarily focused on a 31-to-60-day time period, this measure excluded the components mentioned above from a period of 30 days starting at 31 days after discharge from index hospitalization.<sup>xxiv</sup>

## Explanatory Variables

The regression controls were for the following beneficiary demographic and clinical characteristics: age; sex; chronic condition flags; dual eligibility (Medicare and Medicaid); race (see Table A2); and resided in urban versus rural. In addition to the demographic and clinical characteristics, the regression models incorporated explanatory variables gauging the clinical severity, or prognostic of the episode. These included DRG relative weights, length of stay of index hospitalization, inpatient hospitalizations in the

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<sup>xxiii</sup> Centers for Medicare & Medicaid Services. Readmission Measures Methodology. Accessed August 30, 2021. <https://qualitynet.cms.gov/inpatient/measures/readmission/methodology>

<sup>xxiv</sup> Healthy days at home is typically calculated for an entire year (365 days), but this analysis focused on HDAH for 31 to 60 days post index hospitalization.

past six months before index hospitalization, and emergency department visits in the past six months before index hospitalization. The regression models’ explanatory variables also included a dichotomous variable if patients were aligned with Medicare ACOs: Medicare Shared Savings Program (MSSP), Next Generation Accountable Care Organization (NGACO), Comprehensive ESRD Care (CEC) Model, Vermont All-Payer ACO Model, and Maryland’s Total Cost of Care Model. Hospital factors such as hospital ownership, teaching status, hospital size, hospital system status, and community-level factors, were collected from CMS’ provider of service (POS), American Hospital Association (AHA) annual survey database file (2018), American Community Survey (AHS 2015-2019), Area Health Resources Files (AHRF 2019), and AHRQ Social Determinants of Health (SDOH 2019) file. Hospital ownership was categorized as Government, Private, and Church/Nonprofit. Teaching status was defined as major, minor, and non-teaching as reported under medical school affiliation in the POS file. Hospital also was categorized as a system hospital if it was reported in the AHA survey with a health care system ID. The county-level variables included social deprivation index, primary care physician supply per 10,000 population, licensed nursing home bed counts, and median household income. The county-level variables were further grouped into three or four categories. The coefficient of interest was the binary variable for the provision of TCM services.

## Regression Specifications

This analysis relied upon cross-section multivariate mixed-effect regression approaches to compare the outcomes between treatment and comparison groups. TCM has been covered by Medicare since 2013, but the slow adoption rate in the earlier years prevented a difference-in-difference analysis. Table A2 provides a synopsis of specifications for the multiple regressions. For total cost of care and healthy days at home, this analysis used a generalized linear model (GLM) with appropriate functional form for the dependent variables. All the regressions listed in the table below used the same explanatory variables.

**Table A2.** Regression Specifications

Dependent Variable	Statistical Approach	Regression Models	Covariates Included
31-to-60-Day Rehospitalization	Two-level hierarchical logistic regression model <sup>xxv, xxvi</sup> , was employed with random intercepts and fixed effects. The assumption was that the covariates’ effects were fixed among the hospital and community factors, whereas the mean effect of each hospital was allowed to vary because of the	<ul style="list-style-type: none"> <li>• <b>Overall</b> (including all episodes)</li> <li>• <b>DRG-specific</b> (DRGs with less than 1,000 episodes for the treatment group were grouped into quintiles by medical</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Patient demographic characteristics</b> – age, sex, race, dual-eligible status, disabled and end-stage renal disease, aligned with an ACO</li> <li>• <b>Clinical characteristics</b> – chronic conditions, prior ED visits in the last six</li> </ul>

<sup>xxv</sup> George Y. Wong & William M. Mason (1985) The Hierarchical Logistic Regression Model for Multilevel Analysis, Journal of the American Statistical Association, 80:391, 513-524, DOI: [10.1080/01621459.1985.10478148](https://doi.org/10.1080/01621459.1985.10478148)  
<sup>xxvi</sup> <https://lexjansen.com/wuss/2006/analytics/ANL-Dai.pdf>



Dependent Variable	Statistical Approach	Regression Models	Covariates Included
	data's nested nature to take into account the natural clustering construction of patient nested within hospital.	and surgical DRGs.)	months before index hospitalization, prior inpatient hospitalization, participation in an ACO, length of stay in index hospitalization, DRG relative weight • <b>Socioeconomic characteristics (by patient county)</b> – household income, social deprivation index, supply of primary care physicians per capita • <b>Hospital characteristics</b> – number of licensed beds, hospital ownership, affiliation with medical school, and part of hospital system
31-to-60-Day Mortality			
31-to-60-Day Rehospitalization and Mortality			
Total Cost of Care (TCOC)	The distribution of the dependent variable 31 to 60 days medical expenditure contained a high proportion of zero and right-skewed positive values. Tweedie regression model <sup>xxvii, xxviii</sup> , a special case of exponential dispersion models, and distributions for generalized linear models, were applied to fit. TCOC was also examined by fitting a negative binomial regression model. The risk-adjusted estimates of TCOC from both models were close. The Tweedie model performed better when comparing the Akaike Information Criterion (AIC).		
Healthy Days at Home (HDAH)	Negative binomial model, <sup>xxix, xxx</sup> which was applicable to restricted count data, accounted for the inflation in the proportion of zero and 30 days, and provided an overall intervention effect on the entire distribution of the dependent variable as HDAH had overrepresentation of both zero and maximum value of 30 days.		

<sup>xxvii</sup> Tweedie distributions for fitting semicontinuous health care utilization cost data <https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-017-0445-y>

<sup>xxviii</sup> Models for continuous nonnegative response data that contain many zeros <https://support.sas.com/kb/68/202.html>

<sup>xxix</sup> Too many zeros and/or highly skewed? A tutorial on modelling health behavior as count data with Poisson and negative binomial regression <https://www.tandfonline.com/doi/epdf/10.1080/21642850.2021.1920416?needAccess=true&role=button>

<sup>xxx</sup> Hospital-Free Days: A Pragmatic and Patient-centered Outcome for Trials among Critically and Seriously Ill Patients <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8534616/>

## Appendix B: DRG-Level Results

This section summarizes the results of DRG-level regressions for the top 20 index hospitalization DRGs. The top 20 DRGs are defined as index hospitalization DRGs that account for highest volume of treatment group episodes in descending order.

The top 20 DRGs<sup>xxx1</sup> for index hospitalization comprise almost 46 percent of the episodes for beneficiaries receiving TCM services. These are all medical DRGs with the exception of DRG 247 (Percutaneous Cardiovascular Procedures with Drug-Eluting Stent without Major Complication or Comorbidity) and DRG 470 (Major Hip and Knee Joint Replacement or Reattachment of Lower Extremity without Major Complication or Comorbidity) that relate to surgical services.

### Impact of TCM on 31-to-60-Day Rehospitalization, Mortality, Total Cost of Care, and Healthy Days at Home, and 1-to-60-Day Total Cost of Care

Table B1 shows the difference (Treatment minus Comparison group) for all the study outcomes for the top 20 DRGs. This table is broadly categorized into medical and surgical DRGs and then sorted by DRG relative weight<sup>xxxii</sup> for index hospitalization. This allowed us to examine if Medicare beneficiaries with higher index hospitalization DRG relative weights benefitted more from TCM services relative to those with lower index hospitalization DRG relative weights.

Tables B2 through B7 provide additional information on the difference between the treatment and comparison groups for the top 20 DRGs for each of the individual study outcomes.

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<sup>xxx1</sup> Top 20 DRGs are defined as index hospitalization DRGs that account for highest volume of treatment group episodes in descending order.

<sup>xxxii</sup> Each DRG weight represents the average resources required to care for cases in that particular DRG, relative to the average resources used to treat cases in all DRGs.

**Table B1.** Difference between Treatment and Comparison Groups on 31-to-60-Day Risk-Adjusted Rehospitalization Rate, Mortality, Total Cost of Care, and Healthy Days at Home, and 1-to-60-Day Total Cost of Care by Top 20 DRGs for Index Hospitalization (Sorted in Descending Order by DRG Relative Weight)

DRG	Description	DRG Relative Weight	Difference between Treatment and Comparison Groups					
			Rehospitalization (31 to 60 days) %	Mortality (31 to 60 days) %	Rehospitalization or Mortality (31 to 60 days) %	Total Cost of Care (31 to 60 days) \$	Total Cost of Care (1 to 60 days) \$	Healthy Days at Home (31 to 60 days)
<b>Medical DRG</b>								
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	1.8231	-1.31**	-0.28**	-1.59**	-486.93**	-1501.02**	0.59**
291	Heart Failure and Shock W MCC	1.4761	-1.54**	0.38**	-1.32**	-470.76**	-1534.44**	0.39**
193	Simple Pneumonia and Pleurisy W MCC	1.3733	-0.98**	0.13	-0.99**	-400.29**	-1238.47**	0.40**
189	Pulmonary Edema and Respiratory Failure	1.2198	-1.80**	0.28**	-1.72**	-498.47**	-1382.15**	0.47**
190	Chronic Obstructive Pulmonary Disease W MCC	1.1528	-1.42**	0.07	-1.43**	-342.10**	-1077.89**	0.40**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	1.0547	-1.24**	-0.22**	-1.37**	-417.41**	-1161.15**	0.48**
378	Gastrointestinal Hemorrhage W CC	0.9704	-0.99**	0.02	-1.03**	-306.41**	-1057.19**	0.39**
292	Heart Failure and Shock W CC	0.9589	-1.49**	0.23**	-1.28**	-469.34**	-1466.38**	0.38**
194	Simple Pneumonia and Pleurisy W CC	0.9333	-0.97**	0.03	-0.98**	-399.49**	-1069.36**	0.36**
683	Renal Failure W CC	0.9293	-1.43**	0.06	-1.47**	-552.98**	-1540.31**	0.50**
191	Chronic Obstructive Pulmonary Disease W CC	0.9178	-1.32**	0.24**	-1.15**	-382.53**	-1049.18**	0.41**

DRG	Description	DRG Relative Weight	Difference between Treatment and Comparison Groups					
			Rehospitalization (31 to 60 days) %	Mortality (31 to 60 days) %	Rehospitalization or Mortality (31 to 60 days) %	Total Cost of Care (31 to 60 days) \$	Total Cost of Care (1 to 60 days) \$	Healthy Days at Home (31 to 60 days)
603	Cellulitis W/O MCC	0.8503	-0.84**	0.06	-0.79**	-309.05**	-864.54**	0.42**
312	Syncope and Collapse	0.7965	-0.74**	0.11	-0.61*	-186.90**	-618.69**	0.18**
690	Kidney and Urinary Tract Infections W/O MCC	0.7946	-1.33**	-0.18**	-1.50**	-466.71**	-1287.60**	0.52**
309	Cardiac Arrhythmia and Conduction Disorders W CC	0.7721	-0.35	0.15**	-0.26	-258.14**	-1030.85**	0.17**
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	0.7594	-1.08**	-0.04	-1.11**	-361.39**	-1042.25**	0.38**
641	Miscellaneous Disorders of Nutrition, Metabolism, Nutrition, Fluids and Electrolytes W/O MCC	0.7461	-0.99**	-0.07	-10.00**	-484.70**	-1471.82**	0.50**
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	0.5626	-0.15	0.13**	-0.04	-137.65**	-496.74**	0.03
<b>Surgical DRG</b>								
247	Percutaneous Cardiovascular Procedures W Drug-Eluting Stent W/O MCC	2.1158	-0.31	0.08	-0.28	-94.48**	-518.29**	0.07*
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	2.0544	0.07	0.10**	0.14	-3.96	32.29	-0.02

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) and 5% (\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation.

The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

Percent of Treatment Group Episodes represents the percent of treatment episodes qualifying for TCM.

**Table B2.** Difference between Treatment and Comparison Groups on 31-to-60-Day Risk-Adjusted Rehospitalization Rate for Top 20 DRGs for Index Hospitalization (Sorted in Ascending Order based on Difference between Treatment and Comparison Groups)

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
189	Pulmonary Edema and Respiratory Failure	MED	1.85	21.19	14.18	17.26	13.56 (12.93-14.22)	15.36 (14.82-15.91)	-1.80**
291	Heart Failure and Shock W MCC	MED	5.94	22.68	17.44	20.25	16.55 (16.14-16.97)	18.09 (17.75-18.45)	-1.54**
292	Heart Failure and Shock W CC	MED	1.46	20.92	14.97	17.21	14.99 (14.25-15.75)	16.48 (15.89-17.09)	-1.49**
683	Renal Failure W CC	MED	1.89	20.59	11.70	13.73	11.46 (10.89-12.06)	12.89 (12.41-13.38)	-1.43**
190	Chronic Obstructive Pulmonary Disease W MCC	MED	2.28	21.64	13.96	16.61	12.72 (12.18-13.28)	14.14 (13.69-14.60)	-1.42**
690	Kidney and Urinary Tract Infections W/O MCC	MED	1.94	18.41	9.41	11.31	9.25 (8.77-9.76)	10.58 (10.2-10.98)	-1.33**
191	Chronic Obstructive Pulmonary Disease W CC	MED	1.22	20.87	14.49	16.89	13.17 (12.43-13.95)	14.49 (13.89-15.12)	-1.32**

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	MED	5.72	21.56	11.07	13.51	10.56 (10.23-10.89)	11.87 (11.6-12.16)	-1.31**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	MED	2.54	21.93	8.12	9.91	8.55 (8.10-9.02)	9.79 (9.41-10.18)	-1.24**
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	MED	2.50	19.40	8.03	9.61	8.3 (7.88-8.75)	9.38 (9.03-9.73)	-1.08**
378	Gastrointestinal Hemorrhage W CC	MED	2.69	22.83	8.96	10.26	8.71 (8.27-9.17)	9.69 (9.32-10.09)	-0.99**
641	Miscellaneous Disorders Of Nutrition, Metabolism, Fluids and Electrolytes W/O MCC	MED	1.35	19.52	9.07	10.64	9.29 (8.70-9.92)	10.28 (9.81-10.76)	-0.99**
193	Simple Pneumonia and Pleurisy W MCC	MED	2.39	22.67	10.65	12.62	9.76 (9.28-10.26)	10.74 (10.33-11.16)	-0.98**

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
194	Simple Pneumonia and Pleurisy W CC	MED	2.33	22.45	8.05	9.45	8.02 (7.58-8.47)	8.98 (8.62-9.35)	-0.97**
603	Cellulitis W/O MCC	MED	1.56	20.30	8.95	10.08	8.86 (8.31-9.45)	9.70 (9.25-10.17)	-0.84**
312	Syncope and Collapse	MED	1.17	19.37	8.02	9.11	7.62 (7.04-8.24)	8.36 (7.89-8.86)	-0.74**
309	Cardiac Arrhythmia and Conduction Disorders W CC	MED	1.64	19.77	9.79	10.37	10.24 (9.65-10.86)	10.59 (10.13-11.06)	-0.35
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	MED	1.23	17.59	5.55	5.59	6.83 (6.23-7.47)	6.97 (6.52-7.45)	-0.15
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	SURG	1.32	3.27	2.38	1.69	2.79 (2.15-3.62)	2.32 (2.01-2.68)	0.48
247	Percutaneous Cardiovascular Procedures W Drug-Eluting	SURG	1.67	10.35	7.50	6.44	6.34 (5.32-7.53)	5.68 (4.95-6.49)	0.66

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
	Stent W/O MCC								

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) and 5% (\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation

The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

Percent of Treatment Group Episodes represents the percent of treatment episodes qualifying for TCM.



**Table B3.** Difference between Treatment and Comparison Groups on 31-to-60-Day Risk-Adjusted Mortality by Top 20 DRGs for Index Hospitalization (Sorted in Ascending Order based on Difference between Treatment and Comparison Groups)

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Mortality %		Regression-Adjusted Means for 31-to-60-Day Mortality (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	MED	5.72	21.56	1.98	2.48	1.98 (1.84-2.13)	2.26 (2.14-2.39)	-0.28**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	MED	2.54	21.93	0.82	1.11	0.92 (0.78-1.08)	1.13 (1.00-1.28)	-0.22**
690	Kidney and Urinary Tract Infections W/O MCC	MED	1.94	18.41	0.98	1.23	0.90 (0.76-1.07)	1.08 (0.96-1.21)	-0.18**
641	Miscellaneous Disorders Of Nutrition, Metabolism, Fluids and Electrolytes W/O MCC	MED	1.35	19.52	1.35	1.53	1.33 (1.11-1.59)	1.40 (1.23-1.59)	-0.07

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Mortality %		Regression-Adjusted Means for 31-to-60-Day Mortality (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	MED	2.50	19.4	0.71	0.78	0.63 (0.52-0.76)	0.67 (0.59-0.77)	-0.04
378	Gastrointestinal Hemorrhage W CC	MED	2.69	22.83	1.06	1.08	1.04 (0.89-1.21)	1.02 (0.90-1.15)	0.02
194	Simple Pneumonia and Pleurisy W CC	MED	2.33	22.45	1.31	1.39	1.34 (1.16-1.55)	1.31 (1.18-1.46)	0.03
683	Renal Failure W CC	MED	1.89	20.59	1.84	1.82	1.87 (1.63-2.14)	1.81 (1.63-2.01)	0.06
603	Cellulitis W/O MCC	MED	1.56	20.3	0.85	0.82	0.89 (0.72-1.10)	0.83 (0.71-0.98)	0.06
190	Chronic Obstructive Pulmonary Disease W MCC	MED	2.28	21.64	1.77	1.74	1.60 (1.40-1.82)	1.53 (1.38-1.69)	0.07

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Mortality %		Regression-Adjusted Means for 31-to-60-Day Mortality (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
247	Percutaneous Cardiovascular Procedures W Drug-Eluting Stent W/O MCC	SURG	1.67	18.94	0.29	0.22	0.36 (0.25-0.53)	0.28 (0.2-0.37)	0.08
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	SURG	1.32	3.24	0.11	0.04	0.18 (0.11-0.31)	0.08 (0.06-0.11)	0.10**
312	Syncope and Collapse	MED	1.17	19.37	1.08	0.96	0.87 (0.69-1.10)	0.76 (0.64-0.92)	0.11
193	Simple Pneumonia and Pleurisy W MCC	MED	2.39	22.67	2.03	2.04	2.11 (1.88-2.37)	1.98 (1.81-2.17)	0.13
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	MED	1.23	17.59	0.42	0.26	0.38 (0.26-0.55)	0.25 (0.18-0.34)	0.13**

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Mortality %		Regression-Adjusted Means for 31-to-60-Day Mortality (95% CI) %		Difference %
					Treatment	Comparison	Treatment	Comparison	
309	Cardiac Arrhythmia and Conduction Disorders W CC	MED	1.64	19.77	1.24	1.08	1.07 (0.46-2.47)	0.92 (0.40-2.12)	0.15**
292	Heart Failure and Shock W CC	MED	1.46	20.92	2.49	2.26	2.28 (1.99-2.61)	2.05 (1.84-2.28)	0.23**
191	Chronic Obstructive Pulmonary Disease W CC	MED	1.22	20.87	1.55	1.33	1.54 (1.29-1.83)	1.30 (1.14-1.48)	0.24**
189	Pulmonary Edema and Respiratory Failure	MED	1.85	21.19	2.57	2.42	2.70 (2.39-3.04)	2.42 (2.20-2.66)	0.28**
291	Heart Failure and Shock W MCC	MED	5.94	22.68	3.35	2.97	3.01 (2.83-3.21)	2.63 (2.50-2.78)	0.38**

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation; TPA – Tissue Plasminogen Activator  
 The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.  
 Percent of Treatment Group Episodes represents the percent of treatment episodes qualifying for TCM.

**Table B4.** Difference between Treatment and Comparison Groups on 31-to-60-Day Risk-Adjusted Rehospitalization Rate or Mortality for Top 20 DRGs for Index Hospitalization (Sorted in Ascending Order based on Difference between Treatment and Comparison Groups)

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate or Mortality %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate or Mortality (95% CI) %		Difference%
					Treatment	Comparison	Treatment	Comparison	
189	Pulmonary Edema and Respiratory Failure	MED	1.85	22.83	15.63	18.65	15.32 (16.02-14.65)	17.04 (17.62-16.48)**	-1.72**
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	MED	5.72	22.68	12.25	15.06	11.86 (12.22-11.52)	13.45 (13.75-13.16)**	-1.59**
690	Kidney and Urinary Tract Infections W/O MCC	MED	1.94	21.93	9.99	12.07	9.84 (10.36-9.35)	11.34 (11.75-10.94)**	-1.50**
683	Renal Failure W CC	MED	1.89	19.40	12.70	14.77	12.59 (13.21-11.99)	14.06 (14.57-13.56)**	-1.47**
190	Chronic Obstructive Pulmonary Disease W MCC	MED	2.28	21.56	14.88	17.55	13.63 (14.21-13.07)	15.06 (15.53-14.59)**	-1.43**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	MED	2.54	20.59	8.62	10.58	9.21 (9.69-8.74)	10.58 (10.99-10.19)**	-1.37**
291	Heart Failure and Shock W MCC	MED	5.94	21.19	19.27	21.85	18.37 (18.81-17.94)	19.69 (20.06-19.33)**	-1.32**
292	Heart Failure and Shock W CC	MED	1.46	20.30	16.41	18.43	16.4 (17.20-15.64)	17.68 (18.31-17.07)**	-1.28**

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate or Mortality %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate or Mortality (95% CI) %		Difference%
					Treatment	Comparison	Treatment	Comparison	
191	Chronic Obstructive Pulmonary Disease W CC	MED	1.22	17.59	15.40	17.63	14.16 (14.96-13.39)	15.31 (15.95-14.69)**	-1.15**
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	MED	2.50	21.64	8.45	10.07	8.79 (9.25-8.35)	9.9 (10.27-9.55)**	-1.11**
378	Gastrointestinal Hemorrhage W CC	MED	2.69	20.92	9.52	10.87	9.36 (9.84-8.90)	10.39 (10.80-10.00)**	-1.03**
641	Miscellaneous Disorders Of Nutrition, Metabolism, Fluids and Electrolytes W/O MCC	MED	1.35	19.37	9.95	11.60	10.3 (10.96-9.67)	11.3 (11.80-10.81)**	-1.00**
193	Simple Pneumonia and Pleurisy W MCC	MED	2.39	18.41	11.79	13.80	11.07 (11.61-10.56)	12.06 (12.51-11.63)**	-0.99**
194	Simple Pneumonia and Pleurisy W CC	MED	2.33	20.87	8.80	10.25	8.88 (9.36-8.42)	9.86 (10.24-9.48)**	-0.98**
603	Cellulitis W/O MCC	MED	1.56	22.45	9.43	10.52	9.45 (10.06-8.88)	10.24 (10.73-9.78)**	-0.79**
312	Syncope and Collapse	MED	1.17	3.27	8.70	9.66	8.28 (8.93-7.68)	8.89 (9.40-8.41)*	-0.61*

DRG	Description	TYPE	Percent of Treatment Group Episodes	Percent of Episodes Receiving TCM	Unadjusted 31-to-60-Day Rehospitalization Rate or Mortality %		Regression-Adjusted Means for 31-to-60-Day Rehospitalization Rate or Mortality (95% CI) %		Difference%
					Treatment	Comparison	Treatment	Comparison	
247	Percutaneous Cardiovascular Procedures W Drug-Eluting Stent W/O MCC	SURG	1.67	19.52	4.76	4.89	5.82 (6.38-5.31)	6.10 (6.56-5.68)	-0.28
309	Cardiac Arrhythmia and Conduction Disorders W CC	MED	1.64	22.67	10.47	10.97	10.95 (11.59-10.34)	11.21 (11.70-10.75)	-0.26
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	MED	1.23	19.77	5.78	5.72	7.11 (7.77-6.50)	7.15 (7.63-6.69)	-0.04
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	SURG	1.32	3.27	1.70	1.45	2.77 (3.15-2.42)	2.63 (2.82-2.45)	0.14

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) and 5% (\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation

The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

Percent of Treatment Group Episodes represents the percent of treatment episodes qualifying for TCM.

**Table B5.** Difference between Treatment and Comparison Groups on 31-to-60-Day Total Cost of Care for Top 20 DRGs for Index Hospitalization (Sorted in Ascending Order based on Difference between Treatment and Comparison Groups)

DRG	Description	TYPE	Unadjusted 31 - 60 day Total Cost of Care \$		Regression-Adjusted Means for 31- 60 day Total Cost of Care (95% CI) \$		Difference \$
			Treatment	Comparison	Treatment	Comparison	
683	Renal Failure W CC	MED	3,427.48	4,064.42	3267.95 (3199.18-3338.19)	3820.93 (3784.73-3857.47)	-552.98**
189	Pulmonary Edema and Respiratory Failure	MED	3,587.28	4,374.56	3419.78 (3348.62-3492.44)	3918.25 (3881.16-3955.71)	-498.47**
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	MED	3,311.10	4,113.14	3145.43 (3106.52-3184.84)	3632.36 (3611.60-3653.24)	-486.93**
641	Miscellaneous Disorders Of Nutrition, Metabolism, Fluids and Electrolytes W/O MCC	MED	2,661.63	3,330.48	2544.31 (2478.35-2612.01)	3029.01 (2994.91-3063.51)	-484.70**
291	Heart Failure and Shock W MCC	MED	4,535.31	5,286.21	4499.20 (4446.96-4552.04)	4969.96 (4942.73-4997.34)	-470.76**
292	Heart Failure and Shock W CC	MED	3,980.87	4,592.53	3909.92 (3815.95-4006.20)	4379.26 (4331.65-4427.39)	-469.34**
690	Kidney and Urinary Tract Infections W/O MCC	MED	2,675.90	3,258.14	2513.17 (2459.64-2567.85)	2979.88 (2952.97-3007.03)	-466.71**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	MED	2,540.45	3,088.55	2355.79 (2310.61-2401.86)	2773.2 (2748.68-2797.94)	-417.41**
193	Simple Pneumonia and Pleurisy W MCC	MED	3,078.42	3,703.66	2896.4 (2841.33-2952.55)	3296.69 (3267.05-3326.59)	-400.29**



DRG	Description	TYPE	Unadjusted 31 - 60 day Total Cost of Care \$		Regression-Adjusted Means for 31- 60 day Total Cost of Care (95% CI) \$		Difference \$
			Treatment	Comparison	Treatment	Comparison	
194	Simple Pneumonia and Pleurisy W CC	MED	2,501.14	2,988.50	2335.45 (2288.77-2383.09)	2734.94 (2709.44-2760.67)	-399.49**
191	Chronic Obstructive Pulmonary Disease W CC	MED	3,323.41	3,866.83	3154.82 (3074.28-3237.47)	3537.35 (3496.78-3578.39)	-382.53**
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	MED	2,409.53	2,885.70	2280.97 (2236.76-2326.06)	2642.36 (2620.29-2664.61)	-361.39**
190	Chronic Obstructive Pulmonary Disease W MCC	MED	3,361.10	3,933.25	3180.18 (3119.42-3242.11)	3522.28 (3491.42-3553.41)	-342.10**
603	Cellulitis W/O MCC	MED	2,653.39	3,052.13	2434.58 (2376.74-2493.82)	2743.63 (2714.44-2773.13)	-309.05**
378	Gastrointestinal Hemorrhage W CC	MED	2,645.54	3,042.10	2463.92 (2418.12-2510.60)	2770.33 (2746.07-2794.81)	-306.41**
309	Cardiac Arrhythmia and Conduction Disorders W CC	MED	3,164.18	3,509.09	3043.62 (2972.55-3116.40)	3301.76 (3267.95-3335.93)	-258.14**
312	Syncope and Collapse	MED	2,659.77	2,950.94	2432.73 (2365.36-2502.01)	2619.63 (2587.86-2651.80)	-186.90**
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	MED	2,111.63	2,275.60	2050.95 (1993.64-2109.90)	2188.6 (2163.44-2214.06)	-137.65**
247	Percutaneous Cardiovascular Procedures W Drug-Eluting Stent W/O MCC	SURG	1,794.33	1,844.60	1582.27 (1544.72-1620.73)	1676.75 (1659.69-1693.99)	-94.48**

DRG	Description	TYPE	Unadjusted 31 - 60 day Total Cost of Care \$		Regression-Adjusted Means for 31- 60 day Total Cost of Care (95% CI) \$		Difference \$
			Treatment	Comparison	Treatment	Comparison	
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	SURG	1,051.10	967.88	931.28 (911.88-951.09)	935.24 (931.72-938.77)	-3.96

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation

The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

**Table B6.** Difference between Treatment and Comparison Groups on 1-to-60-Day Risk-Adjusted Total Cost of Care by Top 20 DRGs for Index Hospitalization (Sorted in Ascending Order based on Difference between Treatment and Comparison Groups)

DR G	Description	TYPE	Unadjusted 1-to-60-Day Total Cost of Care \$		Regression-Adjusted Means for 1-to-60-Day Total Cost of Care (95% CI) \$		Difference \$
			Treatment	Comparison	Treatment	Comparison	
683	Renal Failure W CC	MED	7,357.87	9,088.59	7089.51 (6970.63-7210.41)	8629.82 (8564.75-8695.38)	-1540.31**
291	Heart Failure and Shock W MCC	MED	9,366.25	11,428.43	9305.56 (9220.92-9390.98)	10840.00 (10794.00-10886.00)	-1534.44**
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	MED	7,380.48	9,526.49	7090.47 (7021.99-7159.63)	8591.49 (8553.27-8629.88)	-1501.02**
641	Miscellaneous Disorders Of Nutrition, Metabolism, Fluids and Electrolytes W/O MCC	MED	5,934.22	7,728.15	5708.39 (5590.01-5829.28)	7180.21 (7115.67-7245.33)	-1471.82**
292	Heart Failure and Shock W CC	MED	8,231.68	9,950.96	8102.20 (7949.00-8258.34)	9568.58 (9487.01-9650.85)	-1466.38**
189	Pulmonary Edema and Respiratory Failure	MED	7,551.68	9,526.06	7280.78 (7158.81-7404.82)	8662.93 (8597.09-8729.27)	-1382.15**
690	Kidney and Urinary Tract Infections W/O MCC	MED	5,994.52	7,516.49	5740.47 (5645.62-5836.92)	7028.07 (6978.87-7077.62)	-1287.60**

DR G	Description	TYPE	Unadjusted 1-to-60-Day Total Cost of Care \$		Regression-Adjusted Means for 1-to-60-Day Total Cost of Care (95% CI) \$		Difference \$
			Treatment	Comparison	Treatment	Comparison	
193	Simple Pneumonia and Pleurisy W MCC	MED	6,777.81	8,452.73	6447.41 (6349.72-6546.61)	7685.88 (7630.96-7741.20)	-1238.47**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	MED	5,568.51	7,028.42	5251.25 (5172.12-5331.60)	6412.40 (6367.89-6457.23)	-1161.15**
190	Chronic Obstructive Pulmonary Disease W MCC	MED	7,038.58	8,544.47	6687.24 (6584.05-6792.04)	7765.13 (7710.39-7820.26)	-1077.89**
194	Simple Pneumonia and Pleurisy W CC	MED	5,570.25	6,795.26	5252.32 (5167.96-5338.05)	6321.68 (6274.37-6369.35)	-1069.36**
378	Gastrointestinal Hemorrhage W CC	MED	5,513.65	6,779.29	5161.90 (5084.05-5240.94)	6219.09 (6175.02-6263.48)	-1057.19**
191	Chronic Obstructive Pulmonary Disease W CC	MED	6,953.37	8,294.35	6663.81 (6525.05-6805.53)	7712.99 (7641.06-7785.61)	-1049.18**
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	MED	5,119.08	6,394.04	4822.24 (4745.74-4899.96)	5864.49 (5824.45-5904.80)	-1042.25**

DR G	Description	TYPE	Unadjusted 1-to-60-Day Total Cost of Care \$		Regression-Adjusted Means for 1-to-60-Day Total Cost of Care (95% CI) \$		Difference \$
			Treatment	Comparison	Treatment	Comparison	
309	Cardiac Arrhythmia and Conduction Disorders W CC	MED	6,630.98	7,820.50	6373.65 (6252.72-6496.93)	7404.5 (7343.09-7466.43)	-1030.85**
603	Cellulitis W/O MCC	MED	5,811.83	6,850.46	5410.27 (5309.59-5512.85)	6274.81 (6222.62-6327.43)	-864.54**
312	Syncope and Collapse	MED	5,937.53	6,779.39	5555.6 (5434.89-5679.00)	6174.29 (6115.76-6233.38)	-618.69**
247	Percutaneous Cardiovascular Procedures W Drug-Eluting Stent W/O MCC	SURG	3,971.72	4,419.12	3528.92 (3459.61-3599.63)	4047.21 (4013.31-4081.39)	-518.29**
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	MED	4,377.54	4,889.18	4212.58 (4117.04-4310.32)	4709.32 (4665.47-4753.58)	-496.74**
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	SURG	4,022.17	3,655.30	3566.33 (3512.70-3620.78)	3534.04 (3524.45-3543.65)	32.29

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation; TPA – Tissue Plasminogen Activator  
The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

**Table B7.** Difference between Treatment and Comparison Groups on 31-to-60-Day Healthy Days at Home by Top 20 DRGs for Index Hospitalization (Sorted by Descending Order of DRG Relative Weight)

DRG	Description	TYPE	Unadjusted 31-to-60-Day Healthy Days at Home		Regression-Adjusted Means for 31-to-60-Day Healthy Days at Home (95% CI)		Difference
			Treatment	Comparison	Treatment	Comparison	
291	Heart Failure and Shock W MCC	MED	24.65	24.07	24.75 (24.65-24.85)	24.36 (24.28-24.44)	0.39**
871	Septicemia Or Severe Sepsis W/O Mv >96 Hours W MCC	MED	26.20	25.27	25.30 (25.21-25.38)	24.71 (24.64-24.78)	0.59**
378	Gastrointestinal Hemorrhage W CC	MED	27.56	27.07	26.94 (26.83-27.04)	26.55 (26.46-26.64)	0.39**
872	Septicemia Or Severe Sepsis W/O Mv >96 Hours W/O MCC	MED	27.40	26.69	26.25 (26.14-26.36)	25.77 (25.68-25.85)	0.48**
392	Esophagitis, Gastroenteritis and Miscellaneous Digestive Disorders W/O MCC	MED	27.65	27.15	26.82 (26.72-26.92)	26.44 (26.36-26.52)	0.38**
193	Simple Pneumonia and Pleurisy W MCC	MED	26.41	25.80	25.77 (25.64-25.90)	25.37 (25.26-25.48)	0.40**
194	Simple Pneumonia and Pleurisy W CC	MED	27.24	26.75	26.58 (26.46-26.69)	26.22 (26.13-26.31)	0.36**
190	Chronic Obstructive Pulmonary Disease W MCC	MED	26.11	25.52	25.61 (25.47-25.74)	25.21 (25.10-25.32)	0.40**
690	Kidney and Urinary Tract Infections W/O MCC	MED	26.38	25.67	25.83 (25.69-25.96)	25.31 (25.20-25.41)	0.52**
683	Renal Failure W CC	MED	26.07	25.40	25.45 (25.30-25.59)	24.94 (24.83-25.06)	0.50**
189	Pulmonary Edema and Respiratory Failure	MED	25.80	25.11	25.06 (24.90-25.21)	24.59 (24.46-24.72)	0.47**
247	Percutaneous Cardiovascular Procedures	SURG	28.87	28.81	27.74 (27.65-27.83)	27.67 (27.59-27.74)	0.07*

DRG	Description	TYPE	Unadjusted 31-to-60-Day Healthy Days at Home		Regression-Adjusted Means for 31-to-60-Day Healthy Days at Home (95% CI)		Difference
			Treatment	Comparison	Treatment	Comparison	
	W Drug-Eluting Stent W/O MCC						
309	Cardiac Arrhythmia and Conduction Disorders W CC	MED	27.19	26.99	26.44 (26.31-26.57)	26.27 (26.16-26.38)	0.17**
603	Cellulitis W/O MCC	MED	26.43	25.92	25.53 (25.37-25.68)	25.11 (24.98-25.24)	0.42**
292	Heart Failure and Shock W CC	MED	25.29	24.80	25.14 (24.97-25.32)	24.76 (24.63-24.91)	0.38**
641	Miscellaneous Disorders Of Nutrition, Metabolism, Fluids and Electrolytes W/O MCC	MED	26.82	26.12	26.13 (25.98-26.29)	25.63 (25.51-25.75)	0.50**
470	Major Hip and Knee Joint Replacement Or Reattachment Of Lower Extremity W/O MCC	SURG	29.15	29.26	27.80 (27.74-27.86)	27.82 (27.78-27.86)	-0.02
310	Cardiac Arrhythmia and Conduction Disorders W/O CC/MCC	MED	28.62	28.64	27.64 (27.53-27.74)	27.60 (27.51-27.69)	0.03
191	Chronic Obstructive Pulmonary Disease W CC	MED	26.15	25.60	25.85 (25.67-26.03)	25.44 (25.29-25.59)	0.41**
312	Syncope and Collapse	MED	26.77	26.53	26.33 (26.17-26.48)	26.15 (26.02-26.28)	0.18**
065	Intracranial Hemorrhage or Cerebral Infarction W CC Or TPA In 24 Hrs	MED	27.18	26.61	25.89 (25.73-26.05)	25.46 (25.32-25.60)	0.43**

Source: Analysis of 100% Medicare Part A and Part B claims for 2018 and 2019.

Statistical significance is shown at the 1% (\*\*) level.

Notes: W – With; W/O – Without; CC – Complication or Comorbidity; MCC – Major Complication or Comorbidity; MV – Mechanical Ventilation; TPA – Tissue Plasminogen Activator  
The treatment group included qualifying episodes where the beneficiary received TCM services within 30 days following a short-term acute care hospital stay.

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