ECONOMETRICA, INC.

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Policy Research

Final Evaluation Report

Evaluation of the Community-based Care Transitions Program

Contract No.:
HHSM-500-2011-00015I

Order No.:
HHSM-500-T0006

Project No.:
2246-000

November 2017

Authors

ECONOMETRICA, INC.

- *David Ruiz*

- *Kristie McNealy*

- *Kristen Corey*

- *Jill Simmerman*

MATHEMATICA POLICY RESEARCH

- *Jelena Zurovac*

- *Catherine McLaughlin*

- *Mike Barna*

- *Matt Mleczko*

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List of Acronyms

Acronym	Definition
AAA	Area Agency on Aging
ACH	acute care hospital
ACO	Accountable Care Organization
ADL	activity of daily living
ADRC	Aging and Disability Resource Center
AMI	acute myocardial infarction
AoA	Administration on Aging
BH	behavioral health
BPCI	Bundled Payments for Care Improvement
CAH	critical access hospital
CBO	community-based organization
CBSA	Core Based Statistical Area
CCTP	Community-based Care Transitions Program
CHF	congestive heart failure
CMS	Centers for Medicare & Medicaid Services
COPD	chronic obstructive pulmonary disease
CT	care transitions
CTB	care transition bundle
CTI®	Coleman's Care Transitions Intervention®
DiD	difference-in-differences
ED	emergency department
EHR	electronic health record
ESRD	end-stage renal disease
FFS	fee-for-service
HCC	Hierarchical Condition Category
HF	heart failure

Acronym	Definition
HHA	home health agency
HRR	Hospital Referral Region
HRRP	Hospital Readmissions Reduction Program
IADL	instrumental activity of daily living
IPPS	Inpatient Prospective Payment System
LTC	long-term care
LTCH	long-term care hospital
MAP	Medication Adherence Program
MDRG	modified diagnosis-related group
NP	nurse practitioner
PAC	post-acute care
PAM	Partitioning Around Medoids
PCP	primary care physician
PDSA	Plan-Do-Study-Act
PEDR	per eligible discharge rate
PHO	physician–hospital organization
PHR	personal health record
QI	quality improvement
QIO	Quality Improvement Organization
QM	quality monitoring
QM/QI	quality monitoring and quality improvement
RED	Re-Engineered Discharge
RN	registered nurse
RQ	research question
SNF	skilled nursing facility
SS	social services
TCM	Transitional Care Model

Executive Summary

ES.1. Background

Nearly 1 in 5 Medicare patients discharged from a hospital—approximately 2.6 million seniors—is readmitted within 30 days, at a cost of more than $26 billion every year (CMS, 2016). Inadequate care transitions (CT) planning, communication failures, and delays in scheduling post-hospitalization care are among the most common causes of preventable readmissions (Bisognano & Boutwell, 2009).

To help address these issues, the Centers for Medicare & Medicaid Services (CMS) launched the Partnership for Patients in 2011, with the initial goal of reducing hospital-acquired conditions by 40 percent and readmissions by 20 percent. One way that the Partnership for Patients attempted to decrease readmissions was through the Community-based Care Transitions Program (CCTP). Mandated by Section 3026 of the Affordable Care Act, the CCTP provided a framework for community-based organizations (CBOs) to partner with hospitals to address the needs of high-risk Medicare fee-for-service (FFS) beneficiaries. The CCTP aimed to address these needs both as beneficiaries prepare for discharge from the hospital and after discharge by providing funds to support partnerships among CBOs, hospitals, and other community organizations. The CCTP built off the Quality Improvement Organizations' 9th Scope of Work, which demonstrated that a community-based CT approach could serve as an effective mechanism for reducing readmissions. CCTP organizations began their period of performance almost in tandem with other nationwide efforts to reduce readmissions, such as the Hospital Readmissions Reduction Program (HRRP).

Most CBOs were Area Agencies on Aging and/or Aging and Disability Resource Centers with extensive experience connecting elders to community support services. CBOs signed agreements with CMS beginning in December 2011. A total of 101 CBOs were admitted to the program on a rolling basis, with the earliest CBO beginning to serve beneficiaries on February 1, 2012. The CCTP had an initial 2-year period of performance after which enrolled organizations could receive extensions culminating up to a 5-year program period, through January 31, 2017. Of the 101 CCTP organizations, 44 received at least a 1-year extension to participate in the CCTP beyond the initial 2-year period of performance. The extensions were given based on progress in meeting beneficiary enrollment goals and exhibiting improvements in unadjusted readmission rate analysis. The CCTP performance period for these 44 organizations lasted up to 60 months and averaged 44 months.

CBOs partnered with 448[1] hospitals ("partner hospitals") to deliver CT services to enrolled high-risk Medicare FFS beneficiaries ("participants"), with the purpose of reducing readmissions and demonstrating measurable savings to Medicare. CBOs had flexibility in many programmatic aspects, including selecting which beneficiaries to enroll and which CT interventions to employ, as they attempted to meet CCTP goals. CBOs, their partner hospitals, and other community organizations—collectively referred to as CCTP sites—designed intervention strategies based on their expected participant population and resources. Sites conducted root cause analyses that identified the medical and social factors associated with preventable readmissions in their communities and selected an evidence-based CT model (or models) that met their high-risk populations' needs. Reducing overall Medicare FFS readmission rates necessitated a CCTP site to

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[1] Study sample of CCTP partner hospitals used in evaluation analyses.

(1) develop a comprehensive plan that met the needs of CCTP participants and (2) serve a large enough proportion of Medicare FFS beneficiaries at partner hospitals to lead to readmission reductions at the hospital level. CBOs were paid an all-inclusive fee, per-eligible discharge rate (PEDR), for providing CT services to participants.

ES.2. Purpose of This Report

This evaluation aims to answer the following four research questions (RQs).

1. Was the CCTP associated with lower readmission rates and lower Medicare expenditures for the beneficiaries directly served by the CCTP?

2. How were CCTP characteristics associated with lower readmission rates?

3. Which CT components were associated with lower readmission rates?

4. Did the CCTP have an impact on readmission rates and Medicare expenditures?

To answer these questions, we used a variety of datasets and methods. We used Medicare Part A and Part B claims and administrative data to calculate 30-day all-cause readmission rates and Medicare Part A and Part B expenditure measures, covering the 1-month post-hospitalization discharge period during which a majority of the sites focused their CT interventions. These data were used to compare differences in outcomes between participants and comparable nonparticipants over the CCTP performance period (RQ-1). In this first analysis, these differences were measured for participants discharged from partner hospitals and comparable nonparticipants discharged from nonpartner hospitals. We also examined sites' initial CCTP applications, detailing site characteristics and proposed intervention strategies, and data collected from telephone interviews and site visits over the implementation period in order to identify how sites perceived success and program implementation pain points (RQ-2). We further leveraged other site-reported data—the List Bill, which is a transactional record for PEDR billing, specific to the CCTP to answer RQ-3. Importantly, these data also captured CT encounters (e.g., home visits or telephone follow-ups), support services (e.g., transportation or home-delivered meals), and other intervention components new to CMS models at the time, such as transitional planning services and medication reconciliation. For RQ-4, we extended our analysis for RQ-1 from the participant population to all Medicare FFS beneficiaries discharged from partner and nonpartner hospitals and examined changes in outcomes before and after the start of the CCTP.

Each analysis has limitations that preclude definite estimates of the effect of the CCTP. However, our triangulation of these data and analyses did afford insight into the value of the CCTP.

ES.3. Findings

As noted, the decision to extend 44 sites at least 1 year beyond the initial 2-year participation period was based on progress in meeting enrollment goals and achieving improvements in unadjusted readmission rates. The 57 sites whose participation was not extended at least 1 year beyond the initial period did not show significant progress in meeting these targets. From discussions with sites and CMS CCTP program officers, we found common implementation challenges across the 101 sites. Initially, many sites struggled with building CBO–hospital partner relationships, operationalizing CT interventions and program administration, and maintaining

appropriate staffing. For the 57 nonextended sites, these challenges may have significantly impeded successful implementation of their programs. Overall, the 44 extended sites reported overcoming these challenges.

The 44 extended sites employed several common strategies that helped them succeed in building effective CBO–hospital partner relationships, including maintaining an integrated and consistent CT worker presence in the hospital that did not detract from the fieldwork of providing home visits to participants. They also used data to build communications and relationships, working with hospital partners to analyze these data and adapt their programs according to findings from that data analysis.

These 44 extended sites also successfully identified beneficiary needs, effectively linked participants with community-based services, and coordinated with post-acute care (PAC) providers. Specifically, successful sites responded to challenges with the provision of support services by identifying new service providers, sources of funding, and ways to connect participants with appropriate services in a timely manner. Extended sites also developed processes to engage PAC providers to reach beneficiaries discharged to such care settings, including assigning CT coaches as liaisons and providing PAC staff education about the CCTP to improve their engagement and develop a collaborative relationship for shared patients.

> **Key Finding**
>
> Sites with relatively high enrollment tended to build successful relationships with community-based service providers and develop mechanisms to reach beneficiaries in PAC settings after hospitalization.

Importantly, the 44 extended sites employed strategies to better allocate CT encounters (e.g., risk stratifying to use home visits and telephone calls when most appropriate) and support services (e.g., engaging Meals on Wheels) based on participant risk factors. This risk-stratification-based provision of CT services included commonly allowing for additional intervention time (beyond 30 days) or additional home visits, as needed, to provide the appropriate level of intervention based on specific participant needs and risk factors.

> **Key Finding**
>
> Participants from all 101 sites combined and all 44 extended sites combined exhibited lower readmission rates and Medicare Part A and Part B expenditures relative to comparisons.

Our empirical findings for RQ-1 indicate that CCTP participants from all 101 sites combined had lower readmission rates and Medicare Part A and Part B expenditures over periods in which these sites were active in the program, relative to comparable nonparticipants (matched comparisons). Specifically, after adjusting for beneficiary risk factors, market conditions, and hospital characteristics, CCTP participants exhibited readmission rates that were 1.82 percentage points lower (14.57 percent versus 16.38 percent; $p < 0.01$) than those of matched comparisons.

Medicare Part A and Part B expenditures were \$634 lower (\$7,064 vs. \$7,698; $p < 0.01$) for participants from the 101 sites than matched comparisons. Risk-adjusted readmission and expenditure differences between participants from the 44 extended sites and nonparticipants were similarly favorable—more so among the examined readmission rate measure, which was 2.10 percentage points lower (14.21 percent vs. 16.31 percent; $p < 0.01$).

These empirical findings came from cross-sectional regression models that spanned the CCTP period of performance for either all 101 sites or the 44 extended sites. While positive, this finding cannot be used to show the impact of the CCTP due to the inability to observe participant-level pre-CCTP outcomes or consistently identify a baseline cohort of *potential* CCTP participants. We employed this cross-sectional modeling approach on participants in place of a pre-post comparative study such as difference-in-differences (DiD). It was not possible to use participant eligibility criteria to construct baseline outcomes for the population of eligible admissions in either the treatment or comparison population because eligibility criteria and recruitment strategies differed across sites and over the course of the program and often relied on data not available for the comparison group.

Despite their limitations, these cross-sectional regression models provided valuable insight into risk-adjusted site performance on readmission and Medicare expenditure measures by comparing these outcomes for CCTP participants to non-CCTP participants from similar healthcare markets. Because the 44 extended sites had a longer CCTP period of performance than nonextended sites (up to 60 months vs. 30 months)[2] and higher enrollment on average (18.52 percent vs. 7.55 percent of Medicare FFS beneficiaries), we focused site-specific analyses on the 44 extended sites. Our site-specific cross-sectional models indicated that participants in 26 of the 44 extended sites had lower readmission rates than the comparison group ($p < 0.1$ or better), with remaining sites exhibiting statistically insignificant readmission rates relative to matched comparisons.

Empirical findings from RQ-1 were likely influenced by the site-specific strategies and characteristics that contributed to sites' perceived implementation success noted earlier. Indeed, these potential influencers were the focus of RQ-2 and RQ-3. Site-level characteristics studied for RQ-2, however, did not readily lend themselves to be incorporated into our quantitative analysis given the relatively small sample of the sites (44 extended sites) and the fact that many of these implementation characteristics were adopted by most of the 44 extended sites, resulting in minimal variation. A qualitative assessment of these 44 extended sites did identify the potential relevance of prevalent strategies that sites reported as aiding their successful implementation of the CCTP.

Our qualitative analysis for RQ-2 indicated that the 26 sites whose participants exhibited statistically significant lower readmissions rates largely implemented a hospital–field worker model that divided labor between CT workers based primarily in a hospital and CT workers who were primarily field-based. This model helped build CBO–hospital relationships as it led to greater consistency in hospital-based CT personnel and did not detract from focused participant engagement after hospital discharge. These sites widely established seamless data processes, which limited manual participant data entry (e.g.,

> **Key Finding**
>
> The sites with most successful program implementation were integrated with their hospital partners, allowing for analysis of participant readmission data and the ability to adapt interventions to better suit participants.

patient demographics, encounters, and services provided), simplified CT worker documentation, and afforded easier conversion of participant data into formats for CMS reporting and billing (i.e., preparing the List Bill). Sites used these data processes and reports to facilitate other common data and quality analysis strategies, including conducting analysis of readmissions within the CBO and analyzing readmissions with hospital partners. These analyses facilitated sites' process of making

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[2] Average of 44 months vs. 23 months.

data-driven adaptations to CCTP interventions. Such adaptations to site-selected evidence-based CT models included targeting participants with non-diagnosis-based risk factors (e.g., living alone, history of falls, socioeconomic frailty) and adapting CT encounters to fit the needs of participants (e.g., telephone-based interventions for out-of-area participants), or identifying and arranging supportive services for participants who may receive the most benefit.

> **Key Finding**
>
> Sites exhibiting favorable associations between the CCTP and readmission rates principally chose CTI® as their formal model.

The 44 extended sites primarily employed Coleman's Care Transitions Intervention® (CTI®) as their formal model. We approximated the CTI® model components to answer RQ-3 as whether a participant received a hospital visit from a CT worker before hospitalization discharge, at least one in-home visit, at least one telephone call, and medication review and reconciliation. An analysis of List Bill data on participants from the 44 extended sites indicated that participants who received this approximation of CTI® (44 percent of participants from the 44 extended sites) exhibited a 3.04 percentage point lower 30-day readmission rate relative to participants who did not receive this bundle of services.

CCTP sites used targeting strategies and criteria that varied across sites and were refined over time. While this improved sites' ability to identify appropriate participants, it hindered our calculation of participant (or would-be participant) pre-CCTP baselines and therefore our ability to identify impacts of the program at the beneficiary level. That said, we might, however, expect to see hospital-level impacts attributable to the CCTP if sites enrolled a sufficiently large number of beneficiaries at high risk of readmission (due to our ability to construct a hospital-level baseline). Indeed, our approach to RQ-4 examined whether the CCTP impacted readmission rates and Medicare Part A and Part B expenditures at that hospital level. We employed DiD models on a beneficiary population more expansive than participants that included all Medicare FFS beneficiaries at partner hospitals from the 44 extended sites and comparison hospitals. We continued our focus on the 44 extended sites given their longer average program performance period and higher participant enrollment relative to nonextended sites. This population did include a high percentage of beneficiaries that were *not* CCTP participants (80 percent, on average), a potential contributing factor to statistically insignificant results or even spurious findings at the hospital level.

In contrast to the favorable associations between the CCTP and outcomes estimated at the participant level (RQ-1), our pre/post CCTP implementation comparison between all Medicare FFS beneficiaries at partner hospitals and comparison hospitals (DiD model) indicated no statistically significant impact of the CCTP on any 30-day outcome at the 10-percent level (RQ-4).

> **Key Finding**
>
> There were no statistically significant hospital-wide impacts of the CCTP across all 44 extended sites.

Specifically, this analysis, performed on a 33-month balanced panel of hospitals, indicated that the regression-adjusted mean readmission rate in partner hospitals was lower than that of comparison hospitals both before and after CCTP participation, declining slightly, from 19.27 percent to 19.19 percent in partner hospitals and from 27.02 percent to 26.99 percent in their matched comparison hospitals, on average. The difference in these changes was not statistically significant and, in conjunction with population ratio of participants to nonparticipants, possibly a reflection of other

concurrent national and local efforts to lower readmission rates like the HRRP that started in the same year that sites first enrolled participants.

Site-specific DiD impact estimates were statistically insignificant for 29 of the 44 extended sites. Among the sites with significant estimates, impacts were mixed: seven sites had a negative (favorable) impact on readmissions, while eight sites had a positive (unfavorable) impact ($p < 0.1$). Five of the seven sites that exhibited statistically significantly lower participant readmissions also had reduced readmissions for all Medicare FFS beneficiaries at partner hospitals (compared with their matched comparisons). One interpretation of the results for these five sites is that their targeted participants constituted a substantial portion of Medicare FFS beneficiaries likely to experience a readmission. Low enrollment of participants (as a percentage of all Medicare FFS beneficiaries) in most partner hospitals, coupled with changing selection criteria, limits our ability to extrapolate beyond this small number of sites and attribute either the favorable or unfavorable DiD estimates to the CCTP. Additionally, with multiple models and programs attempting to drive readmission rates down, within, and across hospitals, the discernable impact of the CCTP becomes difficult to disentangle without an identified hospital-level impact.

The five sites with both lower readmission rate associations and impacts were similar to the 26 sites with lower readmissions with respect to their program characteristics. While the majority of these sites utilized CTI® as their formal model, their ability to remain flexible and to adapt interventions to meet the unique needs of beneficiaries were key characteristics of their programs. Furthermore, these sites were similarly more likely to have long-standing, stable relationships with their hospital partners and did not experience serious ongoing problems in these relationships. Their CT workers were well-integrated into the hospital setting, with access to electronic health records, access to work space, and regular communication with hospital staff. They were likely to use streamlined data processes that could facilitate the production of reports and aid in program monitoring and continuous quality improvement efforts in collaboration with partner hospitals.

ES.4. Conclusion

The initial vision of the CCTP was to engage a sufficient number of high-risk Medicare beneficiaries to decrease overall Medicare FFS readmission rates at partner hospitals. For this reason, the main outcome measure, 30-day all-cause readmissions, was constructed both at the level of the participants directly served by the CCTP and at the overall hospital level (i.e., including all Medicare FFS beneficiaries). At the participant level, we did find favorable associations between the CCTP and readmission and expenditure measures among participants from the 101 sites (combined) and the 44 extended sites (combined), and among most of the 44 extended sites individually. Though not indicative of causal impact these results are suggestive of the measurable potential of the CCTP. For example, accounting for site participant sample sizes, these estimated average differences of 1.82 and 2.10 percentage points translate to a difference of 12,033 fewer readmissions for participants relative to matched comparisons across all 101 sites and 11,197 fewer readmissions for the 44 extended sites (Table ES-1).

Table ES-1. Aggregate Participant-Level 30-Day All Cause Readmission and Medicare Part A and Part B Expenditure Estimates Over All Months of Participation for All 101 and All 44 Extended Sites

Sample	Measure	Estimate	90% Confidence Interval
All 101 Sites Combined*	30-Day Readmissions (Number)	-12,032.70	-13,576.12 to -0,489.29
	30-Day Medicare Part A and Part B Expenditures ($M)	-419.77	-532.61 to -306.93
All 44 Extended Sites Combined**	30-Day Readmission (Number)	-11,196.90	-12,585.39 to -9,808.40
	30-Day Medicare Part A and B Expenditures ($M)	-305.30	-413.18 to -197.42

* The regression results were based on a sample of 662,607 CCTP participants enrolled between February 2012 and January 2017 from all 101 sites. Table estimates were calculated by multiplying regression point estimates by the total number of CCTP participant discharges over all months of program participation.

** The regression results were based on a sample of 533,609 CCTP participants enrolled between February 2012 and January 2017 from the 44 extended sites. Table estimates were calculated by multiplying regression point estimates by the total number of CCTP participant discharges over all months of program participation. Per-eligible discharge rate is an amount provided to fund CCTP services for participants.

The more favorable noncausal associations between the CCTP and readmission rates found among the 44 extended sites were not unexpected. These sites received extensions by demonstrating sufficient progress in enrollment goals and readmission rate improvements (based on early unadjusted data). It is possible that their results provide an upper bound of the association between the CCTP and readmission rates for the 101 sites.

Lessons can be learned from the 44 extended sites that overcame many of the initial startup challenges faced by the majority of the 101 CCTP sites. We found that sites with lower readmission rates implemented the hospital–field worker approach to delivering CT services to participants; had a seamless data process and used these data to analyze readmissions to inform intervention adaptations that could address the unique needs of their targeted participants; chose CTI® as their formal model; targeted participants with non-diagnosis-based risk factors; and arranged supportive services for those who could benefit. Strategies employed by these sites demonstrate areas of promise for future development in community organization/hospital cooperation, coordination, and intervention selection and implementation so that healthcare dollars are spent wisely and the quality of care is improved.

While the CCTP has ended, future models must recognize the importance of understanding the population that is at risk for readmission within the community to determine how to best address their needs. Determining how to meet the needs of a Medicare beneficiary discharged to a skilled nursing facility, for example, is likely to be substantially different from how to meet the needs of an individual discharged home with a caregiver. Many sites achieved success—either as progression toward CCTP goals or successful implementation of the program—by attempting to tailor their interventions to specific populations and meet their needs (e.g., reconciliation of medications, follow-up of primary care physician appointments) in a way that worked for participants. In some cases, participants required minimal assistance, while others required multiple visits and phone calls for support. Those sites that succeeded as part of the CCTP risk

stratified participants and apportioned resources accordingly. Given the wide variation of needs of high-risk participants discharged from hospitals, it also appears that implementing multiple strategies to avert readmissions is necessary to meet the needs of a sufficiently large number of participants to positively impact the overall hospital-level Medicare readmissions rate.

1. Introduction

1.1. Background and Objectives of the CCTP

The Centers for Medicare & Medicaid Services (CMS) initiated the Community-based Care Transitions Program (CCTP)—mandated by Section 3026 of the Affordable Care Act—as a 5-year program in April 2011, with an initial 2-year initial period of performance. The CCTP provided funds to support partnerships among community-based organizations (CBOs), hospitals, and other healthcare providers with the goal of improving care transitions (CT) for high-risk Medicare beneficiaries. CBOs signed agreements with CMS beginning in December 2011. Since then, 101 CBOs—across 7 cohorts—were admitted into the program on a rolling basis, with the earliest CBO beginning to serve beneficiaries on February 1, 2012. Out of these 101 organizations, 44 received at least a 1-year extension to participate in the CCTP beyond the initial 2-year period of performance. The CCTP ended on January 31, 2017.

The CCTP's goal to reduce readmissions of Medicare fee-for-service (FFS) beneficiaries focuses on the transition of beneficiaries from an acute care hospital (ACH) stay—during which they are enrolled into the program—to home or other post-discharge settings. Transitions from the hospital to other settings are dangerous points in the care continuum for vulnerable patients, especially frail, older patients and those with chronic conditions. Without a plan to ensure continuous care, these patients may be readmitted to a hospital with serious complications. Factors commonly associated with readmissions include lack of follow-up appointments or delays scheduling post-hospitalization care (Felix, Seaberg, Bursac, Thostenson, & Stewart, 2015). Other issues associated with preventable readmissions include inability to keep follow-up appointments, lack of awareness of whom to contact after discharge, and communication failure between inpatient and outpatient providers (Auerbach, Kripalani, & Vasilevskis, 2016). Safe, effective, and efficient CT and reducing risk of potentially preventable readmissions require cooperation among providers of medical services, social services, and support services in the community and post-acute care (PAC) facilities.

CCTP-participating organizations selected an intervention that included an evidenced-based CT model and other elements (such as supplemental community-based services) to reduce readmissions. CBOs partnered with 448[3] hospitals to deliver CT services to high-risk Medicare FFS beneficiaries. CBOs served as lead organizations, which made formal arrangements to serve beneficiaries discharged from one or more partner hospitals. CBOs could partner with other organizations in their communities, including home health agencies (HHAs); skilled nursing facilities (SNFs); Area Agencies on Aging (AAAs); and meal, transportation, and other service providers to provide coaching and other services after discharge. Together, the CBOs, their partner hospitals, and any other community organizations working together to implement the CCTP are referred to as "sites" or "CCTP sites." CMS paid sites an all-inclusive per-eligible discharge rate (PEDR) for the provision of CT services under the CCTP to Medicare FFS beneficiaries (participants).

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[3] Study sample size of CCTP partner hospitals detailed in Section 3 and Appendix A.

If the site's CT program was effectively implemented, CCTP participants could exhibit reduced readmissions and improvements in quality of care. Reduced readmissions could lead to lower Medicare hospitalization expenditures and even decrease expenditures for other Medicare services. Furthermore, such improvements may manifest among beneficiaries hospital-wide if the number of CCTP participants was a large enough portion of all Medicare FFS beneficiaries served by partner hospitals in the CCTP.

Sites used data from Quality Improvement Organizations and partner hospitals to propose an enrollment goal in their applications. These initial goals were often based on the expected number of beneficiaries discharged with targeted diagnoses a CBO selected. Enrollment goals were updated over time to ensure that sites could achieve the necessary footprint at their partner hospitals to achieve a hospital-wide impact.

This evaluation report examines associations with key CCTP outcomes of readmission and Medicare Part A and Part B expenditure measures for all 101 sites and the subset of the 44 extended sites. For the 44 extended sites, this report also analyzes secondary outcomes, including those potentially related to readmissions, such as emergency department visits and observation stays. These analyses include CCTP participants and all Medicare FFS beneficiaries at partner hospitals and respective comparison cohorts. The evaluation also relies on data from stakeholder telephone interviews, focus groups, and CCTP site applications to identify and analyze program implementation processes and lessons learned to contextualize outcome results.

1.2. CCTP Sites

CBOs had flexibility in many programmatic aspects, including the beneficiary populations targeted and interventions used for their programs. In determining readmission reduction strategies, sites conducted root cause analyses to identify the medical and social factors associated with preventable readmissions in their communities and selected targeting criteria and an evidence-based CT model (or models) that met the specific needs of their populations.

While this Final Evaluation Report provides an overview of all 101 sites for context, we focus on the subset of 44 sites that completed their initial 2-year agreements with CMS and were awarded at least a 1-year or 2 6-month extensions to continue in the CCTP (44 "extended sites"). Focusing on the 44 extended sites provides a longer perspective of the CCTP. This report also briefly discusses characteristics of the 57 sites that were not extended at least 1 year beyond their initial agreements with CMS. Continuation of CCTP sites beyond the initial 2-year contract was based on an assessment of whether sites achieved the following:

1. Significant reductions in partner hospitals' all-cause 30-day readmission rates for the total Medicare FFS population.

2. Reduction in the 30-day readmission rate for the high-risk cohort served, compared to the all-cause Medicare FFS baseline readmission rate.

3. Achievement of target volumes proposed by the sites. For continuation beyond the initial performance period, sites need to demonstrate the potential to enroll a sufficient footprint to impact the all-cause Medicare FFS readmission rate in subsequent years.

As of January 31, 2017, the shortest time any of the 44 extended sites was active was 33 months, and the longest was 60 months. The majority of the 44 extended sites were active for 44 months. Of the 57 sites that did not participate beyond the initial 2-year period ("nonextended sites"), the shortest time active in the CCTP was 9 months and longest time active was 30 months, with most of the 57 sites active for 24 months.

Table 1.1 provides some hospital-level characteristics for hospitals partnering with the 44 extended sites, 57 nonextended sites, and all Inpatient Prospective Payment System (IPPS) U.S. hospitals. The data suggest that the 57 nonextended sites did not differ substantively from 44 extended sites across for-profit status, capacity (as measured by bed count), or mix of Medicare and Medicaid discharges. Partner hospitals working with the 57 nonextended sites were more likely to be teaching hospitals relative to partner hospitals working with the 44 extended sites (44 percent vs. 34 percent). Generally, CCTP partner hospitals were similar to the national profile of ACHs but had a higher concentration of hospitals with teaching status, higher number of hospital beds, and a lower concentration of for-profit hospitals.

Table 1.1. Facility Characteristics of CCTP Partner Hospitals, Nonparticipating Hospitals in CCTP Market Areas, and All U.S. Hospitals*

Characteristics	CCTP Partner Hospitals of 44 Extended Sites (n=215)	CCTP Partner Hospitals of 57 Nonextended Sites (n=233)	Inpatient Prospective Payment System (IPPs) U.S. Hospitals (n=3,432)
Organizational structure (for profit), %	14.42	15.02	23.92
Teaching hospital, %	34.41	44.21	25.20
Number of hospital beds	284	303	211
Medicare discharges (of all admissions), %	47.44	45.41	46.64
Medicaid discharges (of all admissions), %	18.97	20.91	18.08

* Partner hospital data come from the 2012 or 2013 Annual Hospital Survey, depending on the year that the site first became active in the CCTP; national sample data come from the 2013 Annual Hospital Survey data.

Figure 1.1 shows unadjusted quarterly 30-day all-cause readmission rates for CCTP participants from the 44 extended sites and their matched nonparticipant comparisons,[4] and national rates of all Medicare FFS beneficiaries over the CCTP period (CMS, 2017). CCTP participants and comparisons exhibited a downward trend in these unadjusted statistics, with the national rate exhibiting a more modest downward trend.

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[4] Matched comparisons detailed in Section 3 and Appendix A.

Figure 1.1. Unadjusted Quarterly Readmission Rates for Medicare FFS Beneficiaries Nationwide and CCTP Participants From the 44 Extended Sites and Non-Participant Comparable Beneficiaries Over the CCTP Period*
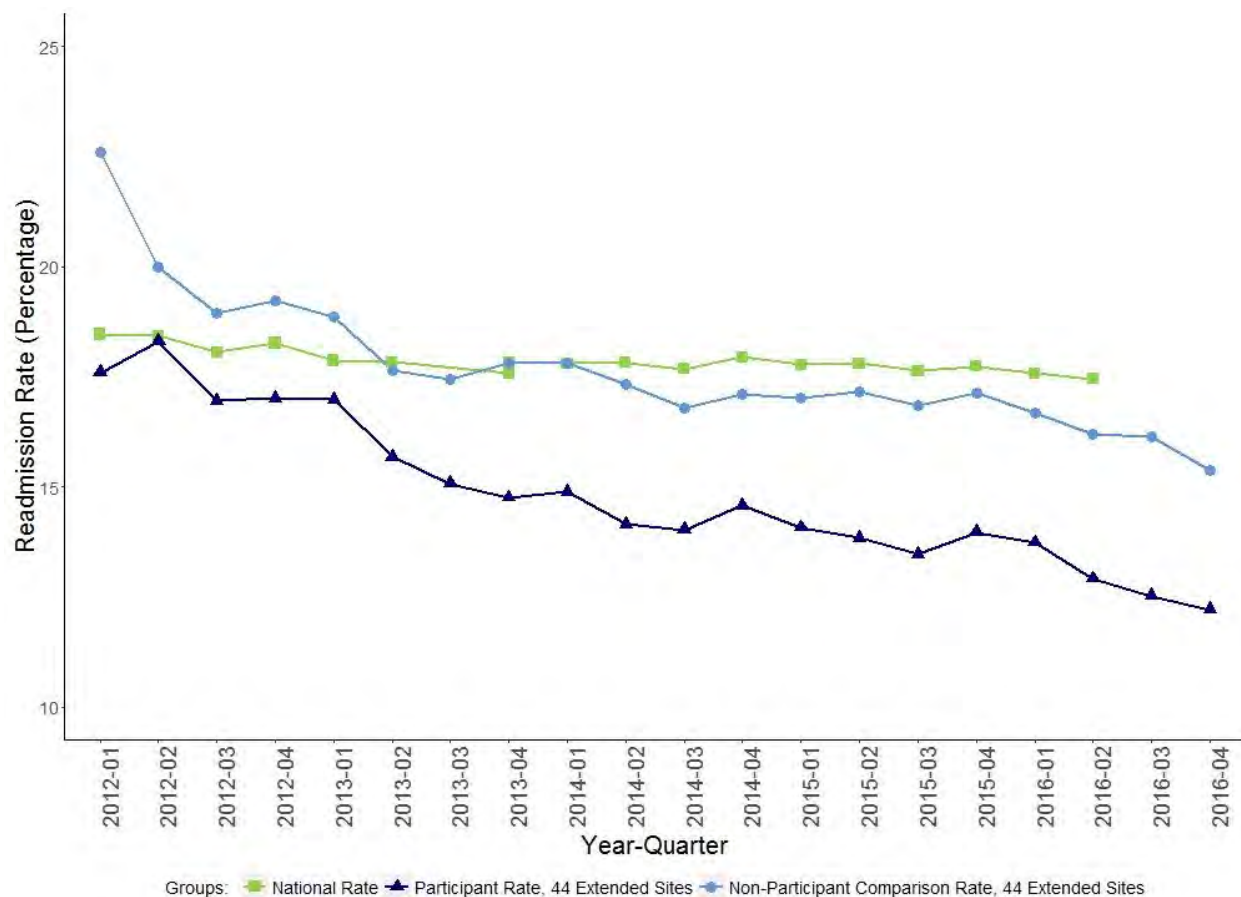
* Notes: Quarters are defined to align with program quarters of the CCTP program in a given calendar year. For example, the 2012-01 Year-Quarter period covers February 2012 through April 2012, and the 2012-04 Year-Quarter period covers months November 2012 through January 2013. The population for the nonparticipant comparison rate comes from statistical cohort matching for participants of the 44 extended sites; Section 3 of this report and Appendix A detail this process. National rate information comes from https://data.cms.gov/Medicare-Claims/FFS-Medicare-30-Day-Readmission-Rate-PUF/b6st-bzjs.

1.2.1. Intervention Strategies

Table 1.2 shows the intervention characteristics for the 44 extended sites and 57 nonextended sites. The model categories consider the formal, evidence-based models chosen for the intervention. For example, if a site used Coleman's Care Transitions Intervention® (CTI®) as its only evidence-based model and included a package of supportive services like transportation and meals in its PEDR, then its model would be coded as *CTI®*. The *CTI® and other* category indicates that a site used CTI® in combination with one or more other models (e.g., Project RED, BOOST, Transitional Care Model). Sites categorized as *non-CTI® and other* used two or more CT models, but did not use CTI®, while sites categorized as *other* chose a single non-CTI® model. Fundamental components of these models tended to include hospital discharge planning support, in-home follow-up visits, medication reconciliation, and follow-up phone calls.

Many sites chose CTI® as their sole evidence-based model; however, the 44 extended sites implemented more model adaptations than the 57 nonextended sites. These included offering alternatives to the home visit (e.g., telephone-only contact after hospital discharge to increase enrollment of participants living in another State) and providing additional services for participants with more complex needs (e.g., increasing the dosage of intervention components by adding additional calls or visits or implementing a risk-stratified intervention). In addition to these adaptations, all CCTP sites found that a key component of their intervention was connecting participants with support services, such as transportation, meals, homemaker services, or home care, either by making referrals or directly arranging those services. As CBOs were commonly AAAs and/or Aging and Disability Resource Centers, they were well-suited to lead CCTP sites given their extensive experience connecting or providing elders in their communities these services. For the CCTP, these services could be funded by the PEDR, provided through other programs operated by the CBO, or supported by other funding sources. CT workers assessed the need for supportive services through conversations with participants and their caregivers, as well as via formal assessments conducted during hospital and home visits.

In addition to adapting their interventions, many sites changed staffing arrangements to improve efficiency and increase CT worker presence at partner hospitals. The "hospital–field worker" staffing model divides roles in the CT process between hospital-based staff responsible for participant recruitment and communication with hospital staff, and field-based staff responsible for home visits and other post-discharge intervention components. This better coordinates CT workers' caseloads and maximizes time workers can dedicate to patient outreach and home visits. Sites suggested this model helped their programs become more integrated in their partner hospitals.

While use of the hospital–field worker model and model adaptations were more common among the 44 extended sites, it is important to note that sites made changes to their interventions over time. Indeed, some of the 44 extended sites were modifying their intervention strategies during the initial 2-year period and after the 57 nonextended sites ended their participation in the CCTP.

Table 1.2. Select Intervention Characteristics for Site Cohorts

Intervention Characteristic	44 Extended Sites N (%)	57 Nonextended Sites N (%)
Model		
Coleman's Care Transitions Intervention (CTI®)	26 (59.1)	42 (73.7)
CTI® and other	13 (29.5)	9 (15.8)
Non-CTI® and other	1 (2.2)	1 (1.8)
Other model	4 (9.1)	5 (8.8)
Model Adaptations		
Alternatives to the home visit	32 (72.7)	23 (40.3)
Additional home visits	18 (40.9)	15 (26.3)
Additional phone calls	14 (31.8)	14 (24.6)
Extension beyond 30 days	9 (20.5)	6 (10.5)
Risk stratification	15 (34.1)	6 (10.5)
Staffing Approach		
Hospital–field worker model	33 (75)	21 (36.8)

Source: CCTP site program application data and primary data collection.

1.2.2. The Initial 2-Year Performance Period

The decision to extend 44 sites at least 1 year beyond the initial 2-year participation period was based on progress in meeting enrollment goals and achieving improvements in readmission rates. In discussions with sites and program officers, the following themes emerged as common challenges faced by nearly all sites; however, for the 57 non-extended sites these issues served to significantly impede successful implementation of their programs.

- **Partnership between the CBO and hospital:** Strong CBO and hospital partnerships were key to making steady progress toward meeting participant enrollment targets and improvements in readmission rates in the CCTP. CBOs spent a considerable amount of time and energy fostering relationships with hospitals, which included providing ongoing education to hospital staff about the CT program and maintaining a consistent presence at the hospital. While the 44 extended sites generally succeeded in building strong partnerships, the 57 non-extended sites commonly described serious ongoing challenges with the CBO–hospital relationship, including lack of buy-in from hospital leadership or frontline staff, poor CT worker integration, or factors in the hospital system, such as financial instability, hospital leadership and staff turnover, or a focus on competing internal programs.

- **Intervention strategies:** In the initial stages of CCTP implementation, CBOs identified issues with their intervention strategies that impacted the delivery of services and ultimately performance in the CCTP. Many of these challenges revolved around participants who were difficult to serve, including participants with complex needs that could not be adequately addressed with patient activation and participants who were reluctant or unable to accept a home visit. CT coaches found that some beneficiaries were uncomfortable allowing CT staff into their home, due to concerns about privacy or misconceptions that CT workers might seek to remove them from their homes. Additionally, some beneficiaries were discharging to other States or remote rural locations, making home visits unfeasible. Sites spent considerable effort developing adaptations to their intervention strategies to overcome these issues.

- **Targeting:** Selecting appropriate targeting criteria and a system for timely participant identification was central to reaching enrollment goals. Some sites had complicated selection processes that made it difficult to quickly identify eligible patients, while others chose narrow targeting criteria or broad exclusion criteria, resulting in few eligible participants. In addition, sites that relied on hospital staff to identify patients and make referrals often had challenges in enrollment if hospital staff did not have time to take on the additional work of patient identification in a timely manner. Sites that could pinpoint opportunities to improve patient identification and broaden targeting criteria reported success in increasing enrollment.

- **Coordination with other initiatives or Accountable Care Organizations (ACOs):** Partnering with ACOs presented unique opportunities for sites because it was common for the ACO to manage the entire spectrum of care its patients received. For CBOs that had strong relationships with the hospital, there was more potential to work with hospital administrators to find a way to build the CT program into the care pathway to create a seamless transition. However, for other sites, competing CT initiatives at partner hospitals

resulted in the exclusion of a significant portion of the eligible patient pool. In extreme cases, this resulted in initiative fatigue among hospital staff or the loss of a hospital partner.

- **Timely and accurate reporting:** List Bills documented CT services provided to each participant and were used to calculate reimbursement by CMS. Issues with submitting List Bills resulted in denied or delayed payment for CT services rendered. This was a significant problem for CBOs operating with little margin, as they were not able to absorb the financial impact. This issue was more pronounced for sites that used multiple CBOs to provide CT workers to different partner hospitals. The coordination required for centralizing the collection and submission of List Bills in a timely manner sometimes resulted in other management and staff supervision challenges for the lead organization.

- **Staffing/management:** Sites discussed the financial impact of staff hiring and turnover because the cost of hiring, training, and credentialing new staff members was not built into the CCTP PEDR. Many organizations were used to operating programs with prospective payments from grant funding and therefore were not prepared to absorb the upfront operational program costs of the CCTP. Supporting CT worker salaries until the point that they received reimbursement for delivered services slowed startup for sites that were unable to hire enough staff upfront to effectively operate the program. Many of the CBOs were county agencies or other Government organizations and were required to adhere to stringent hiring regulations. Additionally, CBOs needed to adhere to hospital requirements for CT worker credentialing, including immunizations and background checks, which could be a lengthy and expensive process. These factors impacted their ability to hire staff quickly and exacerbated any issues of high employee turnover.

1.3. Organization of the Report

Section 2 of this report presents an overview of strategies and model adaptations the 44 extended sites employed in reaction to challenges they experienced. Section 3 presents analyses of the associations and impacts of the CCTP on primary and secondary outcomes for the 44 sites whose participation extended beyond 2 years and analyzes all 101 sites together for key outcomes. Section 4 expands the contemporaneous analyses of key outcomes for the 44 extended sites in Section 3 through qualitative analysis of site and partner hospital characteristics and empirical analysis of CT encounter and service data. Section 5 concludes the report.

2. How Did CCTP Sites Implement the Program?

2.1. Overview

CBOs selected and implemented evidence-based CT models and accompanying intervention elements based on the results of a root cause analysis of readmissions conducted in collaboration with their partner hospitals. The root cause analysis allowed sites to tailor their CT programs to their patient populations and community assets. Despite planning and collaboration, it was common for sites to encounter unforeseen logistical issues with implementation.

Many sites' CCTP programs changed significantly over the period of participation. Sites generally made programmatic changes through an ongoing series of Plan-Do-Study-Act cycles, a process that was emphasized to the sites through the CCTP Learning Collaborative, which used regular webinars and in-person meetings to identify and disseminate innovations in CT from participating sites. During Learning Collaborative sessions, sites shared particularly successful implementation strategies, resulting in widespread adoption of specific changes across CCTP sites, such as the hospital–field worker model discussed in Section 1.2.1.

Our analysis of data collected during CCTP site interviews and site visits identified key strategies that sites implemented to improve their CT programs, including the following:

1. Strengthening CBO–hospital partner relationships.

2. Linking CCTP participants to community-based services and coordinating with HHAs and SNFs after hospital discharge.

3. Making changes to CT interventions and types of participants included and excluded from their programs to increase enrollment and serve a wider range of beneficiaries.

2.1.1. Key Takeaways
The key takeaways of this analysis include:

CBO–Partner Relationships

- **CT programs can benefit from maintaining regular communication and presence at partner facilities to reach program goals of improve CT for high-risk beneficiaries.** Several common strategies helped sites succeed in building effective CBO–hospital partner relationships, including maintaining an integrated and consistent CT worker presence in the hospital, in part by leveraging the hospital–field worker staffing model. CBOs also used data as communication and relationship-building tools and worked with hospital partners to analyze data and use the findings to improve their programs.

- **CT programs need to effectively link participants with community-based services and coordinate with PAC providers.** CCTP sites addressed this need by including support services like transportation or home-delivered meals in their interventions and by identifying new service providers (e.g., private vendors, social service agencies), sources of funding, and ways to connect participants with appropriate services in a timely manner. Sites developed processes to engage PAC providers such as SNFs and HHAs, including assigning specific coaches as liaisons and providing PAC staff education about the CCTP to improve engagement and develop a collaborative relationship for shared patients.

Intervention Adaptation

- **A rapid-cycle improvement process can identify better ways to address the needs of potential and actual program participants.** Common intervention strategies implemented by sites included risk stratification and increasing the dosage of the intervention for higher risk participants by adding additional time or visits as needed to provide the appropriate level of intervention based on participant risk factors. These changes became necessary in part because of changes to targeting criteria implemented to reach increased enrollment goals, which included adding participants in SNFs.

We describe the data used to identify these takeaways in Section 2.2 and detail these key takeaways further in Sections 2.3 and 2.4.

2.2. Data and Methods

We conducted quantitative analyses using List Bill data matched to Medicare Part A and Part B claims to analyze the provision of CCTP services to participants. CBOs submitted monthly List Bills for each CT beneficiary enrolled in the CCTP started during a given reporting period. These data contained information needed to verify participant eligibility (e.g., Medicare beneficiary identifier, date of hospital discharge). These data also included a record of and distinction between CCTP *encounters* and *services*. Encounters under the CCTP were distinguished by the mode and frequency of participant CT contact (e.g., whether a participant had a home visit within 3 days of hospital discharge or a phone call after 3 days of discharge). CCTP services captured in List Bill data identify the types of assistance provided during participant encounters (e.g., medication reconciliation that may have occurred during a home visit). The List Bill data used for this report cover the start (February 1, 2012) through the end of the CCTP (January 31, 2017).

Data sources we used for qualitative analyses in this report include:

- **CCTP site applications:** We reviewed applications to obtain information on characteristics of lead organizations, program design, and partner organizations.

- **Annual telephone interviews:** We conducted four rounds of interviews with sites to obtain information about program design, progress, operations, changes, and implementation experiences. . All 101 CCTP sites were interviewed in their first year in the program. Interviews were conducted annually thereafter, and sites participated in one to four interviews over the course of the program.

- **Site visits:** We conducted 30 site visits to gather more in-depth information on progress, lessons learned, and strategies developed by CCTP sites as they gained experience in implementing and operating their programs.

We uploaded telephone interview transcripts and site visit notes into NVivo qualitative analysis software and coded the data by major topic area. Our thematic analysis of these data identified common challenges, improvement strategies, and program features among CCTP sites.

2.3. How Did CBOs Work With Hospitals and Other Facility Providers to Improve CT?

CBO–partner relationships changed over time as sites attempted to establish an effective CCTP implementation. Most CCTP sites were led by a CBO working in partnership with an average of 5 partner hospitals. The number of partner hospitals ranged from 2 to 11 hospitals. Moreover, most sites partnered with a variety of other community partners, including HHAs and SNFs. Over time, the 44 extended sites evolved to improve the following:

1. How CBOs worked with their hospital partners.
2. How sites worked with other community providers.
3. How sites connected participants with post-discharge support services.

These improvements led to what sites characterized as effective working relationships with hospital partners that were essential for both increasing participant enrollment and also the self-reported effectiveness of their CCTP interventions.

2.3.1. The CBO–Partner Hospital Relationship

CT programs can benefit from maintaining regular communication and presence at partner facilities to reach program goals of improving CT for high-risk beneficiaries. Sites overcame common challenges, including mergers, hospital staff turnover, lack of effective CT staff integration, and competing priorities, using several common strategies.

- **When CT workers were well-integrated in the hospital, it helped sites implement their programs successfully.** Sites reported that integration through access to electronic health records (EHRs), office space and hospital ID badges, and the ability to communicate openly and regularly with hospital staff members improved CT workers' ability to be responsive to patient admissions and discharges, contact patients in a timely manner, and improve overall coordination of care for CCTP participants. Sites also emphasized that access to these resources supported their programs by embedding CT workers in the hospital setting, establishing the program as a legitimate hospital effort and allowing CT and hospital staff members to work as a team. EHR access improved the efficiency of patient identification and improved two-way communication between CT workers and hospital staff when CT workers could document in the medical record.

- **Adopting the hospital–field worker staffing model improved staff integration in the hospital, as well as staff efficiency.** While sites noted improvement in CBO–hospital staff relationships and patient identification processes when they were well-integrated, sites noted additional opportunities to improve enrollment and efficiency by optimizing their staffing model. A majority of CBOs implemented the hospital–field worker model, which allowed staff to better coordinate CT workers' caseloads and maximize the time workers could dedicate to patient outreach and home visits. According to sites, the hospital worker often became the face of the CCTP within the hospital, building relationships with case managers, discharge planners, and nurses; expanding recognition of the program; and cementing integration of CT in the hospital context. A well-integrated team of hospital–field workers can share patient information with hospital staff about patients served, which focuses attention on improvements needed to ensure the discharge process is successful and points out factors that can contribute to readmissions.

This staffing model, which was promoted during the Learning Collaborative, first appeared during the initial year of the CCTP and continued to spread to other sites for the remainder of the program. Seventy-three percent of extended sites ultimately implemented the hospital–field worker approach.

Additionally, CBOs learned with experience that specific characteristics were desirable in CT workers, including sales experience and the ability to quickly develop rapport with potential participants. This led CBOs to deviate from their original plans to focus on staffing nurses and/or social workers, moving toward hiring criteria that better reflected the ability to develop relationships, communicate effectively, and quickly and easily engage with potential participants and hospital staff. They also found that some CT workers were better suited to either the hospital- or field-worker role and made

Site Story
One site in particular exemplified the evolution of the CBO–hospital relationship to better integrate CT staff and leverage data with its partners. This site was led by a CBO that only began working with its partner hospitals when they initiated a CT pilot in preparation for the application process. The CBO worked quickly to establish successful relationships with decision makers at the hospital. These relationships led to EHR access and office space for CT workers. To accommodate increased enrollment goals, the CBO switched to the hospital–field worker model to increase efficiency when CMS increased its enrollment goal. The CBO continued to monitor performance and optimize its staffing model by reorganizing its teams and deploying field coaches based on geographic assignments rather than on the hospital from which the participant discharged. Ongoing data analysis also led the site to offer additional home visits for participants who needed more support, as well as offer the components of the home visit by telephone and in SNFs. This continuous improvement led to the site being able to consistently exceed its monthly enrollment goal.

assignments based on strengths of their staff. For instance, CT workers who excelled at multitasking, organization, and engaging participants in the hospital became hospital-based, and those who excelled at the motivation and education component of the intervention were assigned to field work.

- **CBOs analyzed participant outcome data with hospital partners to increase accountability across organizations and engage in continuous quality improvement.** CBOs tracked a variety of program data, which they shared with hospital leadership and staff. In some cases, CBOs used data indicating that the program was reducing readmissions to gain or further bolster and sustain the support of hospital leadership. CBOs and hospitals also determined how to better serve patients by analyzing program data and readmissions, leading to changes in targeting criteria and interventions (e.g., making additional intervention adaptations, adjusting risk stratification), and in hospital-level discharge processes or services. Changes to targeting allowed sites to increase the pool of eligible beneficiaries and increase enrollment. Risk stratification further allowed sites to tailor the type of intervention offered to different needs or levels of risk, allowing sites to serve a wide range of participants with a wide range of risk factors, and sometimes increasing efficiency by providing a less intensive intervention to participants with fewer needs. As an example, hospital-level changes that facilitated these improvements included the addition of outpatient clinics, implementation of pre-discharge medication reconciliation, simplification of discharge instructions, and arranging physician follow-up appointments prior to discharge.

While consistent CT worker presence, integration, and the use of data were common strategies among many of the 44 extended sites, we also note some specific experiences or strategies that impacted relationships between some CBOs and their partner hospitals.

- **Hospital champions played an important role in connecting CBOs at some sites with key resources and increasing the buy-in of other hospital staff.** Among sites with strong hospital champions, these individuals often established themselves during the application or planning process, although sometimes relationships with champions developed organically as the CBO interacted with hospital leadership and presented data. Champions were often high-level staff members with authority over case management, discharge planning, and quality improvement, and these individuals were pivotal in changing the culture of their staff members regarding how they worked with CBOs and how they planned discharges. Securing champions was an essential step for some sites that initially struggled to get CT workers credentialed to work in hospitals, develop processes for patient identification, and secure access to EHRs or other reports to facilitate patient identification. Resolving these issues improved CT worker integration and resulted in greater efficiency.

> As one CBO staff member described, *"I think it's finding the right hospital champion . . . rather than putting up barriers, they completely embraced everything that we were doing, and oh, my goodness, the impact on their readmissions numbers, once they opened up that door and let those coaches in …"*

- **Some CBOs used the Learning Collaborative to increase hospital engagement.** The Learning Collaborative was a unique educational component of the CCTP for participating sites that used webinars and in-person events to spread innovations and successful strategies. The in-person learning events were exceptional experiences for some sites, resulting in deeper relationships with hospital personnel as they traveled together and shared team-building work, sparking ideas for process improvements and model adaptations. Sites said that seeing so many people at the in-person events demonstrated the magnitude of the effort to hospital personnel, impressing on them the national level of engagement. The CBOs also felt that the Learning Collaborative was a useful forum for learning about new CT tools and approaches and for gaining a better understanding of important principles such as footprint and how many participants they needed to serve to make a hospital-level impact.

- **Engaging hospital leaders can overcome the impact of mergers and acquisitions of hospital partners.** While mergers could cause short-term disruptions in processes, sites often found that there was a net benefit to a merger when the merger unified hospital partners under the same management or corporate structure, streamlining communication and minimizing differences in intervention strategies between hospitals. Changes in leadership at the hospital level also afforded CBOs the opportunity to identify new champions for their program. These champions helped engage other leaders and increase the buy-in of hospital staff.

CCTP sites used many mechanisms to develop relationships with partner hospitals. Sites established relationships with their hospitals by maintaining a consistent CT worker presence, increasing CT worker integration into the hospital workspace and workflow, sharing data to increase accountability, establishing champions, and educating staff. CCTP site experience corroborated literature on program implementation, which shows that gaining support of senior management and clinical staff champions can lead to the development of infrastructure supportive to the new program (Rubin, Neal, Fenlon, Hassan, & Inouye, 2011; Ash, Stavari, Dykstra, & Fournier, 2003; Bradley, Webster, Schlesinger, Baker, & Inouye, 2006; Parrish, Kate, Adams, Adams, & Coleman, 2009). Future interventions should consider CT organizations' abilities to systematically engage in these activities to increase the strength of relationships with partners, decrease the startup time needed to launch a program, and improve their overall ability to implement and operate the program.

2.3.2. The Site and Community Provider Relationship

CT programs found it necessary to engage other continuing care services to address the needs of (potential) participants discharged to these care settings. In 2013, as sites were beginning to implement their CT programs, 20 percent of Medicare FFS beneficiaries were discharged from ACHs to SNFs, and 17 percent were discharged with home health (Medicare Payment Advisory Commission, 2015). Overall, 19 percent of CCTP participants received SNF services within 30 days of hospital discharge; this percentage doubled over the program period from 15 percent in the first performance quarter to approximately 30 percent over the last two performance quarters, which is consistent with interview data that indicate that more sites began to see participants discharged to SNFs over time in an effort to increase enrollment. Approximately 34 percent of CCTP participants received HHA services within the 30 days of hospital discharge, a proportion that remained relatively stable over time.

While some CT programs are designed with specific beneficiary characteristics in mind, the CCTP allowed sites flexibility in designing their own targeting requirements. When expanding their reach to participants discharged to SNFs and HHAs to increase enrollment, CBOs discovered they needed to build relationships with these PAC providers to better meet the unique needs of these participants. These relationships helped improve enrollment and retention for patients discharged to these settings through better coordination between organizations and improved engagement with the participants. By establishing successful relationships with SNFs and HHAs, participants discharged to or with these services could benefit from the CCTP's assistance with their CT while also receiving the appropriate range of medical support needed after hospitalization. Sites reported that building these relationships increased the pool of eligible patients (e.g., by affording access to participants discharged to SNFs) and increased the number of recruited participants who completed the intervention based on their internal data.

- **Sites developed relationships with SNFs to follow patients after hospital discharge.** While some sites partnered with PAC providers at the start of the program, many that added patients discharged to SNFs after initial implementation noted the need to establish or strengthen these relationships after startup. To build these relationships, many sites began to include SNFs in their coalitions, workgroups, or partner meetings. Despite these growing relationships, CT workers still struggled to track individual patients after discharge to SNFs to serve them. Sites employed several strategies to address this issue, including creating SNF coordinator or liaison positions, making regular calls to SNFs to monitor when

participants would be discharged home, and checking in periodically with participants in SNFs by telephone or in person to build rapport and increase retention. Depending on the number of SNFs in the service area, all coaches might perform these functions for the participants with whom they worked, or the site might appoint specific SNF coaches for this effort.

Because the CCTP focuses on reducing 30-day readmissions and patients typically stay in rehabilitation for a few weeks, where facility staff are responsible for medications and other needs, interventions for participants in SNFs evolved to meet their needs. Sites reported providing the components of the home visit while patients were in SNFs to prepare participants for a successful discharge home. This is consistent with List Bill data that indicate participants who spent at least some of those 30 days in a SNF were less likely to receive a home visit, as discussed in Section 2.4.2. Some sites also performed an additional visit in the home after SNF discharge for participants that were identified as higher risk or in need of supportive services based on their discussions with their CT worker.

Other strategies for increasing engagement and integration in SNFs included CBO staff working with SNF staff to establish or improve nurse-to-nurse or doctor-to-doctor communication processes at transfer to ensure that the SNF had complete information about the patient and to facilitate a warm handoff. In one instance, this was accomplished by using a post transfer survey to verify the completeness of information provided to the SNF. Other sites worked directly with SNFs to improve their work, offering training related to communication techniques and CT. As CCTP staff members became more familiar to the SNFs, some CT workers were included in discharge meetings and could have open discussions with SNF staff members, resulting in additional opportunities to gain information about their participants and aid in their transitions from the SNF to home.

- **CCTP sites collaborated with HHAs to address misconceptions about duplication of services worked to improve appropriate utilization of home health services.** Because it was common for CCTP participants to also receive home health, CBOs dedicated time to educating home health staff about their programs and services and seeking to cooperate with them. CBOs engaged HHAs by working through existing coalitions, establishing new coalitions or workgroups specific to PAC providers for CCTP participants, and developing formal collaborations with specific HHAs. While coalitions and community meetings were generally used as a forum for education about the goals of the CCTP and to address concerns over duplication of services, more formal relationships allowed collaboration regarding specific shared patients by calling about issues or making joint home visits.

> As one CBO administrator described, this type of education and relationship building *"… has been really crucial in terms of addressing the perceptions out there that care transitions may be duplicative to home health services, … Because of that, we've actually had great traction in terms of partnering with our home health agencies, such that oftentimes both services are involved on a single patient and both services are looking and evaluating for the other service whether or not they should be involved if they're not already involved. That's kind of a side partnership that we've looked to develop that's actually been a big win for us."*

In addition to improving coordination with and increasing understanding of the CCTP with HHAs, sites also described opportunities to help connect participants with home health when it was not ordered, or when participants refused home health because they did not understand the services home health would provide. CT workers found themselves working with hospital staff to obtain home health orders; educating participants about the value of home health services to manage wounds, medications, or other medical issues at home; and assisting participants with securing home health services through the hospital or their primary care physician. They also communicated with HHA partners and hospital staff to improve appropriate HHA utilization.

Future projects aimed at improving community-based CT will benefit from planning how to actively engage SNFs and HHAs if they plan to enroll discharged patients who receive these services. Organizations operating future CT programs should also consider reaching out to providers in other settings as applicable to their patient population to improve coordination of care. Additionally, the unique needs and constraints that result from serving participants discharged to PAC settings should be considered, and intervention strategies should address these issues.

2.3.3. Sites and Supplementary Support Services

Linkages to post-discharge support services in the community are a key component to reducing readmissions. Interventions implemented for the CCTP typically included a formal CT model plus a variety of enhancements or adaptations, as well as linkages to community-based services after discharge, such as transportation to medical appointments and meal services. Sites emphasized that many clients had a critical need for supportive services after discharge and attributed some readmissions to a lack of specific services, such as transportation to a pharmacy or doctor's office or medically appropriate meals. Because many CBOs were AAAs or Aging and Disability Resource Centers operating programs for seniors and people with disabilities, their experience with directly providing the types of services patients needed post discharge or providing referrals to other resources in the community made them uniquely suited to the role of helping to transition participants back to their homes.

- **CT workers assessed patient support needs to ensure that appropriate services were offered to participants who would benefit from them.** Services were not provided universally to all participants, but offered to participants who were identified as needing a specific type of support to reduce their risk of readmission. Generally, CT workers identified support service needs using assessment tools and/or patient records and through communication with hospital or SNF staff members and participants' family members and caregivers. They also identified needs during the home visit through discussion, formal assessment, and observation of the home environment.

- **Sites funded or provided access to support services in a variety of ways to address the needs of their participants and differences in service availability between sites.** Some sites negotiated with CMS to include funding to provide support services through the CCTP PEDR to participants who needed them. In these cases, they often contracted specific services such as meals, transportation, or homemaker services through specific vendors. In addition to funds in the PEDR, some sites secured other funding for support services through grants or their own foundations or had partner hospitals provide services such as transportation vouchers or supplies.

> As explained by one CBO administrator, *"… we went out and got extra grant funding so that we could provide a wraparound [social work case management] component to our highest risk patients."*

Other sites connected participants with services that the CBOs, community partners, or other local organizations provided as a part of their regular, non-CCTP services. CBOs believed that these additional services were instrumental in improving their success at preventing readmissions for certain high-risk beneficiaries.

- **Ensuring timely access to services when participants are vulnerable immediately after discharge is important to preventing readmissions.** In a 30-day intervention, prompt provision of services is essential. In several cases, CBOs were able to prioritize services for CCTP participants to avoid wait lists or expedite service provision. Other sites created streamlined application processes for services or developed networks of providers willing to provide services quickly. Sites also used funds for support services in their PEDR to bridge the gap between discharge and establishment of long-term support services. For example, one site implemented a combination of immediate in-home services purchased from a vendor with funds from its PEDR, frozen meals, and referral of every participant for assessment by senior services for longer-term support services to meet both immediate and long-term needs.

CCTP sites identified specific strategies to provide needed services to participants. When CT workers identify participants who are unable to go to follow-up appointments, pick up their medications, or shop for and prepare meals, and then bridge those gaps, readmissions may be avoided as a result. Literature shows that patients who have low socioeconomic status, limited social networks, and low education may need additional community-based support to prevent readmissions (Kangovi, et al., 2014; Shier, Ginsburg, Howell, Volland, & Golden, 2013). Similarly, Medicare patients who live alone may be more at risk of adverse post-discharge events and hospital readmission than those who are married and/or have close family members living with them or close by (Arbaje, et al., 2008; Naylor, et al., 2004; Woz, et al., 2012; Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011; Chin & Goldman, 1997; Mitchell, et al., 2010). The CCTP was the first large-scale, national Medicare program that sought to address the needs of high-risk Medicare beneficiaries using community partnerships. Future projects may consider strategies to facilitate post-discharge access to supportive services to help fill a critical need for assistance during this period of vulnerability.

2.4. Which Participants Did Sites Pursue?

2.4.1. Most Common Changes in Intervention Strategy

As described in Section 1.2.1, CCTP sites made adaptations to the formal model they selected for their intervention to better serve the needs of their targeted participants. While some sites proposed multiple models or specific model adaptations in their application (e.g., connecting participants with community support services or providing additional visits), many sites adapted their original model over time based upon data, the experience of CT workers, and the input of their hospital and community partners. As Section 2.2 noted, the working relationships between top-performing CBOs and their hospital and community partners evolved and strengthened over time, and these collaborations led to changes in the interventions implemented.

The most common types of adaptations included offering an alternative to the home visit and developing approaches to address varied levels of risk for readmissions in their target populations, such as risk stratification. As Section 2.2 discussed, data analysis and readmission reviews conducted by CBOs and in collaboration with hospital partners were used to drive the improvement process and selection of model adaptations, and many sites had access to real-time data and regular data reporting, which allowed for continuous quality improvement. Sites made rapid-cycle improvements, often via the Plan-Do-Study-Act model, which was described during sessions of the Learning Collaborative. The result included a variety of program changes to expand the pool of eligible patients and better serve participants who were more challenging, including changes in targeting criteria and adapting the intervention.

- **A majority of sites reported adding an alternative to home visits because large numbers of eligible beneficiaries discharged out of the area or participants refused the home visit component of the intervention.** It was common for CBOs to plan to serve participants discharging in their existing service areas. Based on data from their partner hospitals, CBOs identified that potential participants lived outside these service areas—in other counties or States—and they made adaptations to address this issue in a cost- and time-effective manner. The most common alternative to the home visit was a telephone-only intervention, which was offered by 48 percent of extended sites. Other approaches included offering components of the home visit in an alternative location such as a library, doctor's office, a SNF prior to discharge home (30 percent), or an intensive bedside intervention prior to discharge followed by phone follow-up (25 percent). Sites reported that adding these alternatives to the home visit resulted in a larger pool of eligible patients and increased enrollment and completion rates for the CCTP.

> After finding out that roughly 50 percent of Medicare beneficiaries were discharging out of the area, one site modified its intervention to serve those beneficiaries. As the site explained, an *"enhanced hospital visit is basically providing the initial intervention [at the bedside], and then the follow-up phone calls when* somebody *returns home reiterates what happened in the intervention. Then there's follow-up if there's a caregiver or there's resources that they might need, of course …"*

- **Sites used risk stratification to ensure that participants received the appropriate level of services.** Initially, interventions typically included one formal model, with fewer sites offering multiple models based on hospital preferences, discharge destination (i.e., a different model for all participants discharged to SNFs), or risk. As sites gained experience working with their target populations, expanded their populations, and learned more about readmission drivers through root cause analysis, additional sites chose to risk stratify participants into distinct intervention arms based upon risk scores or other criteria, or added additional arms to already stratified interventions. Typically, the highest risk patients might receive more intense services or a different model of services (e.g., one that includes a home visit) while participants with a lower relative risk might receive a hospital or telephone-only intervention. Other sites assigned specific CT workers based on risk factors. For example, a site might assign a CT worker with a behavioral health background to participants with a mental health diagnosis.

Some sites also added other types of visits or services on top of their formal model to better serve patients at higher risk for readmission. These components included increasing the dosage of the intervention by offering additional follow-up (e.g., home visits or telephone calls) or extending the length of the intervention for higher risk participants. Another strategy to serve higher risk participants was providing access to specialized practitioners, including nurse practitioners, registered nurses, pharmacists, and respiratory therapists. This could include in-home visits as well as telephone discussions. In some cases, coaches contacted these other professionals while they were in the home for guidance, and in other cases these other professionals worked with participants directly.

- **Sites modified their targeting criteria to expand their populations of eligible participants and address additional risk factors identified during readmission reviews.** Initially, the most common targeting criteria included specific diagnoses, with a minority of sites including psychosocial or other criteria (e.g., living alone, socioeconomic frailty, low health literacy). Sites reported that they first expanded their targeting criteria by adding additional diagnoses, adding psychosocial criteria, expanding age limits, adding discharge dispositions (e.g., discharge to SNFs), and/or expanding geographic coverage. With additional experience, some sites opted to switch from a specific list of criteria to targeting based on readmission risk assessment tool scores such as LACE or tools built into partner hospital EHRs, which had the additional benefit of automating case finding. Model and targeting adaptations that were data-driven resulted in increased pools of eligible participants, improved enrollment, and enhanced services for the highest risk participants.

> One CBO initially planned to serve patients in the same geographic area as its county-based service area for other programs. The site quickly found it difficult to meet its enrollment targets. As one CBO staff member descibed, *"We bump up against Florida and Georgia. We really didn't think it was too big of a percentage, but one of our larger hospitals changed out their information system and we had been filtering the Medicare census by ZIP Code for our service area. It was excluding the ones right across the Florida or Georgia line. That went away and the coach [said] I'm seeing a lot of Florida and Georgia people in my census … Some of them are really sick. That kind of got us wondering about it. We requested data from the hospital. It came out to about … 15 percent to 18 percent of their Medicare census was going back across the State lines."*

The site reported that expanding its program to include participants discharging to neighboring States resulted in increased enrollment.

2.4.2. What Types of CT Encounters and Services Did CCTP Participants Receive?

This section examines the types of CT encounters and services recorded in List Bill data across the 44 extended sites over the CCTP period. Section 4 includes CT encounters and a bundle of these encounters, with select outcomes studied in Section 3 to further understand the relation of CT encounters with study outcomes.

The List Bill data indicate which of five types of encounters and six types of services each participant received (plus "other"). These data are an important source of information about the encounters and services received as well as how these encounters and services vary across participants within sites and across sites. These data are available only for CCTP participants.

Each site designed and implemented CT encounters and services to address needs identified during assessment of the root causes of readmission and, as noted earlier, that evolved over the life of the CCTP. We detailed site-level adaptations in our Site-Specific Supplement Report provided as an attachment to this Final Evaluation Report and throughout Section 2. In this section, we note that site-specific adaptations engender variation in CT approaches such that not every participant in the CCTP can be expected to receive every encounter or service. Table 2.1 lists each of these encounters and services, along with the percentage of participants among the 44 extended sites that received each CT component. These data indicate that:

- **The most frequently received encounter was the hospital visit (78 percent). Almost as many participants (70 percent) received at least one in-home visit.** The majority of sites used the CTI® model, which includes a home visit as a key intervention component. Relatively few sites reported adopting telephone-based interventions for the majority of their participants or choosing models that did not include a home visit. Instead, they used telephone-only interventions for select participants who refused or were unable to receive a home visit. Forty-three percent of participants received a home visit within 3 days after discharge, and 31 percent received a visit outside of this 3-day post-discharge window. About 4 percent were visited both within the 3-day window and afterward.

- **Transition planning support and counseling and/or other self-management support were services most often provided, with approximately 89 percent and 84 percent of participants receiving these services, respectively.** These services—which could include assisting with making follow-up appointments, identifying support service needs prior to hospital discharge, educating participants about self-managing their medical conditions, and identifying red flags that indicate the need for follow up—were central to the goals of CT interventions and were often provided during the same hospital or home visit.

Table 2.1. List Bill Information

	Percentage of Participants Receiving (N=533,609)
Type of Patient Encounter	
Hospital visit	78.45
In-home visit within 3 days after discharge	43.32
In-home visit more than 3 days after discharge	30.90
Telephone follow-up within 1 week after discharge	63.19
Telephone follow-up more than 1 week after discharge	52.63
Other	14.58
No encounter specified	2.71
Type of Service Provided	
Transition planning support	89.08

	Percentage of Participants Receiving (N=533,609)
Comprehensive medication review and reconciliation	71.39
Counseling and/or other self-management support	83.84
Communication with patient's family and/or informal caregivers	57.64
Assistance to ensure productive and timely interactions between patient and providers	74.43
Information to help patient identify additional health problems or deteriorating conditions	77.35
Other	15.31

Source: Analysis of List Bill data.

Hierarchal encounter variables. Despite the wide range of models and intervention adaptations, face-to-face encounters remained a mainstay of CT models in most cases, as evidenced by the frequency of hospital and home visits. Recognizing that there are many different combinations, or bundles of encounters, that can take place for any given patient, we constructed the mutually exclusive hierarchical structure described in Table 2.2.

We began by considering the first encounter variable in the table, *home.* This variable was intended to capture whether a participant received at least one in-home visit. The rationale for this focus was that certain services, such as comprehensive post-discharge medication review and reconciliation, are not only more likely to take place during home visits, but may also be more efficacious in the home environment. While 88 percent of those visited in the home were reported to have received medication review and reconciliation, only 31 percent of those visited in the hospital but not in the home were reported to have received this service. We also considered the percentage of participants who had a face-to-face encounter, but only in the hospital before discharge and not in their home (*hospital, no home*), as well as the percentage of participants had no face-to-face encounters.

Table 2.2. Hierarchical Encounter Variable Identification

Encounter Type	Definition
Home	Equals 1 if CCTP participant received a home visit, regardless of what other encounters they may also have received, including hospital visits and phone calls.
Hospital, no home	Equals 1 if CCTP participant did not receive a home visit, but did receive a hospital visit; may also have received a phone call or other CCTP encounters outside the home.
Phone, no hospital or home	Equals 1 if CCTP participant did not receive a home or hospital visit, but did receive a phone call.
Other, no hospital, home, or phone	Equals 1 if CCTP participant did not receive a home or hospital visit or phone call, but did receive some other, non-specified CCTP encounter.
No CCTP encounters	Equals 1 if CCTP participant received no (recorded) CCTP encounters.

More than two-thirds (70 percent) of the participants in the 44 extended sites received at least a home visit (Figure 2.1). More than one-fifth (23 percent) did not have a home visit but were visited in the hospital; less than 3 percent (2.76 percent) were called but not visited in either the home or the hospital; less than 2 percent (1.86 percent) received only a non-specified other encounter; and fewer than 3 percent (2.71 percent) had no recorded encounter.

Figure 2.1.   Distribution of CCTP Participant Encounters
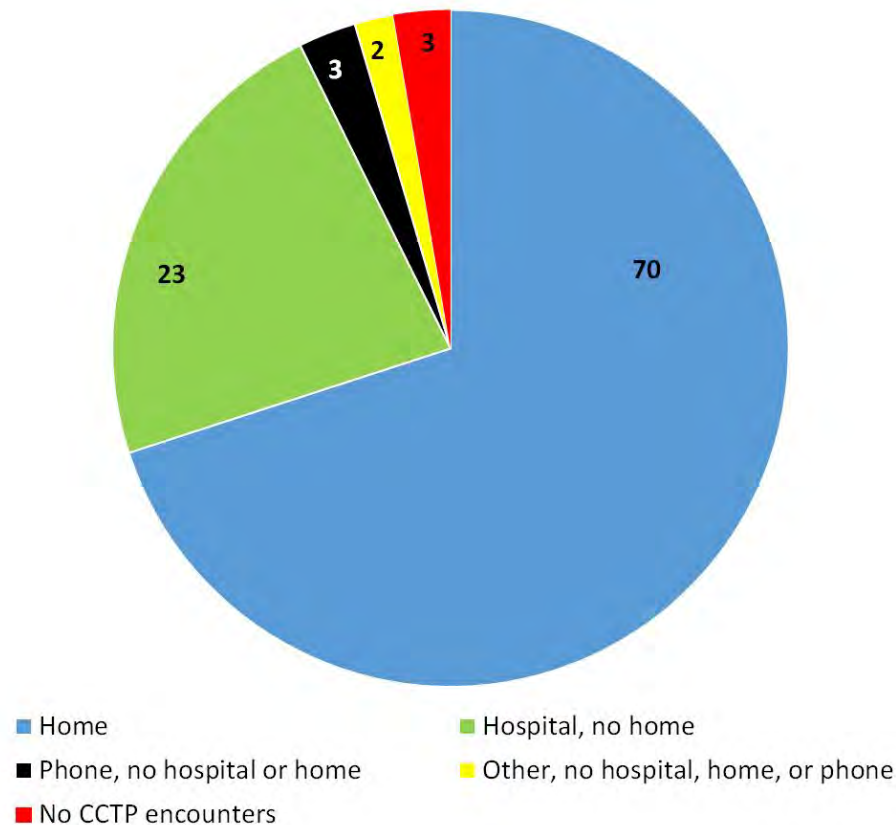
Source: Analysis of List Bill data used in analytical samples; encounters identified by hierarchy detailed in Table 2.2.

There was variation in the distribution of these hierarchal encounter variables across the 44 extended sites. Twelve sites reported providing at least 1 home visit to at least 98 percent of participants. Conversely, 10 sites reported providing home visits to fewer than half of participants.

The type of encounters received also varied according to whether the beneficiary was in a SNF during those 30 days post-discharge. Under the hierarchal paradigm in Table 2.2, the List Bill data indicate that participants who spent at least some of those 30 days in a SNF were less likely to receive a home visit—58 percent had a home visit versus 73 percent for those without a SNF stay (Figure 2.2). We note that sites reported during interviews that there was not always time to complete a home visit with participants discharged to SNFs due to the length of the SNF stay. To address this issue, some sites offered components of the home visit in the SNF, but it is unclear how they documented this type of encounter in the List Bill.

Figure 2.2. Distribution of CCTP Encounters for Participants With and Without Skilled Nursing Facility Expenditures After Discharge
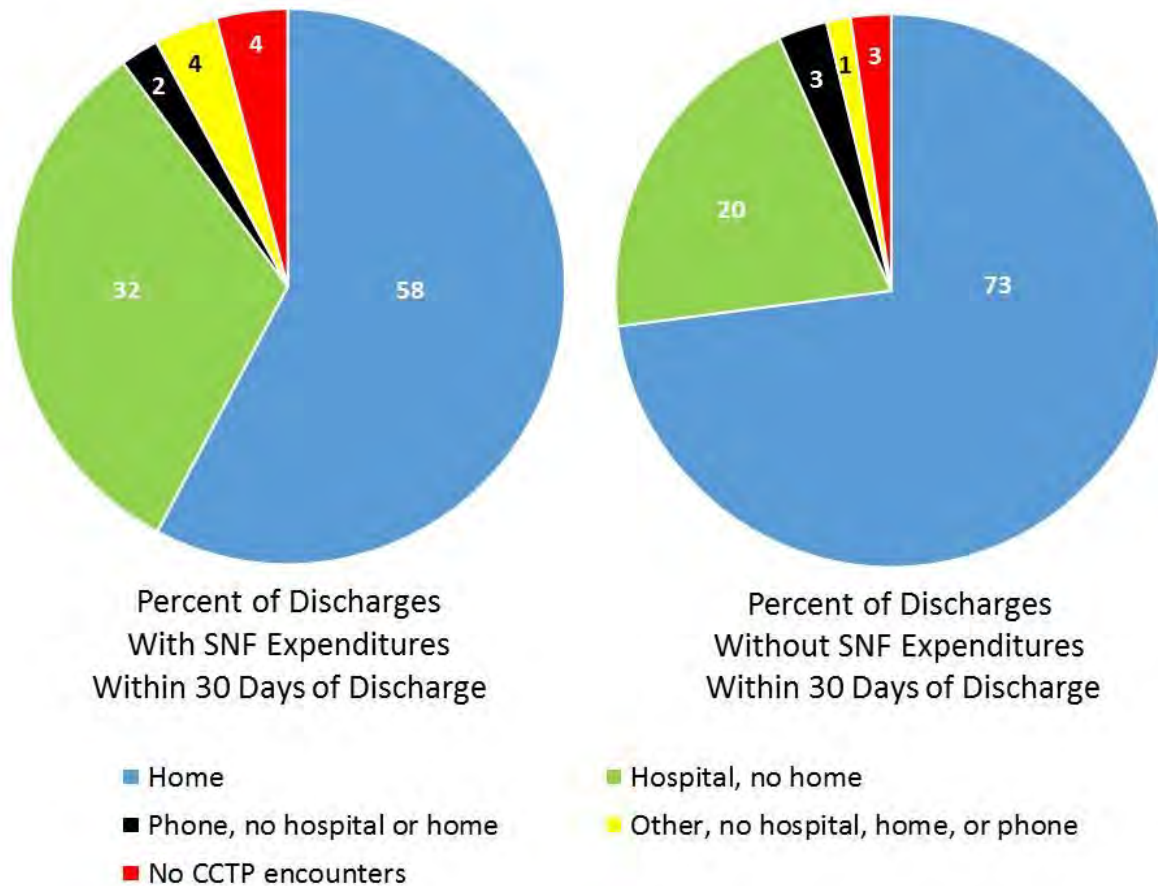
Percent of Discharges
With SNF Expenditures
Within 30 Days of Discharge

Percent of Discharges
Without SNF Expenditures
Within 30 Days of Discharge

- Home
- Phone, no hospital or home
- No CCTP encounters
- Hospital, no home
- Other, no hospital, home, or phone

Source: Analysis of List Bill data used in analytical samples; encounters identified by hierarchy detailed in Table 2.2.

3. What Is the Association Between the CCTP and Readmissions and Medicare Expenditures? How Did the CCTP Impact These Outcomes?

3.1. Overview

We tested the hypothesis that the CCTP would reduce both the 30-day all-cause readmission rates for CCTP participants and also readmission rates for all Medicare FFS discharges from partner hospitals. In order for the CCTP to impact the readmission rate at the (partner) hospital level, sites must have succeeded in achieving large reductions in the readmission rate of their participants (relative to the sites' total Medicare FFS beneficiary population) and/or enrolled a high proportion of the Medicare FFS beneficiary population at those hospitals.

To test the first hypothesis, we examined *associations* between the CCTP and key outcomes for CCTP participants over the CCTP period in a contemporaneous cross-sectional framework. These analyses are limited. With no baseline information to provide a pre/post analysis,[5] these associations do not identify causal impacts of the CCTP. The strength of this analysis, however, is that it provides insight into differences between the participant population that received services under the CCTP and comparison groups of beneficiaries drawn from IPPS nonpartner hospitals operating in healthcare markets that were similar before inception of the CCTP.[6]

Despite relatively low average participant enrollment (less than 20 percent among the 44 extended sites that exhibited the potential for high enrollment at the CCTP's 2-year mark), we examined the second hypothesis—the presence of impacts at the hospital level of the CCTP on key outcomes—to determine if the targeting strategies of sites were sufficient to impact the overall readmission rate at partner hospitals. We did this by comparing all Medicare FFS beneficiaries at partner hospitals to all Medicare FFS beneficiaries at a matched group of IPPS nonpartner hospitals operating in similar underlying healthcare markets before and during the CCTP period in a difference-in-differences (DiD) framework. In the absence of a high proportion of the Medicare FFS beneficiary population enrolled, detecting an impact on all Medicare FFS discharges relies on targeting those at risk of readmission for whom those readmissions are likely to be preventable, resulting in relatively large reductions in the readmission rate of participants in those hospitals.

Secondary to the CCTP's hypothesized effect on readmissions, we also examined differences in other Medicare services, including emergency department visits and their potential translation to differences in Medicare expenditures. For example, lower 30-day readmission rates for participants relative to matched comparisons may translate to lower inpatient 30-day Medicare expenditures during the same 30-day post-discharge period. As part of our evaluation of the associations between the CCTP and outcomes among CCTP participants, we also estimated—for each site and for the pooled sample—the overall *net* differences between CCTP participants and matched comparisons in 30-day Medicare Part A and Part B expenditures following hospital discharge. This estimate accounted for payments made to sites for the provision of CCTP services

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[5] Discussed in Section 3.2.
[6] We grouped Hospital Referral Regions (HRRs) into clusters with similar pre-intervention values of key outcome variables and local healthcare market characteristics.

(PEDR) apart from any differences in Medicare FFS Part A and Part B expenditures associated with the CCTP.

Additionally, given a large and consistent proportion of CCTP participants that received home health services 30 days after hospital discharge and the potential alignment of the CCTP and HHA services noted in Section 2.3, we examined how receipt of HHA services was associated with key outcomes, while accounting for CCTP participation. These analyses are also limited in their causal inference. For example, we did not have data on the intensity or content of the home health services received. In addition, we were not able to control for the timing of the home health services, which could be provided before, after, or during the receipt of CCTP services. Finally, beneficiaries who receive home health services but not CCTP services may differ in ways that we did not observe but are associated with a different risk of readmission.

Analyses in this section differ by the cohort of sites considered. We analyzed the association between CCTP participants and key outcomes for all 101 sites and, separately, for the 44 extended sites. Estimates for either cohort constitute *program-wide* estimates, though the latter was limited to sites that CMS regarded as sufficient in their progress toward enrollment goals and readmission improvements to continue in the CCTP beyond the initial 2-year performance period. As such, *program-wide* estimated associations or impacts for these 44 extended sites likely provide an upper bound of program associations or impacts. We conducted the impact analysis for only the sample of 44 extended sites for several reasons. These sites were all extended, some for an additional 24 months, allowing them to further ameliorate implementation issues noted in Section 2 and providing us with a longer timeframe to observe trends given the rolling entry of sites into the CCTP. In addition, the higher enrollment levels led to not only more robust sample sizes, but also a higher likelihood of an observable impact at the hospital level. Even so, given the average enrollment rate for the 44 extended sites of only 18.57 percent—higher than for the other 57 sites that were not extended—we do not expect to detect meaningful changes in outcomes in our impact analysis even for the 44 high-performing extended sites.

3.1.1. Key Takeaways

For CCTP participants, **30-day readmission rates and inpatient expenditures were significantly lower than those for the comparison group over the CCTP performance period.[7]**

- When examining associations across all 101 sites, CCTP participants had statistically significantly lower readmissions (11.08 percent) and Medicare Part A and part B expenditures (8.23 percent) than the comparison group (Table 3.2). Differences in readmission rates were slightly smaller for the 101 sites than for the 44 extended sites; however, differences in 30-day total Part A and Part B expenditures were larger for the 101 sites.

- Site-by-site cross-sectional results show that participants in 26 of the 44 extended sites had lower readmission rates than the comparison group (Figure 3.1), statistically significantly

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[7] Cross-sectional estimates for differences in readmission rates and Medicare Part A and Part B expenditures between participants and their matched comparisons in the 44 extended sites were similar to those found in an earlier analysis not shown here that had 14 fewer months of data, indicating stability in these pooled participant results.

lower at p < 0.1. An additional 10 sites did also exhibit lower—albeit statistically insignificant—readmission rates relative to the comparison group.

For all Medicare FFS beneficiaries **discharged from partner hospitals in the 44 extended sites, there was no significant impact of the CCTP (i.e., 30-day outcomes were not significantly different from those of the comparison group).**

- The estimated impacts from DiD regressions for readmissions, Medicare Part A and Part B expenditures, and expenditure components were small (under 1 percent) and not statistically significant at p < 0.1 (Table 3.3).

- Similarly, DiD impact estimates at the site level of readmissions were small and statistically insignificant for 29 of the 44 extended sites (Figure 3.1). Among the sites with significant estimates, impacts were mixed: Seven sites had a negative (favorable) impact on readmissions, while eight sites had a positive (unfavorable) impact (p<0.1).

When examining the association between the receipt of home health services and outcomes, after accounting for the association between the CCTP and outcomes, home health services had a more favorable association with readmissions and inpatient expenditures for matched comparisons than for participants (Table 3.6).

- Home health services were associated with a 35.01 percent lower readmission rate among matched comparisons than among participants.

- Home health services were associated with 60.61 percent lower inpatient expenditures among matched comparisons than among participants.

3.2. Data and Methods

We used Medicare claims data and the Master Beneficiary Summary File, which provided necessary data for characteristics of beneficiary and some HRR characteristics used in clustering. Census and American Community Survey data provided some characteristics of HRRs as well as some aggregated characteristics relevant to Medicare beneficiaries. Information on CCTP encounters and services received was obtained from List Bill data supplied by each site and for each participant. Finally, the American Hospital Association Annual Survey and Dartmouth Atlas contributed hospital and HRR characteristics. Table A.2 in Appendix A provides a comprehensive list of data sources used.

To estimate the effect of the CCTP and association between the CCTP and patient outcomes, we used the pooled sample of all sites and samples for each site to analyze outcomes for:

1. Discharges receiving CCTP services (participants).
2. All Medicare FFS discharges at partner hospitals.

Table 3.1 provides an overview of the analyses conducted for this section. To analyze associations between the CCTP and participant outcomes, we performed a cross-sectional regression that analyzes contemporaneous differences in outcomes between participants and their matched comparisons. To assess CCTP impacts, we performed a DiD analysis for all Medicare FFS discharges at partner hospitals versus matched comparison hospitals.

Table 3.1. Description of Samples, Comparison Selection Methods, and Outcome Measurement for Analyses of Association and Program Impact

Analysis	Unit of Analysis	Outcome Measurement After Start of Program	Sample of Sites
Analysis of Association Between Program Participation and Outcomes (Cross-Sectional Analysis of Participants and Matched Comparisons)			
Pooled analysis (all discharges)	Discharge	All months (varies by site),[a] through January 31, 2017	101 sites; 44 extended sites
Pooled analysis (all discharges)	Discharge	First 33 months, through July 31, 2016	44 extended sites
Site-by-site analysis	Discharge	All months (varies by site),[b] through January 31, 2017	44 extended sites
Home health analysis	Discharge	All months, through January 31, 2017	44 extended sites
Analysis of Program Impact (Difference-in-Difference (DiD) Analysis of Partner Hospitals and Matched Nonpartner Hospitals)			
Pooled analysis (all FFS discharges)	Hospital month	First 33 months, through July 31, 2016	44 extended sites
Site-by-site analysis (all FFS discharges)	Discharge	All months, through January 31, 2017	44 extended sites

[a] Outcome measurement is from 33 to 60 months for the 44 continuing sites, and from 9 to 30 months for the 57 non-continuing sites.
[b] Outcome measurement is from 33 to 60 months for the 44 continuing sites.

3.2.1.1. Analysis Methods

The cross-sectional models give us the estimate of differences in beneficiary outcomes between participants and matched comparisons in the 30-day period following hospitalizations that occurred during the CCTP period. The participant cross-sectional analysis does not assess program impacts, only associations.

A DiD model with matched comparison hospitals mitigates the effects of external factors and selection bias on the outcomes of interest by comparing the change over time—from the baseline period to after the intervention—in these outcomes for partner hospitals to the change over time for matched comparison hospitals. For these reasons, the DiD model is preferred from a statistical perspective to a participant cross-sectional model that only contemporaneously compares outcomes for the two groups.

It was not feasible, however, to use a DiD model for the participant-level analysis due to differing and, in some cases, changing eligibility criteria for enrollment (which were often based on clinical judgment and other non-claims-based factors) as well as the lack of comparable data for the comparison group. Additionally, only 35.32 percent of participants among the 44 extended sites were admitted at some point during the yearlong baseline period, making it impossible to generate appropriate baseline outcomes. In addition, participants would have needed to experience a similar type of admission in the baseline period to serve as good comparisons for the admission during the program. DiD models can be used with a group of beneficiaries who resemble participants at baseline and matched comparisons; however, in this case, creating a group of "would-be"

participants at the baseline was not possible because the eligibility criteria used for enrollment differed by site.

For all 101 sites, we estimated the cross-sectional association between the CCTP, 30-day readmissions, and 30-day Medicare Part A and Part B FFS expenditures using the following approach:

- **Pooled analysis** of the entire sample of recipients of CCTP services (participants) and their matched comparisons between the beginning of CCTP enrollment (February 1, 2012) and the end of enrollment (January 31, 2017). Each site had between 9 and 60 months of participation. This is a pooled cross-sectional model.

For the 44 extended sites, we estimated the effect of CCTP participation and association between CCTP participation on 30-day readmission rates, Medicare Part A and Part B expenditures, and select expenditure subcomponents using the following approaches:

- **Pooled analysis** using the first 33 months of data for each site, ranging from February 1, 2012, through July 31, 2016, for:
  a. Participants and their matched comparisons (pooled cross-sectional model).
  b. Partner and matched comparison hospitals, aggregating across all Medicare FFS discharges for each hospital in each month (pooled DiD model).

  The minimum number of months that an extended site participated in the CCTP was 33 months. For this reason, we limited data used for all sites to the first 33 months of program participation to construct a balanced panel for the pooled hospital-level DiD analysis—that is, to have the same length of follow-up for each site in the analysis. We used the 33-month measurement period in the cross-sectional analysis to ease comparisons between hospital- and participant-level results.

- **Pooled analysis** using between 33 and 60 months of participation, depending on the site's length of participation, between February 1, 2012, and January 31, 2017, for participants and their matched comparisons (pooled cross-sectional model).

- **Site-by-site analysis** using between 33 and 60 months of participation, depending on the site, between February 1, 2012, and January 31, 2017, for:
  a. Participants and their matched comparisons (site-by-site cross-sectional model).
  b. Partner and matched comparison hospitals, aggregating across all Medicare FFS discharges for each hospital in each month (site-by-site DiD model).

As part of the participant cross-sectional analyses, we also estimated—for each site and for the pooled sample—the overall net differences in expenditures during the 30-day period after discharge by subtracting the payments made to sites for provision of CCTP services (PEDR) from any reductions in Medicare Part A and Part B expenditures associated with the CCTP.

In addition, for CCTP participants, we also used cross-sectional models to estimate the incremental association of home health services on readmissions, inpatient expenditures, and Medicare Part A and Part B expenditures, in addition to the association between CCTP participation and outcomes.

We used an instrumental variables model that accounts for the fact that the CCTP may influence the receipt of home health services during the 30 days after discharge. CCTP influence on receipt of home health services is likely given the large difference at baseline in the proportion of participants and matched comparisons who received home health services after discharge (33.80 percent and 24.40 percent, respectively). We used pre-intervention home health expenditures as identifying variables for home health use 30 days after discharge.

Please refer to Appendix A for further methodological details on regression models.

3.2.1.2. Comparison Group Selection
Using propensity score methods, we selected a comparison group of discharges that were similar to the treatment group during the baseline period on all available factors that might influence patient outcomes and the decision to participate in the program. We included measures of utilization before the intervention because prior outcomes are the best single predictor of future outcomes. We identified the comparison group in two steps:

1. Starting with the pool of hospitals/discharges located in HRRs that contain at least one partner hospital with at least one eligible discharge, we grouped the sites into clusters based on similar healthcare market and population characteristics.

2. For the DiD analyses, we matched each partner hospital with a nonpartner hospital within the same cluster and by year of implementation. For the participant cross-sectional analysis, we matched each CCTP participant discharge with a discharge from any nonpartner hospital within the same cluster and within the same program quarter.

For the participant cross-sectional analysis, we matched discharges on the characteristics of the stay, beneficiary, hospital, and HRR. In general, the discharges were well-matched both overall and within most sites. Please refer to Appendix A for additional details on selecting the participant comparison groups for the 44 extended sites and all 101 participating sites.

For the hospital-level DiD analyses, we matched hospitals on their characteristics, HRR characteristics, and aggregated beneficiary characteristics. Matching on these characteristics resulted in a matched pooled sample of hospitals where partner and matched comparison hospitals were statistically similar across characteristics. However, because of small sample sizes within sites, matching on many variables at the site level was not feasible. For that reason, we required balance (within 0.25 standard deviations) only on outcome variable levels (e.g., Medicare FFS expenditures, readmissions, and mortality) 1 year before the hospital joined the program. We also considered changes in outcomes between 2 years and 1 year before a hospital joined the program (trends in outcome variables). For further details on selecting the hospital-level comparison group for the 44 extended sites, please refer to Appendix A.

3.3. Findings

Below, we present findings of the program-level analyses, which examine associations and program impacts for the program as a whole, and site-level analyses, which present estimates for each site.

3.3.1. Program-Level Analyses

We estimated the association between the receipt of CCTP services, the 30-day readmission rate, and 30-day Medicare FFS Part A and Part B expenditures using a discharge-level multivariate cross-sectional regression that accounts for residual differences between the two groups after matching on discharge, beneficiary, and hospital characteristics.

The hospital-level DiD analysis examined differentials between partner hospitals and matched comparison hospitals in the change in 30-day readmission rates and 30-day Medicare FFS expenditures per discharge, again accounting for other factors that may influence those outcomes (e.g., case mix). The unit of analysis in the pooled model is the hospital, and the outcome variables are the mean Medicare FFS readmission rate and expenditures for each month. The DiD model estimated the impact of the CCTP by controlling for systematic time-invariant baseline differences between hospitals and changes over time in outcomes for both groups.

Given very large samples, we have the power to detect even small changes in outcomes for both the pooled sample of all discharges for participants and matched comparisons in the participant cross-sectional model and for the pooled sample of all partner hospitals and their matched comparison hospitals in the DiD model.

3.3.1.1. Participant Cross-Sectional and Hospital DiD Analyses
CCTP participants had lower 30-day readmission rates and Medicare FFS Part A and Part B expenditures than comparison discharges.

For the full 101-site sample, the 30-day readmission rate and Medicare Part A and Part B expenditures for participants were lower, on average, than the rates of their matched comparisons after controlling for factors that might affect the likelihood of a readmission (Table 3.2).

- Participants had a 1.82-percentage-point lower rate of readmissions than matched comparisons—an 11.08 percent difference.

- Similarly, the average Medicare Part A and Part B expenditures was $634 or 8.23 percent lower for participants relative to matched comparisons.

- Large differences in the proportion of participants and matched comparisons who received PAC services indicate that the two groups may not have been comparable at baseline because of unmeasured differences.

Table 3.2. Participant Cross-Sectional Regression Results During the Entire Period of Participation for All 101 Sites

	Regression-Adjusted Treatment Mean	Regression-Adjusted Comparison Mean	Regression-Adjusted Mean Difference From Comparison (SE)[a]	% Difference[b]
30-day readmission rate, %	14.57	16.38	-1.82** (0.14)	-11.08
30-day Part A and Part B expenditures, $	7,064.15	7,697.66	-633.51** (103.47)	-8.23

	Regression-Adjusted Treatment Mean	Regression-Adjusted Comparison Mean	Regression-Adjusted Mean Difference From Comparison (SE)[a]	% Difference[b]
Number of discharges (hospitals) in the sample	662,607 discharges (448 hospitals)	662,607 discharges[c] (1,042 hospitals)		

Notes: ^p < 0.20, +p < 0.10, *p < 0.05, **p < 0.01; standard errors are given in parentheses where appropriate.
N/A = not applicable. Medicare expenditures for services beginning in the 30-day post-discharge period and extending beyond this period were not prorated.
[a] Results from regression estimation of the association between participation in the CCTP and outcomes for discharges from hospitals associated with all 101 sites using the entire period of CCTP participation, which varies between 9 and 60 months for each hospital, falling between February 2012 and January 2017. Covariates (Appendix A, Table A7) include characteristics of the stay, such as modified diagnostic-related groups; beneficiary characteristics, including basic demographics, prior outcomes (e.g., admissions, readmissions, Medicare fee-for-service expenditures), and Hierarchical Condition Category scores; and hospital characteristics, such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions, all measured in the year before implementation.
[b] The percent change for the participant cross-sectional analysis is calculated as 100 × (regression-adjusted mean difference from comparison) / (regression-adjusted comparison mean).
[c] Because 5,569 comparison discharges were each matched to two different treatment discharges, the unique number of comparison discharges is 657,038. The matching algorithm attempts to find a suitable comparison within the same cluster as the treatment discharge, but when that is not possible (for approximately 5.5 percent of treatment discharges), it draws a comparison from outside the cluster.

For the 44 extended sites in their first 33 months of operation, the 30-day readmission rate and Part A and Part B expenditures for participants were also lower, on average, than their matched comparisons (Table 3.3, left panel).

- Participants had a 2.15-percentage-point lower rate of readmissions than their matched comparisons—a 12.92 percent difference.

- Lower readmissions among all participants versus matched comparisons produced lower inpatient expenditures of $291 per discharge (13.85 percent).

- Participation in the CCTP was associated with $680 lower Medicare Part A and Part B expenditures, a difference of -8.69 percent. The difference in total expenditures was driven by lower inpatient and SNF expenditures and other Medicare services not detailed, reflecting lower usage rates of these services by participants relative to their matched comparisons. However, these favorable differences were partially offset by higher home health and inpatient rehabilitation hospital expenditures—services that were more frequently used by participants.

- Large differences in the proportion of participants and matched comparisons who received PAC services indicate that the two groups may not have been comparable at baseline because of unmeasured differences.

Table 3.3. Estimated Association Between Program Participation, Outcomes, and CCTP Impacts for the First 33 Months of Participation for 44 Continuing Sites

	Participant Cross-Sectional Analysis Using Participants' Discharges[a]			Difference-in-Difference (DiD) Analysis Using All Discharges[b]		
	Regression-Adjusted Comparison Mean	Regression-Adjusted Mean Difference From Comparison (SE)	% Difference[e]	Counter-Factual Mean[d]	Regression-Adjusted DiD Impact Estimate (SE)	% Difference[e]
30-day readmission rate, %	16.65	-2.15** (0.16)	-12.92	19.23	-0.04 (0.12)	-0.19
30-day acute care hospital/critical access hospital inpatient expenditures, $	2,101.67	-291.10** (34.47)	-13.85	2,442.28	-13.29 (26.48)	-0.54
30-day Medicare Part A and Part B expenditures, $	7,823.70	-679.87** (130.13)	-8.69	8,400.60	-2.17 (46.77)	-0.03
30-day net differences in Medicare Part A and Part B Expenditures per discharge (30-day Medicare Part A and Part B expenditures with per-eligible discharge rate), $	N/A	-319.90** (130.13)	N/A	N/A	N/A	N/A
30-day skilled nursing facility expenditures, $	2,283.60	-336.83** (93.04)	-14.75	2,249.64	14.59 (22.78)	0.65
30-day home health expenditures, $	704.58	221.01** (19.44)	31.37	656.33	2.87 (7.27)	0.44
30-day outpatient expenditures, $	386.61	1.37 (6.21)	0.35	428.46	5.19 (4.59)	1.21
30-day emergency department expenditures, $	40.82	1.36 (1.08)	3.32	47.80	-1.02^ (0.70)	-2.14
30-day observation stay expenditures, $	39.87	-0.18 (2.10)	-0.46	37.64	1.24 (1.37)	3.30
Number of discharges (hospitals) in the sample	683,732 discharges (847 hospitals)			2,488,979 discharges (359 hospitals)		

Notes: ^$p < 0.20$, +$p < 0.10$, *$p < 0.05$, **$p < 0.01$. N/A = not applicable. Medicare expenditures for services beginning in the 30-day post-discharge period and extending beyond this period were not prorated. The CCTP is not expected to influence utilization of some services, such as hospice and LTCH expenditures. Beneficiaries discharged to a LTCH have complex conditions, such as paralysis, organ failure, or conditions requiring prolonged mechanical ventilation, which require

care that cannot be provided in other settings regardless of the support provided by the CCTP care transition staff. Therefore, the lower expenditures observed for certain categories, such as LTCH services, may be due to preexisting differences between participants and matched comparisons that are not observed and therefore not controlled for in our analysis.

[a] Results from regression estimation of the association between participation in the CCTP and outcomes for discharges from hospitals associated with the 44 extended sites, estimated using the first 33 months of participation for each hospital, falling between February 2012 and July 2016. Covariates (Appendix A, Table A.8) include characteristics of the stay, such as modified diagnostic-related groups (MDRGs); beneficiary characteristics, including basic demographics, prior outcomes (i.e., admissions, readmissions, Medicare fee-for-service (FFS) expenditures), and Hierarchical Condition Category scores; and hospital characteristics, such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions, all measured in the year before implementation.

[b] Results from hospital-level estimated impacts of the CCTP on 30-day readmissions and 30-day Medicare FFS expenditures using DiD regression models for hospitals associated with the 44 extended sites, estimated using the first 33 months of participation for each hospital, falling between February 2012 and July 2016. Covariates (Appendix A, Table A.9) include hospital averages of percentages of the 48 most frequently occurring MDRGs among participants (these MDRGs cover 75 percent of participants); dual eligibles; beneficiary demographics including age and race/ethnicity; hospital fixed effects; and month fixed effects.

[c] The percent change for the participant cross-sectional analysis is calculated as 100 × (regression-adjusted mean difference from matched comparison) / (regression-adjusted comparison mean).

[d] The counterfactual is the outcome that the treatment group would have had in the absence of the program. Our estimate of the counterfactual is the treatment group mean during the program minus the regression-adjusted DiD impact estimate.

[e] The percent change for the DiD analysis is calculated as 100 × (regression-adjusted DiD impact analysis) / counterfactual.

For the 44 extended sites, the 30-day readmission rate and Medicare Part A and Part B expenditures were also lower for participants, on average, than their matched comparisons (Table 3.4).

- Lower readmissions among all participants than among matched comparisons produced lower inpatient expenditures of $270 per discharge (13.30 percent) during the entire period of participation available in the data.

- Participants' Medicare Part A and Part B expenditures were $572 lower per discharge than their matched comparisons' expenditures.

Table 3.4. Participant Cross-Sectional Regression Results During the Entire Period of Participation for 44 Continuing Sites

	Regression-Adjusted Treatment Mean	Regression-Adjusted Comparison Mean	Regression-Adjusted Mean Difference From Comparison (SE)[a]	% Difference[b]
30-day readmission rate, %	14.21	16.31	-2.10** (0.16)	-12.86
30-day acute care hospital/critical access hospital inpatient expenditures, $	1,762.76	2,033.24	-270.48** (34.06)	-13.30
30-day Medicare Part A and Part B expenditures, $	7,113.87	7,686.01	-572.14** (122.78)	-7.44
30-day net differences in Medicare Part A and Part B Expenditures per discharge (30-day Medicare Part A and Part B expenditures with per-eligible discharge rate (PEDR), $	N/A	N/A	-211.38** (122.78)	N/A
30-day skilled nursing facility expenditures, $	2,044.03	2,280.32	-236.30** (86.91)	-10.36
30-day home health expenditures, $	911.06	694.90	216.15** (18.88)	31.11
30-day outpatient expenditures, $	383.55	384.84	-1.29 (5.87)	-0.34
30-day emergency department expenditures, $	41.65	40.48	1.17 (0.98)	2.90
30-day observation stay expenditures, $	40.91	40.61	0.30 (1.95)	0.75
Number of discharges (hospitals) in the sample	533,609 discharges (215 hospitals)[c]	533,609 discharges (632 hospitals)		

Notes: $^p < 0.20$, $+p < 0.10$, $*p < 0.05$, $**p < 0.01$; standard errors are given in parentheses where appropriate. N/A = not applicable. Medicare expenditures for services beginning in the 30-day post-discharge period and extending beyond this period were not prorated. The CCTP is not expected to influence utilization of some services, such as hospice and LTCH expenditures. Beneficiaries discharged to a LTCH have complex conditions, such as paralysis, organ failure, or conditions requiring prolonged mechanical ventilation, which require care that cannot be provided in other settings

regardless of the support provided by the CCTP care transition staff. Therefore, the lower expenditures observed for certain categories, such as LTCH services, may be due to preexisting differences between participants and matched comparisons that are not observed and therefore not controlled for in our analysis.

[a] Results from regression estimation of the association between participation in the CCTP and outcomes for discharges from hospitals associated with 44 extended sites, estimated using the entire period of CCTP participation, which varies between 33 and 60 months of participation for each hospital, falling between February 2012 and January 2017. Covariates (Appendix A, Table A.8) include characteristics of the stay, such as modified diagnostic-related groups (MDRGs); beneficiary characteristics, including basic demographics, prior outcomes (i.e., admissions, readmissions, Medicare fee-for-service expenditures), and Hierarchical Condition Category scores; and hospital characteristics such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions, all measured in the year before implementation.

[b] The percent change for the participant cross-sectional analysis is calculated as 100 × (regression-adjusted mean difference from comparison) / (regression-adjusted comparison mean).

[c] Participant cross-sectional regressions shown in this table included 215 partner hospitals, compared with 216 partner hospitals included in the site-by-site DiD impact analyses. One partner hospital was excluded from the participant analysis because its List Bill records of participation could not be merged to claims data, despite having employed several strategies to facilitate the merge.

In contrast to the favorable associations between the CCTP and outcomes estimated in cross-sectional analyses, our DiD estimates show no statistically significant impact of the CCTP on any 30-day outcome at $p < 0.1$ (Table 3.3, right panel) across the 44 extended sites during their first 33 months of operation.[8]

- Estimated effects of the program were small and statistically insignificant for readmission rates, Medicare Part A and Part B expenditures, and expenditure components over the 33-month period of participation (Table 3.3, right panel).

- The regression-adjusted mean readmission rate in partner hospitals was lower than in comparison hospitals both before and after CCTP participation (Table 3.5). Both rates declined very slightly, from 19.27 percent to 19.19 percent in partner hospitals and from 27.02 percent to 26.99 percent in their matched comparison hospitals, on average. The difference in these changes was not significant.

For the 44 extended sites, the readmission rate during the program was lower than the baseline rate (Table 3.5, Table B.4) for both partner and matched comparison hospitals, which may reflect other concurrent national and local efforts to lower readmission rates, such as the ongoing Hospital Readmissions Reduction Program that started in October 2012.

Findings in this section thus far indicate that there was no discernable impact on readmission rates among all Medicare FFS beneficiaries, but that many sites, and all sites combined, exhibited a favorable association between CCTP participants and readmission outcomes. The literature has identified potential concerns of an offset between readmissions and observation-stay utilization that might stem from possible changes to provider incentives (potentially because of CMS programs) (Zuckerman, Sheingold, Orav, Ruhter, & Epstein, 2016). Such incentives, however, are not directly apparent in the CCTP. For example, a key financial component of the CCTP, the PEDR, is a fixed amount paid for services external to what Medicare Part A and B cover, accounting for CT worker services and, in some cases, community support services.

At conventional levels ($p < 0.1$ or lower), there were no statistically significant differences between participants and selected comparisons served by the 44 extended sites in 30-day emergency

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[8] These results are presented as an analog to the 33-month panel used in our DiD analysis (e.g., Table 3.5).

department (ED) expenditures or observation-stay expenditures (Table 3.3), or utilization (Appendix Table B.10). In addition, we found no meaningful correlations between participant readmissions and ED or observation-stay utilization, as well as steady trends over the CCTP implementation period for the ED and observation utilization (data not shown, 33-month panel).[9] In pooled-participant cross-sectional analyses of physical and occupational therapy utilization, participants had higher utilization than comparisons but not by meaningful levels (3.97 percent, not statistically significant). Furthermore, rates of 30-day primary care physician and physician office utilization post-discharge were higher for participants than comparisons (26.11 percent, $p < 0.01$; 18.45 percent, $p < 0.01$). Such relationships may occur if CCTP participants are more proactive in obtaining necessary rehabilitation, given the CCTP intervention. Indeed, beneficiary activation is central to many CT models. In addition, most sites provide or facilitate access to additional supports, such as home-delivered meals or transportation to medical appointments, which could provide needed support to CCTP participants in recovery. Hence, these findings are considered an expected consequence of a CT intervention.

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[9] ED and observation stays are identified as instances that did not lead to readmissions. Correlation coefficients are -0.01 for ED utilization and readmissions and -0.0094 for observation-stay utilization and readmissions among all participants in the study over the first 33 months of participation.

Table 3.5. Regression-Adjusted Means Before and During the Program for Partner and Matched Comparison Hospitals Used in Difference-in-Differences (DiD) Analyses for the First 33 Months of Participation for Each Provider for 44 Continuing Sites

	Partner Hospitals			Matched Comparison Hospitals				
	Pre[a]	Post[b]	Difference	Pre[a]	Post[b]	Difference	Regression-Adjusted DiD Impact Estimate (SE)	% Difference[c]
30-day readmission rate, %	19.27	19.19	-0.07	27.02	26.99	-0.03	-0.04 (0.12)	-0.19
30-day acute care hospital/critical access hospital inpatient expenditures, $	2,449.58	2,428.99	-20.59	3,372.42	3,365.12	-7.30	-13.29 (26.48)	-0.54
30-day Medicare Part A and Part B expenditures, $	8,349.95	8,398.44	48.49	8,713.88	8,764.53	50.65	-2.17 (46.77)	-0.03
30-day skilled nursing facility expenditures, $	2,228.17	2,264.23	36.06	1,982.70	2,004.17	21.47	14.59 (22.78)	0.65
30-day home health expenditures, $	651.61	659.21	7.60	350.89	355.61	4.72	2.87 (7.27)	0.44
30-day outpatient expenditures, $	429.37	433.65	4.28	523.67	522.75	-0.92	5.19 (4.59)	1.21
30-day emergency department expenditures, $	47.21	46.78	-0.43	45.01	45.61	0.60	-1.02^ (0.70)	-2.14
30-day observation stay expenditures, $	39.74	38.89	-0.85	45.99	43.90	-2.09	1.24 (1.37)	3.30
Number of hospitals in the sample		216[d]			143			

Notes: ^p < 0.20, +p < 0.10, *p < 0.05, **p < 0.01. Medicare expenditures for services beginning in the 30-day post-discharge period and extending beyond this period were not prorated. Covariates (Appendix A, Table A.9) used in regression estimation to calculate these adjusted means include hospital averages of the 48 most frequently occurring modified diagnostic-related groups among participants (covering 75 percent of participants); dual eligibles; beneficiary demographics including age and race/ethnicity; hospital fixed effects; and month fixed effects.

[a] The pre-intervention period consists of the 12 months before each site's CCTP implementation date, the earliest of which is February 2012.

[b] The post-intervention period consists of the 33 months of program participation for each site. The 33 months vary among sites and fall between February 2012 and July 2016.

[c] The percent difference is calculated as 100 × (regression-adjusted DiD impact estimate) / (regression-adjusted comparison mean measured during the pre-intervention period).

[d] DiD impact analysis shown in this table included 216 partner hospitals, compared with the 215 partner hospitals that were included in the participant cross-sectional regressions. One partner hospital was excluded from the participant analysis because its List Bill records of participation could not be merged to claims data, despite having employed several strategies to facilitate the merge.

3.3.1.2. Net Differences in Medicare Part A and Part B Expenditures

We also estimated the average net differences in 30-day Medicare FFS Part A and Part B expenditures per participant directly served by the program. We took the regression-adjusted estimate of the average difference in Medicare Part A and Part B FFS expenditures between participants and matched comparisons and reduced it by the average cost of services (PEDR) per discharge (Table 3.4). We then multiplied average net differences in Medicare Part A and Part B expenditures per discharge by the number of discharges in the analytic sample. These net differences are based on associations between the program and expenditures, rather than impact estimates, and therefore should not be interpreted as savings attributed to the program.

Medicare Part A and Part B expenditures are estimated to be $112,795,168 lower among participants versus matched comparisons for the entire period of participation. Participants' 30-day Medicare Part A and Part B expenditures were $572 lower per discharge than their matched comparisons' expenditures. After accounting for the average fee paid for services provided to participants (PEDR), the net difference in Medicare Part A and Part B expenditures was approximately -$211 per discharge (Table 3.4). Multiplying this difference by the total number of discharges (533,609) yields the estimate of $112.8 million in lower Medicare Part A and Part B expenditures for participants than for the comparison group. Without a more rigorous design that compares outcomes before and after participation in the CCTP for both participants and matched comparisons, we are not able to discern what percentage of those lower expenditures reflect savings that are due to the CCTP.

For the first 33 months of sites' participation, 30-day Medicare Part A and Part B expenditures are estimated to be $109,363,664 lower among participants versus matched comparisons. Despite the fact that there were fewer participating discharges during the first 33 months than during the full program period, the estimated net difference in expenditures is only slightly less. This is because the program is associated with a larger net difference in Medicare Part A and Part B expenditures (-$320 per discharge) during the first 33 months of program participation than during the full program period (Table 3.3).

3.3.2. Site-Level Analyses of Readmissions

Results of the participant cross-sectional analysis show that, for the sample as a whole, the program is associated with statistically significantly lower readmission rates. If partner and comparison hospitals differ at baseline, observed differences in outcomes after the start of the CCTP might reflect these baseline differences, not CCTP participation. The need to demonstrate similarity at baseline is greater for cross-sectional beneficiary-level results because this model does not adjust for differences in outcomes at baseline (as the DiD model does). Both the participant- and hospital-level matching produced groups of similar participants and matched comparisons for the pooled cross-sectional analysis. Matching at the site level produced excellent balance for all but four sites (Appendix A.3). Hospital matching produced excellent, very good, or moderate balance for 31 of 44 extended sites (Appendix A.3).

Power to detect differences in outcomes at the hospital level was also influenced by the number of hospital partners (ranged from 2 to 11), the number of participants served by the intervention (average enrollment rate was 18.52 percent), and the variation in the outcome variables across discharges. Given these limitations, for sites with the poorest power, we would be able to detect

as statistically significant only differences in outcomes in the participant cross-sectional model that were approximately a quarter of the mean outcome value or larger.

The 30-day readmission rate for participant discharges was statistically significantly lower than the rate of their matched comparisons in 26 of the 44 extended sites (p < 0.10) (Table 3.1). Participant readmission rates were between 7 percent and 39 percent lower than those of their matched comparisons in the 26 sites with lower readmissions. In sites with lower participant Medicare Part A and Part B expenditures, participants averaged between 6 percent and 45 percent lower expenditures than their matched comparisons. For the seven sites with higher Medicare expenditures, participants had between 5 percent and 21 percent higher expenditures, on average, than their matched comparisons. For a number of sites with insignificant differences, the lack of statistically significant results is likely due to the low power to detect differences in outcomes, mainly because of sites working with few hospital partners.

A statistically significant impact (p < 0.10) of the CCTP on 30-day readmission rates occurred in only 15 of the 44 extended sites, and in 7 of these cases, the impact was negative (favorable); in the other 8 sites, the impact was positive (unfavorable) (Figure 3.1, right graph). Impacts on 30-day Medicare Part A and Part B expenditures were found to be statistically significant (p < 0.10) for 11 of the 44 extended sites, 5 of which were negative (favorable) and 6 positive (unfavorable) (Appendix B, Table B.7). In the pooled DiD regression, the level of observation was a hospital-level average of all discharges in each month. In the site-by-site DiD regressions, the level of observation was a hospital discharge, clustered within the hospital that provided services.

For results of the site-by-site estimates from analyses conducted on key outcomes, please refer to Tables B.6 and B.9 in Appendix B.

Figure 3.1. Participant Cross-Sectional and Hospital Difference-in-Differences (DiD) Results for 30-Day Readmissions for 44 Extended Sites

Not statistically significant at p<0.1   Statistically Significant at p<0.1
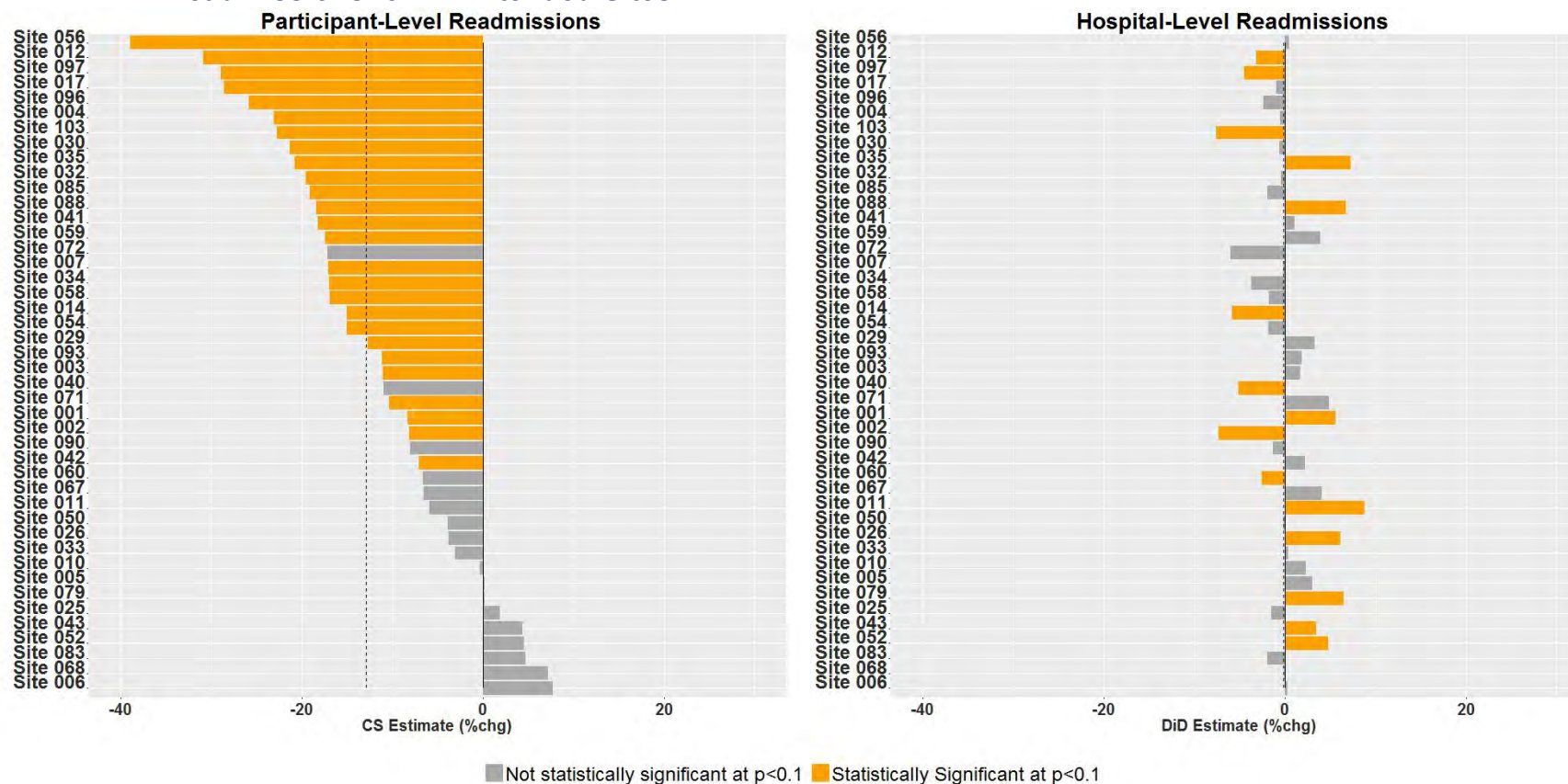
Notes: The dotted line in the Participant-Level Readmissions panel represents the all-month pooled participant-level cross-sectional regression estimate, while the dotted line in the Hospital-Level Readmissions panel represents the 33-month pooled hospital-level DiD regression estimate. Site-level results come from comparable site-level models for each of the 44 extended sites through January 31, 2017.

3.3.3. Interpretation of the Participant Cross-Sectional Analyses

Our findings for the associations between the CCTP and expenditures in participant cross-sectional analyses should be interpreted with caution.. In participant analyses, there were large differences in the receipt of PAC services at baseline between participants and matched comparisons. For example, for the analysis of discharges in 44 extended sites, 33.80 percent of participants and 24.40 percent of matched comparisons, respectively, had post-discharge home health expenditures, a difference of 0.21 standard deviations. The differences in PAC use (and thus expenditures) are likely due to a combination of two factors:

- Unmeasured differences between participants and matched comparisons.
- Influence of the CCTP on the extent to which home health services are used.

The key limitation of the cross-sectional analysis is that we cannot discern the extent to which each of the two factors drove the observed differences in post-acute service use.

Part of the participant-comparison group differences in PAC expenditures may be due to unmeasured differences between participants and matched comparisons. Although we do reduce differences in patient risk by matching on approximately 100 variables that describe a variety of beneficiary and stay characteristics, it is likely that some differences remain after matching. Given the moderately large differences in the receipt of PAC services after discharge, some of the differences are unlikely to have been influenced by the program.

The CCTP is not expected to influence utilization of some services, such as hospice and LTCH expenditures. Beneficiaries discharged to an LTCH have complex conditions, such as paralysis, organ failure, or conditions requiring prolonged mechanical ventilation, which require care that cannot be provided in other settings regardless of the support provided by the CCTP CT staff. Therefore, the lower expenditures on LTCH services that we observed for the participants are likely due to preexisting differences between participants and matched comparisons that are not observed and therefore not controlled for in our analysis.

The CCTP might have influenced PAC use in several ways, making it difficult to interpret findings of cross-sectional participant-comparison differences in outcomes. Differences in participant-comparison PAC services are partially due to the influence of the CCTP through two mechanisms:

- A majority of CCTP sites targeted discharges to home (with or without home health) over discharges to other settings. For example, not all sites included beneficiaries discharged to a SNF, and for those that did some sites only targeted discharges to SNFs with which they had existing relationships. Additionally, sites that did serve SNF patients reported difficulty in tracking these participants and completing the intervention with them. The intervention used by sites may not have been suited to beneficiaries in a SNF. The CCTP also may not have targeted discharges to hospices and LTCHs because of the interventions the sites employed and the complexity of the beneficiaries' needs..

- The presence of the CCTP may have altered discharges to a given setting. For example, a partner hospital's discharge planners may discharge beneficiaries who participating in the CCTP to home health instead of to a SNF knowing that CCTP staff will coordinate these beneficiaries' care.

Our analysis of the influence of home health services and outcomes after accounting for the association of the CCTP accounts for the influence of the program on the receipt of home health services.

3.3.4. Participant Cross-Sectional Analysis of the Influence of Home Health Services on Outcomes After Accounting for the Association of the CCTP and Outcomes

This analysis estimates the association between home health services and 30-day readmissions, inpatient expenditures, and Medicare acute care expenditures after accounting for the association between the CCTP and outcomes. In other words, it answers the following question: What is the association between home health use and outcomes after accounting for the association between the CCTP and outcomes? We analyzed this relationship using all participants and their matched comparisons' discharges.

Beneficiaries who had non-zero home health expenditures in the 30 days after discharge (29.10 percent of all beneficiaries) are regarded as having received home health services. Of those beneficiaries, approximately one-fifth received SNF services, and few received long-term care, rehabilitation, or hospice services. Those who did not receive any PAC services and those who did not receive home health services but did receive other PAC services (SNF, long-term care, or rehabilitation) or hospice care are regarded as not having received home health services.

As described in Section 3.3.3, the receipt of home health services is likely endogenous to participation in the CCTP because, in some cases, the CCTP targeted beneficiaries who were discharged to a given setting, or because the CCTP influenced the receipt of PAC services. To account for this endogeneity, we took an instrumental variables approach that enabled us to estimate the relationship of interest by modeling the selection process (i.e., by explaining the receipt of home health services).

Our findings are as follows (Table 3.6):

- **Home health services had a more favorable association with 30-day readmissions for matched comparisons than for participants.** Readmissions were 6.8 percentage points and 9.4 percentage points lower for participants and matched comparisons, respectively, among those who received home health services versus those who did not. The influence of home health services was 2.56 percentage points (35.01 percent, $p<0.01$) larger for participants versus comparisons.

- **Home health services had a more favorable association with 30-day inpatient expenditures for matched comparisons than for participants.** Inpatient expenditures were $1,404 for participants and $1,709 for matched comparisons, among those who received home health services. The influence of home health services was $305 (60.61 percent, $p<0.05$) larger for participants versus comparisons.

The percentage difference is the proportion of the counterfactual—the predicted outcome that home health recipients would have had in the absence of home health services. Our estimate of the counterfactual is the average outcome for participants receiving home health services minus the regression estimate of the incremental influence of home health (interaction estimate).

Table 3.6. Regression-Adjusted Differences in Outcomes Due to Receipt of Home Health Services, Accounting for Association Between the CCTP and Outcomes

	Influence of Home Health Services on Participants	Influence of Home Health Services on Matched Comparisons	Influence of Home Health Services in Addition to Association of the CCTP (SE)	% Difference[a]
30-day readmission rate, %	-6.80	-9.36	2.56** (0.67)	35.01
30-day acute care hospital/critical access hospital inpatient expenditures, $	-1,404.27	-1,708.89	304.62* (122.85)	60.61
Number of discharges in the sample	N/A	N/A	1,064,030	

Notes: $^p < 0.20$, $+p < -0.10$, $*p < 0.05$; $**p < 0.01$; standard errors are given in parentheses. Standard errors were bootstrapped using 600 iterations.

Covariates (Appendix A, Table A.8) used in regression estimation to calculate these adjusted means include hospital averages of the 48 most frequently occurring modified diagnostic-related groups among participants (covering 75 percent of participants); dual eligibles; beneficiary demographics, including age and race/ethnicity; hospital fixed effects; and month fixed effects. To ensure that results were not sensitive to the inclusion of outliers, we dropped observations with negative 30-day post-discharge expenditures and with extremely high values. If we dropped a participant discharge, we dropped their matched comparison, and vice versa. A total of 3,188 discharges (0.30 percent) were excluded from the analysis.

[a] The % difference is calculated as 100 × (regression-adjusted difference-in-differences impact analysis) / counterfactual. The counterfactual is the outcome that the home health group would have had in the absence of home health services. Our estimate of the counterfactual is the home health group mean for participants minus the regression-adjusted interaction estimate.

3.3.4.1. Interpretation and Limitations

- **There are several reasons why home health services could have had a more favorable association with readmissions and inpatient expenditures among matched comparisons than among participants.** For example, qualitative analysis tells us that the CCTP targeted beneficiaries at a high risk of readmission, using factors that the CCTP staff could observe but we cannot capture in our control variables. Also, our analysis does not capture the intensity or content of the home health services received, which might explain some of the differential.

- **A key caveat for interpretation of these results is that we do not control for the timing of the home health services, which could be provided before, after, or during the receipt of CCTP services.** For example, for beneficiaries who received home health services immediately upon discharge from the hospital, CCTP staff may have recommended additional or different kinds of home health services that altered the outcome; alternatively, CCTP staff may have worked collaboratively with home health staff, providing a richer set of targeted services and reducing the need for prolonged home health services. It is also possible that the CCTP participant did not originally receive home health services, experienced difficulties that required a readmission shortly after discharge, then began home health services after discharge from the readmission.

- **The association between home health services and 30-day outcomes is very large in magnitude, casting doubt on the plausibility of the results.** Readmissions were 6.8 percentage points lower for participants who received home health services: The readmission rate was 9.88 percent for participants who received home health services and 16.68 percent for those who did not. A likely reason is that the group that did not receive home health services included not only beneficiaries who did not receive any PAC services, but also those who received SNF services but did not receive home health services—and beneficiaries discharged to SNF are at a greater risk of readmission (Mor, Intrator, Feng, & Grabowski, 2010). Also, the group that did not receive home health services includes beneficiaries who needed but refused home health services. It also includes a small proportion of beneficiaries who received LTCH services, who are also at a greater risk of readmission than beneficiaries who received home health services.

- **The association between the receipt of home health services and higher 30-day Medicare Part A and B expenditures (among participants and matched comparisons alike) was largely driven by higher SNF expenditures.** Despite being associated with lower readmissions and inpatient expenditures, receiving home health was also associated with higher Medicare Part A and B expenditures. These differences in total expenditures were driven by higher SNF expenditures among home health service recipients than among others. A likely mechanism is that beneficiaries with greater needs who were discharged from the hospital to SNF also received home health services upon discharge from the SNF.

4. Which Site Characteristics and CT Components Were Associated With Lower Readmissions?

4.1. Overview

The 44 extended sites reported success in identifying key strategies for overcoming the challenges discussed in Section 1.2.2 and improving their implementation strategies over the course of the program. These strategies, discussed in Section 2, included maintaining a consistent, well-integrated CT staff presence at partner hospitals, using data to inform quality improvement efforts, and adapting intervention strategies to work with PAC providers and participants with complex needs. CCTP sites cited these strategies as factors that contributed to their success. Based on these qualitative findings, we assess their prevalence among the sites that exhibited lower and/or reduced participant readmission rates.

4.1.1. Key Takeaways

We tested for the relationship between three key beneficiary outcomes and a participant receiving different combinations of encounters. We compared the relationship between receipt of each combination relative to receiving at least one home visit (*home*).

Key takeaways:

- Sites whose participants exhibited lower participant readmission rates than the comparison group of beneficiaries implemented communication and operational approaches that promoted solid integration between CBOs and their partners. These approaches included, for example, implementation of the **hospital–field worker staffing model** (i.e., some CT workers were primarily based in the hospital while others were primarily tasked with home visits) that allowed for consistent in-hospital CT worker presence without detracting from post-discharge CT services. These site-specific approaches also included ensuring that **seamless data processes** were in place, in part to leverage participant data to analyze readmission rates, adjust participant **targeting,** and make **model adaptations** to allow service provision based on participant risk for more efficient CT service delivery and appropriate selection of supportive services. Additionally, these sites tended to elect **CTI®** **as their formal model,** leveraging a bundle of CT encounters including home visits and services including medication reconciliation.

- **Participants receiving at least one home visit had more favorable outcomes,** exhibiting a 1.80 percentage point lower 30-day readmission rate **relative to participants receiving a hospital visit with no home visit.** These favorable differences were larger relative to participants receiving "other" encounters (2.27 percentage point lower) or no encounters (3.82 percentage point lower). However, there was no statistically significant difference in the 30-day readmission rate between those receiving a home visit and those with at least one phone call but no hospital or in-home visit. This latter point may be indicative of appropriate triaging through selective application of the telephone-only intervention modality.

- **Receipt of the care transitions bundle (CTB) similar to CTI® is statistically significantly associated with favorable outcomes on all three measures.** Relative to participants who did not receive the CTB bundle, participants who received this collection of services experienced, on average:

    o A 3.04 percentage point lower 30-day readmission rate.
    o $391 lower 30-day inpatient expenditures.
    o $1,787 lower Part A and Part B expenditures.

4.2. Data and Methods

This section contains two sets of analyses. The first set identifies the most common site-specific characteristics among sites that exhibited lower participant readmission rates relative to comparisons. Specifically, we translate site characteristics, as Section 2 discussed, to binary indicators to identify which communication and operational approaches were most commonly implemented by sites. Additionally, we provide a discussion of common characteristics of the five sites noted in Section 3.3 that exhibited both lower readmission rates at the participant level and reduced readmissions at the hospital level (all Medicare FFS beneficiaries).

The second set of analyses uses List Bill data. As Section 2.2 noted, these data provide information about encounters and services provided to each CCTP participant. When linked to Medicare claims data, they offer an opportunity to test for relationships between what encounters and services participants receive and key outcomes. However, these encounter and service variables cannot be included in either our DiD or cross-sectional models as presented in Section 3 as these models rely on data from both CCTP participants and nonparticipant Medicare FFS beneficiaries. As List Bill data were available only for CCTP participants, we cannot determine whether, for example, matched nonparticipant comparisons received phone calls from their primary care physicians, or which, if any, post-discharge communication nonparticipant comparisons engaged with their providers and their family and/or caregivers. Nonetheless, the data provide interesting insight into the variation in outcomes among CCTP participants. We incorporate CT encounters into the cross-sectional model (Section 3.2) to consider the relationship between readmissions and a participant receiving a *bundle* of CT encounters and services that approximates the primary components of CTI®. Specifically, using List Bill data, we approximated CTI® by creating an indicator for participants who received a hospital visit, at least one home visit (whether it was within 3 days after discharge or after 3 days), at least one phone call (whether it was within 1 week after discharge or after 1 week), and medication review and reconciliation. We refer to receipt of these encounters and medication review and reconciliation as CTB.

Due to the associative nature of the analyses, neither set of analyses provides evidence of a causal relationship between readmission rates and encounters and services received or site-specific characteristics.

4.3. Findings

4.3.1. Site and Intervention Characteristics and Readmissions

We examined the site and intervention characteristics of the 44 extended sites and the subset of 26 sites that had lower participant readmission rates in Section 3. We identified the following key

strategies that were implemented more frequently by sites exhibiting lower readmission rates (Table 4.1 and Table 4.2):

- Hospital–field worker staffing model.
- Seamless data process.
- Analyzing readmissions.
- Using the CTI® as the only formal model.
- Targeting non-diagnosis-based risk factors.
- Making model adaptations to address specific participant needs.
- Connecting participants to supportive services.

Section 2 defines these and other site-specific characteristics, the reasons for their adoption, and the sites' perceptions of their impact on success in the CCTP. We discuss the rationale for the perceived success of these characteristics below.

4.3.1.1. Site Characteristics

As shown in Table 4.1, the **hospital–field worker model** was adopted by 77 percent of the 26 sites exhibiting lower readmission rates, and a **seamless data process** was a feature of 73 percent of these sites. Additionally, these 26 sites commonly employed specific quality strategies, including **conducting analysis of readmissions** within the CBO and **analyzing readmissions with hospital partners.**

The hospital–field worker staffing model allowed hospital-based workers a more consistent presence in partner hospitals and with hospital staff. This benefit contributed to building the CBO–partner hospital relationships as well as providing adequate time to approach potential participants throughout each day—without detracting from the time CT workers needed to follow up with participants after hospital discharge. Sites also perceived the greater specialization of CT workers within the hospital- and field-setting may have improved performance in their assigned work area.

> As one CBO administrator that had their hospital-based coach make daily visits to participants in the hospital explained, *" … having the coaches in the hospital every day seeing the patient has really done a lot for us in terms of keeping the patients engaged once they discharge."*

A seamless data process is one that limits manual data entry, simplifies CT worker documentation, simplifies analysis and reporting, and easily converts data into formats for CMS reporting and billing for services. The strength of these kinds of systems is that they create efficiencies in documentation and data management activities and can facilitate easy access to important information for program staff across roles and settings. A well-designed data process also facilitates the production of reports to conduct analysis of readmissions within the CBO and analyze readmissions with hospital partners. For example, one site selected a web-based software system that could connect to partner hospital data systems and automatically screen admitted patients for program eligibility, generating a list of referrals for the hospital-based coach in real time. The same system can be accessed by coaches via tablet computers both in the hospital and the field to determine if participants have been served previously or have been readmitted to any partner hospital. The system also generates data reports and sends updates to partner hospitals on

a regular basis, allowing for nearly real-time assessment of program performance, in addition to automatically submitting List Bill data to CMS.

Table 4.1. Site Characteristics of 44 Extended Sites

Characteristic	Definition	Percent of 26 Lower Readmission Sites	Percent of 44 Extended Sites
Structural			
Hospital–field worker staffing model	Site reported use of the hospital–field worker model at one or more partner hospitals.	76.9	72.7
Data and Quality Characteristics			
Conducts analysis of readmissions[a]	CBO reported conducting analysis of readmissions.	68.0	73.8
Reviews readmissions with partners	CBO reported reviewing readmissions with partner hospitals or shared and discussed the findings of their readmission reviews among the partners. This includes the CBO attending hospital readmission review meetings that include CCTP readmissions.	69.2	72.7
Seamless data process	The complexity of the data process based on data systems and data entry processes in use was reportedly "seamless."	73.1	63.6
CCTP Hospital Integration Characteristics			
Integration composite	Site reported having three or four of the integration characteristics listed below.	53.8	56.8
Allows CT staff electronic health record (EHR) access	All partner hospitals have arranged for/allowed CT workers access to their EHRs to identify and track clients.	69.2	72.7
Attending regular meetings with hospital case management/ discharge staff[b]	CT workers attend regularly scheduled meetings with case management/discharge planning at all partner hospitals, either specifically for the CCTP or for general discharge planning meetings.	50.0	53.5
Open communication[c]	CT workers and hospital staff communicate openly throughout the day at all partner hospitals, as needed, to collaborate on patients.	69.2	74.4
CT staff have access to hospital IDs and office space	All partner hospitals provide CT workers with IDs and designated workspace.	46.1	52.3

Source: Data from site applications and interviews of 44 extended sites.
[a] N=42; two sites with missing data were excluded from the denominator.
[b] N=43; one site with missing data missing data was excluded from the denominator.
[c] N=43; one site with missing data missing data was excluded from the denominator.

4.3.1.2. Intervention Characteristics

As Table 4.2 shows, **CTI®** was selected as the only formal CT model by 73 percent of the 26 sites that exhibited lower participant readmission rates. **Non-diagnosis-based targeting criteria** (e.g.,

"other factors") were utilized by 80 percent of sites with lower readmissions. While offering **components of the home visit in an alternate location** was the only model adaptation included in this analysis adopted by the majority these 26 sites, most sites made at least one of the adaptations shown. Additionally, approximately 62 percent of these 26 sites **arranged support services** for beneficiaries who needed them.

CTI® is a well-defined, evidence-based model, and its developers offer structured training and ongoing assistance. This structure may make it more effective than other models that are more flexible. Non-diagnosis-based targeting criteria indicates sites targeted beneficiaries based on other, non-diagnostic or psychosocial risk factors for readmission. It is possible that CT services, such as connection with support services, medication reconciliation, or assistance arranging follow-up appointments, were better suited to address non-diagnosis-based risk factors utilized by sites.

Most sites made at least one of the adaptations shown in Table 4.2. Because of the variety of targeting strategies and site and community characteristics across CCTP sites, it is not surprising that sites chose different types of model adaptations to meet the specific needs of their participants. While sites varied in their approaches to connecting participants with support services after discharge, all CBOs believed that these additional services were instrumental in improving their success at preventing readmissions for certain high-risk beneficiaries, and that timely access to services was important to avoid readmissions.

> As one CBO adminstrator shared, *"part of what we've done is set up expedited processing for these patients that we're working with through the intervention to get temporary meals in place quickly, within 48 hours; transportation set up within 48 hours; and an assessment within 48 hours. All those things are happening on the very front end of the 30-day intervention."*

Site Story

One site that exemplifies the successful use of these strategies had previous experience using the CTI® model with a partner hospital for a prior program and started the CCTP with EHR access in place for the CT workers at every partner hospital. The CT workers were well-integrated into the hospital setting, and the site adopted the hospital–field worker staffing model and selected coaches to specialize in SNF visits and participants with behavioral health issues. The site invested in new software for home visit scheduling and quality monitoring and was able to use the reports to engage hospital staff and make program changes. For instance, the site identified a high rate of readmissions between the second and third follow-up phone calls, so it created a script for the second call that addresses common reasons for readmissions. The site also adapted its SNF intervention to provide components of the home visit during the SNF stay, as well as home visits for participants identified as high risk following discharge to home. The strong relationship between this CBO and its partner hospitals was illustrated by their success in developing a system for coordinating and handing off patients to hospital-based programs at the end of the 30-day CCTP intervention.

Table 4.2. Intervention Characteristics of 44 Extended Sites

Characteristic	Definition	Percent of 26 Lower Readmission Sites	Percent of 44 Extended Sites
CCTP Model/Adaptions			
Care Transitions Intervention® (CTI®)	Site reported using CTI® as its only formal model.	73.1	59.1
Additional services to increase dosage for more complex needs	Site reported dispensing encounter/services beyond that typically prescribed by CT model.	53.8	65.9
Additional home visits	Site offers additional home visits.	26.9	40.9
Additional phone calls	Sites were coded as offering additional phone calls if CT workers can make additional follow-up phone calls if participants have needs that are more complex.	26.9	34.1
Extension beyond 30 days	Sites were coded as offering extension of the intervention beyond 30 days if their CCTP intervention continues for all or some participants beyond 30 days (or beyond the length of the standard intervention they offer, if not a 30-day intervention).	7.7	20.5
Additional screening	Sites were coded as offering additional screening if CT workers conduct screenings to assess client needs as part of the intervention (e.g., screening for depression or activities of daily living, use of Care at Hand tool). This does not include use of screening tools to identify patients.	34.6	43.2
Other model adaptations	Site reported modification of their formal CT model.	57.7	68.2
Telephone-based intervention (refused home visit)	Site offers education/support over the phone instead of a home visit to participants who do not want someone coming into the home.	26.9	38.6
Telephone-based intervention (out of area)	Site offers education/support over the phone instead of a home visit to participants who live outside of the CCTP service area.	26.9	34.1
Components of the home visit in the skilled nursing facility (SNF)	Participants discharged to SNFs receive the components of their home visit while still in the SNF, before they are discharged home.	38.5	38.6
Specialized visits for participants with more complex needs	Participants could receive a visit by a nurse practitioner, pharmacist, or other specialist to assist with their more complex needs.	11.5	22.7

Characteristic	Definition	Percent of 26 Lower Readmission Sites	Percent of 44 Extended Sites
Components of the home visit in alternate location	CT worker can meet participants in an alternate location, such as a doctor's office, hospital waiting area, or restaurant, if a participant does not want someone coming into the home.	65.4	72.7
Support Services			
Arranged support services	Site actively worked to initiate the connection with services, such as by calling straight to a vendor or by making a direct connection with an eligibility person at the Area Agency on Aging/Aging and Disability Resource Center.	61.5	65.9
Targeting			
Diagnoses	Site targets based on diagnoses.	57.7	56.8
Other factors[a]	Site employs some non-diagnosis-based targeting criteria.	80.0	74.4
Risk-stratification	Site risk stratifies in any way.	34.6	45.5

Source: Data from site applications and interviews of 44 extended sites.
[a] N=43; one site with missing data was excluded from the denominator.

4.3.2. CT Encounters and Readmissions

We examined the relationship between 30-day readmissions and a participant receiving those different combinations of encounters and extended this analysis to examine 30-day ACH and 30-day Part A and Part B expenditure outcomes. These relationships were compared to receiving at least one home visit (*home*). Our analysis indicated the following:

- **Participants receiving at least one home visit exhibited lower 30-day readmission rates, relative to participants receiving a hospital visit but no home visit and participants with only other or no encounters.** Participants receiving at least one home visit under the hierarchical categorization in Table 2.2 had, on average, a 1.80 percentage point lower 30-day readmission rate than those with a face-to-face (hospital) visit. The difference is higher for those with no CCTP encounters (3.82 percentage points). As expected, the 30-day ACH inpatient expenditures followed a similar pattern. Inpatient expenditures were $302.81 lower for those with at least one home visit compared to those with a hospital visit but no home visit and a $570.81 difference for those with no CCTP encounters.

- There was, however, **no difference in the 30-day readmission rate for those receiving a home visit and those with at least one phone call with no hospital or in-home visit.** This finding may be an artifact of selective application of the telephone-only intervention modality. As Section 2 noted, some sites reported offering telephone-only interventions to lower risk participants as one arm of their risk stratification, reserving home visits for only the highest risk beneficiaries they served. Sites also reported offering telephone-only interventions to participants who discharged out of the area or those who refused a home visit, allowing the sites to provide some support to participants when a CT worker could not complete a visit in the home. Less than 3 percent of participants received only phone

calls (Figure 2.1); only two sites provided a telephone-only intervention to more than 10 percent of their participants (19 percent in one of those two sites; 27 percent in the other). Thus, our finding of no difference in readmission rates between participants receiving a home visit relative to those receiving a telephone-only encounter may be indicative of appropriate site triaging of participants at a few sites. We also find that participants with at least one phone call (only) exhibited, on average, $154.20 lower 30-day ACH inpatient expenditures and no statistically significant differences in 30-day Part A and Part B expenditures relative to participants receiving a home visit.

Table 4.3. CCTP Participant-Only Analysis: Relationship Between CCTP Services and Hierarchical Encounter Variable and 30-Day Readmission Rates, 30-Day Medicare Acute Care Hospital (ACH)/Critical Access Hospital (CAH) Expenditures, and 30-Day Medicare Expenditures, 44 Extended Sites

Encounter Type	30-Day Readmission Rate, % (SE)	30-Day ACH/CAH Inpatient Expenditures, $ (SE)	30-Day Part A and Part B Expenditures, $ (SE)
Home	Default	Default	Default
Hospital, no home	1.80** (0.38)	$302.81** (80.13)	$2,070.60** (406.42)
Phone, no hospital or home	-0.23 (.31)	-$154.20* (66.98)	$150.12 (426.66)
Other, no hospital, home, or phone	2.27** (.54)	$415.89** (83.15)	$6,478.92** (1,224.25)
No CCTP encounters	3.82** (.75)	$570.81** (107.90)	$2,808.47** (454.32)
Unadjusted mean	14.21 (0.05)	1,762.76 (10.00)	7113.87 (14.86)

Notes: ^$p < 0.20$, +$p < 0.10$, *$p < 0.05$, **$p < 0.01$; standard errors are given in parentheses where appropriate. N = 533,609.

We also tested for the relationship between outcomes and a participant receiving a bundle of encounters and services that approximates the primary components in CTI®, the CTB. Approximately 44 percent of participants received the CTB. We found that:

- **Receipt of CTB is statistically significantly associated with favorable outcomes on all three measures** (Table 4.3). Relative to participants who did not receive the CTB, participants who received this collection of services experienced, on average:

  o A 3.04 percentage point lower 30-day readmission rate.

  o $391 lower 30-day inpatient expenditures.

  o $1,787 lower Part A and Part B expenditures per discharge than did the 56 percent of participants who did not receive the CTB.

As noted in Section 4.2, the hierarchical encounter variable and CTB model cannot, by construction, provide evidence of a causal relationship between encounters and services received. Findings in this section may instead reflect nonrandom selection by the sites with respect to which specific encounters and services were provided to each participant. As noted, the interventions

varied and did not necessarily include the same set of components. In addition, some of the sites had strategies or may have been more efficient in their strategies to assign participants to different interventions or to receive specific services based on assessed level of risk for readmission.

Table 4.4. CCTP Participant-Only Analysis: Relationship Between CCTP Services and Care Transitions Bundle (CTB) and 30-Day Readmission Rates, 30-Day Medicare Acute Care Hospital (ACH)/Critical Access Hospital (CAH) Expenditures, and 30-Day Medicare Expenditures, 44 Extended Sites

	Percentage of Participants Receiving	30-Day Readmission Rate, % (SE)	30-Day ACH/CAH Inpatient Expenditures, $ (SE)	30-Day Part A and Part B Expenditures $ (SE)
CTB	44.06	-3.04** (0.38)	-391.44** (50.85)	-1,787.02** (184.26)
Regression-adjusted mean	N/A	14.21 (0.05)	1,762.76 (10.00)	7113.87 (14.86)

Notes: ^$p < 0.20$, +$p < 0.10$, *$p < 0.05$, **$p < 0.01$; standard errors are given in parentheses where appropriate. N = 533,609. N/A = Not applicable.

CTB is an indicator that the CCTP participant received a hospital visit before discharge, at least one in-home visit, at least one telephone call, and medication review and reconciliation.

5. Conclusions

The CCTP launched in 2011 with the goal of improving CT for high-risk Medicare beneficiaries through the provision of enhanced post-discharge services. One hundred and one sites were awarded over the course of nearly 2 years of rolling applications; 44 of these sites were extended for at least 1 year beyond the initial award, for an average of 3.7 years of participation. The initial vision of the CCTP was to provide tailored enhanced services to a sufficient number of Medicare beneficiaries at high risk of a readmission in order to reduce overall Medicare FFS readmission rates at those hospitals. This evaluation aimed to identify whether (and how) the CCTP was associated with key outcomes or impacted these outcomes as well as what program and CT components might have driven favorable key outcome findings.

Our evaluation questions were answered amid a national landscape of decreasing readmissions due, in part, to numerous co-occurring initiatives. In addition, sites faced challenges with scaling up and building relationships with community and facility care providers in the early years of participation. Many of the sites that were extended at least 1 year beyond their initial 2-year agreements were those that noted strong working relationships with hospitals and were able to leverage those relationships and modify implementation strategies to best meet the needs of the hospitals and participants.

Our primary outcome measure across research questions, 30-day all-cause readmissions, was constructed both at the level of the participants directly served as well as at the overall hospital level (i.e., including all Medicare FFS beneficiaries). As Section 3 discussed, we were unable to examine CCTP impacts on participant readmissions since we could not identify whether differences between participants and comparisons over the CCTP's period of performance existed prior to the CCTP. We employed a DiD model on more expansive hospital populations—all Medicare FFS beneficiaries—which allowed us to establish hospital-level baselines and potentially identify impacts of the CCTP. However, these samples included high percentages of beneficiaries that were *not* touched by the CCTP (more than 80 percent, on average, for the 44 extended sites), which likely contributed to a lack of a significant impact even among the 44 extended sites that exhibited higher average participant enrollment (18.52 percent) and had greater maturity in the CCTP.[10]

Our impact models identified no statistically significant impacts of the CCTP on readmission rates or Medicare Part A and Part B expenditures among all 44 extended sites combined. Site-specific DiD impact estimates were statistically insignificant for 29 of the 44 extended sites. Among the sites with significant estimates, impacts were mixed: seven sites had a negative (favorable) impact on readmissions, while eight sites had a positive (unfavorable) impact ($p < 0.1$). Low enrollment of participants (as a percent of all Medicare FFS beneficiaries) in most partner hospitals, coupled with changing selection criteria, limit our ability to extrapolate beyond this small number of sites and attribute either the favorable or unfavorable DiD estimates to the CCTP. Additionally, with multiple models and programs attempting to drive readmission rates down within and across hospitals, the discernable impact of the CCTP becomes difficult to disentangle without an identified hospital-level impact.

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[10] Section 3 noted other methodological considerations as well, including rolling site entry into the CCTP.

At the participant level, we found favorable associations between the CCTP and readmission and expenditure measures among participants from the 101 sites (combined) and the 44 extended sites (combined), and among most of the 44 extended sites individually. Although not indicative of causal impact, these results suggest the potential of the CCTP. For example, 26 of the 44 extended sites exhibited statistically significantly lower readmission rates, and the majority of nonsignificant results indicated favorable (lower) readmission rates among participants.

Strategies employed by some sites demonstrated areas of promise for future development in community organization/hospital cooperation, coordination, and intervention selection and implementation so that healthcare dollars are spent wisely and the quality of care is improved. For example, we found that the 44 extended sites that exhibited lower readmission rates were able to engage strategies to help overcome initial startup challenges reported. These strategies included implementing the hospital–field worker approach to delivering CT services to participants, having a seamless data process, using data to analyze readmissions to inform intervention adaptations that could address the unique needs of their targeted participants, using CTI® as their formal model, targeting participants with non-diagnosis-based risk factors, and arranging supportive services for those who could benefit.

While the CCTP has ended, future models must recognize the importance of understanding the population that is at risk for readmission within the community to identify how to best address their needs. For example, determining how to meet the needs of a Medicare beneficiary discharged to a SNF is likely to be substantially different from how to meet the needs of an individual discharged home with a caregiver. Many sites achieved success—either as progression toward CCTP goals or successful implementation of the program—by attempting to tailor their interventions to specific populations and meet their needs (e.g., reconciliation of medications, follow-up of primary care physician appointments) in a way that worked for the beneficiaries. In some cases, participants required minimal assistance, while others required multiple visits and phone calls for support. Those sites that succeeded as part of the CCTP could risk stratify beneficiaries and apportion resources accordingly. Given the wide variation of needs of high-risk beneficiaries discharged from hospitals, it also appears that implementing multiple strategies to avert readmissions is necessary to meet the needs of a sufficiently large number of beneficiaries to positively impact the overall hospital-level Medicare readmissions rate.

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Appendix A: Data and Methods

A.1. Overview

In this appendix, we provide additional information about the data and methods used in the Final Evaluation Report of the Community-based Care Transitions Program (CCTP).

Table A.1 lists the CCTP community-based organizations (CBOs) analyzed in the Final Evaluation Report and whether and the extent to which these CBOs were extended beyond the initial 2-year program period.

Table A.1.   List of CCTP Sites Included in This Report

CBO ID	CBO/Applicant	Extensions
001	Southern Maine Agency on Aging	1 year + 1 year
002	Council on Aging of Southwestern Ohio	1 year + 1 year
003	Atlanta Regional Commission	1 year + 1 year
004	Akron/Canton Area Agency on Aging	1 year + 1 year
005	Elder Services of the Merrimack Valley, Inc.	6 months + 1 year
006	Council for Jewish Elderly (CJE Senior Life)	6 months + 1 year
007	Area Agency on Aging, Region One	1 year + 1 year
008	Area Agency on Aging 1-B	None
009	Agency on Aging of South Central Connecticut	None
010	Southwestern Pennsylvania Area Agency on Aging, Inc.	6 months + 1 year + 1 year
011	Aging and Disability Resource Center of El Paso and Far West Texas (Project Amistad)	6 months + 1 year + 1 year
012	Philadelphia Corporation for Aging	6 months + 1 year
013	UniNet Healthcare Network	None
014	Ohio Area Agency on Aging of Region 8	6 months + 1 year + 1 year
015	CareLink (Central Arkansas Area Agency on Aging)	None
016	Care Connection Aging and Disability Resource Center/Harris County Agency on Aging	None
017	Lifespan of Greater Rochester Inc.	1 year + 1 year
018	Cobble Hill Health Center, Inc.	None
019	Tompkins County Office for the Aging	None
020	Pierce County Department of Community Connections Aging and Disability Resources	None
021	Southeast Washington Aging and Long Term Care	None
022	AgeOptions	None
023	P[2] Collaborative of Western New York	None
024	Elder Services of Berkshire County, Inc.	None
025	St. John Providence Health System	1 year
026	Carondelet Health Network	1 year

CBO ID	CBO/Applicant	Extensions
027	County of Marin, Department of Health and Human Services Agency, Division of Aging and Adult Services	None
028	Delaware County Office of Services for the Aging	None
029	The Senior Alliance, Area Agency on Aging 1-C	6 months + 1 year + 1 year
030	Elder Services of Worcester Area, Inc.	1 year + 1 year
031	Connecticut Community Care, Inc.	6 months[a]
032	Lower Rio Grande Valley Development Council	6 months + 1 year
033	Northwest Community Care Network, Inc.	1 year + 3 months
034	Catholic Charities of the Archdiocese of Chicago	1 year + 1 year
035	Mid-Florida Area Agency on Aging, Inc. (Elder Options)	6 months + 1 year
036	Visiting Nurse Services of Schenectady and Saratoga Counties, Inc.	None
037	Whatcom Alliance for Healthcare Access	6 months[a]
038	Home Aide Service of Eastern New York, Inc. (Eddy Visiting Nurse Association)	None
039	Metropolitan Area Agency on Aging, Inc.	None
040	Jewish Family Service of Los Angeles	1 year
041	Somerville-Cambridge Elder Services, Inc.	1 year
042	Allegheny County Department of Human Services Area Agency on Aging	1 year + 1 year
043	Mount Sinai Hospital	1 year + 1 year
044	Senior Resource Alliance	None
045	New York Methodist Hospital	None
046	Alliance for Aging, Inc.	6 months[a]
047	The Coordinating Center	6 months[a]
048	San Francisco Department of Aging and Adult Services	6 months[a]
049	AccessCare	6 months[a]
050	County of San Diego, HHS Agency Aging & Independence Services	1 year
051	Area Agency on Aging 11, Inc.	None
052	CRIS Healthy Aging Center (CHESS Coalition)	1 year
053	Area Agency on Aging Region 9	None
054	Aging & In-Home Services of Northeast Indiana	6 months + 1 year
055	Northeast Georgia Regional Commission	6 months[a]
056	Central Savannah River Area Regional Commission	1 year
057	Appalachian Agency for Senior Citizens, Inc.	None
058	Bay Aging	1 year
059	Southern Alabama Regional Council on Aging	1 year
060	Glendale Memorial Hospital and Health Center	1 year
061	Maui County Office on Aging	None
062	Isabella Geriatric Center	None
063	Area Agency on Aging – PS2	None
064	Kansas City Quality Improvement Consortium, Inc.	6 months[a]
065	Fort Drum Regional Health Planning Organization	None

CBO ID	CBO/Applicant	Extensions
066	Appalachian Council of Governments Area Agency on Aging	None
067	Catholic Health Care Transitions Services, Inc.	1 year
068	Aging and Long Term Care of Eastern Washington	1 year
069	Tri-County Aging Consortium	None
070	Denver Regional Council of Governments	None
071	Partners in Care Foundation	1 year
072	Missoula Aging Services	6 months + 1 year
073	Multnomah County Aging and Disability Services	6 months[a]
074	New York City Department for the Aging	None
075	Three Rivers Planning & Development District	6 months[a]
076	West Central Florida Area Agency on Aging	None
077	Southeast Tennessee Area Agency on Aging	None
078	Siouxland Aging Services	None
079	Access East Community-based Transitional Partnership	1 year
080	Central Texas Aging and Disability Resource Center	None
081	Ventura County Area Agency on Aging	None
082	AltaMed Health Services Corporation	None
083	Hospice of the Bluegrass	1 year
084	Sonoma County Area Agency on Aging	None
085	Top of Alabama Regional Council of Governments	1 year
087	LifeSpan Resources, Inc.	None
088	York County Area Agency on Aging	1 year
089	Dominican Sisters Family Health Service, Inc.	None
090	Jewish Home for the Aging Geriatric Services Inc.	1 year
091	Carelink, Inc.	None
092	Capital Area Agency on Aging	None
093	Visiting Nurse Association Health Group	1 year
094	Area Office on Aging of Northwestern Ohio, Inc.	None
095	Brewster Place	None
096	Deep East Texas Council of Governments/Area Agency on Aging	1 year
097	Sun Health	1 year
099	Valley Area Agency on Aging	None
100	Community SeniorServ	None
101	PSA 3 Area on Aging	None
102	Green River Area Development District	None
103	Clinica Sierra Vista	1 year

[a] Site was given a single 6-month extension; however, we do not count this site toward the 44 extended sites, as it was not extended for at least a year.

A.2. Data

We gathered data for the quantitative analysis from several sources (Table A.2).

Table A.2.   Data Sources Used in the Evaluation of the CCTP

Data	Demographic Characteristics	Chronic Conditions	Service Use: Outcome Measures	Population Characteristics	Hospital Market Characteristics	Service Provision
Medicare Enrollment Database	✓					
Master Beneficiary Summary File	✓	✓				
Inpatient claims			✓			
Outpatient claims			✓			
Carrier claims			✓			
Home health agency claims			✓			
Skilled nursing facility claims			✓			
U.S. Census and American Community Survey				✓		
Centers for Medicare & Medicaid Services (CMS) Medicare Case Mix Index data				✓		
CMS Geographic Variation Public Use File					✓	
American Hospital Association Annual Survey					✓	
Dartmouth Atlas					✓	
List Bill						✓
Site visits and telephone discussions						✓

A.3. Comparison Group Methodology

We constructed a comparison group of Medicare fee-for-service (FFS) beneficiaries that is similar to the treatment group—discharges from partner hospitals that received CCTP services (participants). We examined the similarity between treatment and comparison groups during the baseline period on factors that can influence patient outcomes as well as factors that influence the decision to participate in the program. We also constructed a comparison group of hospitals that is similar to the group of partner hospitals, again matching based on relevant characteristics of the hospitals and their healthcare markets at baseline. The subsections below detail our comparison group identification for participants of the 44 sites and all 101 sites and for hospitals partnered with the 44 extended sites.

A.3.1. Identifying Potential Comparison Groups

We first grouped the sites into clusters based on similar healthcare market and population characteristics. While matching within clusters narrows the size of the pool of potential comparison Medicare FFS beneficiaries and potential comparison hospitals, it enables us to control for characteristics not observed in the data that may affect selection into the program and the provision of healthcare services. For example, within-cluster matching allowed us to select comparison hospitals similar on characteristics that influence both beneficiaries' needs and demand for healthcare services and ensure that beneficiaries in comparison hospitals are receiving healthcare services within similar healthcare markets. Geographic regions were defined by Hospital Referral Regions (HRRs). We used the Partitioning Around Medoids (PAM)[1] package in R to cluster HRRs.

We grouped HRRs into clusters based on similarity across 10 HRR characteristics (Table A.3 and Table A.5), measured using publicly available U.S. Census Bureau data, including:

1. Preintervention values of key outcome variables.

2. Local healthcare market characteristics that could affect analyzed outcomes, such as availability of healthcare resources.

The key criterion in evaluating potential clustering solutions was homogeneity within clusters with at least one potential comparison hospital for each treatment hospital, aimed at facilitating subsequent matching. A secondary goal was to evaluate whether clusters are distinguishable from one another, which represents a face validity check on the clustering exercise. We used the following tools to evaluate clustering solutions:

- Evaluated whether there is at least one potential comparison hospital for each treatment hospital by counting hospitals in each solution (practical goal).

- Evaluated homogeneity within clusters (primary goal):

  o Aimed for a small distance (in terms of characteristics) between HRRs within clusters.

  o Examined a two-dimensional visual representation of the clustering solution.

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[1] PAM first finds representative objects, called medoids, for which average dissimilarity to all objects in the cluster is minimal. After finding the set of medoids, each site/HRR is assigned to the nearest medoid. That is, the site/HRR is placed into a cluster whose medoid is closer than any other medoid.

o   Compared the range of values for the 10 characteristics used to assess similarity.

o   Performed a face validity test by examining which HRRs are grouped together.

- Evaluated whether clusters are distinguishable from one another (secondary goal) by:

o   Examining a combined measure of the distance within and across clusters.
o   Examining a two-dimensional visual representation of the clustering solution.

Sections A.3.1.1 and A.3.1.2 discuss our clustering methodology for the 101 sites and for the subset of 44 sites that identified potential comparisons, followed by details on participant and hospital matching within clusters. The clustering solutions presented in Sections A.3.1.1 and A.3.1.2 for the 101 and 44 sites are similar. The solutions for the two sets of sites differ principally by the variable cutoffs and definitions used in clustering, which reflect the different distributions of market characteristics among the 101 sites and among the subset of 44 sites.

A.3.1.1. Clustering Methods for the 101 Sites

Because several of the 101 sites served more than one HRR, we performed clustering on sites rather than on HRRs to ensure that HRRs served by the same site were grouped together in subsequent analyses. (We performed clustering on sites by combining HRRs served by the same site). The 10 HRR characteristics and their definitions for clustering are provided in Table A.3.

Using the PAM function in R, we clustered the 101 sites into several clustering solutions, each of which had 2 to 25 clusters, then evaluated several criteria to select the grouping that best fits the needs of the evaluation.

Table A.3. HRR Characteristics and Variable Definitions Used in Clustering Sites for the 101 Sites

Hospital Referral Region Characteristic	Definition of Variable Used in Clustering
Categorical Variables	
Number of readmissions per 1,000 Medicare beneficiaries	<51; 51 – <75; ≥75
Average annual Medicare costs per beneficiary, $	<8,000; 8,000 – <10,000; ≥10,000
Number of acute care beds per 1,000 population	<2.05; ≥2.05
Total age-standardized mortality rate	<4.1; 4.1 – <5; ≥5
Number of emergency department visits per 1,000 Medicare beneficiaries	<562; 562 – <649; 649 – <705; ≥705
Binary Variables	
Average annual Medicare home health costs per beneficiary, $	<900; ≥900
Number of primary care physicians per 100,000 population	<76; ≥76
Percent of Medicare beneficiaries eligible for Medicaid, %	<30%; ≥30%
Percent of population below Federal poverty level, %	<16%; ≥16%
Continuous Variable	
Proportion of population who are fee-for-service beneficiaries	Continuous variable

Notes: We determined cutoffs for categorical and binary variables by examining their distributions for meaningful cutoffs. For example, we clustered based on whether the percentage of the population in poverty is above or below 16 percent because this variable has a symmetric distribution around the mean of 16 percent. In addition, this value is nearly identical to the national average of 15.9 percent.

We identified the clustering solution that best fit our needs as one with the smallest distance between sites within a cluster. This solution grouped the 101 sites into 23 clusters. This solution also separates the San Francisco HRR into its own cluster, resulting in fewer potential comparison hospitals than partner hospitals in that cluster. However, more than half of the solutions with a small distance between sites separated San Francisco into its own cluster, suggesting that San Francisco should remain in its own cluster. Because the subsequent matching draws comparison discharges within the cluster whenever possible, having fewer comparison hospitals than partner hospitals within one cluster does not present an issue for the analysis.

We verified that within each of the 23 clusters, sites are similar on clustering variables. We also examined a two-dimensional visual representation of the clustering solution and confirmed homogeneity within clusters and heterogeneity across clusters. We confirmed face validity of the selected sites by examining the locations clustered together (Table A.4). Sites were often grouped within the same State or region. For example, Chicago, Evanston, Melrose Park, Elgin, and Blue Island—all in Illinois—were grouped together. Unique areas (Manhattan, NY; Los Angeles, CA; San Francisco, CA; and Miami, FL) remained alone, not grouped with others. We also verified that clusters are distinguishable from one another.

As described above, we performed clustering on sites rather than on HRRs to ensure that HRRs served by the same site are grouped together in subsequent analyses. Note that in cases where two sites that serve the same HRR are grouped by the matching algorithm into two clusters, the HRR they jointly serve will also be grouped into two clusters. For example, the Canton, OH, HRR was served by two sites: site 4 and site 53. Because these two sites were grouped into two clusters (clusters 2 and 4), Canton HRR was also grouped into these two clusters.

Table A.4. Clustering Solution With 11 Clusters of HRRs, Within Which Subsequent Matching Was Performed for All 101 Sites

Cluster No.	Ratio of Control-to-Partner Hospitals	Number of CBOs in a Cluster	Hospital Referral Regions (HRRs) in a Cluster
1	3.7	7	Portland, ME; Minneapolis, MN; (Syracuse, NY; Burlington, VT); Portland, OR; Seattle, WA; Spokane, WA; Santa Rosa, CA
2	3.6	4	(Buffalo, NY; Rochester, NY; Erie, PA); (Canton, OH; Pittsburgh, PA; Columbus, OH); Cincinnati, OH; (Kettering, OH; Dayton, OH)
3	2.2	7	Phoenix, AZ; Gainesville, FL; (Tampa, FL; Lakeland, FL); Atlanta, GA; Bakersfield, CA; Tacoma, WA
4	1.8	4	(Canton, OH; Akron, OH; Cleveland, OH); (Youngstown, OH; Pittsburgh, PA); Pittsburgh, PA

Cluster No.	Ratio of Control-to-Partner Hospitals	Number of CBOs in a Cluster	Hospital Referral Regions (HRRs) in a Cluster
5	3.0	9	New Haven, CT; (New Haven, CT; Hartford, CT); Orlando, FL; Boston, MA; (Worcester, MA; Springfield, MA; Boston, MA); (Dearborn, MI; Ann Arbor, MI); (Newark, NJ; New Brunswick, NJ; Camden, NJ; Providence, RI
6	3.2	3	Blue Island, IL; (Evanston, IL; Chicago, IL); (Melrose Park, IL; Evanston, IL; Elgin, IL; Chicago, IL; Blue Island, IL)
7	2.1	2	(Royal Oak, MI; Detroit, MI); (Royal Oak, MI; Pontiac, MI; Detroit, MI)
8	1.6	5	Tucson, AZ; Topeka, KS; Missoula, MT; El Paso, TX; (Yakima, WA; Spokane, WA)
9	6.1	3	Baltimore, MD; Philadelphia, PA
10	1.6	3	Sioux City, IA; Omaha, NE; (York, PA; Harrisburg, PA)
11	3.2	7	(Pensacola, FL; Dothan, AL); Little Rock, AR; Lexington, KY; (Tupelo, MS; Oxford, MS); Winston-Salem, NC; Columbus, OH; (Kingsport, TN; Roanoke, VA)
12	4.4	5	(Miami, FL; Fort Lauderdale, FL); (Slidell, LA; Metairie, LA; Baton Rouge, LA); (Harlingen, TX; McAllen, TX); Houston, TX
13	1.0	2	Rochester, NY
14	1.8	4	Manhattan, NY
15	2.1	8	Sun City, AZ; (Muncie, IN; Indianapolis, IN; Fort Wayne, IN); Louisville, KY; Kansas City, MO; Albany, NY; (Albany, NY; Burlington, VT); (Richmond, VA; Norfolk, VA; Newport News, VA)
16	0.2	2	San Francisco, CA
17	2.9	5	Los Angeles, CA
18	2.0	1	Miami, FL
19	1.4	4	Lansing, MI; (Lansing, MI; Flint, MI); (Durham, NC; Raleigh, NC); (Greenville, NC; Raleigh, NC)
20	1.7	5	Denver, CO; Honolulu, HI; Orange County, CA; San Diego, CA; Ventura, CA
21	2.6	3	Urbana, IL; Dayton, OH; Toledo, OH
22	1.4	6	Augusta, GA; (Owensboro, KY; Evansville, IN); Spartanburg, SC; Chattanooga, TN; (Waco, TX; Temple, TX); Huntsville, AL
23	3.0	2	East Long Island, NY

Note: We combined HRRs served by the same site to ensure that they are grouped together in subsequent analyses. We denote such groupings with parentheses.

A.3.1.2. Clustering Methods for the 44 Sites

Similar to the 101 sites, several of the 44 sites served more than one HRR. We performed clustering on sites rather than on HRRs to ensure that HRRs served by the same site were grouped together in subsequent analyses. We clustered the 39 site/HRR entities into each of 2 to 20 clusters and then evaluated several criteria to select 1 grouping that best fit the needs of the evaluation. The 10 HRR characteristics and their definitions for clustering are provided in Table A.5.

Table A.5. HRR Characteristics and Variable Definitions Used in Clustering Sites/HRRs for the 44 Extended Sites

Hospital Referral Region Characteristic	Definition of Variable Used in Clustering
Categorical Variables	
Number of readmissions per 1,000 Medicare beneficiaries	<51; 51–75; >75
Average annual Medicare costs per beneficiary, $	<8,000; 8,000–10,000; >10,000
Number of acute care beds per 1,000 population	<1.9; 1.9–2.3; >2.3
Total age-standardized mortality rate	<4.1; 4.1–5; >5
Number of emergency department visits per 1,000 Medicare beneficiaries	<612; 612–699; >699
Binary Variables	
Average annual Medicare home health costs per beneficiary, $	<900; ≥900
Number of primary care physicians per 100,000 population	<74; ≥74
Percent of Medicare beneficiaries eligible for Medicaid, %	<35%; ≥35%
Percent of population below Federal poverty level, %	<17%; ≥17%
Continuous Variable	
Proportion of population who are fee-for-service beneficiaries	Continuous variable

Notes: We determined cutoffs for categorical and binary variables by examining their distributions for meaningful cutoffs. For example, we clustered based on whether the percentage of the population in poverty is above or below 17 percent because that variable has a symmetric distribution around the mean of 17 percent. In addition, this value is close to the national average of 15.9 percent.

We identified the best clustering solution that fit our needs as one that has at least one potential comparison hospital per treatment and has the smallest distance between site/HRRs entities within a cluster. This solution grouped the 39 site/HRRs into 11 clusters.

The chosen solution does not have the smallest distance between site/HRRs compared to other solutions that do not have at least one potential comparison per treatment hospital. However, the value of the distance within site/HRRs does not differ considerably across solutions. Therefore, solutions with less than one potential comparison per treatment hospital did not have much smaller distance within site/HRRs. It is acceptable to find some differences between HRRs within a cluster because we will explicitly select entities that are more similar as part of subsequent hospital and participant matching.

We verified that within each of the 11 clusters, site/HRRs are similar on clustering variables. We also examined a two-dimensional visual representation of the clustering solution and confirmed homogeneity within clusters and heterogeneity across clusters. We confirmed face validity of the

selected site/HRRs by examining the names of site/HRRs clustered (Table A.6). Site/HRR areas were often grouped within the same State or region (e.g., Chicago, IL, and Evanston, IL). Unique areas (Manhattan, NY, and Los Angeles, CA) remained alone, not grouped with other areas. We also verified that clusters are distinguishable from one another.

Table A.6. The Clustering Solution With 11 Clusters of HRRs Within Which Subsequent Matching Was Performed for the 44 Extended Sites

Cluster No.	Ratio of Control-to-Treatment Hospitals	Number of CBOs in a Cluster	Hospital Referral Regions (HRRs) in a Cluster
1	1.9	3	Portland, ME; Spokane, WA; Missoula, MT
2	2.3	4	Cincinnati, OH; Boston, MA; Rochester, NY; (Worcester, MA; Springfield, MA; Boston, MA)
3	2.6	7	Atlanta, GA; Pittsburgh, PA; (Muncie, IN; Indianapolis, IN; Fort Wayne, IN); (Richmond, VA; Norfolk, VA; Newport News, VA); (Greenville, NC; Raleigh, NC); Sun City, AZ; Bakersfield, CA
4	3.7	4	(Canton, OH; Akron, OH; Cleveland, OH); Philadelphia, PA; (Dearborn, MI; Ann Arbor, MI); (Newark, NJ; New Brunswick, NJ; Camden, NJ)
5	2.8	3	(Evanston, IL; Chicago, IL); (Royal Oak, MI; Detroit, MI); Blue Island, IL
6	2.6	5	Phoenix, AZ; El Paso, TX; Tucson, AZ; San Diego, CA; (York, PA; Harrisburg, PA)
7	1.9	3	Columbus, OH; Winston-Salem, NC; Urbana, IL
8	4.0	3	(Harlingen, TX; McAllen, TX); (Miami, FL; Fort Lauderdale, FL); Houston, TX
9	2.6	5	Gainesville, FL; Augusta, GA; (Pensacola, FL; Dothan, AL); Lexington, KY; Huntsville, AL
10	3.3	1	Los Angeles, CA
11	2.6	1	Manhattan, NY

Note: We combined HRRs served by the same site to ensure that they are grouped together in subsequent analyses. We denote such groupings with parentheses.

A.3.2. Propensity Score Matching

A.3.2.1. Propensity Score Matching Methods

For both the 101- and 44-site analyses, we used propensity score matching to select comparison discharges for participant matching (for the cross-sectional analysis). For the 44 extended sites analysis, we also matched hospitals (for the difference-in-differences (DiD) analysis) within clusters. In a handful of cases, there was an insufficient number of similar comparison hospitals, so we matched outside the clusters.

We first estimated a probit regression predicting participation in the program based on a number of characteristics expected to affect outcomes and/or selection into the program. For each participating discharge or partner hospital, we selected comparisons that have the closest value of the estimated propensity score.

For both the 101- and 44-site participant analyses, we matched discharges on the following characteristics (Table A.7 and Table A.8).

- **Characteristics of the stay,** such as modified diagnosis-related groups (MDRGs).

- **Beneficiary characteristics,** including basic demographics, outcomes (admissions, readmissions, and Medicare FFS expenditures), and chronic conditions.

- **Hospital characteristics,** such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions.

- **Key HRR characteristics,** such as the number of primary care physicians (PCPs) per 100,000 residents and the average annual Medicare costs per FFS beneficiary, all measured in the year before implementation.

For participants and matched comparisons within sites, we required balance (within 0.25 standard deviations) on six variables: the values of outcome variables (Medicare FFS expenditures, admissions, and readmissions), age, original reason for Medicare eligibility being disability or end-stage renal disease (ESRD), and dual eligibility, with a focus on outcome variables.

For the hospital-level DiD analyses, we matched hospitals on the characteristics of hospitals and the HRR in addition to aggregated beneficiary characteristics. We matched hospitals on the following characteristics:

- **Beneficiary characteristics,** aggregated to the hospital level, including basic demographics, outcomes (e.g., readmissions, expenditures, and mortality), and MDRGs.

- **Hospital characteristics,** such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions.

- **Key HRR characteristics,** such as the number of PCPs per 100,000 residents and the average annual Medicare costs per FFS beneficiary, all measured in the year before implementation. We also matched hospitals on changes in outcomes between 2 years before implementation and 1 year before implementation. We did not match on all 10 HRR characteristics used to group sites/HRRs into clusters.

Because of small sample sizes within each site, matching on many variables at the site level was not feasible. For that reason, we required balance (within 0.25 standard deviations) only on the

levels of outcome variables (e.g., Medicare FFS expenditures, readmissions, and mortality) 1 year before the hospital joined the program. We also took into account changes in outcomes between 2 years and 1 year before a hospital joined the program (trends in outcome variables).

Sections A.3.2.2 and A.3.2.3 detail participant-matching results for the 101 and 44 sites; Section A.3.2.4 details hospital-level matching results for the 44 sites.

A.3.2.2. Discharge-Level Matching Results for Cross-Sectional Analyses for All 101 Sites

We matched all index discharges in List Bill data that were successfully merged to claims, starting on February 1, 2012 (the first participant enrolled in February 2012), through January 31, 2017. We dropped the following index discharges:

- Discharges from nonacute hospitals.

- Discharges with a total length of stay longer than a year.

- Discharges during which beneficiaries died.

- Discharges for beneficiaries who were not observable in the month of admission (beneficiaries who do not have Medicare Part A and Part B).

We matched all participating discharges to a group of matched comparisons within cluster and quarter of discharge. We regarded the preintervention (or baseline) period as the period covering 1 year before the index discharge stay because it is possible that a hospital's participation in the CCTP can prompt the hospital to change practices that affect this variable. All time-varying variables used in matching were defined either over the whole 1-year baseline period or for a part of that period. For example, we only included Medicare payments if they occurred during the 6-month period before the index discharge. Time-invariant variables (such as gender) are defined at the time of the index discharge. Specific variables used in matching are listed in Table A.7.

We used one-to-one nearest neighbor matching without replacement, matching each participating index discharge to a comparison discharge. We did not apply calipers on the propensity score. Furthermore, we did not restrict the pool of treatment and comparison discharges to those within the same range of the estimated propensity score (common support) because this would result in exclusion of some participating discharges. This approach was successful in identifying a group of similar comparisons; it yielded balance on each matching characteristic within the goal of 0.25 standard deviations and was thus used in the subsequent DiD matching. The 0.25 target is a standard often used in comparison matching literature.[2] We used Stata software to perform the matching.

Using the sample of matched comparisons from pooled discharge-level matching, we assessed similarities between treatment and comparison discharges within each site. For balance within sites, we required balance (within 0.25 standard deviations) only on six variables: the values of outcome variables (Medicare FFS expenditures, admissions, and readmissions), age, original reason for Medicare eligibility being disability or ESRD, and dual eligibility, with a focus on

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[2] Institute of Education Sciences. (2014). What works clearinghouse: Procedures and standards handbook, version 3.0. Washington, DC: U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/DocumentSum.aspx?sid=19.

outcome variables. Prior-year outcomes are important in determining current outcomes. In addition, we selected age, original reason for eligibility, and dual eligibility as variables likely to predict selection into treatment and subsequent outcomes. This methodology was also used in matching participants to comparisons for the 44 extended sites (next section - Section A.3.2.3).

Results of matching. Table A.7 shows that after pooled matching of all discharges in List Bill data that were successfully merged to claims for all 101 sites, treatment and matched comparison discharges were similar. The standardized differences across the propensity score matching variables are all within our target of 0.25 standardized differences—the largest difference was 0.13 standard deviations in the skilled nursing facility (SNF) expenditures 1 month before discharge and SNF expenditures in months 1 through 6 before discharge. Differences in most other variables were smaller—differences were larger than 0.10 standard deviations for only 3 of 94 matching variables.

The matching algorithm drew comparisons from outside the cluster for approximately 5.5 percent of discharges where matches could not be found within a given cluster (data not shown).

Table A.7. Characteristics of Treatment and Matched Comparison Discharges During Stays and Characteristics of Discharging Hospitals and HRRs at the Start of the Intervention for the Pooled Sample Used in the Cross-Sectional Analyses for All 101 Sites

Matching Characteristic	Treatment Mean (N = 662,612)	Comparison Mean (N = 662,612)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Characteristics of Stays and Beneficiaries Discharged During Those Stays				
Percentage of stays with each of the 19 most common modified diagnosis-related groups (MDRGs) among CCTP participants, %				
524: Heart failure (HF) and shock	6.33	6.17	0.01	Yes[a]
409: Chronic obstructive pulmonary disease (COPD)	5.02	5.07	0.00	Yes[a]
1808: Septicemia without mechanical ventilation for more than 96 hours	5.43	5.57	-0.01	Yes[a]
410: Simple pneumonia and pleurisy	4.44	4.45	0.00	Yes[a]
807: Major joint replacement or reattachment of lower extremity	5.29	5.06	0.01	Yes[a]
531: Cardiac arrhythmia and conduction disorders	3.09	2.96	0.01	Yes[a]
620: Esophagitis, gastroenteritis, and miscellaneous digestive disorders	2.48	2.46	0.00	Yes[a]
1110: Renal failure	2.93	2.92	0.00	Yes[a]
615: Gastrointestinal hemorrhage	2.25	2.23	0.00	Yes[a]
1113: Kidney and urinary tract infections	2.34	2.44	-0.01	Yes[a]
511: Percutaneous cardiovascular procedure with drug-eluting stent	1.70	1.58	0.01	Yes[a]
910: Cellulitis	1.82	1.79	0.00	Yes[a]
522: Circulatory disorders except acute myocardial infarction (AMI), with cardiac catheter	1.44	1.36	0.01	Yes[a]
1008: Septicemia without mechanical ventilation for 96 hours or longer	1.67	1.71	0.00	Yes[a]
114: Intracranial hemorrhage or cerebral infarction	2.26	2.13	0.01	Yes[a]
520: AMI	1.51	1.46	0.00	Yes[a]

Matching Characteristic	Treatment Mean (N = 662,612)	Comparison Mean (N = 662,612)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
408: Pulmonary edema and respiratory failure	1.39	1.39	0.00	Yes
811: Hip and femur procedures, except major joint	1.31	1.34	0.00	Yes
602: Major small and large bowel procedures	1.19	1.15	0.00	Yes
Discharged from a skilled nursing facility (SNF), %	17.57	21.73	-0.10	No
Admitted as a transfer from a health facility[b], %	5.17	7.74	-0.10	Yes
Dual eligible in quarter of discharge, %	28.21	29.38	-0.03	Yes[c]
Age[d]	74.46	74.18	0.02	Yes[e]
Male, %	43.03	43.33	-0.01	Yes
Race and ethnicity, %				
African American	14.07	14.22	0.00	Yes
Asian	1.65	2.05	-0.03	Yes
Other race	2.15	2.32	-0.01	Yes
Hispanic ethnicity	4.17	4.51	-0.02	Yes[c]
Original reason for Medicare eligibility is age, %	70.21	69.48	0.02	Yes
Original reason for Medicare eligibility is disability, %	27.14	27.87	-0.02	Yes
Original reason for Medicare eligibility is end-stage renal disease (ESRD), %	1.09	1.14	0.00	Yes
Original reason for Medicare eligibility is disability and ESRD, %	1.56	1.51	0.00	Yes
Entitled to Medicare benefits due to ESRD, as of last calendar year, %	5.81	5.94	-0.01	Yes
Percentage of people in the beneficiary's ZIP Code who live under the Federal poverty level, %	25.25	25.42	-0.02	No
Percent population with college degree or more in beneficiaries' ZIP Code of residence, %	27.59	27.31	0.02	No
Count of inpatient admissions in the previous calendar year	0.73	0.76	-0.02	Yes
Count of readmissions in the previous calendar year	0.17	0.19	-0.02	Yes
Count of emergency department visits in the previous calendar year	1.50	1.55	-0.01	Yes

Matching Characteristic	Treatment Mean (N = 662,612)	Comparison Mean (N = 662,612)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Admitted in the previous calendar year, %	36.09	36.53	-0.01	Yes
Readmitted in the previous calendar year, %	9.16	9.76	-0.02	Yes
Total Medicare Part A and Part B payments 1 year before discharge, $	36,397.64	40,497.12	-0.09	Yes
Total Medicare Part A and Part B payments 1 month before discharge, $	15,318.90	16,116.30	-0.05	Yes
Total Medicare Part A and Part B payments in months 1 through 6 before discharge, $	25,392.39	29,080.69	-0.12	Yes
Inpatient Medicare payments 1 month before discharge, $	12,155.66	12,576.44	-0.03	Yes
Inpatient Medicare payments in months 1 through 6 before discharge, $	16,228.80	18,632.30	-0.10	Yes
Outpatient Medicare payments 1 month before discharge, $	490.98	516.97	-0.02	Yes
Outpatient Medicare payments in months 1 through 6 before discharge, $	2,310.60	2,394.45	-0.02	Yes
Part B carrier Medicare payments 1 month before discharge, $	2,210.77	2,257.15	-0.02	Yes
Part B carrier Medicare payments in months 1 through 6 before discharge, $	4,539.76	4,917.49	-0.05	Yes
SNF Medicare payments 1 month before discharge, $	209.99	487.91	-0.13	Yes
SNF Medicare payments in months 1 through 6 before discharge, $	1,006.77	1,738.62	-0.13	Yes
Home health agency (HHA) Medicare payments 1 month before discharge, $	179.33	192.78	-0.02	Yes
HHA Medicare payments in months 1 through 6 months before discharge, $	940.66	977.16	-0.01	Yes
Zero total Medicare payments 1 month before discharge, %	0.05	0.63	-0.10	Yes
Zero total Medicare payments all 6 months before discharge, %	0.03	0.46	-0.09	Yes
Hierarchical Condition Category (HCC) score	1.96	1.95	0.00	Yes[e]

Matching Characteristic	Treatment Mean (N = 662,612)	Comparison Mean (N = 662,612)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Chronic conditions, %				
AMI	3.94	3.95	0.00	No[f]
Alzheimer's/senile dementia	17.87	19.33	-0.04	No[f]
Atrial fibrillation	21.19	20.89	0.01	No[f]
Cataract	16.85	16.77	0.00	No[f]
Chronic kidney disease	43.65	43.73	0.00	No[f]
COPD	32.59	32.94	-0.01	No[f]
HF	41.34	41.21	0.00	No[f]
Diabetes	46.64	46.33	0.01	No[f]
Glaucoma	10.64	10.37	0.01	No[f]
History of hip fracture	2.35	2.59	-0.02	No[f]
Ischemic heart Disease (coronary artery disease)	55.11	54.50	0.01	No[f]
Depression	30.03	30.63	-0.01	No[f]
Osteoporosis	11.52	11.52	0.00	No[f]
Rheumatoid arthritis/osteoarthritis	49.44	48.62	0.02	No[f]
History of transient ischemic attack/stroke	10.22	10.43	-0.01	No[f]
Cancer	13.95	14.08	0.00	No[f]
Anemia	51.45	52.41	-0.02	No[f]
Asthma	17.23	17.33	0.00	No[f]
Hyperlipidemia	65.89	64.57	0.03	No[f]
Prostatic hyperplasia	12.19	12.39	-0.01	No[f]
Hypertension	83.44	82.60	0.02	No[f]
Hypothyroidism	22.58	22.46	0.00	No[f]
Hospital Characteristics Measured 1 Year Before the Program				
Organizational structure (for-profit), %	12.15	14.35	-0.06	Yes
Teaching hospital status, %	51.09	46.68	0.09	Yes
Number of hospital beds	389.68	371.51	0.07	Yes

Matching Characteristic	Treatment Mean (N = 662,612)	Comparison Mean (N = 662,612)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Medicare admissions (of all admissions), %	45.37	45.10	0.03	Yes
Medicaid admissions (of all admissions), %	19.74	19.88	-0.01	Yes
Core Based Statistical Area (CBSA) Category – micropolitan or rural, %	7.25	8.56	-0.05	Yes
CBSA Category – rural, %	1.86	2.05	-0.01	Yes
Medicare Case Mix Index	1.63	1.61	0.08	Yes
30-day all-cause readmission rate in the prior year, %	19.79	19.86	-0.02	Yes
Average inpatient costs per discharge in the prior year, $	10,870.37	10,758.10	0.03	Yes
30-day mortality rate in the prior year, %	4.67	4.71	-0.04	Yes
Hospital Referral Region (HRR) Characteristics Measured 1 Year Before the Program				
Number of primary care physicians per 100,000 residents	74.44	75.07	-0.05	No[g]
Mortality rate per 1,000 Medicare enrollees	4.52	4.49	0.07	No[g]
Average annual Medicare costs per fee-for-service beneficiary, $	10,141.88	10,249.67	-0.05	No[g]
Number of acute care hospital beds per 1,000	2.01	2.02	-0.03	No[g]
Average annual Medicare SNF costs per fee-for-service beneficiary, $	849.22	865.63	-0.07	No

[a] These 16 MDRGs occur for 50 percent of CCTP participants. We also controlled in regressions for the next 32 most frequently occurring MDRGs. These 48 MDRGs cover 75 percent of all CCTP participants.

[b] Defined as having been transferred from another hospital, SNF, intermediate care facility, ambulatory surgery center, or another healthcare facility for which the beneficiary was an inpatient.

[c] We also controlled in regressions for the interaction between dual-eligibility status and the following variables: age over 65, HCC score, number of chronic conditions, original reason for Medicare eligibility is disability or ESRD, total Medicare payments 1 year before discharge, and indicator for zero readmissions in the previous calendar year.

[d] We also matched on and assessed balance for age categories (less than 70, 70 to 74, 75 to 84, 85 and above), as well as those categories that interact with gender. Balance within each age category ranged from -0.02 to 0.01 standard deviations, and within the interaction terms ranged from -0.02 to 0.01 standard deviations.

[e] In regressions, we controlled for several age categories: less than 70 years old, 70 to 74 years old, 75 to 84 years old, and 85 years old and above.

[f] In addition to the HCC score, we also controlled in regressions for the Charlson Comorbidity Index computed using diagnoses on the stay claim, the number of chronic conditions, and the number of chronic conditions squared.

[g] These and other HRR characteristics were already used in clustering that preceded matching.

A.3.2.3. Discharge-Level Matching Results for Cross-Sectional Analyses for 44 Extended Sites

Table A.8 shows that after pooled matching of all discharges in List Bill data for the 44 extended sites were successfully merged to claims, treatment and matched comparison discharges were similar. The standardized differences across the propensity score matching variables are all well within our target of 0.25 standardized differences—the largest difference was 0.15 standard deviations for SNF expenditures 1 month and 6 months before discharge, and only 8 of 94 matching variables had differences greater than 0.10.

In examining site-specific matches for the in-depth analysis of the 44 extended sites in the Final Evaluation Report, we found that discharges were well-matched within all but one site.[3] Matching produced:

1. **Excellent balance for 40 sites:** For 25 sites, balance was within 0.25 standard deviations on all variables; for 15 sites, slight imbalances on one outcome variable or one to two non-outcome variables.

2. **Moderate balance for three sites:** Imbalance on three non-outcome variables.

3. **Poor balance for one site:** Imbalance on one outcome and three non-outcome variables.

We did not identify any worrisome patterns in imbalance, except that most of the sites with imbalance had imbalance on the percentage of dual-eligible beneficiaries—those eligible for both Medicare and Medicaid.

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[3] Results of matching are not shown for each site to conserve space.

Table A.8. Characteristics of Treatment and Matched Comparison Discharges During the Stays and Characteristics of Discharging Hospitals and HRRs at the Start of the Intervention for the Pooled Sample Used in the Cross-Sectional Analyses for 44 Extended Sites

Matching Characteristic	Treatment Mean (N = 533,609)	Comparison Mean (N = 533,609)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Characteristics of Stays and Beneficiaries Discharged During Those Stays				
Percentage of stays with each of the 19 most common modified diagnosis-related groups (MDRGs) among CCTP participants, %				
524: Heart failure (HF) and shock	5.98	5.98	0.00	Yes[a]
409: Chronic obstructive pulmonary disease (COPD)	4.71	4.82	0.00	Yes[a]
1808: Septicemia without mechanical ventilation for more than 96 hours	5.45	5.49	0.00	Yes[a]
410: Simple pneumonia and pleurisy	4.23	4.33	0.00	Yes[a]
807: Major joint replacement or reattachment of lower extremity	5.72	5.46	0.01	Yes[a]
531: Cardiac arrhythmia and conduction disorders	3.07	2.96	0.01	Yes[a]
620: Esophagitis, gastroenteritis, and miscellaneous digestive disorders	2.50	2.46	0.00	Yes[a]
1110: Renal failure	2.84	2.87	0.00	Yes[a]
615: Gastrointestinal hemorrhage	2.23	2.21	0.00	Yes[a]
1113: Kidney and urinary tract infections	2.37	2.52	-0.01	Yes[a]
511: Percutaneous cardiovascular procedure with drug-eluting stent	1.73	1.59	0.01	Yes[a]
910: Cellulitis	1.84	1.77	0.00	Yes[a]
522: Circulatory disorders except acute myocardial infarction (AMI) with cardiac catheter	1.44	1.38	0.01	Yes[a]
1008: Septicemia without mechanical ventilation for 96 hours or longer	1.71	1.78	-0.01	Yes[a]
114: Intracranial hemorrhage or cerebral infarction	2.34	2.17	0.01	Yes[a]
520: AMI	1.46	1.37	0.01	Yes[a]
408: Pulmonary edema and respiratory failure	1.32	1.38	-0.01	Yes
811: Hip and femur procedures, except major joint	1.41	1.42	0.00	Yes
602: Major small and large bowel procedures	1.21	1.15	0.01	Yes

Matching Characteristic	Treatment Mean (N = 533,609)	Comparison Mean (N = 533,609)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Discharged from a skilled nursing facility (SNF), %	18.10	21.98	-0.10	No
Admitted as a transfer from a health facility[b], %	5.11	7.41	-0.09	Yes
Dual eligible in quarter of discharge, %	27.55	29.74	-0.05	Yes[c]
Age[d]	74.42	73.73	0.05	Yes[e]
Male, %	43.13	43.89	-0.02	Yes
Race and ethnicity, %				
African American	13.82	14.07	-0.01	Yes
Asian	1.54	1.71	-0.01	Yes
Other race	2.18	2.54	-0.02	Yes
Hispanic ethnicity	4.15	4.12	0.00	Yes
Original reason for Medicare eligibility is age, %	70.44	68.46	0.04	Yes
Original reason for Medicare eligibility is disability, %	26.83	28.67	-0.04	Yes
Original reason for Medicare eligibility is end-stage renal disease (ESRD), %	1.14	1.25	-0.01	Yes
Original reason for Medicare eligibility is disability and ESRD, %	1.59	1.62	0.00	Yes
Entitled to Medicare benefits due to ESRD, as of last calendar year, %	5.89	6.22	-0.01	Yes
Percentage of people in the beneficiary's ZIP Code who live under the Federal poverty level, %	25.47	25.29	0.02	No
Percent population with college degree or more in beneficiaries' ZIP Code of residence, %	27.52	26.32	0.07	No
Count of inpatient admissions in the previous calendar year	0.71	0.78	-0.05	Yes
Count of readmissions in the previous calendar year	0.16	0.20	-0.05	Yes
Count of emergency department visits in the previous calendar year	1.47	1.60	-0.04	Yes
Admitted in the previous calendar year, %	35.32	36.72	-0.03	Yes
Readmitted in the previous calendar year, %	8.84	10.05	-0.04	Yes
Total Medicare Part A and Part B payments 1 year before discharge, $	35,956.31	41,518.40	-0.11	Yes
Total Medicare Part A and Part B payments 1 month before discharge, $	15,193.84	15,889.22	-0.04	Yes

Matching Characteristic	Treatment Mean (N = 533,609)	Comparison Mean (N = 533,609)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Total Medicare Part A and Part B payments in months 1 through 6 before discharge, $	25,043.88	29,876.47	-0.14	Yes
Inpatient Medicare payments 1 month before discharge, $	12,027.89	12,337.27	-0.02	Yes
Inpatient Medicare payments in months 1 through 6 before discharge, $	15,928.89	19,185.53	-0.13	Yes
Outpatient Medicare payments 1 month before discharge, $	485.65	532.90	-0.03	Yes
Outpatient Medicare payments in months 1 through 6 before discharge, $	2,287.48	2,460.36	-0.03	Yes
Part B carrier Medicare payments 1 month before discharge, $	2,228.64	2,235.10	0.00	Yes
Part B carrier Medicare payments in months 1 through 6 before discharge, $	4,567.66	5,011.65	-0.05	Yes
SNF Medicare payments 1 month before discharge, $	203.64	511.69	-0.15	Yes
SNF Medicare payments in months 1 through 6 before discharge, $	974.88	1,846.53	-0.15	Yes
HHA Medicare payments 1 month before discharge, $	177.12	187.92	-0.01	Yes
HHA Medicare payments in months 1 through 6 months before discharge, $	926.49	949.96	-0.01	Yes
Zero total Medicare payments 1 month before discharge, %	0.06	0.59	-0.09	Yes
Zero total Medicare payments all 6 months before discharge, %	0.03	0.42	-0.08	Yes
HCC score	1.95	1.96	-0.01	Yes[e]
Chronic conditions, %				
AMI	3.80	3.87	0.00	No[f]
Alzheimer's/senile dementia	17.90	19.50	-0.04	No[f]
Atrial fibrillation	20.70	20.35	0.01	No[f]
Cataract	16.66	16.22	0.01	No[f]
Chronic kidney disease	43.50	43.88	-0.01	No[f]
COPD	31.63	32.78	-0.02	No[f]
HF	40.55	40.80	-0.01	No[f]
Diabetes	46.18	46.34	0.00	No[f]
Glaucoma	10.40	9.82	0.02	No[f]
History of hip fracture	2.41	2.74	-0.02	No[f]
Ischemic heart Disease (coronary artery disease)	54.55	54.01	0.01	No[f]
Depression	29.70	31.04	-0.03	No[f]
Osteoporosis	11.52	11.41	0.00	No[f]

Matching Characteristic	Treatment Mean (N = 533,609)	Comparison Mean (N = 533,609)	Standardized Difference (Standard Deviations)	Controlled for in Cross-Sectional Regressions
Rheumatoid arthritis/osteoarthritis	49.89	48.97	0.02	No[f]
History of transient ischemic attack/stroke	10.19	10.40	-0.01	No[f]
Cancer	13.85	13.74	0.00	No[f]
Anemia	51.16	52.46	-0.03	No[f]
Asthma	17.70	18.06	-0.01	No[f]
Hyperlipidemia	65.74	64.31	0.03	No[f]
Prostatic hyperplasia	12.20	12.35	0.00	No[f]
Hypertension	83.10	82.46	0.02	No[f]
Hypothyroidism	22.71	22.69	0.00	No[f]
Hospital Characteristics Measured 1 Year Before the Program				
Organizational structure (for-profit), %	13.04	16.15	-0.09	Yes
Teaching hospital status, %	48.47	45.09	0.07	Yes
Number of hospital beds	381.89	345.39	0.15	Yes
Medicare admissions (of all admissions), %	45.79	45.36	0.04	Yes
Medicaid admissions (of all admissions), %	19.40	20.03	-0.07	Yes
Core Based Statistical Area (CBSA) Category – micropolitan or rural, %	7.00	10.42	-0.12	Yes
CBSA Category – rural, %	2.21	3.06	-0.05	Yes
Medicare Case Mix Index	1.62	1.60	0.11	Yes
30-day all-cause readmission rate in the prior year, %	19.76	19.59	0.05	Yes
Average inpatient costs per discharge in the prior year, $	10,673.93	10,484.80	0.05	Yes
30-day mortality rate in the prior year, %	4.69	4.79	-0.09	Yes
Hospital Referral Region (HRR) Characteristics Measured 1 Year Before the Program				
Number of primary care physicians per 100,000 residents	73.92	74.20	-0.02	No[g]
Mortality rate per 1,000 Medicare enrollees	4.53	4.56	-0.07	No[g]
Average annual Medicare costs per fee-for-service beneficiary, $	10,145.30	10,119.76	0.01	No[g]
Number of acute care hospital beds per 1,000	1.99	2.03	-0.10	No[g]
Average annual Medicare SNF costs per fee-for-service beneficiary, $	841.35	834.46	0.03	No

[a] These 16 MDRGs occur for 50 percent of CCTP participants. We also controlled in regressions for the next 32 most frequently occurring MDRGs. These 48 MDRGs cover 75 percent of all CCTP participants.
[b] Defined as having been transferred from another hospital, SNF, intermediate care facility, ambulatory surgery center, or another healthcare facility for which the beneficiary was an inpatient.

[c] We also controlled in regressions for the interaction between dual-eligibility status and the following variables: age over 65, HCC score, number of chronic conditions, original reason for Medicare eligibility is disability or ESRD, total Medicare payments 1 year before discharge, and indicator for zero readmissions in the previous calendar year.
[d] We also matched on and assessed balance for age categories (less than 70, 70 to 74, 75 to 84, 85 and above), as well as those categories that interact with gender. Balance within each age category ranged from -0.04 to 0.01 standard deviations, and within the interaction terms ranged from -0.04 to 0.01 standard deviations.
[e] In regressions, we controlled for several age categories: less than 70 years old, 70 to 74 years old, 75 to 84 years old, and 85 years old and above.
[f] In addition to the HCC score, we also controlled in regressions for the Charlson Comorbidity Index computed using diagnoses on the stay claim, the number of chronic conditions, and the number of chronic conditions squared.
[g] These and other HRR characteristics were already used in clustering that preceded matching.

A.3.2.4. Hospital-Level Matching for DiD Analyses

Pooled hospital-level matching. We matched all partner hospitals associated with 44 extended sites to a group of matched comparisons by matching hospitals within cluster and by year of implementation. That is, we separately matched hospitals that joined the CCTP in 2012 (2012 joiners) and those that joined in 2013 (2013 joiners). Both 2012 joiners and 2013 joiners were matched to nonpartner hospitals in the same cluster. The main reason for matching separately by year of implementation is that the selection mechanism may differ for early joiners versus late joiners. A practical benefit of matching separately by year of implementation is that it enables us to use the same set of potential comparison hospitals without matching with replacement explicitly. An ancillary benefit is that matching separately by year facilitates a potential future subgroup analysis of impacts for 2012 joiners versus 2013 joiners.

We did not match on all 10 HRR characteristics used to group sites/HRRs into clusters. We also matched hospitals on changes in outcomes between 2 years before implementation and 1 year before implementation. Specific variables used in matching are listed in Table A.9.

We first attempted nearest neighbor matching without replacement in which each partner hospital was matched to one nonparticipant; therefore, with a one-to-one ratio. Because the differences between treatment and selected comparison hospitals were larger than 0.25 standard deviations for several key matching variables, we conducted one-to-one matching with replacement, meaning that one hospital could serve as a comparison for more than one partner hospital. To retain all partner hospitals in the analytic sample, we did not apply calipers on the propensity score. (The caliper is the difference in the estimated propensity score between treatment and potential comparison units.) Matching within a caliper would have dropped partner hospitals that do not have a matched comparison hospital with a propensity score within a given caliper. Even though matching within a caliper might have produced a group of comparison hospitals that is more similar to the remaining partner hospitals than matching without the caliper, dropping partner hospitals from the sample would mean that we would capture program impact on only a subset of partner hospitals. Furthermore, we did not restrict the pool of partner and comparison hospitals to those within the same range of the estimated propensity score (common support), because this would also result in the exclusion of some partner hospitals. This approach was successful in identifying a group of similar comparison hospitals; it yielded balance on each matching characteristic within the goal of 0.25 standard deviations and was thus used in subsequent DiD analysis. We used Stata software to perform the matching.

Site-by-site matching. Using the sample of matched comparisons from pooled hospital-level matching, we assessed similarity between treatment and comparison hospitals within each site. We found that hospitals were not well-matched within each site and proceeded to match hospitals separately within each site by running separate matching regressions for each site.

Due to small sample sizes within each site, matching on many variables was not feasible. For that reason, we required balance (within 0.25 standard deviations) only on the values of outcome variables (i.e., Medicare FFS expenditures, readmissions, and mortality) 1 year before the hospital joined the program (level of outcome variables). We also took into account changes in outcomes between 2 years and 1 year before a hospital joined the program (trends in outcome variables). We attempted using nearest neighbor matching, but this approach did not yield balanced groups. For that reason, we used optimal matching that does not select matches sequentially, but rather reconsiders matching decisions to minimize the overall differences between treatments and selected comparisons.

Results of matching. We matched all 216 hospitals that partnered with 44 extended sites to 152 comparison hospitals or 143 unique comparisons. More than 139 comparison hospitals matched to only 1 or 2 partner hospitals; only 1 comparison hospital was matched 6 times. Table A.9 shows that after pooled matching, treatment and selected comparison hospitals were similar at the start of the program. The standardized differences across the propensity score matching variables are all well within our target of 0.25 standardized differences—the largest difference was 0.19, and most were much smaller. Unless noted, each characteristic was measured in the year before the intervention started. For hospitals that joined the CCTP in 2012, the previous year is 2011. For hospitals that joined the CCTP in 2013, the previous year is 2012. What is not shown in the table is that hospitals were exact-matched on cluster—all selected comparison hospitals come from the same clusters as the treatments to which they are matched.

It is important to demonstrate that partner hospitals and their matched comparison hospitals are similar at baseline in terms of characteristics that affect analyzed outcomes or the decision to participate in the CCTP. If partner and comparison hospitals differ at baseline, observed differences in outcomes after the start of the CCTP might reflect these baseline differences, not the CCTP. The need to demonstrate similarity at baseline is greater when estimating contemporaneous differences in outcomes, because this model does not allow adjustment for differences in outcomes at baseline (as does the DiD model). In the site-by-site summaries in the CCTP Site Supplement attachment for this report, we indicate sites where matching was poor and note that those results should be interpreted with caution given that poor balance at baseline increases the likelihood of bias in the impact estimates for these sites. Results of optimal matching are not shown for each site to conserve space. Optimal matching produced:

1. **Excellent/very good balance for 19 sites:** Balance within 0.25 standard deviations on both levels and trends or on levels of outcome variables.

2. **Moderate imbalance balance for 12 sites:** Balance within 0.25 standard deviations on two-level variables and slight imbalance (between 0.25 standard deviations and 0.40 standard deviations) on one-level variable.

3. **Poor balance for 13 sites:** Imbalance greater than in No. 2 above.

Table A.9. Characteristics of Treatment and Selected Comparison Hospitals Before the Start of the Intervention for the Sample Used in the Pooled Analysis for the 44 Sites

Characteristic	Treatment Mean	Comparison Mean	Standardized Difference (Standard Deviations)	Controlled for Characteristic in DiD Regressions[a]
Characteristics of Index Stays and Beneficiaries Discharged During Those Stays				
Percentage of index stays with each of 16 most common modified diagnosis related groups (MDRGs) among CCTP participants, %				
524: Heart failure (HF) and shock	5.1	5.2	-0.04	Yes
409: Chronic obstructive pulmonary disease (COPD)	5.0	5.2	-0.06	Yes
410: Simple pneumonia and pleurisy	4.3	4.4	-0.01	Yes
807: Major joint replacement or reattachment of lower extremity	4.0	3.4	0.19	Yes
531: Cardiac arrhythmia and conduction disorders	2.8	2.8	-0.06	Yes
620: Esophagitis, gastroenteritis, and miscellaneous digestive disorders	2.8	2.9	-0.04	Yes
615: Gastrointestinal hemorrhage	2.2	2.3	-0.04	Yes
1808: Septicemia without mechanical ventilation for 96 hours or longer	2.2	2.1	0.04	Yes
114: Intracranial hemorrhage or cerebral infarction	2.1	2.0	0.11	Yes
910: Cellulitis	1.9	2.0	-0.05	Yes
811: Hip and femur procedures	1.2	1.2	0.10	Yes
520: Acute myocardial infarction (AMI)	1.2	1.2	0.00	Yes
511: Percutaneous cardiovascular procedure with drug-eluting stent	0.9	0.8	0.19	Yes
408: Pulmonary edema and respiratory failure	1.1	0.9	0.16	Yes
522: Circulatory disorders except AMI, with cardiac catheter	1.0	0.9	0.15	Yes
602: Major small and large bowel procedures	1.1	1.0	0.13	Yes
Dual eligibles, %	33.0	34.3	-0.07	Yes
Mean age	73.2	72.8	0.11	Yes

Characteristic	Treatment Mean	Comparison Mean	Standardized Difference (Standard Deviations)	Controlled for Characteristic in DiD Regressions[a]
Female, %	56.5	56.0	0.12	Yes
Race and ethnicity, %				
African American	12.5	13.6	-0.07	Yes
White	80.4	79.5	0.05	Yes
Asian	1.4	1.4	0.01	Yes
Other race	1.6	1.7	-0.02	Yes
Hispanic ethnicity	4.1	3.8	0.03	Yes
Hospital Characteristics				
Organizational structure: not-for-profit, %	85.6	88.8	-0.10	No[c]
Teaching status, %	34.3	32.9	0.03	No[c]
Number of beds	282	245	0.19	No[c]
Medicare admissions (of all admissions), %	47.4	46.3	0.11	No[c]
Medicaid admissions (of all admissions), %	18.9	19.5	-0.06	No[c]
Located in a rural area[b] %	17.1	20.4	-0.08	No[c]
Medicare Case Mix Index	1.52	1.48	0.18	No[c]
30-day all-cause readmission rate, %	19.4	19.5	-0.03	No[c]
Average inpatient expenditures per discharge, $	9,431	9,223	0.06	No[c]
30-day mortality rate, %	4.9	4.7	0.16	No[c]
Change in the 30-day readmissions between 2 years and 1 year before the intervention, %	-0.18	-0.08	-0.06	No[c]
Change in the average inpatient expenditures per discharge between 2 years and 1 year before the intervention, $	44	87	-0.07	No[c]
Change in the 30-day mortality rate between 2 years and 1 year before the intervention, %	0.16	0.04	0.16	No[c]

Characteristic	Treatment Mean	Comparison Mean	Standardized Difference (Standard Deviations)	Controlled for Characteristic in DiD Regressions[a]
Hospital Referral Region (HRR) Characteristics				
Number of primary care physicians per 100,000 residents in previous year	72.4	75.8	-0.246	No[d]
Mortality rate per 1,000 Medicare enrollees, %	4.6	4.5	0.12	No[d]
Average annual Medicare expenditures per fee-for-service (FFS) beneficiary, $	9,951	10,034	-0.05	No[d]
Number of acute care hospital beds per 1,000 in previous year	2.04	2.03	0.01	No[d]
Population that lives under the Federal poverty line, %	17.0	16.5	0.10	No[d]
Population with college degree or more, %	27.7	29.1	-0.19	No[d]

[a] In DiD regressions, we also controlled for the HCC score, on which we did not seek balance after matching.

[b] Rural indicator is based on the CBSA category—micropolitan or rural.

[c] We did not control for hospital characteristics in difference-in-differences regressions because there was little variation in hospital characteristics over time, and hospital fixed effects were used. The only hospital characteristic included in regressions is the number of Medicare FFS discharges.

[d] These HRR characteristics were already used in clustering that preceded matching.

A.4. Analysis Methods

In this section, we describe the methods used to analyze:

- Cross-sectional analysis of association between CCTP participation and outcomes.

    o Pooled and site-by-site analysis.
    o Net difference in expenditures associated with the CCTP.

- DiD impact analysis for all discharges.

    o Pooled hospital-level DiD impact analysis.
    o Site-by-site analysis at the hospital discharge level.

- The association between home health use and outcomes using the instrumental variables model.

- The association between types of encounters and services received through the CCTP and outcomes.

A.4.1. Cross-Sectional Analysis of Association Between CCTP Participation and Outcomes

For the pooled analysis, we also estimated associations between the CCTP and participants' outcomes using (1) all months of available data and (2) the first 33 months of data for each site to facilitate comparison with the DiD-pooled analyses, which use only the first 33 months of data. Site-by-site analysis used all months of available data for a given site. All data for these models spanned the CCTP intervention period(s) studied in the Interim Evaluation Report.

Pooled and site-by-site analyses. We estimated the following cross-sectional multivariate linear regression model with an index discharge as the unit of observation. For pooled regressions, we used the whole sample of participant and selected comparison discharges. For the site-by-site analysis, we used the same specification to estimate 44 separate regressions, including the participant and matched comparison discharges for each site. We did not report site by site all 101 sites.

Equation 1

$$R_{i,m} = \vartheta_0 + \vartheta_1 D^m + \vartheta_2 D^{CCTP} + \vartheta_3 W_i + \vartheta_4 X_h + \varepsilon_{i,m}$$

In this model:

- The dependent variable $R_{i,m}$ is the outcome (such as 30-day aggregate Medicare expenditures and 30-day readmissions) for discharge i during month m.

- D^m are month indicator variables for each month (m). They control for changes in the dependent variable occurring in a particular month averaged across discharges regardless of CCTP participation.

- W_i are the index discharge or characteristics of beneficiary with an index discharge i.

- X_h are hospital characteristics for each participant's index discharge hospital.

- D^{CCTP} equals 1 if the outcome is for an index discharge for participants and 0 if it is for a comparison.

- ϑ_2 is the estimate of interest and captures the association between CCTP participation and outcomes, compared with matched discharges for beneficiaries who did not participate in the CCTP. A negative ϑ_2 will indicate that CCTP participation was associated with lower outcomes relative to nonparticipants.

- We clustered standard errors by hospital to adjust for hospital-specific practices that affect all discharges in that hospital, resulting in correlation between within-hospital discharges.

Net difference in expenditures associated with the CCTP. We calculated net difference in expenditures associated with the CCTP using results from the participant cross-sectional regression, which represents associations between outcomes for participants and their selected comparisons, rather than the program's impacts. This model was appropriate for such a calculation because hospitals receive payment only for participants. We calculated net difference in expenditures from the program overall and for each participating site by conducting the following four calculations:

1. Average Per Eligible Discharge Rate (PEDR) for each site over all non-missing index discharges. The PEDR is a dollar amount paid by CMS for provision of CCTP services.

2. Average net difference in expenditures per discharge by adding the average PEDR to the difference in Part A and Part B Medicare expenditures between participants and matched comparisons for each site estimated in the participant cross-sectional regressions, whether pooled or regressions for each site.

3. Net difference in expenditures for each site by multiplying the average net difference in expenditures per discharge by the total number of index discharges in the analytic sample (those index discharges in List Bill data that were successfully merged to claims).

4. Total net difference in expenditures for the program by multiplying the average net difference in expenditures among all discharges by the entire sample estimated in participant cross-sectional models.

Equation 2

The average PEDR for the entire CCTP was calculated as follows:

$$Average\ PEDR = \sum_{i=1}^{I}(PEDRcbo_i * ParticipantDischargescbo\_i)/(Total\ Number\ of\ CCTP\ Participant\ Discharges)$$

The number of participant discharges in a site ($ParticipantDischargescbo\_i$) is used to weight the PEDR in constructing the average PEDR. We then use the average PEDR from Equation 2 to calculate the overall lower or higher net expenditures by adding it to the estimated regression-adjusted difference in Part A and Part B Medicare FFS expenditures between CCTP participants and nonparticipants.

Equation 3

$$Net\ difference\ in\ expenditures = [(Difference\ in\ Medicare\ Part\ A\ and\ Part\ B\ expenditures\ per\ index\ discharge\ associated\ with\ the\ CCTP) + (Average\ PEDR)]$$

If the lower Medicare expenditures associated with the CCTP offset the average amount paid for CCTP services (PEDR), Equation 3 would yield a negative value, indicating that lower net expenditures occurred. If the PEDR is larger than the amount by which Medicare expenditures are lower among participants versus comparisons, or if Medicare expenditures are higher among participants versus comparisons, Equation 3 would yield a positive value.

A.4.2. DiD Impact Analysis for All Discharges

The pooled hospital analyses consist of a model that controls for hospital fixed effects and therefore excludes characteristics that are time-invariant (i.e., do not change over the study period). Time-invariant characteristics include ownership (private for-profit, private nonprofit, Government) and bed size. The site-by-site analyses consist of 44 separate discharge-level regressions.

The baseline period included in the regressions differs by hospital according to when the hospital's affiliated CBO began participating in the CCTP. It consists of the 12 months immediately prior to the implementation month.

The intervention period for a hospital in our analysis starts in the month in which the CBO began offering CCTP services, with the earliest implementation month beginning February 1, 2012. Similarly, the post-program period of a matched comparison hospital is set to the implementation month of the site with which its matched participant hospital partnered. The post-program period spans February 1, 2012, to January 31, 2017.

Pooled hospital-level DiD impact analysis. The level of observation for the analysis pooled across all sites is the hospital–month. Claims-based variables were aggregated over all Medicare FFS discharges for each hospital in each month.

To mitigate the threat of bias from nonrandom attrition due to rolling start and end dates in the analysis that pools together hospitals across all sites, the intervention period consists only of the first 33 months for which the 44 extended sites provided CCTP services. The 33 months vary in calendar time across the sites because the sites did not participate over the same 33 calendar months. Each site has 33 months of intervention period data, but each site will have a different set of 33 months. Therefore, we only observe 33 months of the intervention period for each intervention group hospital. In addition to the intervention period months, each hospital has 12 months of preintervention data such that each hospital has a total of 45 months of data (potentially spanning different years).

In the model specification for the pooled hospital-level DiD, we estimate the following hospital fixed-effects model, which will conservatively control for all unobserved time-invariant hospital characteristics.

Equation 4
$$R_{h,m} = \vartheta_0 + \vartheta_1 D_m + \vartheta_2 D^{CCTP} + \vartheta_3 Post + \vartheta_4 D^{CCTPm} + \vartheta_5 X_{h,m} + \vartheta_6 P_h + \varepsilon_{h,m}$$
In this estimation model, the variables are defined as follows:

- The dependent variable $R_{h,m}$ is an outcome for hospital h in month m.

- D_m is a time fixed effect, with each baseline and postintervention month coded as an indicator variable. It controls for changes in the dependent variable occurring in a month (m) across hospitals for both treatment and comparison groups relative to the first month of the baseline period.

- $X_{h,m}$ includes the number of hospital discharges in month m and MDRG for index discharges.

- P_h represents hospital indicator variables (fixed effects) that control for all time-invariant characteristics.

- D^{CCTP} equals 1 if the outcome is for a partner hospital and 0 if it is for a comparison hospital. The estimate for ϑ_2 captures the group effect; that is, D^{CCTP} controls for any constant differences in the outcome associated with comparison versus partner status regardless of whether the CCTP was implemented.

- *Post* equals 1 for all months in the postintervention period for each hospital (on or after its implementation of the CCTP) and 0 for all preintervention months.

- The variable D^{CCTPm} indicates the observation is for a partner hospital for a site that has implemented the CCTP by the month of observation. It represents the interaction between D^{CCTP} and *Post*.

   o D^{CCTPm} equals 1 if the measure is for a partner/intervention group hospital during any month on or after its implementation of the CCTP.

   o D^{CCTPm} equals 0 if the measure is from a comparison hospital in *any* month or from a partner hospital *before* its implementation of the CCTP.

   o The estimate for ϑ_2 captures the effect of the CCTP on the dependent variable and is the estimate of interest. A negative ϑ_2 will support our hypothesis of the CCTP improving outcomes.

- Standard errors are clustered at the hospital level.

- Importance weights are included to account for the number of Medicare FFS discharges per hospital per month multiplied by matching weights.

Site-by-site analysis at the hospital discharge level. The level of observation for the site-by-site regressions is an index hospital discharge with outcomes calculated over the 30-day post-discharge period. This analysis uses a different dataset than the hospital–month-level dataset used for the analysis described in Equation 1 in Section A.4.1. There are 44 regressions—one for each extended site, including discharges from matched comparison hospitals associated with each site. For the discharge-level site-by-site analysis, all available intervention months from February 2012 through January 2017 are used, such that the number of intervention months will vary by site and therefore by regression.

Equation 5
In order to assess impacts using a DiD model in each CCTP site, we estimate site-specific discharge-level models with the following specifications:

$$R_{i,m} = \vartheta_0 + \vartheta_1 D_m + \vartheta_2 D^{CCTP} + \vartheta_3 Post + \vartheta_4 D_i^{CCTPm} + \vartheta_5 W_{i,m} + \vartheta_6 X_{h,m} + \vartheta_7 P_h + \varepsilon_{i,m}$$

In this model:

- The dependent variable $R_{i,m}$ is the outcome (e.g., 30-day select Medicare expenditure) for discharge i during month m.

- D_m is a time fixed effect with each baseline and postintervention month. It controls for changes in the dependent variable occurring in a month (m) (across hospitals, for both treatment and comparison groups relative to the first month of the baseline period.

- $W_{i,m}$ are the beneficiary characteristics of individual i with a discharge in month m.

- X_h are hospital characteristics for each participant's index discharge hospital measured 1 year before the program started for each hospital.

- P_h are hospital indicator variables (fixed effects). They control for time-invariant unobservable factors at the hospital level that may influence the outcome irrespective of CCTP participation (e.g., healthcare infrastructure).

- D^{CCTP} equals 1 if the outcome is for a partner hospital and 0 if it is for a comparison hospital. The estimate for ϑ_2 captures the group effect; that is, D^{CCTP} controls for any constant differences in the outcome associated with comparison versus partner status regardless of whether the CCTP was implemented.

- *Post* equals 1 for all months in the postintervention period for each hospital (that is on or after its implementation of the CCTP) and 0 for all preintervention months.

- The program indicator D_i^{CCTPm} indicates that the observation is for a partner hospital with a site that has implemented the CCTP by the month of observation.

  o D^{CCTPm} equals 1 if the observation is for a Medicare FFS discharge from a partner hospital during the months on or after the hospital's implementation of the CCTP (the intervention months).

  o D^{CCTPm} equals 0 if the observation is for a Medicare FFS discharge from a comparison hospital in any month or from a partner hospital before its implementation of the CCTP (the baseline 12 months for partner hospitals).

  o The estimate for ϑ_2 captures the effect of the CCTP on the dependent variable and is the estimate of interest. A negative ϑ_2 will support our hypothesis of the CCTP improving outcomes.

- Standard errors are clustered by hospital.

- Matching weights were included to account for treatment hospitals matched to multiple comparison hospitals.

In this site-specific discharge-level regression model, all Medicare FFS discharges from partner hospitals within the given site and all discharges from matched comparison hospitals during the baseline 12 months and subsequent intervention months (at the earliest, February 1, 2012, and proceeding through January 31, 2017) are included, regardless of beneficiary participation in the CCTP.

A.4.3. Pooled Analysis of the Association Between Home Health Services and Outcomes, After Accounting for the Association of the CCTP and Outcomes

This analysis estimates the association between home health services and 30-day readmissions, inpatient expenditures, and Medicare Part A and Part B expenditures (net of home health expenditures) after accounting for the association between the CCTP and outcomes. In other words, it answers the following question: What is the association between home health use and outcomes after accounting for the association between the CCTP and outcomes? We analyzed this relationship using all discharges of participants and their matched comparisons. As described in Section 3 of the Final Evaluation Report, the receipt of home health services is likely endogenous to participation in the CCTP—in some cases, the CCTP targeted beneficiaries discharged to a given setting, and in other cases, the CCTP also influenced the receipt of post-acute care services.

To account for this endogeneity, we took an instrumental variables approach. This approach enables us to estimate the association of interest by first modeling the selection process into home health services by estimating the likelihood of receipt of home health services post-discharge as a function of identifying variables and other exogenous characteristics. The success of the instrumental variables approach hinges on finding high-quality identifying variables—factors that strongly influence home health use post-discharge but do not directly affect the outcomes of interest. We used receipt of home health services 4 to 6 months and 7 to 12 months before the discharge as identifying variables. These variables were valid—that is, they were very weakly associated with outcomes—and strongly associated with home health use post-discharge.

In addition to using the instrumental variables approach (Equation 6), we controlled for a variety of characteristics in the regressions (Equation 7).

To ensure that results were not sensitive to the inclusion of outliers, we dropped both observations with negative 30-day post-discharge expenditures (n = 807) and those with extremely high values (n = 789). If we dropped a participant discharge, we dropped their matched comparison, and vice versa. In addition, two pairs of participants and their matched comparison discharges both had outlier values. Thus, a total of 3,188 discharges (0.30 percent) were excluded from the analysis.

Equation 6

We modeled the selection process as follows:

$$HH_{i,t} = \alpha_0 + \alpha_1 HH_{i,t-6} + \alpha_2 HH_{i,t-12} + \gamma X_i + \theta_0 T_i$$

Terms are defined as follows:

- $HH_{i,t}$ is a home health indicator equal to 1 for discharges that were followed by non-zero home health expenditures in a 30-day period after discharge, and equal to 0 otherwise.

- $HH_{i,t-6}$ and $HH_{i,t-12}$ are identifying variables that predict non-zero home health expenditures in months 4 to 6 and 7 to 12 after discharge.

- T_i is an indicator for treated (participating) discharges, equal to 1 for CCTP participants and 0 for matched comparisons.

- X_i is the vector of covariates used in cross-sectional regressions, including approximately 100 characteristics that may influence selection into home health or outcomes.

Equation 7

We modeled the influence of home health services as follows:

$$R_i = \beta_0 + \beta_1 \widehat{HH_{\iota,t}} + \beta_2 T_i + \beta_3 \widehat{HH_{\iota,t}} * T + \delta X_i$$

Terms are defined as follows:

- The dependent variable R_i is the outcome for discharge i.

- $\widehat{HH_{\iota,t}}$ is the estimate of the likelihood of receiving home health services post-discharge. This variable was estimated in Equation 6.

The key regression parameters are defined as follows:

- β_1 gives the association between receiving home health services and outcomes for matched comparison discharges.

- β_2 gives the association of the CCTP and outcomes for discharges that do not have home health expenditures.

- $\beta_2 + \beta_3$ gives the association of the CCTP and outcomes for discharges with home health expenditures.

- β_3 gives the incremental association of home health services and outcomes in addition to the association of the CCTP. This is the coefficient of interest.

The second regression (Equation 7) provides unbiased estimates of the association of interest but does not account for the fact that the receipt of home health services in the second regression is estimated. As a result, the regression generates inaccurate standard errors. In other words, the point estimate of interest (β_3) is unbiased, but the precision with which it is estimated is not. To remedy this, we bootstrapped standard errors, computing the sample variation across the estimates obtained from 600 random samples of the data used to estimate the same model.

A.4.4. Pooled Analysis of Service Provision for Participants

For participants' discharges, we also analyzed the association between types of encounters and services received through the CCTP and outcomes on:

1. 30-day readmissions.
2. 30-day inpatient acute care hospital/critical access hospital Medicare expenditures.
3. 30-day Part A and Part B Medicare FFS expenditures.

We estimated two models. The first model includes a variable denoting receipt of a bundle of encounters and services that includes a hospital visit, at least one home visit (within 3 days after discharge or after 3 days), at least one phone call (within or after 1 week of discharge), and medication review and reconciliation. We refer to this bundle as the care transition bundle (CTB).

We also estimated a second model that includes a set of hierarchical encounter variables in place of the CTB variable: home; hospital, no home; phone, no hospital or home; and other.

Equation 8

$$R_{i,m} = \vartheta_0 + \vartheta_1 D^m + \vartheta_3 W_i + \vartheta_4 X_h + \vartheta_5 E_h + \vartheta_6 Z_c + \varepsilon_{i,m}$$

In this model, the variables are defined the same way as in the cross-sectional analysis between participants and matched comparisons with a few exceptions. For example, the model is estimated only for participating discharges and therefore excludes the variable denoting participation. We list each term briefly:

- The dependent variable ($R_{i,m}$) is the outcome for discharge i during month m.
- D^m are indicator variables for each month (m).
- W_i is a vector of beneficiary/discharge characteristics.
- X_h is a vector of hospital characteristics.
- E_h is a combination of services received: In the first model, this is the CTB, defined above; in the second model, it is the set of hierarchical variables defined above, with *home* as the reference category.
- Z_c are indicators for each site.

When using the CTB variable, a negative coefficient would support that receipt of this bundle of encounters/services was correlated with improved outcomes. A positive coefficient on any of the included hierarchical variables in E_h would indicate that receipt of a home visit was correlated with a lower 30-day readmission rate or lower Medicare Part A and Part B expenditures than the encounters represented by that hierarchical variable (e.g., receiving a hospital visit but no home visit).

We considered including service variables as well as encounter variables in the second model. However, when examining the relationships between service variables and the encounter variables, we found that, in general, those who have a home visit also receive a transition plan (94 percent) and medication review and reconciliation (88 percent) (Table A.10). Thus, by including the home visit as a covariate, we also capture the effects of those two services on outcomes.

Table A.10. Relationship Between Hierarchical Encounter Variables and Service Variables

Encounter Type	Percentage of Participants With Encounter	Percentage of Those With Encounter That Also Received Transition Plan[a]	Percentage of Those With Encounter That Also Received Medication Review and Reconciliation[b]
Any home visit	70.01	94.22	87.81
Any hospital visit, with no home visit	22.66	82.91	31.33
Any phone call, with no in-person visit	2.76	83.23	25.12

[a] 89.08 percent of all discharges received a transition plan, regardless of whether they had an encounter.
[b] 71.39 percent of all discharges received medication review and reconciliation, regardless of whether they had an encounter.

Appendix B: Supplementary Results

Table B.1. Unadjusted Means for Participating and Matched Comparison Discharges in the Participant Cross-Sectional Analysis for All Months of Participation for All 101 Sites

	Treatment Discharges	Matched Comparison Discharges	Difference
30-day readmission rate, %	14.57	16.97	-2.40
30-day Medicare Part A and Part B expenditures, $	7,064.15	8,033.28	-969.13
Number of discharges (hospitals) in the sample	662,607 discharges (448 hospitals)	662,607 discharges[a] (1,042 hospitals)	

Note: Results based on discharges from hospitals associated with all 101 sites, estimated using the entire period of Community-based Care Transitions Program participation, which varies between 9 and 60 months of participation for each hospital and falls between February 2012 and January 2017.

[a] Because 5,569 comparison discharges were each matched to 2 different treatment discharges, the number of unique comparison discharges is 657,038. The matching algorithm attempts to find a suitable comparison within the same cluster as the treatment discharge, but when that was not possible (for approximately 5.5 percent of treatment discharges), it drew a comparison from outside the cluster.

Table B.2. **Unadjusted Means for Participating and Matched Comparison Discharges in the Participant Cross-Sectional Analysis for the First 33 Months of Participation for 44 Continuing Sites**

	Treatment Discharges	Matched Comparison Discharges	Difference
30-day readmission rate, %	14.50	17.49	-2.99
30-day acute care hospital/critical access hospital inpatient expenditures, $	1,810.57	2,196.71	-386.14
30-day Medicare Part A and Part B expenditures, $	7,143.83	8,141.94	-998.11
30-day inpatient psychiatric hospital expenditures, $	22.51	71.37	-48.86
30-day inpatient rehabilitation hospital expenditures, $	757.57	604.30	153.27
30-day long-term care hospital expenditures, $	230.08	610.89	-380.81
30-day carrier expenditures, $	856.22	922.32	-66.10
30-day skilled nursing facility expenditures, $	1,946.77	2,381.12	-434.35
30-day home health expenditures, $	925.59	658.62	266.97
30-day hospice expenditures, $	37.53	126.39	-88.86
30-day outpatient expenditures, $	387.98	407.39	-19.40
30-day emergency department expenditures, $	42.18	43.57	-1.39
30-day observation stay expenditures, $	39.69	39.95	-0.26
30-day durable medical equipment expenditures, $	87.13	79.31	7.81
Number of discharges (hospitals) in the sample	341,866 discharges (215 hospitals)[a]	341,866 discharges (632 hospitals)	

Note: Results based on discharges from hospitals associated with the 44 extended sites, estimated using the first 33 months of participation for each hospital, falling between February 2012 and July 2016.

[a] Participant cross-sectional regressions shown in this table included 216 partner hospitals, compared with 215 partner hospitals included in the difference-in-differences impact analyses. One partner hospital was excluded from the participant analysis because its List Bill records of participation could not be merged to claims data, despite employing several strategies to facilitate the merge.

Table B.3. Regression-Adjusted Means for Participating and Matched Comparison Discharges in the Participant Cross-Sectional Analysis for the First 33 Months of Participation for Each Provider for 44 Continuing Sites

	Treatment Discharges	Matched Comparison Discharges	Regression-Adjusted Mean Difference (Standard Error)
30-day readmission rate, %	14.50	16.65	-2.15** (0.16)
30-day acute care hospital (ACH)/critical access hospital (CAH) inpatient expenditures, $	1,810.57	2,101.67	-291.10** (34.47)
30-day Medicare Part A and Part B expenditures, $	7,143.83	7,823.70	-679.87** (130.13)
30-day inpatient psychiatric hospital expenditures, $	22.51	64.00	-41.49** (4.43)
30-day inpatient rehabilitation hospital expenditures, $	757.57	623.75	133.82* (61.48)
30-day long-term care hospital expenditures, $	230.08	496.43	-266.35** (47.23)
30-day carrier expenditures, $	856.22	888.34	-32.11** (10.31)
30-day skilled nursing facility expenditures, $	1,946.77	2,283.60	-336.83** (93.04)
30-day home health expenditures, $	925.59	704.58	221.01** (19.44)
30-day hospice expenditures, $	37.53	120.78	-83.24** (3.43)
30-day outpatient expenditures, $	387.98	386.61	1.37 (6.21)
30-day emergency department expenditures, $	42.18	40.82	1.36 (1.08)
30-day observation stay expenditures, $	39.69	39.87	-0.18 (2.10)
30-day durable medical equipment expenditures, $	87.13	73.25	13.88** (1.93)
Number of discharges (hospitals) in the sample	341,866 discharges (215 hospitals)[a]	341,866 discharges (632 hospitals)	

Notes: ^p<0.20, +p<0.10, *p<0.05, **p<0.01.

Results are based on discharges from hospitals associated with the 44 extended sites, estimated using the first 33 months of participation for each hospital, falling between February 2012 and July 2016. Covariates (Appendix A, Table A.7) include characteristics of the stay, such as modified diagnosis related groups; beneficiary characteristics, including basic demographics, prior outcomes (i.e., admissions, readmissions, Medicare fee-for-service expenditures), and Hierarchical Condition Category scores; and hospital characteristics such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions, all measured in the year before implementation.

[a] Participant cross-sectional regressions shown in this table included 215 partner hospitals, compared with 216 partner hospitals included in the difference-in-differences impact analyses. One partner hospital was excluded from

the participant analysis because its List Bill records of participation could not be merged to claims data, despite having employed several strategies to facilitate the merge.

Table B.4. Unadjusted Means for Participating and Matched Comparison Discharges in the Participant Cross-Sectional Analysis During the Entire Period of Participation for 44 Continuing Sites

	Treatment Discharges	Matched Comparison Discharges	Difference
30-day readmission rate, %	14.21	17.15	-2.94
30-day acute care hospital/critical access hospital inpatient expenditures, $	1,762.76	2,149.88	-387.12
30-day Medicare Part A and Part B expenditures, $	7,113.87	8,047.02	-933.14
30-day inpatient psychiatric hospital expenditures, $	20.86	72.47	-51.61
30-day inpatient rehabilitation hospital expenditures, $	749.05	618.93	130.12
30-day long-term care hospital expenditures, $	203.07	551.64	-348.58
30-day carrier expenditures, $	839.38	910.30	-70.92
30-day skilled nursing facility expenditures, $	2,044.03	2,397.33	-353.30
30-day home health expenditures, $	911.06	654.46	256.60
30-day hospice expenditures, $	37.12	125.72	-88.60
30-day outpatient expenditures, $	383.55	406.59	-23.04
30-day emergency department expenditures, $	41.65	43.35	-1.70
30-day observation stay expenditures, $	40.91	40.68	0.24
30-day durable medical equipment expenditures, $	80.44	75.67	4.77
Number of discharges (hospitals) in the sample	533,609 discharges (215 hospitals)[a]	533,609 discharges (632 hospitals)	

Note: Results based on discharges from hospitals associated with the 44 extended sites, estimated using the entire period of CCTP participation, which varies between 33 and 60 months of participation for each hospital and falls between February 2012 and January 2017.

[a] Participant cross-sectional regressions shown in this table included 215 partner hospitals, compared with 216 partner hospitals included in the difference-in-differences impact analyses. One partner hospital was excluded from the participant analysis because its List Bill records of participation could not be merged to claims data, despite employing several strategies to facilitate the merge.

Table B.5. Unadjusted Means Before and After Program Implementation (During the First 33 Months) for 44 Continuing Sites and Their Matched Comparison Hospitals in Difference-in-Differences Analyses

	Partner Hospitals			Matched Comparison Hospitals		
	Pre[a]	Post[b]	Difference	Pre[a]	Post[b]	Difference
30-day readmission rate, %	19.29	18.46	-0.83	19.16	18.34	-0.81
30-day acute care hospital/critical access hospital inpatient expenditures, $	2,271.48	2,158.49	-113.00	2,233.13	2,154.78	-78.35
30-day Medicare Part A and Part B expenditures, $	8,032.03	7,941.91	-90.13	7,974.04	7,969.93	-4.11
30-day inpatient psychiatric hospital expenditures, $	96.88	90.97	-5.91	112.38	109.73	-2.65
30-day inpatient rehabilitation hospital expenditures, $	619.34	653.05	33.72	566.49	606.22	39.73
30-day long-term care hospital expenditures, $	494.36	501.88	7.52	563.74	589.87	26.13
30-day carrier expenditures, $	938.47	917.64	-20.83	914.58	902.92	-11.66
30-day skilled nursing facility expenditures, $	2,286.42	2,291.67	5.25	2,297.92	2,317.28	19.36
30-day home health expenditures, $	633.63	632.32	-1.31	616.86	615.76	-1.11
30-day hospice expenditures, $	143.49	135.08	-8.41	133.85	128.37	-5.48
30-day outpatient expenditures, $	382.87	397.85	14.98	371.16	381.21	10.05
30-day emergency department expenditures, $	44.29	47.99	3.70	46.28	50.34	4.05
30-day observation stay expenditures, $	29.91	39.36	9.45	32.38	41.88	9.50
30-day durable medical equipment expenditures, $	90.38	75.13	-15.25	85.09	71.42	-13.67
Number of hospitals in the sample		216[c]			143	

[a] The preintervention period consists of the 12 months prior to each site's CCTP implementation date, the earliest of which is February 2012.

[b] The postintervention period consists of the 33 months of program participation for each site. The 33 months vary among sites and fall between February 2012 and July 2016.

[c] Difference-in-differences analyses presented in this table included 216 partner hospitals, compared to 215 hospitals in the cross-sectional participant analyses. One partner hospital was excluded from the participant analysis because its List Bill records of participation could not be merged to claims data, despite employing several strategies to facilitate the merge.

Table B.6. Average Per-Participant and Per-Site Net Differences in Expenditures to Medicare for 44 Continuing CCTP Sites With Lower Net Expenditures, Through January 31, 2017

Site ID	Number of Discharges[a]	Regression-Adjusted Difference in 30-Day Medicare Part A and Part B Expenditures With Per-Eligible Discharge Rate (PEDR)[b] (Standard Error)	Average Per Discharge Lower 30-Day Net Expenditures[c]	Total Lower 30-Day Net Expenditures[c]
Total	533,609	-572.14** (122.78)	$211.38	$112,795,168.00
001	10,816	-917.93+ (455.58)	$526.50	$5,694,659.00
003	13,868	-2,345.54** (192.21)	$1,935.63	$26,843,252.00
004	25,919	-1,322.36** (320.51)	$926.36	$24,010,236.00
007	14,624	-412.90^ (308.89)	$58.90	$861,380.75
010	9,959	-526.76** (191.83)	$206.76	$2,059,116.88
012	4,949	-3,655.20** (567.45)	$3,378.29	$16,719,161.00
014	13,607	-675.53** (174.08)	$251.39	$3,420,694.75
017	13,147	-1,828.52** (440.90)	$1,531.26	$20,131,424.00
025	6,374	-985.58* (451.92)	$561.86	$3,581,316.25
029	28,738	-1,565.62** (329.21)	$1,202.73	$34,564,008.00
033	3,412	-1,430.88* (633.31)	$1,044.32	$3,563,213.50
034	18,562	-2,523.12** (477.95)	$2,155.12	$40,003,408.00
035	6,963	-2,922.97** (713.13)	$2,613.39	$18,197,018.00
040	5,666	-3,815.62** (1,125.56)	$3,337.44	$18,909,952.00
052	6,963	-909.13** (209.95)	$766.13	$5,334,557.50
054	14,588	-815.61** (305.58)	$500.60	$7,302,685.50
056	2,841	-3,112.06** (300.21)	$2,723.30	$7,736,888.00
058	20,433	-379.90+ (203.52)	$23.90	$488,427.16

Site ID	Number of Discharges[a]	Regression-Adjusted Difference in 30-Day Medicare Part A and Part B Expenditures With Per-Eligible Discharge Rate (PEDR)[b] (Standard Error)	Average Per Discharge Lower 30-Day Net Expenditures[c]	Total Lower 30-Day Net Expenditures[c]
059	14,995	-1,093.43* (524.71)	$698.43	$10,473,004.00
060	5,340	-3,386.44** (352.38)	$2,981.44	$15,920,865.00
068	4,078	-927.82 (760.03)	$679.82	$2,772,298.25
071	12,829	-1,802.16** (491.18)	$1,372.16	$17,603,390.00
072	1,998	-1,198.03^ (732.78)	$931.03	$1,860,199.50
079	8,117	-806.98** (243.98)	$500.88	$4,065,673.75
083	6,460	-597.45^ (406.47)	$202.45	$1,307,825.88
085	17,118	-831.93** (73.35)	$549.23	$9,401,673.00
088	6,987	-1,910.92** (410.88)	$1,555.92	$10,871,232.00
090	4,111	-2,010.97** (419.68)	$1,592.97	$6,548,686.50
096	6,767	-509.10 (1,145.48)	$289.10	$1,956,354.38
097	8,290	-2,039.58** (401.66)	$1,676.58	$13,898,885.00

Notes: ^p<0.2, ⁺p<0.1, *p<0.05, **p<0.01.

[a] The number of discharges is the number of discharges in the analytic sample used to estimate differences in expenditures (as part of participant cross-sectional models). These are participant discharges in List Bill data that were successfully matched to claims data.

[b] Drawn from Table B.7.

[c] To calculate net differences in expenditures from the program overall and net differences in expenditures for each participating site, we first calculated the PEDR for each site (community-based organization) over all non-missing index discharges. Then, we calculated average net differences in expenditures per discharge by subtracting/adding the average PEDR from/to the decrease/increase in Medicare Part A and Part B expenditures for each site estimated in the participant cross-sectional models. We then calculated net differences in expenditures for each site by multiplying the average net differences in expenditures per discharge by the total number of discharges in the analytic sample (those discharges in List Bill data that were successfully merged to claims). To calculate total net differences in expenditures for the program, we multiplied the average PEDR among all discharges by the decrease/increase in Medicare Part A and Part B expenditures for the entire sample estimated in participant cross-sectional models.

Table B.7. Average Per-Participant and Per-Site Differences in Expenditures to Medicare for 44 Continuing CCTP Sites With Higher Net Expenditures, Through January 31, 2017

Site ID	Number of Discharges[a]	Regression-Adjusted Difference in 30-Day Medicare Part A and Part B Expenditures With Per-Eligible Discharge Rate (PEDR)[b] (Standard Error)	Average Per Discharge Higher 30-Day Net Expenditures[c]	Total Higher 30-Day Net Expenditures[c]
002	22,285	41.37 (310.91)	$450.48	$10,038,992.00
005	13,355	953.39** (305.07)	$1,318.49	$17,608,444.00
006	3,287	1,110.85** (405.02)	$1,577.85	$5,186,406.00
011	11,219	-72.56[d] (252.27)	$246.44	$2,764,849.50
026	3,209	1,791.17* (796.80)	$2,211.87	$7,097,904.50
030	19,558	753.35** (250.46)	$1,131.60	$22,131,930.00
032	16,935	155.97 (601.40)	$390.97	$6,621,140.00
041	8,188	1,525.42** (265.05)	$1,981.42	$16,223,903.00
042	8,844	337.24+ (176.72)	$647.24	$5,724,162.00
043	24,547	318.87 (397.96)	$760.17	$18,660,000.00
050	52,122	1,223.68** (314.51)	$1,570.76	$81,870,952.00
067	9,802	451.42 (570.29)	$755.42	$7,404,662.50
093	11,251	55.62 (274.12)	$452.62	$5,092,393.00
103	10,488	-361.97^ (256.77)	$57.28	$600,760.94

Notes: ^$p<0.2$, +$p<0.1$, *$p<0.05$, **$p<0.01$.

[a] The number of discharges is the number of discharges in the analytic sample used to estimate differences in expenditures (as part of participant cross-sectional models). These are participant discharges in List Bill data that were successfully matched to claims data.

[b] Drawn from Table B.7.

[c] To calculate net differences in expenditures from the program overall and net differences in expenditures for each participating site, we first calculated the average PEDR for each site (community-based organization) over all non-missing discharges. Then we calculated average net differences in expenditures per discharge by subtracting/adding the average PEDR from/to the decrease/increase in Medicare Part A and Part B expenditures for each site estimated in the participant cross-sectional models. We then calculated net differences in expenditures for each site by multiplying the average net differences in expenditures per discharge by the total number of discharges in the analytic sample (those discharges in List Bill data that were successfully merged to claims). To calculate total net differences in expenditures for the program, we multiplied the average PEDR among all discharges by the decrease/increase in Medicare Part A and Part B expenditures for the entire sample estimated in participant cross-sectional models.

[d] For site 11, the CCTP was associated with $73 lower expenditures among participating discharges versus comparison discharges. However, when PEDR is added, the net expenditures are $246 higher.

Table B.8. Regression-Adjusted Means for Participating and Matched Comparison Discharges in the Participant Cross-Sectional Analyses for All Months of Participation for 44 Continuing Sites, by Site

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
Pooled Sample				
30-day readmission rate, %	14.21	16.31	-2.10** (0.16)	-12.86
30-day acute care hospital (ACH)/critical access hospital (CAH) inpatient expenditures, $	1,762.76	2,033.24	-270.48** (34.06)	-13.30
30-day Medicare Part A and Part B expenditures, $	7,113.87	7,686.01	-572.14** (122.78)	-7.44
Site 1				
30-day readmission rate, %	13.05	14.24	-1.18+ (0.69)	-8.30
30-day ACH/CAH inpatient expenditures, $	1,472.99	1,651.91	-178.92 (163.55)	-10.83
30-day Medicare Part A and Part B expenditures, $	6,668.67	7,586.59	-917.93+ (455.58)	-12.10
Site 2				
30-day readmission rate, %	14.27	15.54	-1.27* (0.55)	-8.16
30-day ACH/CAH inpatient expenditures, $	1,707.09	1,887.59	-180.50+ (101.74)	-9.56
30-day Medicare Part A and Part B expenditures, $	7,978.64	7,937.27	41.37 (310.91)	0.52
Site 3				
30-day readmission rate, %	15.42	17.33	-1.91* (0.87)	-11.03
30-day ACH/CAH inpatient expenditures, $	1,721.19	2,083.20	-362.01* (146.90)	-17.38
30-day Medicare Part A and Part B expenditures, $	4,637.31	6,982.85	-2,345.54** (192.21)	-33.59
Site 4				
30-day readmission rate, %	11.69	15.21	-3.51** (0.60)	-23.10
30-day ACH/CAH inpatient expenditures, $	1,208.60	1,603.68	-395.07** (95.63)	-24.64
30-day Medicare Part A and Part B expenditures, $	5,704.71	7,027.07	-1,322.36** (320.51)	-18.82
Site 5				
30-day readmission rate, %	17.90	17.87	0.04 (0.74)	0.20
30-day ACH/CAH inpatient expenditures, $	2,063.68	1,968.79	94.89 (121.36)	4.82
30-day Medicare Part A and Part B expenditures, $	9,754.84	8,801.45	953.39** (305.07)	10.83

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
Site 6				
30-day readmission rate, %	13.05	14.24	1.39 (1.07)	7.70
30-day ACH/CAH inpatient expenditures, $	2,533.91	2,243.75	290.16^ (196.79)	12.93
30-day Medicare Part A and Part B expenditures, $	9,922.26	8,811.40	1,110.85** (405.02)	12.61
Site 7				
30-day readmission rate, %	12.36	14.91	-2.55** (0.49)	-17.08
30-day ACH/CAH inpatient expenditures, $	1,306.93	1,737.92	-430.99** (97.60)	-24.80
30-day Medicare Part A and Part B expenditures, $	6,685.76	7,098.66	-412.90^ (308.89)	-5.82
Site 10				
30-day readmission rate, %	13.05	14.24	-0.04 (0.83)	-0.30
30-day ACH/CAH inpatient expenditures, $	1,281.22	1,183.86	97.35 (124.64)	8.22
30-day Medicare Part A and Part B expenditures, $	5,309.90	5,836.66	-526.76** (191.83)	-9.03
Site 11				
30-day readmission rate, %	17.00	18.07	-1.08 (1.13)	-5.95
30-day ACH/CAH inpatient expenditures, $	1,762.15	1,837.47	-75.32 (253.08)	-4.10
30-day Medicare Part A and Part B expenditures, $	8,354.17	8,426.73	-72.56 (252.27)	-0.86
Site 12				
30-day readmission rate, %	16.33	23.61	-7.28** (2.17)	-30.85
30-day ACH/CAH inpatient expenditures, $	3,061.19	3,627.19	-566.00 (467.24)	-15.60
30-day Medicare Part A and Part B expenditures, $	5,865.68	9,520.88	-3,655.20** (567.45)	-38.39
Site 14				
30-day readmission rate, %	15.12	17.79	-2.68** (0.65)	-15.04
30-day ACH/CAH inpatient expenditures, $	1,505.76	1,830.17	-324.41** (105.02)	-17.73
30-day Medicare Part A and Part B expenditures, $	5,781.58	6,457.12	-675.53** (174.08)	-10.46
Site 17				
30-day readmission rate, %	14.98	20.97	-5.99** (1.06)	-28.59

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
30-day ACH/CAH inpatient Expenditures, $	1,833.39	2,403.26	-569.87* (222.62)	-23.71
30-day Medicare Part A and Part B expenditures, $	5,707.78	7,536.30	-1,828.52** (440.90)	-24.26
Site 25				
30-day readmission rate, %	19.14	18.78	0.36 (1.01)	1.89
30-day ACH/CAH inpatient expenditures, $	2,085.94	2,498.71	-412.77** (153.83)	-16.52
30-day Medicare Part A and Part B expenditures, $	7,233.27	8,218.85	-985.58* (451.92)	-11.99
Site 26				
30-day readmission rate, %	16.02	16.65	-0.63 (1.47)	-3.77
30-day ACH/CAH inpatient expenditures, $	1,806.50	1,552.83	253.67 (222.66)	16.34
30-day Medicare Part A and Part B expenditures, $	10,209.55	8,418.38	1,791.17* (796.80)	21.28
Site 29				
30-day readmission rate, %	15.53	17.80	-2.27** (0.49)	-12.75
30-day ACH/CAH inpatient expenditures, $	1,596.00	2,169.97	-573.97** (70.71)	-26.45
30-day Medicare Part A and Part B expenditures, $	6,997.25	8,562.86	-1,565.62** (329.21)	-18.28
Site 30				
30-day readmission rate, %	13.78	17.52	-3.74** (0.60)	-21.35
30-day ACH/CAH inpatient expenditures, $	1,996.41	2,218.28	-221.87* (110.37)	-10.00
30-day Medicare Part A and Part B expenditures, $	8,568.96	7,815.61	753.35** (250.46)	9.64
Site 32				
30-day readmission rate, %	15.02	18.67	-3.66** (1.23)	-19.59
30-day ACH/CAH inpatient expenditures, $	1,741.86	2,994.91	-1,253.04** (378.70)	-41.84
30-day Medicare Part A and Part B expenditures, $	9,214.52	9,058.55	155.97 (601.40)	1.72
Site 33				
30-day readmission rate, %	14.92	15.39	-0.47 (1.47)	-3.06
30-day ACH/CAH inpatient expenditures, $	1,997.18	2,208.84	-211.65 (252.82)	-9.58

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
30-day Medicare Part A and Part B expenditures, $	4,287.64	5,718.52	-1,430.88* (633.31)	-25.02
Site 34				
30-day readmission rate, %	14.21	17.11	-2.90* (1.23)	-16.95
30-day ACH/CAH inpatient expenditures, $	1,485.12	1,794.84	-309.71 (243.27)	-17.26
30-day Medicare Part A and Part B expenditures, $	4,662.23	7,185.36	-2,523.12** (477.95)	-35.11
Site 35				
30-day readmission rate, %	14.20	17.94	-3.73* (1.62)	-20.82
30-day ACH/CAH inpatient expenditures, $	1,650.13	2,151.28	-501.15^ (377.21)	-23.30
30-day Medicare Part A and Part B expenditures, $	5,347.66	8,270.63	-2,922.97** (713.13)	-35.34
Site 40				
30-day readmission rate, %	15.50	17.41	-1.91^ (1.19)	-10.99
30-day ACH/CAH inpatient expenditures, $	2,483.24	2,715.32	-232.08 (309.72)	-8.55
30-day Medicare Part A and Part B expenditures, $	10,580.32	14,395.94	-3,815.62** (1,125.56)	-26.50
Site 41				
30-day readmission rate, %	13.35	16.32	-2.97** (0.96)	-18.19
30-day ACH/CAH inpatient expenditures, $	1,680.43	1,788.55	-108.12 (119.80)	-6.04
30-day Medicare Part A and Part B expenditures, $	8,971.80	7,446.37	1,525.42** (265.05)	20.49
Site 42				
30-day readmission rate, %	15.32	16.49	-1.17* (0.56)	-7.08
30-day ACH/CAH inpatient expenditures, $	1,765.32	1,838.31	-72.99 (74.18)	-3.97
30-day Medicare Part A and Part B expenditures, $	7,333.27	6,996.03	337.24[+] (176.72)	4.82
Site 43				
30-day readmission rate, %	18.03	17.28	0.75 (0.64)	4.36
30-day ACH/CAH inpatient expenditures, $	3,851.65	3,810.06	41.58 (173.30)	1.09
30-day Medicare Part A and Part B expenditures, $	10,664.30	10,345.43	318.87 (397.96)	3.08

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
Site 50				
30-day readmission rate, %	12.83	13.36	-0.52 (0.56)	-3.91
30-day ACH/CAH inpatient expenditures, $	1,933.22	2,147.42	-214.19[+] (108.86)	-9.97
30-day Medicare Part A and Part B expenditures, $	8,534.56	7,310.88	1,223.68** (314.51)	16.74
Site 52				
30-day readmission rate, %	15.98	15.29	0.70 (1.20)	4.56
30-day ACH/CAH inpatient expenditures, $	1,656.29	1,619.20	37.09 (136.13)	2.29
30-day Medicare Part A and Part B expenditures, $	6,173.64	7,082.77	-909.13** (209.95)	-12.84
Site 54				
30-day readmission rate, %	12.11	14.24	-2.14** (0.62)	-15.01
30-day ACH/CAH inpatient expenditures, $	1,138.97	1,477.18	-338.21** (112.19)	-22.90
30-day Medicare Part A and Part B expenditures, $	4,986.19	5,801.80	-815.61** (305.58)	-14.06
Site 56				
30-day readmission rate, %	11.26	18.45	-7.19** (2.38)	-38.97
30-day ACH/CAH inpatient expenditures, $	962.50	1,966.06	-1,003.56** (277.53)	-51.04
30-day Medicare Part A and Part B expenditures, $	3,776.70	6,888.76	-3,112.06** (300.21)	-45.18
Site 58				
30-day readmission rate, %	13.49	16.22	-2.74** (0.44)	-16.86
30-day ACH/CAH inpatient expenditures, $	1,355.08	1,659.06	-303.98** (77.49)	-18.32
30-day Medicare Part A and Part B expenditures, $	6,398.30	6,778.20	-379.90[+] (203.52)	-5.60
Site 59				
30-day readmission rate, %	12.69	15.37	-2.68** (0.67)	-17.43
30-day ACH/CAH inpatient expenditures, $	989.95	1,017.33	-27.39 (163.21)	-2.69
30-day Medicare Part A and Part B expenditures, $	5,747.58	6,841.01	-1,093.43* (524.71)	-15.98
Site 60				
30-day readmission rate, %	14.27	15.29	-1.02 (1.04)	-6.65

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
30-day ACH/CAH inpatient expenditures, $	2,085.04	2,599.61	-514.57* (233.02)	-19.79
30-day Medicare Part A and Part B expenditures, $	6,907.42	10,293.85	-3,386.44** (352.38)	-32.90
Site 67				
30-day readmission rate, %	16.61	17.77	-1.16^ (0.72)	-6.52
30-day ACH/CAH inpatient expenditures, $	1,832.77	2,091.66	-258.89^ (163.39)	-12.38
30-day Medicare Part A and Part B expenditures, $	9,438.69	8,987.26	451.42 (570.29)	5.02
Site 68				
30-day readmission rate, %	11.48	10.71	0.77 (1.65)	7.19
30-day ACH/CAH inpatient expenditures, $	1,354.55	1,235.46	119.08 (174.01)	9.64
30-day Medicare Part A and Part B expenditures, $	7,201.15	8,128.96	-927.82 (760.03)	-11.41
Site 71				
30-day readmission rate, %	15.13	16.88	-1.75** (0.63)	-10.36
30-day ACH/CAH inpatient expenditures, $	3,256.93	3,107.05	149.87^ (106.35)	4.82
30-day Medicare Part A and Part B expenditures, $	7,937.74	9,739.90	-1,802.16** (491.18)	-18.50
Site 72				
30-day readmission rate, %	8.56	10.34	-1.78 (2.03)	-17.20
30-day ACH/CAH inpatient expenditures, $	868.76	992.92	-124.16 (390.87)	-12.50
30-day Medicare Part A and Part B expenditures, $	2,684.15	3,882.18	-1,198.03^ (732.78)	-30.86
Site 79				
30-day readmission rate, %	14.76	14.72	0.03 (0.77)	0.24
30-day ACH/CAH inpatient expenditures, $	1,544.48	1,595.37	-50.89 (127.26)	-3.19
30-day Medicare Part A and Part B expenditures, $	5,270.72	6,077.70	-806.98** (243.98)	-13.28
Site 83				
30-day readmission rate, %	18.53	17.69	0.84 (2.13)	4.76
30-day ACH/CAH inpatient expenditures, $	1,625.90	1,698.90	-72.99 (253.71)	-4.30

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
30-day Medicare Part A and Part B expenditures, $	4,837.67	5,435.12	-597.45^ (406.47)	-10.99
Site 85				
30-day readmission rate, %	9.84	12.16	-2.32** (0.72)	-19.07
30-day ACH/CAH inpatient expenditures, $	850.38	1,034.18	-183.81* (76.12)	-17.77
30-day Medicare Part A and Part B expenditures, $	4,507.87	5,339.80	-831.93** (73.35)	-15.58
Site 88				
30-day readmission rate, %	13.32	16.32	-3.00** (1.03)	-18.36
30-day ACH/CAH inpatient expenditures, $	1,421.24	1,982.38	-561.15** (124.44)	-28.31
30-day Medicare Part A and Part B expenditures, $	5,677.35	7,588.28	-1,910.92** (410.88)	-25.18
Site 90				
30-day readmission rate, %	13.89	15.10	-1.21 (1.04)	-7.99
30-day ACH/CAH inpatient expenditures, $	2,011.93	2,339.86	-327.93+ (183.93)	-14.01
30-day Medicare Part A and Part B expenditures, $	9,000.31	11,011.28	-2,010.97** (419.68)	-18.26
Site 93				
30-day readmission rate, %	15.82	17.80	-1.98** (0.57)	-11.14
30-day ACH/CAH inpatient expenditures, $	2,190.46	2,391.77	-201.31* (81.63)	-8.42
30-day Medicare Part A and Part B expenditures, $	10,211.27	10,155.65	55.62 (274.12)	0.55
Site 96				
30-day readmission rate, %	14.30	19.28	-4.97* (2.45)	-25.79
30-day ACH/CAH inpatient expenditures, $	1,467.18	2,365.37	-898.18^ (560.93)	-37.97
30-day Medicare Part A and Part B expenditures, $	7,885.87	8,394.98	-509.10 (1,145.48)	-6.06
Site 97				
30-day readmission rate, %	8.05	11.32	-3.27* (1.43)	-28.92
30-day ACH/CAH inpatient expenditures, $	808.58	904.25	-95.67 (177.74)	-10.58
30-day Medicare Part A and Part B expenditures, $	3,577.81	5,617.39	-2,039.58** (401.66)	-36.31

	Participant Mean	Matched Comparison Mean	Difference (Standard Error)	% Difference[a]
Site 103				
30-day readmission rate, %	11.89	15.39	-3.50** (0.68)	-22.73
30-day ACH/CAH inpatient expenditures, $	1,661.18	1,963.26	-302.08* (130.07)	-15.39
30-day Medicare Part A and Part B expenditures, $	5,903.31	6,265.28	-361.97^ (256.77)	-5.78

Notes: ^$p<0.2$, †$p<0.1$, *$p<0.05$, **$p<0.01$. Covariates (Final Evaluation Report, Appendix A, Table A.8) include characteristics of the stay, such as modified diagnosis-related group; beneficiary characteristics, including basic demographics, prior outcomes (e.g., admissions, readmissions, expenditures, and Medicare fee-for-service expenditures), and Hierarchical Condition Category scores; and hospital characteristics, such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions, all measured in the year before implementation.

[a] The percent change for the participant cross-sectional analysis is calculated as 100 × (regression-adjusted mean difference from comparison) / (regression-adjusted comparison mean).

Table B.9. Regression-Adjusted Means Before and During the Program for Participating and Matched Comparison Hospitals in Difference-in-Differences (DiD) Analyses for 44 Continuing Sites, by Site

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
Site 1							
30-day readmission rate, %	17.95	15.84	-2.11	17.23	14.28	-2.95	0.84* (0.33)
30-day acute care hospital (ACH)/critical access hospital (CAH) inpatient expenditures, $	2,289.95	1,808.03	-481.92	2,549.79	1,889.92	-659.87	177.95** (61.55)
30-day Medicare Part A and Part B expenditures, $	8,489.09	7,309.69	-1,179.40	9,932.46	8,647.13	-1,285.33	105.92 (174.96)
Number of discharges (hospitals) in the sample	16,496 (5)	61,542 (5)		38,843 (20)	148,033 (20)		
Site 2							
30-day readmission rate, %	24.48	18.83	-5.65	21.99	17.83	-4.16	-1.49** (0.38)
30-day ACH/CAH inpatient expenditures, $	3,204.23	2,218.14	-986.09	2,897.42	2,116.06	-781.35	-204.74** (57.75)
30-day Medicare Part A and Part B expenditures, $	11,851.17	7,780.70	-4,070.47	11,122.36	7,033.44	-4,088.93	18.46 (107.56)
Number of discharges (hospitals) in the sample	34,089 (9)	153,416 (9)		166,148 (40)	760,357 (40)		
Site 3							
30-day readmission rate, %	20.85	18.64	-2.22	20.20	17.67	-2.53	0.31 (0.42)
30-day ACH/CAH inpatient expenditures, $	2,591.99	2,094.99	-497.00	3,689.25	3,058.12	-631.13	134.13* (59.11)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	8,265.00	7,269.77	-995.23	7,951.46	6,637.44	-1,314.03	318.80* (148.57)
Number of discharges (hospitals) in the sample	40,656 (6)	151,675 (6)		101,244 (27)	387,506 (27)		
Site 4							
30-day readmission rate, %	23.86	17.82	-6.03	22.71	16.77	-5.94	-0.09 (0.37)
30-day ACH/CAH inpatient expenditures, $	2,512.72	1,860.60	-652.12	2,892.34	2,203.83	-688.51	36.39 (82.29)
30-day Medicare Part A and Part B expenditures, $	11,621.88	7,484.81	-4,137.06	10,688.54	6,698.56	-3,989.98	-147.08 (169.64)
Number of discharges (hospitals) in the sample	36,228 (11)	149,931 (11)		173,870 (39)	753,524 (39)		
Site 5							
30-day readmission rate, %	20.62	18.69	-1.93	21.39	18.90	-2.49	0.56^ (0.40)
30-day ACH/CAH inpatient expenditures, $	2,367.27	2,160.84	-206.43	2,172.71	1,918.20	-254.52	48.09 (62.39)
30-day Medicare Part A and Part B expenditures, $	9,977.73	8,681.31	-1,296.43	7,171.33	5,690.76	-1,480.57	184.14 (259.33)
Number of discharges (hospitals) in the sample	19,250 (6)	62,659 (6)		101,00 (28)	326,10 (28)		
Site 6							
30-day readmission rate, %	23.27	22.26	-1.01	23.24	22.17	-1.07	0.06 (0.34)
30-day ACH/CAH inpatient expenditures, $	4,103.51	3,180.09	-923.42	3,999.61	3,133.87	-865.74	-57.68 (97.42)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	11,612.22	9,642.43	-1,969.80	10,895.79	8,934.86	-1,960.93	-8.86 (126.15)
Number of discharges (hospitals) in the sample	20,607 (3)	62,203 (3)		65,427 (13)	202,410 (13)		
Site 7							
30-day readmission rate, %	20.62	16.51	-4.11	16.48	12.40	-4.08	-0.03 (0.66)
30-day ACH/CAH inpatient expenditures, $	2,519.45	1,776.90	-742.55	2,686.14	2,052.20	-633.94	-108.61 (84.12)
30-day Medicare Part A and Part B expenditures, $	10,516.76	7,322.73	-3,194.03	11,753.33	8,484.37	-3,268.96	74.93 (268.37)
Number of discharges (hospitals) in the sample	12,208 (4)	61,333 (4)		54,132 (16)	244,605 (16)		
Site 10							
30-day readmission rate, %	21.20	18.45	-2.75	21.75	18.58	-3.16	0.41 (0.50)
30-day ACH/CAH inpatient expenditures, $	2,126.43	1,708.83	-417.60	3,136.59	2,616.89	-519.70	102.10^ (65.61)
30-day Medicare Part A and Part B expenditures, $	9,934.48	7,264.86	-2,669.62	10,114.12	7,082.25	-3,031.87	362.25+ (187.89)
Number of discharges (hospitals) in the sample	10,845 (6)	40,893 (6)		46,838 (23)	189,348 (23)		
Site 11							
30-day readmission rate, %	18.54	18.79	0.25	18.34	17.07	-1.28	1.52* (0.70)
30-day ACH/CAH inpatient expenditures, $	1,825.61	1,997.24	171.63	2,681.71	2,698.24	16.53	155.10* (72.21)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	**Post**	**Difference**	**Pre**	**Post**	**Difference**	
30-day Medicare Part A and Part B expenditures, $	8,447.78	8,315.24	-132.54	9,953.11	9,647.91	-305.20	172.66 (178.37)
Number of discharges (hospitals) in the sample	15,567 (4)	47,779 (4)		40,384 (15)	123,788 (15)		
Site 12							
30-day readmission rate, %	25.03	23.87	-1.16	25.00	24.61	0.39	-0.77* (0.31)
30-day ACH/CAH inpatient expenditures, $	4,757.61	5,035.48	277.86	3,276.86	3,400.46	123.60	154.26 (135.31)
30-day Medicare Part A and Part B expenditures, $	11,694.76	11,786.30	91.54	9,574.79	9,388.41	-186.38	277.92^ (167.90)
Number of discharges (hospitals) in the sample	8,976 (2)	28,826 (2)		47,655 (12)	142,190 (12)		
Site 14							
30-day readmission rate, %	23.15	19.29	-3.85	26.07	23.41	-2.66	-1.19+ (0.60)
30-day ACH/CAH inpatient expenditures, $	2,542.06	1,993.32	-548.74	3,405.21	2,965.99	-439.22	-109.51^ (80.90)
30-day Medicare Part A and Part B expenditures, $	10,378.54	7,215.44	-3,163.11	10,336.50	7,213.81	-3,122.69	-40.42 (194.96)
Number of discharges (hospitals) in the sample	17,989 (5)	76,119 (5)		71,139 (17)	296,854 (17)		
Site 17							
30-day readmission rate, %	20.40	19.37	-1.03	20.88	20.02	-0.86	-0.18 (0.51)
30-day ACH/CAH inpatient expenditures, $	2,459.26	2,317.16	-142.09	1,539.41	1,430.86	-108.55	-33.54 (77.16)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	6,910.18	6,095.28	-814.90	6,614.37	5,414.71	-1,199.66	384.76** (90.77)
Number of discharges (hospitals) in the sample	19,038 (5)	71,837 (5)		213,088 (51)	806,985 (51)		
Site 25							
30-day readmission rate, %	25.06	21.99	-3.07	21.72	18.98	-2.74	-0.33 (0.33)
30-day ACH/CAH inpatient expenditures, $	3,007.53	2,491.80	-515.72	2,788.74	2,219.17	-569.58	53.85 (93.82)
30-day Medicare Part A and Part B expenditures, $	9,059.51	8,078.24	-981.27	9,358.75	8,283.82	-1,074.93	93.66 (141.95)
Number of discharges (hospitals) in the sample	34,420 (3)	93,062 (3)		164,096 (40)	434,135 (40)		
Site 26							
30-day readmission rate, %	15.61	14.73	-0.88	14.28	12.55	-1.73	0.85* (0.31)
30-day ACH/CAH inpatient expenditures, $	1,455.69	1,642.97	187.29	1,675.04	1,711.94	36.90	150.38+ (82.02)
30-day Medicare Part A and Part B expenditures, $	7,980.36	7,528.15	-452.21	6,568.01	6,371.03	-196.99	-255.22* (111.20)
Number of discharges (hospitals) in the sample	6,403 (2)	17,731 (2)		26,540 (11)	68,087 (11)		
Site 29							
30-day readmission rate, %	27.85	21.99	-5.86	26.27	19.71	-6.56	0.69 (0.53)
30-day ACH/CAH inpatient expenditures, $	3,245.31	2,361.82	-883.49	3,247.94	2,235.04	-1,012.90	129.41 (100.35)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	**Post**	**Difference**	**Pre**	**Post**	**Difference**	
30-day Medicare Part A and Part B expenditures, $	12,605.87	8,326.57	-4,279.30	13,227.26	8,895.31	-4,331.95	52.65 (179.02)
Number of discharges (hospitals) in the sample	32,760 (6)	135,618 (6)		93,831 (21)	394,270 (21)		
Site 30							
30-day readmission rate, %	25.19	19.89	-5.30	25.04	19.85	-5.19	-0.11 (0.69)
30-day ACH/CAH inpatient expenditures, $	3,728.64	2,848.15	-880.49	3,190.03	2,329.06	-860.97	-19.51 (98.69)
30-day Medicare Part A and Part B expenditures, $	13,989.38	9,751.93	-4,237.46	11,689.75	7,302.20	-4,387.55	150.09 (155.64)
Number of discharges (hospitals) in the sample	25,992 (7)	105,273 (7)		104,801 (25)	453,786 (25)		
Site 32							
30-day readmission rate, %	21.33	19.26	-2.07	22.84	20.85	-1.99	-0.08 (0.65)
30-day ACH/CAH inpatient expenditures, $	2,960.56	2,272.70	-687.86	3,054.17	2,607.08	-447.09	-240.77** (79.08)
30-day Medicare Part A and Part B expenditures, $	11,642.39	9,063.99	-2,578.39	12,100.52	10,037.15	-2,063.38	-515.02** (158.04)
Number of discharges (hospitals) in the sample	31,174 (8)	94,150 (8)		106,310 (31)	341,746 (31)		
Site 33							
30-day readmission rate, %	18.73	19.03	0.29	25.81	26.03	0.22	0.07 (0.37)
30-day ACH/CAH inpatient expenditures, $	2,774.32	2,463.77	-310.56	4,187.77	3,891.22	-296.55	-14.01 (93.38)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	7,974.67	7,211.35	-763.32	12,473.60	11,804.26	-669.34	-93.98 (121.20)
Number of discharges (hospitals) in the sample	26,155 (7)	66,618 (7)		66,611 (25)	165,302 (25)		
Site 34							
30-day readmission rate, %	26.42	21.86	-4.56	20.98	17.27	-3.71	-0.85 (1.08)
30-day ACH/CAH inpatient expenditures, $	3,230.89	2,410.45	-820.45	3,151.18	2,399.67	-751.51	-68.94 (92.47)
30-day Medicare Part A and Part B expenditures, $	10,917.26	8,423.61	-2,493.66	12,252.95	9,820.25	-2,432.70	-60.96 (112.32)
Number of discharges (hospitals) in the sample	24,063 (4)	76,863 (4)		64,365 (15)	250,194 (15)		
Site 35							
30-day readmission rate, %	22.10	22.03	-0.07	20.41	18.84	-1.57	1.50+ (0.70)
30-day ACH/CAH inpatient expenditures, $	2,440.01	2,818.16	378.15	2,187.63	2,272.89	85.26	292.88** (90.26)
30-day Medicare Part A and Part B expenditures, $	8,060.56	8,232.61	172.06	7,020.98	6,944.08	-76.89	248.95^ (169.36)
Number of discharges (hospitals) in the sample	21,561 (2)	77,204 (2)		40,076 (12)	121,844 (12)		
Site 40							
30-day readmission rate, %	22.52	19.95	-2.57	17.33	15.82	-1.50	-1.07* (0.48)
30-day ACH/CAH inpatient expenditures, $	4,448.93	3,774.73	-674.20	3,678.67	3,384.94	-293.73	-380.47** (111.51)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	11,600.89	10,892.76	-708.13	11,378.66	10,976.49	-402.17	-305.96 (261.51)
Number of discharges (hospitals) in the sample	28,461 (4)	76,221 (4)		42,439 (15)	102,970 (15)		
Site 41							
30-day readmission rate, %	20.14	18.83	-1.31	21.20	19.69	-1.51	0.21 (0.42)
30-day ACH/CAH inpatient expenditures, $	3,012.63	2,297.07	-715.56	3,112.35	2,479.58	-632.77	-82.79 (128.80)
30-day Medicare Part A and Part B expenditures, $	13,202.42	9,034.97	-4,167.45	12,535.69	8,547.87	-3,987.82	-179.63 (229.36)
Number of discharges (hospitals) in the sample	7,996 (2)	26,099 (2)		34,053 (12)	124,847 (12)		
Site 42							
30-day readmission rate, %	23.00	19.36	-3.63	24.83	20.77	-4.07	0.43 (0.70)
30-day ACH/CAH inpatient expenditures, $	2,981.86	2,377.61	-604.25	4,225.11	3,512.56	-712.54	108.30 (104.17)
30-day Medicare Part A and Part B expenditures, $	13,326.44	9,699.50	-3,626.94	11,743.19	7,972.73	-3,770.46	143.52 (219.66)
Number of discharges (hospitals) in the sample	14,106 (5)	48,771 (5)		82,338 (27)	332,880 (27)		
Site 43							
30-day readmission rate, %	20.48	20.83	0.35	21.99	21.64	-0.35	0.70* (0.24)
30-day ACH/CAH inpatient expenditures, $	3,883.37	4,091.28	207.90	4,106.51	4,100.78	-5.73	213.64[+] (115.33)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	10,346.73	10,430.18	83.44	10,087.37	10,024.30	-63.07	146.51 (129.09)
Number of discharges (hospitals) in the sample	37,015 (3)	124,988 (3)		61,753 (9)	225,739 (9)		
Site 50							
30-day readmission rate, %	22.68	17.31	-5.37	27.58	22.23	-5.34	-0.03 (0.39)
30-day ACH/CAH inpatient expenditures, $	3,701.69	2,680.62	-1,021.07	4,402.39	3,368.35	-1,034.04	12.96 (64.70)
30-day Medicare Part A and Part B expenditures, $	13,002.55	9,386.67	-3,615.88	11,329.24	7,622.72	-3,706.52	90.64 (93.77)
Number of discharges (hospitals) in the sample	43,856 (11)	169,815 (11)		141,977 (53)	543,419 (53)		
Site 52							
30-day readmission rate, %	20.27	19.95	-0.32	21.98	20.75	-1.23	0.91** (0.29)
30-day ACH/CAH inpatient expenditures, $	2,039.68	2,097.42	57.74	2,036.53	2,032.90	-3.64	61.38 (90.01)
30-day Medicare Part A and Part B expenditures, $	7,115.19	6,969.91	-145.29	7,110.11	6,876.81	-233.30	88.02 (207.86)
Number of discharges (hospitals) in the sample	11,074 (3)	30,437 (3)		43,459 (12)	125,169 (12)		
Site 54							
30-day readmission rate, %	22.80	16.53	-6.27	23.65	17.69	-5.95	-0.32 (0.38)
30-day ACH/CAH inpatient expenditures, $	2,363.94	1,645.95	-717.98	2,461.37	1,859.14	-602.23	-115.75** (41.28)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	10,009.46	6,820.48	-3,188.98	10,666.91	7,643.89	-3,023.02	-165.96[+] (88.47)
Number of discharges (hospitals) in the sample	22,413 (10)	83,570 (10)		90,832 (47)	327,703 (47)		
Site 56							
30-day readmission rate, %	18.30	17.36	-0.93	19.44	18.42	-1.02	0.08 (0.58)
30-day ACH/CAH inpatient expenditures, $	1,807.66	1,783.15	-24.51	1,679.66	1,609.01	-70.65	46.14 (51.28)
30-day Medicare Part A and Part B expenditures, $	7,427.11	7,307.51	-119.60	7,718.92	7,358.62	-360.30	240.70* (100.99)
Number of discharges (hospitals) in the sample	7,880 (3)	23,366 (3)		27,379 (10)	73,993 (10)		
Site 58							
30-day readmission rate, %	19.33	17.06	-2.27	12.41	10.45	-1.96	-0.31 (0.37)
30-day ACH/CAH inpatient expenditures, $	2,055.29	1,765.90	-289.39	1,241.15	1,001.26	-239.89	-49.50 (65.30)
30-day Medicare Part A and Part B expenditures, $	7,513.58	6,918.21	-595.37	6,791.88	6,228.50	-563.38	-31.99 (105.69)
Number of discharges (hospitals) in the sample	30,967 (10)	85,637 (10)		126,806 (49)	356,378 (49)		
Site 59							
30-day readmission rate, %	19.64	16.79	-2.85	22.40	18.91	-3.48	0.64^ (0.44)
30-day ACH/CAH inpatient expenditures, $	1,725.39	1,370.56	-354.84	1,876.25	1,504.89	-371.35	16.52 (52.38)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	8,442.45	6,110.20	-2,332.25	7,336.93	4,959.60	-2,377.33	45.08 (124.98)
Number of discharges (hospitals) in the sample	17,575 (8)	63,865 (8)		25,657 (22)	90,987 (22)		
Site 60							
30-day readmission rate, %	20.86	19.70	-1.15	21.17	20.52	-0.64	-0.51[+] (0.26)
30-day ACH/CAH inpatient expenditures, $	3,375.54	2,955.08	-420.46	3,551.92	3,461.78	-90.14	-330.32** (71.12)
30-day Medicare Part A and Part B expenditures, $	11,958.05	10,767.41	-1,190.65	10,648.61	9,698.19	-950.42	-240.23 (262.29)
Number of discharges (hospitals) in the sample	10,448 (3)	26,862 (3)		51,762 (18)	136,013 (18)		
Site 67							
30-day readmission rate, %	22.09	22.87	0.78	20.80	20.67	-0.13	0.90 (0.89)
30-day ACH/CAH inpatient expenditures, $	2,878.58	2,372.81	-505.77	2,098.26	1,616.31	-481.94	-23.83 (67.28)
30-day Medicare Part A and Part B expenditures, $	10,954.29	9,558.34	-1,395.96	9,890.00	8,575.35	-1,314.65	-81.31 (179.96)
Number of discharges (hospitals) in the sample	18,201 (4)	51,300 (4)		48,481 (19)	139,569 (19)		
Site 68							
30-day readmission rate, %	15.94	14.52	-1.42	17.36	15.95	-1.40	-0.01 (0.66)
30-day ACH/CAH inpatient expenditures, $	1,953.38	1,841.56	-111.82	2,126.73	2,081.24	-45.49	-66.33 (63.15)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	8,242.45	8,054.67	-187.78	7,642.52	7,344.85	-297.67	109.89 (181.62)
Number of discharges (hospitals) in the sample	13,873 (3)	45,805 (3)		17,861 (7)	54,243 (7)		
Site 71							
30-day readmission rate, %	23.40	19.66	-3.74	26.93	22.28	-4.65	0.91 (0.81)
30-day ACH/CAH inpatient expenditures, $	6,082.85	4,047.30	-2,035.55	6,666.55	4,541.66	-2,124.89	89.34 (222.54)
30-day Medicare Part A and Part B expenditures, $	16,427.89	10,237.13	-6,190.77	16,544.96	10,213.98	-6,330.98	140.21 (288.13)
Number of discharges (hospitals) in the sample	14,936 (3)	54,180 (3)		30,541 (14)	99,746 (14)		
Site 72							
30-day readmission rate, %	12.60	12.78	0.18	12.06	13.05	0.99	-0.81 (0.86)
30-day ACH/CAH inpatient expenditures, $	1,270.38	1,354.59	84.20	1,622.43	1,674.28	51.85	32.35 (108.22)
30-day Medicare Part A and Part B expenditures, $	5,692.63	5,463.71	-228.93	7,221.07	7,040.62	-180.45	-48.48 (261.20)
Number of discharges (hospitals) in the sample	4,908 (2)	17,199 (2)		12,188 (7)	42,820 (7)		
Site 79							
30-day readmission rate, %	21.06	19.69	-1.37	21.20	18.63	-2.57	1.20* (0.54)
30-day ACH/CAH inpatient expenditures, $	2,322.58	2,006.33	-316.25	1,908.45	1,665.56	-242.89	-73.36 (62.08)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	7,242.67	6,886.25	-356.42	6,373.28	6,140.41	-232.88	-123.55 (103.10)
Number of discharges (hospitals) in the sample	13,081 (4)	34,519 (4)		66,596 (23)	193,121 (23)		
Site 83							
30-day readmission rate, %	32.31	25.50	-6.82	26.93	20.60	-6.33	-0.49 (0.55)
30-day ACH/CAH inpatient expenditures, $	3,056.01	2,312.06	-743.96	2,234.55	1,612.31	-622.25	-121.71[+] (59.97)
30-day Medicare Part A and Part B expenditures, $	8,390.26	5,493.27	-2,896.99	8,437.77	6,034.95	-2,402.82	-494.17** (151.66)
Number of discharges (hospitals) in the sample	7,733 (4)	27,437 (4)		24,353 (17)	87,745 (17)		
Site 85							
30-day readmission rate, %	19.75	16.38	-3.38	23.94	20.88	-3.06	-0.32 (0.47)
30-day ACH/CAH inpatient expenditures, $	2,077.72	1,487.75	-589.97	1,459.06	903.51	-555.54	-34.43 (44.38)
30-day Medicare Part A and Part B expenditures, $	8,592.75	6,078.75	-2,514.00	7,479.28	5,067.73	-2,411.56	-102.44 (133.16)
Number of discharges (hospitals) in the sample	21,353 (4)	74,874 (4)		33,396 (19)	107,933 (19)		
Site 88							
30-day readmission rate, %	15.09	16.73	1.64	16.19	16.77	0.58	1.05[+] (0.57)
30-day ACH/CAH inpatient expenditures, $	1,705.35	1,890.92	185.58	2,049.99	2,149.76	99.77	85.81^ (56.55)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	7,691.96	8,070.56	378.60	9,884.99	9,913.80	28.81	349.80* (152.02)
Number of discharges (hospitals) in the sample	12,702 (3)	37,995 (3)		43,204 (17)	125,199 (17)		
Site 90							
30-day readmission rate, %	23.03	20.91	-2.12	21.15	19.31	-1.83	-0.28 (0.41)
30-day ACH/CAH inpatient expenditures, $	3,546.19	3,021.03	-525.16	3,871.15	3,430.80	-440.35	-84.81 (83.27)
30-day Medicare Part A and Part B expenditures, $	11,811.02	10,917.50	-893.52	15,451.29	14,510.07	-941.22	47.70 (159.62)
Number of discharges (hospitals) in the sample	14,559 (4)	36,462 (4)		65,344 (24)	170,238 (24)		
Site 93							
30-day readmission rate, %	21.35	20.67	-0.68	21.53	20.47	-1.06	0.38 (0.40)
30-day ACH/CAH inpatient expenditures, $	3,095.61	2,900.89	-194.72	2,762.37	2,564.10	-198.27	3.55 (55.93)
30-day Medicare Part A and Part B expenditures, $	11,046.75	10,744.82	-301.93	8,049.79	7,300.45	-749.34	447.41** (109.25)
Number of discharges (hospitals) in the sample	28,793 (6)	84,348 (6)		181,718 (41)	508,530 (41)		
Site 96							
30-day readmission rate, %	18.00	16.92	-1.09	16.34	15.66	-0.68	-0.40 (0.56)
30-day ACH/CAH inpatient expenditures, $	1,847.83	1,621.66	-226.17	1,721.04	1,521.91	-199.13	-27.04 (50.59)

	Participating Hospitals			Comparison Hospitals			Regression-Adjusted DiD Impact Estimate[a] (Standard Error)
	Pre	Post	Difference	Pre	Post	Difference	
30-day Medicare Part A and Part B expenditures, $	8,045.59	7,612.74	-432.84	9,030.06	8,533.27	-496.79	63.95 (172.01)
Number of discharges (hospitals) in the sample	9,304 (5)	24,444 (5)		58,331 (29)	173,327 (29)		
Site 97							
30-day readmission rate, %	19.94	14.97	-4.97	18.90	14.63	-4.27	-0.70** (0.24)
30-day ACH/CAH inpatient expenditures, $	2,074.97	1,565.23	-509.74	2,065.98	1,575.55	-490.43	-19.32 (57.69)
30-day Medicare Part A and Part B expenditures, $	9,951.70	6,622.07	-3,329.63	10,252.77	7,379.14	-2,873.63	-456.00** (59.77)
Number of discharges (hospitals) in the sample	11,966 (2)	35,429 (2)		51,155 (24)	178,345 (24)		
Site 103							
30-day readmission rate, %	24.73	18.66	-6.08	22.68	18.13	-4.54	-1.53* (0.57)
30-day ACH/CAH inpatient expenditures, $	3,928.64	2,734.94	-1,193.71	2,835.70	1,871.59	-964.11	-229.60* (103.87)
30-day Medicare Part A and Part B expenditures, $	13,109.53	9,092.12	-4,017.41	8,782.16	4,865.99	-3,916.17	-101.24 (233.85)
Number of discharges (hospitals) in the sample	11,287 (5)	34,692 (5)		113,128 (24)	343,749 (24)		

Notes: ^p<0.2, +p<0.1, *p<0.05, **p<0.01. Standard errors are given in parentheses in the last column, which is labeled "Regression-Adjusted DiD Impact Estimate."

[a] Results from site-by-site discharge-level estimated impacts of the CCTP on 30-day readmissions and 30-day Medicare fee-for-service expenditures using DiD regression models for discharges from hospitals associated with 44 continuing community-based organizations. The site-by-site discharge-level DiD regression model is described in Section A.3.2 of Appendix A to the Final Evaluation Report. Covariates (Final Evaluation Report, Appendix A, Table A.9) include the 58 most frequently occurring modified diagnosis-related groups (covering 75 percent of participating discharges), dual-eligibility status, beneficiary demographics including age and race/ethnicity, hospital fixed effects, and month fixed effects.

Table B.10. **Regression-Adjusted Means for Participating and Matched Comparison Discharges in the Participant Cross-Sectional Analysis for the First 33 Months of Participation for Each Provider**

	Participant Mean, %	Matched Comparison Mean, %	Difference (Standard Error)	% Difference[a]
30-day emergency department utilization rate	8.97	8.78	0.19 (0.16)	2.16
30-day observation stay utilization rate	2.13	2.20	-0.07 (0.09)	-3.16
30-day primary care physician visit rate (any)	38.92	30.86	8.01** (0.87)	26.11
30-day physician office visit rate (any)	58.15	49.08	9.06** (0.97)	18.45
30-day physical therapy/occupational therapy utilization (any)	3.26	3.14	0.12 (0.10)	3.97

Notes: ^p<0.2, +p<0.1, *p<0.05, **p<0.01. Covariates (Final Evaluation Report, Appendix A, Table A.8) include characteristics of the stay, such as modified diagnosis-related group; beneficiary characteristics, including basic demographics, prior outcomes (e.g., admissions, readmissions, expenditures, and Medicare fee-for-service expenditures), and Hierarchical Condition Category scores; and hospital characteristics, such as hospital size, organizational status, and ratio of Medicare and Medicaid admissions to total admissions, all measured in the year before implementation.

[a] The percent change for the participant cross-sectional analysis is calculated as 100 × (regression-adjusted mean difference from comparison) / (regression-adjusted comparison mean).

Attachment S: Site-Specific Supplement

S.1. Introduction

In their applications, Community-based Care Transitions Program (CCTP) sites proposed to implement one or more evidence-based care transitions (CT) models (e.g., Coleman's Care Transitions Intervention® (CTI®), Transitional Care Model (TCM), Bridge). The model and inclusion criteria were selected based on root cause analyses conducted during the application process. Applicants undertook these root cause analyses to identify causes of readmissions at partner hospitals, including medical diagnoses, social issues, and hospital process factors. Over time, sites added additional CT strategies and adapted their chosen models and staffing approaches to reach additional participants and to meet the needs of participants with more complex needs, make their program more culturally appropriate, and improve program efficiency.

Sites adapted evidence-based programs over time through a rapid-cycle improvement process that ultimately led to interventions that look quite different from those initially proposed. This raised the question of how to assess model fidelity, as well as the relative importance of fidelity versus attaining desired program outcomes. For example, our analysis of the care transitions bundle (CTB)[1] delivery uses List Bill data from the CCTP in an attempt to approximate the key elements of CTI® as well as uses tailored methods for monitoring changes over time and the impact of those changes on program outcomes.

Programmatic changes made by sites were generally made as a part of the rapid-cycle improvement process through a series of Plan-Do-Study-Act (PDSA) cycles, a process that was emphasized to the sites through the CCTP Learning Collaborative, which used regular webinars and in-person meetings to identify and disseminate best practices from participating sites. Particularly successful or innovative strategies were shared by sites during Learning Collaborative sessions, resulting in widespread adoption of specific changes, such as the hospital–field worker model. Because of both internal PDSA activities and learning during the Learning Collaborative, many sites' CCTP programs changed significantly over the period of participation in the program.

Successful implementation of evidence-based interventions in the community organizations has been limited due to a lack of a framework for implementing effective interventions that maintain fidelity while allowing for adaptations for new settings.[2] Decreased effectiveness can be seen for multiple reasons, including failing to implement the model with fidelity, implementing the model with fidelity in a population for which the model is not suitable, or a combination of population- and model-level factors.

The remainder of Section S.1 provides an overview of CT model adaptations undertaken by CCTP sites. Section S.2 further details the 44 extended sites studied in the Final Evaluation Report by discussing site-specific characteristics, including CT approaches, and detailing empirical findings.

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[1] Using CCTP program data, we approximated CTI® as a CTB for participants who received a hospital visit, at least one home visit (whether it was within 3 days after discharge or after 3 days), at least one phone call (whether it was within 1 week after discharge or after 1 week), and medication review and reconciliation.

[2] Kilbourne, A. M., Neumann, M. S., Pincus, H. A., Bauer, M. S., & Stall, R. (2007). Implementing evidence-based interventions in health care: Application of the Replicating Effective Programs framework. *Implementation Science, 2*(42). doi:10.1186/1748-5908-2-42.

Qualitative data used in these sections are derived from self-reported information obtained during telephone interviews and site visits with CCTP sites.

S.1.1. Adaptations to Increase Number of Eligible Patients

One common reason for adapting the evidence-based models implemented for the CCTP was to increase the pool of eligible patients so that sites could meet enrollment goals to impact the overall hospital-level Medicare readmission rates. One adaptation that many sites made was the use of a hospital–field coach model. Sites implemented this model in an attempt to be responsive to hospitals' desire for continuity within the hospital, to respond to beneficiaries concerns (e.g., having strangers in the home, feeling overwhelmed), and to meet the needs of beneficiaries discharged out of the local service area.

Adaptations that were used to increase the pool of eligible patients included offering alternatives to the home visit component of the intervention, such as telephone-only interventions, intensive bedside visits at the hospital, and utilizing alternate locations such as public places or medical appointments for components of the home visit. Sites also offered telephone-only interventions to participants discharging outside the community-based organization's (CBO) service area in some cases. This was most common in CCTP programs located near State lines, and those partnered with hospitals that attracted patients from other cities or States because they are teaching facilities or the only alternative for specialized treatment in a large geographic area.

Another common adaptation that increased the number of participants completing the intervention was offering components of the home visit at a skilled nursing facility (SNF) before a participant was discharged. As sites worked with participants discharged to SNFs, they found they were losing participants due to challenges tracking discharge dates and limited time to conduct the CT intervention if the SNF stay approached the site's 30-day post hospital discharge intervention period. In addition, they found that some beneficiaries who agreed to the program while in the hospital did not remember the program after their SNF stays.

S.1.2. Adaptations to Meet Complex Needs

Sites have also added new CT strategies to better serve participants with more complex needs, such as high-risk diagnoses, comorbid conditions, polypharmacy, new medications, or psychosocial risk factors. Generally, sites implemented these strategies to address challenges identified during ongoing analysis of readmissions among CCTP participants or during other readmission analyses conducted by partner hospitals. These strategies include conducting additional assessments of patients, including assessments of behavioral health (BH) (e.g., Patient Health Questionnaire, Geriatric Depressions Scale), cognitive functioning (e.g., mini mental status exam, or the mini-Cog), or home safety and functional status assessments to inform the CT worker about supportive needs in the home. Some sites also added additional phone calls or home visits, typically at the discretion of the CT worker. Additionally, sites have added specialized home visits for patients with complex needs. Specialized practitioners include nurse practitioners (NPs), registered nurses (RNs), pharmacists, respiratory therapists, other specialists, and CT workers with special training in cognitive impairment or BH.

In addition to adding intervention components to meet complex needs, sites gave their CT workers leeway to arrange supportive services or schedule follow-up appointments directly for participants due to factors such as cognitive, language, or literacy challenges.

S.1.3. Adaptations to Improve Cultural Appropriateness

Sites reported finding that they needed to tailor certain aspects of their evidence-based models for the local culture. Strategies employed to improve the administration of the model included translating key components of the model, such as the CTI® model's personal health record (PHR), into other languages, adding pictures, or reformatting to make the materials more easily understood. Sites used native speakers to assist with modifying the terminology and structure of the documents so they would be better understood by participants.

Sites also found that different cultural experiences and expectations around interactions with healthcare providers required different approaches to addressing participant needs. For instance, participants sometimes deferred decisions to family members or allowed family members to act as gatekeepers. As a result, CT workers identified and worked closely with family caregivers, such as adult children to gain trust and meet cultural expectations related to the sharing of health information and healthcare decision making.

S.1.4. Adaptations to Improve Efficiency

The major strategy adopted by sites to improve efficiency was the hospital–field worker model. Sites adopted this approach to staffing to better coordinate workers' caseloads and maximize the time that workers dedicated to patient outreach and home visits. Sites adopted the hospital–field worker model after startup to improve the efficient deployment of support/education resources. There was variation across sites in how roles were distributed between hospital- and field-based workers, but hospital workers generally took on activities that occur in the hospital and field workers took on those in the field. Often, the hospital (or "lead") worker identified eligible patients, selected patients to approach for the program, visited the patient in the hospital to introduce the program, and conducted any in-hospital follow-up. After a patient agreed to participate in the program, the hospital worker would hand the patient off to a field worker, who conducted home visits and follow-up phone calls with participants and helped to link patients with necessary medical and community support services.

Another strategy that sites used to improve efficiency was the implementation of risk assessment tools to identify patients at risk for readmission. These tools were often embedded into partner hospital electronic health records (EHRs), and in those cases, risk scores were calculated automatically. Commonly used risk assessments included LACE, BOOST 8Ps, and other proprietary assessments that already existed within partner EHRs. LACE is a tool that calculates a score from 1 to 19 based on length of stay, acuity, comorbidities, and emergency department visits.[3] Higher scores represent a higher risk of readmission. Because LACE scores cannot be calculated until discharge, when length of stay is known, most sites implementing LACE used a modified LACE tool that uses the length of the most recent prior admission so that patient identification can be done immediately after admission. The BOOST 8Ps assesses the following eight areas of risk:[4]

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[3] van Walraven, C., Dhalla, I. A., Bell, C., Etchells, E., Stiell, I. G., Zarnke, K., … Forster, A. J. (2010, April 6). Derivation and validation of an index to predict early death or unplanned readmission after discharge from hospital to the community. *Canadian Medical Association Journal, 182*(6), 551–557. doi: 10.1503/cmaj.091117.

[4] Project BOOST. (n.d.) *The 8P Screening Tool: Identifying your patient's risk for adverse events after discharge.* Retrieved from http://www.hospitalmedicine.org/CMDownload.aspx?ContentKey=9f02a9b4-274a-4148-be07-23a9c6d9b7d1&ContentItemKey=220e1c55-971c-42f4-b641-d104f18cad30.

- Problems with medications.
- Psychological.
- Principal diagnosis.
- Physical limitations.
- Poor health literacy.
- Poor social support.
- Prior hospitalization.
- Palliative care.

S.1.5. Result Considerations

This Site-Specific Supplement Report provides contextual insight for specific sites. The quantitative findings included in this Site-Specific Supplement Report are not directly comparable to findings presented in the Final Evaluation Report. The findings are the result of analyses done with fewer quarters of data (through November 2015, while analyses in the Final Evaluation Report use data through January 2017) and minor differences in the models (e.g., additional control variables were added to the participant-level regressions). Appendix B contains updated site-level results.

In addition, in the site-specific snapshots that follow, it is important to note the following methodological considerations:

1. As noted throughout the Final Evaluation Report, the nature of cross-sectional analysis does not allow us to determine CCTP impacts; thus, net differences in Medicare Part A and Part B expenditures (relative to comparisons) are not savings or losses attributable to the CCTP but differences between CCTP participants and matched comparisons. Negative net expenditure estimates indicate that CCTP participants were associated with lower Medicare Part A and Part B expenditures—after accounting for per-eligible discharge rate (PEDR) amounts—during the study period relative to comparisons; positive net expenditure differences indicate the opposite.

2. The analysis of List Bill data in Section 4 of the Final Evaluation Report was conducted on a mutually exclusive, hierarchical paradigm imposed on CCTP encounters and services, as detailed in Section 2. By contrast, CCTP encounters and services in the site snapshots are not treated as mutually exclusive categories in analyses. As such, percentages of participant encounters or service receipts may exceed 100 percent when multiple encounter types are combined.

3. Site-specific factors that may contribute to outcomes were derived from telephone interviews, site visits, and site applications submitted as part of the CCTP's enrollment process.

S.2. Site-by-Site Summaries

S.2.1. Site 1

S.2.1.1. Profile

Site Structure: The CBO is an Area Agency on Aging (AAA) in the Northeast that operates in a suburban and rural region and partnered with four partner hospitals and a large physician practice. The site added an additional CBO partner in 2015 to provide additional coaching services.

Intervention: The site chose CTI® as the formal model for the intervention and reported in interviews that they provide phone-based interventions for the 15 percent of participants who live out of the area. Coaches assessed support service needs, provided referrals, and could refer to the CBO's Aging and Disability Resource Center (ADRC) resource specialists for further assessment. There was no service bundle in the CCTP rate, but the CBO received a grant to pay for 2 weeks of Meals on Wheels for CCTP participants. The site did an Administration on Aging (AoA)-funded CT pilot in 2010 and partnered with a hospital and physician practice on chronic disease management.

Eligibility Criteria: The all-cause inclusion criteria were based on the Project BOOST 8P for Medicare beneficiaries of all ages.

Figure S.1.   Site 1 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-11.01** (p=0.02)
Hospital Readmissions (% Chg)	4.74** (p=0.04)
Average Net Differences in Expenditures Per Discharge	$-492*** (p<0.01)
Enrollment Rate (%)	17.34

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	42%
Hospital & Home	93%
Home	65%
Phone	86%
Med Rec	86%

Strengths	Challenges
Strong partner hospitals and PHO	Staff turnover; complex hiring process
Hospitals financially supported startup	HHA engagement a continuous challenge
All partners use the same database	CBO not invited to hospital readmission meetings
Coaches embedded in PCP practices	Hospital EHR adoption interrupted the CCTP

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.1.2. Findings

Site 1 exhibited statistically significantly lower participant readmission rates relative to matched comparisons (11.01 percent; p<0.05). This site's 30-day post-discharge Part A and Part B expenditures for participants were 11.72 percent (p<0.01) lower than for matched comparisons, which translated into lower net Medicare Part A and Part B expenditures of $4,947,212 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate that only approximately 42 percent of participants received CTB, mainly because less than two-thirds received any home visit. The List Bill data suggest this site focused on other activities found to be significantly associated with lower readmission rates, placing phone calls to 86 percent of participants, as well as providing medication review and reconciliation to 86 percent. This is consistent with the fact that the site used a telephone intervention for participants discharged out of State, although the site estimated that only 15 percent of CCTP clients receive a telephone-based intervention, which is smaller than the proportion indicated by List Bill data. Estimates from the difference-in-differences (DiD) analysis indicate that differences for participants did not extend to improvements in outcomes across all discharges from CCTP partner hospitals. In fact, DiD impact estimates show statistically significant increases in the 30-day readmission rate (4.74 percent; p=0.04) but no statistically significant impact on 30-day Part A and Part B expenditures. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.1.3. Factors

One factor that potentially contributed to the favorable participant-level outcomes was the partners' extensive collaborative working experience, which included 2 years designing the CT intervention prior to award using AoA funding that covered the pilot, staff training, and infrastructure development. Another factor was engagement of the broader community in readmission reduction efforts. The partners felt the CCTP aligned well with strategic initiatives (e.g., quality improvement (QI), medical home approach, community care teams) in the hospital systems, accountable care organization (ACO), physician–hospital organization (PHO), ADRC, CBO, and the medical community in general. Since most coaches worked in physician practices, they had access to the patients themselves, staff knowledge of the patients, access to primary care records, and an enhanced ability to schedule follow-up medical appointments with primary care physicians (PCPs). The site also employed nurse coaches for patients with complex medical needs. The hospitals were engaged in CTI®; for example, one is an ACO with multiple internal CT initiatives but considered CTI® important to overall goals and shared ACO savings with the CBO. Of note, when an ACO partnered with a CCTP site, the PEDR for the intervention was paid out of ACO funding, rather than CCTP funding. In some cases, this funding arrangement reduced ACO interest in the program.

The partners demonstrated a high level of engagement in QI, sharing resources, and supporting infrastructure development. For example, the hospital system financially supported startup costs for CTI® and provided a shared database for all partners to use, supporting coordination and communication across the project. The PHO also played an important role in engaging staff at the

hospitals, holding intensive meetings at the unit level with hospital departments to get the staff to recognize that they could refer patients to the CCTP and that there was a benefit to doing so. PHO staff members also joined the CBO's board, and the Director of Care Coordination for the PHO was faculty for the CCTP Learning Collaborative.

The statistically significant increases in hospital-level readmission rates at the hospital level are difficult to explain as the hospital partners are all shared-savings ACOs and have incorporated multiple readmission reduction initiatives while demonstrating a high level of engagement. The hospitals, for example, all conduct readmission review committees.

S.2.2. Site 2

S.2.2.1. Profile

Site Structure: The CBO is an AAA in the Midwest that partnered with nine hospitals and five community partners to provide CT services.

Intervention: The site used CTI® as the formal model for the intervention. Coaching staff at each hospital had access to EHRs, and the hospitals set up reports for the CCTP population. Eight hospitals had a dedicated hospital-based coach, while one rural hospital had a coach with a dual role. Home visits were scheduled at set times using web-based scheduling software in the participant's hospital room, and appointments were dispatched to field workers on their mobile phones. Home visit timing was prioritized for patients with heart failure (HF), pneumonia, or acute myocardial infarction (AMI). The program did not include any supportive services in its PEDR, but it assisted participants in accessing community resources, as needed. The site conducted visits at any of the 129 SNFs in the service area, using its own model that focused on the participant's goals for care and the participant's knowledge and empowerment while in the nursing facility. Patients at the top 10 SNFs based on volume received visits from a dedicated SNF coach. They calculated a LACE score for all participants in SNFs to identify those at highest risk after SNF discharge, and those participants received a visit at home, which an intern conducts.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with any diagnosis (all-cause), with the exception of hospice and long-term care (LTC) residents, who were excluded. Patients with higher LACE scores and diagnoses identified to be at higher risk for readmission (e.g., HF, pneumonia, or AMI) were prioritized for recruitment.

Figure S.2. Site 2 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.96*** (p<0.01)
Hospital Readmissions (% Chg)	-6.55*** (p<0.01)
Average Net Differences in Expenditures Per Discharge	$595 (p=0.49)
Enrollment Rate (%)	13.08

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	89%
Hospital & Home	100%
Home	99%
Phone	99%
Med Rec	100%

Strengths	Challenges
Coaches integrated from start of the CCTP	Staffing challenges
Expanded partners to all local hospitals	Hospital complacency over time
CBO invested in scheduling and QM software	Struggles to maintain acceptance rate
CBO adept at rapid-cycle changes	Dual-eligible project reduced target population

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.2.2. Findings

For Site 2, we found that readmission rates were 10.96 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). We found no statistically significant difference in Part A and Part B expenditures between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate that a large proportion (89 percent) of participants received CTB, with virtually everyone receiving at least one home visit, a phone call, and medication review and reconciliation. Consistent with the participant analysis, estimates from the DiD analysis, which includes all discharges from CCTP partner hospitals and their matched comparison hospitals, indicate a statistically significant decrease in the 30-day readmission rate (6.55 percent; p<0.01) and no statistically significant impact on 30-day Part A and Part B expenditures.

S.2.2.3. Factors

Site 2 exhibited statistically significantly lower participant- and hospital-level readmissions than matched comparators. Factors potentially contributing to these favorable readmission outcomes may include the fact the site had prior experience partnering on its CT model with a hospital partner, and coaches were well integrated in the hospitals from the outset, with EHR access at all hospitals. The site also brought on four new hospitals, so it was serving all of the hospitals in one local hospital system. This helped with integration and engagement within that system. There were also other CT programs occurring in the partner hospitals, including bundled payments, and they developed a system for coordinating and handing off patients to the hospital-based program at the end of the 30-day CCTP intervention. The site also invested in new software for home visit

scheduling and quality monitoring (QM), and used the reports to make program changes. For instance, they identified a high rate of readmissions between the second and third follow-up phone calls, so they created a script for the second call that addressed common reasons for readmissions.

The site identified several key challenges. Initially, they struggled with patient identification and acceptance rates. Although those processes were improved, a State dual-eligible demonstration project that began after the CCTP reduced the number of eligible patients. Identifying a staffing model for their CT workers and adapting to a fee-for-service (FFS) program were also significant culture changes for the site, which was accustomed to working on grant-funded projects.

S.2.3. Site 3

S.2.3.1. Profile

Site Structure: The CBO is a Government coordinating agency that implemented CT services in the South with six partner hospitals and one community partner.

Intervention: The site chose CTI® as the formal model for the intervention. After the home visit, calls were made throughout the month and were scheduled around events such as the physician visit. The field worker used his or her judgment to make another home visit or more phone calls. The site had a service bundle of 14 meals and 2 round-trip transports included in the PEDR. The site had two field workers who work in five area SNFs, who provided the components of the home visit in the SNF and check-ins throughout the participant's stay.

Eligibility Criteria: The site served Medicare beneficiaries of all ages. The site expanded its inclusion criteria many times, moving from a list of specific diagnoses to more of an all-cause criteria approach. Several hospitals used LACE, and patients who scored 9 or 10 were eligible. Hospital-based coaches at all hospitals also used an assessment tool the site developed that is based on psychosocial criteria.

Figure S.3. Site 3 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.63* (p=0.06)
Hospital Readmissions (% Chg)	1.24 (p=0.59)
Average Net Differences in Expenditures Per Discharge	$-1,878*** (p<0.01)
Enrollment Rate (%)	9.31

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	22%
Hospital & Home	99%
Home	99%
Phone	75%
Med Rec	95%

Strengths	Challenges
Excellent hospital relationships	Each hospital changed EHR
Work with hospitals on QI and readmissions	Support services for younger patients
Effective new data system	Hospital mergers, acquisitions, and ACO status
CBO improved efficiency and expanded inclusions	Meeting enrollment target

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.3.2. Findings

Site 3 exhibited statistically significantly lower participant readmission rates relative to matched comparisons (10.63 percent; p<0.10). This site's 30-day post-discharge Part A and Part B expenditures for participants were 33.22 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $25,311,344 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, only 22 percent of participants received CTB; the low percentage reflects the fact that only a third of participants had a hospital visit. This low volume may suggest a reporting error. The List Bill data also indicate that nearly all (99 percent) participants received at least one home visit and medication review and reconciliation. Estimates from the DiD analysis indicate that differences for participants did not extend to improvements in outcomes across all discharges from CCTP partner hospitals. In fact, DiD impact estimates showed a statistically significant increase in the 30-day Part A and Part B expenditures (3.77 percent; p<0.10) but no statistically significant impact on 30-day readmissions.

S.2.3.3. Factors

Site 3 exhibited a statistically significant lower participant readmission rate and lower participant net differences in Medicare Part A and Part B expenditures. Factors which potentially contributed to these favorable participant-level outcomes may include experience gained by conducting a 9-month CT pilot using the CTI® model with three hospital partners. The site described an excellent relationship with its partner hospitals, which allowed it to work through challenges related to hospital mergers and the formation of new ACOs. They were able to integrate the CT process with

one of the ACOs so that the CCTP saw patients for the first 30 days after discharge and then handed the patient back to the care manager. The site had consistent staffing and had hospital coaches that were fully embedded and had access to the EHR at all partner hospitals. They worked closely with hospital staff, including QI and readmission reviews. They also developed a strategy to allow them to serve BH patients by adding coaches with BH experience, and adding additional components such as a depression-screening tool.

These prior relationships and a commitment to QI may have helped the site overcome several key challenges. Multiple partner hospitals were involved in negotiating mergers and acquisitions, and several hospital partners became ACOs. When the largest hospital initially became an ACO, it restricted access to patients. Additionally, each hospital in the partnership changed EHR systems during program participation, which presented challenges for patient identification and intervention documentation.

S.2.4. Site 4

S.2.4.1. Profile

Site Structure: The CBO is an AAA operating in urban and rural areas in the Midwest that partnered with 11 hospitals (it lost a hospital in 2014 and added 2 more).

Intervention: The site used CTI® as its formal model for the intervention. A hospital–field worker model was used in the six largest hospitals, with field workers assigned based on geography and patient needs. Some partner hospitals had a high proportion of clients with BH needs, so the CBO recruited coaches with BH training and provided training for all coaches on BH issues. Coaches visited more than 130 SNFs weekly and delivered the intervention in the SNF unless the patient was discharged home from the SNF within 2 weeks, in which case a home visit was conducted. The PEDR included 14 meals and 1 transport.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who were determined eligible by a modified risk assessment tool. The site excluded beneficiaries who were cognitively impaired or had dementia and no caregiver, who had active substance abuse, or who were discharged to hospice or LTC.

Figure S.4. Site 4 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-25.43*** (p<0.01)
Hospital Readmissions (% Chg)	-1.20 (p=0.57)
Average Net Differences in Expenditures Per Discharge	$-1,740*** (p<0.01)
Enrollment Rate (%)	14.18

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	62%
Hospital & Home	95%
Home	95%
Phone	95%
Med Rec	83%

Strengths	Challenges
Hospital relationships and pilots	Fierce competition among hospitals
QI with hospital partners	Added two hospitals with no relationship
Data system supports QM	Services for younger patients
Grants to cover support services	Lack services in rural areas

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.4.2. Findings

For Site 4, we found that readmission rates were 25.43 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). This site's 30-day post-discharge Part A and Part B expenditures were 30.95 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $28,912,240 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percentages of participants in this site's CCTP program with hospital visits and medication review and reconciliation were close to the average percentages recorded across all participants in all sites; the percentages with home visits and phone calls were above average. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.4.3. Factors

The statistically significant favorable change in participant readmissions and net differences in Medicare Part A and Part B expenditures may have been due to the site's aggressive efforts to successfully engage patients. For example, it developed BH screening and employed coaches with BH backgrounds due to the high number of BH units in the partner hospitals. It was also committed to engaging patients in the more than 130 SNFs in its service area, offering the components of the home visit at the facilities. The partners participated in QI activities throughout the intervention, collecting and analyzing readmission data collaboratively and conducting PDSAs at partner meetings. The site was deeply committed to QM and use of data, purchasing a data solution and hiring a data analyst who developed an online training module and resources, monitored readmission data, and created other reports, including weekly coach productivity reports. The site

also had extensive experience working with its 10 original partners and described "great" relationships with the partner hospitals, as evidenced by complete integration of coaching staff in the 11 hospitals and access to resources, including rounding and open communication.

S.2.5. Site 5

S.2.5.1. Profile

Site Structure: The CBO is an AAA/ADRC that serves urban and rural populations in the Northeast. The site partnered with six hospitals and six community organizations.

Intervention: The site used CTI® as the formal model for the intervention. High- and moderate-risk patients were scheduled for a home visit within 48 hours of discharge. Patients were matched with coaches based on geography, language, and diagnoses. They used a hospital–field worker model. A scheduler assigned home visits to field workers based on geography, diagnoses, and language needs of the patient. Interventions began in the SNF for patients in short-term care, although high-risk patients received another home visit after discharge as well. The CBO offered phone interventions for people who did not want a home visit. The site had support services included in the PEDR, including transportation and necessities.

Eligibility Criteria: The site served all Medicare beneficiaries with no exclusions, identifying those most at risk using its discharge assessment survey, which was based on the risk criteria in its database. The site contacted low-risk patients by phone after discharge to determine if their needs had changed, making them eligible for enrollment.

Figure S.5.   Site 5 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-0.30 (p=0.94)
Hospital Readmissions (% Chg)	2.99 (p=0.18)
Average Net Differences in Expenditures Per Discharge	$1,786*** (p<0.01)
Enrollment Rate (%)	21.37

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	37%
Hospital & Home	88%
Home	65%
Phone	62%
Med Rec	68%

Strengths	Challenges
Hospital relationships and pilots	Hospital mergers raised readmissions
Adopted outstanding data system	SNFs lack concern about readmissions
RCA on every readmission	Limited resources for younger patients
Coaches have all resources in hospitals	Lack of behavioral health services

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.5.2. Findings

Site 5 did not exhibit a statistically significant difference in readmission rates between participants and matched comparisons. This site's 30-day post-discharge Part A and Part B expenditures for participants were 17.06 percent (p<0.01) higher than for matched comparisons, which translated into higher net differences in expenditures of $23,854,550 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate that only 37 percent of participants received CTB; 65 percent were visited in the home, and 62 percent received one or more phone call. The home visit percentage may be explained by the site offering a telephone-only intervention to participants who refused home visits. Ten percent did not have any encounters recorded, which may suggest a reporting error. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.5.3. Factors

This site exhibited higher statistically significant net differences in Medicare Part A and Part B expenditures relative to comparisons. These findings might be explained by the challenges the CBO faced serving younger Medicare patients and that 23 percent of the population served experienced BH problems. The site addressed concerns over the instability of BH clients by hiring coaches with backgrounds and experience with the population as well as by modifying the intervention so BH patients could receive home visits as often as weekly. The site determined that patients with frequent hospital admissions were often discharged without post-acute support, so its largest hospital charged case managers and discharge planners with ensuring that home health services were ordered. The site had experience with the partner hospitals, conducting a pilot prior to the CCTP, and working with them to address program improvement, quality issues, and reviewing readmissions. In 2015, four of the six hospital partners engaged in mergers that reduced administrative support by combining positions over two hospitals. The site reported that this affected continuity and commitment to the program and (reportedly) increased readmission rates at those hospitals. The site was considered a top performer since CCTP startup and felt helpless in controlling the effect of the hospital changes on patients. These changes could have contributed to observed outcomes for CCTP participants.

S.2.6. Site 6

S.2.6.1. Profile

Site Structure: The CBO is an organization that provides comprehensive senior services in urban and suburban communities in the Midwest. It had two partner hospitals.

Intervention: The site used CTI® as the formal model for the intervention. During the home visit, coaches conducted a complete assessment of the participant using eight different assessments that look at activities of daily living (ADLs), instrumental activities of daily living (IADLs), depression, environmental safety, finances, and fall risk. Patients deemed to be at high risk from these assessments were referred to a social work care manager for 180 days to get a support system in place. The site secured additional grant funding to provide this service. The program conducted "virtual home visits" for patients who refused in-person home visits or who lived far beyond the service area. It also used zone tools specific to different diseases for patient education. The site provided nurse-to-nurse coaching for participants in LTC facilities, follow-up calls at 7, 14, 21,

and 30 days after discharge, and a follow-up home visit upon patients' discharges if they were discharged from the SNF within 30 days. The CBO did not include support services in its PEDR.

Eligibility Criteria: The site served all Medicare beneficiaries who met the program's diagnostic and nonclinical criteria.

Figure S.6.   Site 6 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	2.09 (p=0.77)
Hospital Readmissions (% Chg)	0.25 (p=0.87)
Average Net Differences in Expenditures Per Discharge	$1,422** (p=0.05)
Enrollment Rate (%)	5.28

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	77%
Hospital & Home	95%
Home	92%
Phone	93%
Med Rec	81%

Strengths	Challenges
Excellent data system	Hospital merger, EHR adoption, and ACO status
Grant for case management for high risk	Hospitals are not supportive
RCA on every readmission	Hospitals don't attend meetings or use CBO data
Coaches have all resources in hospitals	No physician support of the CCTP

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.6.2. Findings

For Site 6, we did not find a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures were 10.68 percent (p<0.05) higher among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into higher net differences in expenditures of $4,657,535 (p<0.05) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percentages of participants in this site's CCTP program with hospital visits, home visits, and phone calls were all above average across all participants in all sites. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals. Given this site had a low enrollment rate— only 5 percent—compared to the average enrollment rate of 18 percent across all index discharges in all sites, we would not expect to observe an impact in the DiD analysis.

S.2.6.3. Factors

This site struggled to engage its partner hospitals. Additionally, at program start, there were hospital mergers, implementation of new EHRs, and one hospital became an ACO. These events seriously challenged the site in implementing the program and, combined with Medicaid managed care enactment, made meeting the enrollment target a serious issue. Reportedly, it was also unable to engage home health agencies (HHAs) in spite of ongoing efforts to do so. The site did track and analyze every readmission and rapidly addressed challenges with its footprint by adopting a number of changes, such as increasing the area served and changing targeting criteria. It also addressed the high rate of readmissions of participants at LTC facilities by implementing nurse-to-nurse coaching with the nursing homes.

S.2.7. Site 7

S.2.7.1. Profile

Site Structure: The CBO is an AAA/ADRC in the West that partnered with four hospitals and no community organizations.

Intervention: The site used CTI® as the formal model for the intervention and included telephone interventions for people refusing home visits or living out of the area, making unannounced visits to homes when CT workers were in the neighborhood, weekly phone calls, assistance with medication pickup or delivery, transportation to PCP appointments, depression screening with referral to the agency's BH program if indicated, and a mini care assessment and home safety check. Program staff members were divided into four teams: three served the hospitals using a hospital–field worker model, and one served area patients discharged to SNFs. Care advocates made weekly follow-up phone calls, scheduled PCP appointments, and tracked SNF patient discharges. Although the site did not have support services included in the PEDR, it ensured that CT patients received urgent start for Meals on Wheels, and home repairs because the community has extensive wait lists for services.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who were screened as high risk based on social support needs and high-risk diagnoses.

Figure S.7. Site 7 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-20.75*** (p<0.01)
Hospital Readmissions (% Chg)	0.54 (p=0.89)
Average Net Differences in Expenditures Per Discharge	$-333** (p=0.03)
Enrollment Rate (%)	22.28

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	80%
Hospital & Home	99%
Home	82%
Phone	99%
Med Rec	92%

Strengths	Challenges
Hospitals engaged; coaches have all resources	Many other care transitions programs
CBO has vibrant QI program	Transportation is a huge challenge
CBO provides in home behavioral health	Lengthy wait list for all support services
CBO covers meals and home repairs cost	CBO could not afford a database

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.7.2. Findings

Site 7 exhibited statistically significantly lower participant readmission rates relative to matched comparisons (20.75 percent; p<0.01). The 30-day post-discharge Part A and Part B expenditures for participants were 9.48 percent (p<0.05) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $3,447,675 (p<0.05) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percentages of participants in this site's CCTP program receiving home visits, phone calls, and medication review and reconciliation were above the average percentages recorded across all participants in all sites. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.7.3. Factors

One factor that contributed to the site's favorable participant-level outcomes may have been the site's early success in achieving total buy-in from partner hospitals even though they had no formal prior relationship. The site received EHR access, and coaches were well integrated in the hospitals within the first few months of operation. The CBO made rapid changes to improve its program based on monitoring activities, amending its inclusion criteria, adopting a hospital–field worker model, expanding to include patients discharged to SNFs, and telephone interventions for those out of the area or who do not want a home visit. It also changed processes by adopting coach teams, geographically assigning field workers, and adopting scheduling software with multiple capabilities, including coach monitoring. Even though the site did not have support services in its PEDR, it prioritized home-delivered meal services for CCTP patients and covered transportation to appointments. This is particularly telling of its commitment since senior services budgets in the

State were drastically cut and there are extensive wait lists for services. In addition, the CCTP team includes a part-time therapist who provides in-home BH treatment to participants as needed. The CBO is a quality-driven organization with internal QM processes that include the CCTP. Even though it could not afford a database solution, the site actively monitored all activities using spreadsheets.

S.2.8. Site 10

S.2.8.1. Profile

Site Structure: The CBO is an AAA operating in a rural area in a northeastern State which had six hospital partners. It originally had another AAA partner, which withdrew in 2015.

Intervention: The site used CTI® as the formal model for the intervention. For patients discharged to SNFs, coaches provided components of the home visit while the participant was in the SNF. High-risk patients could also receive a home visit after SNF discharge. The CBO used a hospital–field worker model. The site did not have support services in its PEDR, but the State provided adequate funding for senior services so there were no wait lists. However, State funding was impacted beginning in 2016 due to budget constraints.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who met diagnostic and psychosocial inclusion criteria, including AMI, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), diabetes, pneumonia, septicemia, renal failure, urinary tract infection, comorbidities, polypharmacy, readmission history, and referrals by hospital staff.

Figure S.8. Site 10 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-12.51* (p=0.08)
Hospital Readmissions (% Chg)	3.53 (p=0.29)
Average Net Differences in Expenditures Per Discharge	$-272* (p=0.06)
Enrollment Rate (%)	23.55

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	74%
Hospital & Home	100%
Home	100%
Phone	92%
Med Rec	85%

Strengths	Challenges
Hospital relationships through 9th SOW	AAA partner withdrew and CBO had to cover
CBO engaged in QI/QM	Initial struggle to get staffing right
Coaches integrated, have resources	One hospital does not have EHR
State funded training and infrastructure	Hospital system stopped readmission reviews

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.8.2. Findings

For Site 10, we found that readmission rates were 12.51 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.10). This site's 30-day post-discharge Part A and Part B expenditures were 10.25 percent (p<0.10) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $2,016,601 (p<0.10) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate that nearly three-quarters (74 percent) of participants received CTB and that all of them were visited in the hospital and/or received at least one home visit. Medication review and reconciliation were recorded for 85 percent of the participants. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.8.3. Factors

Favorable participant-level outcomes may have resulted from the quality-driven focus of the site, whose approach to the CCTP was to develop formal policies and procedures, training standards, monitoring reports, weekly supervision, annual evaluations, and monthly leadership team reports. The CBO had engaged with its partner hospitals in the Quality Improvement Organization (QIO) 9th Statement of Work and had relationships with other partners due to Medicaid work transitioning patients, determining levels of care, and operating the Ombudsman program. The site was flexible and nimble in adapting processes; it added a hospital–field worker model, expanded to include patients discharged to SNFs, and worked strategically with its QIO to improve training resources and access to current data. The site lost a partner agency providing coaches in 2015 but was successful in taking over this activity and improving results immediately.

The site had excellent supportive partnerships with its six hospital partners, having cultivated multiple champions in each facility. The hospitals and CBO adopted a formal process to review every readmission, and half of the hospitals include the CCTP in their discharge paperwork. All partners worked collaboratively on process improvement. The site's work was highly valued, as evidenced by pilots for continuation with a partner and managed care organizations reaching out to the agency to provide CT for the Medicaid population.

S.2.9. Site 11

S.2.9.1. Profile

Site Structure: The CBO is an ADRC serving an urban, suburban, and rural area in the South. It had five partner hospitals and two community partners.

Intervention: The site used CTI® as the formal model for the intervention. It provided an additional phone call on the 30th day. Coaches visited patients in the hospital and at home. In addition to receiving CTI®, patients were assessed for additional needs and referred to the ADRC for a social services (SS) support package that included meals and transportation, which was included in the PEDR, and a scale to weigh themselves. The site saw patients discharged to any SNF in the service area, conducting a visit in the facility and again at home if patients discharged home within 30 days. The site required coaches to visit a PCP with at least 10 percent of

participants in order for the coaches to gain a better understanding of the healthcare experience for the clients they served.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with heart failure (HF/CHF), AMI, pneumonia, COPD, diabetes, kidney and urinary tract infections, nutritional deficiencies, and renal failure.

Figure S.9. Site 11 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-7.71 (p=0.23)
Hospital Readmissions (% Chg)	8.92** (p=0.05)
Average Net Differences in Expenditures Per Discharge	$-77 (p=0.34)
Enrollment Rate (%)	23.51

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	73%
Hospital & Home	96%
Home	93%
Phone	96%
Med Rec	86%

Strengths	Challenges
Software has advanced reporting capabilities	Patients: 30% mental health; 50% diabetes or ESRD
Review on every readmission	Discharge plans not in Spanish; 80% of patients are Latino
Hospitals involved in coach hiring	PCP shortage
Coaches embedded with resources	Lower admissions and dual plans reduced patient base

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.9.2. Findings

Site 11 did not exhibit a statistically significant difference in readmission rates or Part A and Part B expenditures between participants and matched comparisons. The percentages of participants in this site's CCTP program with hospital visits, home visits, phone calls, and medication review and reconciliation were all above average. The DiD impact estimates show statistically significant increases in the 30-day readmission rate (8.92 percent; p<0.05) but no statistically significant impact on 30-day Part A and Part B expenditures. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.9.3. Factors

There were no statistically significant findings at the participant-level, which may be explained by the numerous challenges with hospital partners and the patient population served. The CBO encountered challenges engaging participants in self-management, which it attributed to cultural differences in health approaches in the target population. The site noted challenges including a preference for the hospital as the site of care and a belief that family support is sufficient and

outside help is not needed. Other challenges in the target population included a high rate of illiteracy and a high rate of end-stage renal disease (ESRD), which is a diagnosis with a high readmission rate. To address these challenges, the CBO attempted to engage all family caregivers and to demonstrate the benefits of the program to the caregivers themselves. In addition, other CT programs operated by partner hospitals and turnover among hospital leadership and other hospital staff challenged engagement of the partners. Confusion over Spanish surnames created ongoing billing challenges for the site, and the lack of discharge instructions in Spanish created a burden for the coaches working with patients in an area that is 80-percent Hispanic. The site attempted to address these challenges by hiring Spanish-speaking coaches from the community who are comfortable in a home visit environment with 15–20 family members attending, although it struggled to meet the transportation needs of ESRD patients. The site performed a review of every readmission, produced coach productivity reports, relied on constant PDSAs to improve, and was data driven.

The hospitals worked with the CBO on the CCTP applications, and they had good relationships, although hospital staff turnover resulted in efforts by the CBO to rebuild trust and gain commitment. This site did exhibit a statistically significant increase in hospital-level readmissions. The high proportion of ESRD patients—who are challenging to keep out of the hospital—and challenges experienced working with a low-income, non-English speaking population could explain these findings.

S.2.10. Site 12

S.2.10.1. Profile

Site Structure: The CBO is an AAA serving an urban population in the East. It had two partner hospitals.

Intervention: The site used the Bridge model as the formal model for the intervention. A nurse navigator employed by the hospital identified appropriate Medicare patients, presented the program, and enrolled patients. At discharge, the navigator then turned enrolled patients over to the Bridge Coordinators, who visited the patient at home and provided follow-up calls. Eighty percent of patients received a telephonic intervention; the other patients were high risk and received a home visit.[5] All patients got weekly phone calls. The Bridge Coordinators were all experienced assessors from the AAA; they screened patients for support service needs and linked them to resources in the agency. The site had seven meals and transportation in its PEDR. One hospital also provided pharmacist medication reconciliation at discharge.

Eligibility Criteria: The site served Medicare beneficiaries of all ages under its all-cause criteria.

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[5] All patients received home visits until 2015, when Site 12 reverted to the straight Bridge model for the majority of patients.

Figure S.10. Site 12 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-24.64*** (p<0.01)
Hospital Readmissions (% Chg)	-3.73*** (p<0.01)
Average Net Differences in Expenditures Per Discharge	$-3,894*** (p<0.01)
Enrollment Rate (%)	17.22

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	27%
Hospital & Home	88%
Home	56%
Phone	35%
Med Rec	98%

Strengths	Challenges
Long relationships with hospitals	Services for under 60, especially transportation
No turnover CBO and hospitals	Urban socioeconomic status and language issues
Readmission reviews with hospitals	No bilingual staff
Support those with frequent hospital admissions	Did not work with SNF patients

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.10.2. Findings

For Site 12, we found that readmission rates were 24.64 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). This site's 30-day post-discharge Part A and Part B expenditures were 41.88 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $19,242,562 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate only slightly more than one-quarter of participants (27 percent) received CTB; only 56 percent of participants had a home visit, 35 percent were recorded as receiving a follow-up phone call, and 11 percent had no encounters recorded in the List Bill. This is not surprising since the site reported having changed its approach to a primarily telephonic Bridge intervention, with only high-risk patients receiving home visits in 2015. In interviews, the site estimated that approximately 20 percent of participants received home visits. The discrepancy between the site's self-reported information and the information in the List Bill data may be due to reporting error or because the analysis did not account for the midstream change in approach. At the same time, medication review and reconciliation were reported as being provided to almost all participants (98 percent). In addition, 88 percent of participants received a hospital visit, which may suggest that the medication service was usually provided in the hospital. Estimates from the DiD analysis, which includes all discharges from CCTP partner hospitals and their matched comparison hospitals, indicate a statistically significant decrease in the 30-day readmission rate (3.73 percent; p<0.01) but no statistically significant impact on 30-day Part A and Part B expenditures. DiD estimates for this site should be interpreted with caution because of poor balance

between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.10.3. Factors

Favorable participant-level outcomes for this site may have been related to the significant commitment from partner hospitals with which the site had longstanding relationships. Because the inner-city population—marked by socioeconomic challenges—was difficult to serve, one hospital provided support through community health workers following the intervention for those patients with frequent hospital admissions, and the other hospital provided a pharmacist intervention. The site had strong hospital support and worked with partners collaboratively on QI activities and readmission reviews. It is also important to note that the CBO and hospitals all had staff stability throughout their award, which contributed to ongoing progress. The site did not work with patients discharged to SNFs and never met enrollment goals, so its outcomes may be partially explained by other initiatives occurring at the hospitals, including Project Re-Engineered Discharge (RED), BOOST, and the Bundled Payments for Care Improvement (BPCI) initiative.

The hospital-level results demonstrated a reduction in readmissions that was statistically significant. The apparent level of commitment of the hospitals and the number of ongoing initiatives could have contributed to this success overall.

S.2.11. Site 14

S.2.11.1. Profile

Site Structure: The CBO is an AAA in the Midwest serving urban and rural residents that partnered with five hospitals and two other AAAs, which also provided coaches.

Intervention: The site used CTI® as the formal model for the intervention. The site adopted a lead coach staffing model in 2013 to increase enrollment numbers and conducted face-to-face visits in the SNF for participants discharged to SNFs. Patients received weekly calls and could receive more than one home visit; patients who did not want someone in the home could receive a telephone intervention. Patients were referred to the AAA for an assessment for community support service needs because the site did not have services in the PEDR.

Eligibility Criteria: The program served all Medicare beneficiaries who met its all-cause inclusion criteria, relying on hospital case manager recommendations for patients appropriate for the model (at higher risk for readmission).

Figure S.11. Site 14 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.03* (p=0.07)
Hospital Readmissions (% Chg)	-6.41** (p=0.01)
Average Net Differences in Expenditures Per Discharge	$-316*** (p<0.01)
Enrollment Rate (%)	16.49

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	57%
Hospital & Home	96%
Home	91%
Phone	81%
Med Rec	96%

Strengths	Challenges
Coaches have all resources	Low literacy of rural population
Post-acute coalition; excellent SNF relations	Limited PCPs and transportation
Home visit information faxed to PCP	Data system learning curve slowed program
Disease-specific patient education used by all partners	Patients decline HHA at discharge

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.11.2. Findings

Site 14 exhibited statistically significant lower participant readmission rates relative to matched comparisons (10.03 percent; p<0.10). Its 30-day post-discharge Part A and Part B expenditures for participants were 12.01 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $2,940,769 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate that slightly more than half (57 percent) of participants received CTB. However, 91 percent received a home visit, and 96 percent had medication review and reconciliation. Estimates from the DiD analysis, which includes all discharges from CCTP partner hospitals and their matched comparison hospitals, indicate a statistically significant decrease in the 30-day readmission rate (6.41 percent; p=0.01) but no statistically significant impact on 30-day Part A and Part B expenditures.

S.2.11.3. Factors

Favorable participant-level outcomes for this site may have been due to the agility of the site in rapid adoption of changes to address challenges. It adopted the hospital–field worker model early on, conducted phone interventions for those patients not wanting a home visit, changed inclusion criteria to include all ages and all cause, and provided the elements of the CTI® home visit in the SNF. More importantly, the site focused on communication between coaches and PCPs, sending a fax report of home visit issues before follow-up appointments; designated strong points of contact with each SNF to address patient issues; and interviewed every readmitted patient and provided a report to the hospital. The site developed excellent partner relationships with its

hospitals and, through the coalition, adopted standardized patient education forms. Additionally, the State has a major focus on CT. All AAAs in the State provide CT services, and the State provided a network for sharing best practices as well as support for the marketing of CT to all payers.

The hospital-level readmission outcome was also favorable and statistically significant, possibly supported by increased engagement with SNFs, PCP communications, and the overall State attitude in support of CT.

S.2.12. Site 17

S.2.12.1. Profile

Site Structure: The CBO provides senior services in the Northeast, serving rural, urban, and suburban populations. It had five partner hospitals and five community partners.

Intervention: The site implemented CT based on two interventions: (1) the Coleman model, and (2) an enhanced hospital pharmacy intervention. Higher risk patients were offered both services - this was determined by the coach and pharmacist based on their assessments of the patient and LACE scores. The site estimated that approximately 15 percent of participants receive both services. Two home health partners provided coaches for the program, one serving each of two hospital systems, and the hospital pharmacists provided the pharmacy intervention. The CBO also worked with patients discharged to SNFs and delivered the intervention in the SNF when patients were discharged there for short-term stays. The coaches evaluated the need for support services, and referrals were made. The CBO did not have funding for services in the PEDR, but one agency provided supportive devices, such as scales and medisets.

Eligibility Criteria: The site served all Medicare FFS beneficiaries aged 18 and older and targeted several diagnoses, with emphasis on chronic conditions.

Figure S.12. Site 17 Snapshot

Metric	Assessment
Participant Readmissions	-25.30***
(% Chg)	(p<0.01)
Hospital Readmissions	-1.07
(% Chg)	(p=0.68)
Average Net Differences in	$-1,932***
Expenditures Per Discharge	(p<0.01)
Enrollment Rate (%)	18.18

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	7%
Hospital & Home	27%
Home	27%
Phone	16%
Med Rec	89%

Strengths	Challenges
Strong community commitment to reduce admissions	CBO did not have care transitions experience
Strong leadership of one partner hospital system	CBO had not worked with partners
Partners had direct CT experience	CBO had limited ability to monitor performance data

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.12.2. Findings

For Site 17, we found that readmission rates were 25.30 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). This site's 30-day post-discharge Part A and Part B expenditures were 28.21 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $21,910,494 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. List Bill data indicate only 7 percent of the participants received CTB, and, in fact, almost one-third of participants (30 percent) had no encounters recorded, 16 percent received a phone call, and 42 percent had only "other" marked. At the same time, medication review and reconciliation was reported as being provided to 89 percent of participants. Estimates from the DiD analysis indicate that differences for participants did not extend to improvements in outcomes across all discharges from CCTP partner hospitals. DiD results indicate a small but statistically insignificant reduction in readmissions and inpatient expenditures, but also an unexpected finding—a statistically significant 6-percent increase (p<0.01) in 30-day Part A and Part B expenditures. This unexpected finding may be due to chance because there is only a moderate similarity between partner and matched comparison hospitals.

S.2.12.3. Factors

Factors potentially contributing to this site's favorable participant-level outcomes may have included a wider healthcare community that was committed to reducing readmissions in the area. For instance, the local coordinating body that developed the application and assembled the partners set goals in 2010 to reduce unnecessary readmissions in the area by 25 percent by 2014. In addition, the site had partners that had substantial prior experience providing the intervention. Two local healthcare plans were paying the partner HHAs for CTI® coaching services provided in partner hospitals since 2011. Thus, the organizations and staff had experience implementing the intervention, and some of the partners had worked closely together. One of the hospitals had also been providing the pharmacy intervention in the emergency room as standard practice for several years and brought that capacity to the program.

This strong experience and commitment of the partners may have helped the site overcome several key challenges. First, the lead CBO had no direct CTI® experience and little past engagement with the partners prior to the CCTP. The lead CBO also reported limited quality monitoring and quality improvement (QM/QI) activities, with data activities being more focused on billing. The CBO was largely dependent on the quarterly monitoring reports and hospitals to provide information on the program's progress. Although the site's program manager technically managed the coaching staff, the site had little knowledge of on-the-ground operations, and it relied on a coach supervisor at each organization to monitor performance and the intervention.

S.2.13. Site 25

S.2.13.1. Profile

Site Structure: This site was led by a health system which partnered with a local AAA in an urban/suburban area of the Midwest to act as its CBO. The program was offered at four hospitals.

Intervention: The site utilized CTI® as the formal model for the intervention. Health navigator nurses reviewed a list of patients identified by BOOST and made sure they had the correct insurance, sorted the list using the EHR, and then approached the patient. The coach then went to the hospital to introduce himself or herself and tried to schedule a home visit. For medical concerns, the coach could contact health navigators since they are nurses, and they utilized the teach-back technique and disease-specific education materials. The navigators were well integrated, with offices and the ability to add CT notes to the EHR. They also attended meetings, rounds, and small care conferences, and were invited to special meetings about high-risk patients coordinated with a physician champion and NPs. There were no supportive service costs included in the PEDR. Support service needs were determined based on discussions with the patient and case management. Coaches provided information or a warm handoff, depending on patient needs and activation. The coaches worked with SNFs that hospitals refer to most frequently, conducting visits at the SNFs to do teaching on red flags, PHRs, and goal setting (no medication reconciliation), as well as performing a follow-up call or visit at home if the patient discharged within 30 days.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who were determined to be high risk using the 8P BOOST tool.

Figure S.13. Site 25 Snapshot

Metric	Assessment
Participant Readmissions	2.53
(% Chg)	(p=0.66)
Hospital Readmissions	-1.61
(% Chg)	(p=0.31)
Average Net Differences in	$-727*
Expenditures Per Discharge	(p=0.07)
Enrollment Rate (%)	6.85

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	54%
Hospital & Home	100%
Home	91%
Phone	67%
Med Rec	74%

Strengths	Challenges
Hospital as lead integrated nurses into process	CBO leadership turnover
Coaches could enter data in EHR	Understaffed due to budget issues
Coaches attended rounds and meetings	Staff training was inconsistent
	Switched data systems and lost historic data

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.13.2. Findings

Site 25 did not exhibit a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures for participants were 13.72 percent (p<0.10) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $4,628,300 (p<0.10) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, only 54 percent of participants received CTB; only two-thirds received a phone call, but virtually everyone (99.7 percent) had a hospital and/or a home visit. Estimates from the DiD analysis indicate differences for participants did not extend to a statistically significant CCTP impact on this outcome or 30-day readmission rate when considering all discharges from CCTP partner hospitals and their matched comparisons. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality). Given that this site had a low enrollment rate—only 7 percent—compared to the average enrollment rate of 18 percent across all index discharges in all sites, we would not expect to observe an impact in the DiD analysis.

S.2.13.3. Factors

Several key issues may have contributed to the lack of statistically significant readmission findings for this site. Turnover was a significant challenge at multiple levels. Due to leadership changes, staff training was inconsistent, which led to differences in implementation of the model across

coaches. Due to budget constraints, the site struggled with maintaining staffing for the program. This negatively affected the site's ability to ramp up enrollment to meet its target enrollment goals. Additionally, there were only three hospital partners involved at the beginning of the program, but two of those shared Medicare numbers with other hospitals/campuses not participating in the CCTP. The site learned these patients were being included in its readmission rate but were not being offered a chance to participate in the CCTP. In order to improve its ability to reduce the all-cause readmission rate at these partner hospitals, the site leveraged existing partnerships to implement the CCTP at the affiliated hospitals.

S.2.14. Site 26
S.2.14.1. Profile
Site Structure: The awardee was a small hospital system in the West that partnered with an AAA to provide social worker coaches and support services to augment nurses and social workers employed by the hospital. The site also utilized the hospital's preferred provider network that includes SNFs, HHAs, infusion therapists, and other service providers.

Intervention: The site selected a hybrid approach based on the Coleman, Naylor, and Project RED models. Participants were stratified into the intervention based on risk: high, moderate high, moderate, and low. Higher risk participants received a home visit by RNs and a social worker; medium-risk participants received an RN visit; and low-risk participants received phone calls. Telemedicine home visits were added in 2014, and pharmacist/pharmacy technician medication reconciliation was added in 2015. Nurses accompanied patients to doctor's appointments as an advocate. Hospital volunteers made "friendly" calls to post-discharged patients. The site's social worker assessed the patient in the hospital for support services so they could be available at discharge and provided an in-depth screening in the home using a State tool that includes home safety, ADLs/IADLs, and depression. The social worker completes an application for a meals contractor to expedite the provision of services. The site served patients discharged to SNFs and provided the components of the home visit in the SNF and again after discharge. The intervention could continue for up to 60 days for patients discharged to SNFs, allowing for up to a 30-day stay in the SNF and the full 30 days of transition services after discharge home.

Eligibility Criteria: The site served patients who are screened in the system using LACE, although hospital staff members could also add patients they deemed to be appropriate.

Figure S.14. Site 26 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-12.62 (p=0.17)
Hospital Readmissions (% Chg)	6.04** (p=0.01)
Average Net Differences in Expenditures Per Discharge	$2,547** (p=0.01)
Enrollment Rate (%)	18.14

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	43%
Hospital & Home	93%
Home	50%
Phone	94%
Med Rec	94%

Strengths	Challenges
Hospital system funded generously	Breaking down silos in the hospital
Televideo home visits allowed multiple attendees	Limited transportation and behavioral health
Shelter housed homeless patients 30 days for CT	Staff turnover and training needs
Strategies for illiteracy, language, and culture issues	Hospitals (awardee) purchased 2015

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.14.2. Findings

For Site 26, we did not find a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures were 26.30 percent (p<0.05) higher among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into higher net differences in Medicare Part A and Part B expenditures of $8,159,212 (p<0.05) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate that only 43 percent of participants received CTB, primarily reflecting that only half received a home visit. This home visit rate may reflect the multitier intervention approach, in which the lower-risk participants only receive a telephone intervention. Estimates from the DiD impact analysis that uses all discharges from partner hospitals and their matched comparisons indicate that CCTP participation resulted in a statistically significant increase in the 30-day readmission rate (6.04 percent; p=0.01), but also a small statistically significant decrease in 30-day Part A and Part B expenditures (3.46 percent; p=0.05). Thirty-day Part A and Part B expenditures and readmission rates are inconsistent across the participant cross-sectional differences and DiD models. Given that a modest percentage of Medicare FFS beneficiaries received services at partner hospitals, DiD impact results may be due to unobservable characteristics and may not be attributable to the CCTP.

S.2.14.3. Factors

Outcomes for this site showed higher statistically significant net differences in Medicare Part A and Part B expenditures for participants relative to comparisons. The differences could be due to the challenges with the target population as well as the hospital system's aggressive efforts to improve patient care. This site worked with 8 of 60 SNFs in the area—those in the preferred provider network—because these facilities agreed to work with the hospital system on readmission reduction. The facilities agreed to use software provided by the QIO to track root cause analysis trends and perform a root cause analysis on each readmission from the SNF to be shared with the coalition. The site's target population is marked by cultural challenges, poverty, and low literacy, with the site noting its root cause analysis showed underutilization of home health, palliative care, and access to prescription drugs. The site implemented many changes to address the population needs, including stratification of patients into multiple program arms, pharmacy medication reconciliation, telehealth home visits that allowed attendance of multiple care providers, and a new palliative care initiative. In addition, the site actively recruited Tribes and the Indian Health Service and developed a preferred provider network of post-acute providers in support of the CCTP. Due to low utilization of services by the targeted population, the site actively sought to ensure home health, palliative care, primary care, and prescription drugs were appropriately utilized.

The site exhibited a statistically significant increase in hospital-level readmissions. The hospital had a preexisting Project RED initiative and demonstrated exceptional support for the CCTP (the hospital system was the awardee). However, in the final year, the hospital was purchased by another health system heavily invested in ACO participation. It is not clear why overall readmissions increased slightly.

S.2.15. Site 29

S.2.15.1. Profile

Site Structure: The CBO is an AAA in the Midwest which had five partner hospitals.

Intervention: The site utilizes CTI® as the formal model for the intervention. Hospital coaches identified and enrolled patients, field-based coaches conducted home visits, and a third group of coaches performed the follow-up phone calls. The PEDR included one physician office transport and home-delivered meals for 7 days post discharge. CTI® coaches made a warm handoff to community support services for other needs. The coaches saw patients that had short-term SNF stays at any SNF in the area, held a weekly face-to-face visit while the patient is in the SNF, and then performed a home visit if discharge from the SNF was within 30 days.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with any diagnosis. Beneficiaries were selected using the LACE tool or another risk assessment tool built into its partner hospitals' EHRs. The site excluded patients with severe BH or substance abuse issues.

Figure S.15. Site 29 Snapshot

Metric	Assessment
Participant Readmissions	-6.39**
(% Chg)	(p=0.02)
Hospital Readmissions	4.15
(% Chg)	(p=0.11)
Average Net Differences in	$-904***
Expenditures Per Discharge	(p<0.01)
Enrollment Rate (%)	18.83

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	17%
Hospital & Home	90%
Home	71%
Phone	56%
Med Rec	41%

Strengths	Challenges
CBO financially committed to full staffing	Difficulty defining coach roles
Used data to identify problems to address	Onboarding coaches into the hospitals
CBO worked to achieve EHR access	Hospital turnover and EHR changes
	Lost a hospital partner

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.15.2. Findings

Site 29 exhibited lower participant readmission rates relative to matched comparisons (6.39 percent; p<0.05), a statistically significant result. This site's 30-day post-discharge Part A and Part B expenditures for participants were 15.12 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $17,954,810 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. List Bill data suggest only 17 percent of participants received CTB. While 90 percent received a hospital and/or home visit, only slightly more than half (56 percent) were called, and only 41 percent of participants are recorded as receiving medication review and reconciliation. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.15.3. Factors

Factors which potentially contributed to the favorable participant-level outcomes may include using data to identify problems and guide program adaptations. In addition, the site gained experience through a small pilot. The site identified an issue with acceptance rates and changed scripting, resulting in an increase in acceptance rates from 60 percent to 85 percent. It also made changes to staffing roles, including forming an eligibility determination team to identify patients and using one group of coaches exclusively for follow-up phone calls. The latter change was implemented to account for the increase in participant volume and to ensure that follow-up calls were made consistently. Staffing challenges may have contributed to the low telephone call completion rate shown in the List Bill data.

Competing priorities at hospitals, such as EHR implementation and leadership turnover resulted in delays in developing buy-in from hospital partners and reaching solutions to implementation challenges. Ultimately, one partner hospital dropped out in 2016. Additionally, the site found that moving CT workers into the hospital was a culture shock. It reported challenges defining CT worker roles and training CT workers to activate and coach participants rather than completing tasks, such as applying for services for them.

S.2.16. Site 30

S.2.16.1. Profile

Site Structure: The CBO is an aging services agency in the Northeast that partnered with seven hospitals and two community partners. The CBO provided coaches and coordinates the activities of seven other organizations (both hospitals and community partners) that provided additional coaches.

Intervention: The site offered multiple interventions. The CTI® arm was available to participants at all partner hospitals. One hospital system also offered three other interventions for the CCTP as alternatives to CTI®:

1. The Naylor intervention (for high-risk medical conditions).
2. A palliative care intervention for the seriously ill.
3. A telephonic intervention for low-risk patients.

Participants at this hospital each received one of these interventions. The site utilized the hospital–field worker model at larger hospitals. If the patient discharged to a SNF, the coach visited them at the SNF and conducted the intervention at discharge from the SNF. Coaches screened patients for support service needs, and the site had funding in its PEDR to cover services the patient needed.

Eligibility Criteria: The site served all Medicare FFS beneficiaries with COPD, AMI, stroke, pneumonia, diabetes, CHF, peripheral vascular disease, deep vein thrombosis, pulmonary emboli, coronary artery disease, back conditions, hip fracture, arrhythmia, anxiety, and depression, as well as patients admitted two times in the past 6 months regardless of medical condition.

Figure S.16. Site 30 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-19.91*** (p<0.01)
Hospital Readmissions (% Chg)	-0.78 (p=0.79)
Average Net Differences in Expenditures Per Discharge	$1,282*** (p<0.01)
Enrollment Rate (%)	17.67

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	32%
Hospital & Home	77%
Home	49%
Phone	87%
Med Rec	76%

Strengths	Challenges
Flexibility on adopting staff changes	Turnover at agencies providing coaches
Collaboration with ACOs	Hospital staff turnover
CBO focus on data and quality	Different hospital cultures and CT programs
CBO resources for data and management	Hospital acquired; paused CT work

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.16.2. Findings

For Site 30, we found that readmission rates were 19.91 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). Even though this resulted in 10.26 percent lower inpatient expenditures (p<0.10), this site's 30-day post-discharge Part A and Part B expenditures were 11.68 percent (p<0.01) higher among participants than for matched comparisons, suggesting higher expenditures of other types offset lower inpatient expenditures. After accounting for this site's average PEDR, this translated into higher net differences of $17,773,254 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. List Bill data suggest only 32 percent of participants received CTB, with slightly less than half (49 percent) receiving a home visit. Since only one hospital out of seven offers a telephone intervention, the low home visit rate may represent a reporting error. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.16.3. Factors

Factors which potentially contributed to the lower participant readmissions may include the site's strong focus on data to guide QI. For example, the site implemented a process of calculating LACE scores for participants to study ways it could stratify their intervention, as well as a readmission survey to guide future process improvement. The CBO was flexible in meeting the demand to staff a larger proportion of coaches than expected. It committed resources to data, staff, and additional management. It also implemented a hospital–field worker model, which it feels improved efficiency and the ability to complete home visits. The site also developed collaborations with two ACOs and other programs and departments within its partner hospitals, sharing lists of patients it

has identified as high risk and exchanging information on shared patients. This benefitted the program because the CTI® coaches are nonclinical, and they have been able to access nurse case managers for patient education.

Strong relationships and a commitment to the program and QI may have helped the site overcome several key challenges. One hospital partner was acquired, and there was a pause in CCTP services at that hospital while negotiations occurred with the new management. The site reported frequent hospital staff turnover, which resulted in challenges getting and maintaining a contact person at each hospital. It also found it challenging to deal with two different hospital systems with different corporate structures and different CCTP interventions. Some of the organizations providing coaches had significant turnover, which has affected the distribution of coaches and workload among partners. The CBO served more participants than it originally planned.

S.2.17. Site 32
S.2.17.1. Profile
Site Structure: The CBO is an AAA that partnered with 10 hospitals and 8 community organizations in a rural and suburban region in the South.

Intervention: It provided CT services using three different models:

4. Patients discharged to facilities or discharged with home health received services utilizing a post-acute care (PAC) model. In these cases, the case manager was responsible for getting discharge information to the appropriate facility or provider. An electronic form was used to determine whether facilities received the information required.

5. Patients discharged to home received CTI®. For patients enrolled in the CTI® arm of the project, the site stated that it maintained full model fidelity, although it did customize the PHR to make it more culturally appropriate and created a Spanish-language version.

6. Patients discharged home who refuse the full CTI® were enrolled in the Medication Adherence Program (MAP). MAP patients were assigned a pharmacy technician, who followed up with them and ensures that they have the proper medication upon discharge.

Coaches did not have EHR access, but the program's data system was able to connect to the EHRs at each hospital partner through a data feed in order to set up an automated system for case identification. Transportation and meals were included in the PEDR. Other services were provided through referral to the AAA.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with HF/CHF, AMI, pneumonia, COPD, diabetes, and readmission history, and those discharged to SNFs or with home health.

Figure S.17. Site 32 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.04 (p=0.10)
Hospital Readmissions (% Chg)	0.05 (p=0.99)
Average Net Differences in Expenditures Per Discharge	$1,088** (p=0.05)
Enrollment Rate (%)	17.05

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	36%
Hospital & Home	67%
Home	40%
Phone	60%
Med Rec	59%

Strengths	Challenges
Experienced CBO manager	Data system connectivity
Three-tiered intervention reaches more patients	High turnover in hospital liaisons
Strong hospital partner and example for others	All hospitals are not engaged
CBO creativity and fundraising	CBO is not using evidence-based models

Notes: *p<0.1, **p<0.05, ***p<0.01.

CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.17.2. Findings

Site 32 did not exhibit a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures for participants were 9.99 percent (p<0.05) higher than for matched comparisons, which translated into higher net differences in Medicare Part A and Part B expenditures of $16,243,794 (p<0.05) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data suggest only 36 percent of participants received CTB. The percentage of participants receiving all types of encounters was below average: 40 percent had a home visit, 60 percent a phone call, and 59 percent medication review and reconciliation. This is consistent with the multiple intervention types offered by the site, since two of the three do not include home visits. Estimates from the DiD analysis, which includes all discharges from CCTP partner hospitals and their matched comparison hospitals, indicate a statistically significant but small decreases in 30-day Part A and Part B expenditures (-4.28 percent, p=0.01). There was no significant impact on readmissions. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.17.3. Factors

Several key issues may have contributed to the lack of statistically significant readmission findings for this site. First, the MAP and PAC models are low-intensity interventions the site created, so there is no specific evidence these interventions are effective at reducing readmissions. Additionally, changes in EHR systems and problems with connectivity caused delays in data processing through the site's data system. The site gained direct access to the EHR at less than half of its partner hospitals to use when data system connectivity was down. High turnover among hospital liaisons also caused disruption, and there was considerable variability in the level of engagement across partner hospitals.

S.2.18. Site 33

S.2.18.1. Profile

Site Structure: The CBO is a nonprofit care management network in a rural and suburban area of the South that partnered with eight hospitals and seven community partners, including the hospital that created the model.

Intervention: The site utilized the Hospital to Home model, but it also allowed a telephone-only intervention for participants considered lower risk. CT workers identified patients using a census list sorted for Medicare type and county of residence. At one hospital, there was a hospital-based CT worker who identified and recruited patients, but at the other hospitals, CT workers did both hospital and field work. Low-risk patients were triaged for telephone-only follow-up, but most patients received a home visit within 24–72 hours of discharge that included medication review and referral for medication management services for any medication problems. The total number of home visits and follow-up calls varied based on patient needs, and there was a NP available to make visits to medically high-risk patients. CT workers participated in multidisciplinary rounding at the hospital, and the hospital staff members identified patients with higher medical needs during these rounds. A local SS agency provides five frozen meals to residents in its county who enroll in the program. In addition, the site had immediate in-home services, including home care and in-home meal preparation, included in its PEDR. All patients were supposed to receive a referral to SS for long-term support, and the site tracked all services and referrals. The site planned to begin seeing short-term patients discharged to SNFs in June 2014 to transition them home.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with HF, AMI, COPD, pneumonia, diabetes, patients with multiple readmissions, or those who were determined to be at high risk for readmission based on psychosocial risk factors.

Figure S.18. Site 33 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	1.09 (p=0.90)
Hospital Readmissions (% Chg)	0.32 (p=0.87)
Average Net Differences in Expenditures Per Discharge	$-1,058** (p=0.02)
Enrollment Rate (%)	5.13

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	30%
Hospital & Home	95%
Home	91%
Phone	77%
Med Rec	94%

Strengths	Challenges
CBO adaptations to challenges	Fewer eligible patients than planned
Good relationships with partners	CBO and hospital financial challenges
Sophisticated data system	Coaches keep patients too long
Availability of community support services	Observation status is high

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.18.2. Findings

For Site 33, we did not find a statistically significant difference in readmission rates between participants and matched comparisons. However, its 30-day post-discharge Part A and Part B expenditures were 25.23 percent (p<0.05) lower among participants than for matched comparisons, suggesting that lower non-inpatient expenditures may have led to the lower Part A and Part B expenditures. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $3,608,013 (p<0.05) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate only 30 percent of participants received CTB. Less than half (44 percent) are recorded as receiving a hospital visit; however, more than 90 percent had one or more home visits and medication review and reconciliation (91 percent and 94 percent, respectively). The low volume of hospital visits may reflect the site's pattern of services, a reporting error, or the site's interpretation of whether the visit took place during a certain timeframe. Estimates from the DiD analysis indicate that any differences for participants did not extend to a statistically significant CCTP impact on outcomes when considering all discharges from CCTP partner hospitals. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality). Given that this site had a low enrollment rate—5 percent—compared to the average enrollment rate of 18 percent across all index discharges in all sites, we would not expect to observe an impact in the DiD analysis.

S.2.18.3. Factors

Several key issues may have contributed to the lack of statistically significant readmission findings for this site. Because of the flexible nature of the model utilized—in terms of length and intensity of the intervention—some CT workers struggled deciding when to discharge patients from the intervention. At times, they followed participants for as many as 3 months. This affected efficiency, decreased their capacity to enroll new participants, and may have affected the site's ability to affect participant or hospital readmissions. The site also found there were fewer eligible patients than initially predicted when the application was written, which caused additional challenges meeting enrollment goals.

S.2.19. Site 34

S.2.19.1. Profile

Site Structure: The CBO is a charitable organization serving seniors that partnered with four hospitals and six community organizations in an urban area of the Midwest.

Intervention: The site provided CT services using CTI® as the formal model for the intervention. Each of the partner hospitals sent a list of eligible patients to the hospital coaches on a daily basis. The hospital coaches had read-only EHR access. While a consent form was not required by the CCTP, the site chose to utilize one. The consent process occurs at home for all hospitals except one, which requires coaches to obtain signed consent in the hospital. Home visit coaches made referrals for necessary home-based services through each hospital's corresponding community-based care coordination unit. The program was enhanced by the addition of pharmacy support services from a retail pharmacy chain as well as five home-delivered meals. In addition, a hospital partner provided scales to CHF patients. Coaches followed patients discharged to SNFs, performing visits approximately every other week and making calls to family. They then performed home visits if the patient went home within 21 days. No additional intervention was provided if a participant was not discharged from the SNF in that period.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with any underlying chronic condition.

Figure S.19. Site 34 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-15.66* (p=0.09)
Hospital Readmissions (% Chg)	-2.96 (p=0.55)
Average Net Differences in Expenditures Per Discharge	$-2,495*** (p<0.01)
Enrollment Rate (%)	23.80

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	47%
Hospital & Home	100%
Home	100%
Phone	97%
Med Rec	97%

Strengths	Challenges
Coaches are well integrated	Hospital leadership turnover
Coaches have resources	EHR change interrupted data transfer
CBO operated community support linkage in hospitals	Hospital staff resistance
Coordination with ACO and BPCI	Defining staff roles

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.19.2. Findings

Site 34 exhibited statistically significantly lower participant readmission rates relative to matched comparisons (15.66 percent; p<0.10). This site's 30-day post-discharge Part A and Part B expenditures for participants were 38.44 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $37,119,668 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. While the minority of participants (47 percent) received CTB, virtually all of them received a home visit, and almost all of them a phone call (97 percent) and medication review and reconciliation (97 percent). The driver of the relatively low percentage receiving CTB was the low percentage with a hospital visit (50 percent). This low volume may reflect this site's pattern of services, a reporting error, or its interpretation of whether the visit took place during a certain timeframe. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.19.3. Factors

Factors that may have contributed to the favorable participant-level outcomes include the fact the site was already established as the care coordination unit for three of its four partner hospitals. This meant that it had established relationships with these partners, and it allowed the site to establish in-home services quickly for patients at these hospitals. Hospitals provided EHR access, phone numbers, voice mail, and other resources the coaches needed. In addition, the site developed good coordination with local ACOs, nurse navigators, and bundled payments programs. They benefited from two-way communication about shared patients and by avoiding duplication of follow-up calls, which are frustrating to patients.

While the site reported challenges maintaining hospital leadership engagement due to turnover, it stated this did not affect day-to-day work due to the high integration of coaches into the hospital setting. There were also some challenges identifying which staff members work best in the hospital versus those that work best in patients' homes. Coaching staff members were originally allowed to choose their work sites and roles, but they were eventually assigned based on their individual strengths.

S.2.20. Site 35

S.2.20.1. Profile

Site Structure: This site is led by an AAA, which partnered with two hospitals and participated in multiple community coalitions.

Intervention: The site used CTI® as the formal model for the intervention and provided a telephone-only intervention to patients who initially declined the program because they do not want a person coming to their home. In rare cases, the program conducted an additional home visit. For participants discharged to SNFs, program staff could visit in order to establish rapport, but the CTI® intervention components were completed after discharge. The site also used a hospital–field worker model. Hospital staff identified eligible patients and provided a list to the hospital coaches. Hospital coaches had read-only access to partners' EHRs and could access additional information about eligible patients. Coaches did not use a formal assessment process to identify needs for supportive services; instead, they used their own judgment based on conversations with the participant. Patients in the program received a home visit 3–5 days post discharge and weekly follow-up phone calls. The agency also provided 14 days of meals and equipment such as scales to monitor body weight, blood pressure monitors, and pulse oximeters.

Eligibility Criteria: The program served Medicare beneficiaries of all ages. Targeting criteria included HF, pneumonia, COPD, history of readmissions, joint replacements, sepsis, renal failure, trauma, vascular or circulatory disorder, gastrointestinal disorder, comorbidities, multiple medications, being discharged to a SNF, being discharged to home health, dialysis, and "any patient at risk for readmission."

Figure S.20. Site 35 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-1.62 (p=0.87)
Hospital Readmissions (% Chg)	6.97* (p=0.06)
Average Net Differences in Expenditures Per Discharge	$-1,496*** (p<0.01)
Enrollment Rate (%)	9.02

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	9%
Hospital & Home	100%
Home	100%
Phone	9%
Med Rec	100%

Strengths	Challenges
CBO creative partnering for referrals	Fewer patients due to MA plans
CBO made adaptations to extend reach	CBO coach turnover
CBO secured new data system	Getting readmission information from hospitals
Good relationships with hospitals	Struggle to meet enrollment target

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.20.2. Findings

For Site 35, we did not find a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures were 25.71 percent (p<0.01) lower among participants than for matched comparisons. Inpatient expenditures were not statistically significantly different, suggesting that differences in non-inpatient expenditures or utilization drove this result. After accounting for this site's average PEDR, Part A and Part B expenditures translated into lower net differences in Medicare Part A and Part B expenditures of $10,377,583 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data suggest that fewer than 1 in 10 participants (9 percent) received CTB; only 9 percent received a phone call. This low phone call rate may be a reporting error, either due to the timing of List Bill submission (i.e., if the List Bill was completed after the home visit but before the follow-up phone calls) or if the site was only reporting telephone calls for participants receiving a telephone-only intervention. However, all participants had a hospital and/or home visit and medication review and reconciliation. Estimates from the DiD impact analysis show a statistically significant increase on the 30-day readmission rate (6.97 percent; p=0.06). DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.20.3. Factors

Several key issues may have contributed to a statistically significant increase in hospital-level readmissions exhibited by this site. The site struggled to find people who had the appropriate skill set to be successful CT workers. It found that it took a specific combination of teamwork, independence, and flexibility to be able to function as a CT worker, and the site reported challenges with turnover among its staff due to its struggle to identify the right people for the job. The site also struggled with obtaining readmission data from its partner hospitals so it could analyze trends, and it found enrollment in Medicare Advantage plans negatively affected the number of eligible patients at its partner hospitals. Additionally, while the site served participants in SNFs, it did not begin the intervention until after the participant was discharged from the nursing facility to home.

S.2.21. Site 40

S.2.21.1. Profile

Site Structure: The CBO is an SS nonprofit agency in the West that partnered with 3 hospitals and 21 community organizations.

Intervention: The site used CTI® as the formal model for the intervention. However, the CBO felt that its coaches went beyond the CTI® model because they often had to do more for patients due to challenges activating them about their health and engaging them in coaching. The site attributed these challenges to the cultural diversity of the population it serves, which includes beneficiaries from diverse backgrounds (e.g., Russian, Iranian, Filipino, Korean, Armenian, and Japanese). The challenges varied by cultural group but included a preference for hospital-based care, stigma surrounding mental health services, and deferring healthcare decisions to adult children. The site used a hospital–field worker model, assigning field workers based on geography and language. Coaches come from the communities they serve and speak Russian, Spanish, Tagalong, Korean, Farsi, Armenian, and Japanese. The coaches noted lengthy home visits due to the language and low socioeconomic status of participants. The site often missed people in the hospital but engaged them by phone or cold calls following discharge. The CBO provided the elements of the CTI® home visit in the SNF or after SNF discharge as the patient desires. Any high-risk patient could receive an additional home visit. Meals and transportation were included in the PEDR, and administrative staff set up referrals to other community services.

Eligibility Criteria: The site served Medicare beneficiaries of all ages meeting its extensive inclusion criteria of diagnostic criteria and other factors.

Figure S.21. Site 40 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-6.08 (p=0.53)
Hospital Readmissions (% Chg)	-5.14** (p=0.04)
Average Net Differences in Expenditures Per Discharge	$-1,943*** (p<0.01)
Enrollment Rate (%)	7.43

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	2%
Hospital & Home	95%
Home	94%
Phone	38%
Med Rec	55%

Strengths	Challenges
Long relationships with hospitals; coaches have resources	Physician buy-in for CT
Bilingual coaches hired from cultures they serve	Few resources for younger patients
CBO purchased great data system	Fewer patients; census drops and dual demo
CBO provides in home behavioral health services for seniors	Social Service agencies slow on referrals for services

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.21.2. Findings

Site 40 exhibited lower readmission rates and inpatient expenditures between participants and matched comparisons that were moderate in size but not statistically significantly different. However, 30-day post-discharge Part A and Part B expenditures for participants were 18.65 percent (p<0.01) lower than for matched comparisons, suggesting that other types of expenditures or PAC utilization were lower for participants. These Part A and Part B expenditures translated into lower net differences in Medicare Part A and Part B expenditures of $10,969,241 (p<0.01) after accounting for this site's average PEDR between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, only 2 percent of participants received CTB, 38 percent received a phone call, and 55 percent had their medications reviewed and reconciled. Estimates from the DiD analysis, which includes all discharges from CCTP partner hospitals and their matched comparison hospitals, indicate statistically significant decreases in 30-day readmission rates (5.14 percent; p=0.04) and 30-day Part A and Part B expenditures (4.86 percent; p=0.04). Given this site had a low enrollment rate—only 7 percent—compared to the average enrollment rate of 18 percent across all index discharges in all sites, it is reasonable that we would find either no impacts in the DiD analysis or smaller, marginally statistically significant improvement in the DiD analysis compared to the participant analysis.

S.2.21.3. Factors

Factors that may account for the lower statistically significant net differences in Medicare Part A and Part B expenditures for this site include successful activation of the target population served. The site noted challenges coordinating with HHAs during interviews. Staff members addressed HHA challenges by working through hospital care managers or by directly contacting the HHA if they had a relationship with the specific agency. The site inspired patients to try to manage their conditions in the home by arranging connections to support services and improving follow-up with PCPs after discharge. The coaches shared during the site visit that some of the populations served in this very multicultural urban area highly value hospital care and feel the best place for them was inpatient care. The site recruited coaches from within cultural communities and many coaches grew up and lived in the ethnic neighborhoods where their target patients lived, which may have contributed to increased trust in the coach and the program. The site was also very nimble in making changes to accommodate identified needs, was deeply driven by data and QI goals, and developed excellent relationships with the partner hospitals. In addition, the site offered in-home BH treatment services through its agency.

This site exhibited a statistically significant decrease in hospital-level readmissions, which may be due to the hospitals being supportive of the CCTP and viewing it as closely aligning with the core values of the hospitals. Every hospital had a champion for the CCTP, and all supported the case management and discharge planners' autonomy to make changes necessary to facilitate serving patients. The hospitals helped get physicians on board in addressing the needs of patients discharged to SNFs. The site also provided hospitals with readmission reports for each patient that highlighted the contributing factors that affected readmission, which could be used to inform process changes within the hospital. Lower hospital readmissions are unlikely to be the result of other formal readmission programs within partner hospitals, because the only hospital partner that reported a readmission program withdrew from participation in the CCTP after only 1 year.

S.2.22. Site 41

S.2.22.1. Profile

Site Structure: The lead CBO is an AAA/ADRC in the Northeast. Two CBOs provided coaches, 6 partner hospitals provided NPs for the CTI® intervention, and the site had 17 community partners.

Intervention: The site used CTI® as the formal model for the intervention. Those patients with medical or psychiatric complications received a home visit from an NP, and the intervention was delivered telephonically to those who did not want someone in their home. A patient could receive more than 1 home visit, received weekly calls for 30 days post discharge, and was followed by an NP for 60 days for cases with complex medical needs. Due to the lead CBO's work with SNFs, there was a nurse onsite in each facility in the community who coordinated discharge dates with the home visit coaches. The site served a diverse population. Fifty percent of patients had BH issues, and eight languages are spoken in the target communities. The site hired bilingual coaches to meet the needs of its diverse population. The site did not have support services included in its PEDR, but an assessment for community support services occurred in the hospital and the home, and referrals were provided. In addition, the CBO paid for a small package of services out of its own funds if a participant was not eligible for State-supported services.

Eligibility Criteria: The site served Medicare FFS beneficiaries aged 65 and over under its all-cause inclusion criteria. Between December 2014 and December 2015, the site expanded its program to all ages to meet the new target enrollment goal during this period. The site reverted to only serving beneficiaries aged 65 and over after the site received an extension in December 2015.

Figure S.22. Site 41 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-7.72 (p=0.24)
Hospital Readmissions (% Chg)	-0.26 (p=0.89)
Average Net Differences in Expenditures Per Discharge	$1,699*** (p<0.01)
Enrollment Rate (%)	32.97

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	63%
Hospital & Home	97%
Home	69%
Phone	78%
Med Rec	70%

Strengths	Challenges
Experience with hospitals; good partners	Coach turnover; hard to recruit at salary
Stable hospital leadership and staff	Patients: BH, low socioeconomic status, illiterate, homeless
Support services available through State and CBO	Patients go to out of area SNFs, hard to monitor
Each SNF has readmission program	Complex and duplicative data systems

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.22.2. Findings

For Site 41, we did not find a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures were 15.91 percent (p<0.01) higher among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into higher net differences in Medicare Part A and Part B expenditures of $10,875,211 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percentages of participants in this site's CCTP program with hospital or home visits, home visits, phone calls, and medication review and reconciliation were close to the average percentages recorded across all participants in all sites. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.22.3. Factors

This site exhibited higher statistically significant net differences in Medicare Part A and Part B expenditures relative to comparisons. This finding could be due to the challenging patient population served that exhibits a high degree of BH issues, low socioeconomic status, health literacy challenges, and a high rate of homelessness. These populations may have been less likely to consume needed health services prior to participation in the CCTP for a variety of reasons, including limited understanding of needed services or how to access them. If coaching educated the participants about how and why to obtain care and effectively motivated them to obtain it, it may have increased the rate at which these populations obtain necessary care. The site described excellent relationships with HHAs and staff, frequently conducting joint home visits. The site also addressed the varied needs of the population by employing NPs for high-risk patients, offering additional home visits and facilitating SNF readmission teams. The hospitals also started nurse-to-nurse SNF communication, pharmacy medication reconciliation, and complex care management teams. The CBO and hospital partners had a deep commitment to the project, jointly planning the intervention for 2 years prior to award. When the enrollment target was lowered in 2015, one hospital continued payment from its own funds up to its previous enrollment target. In addition, one hospital integrated CTI® into its ACO structure.

S.2.23. Site 42

S.2.23.1. Profile

Site Structure: The CBO is an AAA operating in an urban and suburban area in a northeastern State which partnered with 5 hospitals and 10 SNFs.

Intervention: The site used CTI® as the formal model for the intervention. The program offered a telephone-based intervention for patients outside the service area. Some patients received more than 1 home visit, particularly those readmitted within 30 days and patients discharged to SNFs. The intervention was delivered in the SNF, and patients received multiple visits while in the facility. The site also served patients not identified in the hospital prior to discharge. The site did not have support services in its PEDR, but the coach assessed needs for support services in the home/SNF and provided referrals.

Eligibility Criteria: The intervention was open to all Medicare beneficiaries who met the inclusion criteria of diagnostic and nonclinical factors, including HF, AMI, pneumonia, COPD, diabetes, discharged to a SNF, multiple medications, multiple chronic conditions, readmission history, and ZIP Code (as a proxy for poverty).

Figure S.23. Site 42 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.97** (p=0.01)
Hospital Readmissions (% Chg)	1.55 (p=0.68)
Average Net Differences in Expenditures Per Discharge	$287 (p=0.93)
Enrollment Rate (%)	16.80

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	68%
Hospital & Home	100%
Home	89%
Phone	89%
Med Rec	94%

Strengths	Challenges
Coaches are integrated in hospitals	High turnover hospital and CBO
CBO has good relations with HHAs	Many CT programs, the CCTP does not stand out
CBO fully engaged in process improvement	EHR change reduced referrals
Senior services are funded by the state	Health system purchased and changes are ongoing

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.23.2. Findings

Site 42 exhibited statistically significant lower participant readmission rates relative to comparisons (10.97 percent; p<0.05). We found no statistically significant difference in Part A and Part B expenditures between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percent of participants in this site's CCTP program that received CTB as well as the percentages with hospital visits, home visits, phone calls, and medication review and reconciliation were all above the average percentages recorded across all participants in all sites. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.23.3. Factors

The statistically significant lower participant readmissions exhibited by this site (relative to comparisons) is better than expected considering the challenges the site reported. Although the site worked closely with the hospitals on the application for the CCTP, the health system was purchased after award, which resulted in a high rate of staff and leadership turnover and the implementation of a new EHR. The site also noted there were many readmission reduction initiatives within the hospitals and the CCTP "does not stand out." In spite of these challenges, the site was data-driven, quality-focused, and made adaptations to meet the needs of its patients. The site expanded to include patients discharged to SNFs and implemented a telephone intervention for out-of-area patients. The latter was important due to the large number of patients who traveled a considerable distance to utilize the tertiary care services available in this urban community. The site also experienced a high rate of staff turnover, but it has adequately managed coach retention by improving its hiring strategy and providing additional support to coaches.

The lack of significant hospital-level outcomes is somewhat surprising given the large number of interventions in place at partner hospitals to address readmissions. These activities may not have been as effective as expected given the high (80 percent) rate of turnover in the health system after the acquisition. In addition, putting new processes in place and adopting a new EHR can slow progress.

S.2.24. Site 43

S.2.24.1. Profile

Site Structure: The site is a hospital system in an urban setting in the Northeast, which consisted of six hospitals (the hospital system purchased four hospitals in 2013 and added them to the CCTP in 2014) and a partner CBO that is a federally qualified health center that provided CT workers for the program.

Intervention: The site created its own CT model, which it felt meets the needs of the densely populated urban area. The model utilized a comprehensive psychosocial assessment conducted with the patient and family in the hospital setting, the development of an action plan, and fulfillment of the plan. The program did not conduct home visits, instead using face-to-face meetings in various settings, such as accompanying patients to appointments (50 percent of patients receive face-to-face interactions). The patient received a higher or lower intensity of interactions based on risk of readmission. The site reported that very high-risk patients generally received approximately 13 hours of intervention, high-risk patients received approximately 8 hours of intervention, and moderate-risk patients received approximately 2.5 hours of intervention. The intervention was 5 weeks in duration and addresses risk factors identified in the initial assessment and established in the patient's action plan. Services and support could include housing, utility assistance, application assistance for SS, crisis intervention, food access, transportation, and home modifications. Workers visit patients in SNFs. The site did not have a bundle of services in its PEDR but paid for meals and transportation out of its own funds. The CBO operated several outpatient clinics providing primary care, dental, BH, and allied services.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with no exclusions. It embedded a modified risk score for patient selection into the EHR that considers conditions and demographics.

Figure S.24. Site 43 Snapshot

Metric	Assessment
Participant Readmissions	0.91
(% Chg)	(p=0.85)
Hospital Readmissions	1.50
(% Chg)	(p=0.19)
Average Net Differences in	$938
Expenditures Per Discharge	(p=0.29)
Enrollment Rate (%)	18.15

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	1%
Hospital & Home	98%
Home	2%
Phone	97%
Med Rec	2%

Strengths	Challenges
Partner hospital and CBO long history, use same EHR	Excessive effort to automate patient ID
Devoted to readmission analysis	Integrating four purchased hospitals
The CCTP preferred over other CT programs in health system	Challenging urban population
Volunteers perform many activities to free coach time	75-minute patient assessment too "clunky"

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.24.2. Findings

For Site 43, we did not find a statistically significant difference in readmission rates or Medicare Part A and Part B expenditures between participants and matched comparisons. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, less than 1 percent of participants received CTB. While 98 percent are recorded as receiving a hospital and/or home visit and 97 percent received one or more phone calls, 2 percent of participants had a home visit, and 2 percent had medication review and reconciliation. The low home visit rate is consistent with the site's unique intervention, which is tiered by risk and conducts face-to-face visits at doctor's appointments and in other settings. Estimates from the DiD impact analysis indicate CCTP participation shows no statistically significant CCTP impact on 30-day readmissions or 30-day Part A and Part B expenditures. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality). However, the findings of no change/no impacts are consistent between the participant cross-sectional and the DiD analyses.

S.2.24.3. Factors

There were no statistically significant findings for this site, which may be due to the challenges the site experienced scaling its proposed approach to the large number of participants it needed to screen, enroll, and serve to meet its enrollment goal. The site had a wide variety of Medicare beneficiaries it could potentially serve, and it needed to effectively narrow down its census to meet the enrollment goal while also identifying participants who were at high risk for readmission. To accomplish this, the site sought electronic solutions for patient selection and expended huge

resources trying to attain that goal, which it admitted was a lot of effort for little results. The site also conducted a lengthy psychosocial assessment with each patient, which it decided was too time consuming and in need of revision. The hospital system is the awardee. As a large, urban teaching hospital, it is driven toward achieving population health management and committing extensive resources toward process improvement. The hospital system purchased four additional hospitals, and including them in the CCTP was another challenge in terms of the time spent getting buy-in and dealing with process and data issues in order to get the intervention operational in those hospitals. The CCTP had a very large staff and targeted a large number of people, so there were inherent challenges in hiring, training, and deploying the coaches needed for the new facilities.

S.2.25. Site 50
S.2.25.1. Profile
Site Structure: The CBO is an AAA/ADRC serving urban, suburban, and rural populations in the West that had 13 hospital partners in 4 health systems.

Intervention: The site used CTI® as the formal model for the intervention, enhanced by pharmacy medication therapy management, case management, advanced care planning, palliative care, and care enhancement (a wide variety of services included in the PEDR). The site initiated pharmacy medication reconciliation at all partner hospitals to address root cause analysis findings of medication issues. The CBO provided coaches to two hospitals, and the other hospitals provided their own coaches. All provided pharmacists for medication therapy management services (paid out of the PEDR). The CBO provided social workers to all hospitals for the care enhancement program. Telephone interventions were available for out-of-area patients. The site paused the intervention for patients discharged to SNFs but could start the intervention in the SNF depending on the length of stay. One hospital system sent NPs to SNFs to perform medication reconciliation for its patients. The site built a system for referrals and data from all partners to support billing for services. The package of services available in the PEDR included case management, meals, transportation, caregiver support, personal care, homemaker services, medication financial assistance, and pillboxes.

Eligibility Criteria: All Medicare beneficiaries were initially eligible and were further screened based on hospital-specific inclusion criteria,[6] as well as by using a screening tool embedded in each hospital's EHR.

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[6] Inclusion criteria generally address comorbidities, readmission history, polypharmacy, multiple emergency department visits, lack of social supports, inability to provide self-care, end-of-life issues, and CMS target diagnoses.

Figure S.25. Site 50 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-3.83 (p=0.44)
Hospital Readmissions (% Chg)	-0.76 (p=0.74)
Average Net Differences in Expenditures Per Discharge	$1,816*** (p<0.01)
Enrollment Rate (%)	30.68

Participant Encounter/Service Percentages

Encounter/Service Type:
- CTB: 20%
- Hospital & Home: 93%
- Home: 25%
- Phone: 51%
- Med Rec: 42%

Strengths	Challenges
Pilot 2010, partners involved in application	Complexity of patients increasing
Staff background in BH and homeless to address needs	Admissions declining, MA and dual plans reduce numbers
Pharmacist med rec all hospitals	SNFs in chaos due to Medicaid changes
Support service flexibility to meet needs	Timely home visits

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.25.2. Findings

Site 50 did not exhibit a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures for participants were 20.21 percent (p<0.01) higher than for matched comparisons, driven by higher non-inpatient expenditures. This translated into higher net differences in Medicare expenditures of $67,796,000 (p<0.01) between participants and matched comparisons after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data indicate only 20 percent of participants received CTB; only one-fourth of participants had a home visit, half a phone call, and 42 percent medication review and reconciliation. There were no encounters reported for 5 percent of the participants. The low home visit rate might be partially explained by the following factors:

- Telephone-only interventions for participants discharged out of the area.

- Participants receiving care enhancement (supportive services provided after discharge funded by the PEDR) alone (starting in 2015).

- The site did not recommend home visits for all patients.

In addition, the model includes many different components, and participants might receive all or just a few of the components. The site reported that approximately 50 percent of participants received a home visit.[7] The site may also have some data reporting issues. It noted a significant challenge putting together the infrastructure for reporting services for billing purposes because different entities delivered various parts of the intervention. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.25.3. Factors
The higher statistically significant net differences in Medicare Part A and Part B expenditures relative to comparisons may be related to the site's assertion that targeted patients were underserved prior to the CCTP and that activating the patients led to appropriate use of healthcare services, including home health, primary care, laboratory tests, and prescription drugs. The site noted underutilization of home health as one issue its coalition addressed. The site carefully planned its intervention with its partner hospitals and started a pilot in 2010. The community is supportive of healthcare improvement, so the CCTP fit in with the community initiative. The QIO and hospitals engaged SNFs in readmission reduction, and multiple levels of committees reviewed readmissions and trends.

S.2.26. Site 52
S.2.26.1. Profile
Site Structure: The CBO is an SS nonprofit agency providing senior services for suburban and rural residents in the Midwest which partnered with 3 hospitals and 10 community organizations.

Intervention: The site used the Bridge model as the formal model for the intervention. It used a hospital–field worker model, and one hospital used a screening tool based on BOOST. The program conducted up to 3 home visits at days 2, 10, and 30 post discharge, depending on patient need. Patients who did not want home visits received the Bridge telephone intervention. The intervention was paused for patients discharged to SNFs and continued for 30 days after SNF discharge. The CBO provided meals, transportation, and homemaker services to CCTP clients, but does not include these in its PEDR. Coaches used the Bridge Intake Assessment in the home to determine patient support needs, which included ADLs, IADLs, mental status, and home safety. The site provided services directly and prioritizes discharged patients for home-delivered meals in order to avoid the beneficiaries going onto a waiting list. The CBO also operates a rural mass transit program that was useful in providing transportation to CCTP participants. The site worked with agencies in other counties to provide services for patients discharging out of the area.

Eligibility Criteria: The site served Medicare FFS beneficiaries age 18 and older with at least 1 chronic condition.

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[7] This reported information does conflict with site-reported encounter data in the List Bill (Figure S.25).

Figure S.26. Site 52 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-11.16 (p=0.25)
Hospital Readmissions (% Chg)	3.81* (p=0.09)
Average Net Differences in Expenditures Per Discharge	$-924** (p=0.02)
Enrollment Rate (%)	21.40

Participant Encounter/Service Percentages

Encounter/Service Type:
- CTB: 0%
- Hospital & Home: 81%
- Home: 39%
- Phone: 67%
- Med Rec: 2%

Strengths	Challenges
Excellent hospital relationships and pilots	Rural area so travel time is extensive
Coaches have all resources	State budget delay funding senior services
Hospital leadership promotes the CCTP, attends LC	Social Service agencies will not prioritize discharged patients
State funds services for those 60 and older	Training and onboarding takes a month

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.26.2. Findings

For Site 52, we found no statistically significant difference in readmission rates between participants and matched comparisons. This site's 30-day post-discharge Part A and Part B expenditures were 14.65 percent (p<0.05) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $5,250,261 (p<0.05) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, less than 1 percent of participants received CTB. More than half (59 percent) are recorded as receiving a hospital visit, and 39 percent received a home visit, but only 2 percent had medication review and reconciliation. The home visit rate is influenced by the fact that some participants received the telephone-based Bridge intervention, which did not include a home visit. Estimates from the DiD analysis show a statistically significant increase in readmissions (3.81 percent, p=0.09) when considering all discharges from CCTP partner hospitals However, there was no statistically significant CCTP impact on Medicare Part A and Part B expenditures.

S.2.26.3. Factors

The favorable participant-level outcome in net differences in Medicare Part A and Part B expenditures for this site may be due to the intensity of its intervention and the excellent relationships and support it received from its partner hospitals. The availability of the Community Resource Center at 1 hospital, which houses 15 community service agencies onsite and utilizes hospital navigators who perform intakes and meet with frequently admitted patients in the

emergency room, reportedly reduced the admission rate among these patients by 75 percent. This program may be one explanation for the findings related to lower Medicare expenditures. The site's lower Medicare Part A and Part B expenditures may also be related to the success of the intervention in activating and supporting participants in their recovery. The site used the Bridge model with adaptations that include up to three home visits for discharged patients; a high-intensity nurse coach to make home visits in rural areas; and meals, transportation, and homemaker services covered by the CBO. The site also prioritized meals for CCTP patients to avoid the wait list and entered into an arrangement with a provider of home medication-dispensing machines to offer them to discharged patients free of cost. The hospital partners were supportive of the CCTP, promoted the program to employees, and praised those who made referrals to the program. All of the hospitals attended the Learning Collaborative for CCTP sites as well as work with the QIO and SNFs on readmission reviews, and two of them were involved in a program pilot. A statewide initiative promoted by the State government focuses on a holistic approach to healthcare. One hospital CEO opened a community resource center in an empty wing of the hospital, as he was interested in the addressing the social determinants of health identified through the analysis of the root causes of readmission. Because this experiment was considered so successful, community resources centers will be expanded to more hospitals in the health system.

S.2.27. Site 54

S.2.27.1. Profile

Site Structure: The CBO is an AAA/ADRC that partnered with 11 hospitals to provide CT services in a rural and suburban region of the Midwest.

Intervention: The site used CTI® as the formal model for the intervention. Patient identification varied between hospitals. Some had the tool built into their EHRs and could run reports, others searched EHRs to get the information, and others worked with case management to identify patients. Each hospital had a dedicated lead coach, and home visits were distributed to field coaches based on ZIP Code. To enhance the CTI® model, the program sent PCPs and HHAs a letter about each patient served, and provided patients with information about advance directives and Physician Orders for Life-Sustaining Treatment. No support services were included in the PEDR, but patients could be referred to the CBO's ADRC for resources at any time during the intervention. Patients discharged to SNFs for short-term stays received a home visit after discharge from the SNF.

Eligibility Criteria: The program targeted Medicare beneficiaries of all ages, with HF/CHF, pneumonia, AMI, COPD, and symptoms associated with these diagnoses, as well as those who are eligible based on an evidenced-based risk tool. The program excluded patients with dementia who do not have a caregiver and patients with addiction issues.

Figure S.27. Site 54 Snapshot

Metric	Assessment
Participant Readmissions	-19.95***
(% Chg)	(p<0.01)
Hospital Readmissions	-1.19
(% Chg)	(p=0.52)
Average Net Differences in	$-590***
Expenditures Per Discharge	(p<0.01)
Enrollment Rate (%)	14.55

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	63%
Hospital & Home	100%
Home	98%
Phone	86%
Med Rec	89%

Strengths	Challenges
CBO leadership committed; rapid changes	Lack services for BH and homeless
Persistent efforts regained EHR access	Lost community partner providing coaches
Commitment to data and monitoring	Lost champions; EHR access lost one hospital
Adapted to partner loss to cover four hospitals	Serving sufficient number of patients

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.27.2. Findings

Site 54 exhibited statistically significant lower participant readmission rates relative to matched comparisons (19.95 percent; p<0.01). This site's 30-day post-discharge Part A and Part B expenditures for participants were 15.03 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $5,026,626 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percentage of participants in this site's CCTP program that received CTB as well as the percentages with hospital and/or home visits, home visits, phone calls, and medication review and reconciliation were all above the average percentages recorded across all participants in all sites. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.27.3. Factors

Factors which potentially contributed to the favorable participant-level outcomes may include persistent efforts by the program manager to build and maintain relationships. The site engaged the hospitals regularly by sharing data and an agenda with all hospitals on a monthly basis and completing a monthly one-on-one meeting to address program issues and individual hospital concerns. The site developed a closer interaction with home health and other providers by sending PCPs and HHAs a letter about each patient served and established strong relationships with local SNFs, resulting in referrals from both HHAs and SNFs when patients were missed before they left the hospital.

The site's commitment to relationship building may have aided in overcoming challenges when the site lost a community partner that provided coaches to hospitals in part of the service area. It quickly moved to build its own relationship with those hospitals and to address concerns the hospitals had about program staff. It quickly established stronger relationships, and a new coaching staff was put into place without any dip in enrollment.

S.2.28. Site 56

S.2.28.1. Profile

Site Structure: The CBO is an ADRC that partnered with three hospitals in the South in a mixed urban and rural service area.

Intervention: The site utilized CTI® as the formal model for the intervention. At the larger hospital, coaches received the daily census and use the EHR to case find. At the two rural hospitals, coaches received referrals from hospital staff. All coaches worked at the hospitals and in the field; coaches identified and recruited patients at the hospital, and home visits were assigned to coaches based on geographic location. A participant could have a single coach following them through the entire intervention if they live in their hospital coach's home visit area. Clients who were discharged to SNFs for up to 45 days were visited in the SNF at least once and could receive phone calls and additional visits from the coach, depending on their time in the facility. They also received a visit at home after SNF discharge. The program included a support package in its PEDR that provided 14 meals, transportation, and respite care. Clients were screened for needs on the home visit using three screening tools that are used for all ADRC clients, and coaches made referrals as needed. The site obtained additional grant funds to supplement the 14 meals included in the PEDR, so the site could offer 30 meals to participants who needed them. One partner hospital started a CT clinic, which is staffed by a hospitalist who could provide CCTP clients with a follow-up physician appointment if they are unable to see their physician within 7 days.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with any cause of admission.

Figure S.28. Site 56 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-30.83** (p=0.02)
Hospital Readmissions (% Chg)	0.48 (p=0.89)
Average Net Differences in Expenditures Per Discharge	$-2,026*** (p<0.01)
Enrollment Rate (%)	12.05

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	89%
Hospital & Home	100%
Home	100%
Phone	99%
Med Rec	100%

Strengths	Challenges
Pilot with all hospital partners	Hospital CEO and staff turnover
Coaches integrated but no EHR at small hospitals	Patients discharging to another state
Good communication with SNFs	Meeting enrollment numbers
Hospital started CT clinic due to PCP shortage	Recruitment challenges

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.28.2. Findings

For Site 56, we found that readmission rates were 30.83 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.05). This site's 30-day post-discharge Part A and Part B expenditures were 39.99 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $5,017,414 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, participants at this site received an intensive intervention. Eighty-nine percent of participants received CTB. Every participant was recorded as receiving a home visit, and almost all received at least one phone call and had their medications reviewed and reconciled. Estimates from the DiD analysis indicate that differences for participants did not extend to improvements in outcomes across all discharges from CCTP partner hospitals. In fact, the DiD impact estimates show statistically significant 3.51 percent increase in 30-day Part A and Part B expenditures (p=0.01) and no statistically significant impact on 30-day readmission rate. However, DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.28.3. Factors

Factors that potentially contributed to the favorable participant-level outcomes may include the experience the site gained conducting a CT pilot program with all three partner hospitals prior to the CCTP, which helped to establish relationships and operational processes. The site believed the coaches were well integrated in the hospitals, although the resources available varied based on hospital size. At the larger hospital, coaches had IDs, office space, phones, and EHR access, whereas the coaches at the smaller hospitals did not have this access. In all hospitals, however, the coaches attended regular meetings with hospital staff and were able to have informal conversations about patients. The site was also committed to maintaining regular communication with SNF staff so that discharges and other information were not missed.

Strong relationships may have helped the site overcome hospital staff and leadership turnover, which the site considered to be one of its key challenges. The site reported challenges with recruitment, which resulted in changes to its scripting and materials to use simpler language. The site also reported a large number of eligible participants discharged to a different State, where it did not serve participants.

S.2.29. Site 58

S.2.29.1. Profile

Site Structure: The CBO is an AAA which partnered with 5 hospitals and 10 SNFs in a predominantly rural area.

Intervention: It utilized CTI® as the formal model for the intervention. The site utilized a hospital–field worker model and has designated coaches that provide the intervention to patients discharged to SNFs and for participants who experienced a readmission during the CCTP intervention. No support services were included in the PEDR, and referrals were made when participants had additional needs. For participants discharged to SNFs, the SNF coach visited the patient in 24 to 48 hours and continued to visit in the SNF on a weekly basis at a minimum. When the patient discharged from the SNF, the coach planned the home visit. At that time, they conducted a home assessment and made any needed referrals for services. Follow-up phone calls were done between days 21 and 30, based on the coach's judgment.

Eligibility Criteria: The program served Medicare beneficiaries of all ages with specific diagnoses (i.e., AMI, COPD, HF/CHF, pneumonia, renal, stroke, or multiple chronic conditions), socioeconomic frailty, polypharmacy, readmission history, and those discharged to SNFs.

Figure S.29. Site 58 Snapshot

Metric	Assessment
Participant Readmissions	-14.32***
(% Chg)	(p<0.01)
Hospital Readmissions	-1.13
(% Chg)	(p=0.61)
Average Net Differences in	$158
Expenditures Per Discharge	(p=0.31)
Enrollment Rate (%)	23.48

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	44%
Hospital & Home	100%
Home	100%
Phone	72%
Med Rec	73%

Strengths	Challenges
Long history with partner hospitals	Hospital care manager turnover
Coach specialization addresses needs	Two State programs reduced patient base
CBO large and well organized	CBO serves State eliminated patients without pay
CBO devoted to rapid-cycle improvement	Building relations with SNFs

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.29.2. Findings

Site 58 exhibited statistically significantly lower participant readmission rates relative to comparisons (14.32 percent; p<0.01). Even though we observed similarly lower inpatient expenditures (12.73 percent, p<0.01), we found no statistically significant difference in Part A and Part B expenditures between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. While the minority of participants (44 percent) received CTB, all of them had at least one home visit. According to List Bill data, only three-fourths received a hospital visit, 72 percent received a phone call, and 73 percent had medications reviewed and reconciled. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.29.3. Factors

Factors that potentially contributed to this site's favorable participant-level readmission outcome may include the fact this site had a large coaching staff that was specialized into four main roles—hospital, field, SNF, and readmission. The site also utilized non-coach schedulers whose full-time responsibility was to schedule home visits to increase coach efficiency. There were strong relationships with hospital partners and most SNF partners. The site had a long history of working with its partner hospitals in different capacities over the past 30 years. Some of the CBO staff members had also known people in hospital leadership positions for decades, and having those connections resulted in trust between the partners. The site considered this a key element of its success. The site seemed to have overcome major challenges as they arose. For example, it implemented an electronic daily census from case management teams to speed up the identification process and added SNF coaches to work with participants discharged into a SNF. It tackled

challenges by engaging in frequent PDSAs, covering topics that range from coach uniforms to promotional material and coach deployment strategies. The site also engaged in pilot tests of process changes, such as patient identification with their hospital partners.

Strong relationships and a commitment to QI may have helped the site overcome several key challenges. Two State-level programs—the Commonwealth Coordinated Care program and a CMS dual-eligible managed care demonstration project—reduced the number of potentially eligible CCTP participants because their participants are no longer Medicare FFS. In an effort to reduce its hospital-level readmission rates, the site still served patients for free who are no longer eligible because of these two programs, but the site was not reimbursed and the patients did not count toward its target enrollment. The site was also challenged to get processes in place for working with other programs in the community. In addition, the turnover of hospital staff, especially care managers, made it necessary to continually reeducate.

S.2.30. Site 59

S.2.30.1. Profile

Site Structure: The CBO is an AAA/ADRC located in a rural area of the South that partnered with eight hospitals but had no formal arrangements with community partners specific to the CCTP.

Intervention: The site used CTI® as the formal model for the intervention, enhanced by support services in its PEDR, such as transportation, home-delivered meals, personal care, and prescription copays. The site adapted the CTI® model to offer home visits in alternate locations to address the preferences of patients who are unwilling to allow coaches into their homes. The site allowed this flexibility because it felt that it was better to be able to review discharge instructions and offer some coaching and support, even in more limited amounts, than to leave the beneficiary without assistance. They also provided the elements of the CTI® home visit in SNFs, which helps with early identification of support service needs and reduces the impact of waiting lists after SNF discharge. The coach followed up with a home visit after SNF discharge if there is a concern about the home environment.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who discharged to home or a SNF in three States, with specific diagnoses, social needs, or based on LACE scores.

Figure S.30. Site 59 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-25.13*** (p<0.01)
Hospital Readmissions (% Chg)	2.55 (p=0.27)
Average Net Differences in Expenditures Per Discharge	$-1,179*** (p<0.01)
Enrollment Rate (%)	20.47

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	56%
Hospital & Home	99%
Home	89%
Phone	96%
Med Rec	80%

Strengths	Challenges
Strong hospital relationships and pilots	Varying hospital processes delayed implementation
CBO focused on QM/QI; trained in LEAN	Challenge getting discharge information
Coaches have resources and are integrated	Hospital privacy concerns delayed CBO data system
Site staff relations minimized turnover impact	Significant hospital turnover

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.30.2. Findings

For Site 59, we found that readmission rates were 25.13 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). This site's 30-day post-discharge Part A and Part B expenditures were 22.44 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $10,708,799 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percent of participants in this site's CCTP program that received CTB as well as the percentages with hospital and/or home visits, home visits, phone calls, and medication review and reconciliation were all above the average percentages recorded across all participants in all sites. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.30.3. Factors

Factors that potentially contributed to this site's favorable participant-level outcomes may include having experience conducting a CT pilot with one partner hospital, which served as the foundation for implementing the CCTP, as well as regular two-way communication and follow-up between the CBO and its hospital partners. Additionally, good rapport between coach and discharge staff minimized the impact of staff turnover. The site had good buy-in from hospital case management and other staff with which its coaches work directly, and it was asked to participate in hospital-run coalitions with PAC providers and attend readmission meetings. The coaching staff made it a priority to be a resource for the case managers with which they work, and this was embraced by hospital staff. CBO staff also had a strong focus on QM/QI. Targeting criteria changed

significantly over time in response to program data and changes in the enrollment goal. For instance, the decision to include patients living in two neighboring States was made based on analysis of hospital data on patient zip codes, which revealed that 15–18 percent of patients were discharging to those States. The organization received training in LEAN, and it used LEAN principles to streamline its processes, including prepositioning frozen meals at the hospitals so coaches do not need to come to the office to get them and purchasing equipment and meal replacements for patients through an online vendor. In addition to improvements in the program, the CBO worked with hospitals and provided information that has resulted in improvements in its own processes. For example, coaches were able to provide photos of participant discharge medication lists as well as bottles of duplicate medications many participants had at home. This led one hospital partner to make changes in the way medications are listed in the discharge paperwork.

During implementation, the site found details and policies varied among hospital partners, so it encountered new, unexpected problems at each one. This caused rollout to go less smoothly than expected. The site struggled to get good discharge data so it could schedule home visits and meal delivery in a timely fashion. This challenge was mitigated through excellent relationships between the CT workers and hospital discharge staff, as well as the purchase and implementation of a new data system that connected to a data feed from the hospitals. Turnover in hospital leadership was an ongoing problem, with one hospital partner having three different administrators over the course of CCTP participation. They also lost a director of case management who was a strong champion.

S.2.31. Site 60
S.2.31.1. Profile
Site Structure: The CBO is a nonprofit serving a predominately Armenian urban population in the West that partnered with three hospitals. The CBO also operated Sites 71 and 103.

Intervention: The site used a blended model of CT that included CTI®, Bridge, and their own adapted HyBridge model, which is a modified version of CTI® for participants having activation difficulties due to language, culture, or socioeconomic status who need more assistance to obtain appointments or services for themselves. The HyBridge client received one or more home visits, care coordination, assistance, and follow-up calls. In the HyBridge intervention, the coach facilitated making appointments, requesting services, filling out applications for assistance, or whatever the patient might need to remain safe in the home. A telephonic Bridge intervention was offered to patients living out of the area or who did not want people in their home. The site used a hospital–field worker model for the two larger hospitals and was largely dependent on hospital staff for referrals. The site did not receive EHR access until 2015 and did so at only two hospitals. Twenty-five percent of patients discharge to SNFs, and the program was open to these patients. Designated staff members stayed in contact with the facility to determine discharge dates, and the 30-day intervention began after discharge. The site did not have support services in the PEDR, but linked people to service providers in the community, which is rich in resources.

Eligibility Criteria: The site served Medicare beneficiaries of all ages meeting all-cause inclusion criteria and who were screened as at risk with various tools used by the hospitals.

Figure S.31. Site 60 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.21* (p=0.10)
Hospital Readmissions (% Chg)	-2.80** (p=0.03)
Average Net Differences in Expenditures Per Discharge	$-2,796*** (p<0.01)
Enrollment Rate (%)	20.60

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	31%
Hospital & Home	88%
Home	48%
Phone	98%
Med Rec	42%

Strengths	Challenges
Conducted pilot with large hospital who wrote application	Dependence on hospital staff and no EHR access until 2015
Uses three interventions to address patient needs	Hospital champion who wrote application left
CBO owns Web-based med rec program	Monolingual urban population has many cultural challenges
Coaches are bilingual and have resources	Hospitals not interested in readmission reviews

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.31.2. Findings

Site 60 exhibited statistically significantly lower participant readmission rates relative to comparisons (10.21 percent; p<0.10). This site's 30-day post-discharge Part A and Part B expenditures for participants were 31.39 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $13,655,145 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. List Bill data suggest only approximately 31 percent of participants received CTB, with fewer than half (48 percent) receiving a home visit and 42 percent medication review and reconciliation. This is consistent with a multi-arm intervention that includes a telephone-only Bridge model. Almost all participants (98 percent) received one or more phone call. Estimates from the DiD impact analysis indicate that CCTP participant results may have extended to hospital-level decreases for 30-day readmissions (2.80 percent, p=0.03) and inpatient expenditures, but not 30-day Part A and Part B expenditures.

S.2.31.3. Factors

Factors that potentially contributed to this site's favorable participant-level outcomes and favorable decrease in hospital-level readmissions could include the multipronged CT strategy employed in order to meet the needs of discharged patients with varied needs. The site offered CTI®, Bridge for patients out of the area or those not wanting a home visit, and a blended HyBridge model to provide additional support for high-risk patients. The target population was largely monolingual Armenians who presented some cultural challenges; however, it appears the program may have effectively supported these participants in meeting their post-discharge needs. In addition, the lead CBO is a strong organization that operates multiple evidence-based programs,

raises significant funding to support programs, and operates three CCTP sites. The CBO was also very committed to CT and entered into multiple contracts with health plans. The site focused on quality and disease management, made its web-based medication reconciliation program available for served patients, and worked with the QIO and other community agencies on readmissions efforts.

These strengths may have helped the site overcome challenges. Even though the site described its relationships with its partner hospitals as good, the program was not as well integrated in the hospitals as some other programs.

S.2.32. Site 67
S.2.32.1. Profile
Site Structure: The CBO is a religious nonprofit organization in an urban multicultural community in the South that implemented the CCTP in partnership with five hospitals.

Intervention: The site used CTI® as the formal model for the intervention, augmented with additional phone calls (five total). It used a hospital–field worker model where RNs were lead coaches and licensed practical nurses were field workers. Coaches were linguistically diverse to accommodate the multicultural population. The CBO started conducting enhanced hospital visits and follow-up phone calls with out-of-area patients and those refusing a home visit in 2015. It also called higher functioning patients to see if needs have changed. The site developed its own data system in-house that automatically assigned home visits to field workers, creates reminders for activities due, and provides data for reports through downloads to spreadsheets. The program was open to patients discharged to SNFs. Field workers were assigned to specific SNFs close to where they live. They visited patients in the SNF and then conducted the intervention after discharge. The site had two round-trip transports, 30 days of meals, and prescription assistance in the PEDR for the subset of participants who need these types of assistance.

Eligibility Criteria: The program served all Medicare beneficiaries age 22 and older who screened at high risk using the BOOST 8P tool.

Figure S.32. Site 67 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-10.61* (p=0.09)
Hospital Readmissions (% Chg)	4.42 (p=0.24)
Average Net Differences in Expenditures Per Discharge	$318 (p=0.98)
Enrollment Rate (%)	18.31

Participant Encounter/Service Percentages

Encounter/Service Type	
CTB	94%
Hospital & Home	100%
Home	100%
Phone	97%
Med Rec	100%

Strengths	Challenges
Prior hospital experience; good relationships	Largest hospital has 8 CT programs; compete for patients
CBO Lean Six Sigma Master Black Belt leads QI	Transportation is a huge challenge
CBO analyzes readmissions, discuss with hospital	Extensive wait lists for all support services
CBO uses M.S.W. students for post CT patient support	Billing issues persist and data system report problems

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.32.2. Findings

For Site 67, we found that readmission rates were 10.61 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.10). Even though we found lower, statistically significant inpatient expenditures (20.03 percent, p<0.01), we found no difference in Part A and Part B expenditures between participants and matched comparisons. This implies that other Medicare Part A or Part B service expenditures may have outweighed the lower inpatient expenditures. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. List Bill data indicate 94 percent of participants received CTB. All of this site's participants had a home visit and medication review and reconciliation; 97 percent received at least 1 follow-up phone call. Estimates from the DiD analysis indicate there was no statistically significant CCTP impact on outcomes when considering all discharges from CCTP partner hospitals. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.32.3. Factors

The factors that may have contributed to this site's favorable participant-level readmission result are strong relationships with its hospital partners and a deep commitment to QI on the part of the CBO. The CBO is a provider of post-acute services and had worked with the partner hospitals for many years prior to award. It felt that experience in operating other programs provided it with great insight into the needs of the beneficiaries served. The CBO built its own data system, which provided great capacity for QM and has a Lean Six Sigma master black belt heading its Quality and Analytics Department supporting its root cause analysis on every readmission. The Chief

Medical Officer reviewed readmission reports. The site rapidly adopted changes to its program to address challenges that included expanding its inclusion criteria, adopting a hospital–field worker model, and adopting the enhanced hospital visit to support a telephone intervention for out-of-area patients and those who refuse home visits. The site also developed innovative methods to enhance its intervention. For example, to better address the need for coaches appropriate to the multicultural population, the site recruited physicians from other countries as coaches. They also entered into an arrangement with the social work school of the university to have students provide post-intervention support to patients as a practicum component of their education. In addition, the site implemented the "Stop and Watch" tool with SNF partners, training all SNF staff (including custodians) on use of the tool to ensure everyone was aware of danger signs of conditions that could lead to readmission if they are not recognized and handled appropriately.

S.2.33. Site 68
S.2.33.1. Profile
Site Structure: The CBO is an AAA in the West. It partnered with 3 hospitals and 21 community organizations to serve 11 suburban and rural counties in 2 States.

Intervention: The program used CTI® and Bridge as the formal models for the intervention. Patients screened at high and moderate risk based on the screening tool in the CBO's database received the full CTI® or Bridge intervention. Low-risk patients were called and screened again to see if their situation has changed. Most patients received CTI®. Participants who lived out of the area received the Bridge intervention, consisting of an enhanced hospital visit, three follow-up calls, and linkage to support services in their community. The site tracked patients discharged to SNFs and began the intervention at SNF discharge. The site also contracted for home visit coaches with other AAAs in rural counties.

Eligibility Criteria: The site served Medicare beneficiaries of all ages meeting diagnostic and nonclinical inclusion criteria who were identified using a risk assessment tool in the CBO's database.

Figure S.33. Site 68 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-44.78 (p=0.25)
Hospital Readmissions (% Chg)	-1.06 (p=0.83)
Average Net Differences in Expenditures Per Discharge	$-998 (p=0.18)
Enrollment Rate (%)	8.51

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	53%
Hospital & Home	100%
Home	84%
Phone	70%
Med Rec	79%

Strengths	Challenges
Excellent hospital relationships, coaches integrated	Developing hospital relationships
Enthusiastic community developed application	CBO staff turnover
Involve PCP; coach calls with medical issues	EHR adoption slowed referrals for months
Strong SNF engagement; hospitals very involved	Lost a hospital partner

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.33.2. Findings

Site 68 exhibited no statistically significant differences in readmission rates, inpatient expenditures, or Medicare Part A and Part B expenditures between participants and matched comparisons. While all participants in this site were visited in the hospital and/or the home, only 53 received CTB. The List Bill data indicate only 70 percent were called, and 79 percent were noted as having medications reviewed and reconciled. Estimates from the DiD impact analysis indicate that CCTP participation shows no statistically significant CCTP impact on 30-day readmissions or 30-day Part A and Part B expenditures. Given null findings in the participant analysis, the expectation is that DiD estimates will also show no change. Further, DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.33.3. Factors

This site noted excellent relationships with the partner hospitals in the CBO's State as well as community excitement about improving healthcare. The CCTP intervention was developed through a community committee. The site felt that the small-town connections were vital for ensuring success. The site's service area covers small towns and many rural clients. The site was fortunate the State supports CT and provided CTI® and Bridge training for agencies in the State. It was also able to secure grants to pay for a new database. Although the site did not have prior relationships with partner hospitals and had some challenges developing those relationships and getting EHR access, the hospital system was supportive. For example, it sent representatives to the CCTP Learning Collaborative and put into place activities targeting improved relationships with

SNFs. Even though the CBO lost a hospital partner in a neighboring State, it was able to continue meeting its target by working aggressively with the remaining hospital partners. An interesting addition to the intervention was the formation of relationships with primary care practices to improve care coordination. This resulted in the coach calling practice nurses to discuss medical issues identified during the home visit.

S.2.34. Site 71

S.2.34.1. Profile

Site Structure: The CBO is a nonprofit serving a multicultural urban population in the West. It partnered with three hospitals and seven community partners. The CBO also operated Sites 60 and 103.

Intervention: The site used a blended model of CT that included CTI®, Bridge, and the adapted HyBridge, which was also utilized at the CBO's two other CCTP sites. HyBridge is a modified version of CTI® for participants having activation difficulties due to language, culture, or socioeconomic status who need more assistance to obtain appointments or services for themselves. The HyBridge client received one or more home visits, care coordination, assistance, and follow-up calls. In the HyBridge intervention, the coach facilitated making appointments, requesting services, filling out applications for assistance, or whatever the patient might need to remain safe in the home. A telephonic Bridge intervention was offered to patients living out of the area or who did not want people in their home. All referrals came from partner hospital staff. The site used a hospital–field worker model, but it did not have EHR access. The CBO worked with a small number of SNFs. A coordinator stayed in contact with the facility to determine the discharge date, and the 30-day intervention began after discharge. The site had seven meals and transportation in the PEDR.

Eligibility Criteria: The site served Medicare beneficiaries of all ages meeting all-cause inclusion criteria who were screened as at risk by the hospitals.

Figure S.34. Site 71 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-9.52** (p=0.04)
Hospital Readmissions (% Chg)	4.73 (p=0.26)
Average Net Differences in Expenditures Per Discharge	$-1,265*** (p<0.01)
Enrollment Rate (%)	23.17

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	25%
Hospital & Home	87%
Home	38%
Phone	98%
Med Rec	33%

Strengths	Challenges
Prior hospital relations	Lack EHR access
Uses three interventions to address patient needs	Dual demo reduced patient base
CBO owns Web-based med rec program	Hospitals would not link to CBO database
Started White Board project	Hospitals not engaged in readmission analysis

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.34.2. Findings

For Site 71, we found readmission rates were 9.52 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.05). This site's 30-day post-discharge Part A and Part B expenditures were 17.30 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $10,771,936 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. List Bill data indicate only a quarter of participants received CTB, with only 38 percent experiencing a home visit and slightly less than one-third (33 percent) receiving medication review and reconciliation. This is consistent with a multi-arm intervention that includes the telephonic Bridge model. Almost all participants (98 percent) received one or more phone calls. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.34.3. Factors

This site's favorable participant-level outcomes may have been due to adaptations the CBO made to the program to serve the multicultural community in which it operates. The site offered CTI®, Bridge, and a hybrid program that provides additional support for patients challenged due to culture, language, low socioeconomic status, and health literacy; all coaches are bi- or trilingual and come from the ethnic communities they serve. The site was also committed to providing high-quality care as evidenced by its internal QI review processes, pursuing and achieving a new type of certification from the National Committee for Quality Assurance, and advanced trainings provided to coaches. The site also developed a web-based medication reconciliation program used with the CT program and by one of the partner hospitals. The CBO was dependent on hospital

staff for referrals and did not have EHR access due to security concerns, but it had excellent relationships with the partner hospitals as evidenced by meeting enrollment targets, inclusion in committees and groups, rounding with Geriatric Medicine, and coaches having hospital resources (other than EHR access). It is notable the CBO was trained by the Kaiser Permanente Improvement Institute to assist it in achieving better uptake with SNFs. The site had business associate agreements with high-discharge SNFs; it has tried multiple approaches to engage their support but made limited inroads with the many facilities in this large urban area. However, its commitment to improving linkages was strong.

S.2.35. Site 72

S.2.35.1. Profile

Site Structure: The CBO is an AAA in a rural State with low population density which had two partner hospitals for the CCTP.

Intervention: The site used CTI® as the formal model for the intervention with a telephone-based intervention for out-of-area patients. This consisted of an enhanced hospital visit with telephone follow-up. The CBO did not have a bundle of services in the PEDR. The coach arranged to send a packet of information on community services in the mail or make an assessment appointment with one of the CBO's ADRC resource specialists, based on participant preference. The site had one coach until volume increased with EHR access in 2014, at which time it hired two more coaches augmented by two coaches who conducted home visits on an as-needed basis.

Eligibility Criteria: The program was open to Medicare beneficiaries aged 65 or older who met the criteria of a screening tool the program adapted from multiple evidence-based tools.

Figure S.35. Site 72 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	4.47 (p=0.86)
Hospital Readmissions (% Chg)	-8.13 (p=0.13)
Average Net Differences in Expenditures Per Discharge	$-1,909 (p=0.10)
Enrollment Rate (%)	10.34

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	17%
Hospital & Home	87%
Home	84%
Phone	92%
Med Rec	67%

Strengths	Challenges
CBO got EHR access 2014	50% of patients live out of area; hospitals were unaware
CBO adopted phone intervention for out of area patients	Fiercely competitive hospitals lack cooperation
CBO analyzed readmissions	Extensive efforts to engage SNFs failed
Enroller coach had 90% acceptance rate	Relied on paper records until 2014

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.35.2. Findings

Site 72 exhibited no statistically significant differences in readmission rates or Medicare Part A and Part B expenditures between participants and matched comparisons. Given that this site has a small number of partner hospitals (two) and the signs of the estimates (showing higher readmissions and inpatient expenditures but much lower Part A and Part B expenditures), we caution that results for this site may not be reliable. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. According to List Bill data, only 17 percent of participants received CTB. The main reason for this low percentage was the low incidence of hospital visits (23 percent). In contrast, the site reports calling 92 percent of its participants and visiting 84 percent in their homes. The relative low volume of hospital visits may reflect the site's pattern of services, a reporting error, or its interpretation of whether the visit took place during a certain timeframe. Estimates from the DiD analysis indicate there was no statistically significant CCTP impact on outcomes when considering all discharges from CCTP partner hospitals. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.35.3. Factors

No outcomes for this site reached a level of statistical significance, possibly due to ongoing challenges in the partnership. Due to challenges with engagement from both hospitals during implementation, the site partnered with its QIO in an effort to increase the hospital partner involvement. Participant volumes were low from the onset, and the site employed only one coach, who had to devote a significant amount of time to identifying eligible participants using paper charts due to delays obtaining EHR access, which was not obtained until the final year of the program. In addition, 50 percent of the patient base came from out of the area; initially, this impacted the site's enrollment progress. The site started a telephone-based intervention for out-of-area patients to address this issue. Challenges in engaging SNFs and competition with internal CT programs developed at both partner hospitals may have affected the program's success as well. The AAA also had limited CT experience. It participated in a Veteran's Directed Home and Community Based Service Program prior to the CCTP, but it had not conducted a pilot of the program and did not have prior working relationships with the community hospitals.

S.2.36. Site 79

S.2.36.1. Profile

Site Structure: The CBO is a nonprofit care management network partnered with 4 hospitals and 10 SNFs in a rural region of the Southeast.

Intervention: The site implemented CT using a hybrid model of CTI®, TCM, Project RED, BOOST, and Guided Care. Very high-risk patients received weekly home visits. The site's coaches frequently visited without setting a specific appointment time for home visits to improve their home visit completion rate and meet in an alternate location for patients who did not want people in their homes. The site began to serve patients discharged to SNFs in 2014. A CCTP nurse visited participants in the SNF weekly, conducting elements of the home visit and visits in the home after discharge if the participant was very high risk. The site had a service package included in its PEDR that included transportation, nutritional supplements, and 5 hours of personal care. Originally, the site also included meals, but this was eliminated to increase funds available for transportation

services, which were in greater demand. Other services were arranged or referred based on the needs and capability of the participant.

Eligibility Criteria: The program served Medicare beneficiaries of all ages and a high number of dual-eligible persons diagnosed with AMI, CHF, COPD, and pneumonia as well as social frailty.

Figure S.36. Site 79 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-9.56* (p=0.09)
Hospital Readmissions (% Chg)	5.81** (p=0.03)
Average Net Differences in Expenditures Per Discharge	$-538*** (p<0.01)
Enrollment Rate (%)	23.35

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	75%
Hospital & Home	100%
Home	100%
Phone	78%
Med Rec	98%

Strengths	Challenges
Strong hospital relationships	Created model so had to create training
Hospitals invested since they hire coaches	Hospitals hired coaches, CBO not included
CBO had prior CT experience with Medicaid	Rural area, so lots of driving for home visits
CBO had grants and in-kind support for the program	Weekly home visits result in high transportation costs

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.36.2. Findings

For Site 79, we found that readmission rates were 9.56 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.10). This site's 30-day post-discharge Part A and Part B expenditures were 14.19 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $3,698,912 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. All of this site's participants had a hospital visit and a home visit, and 98 percent are recorded as having medications reviewed and reconciled. However, because List Bill data indicate only 78 percent were called, only 75 percent received CTB. Estimates from the DiD analysis indicate that differences for participants did not extend to improvements in outcomes across all discharges from CCTP partner hospitals. In fact, the DiD impact estimates show statistically significant increases in 30-day readmission rates (5.81 percent; p=0.03), and no statistically significant impact on 30-day Part A and Part B expenditures. The unexpected finding of an increase in readmissions may be due to chance because there is only a moderate similarity between partner and matched comparison hospitals.

S.2.36.3. Factors

Site 79 exhibited a statistically significant lower participant readmission rate and lower net differences in Medicare Part A and Part B expenditures relative to comparisons. However, this site also exhibited a statistically significant increase in hospital-level readmission rates. Factors potentially contributing to the favorable participant-level outcomes may include the fact the site had extensive previous experience conducting similar programs for the Medicaid population, which utilized the same hybrid model chosen for the CCTP and included its CCTP hospital partners. The site was also able to use a sophisticated State information system to manage data for the CCTP. It also had strong relationships with its hospital partners, which were invested in the CCTP's success because they hired and employed the CT workers. In addition, the CBO received a grant to offset startup costs and has a large amount of in-kind funds available to support the program.

The site created its own model by choosing components from multiple evidence-based models. This necessitated creating its training program, which consists of various modules. Hiring CT workers was challenging since each hospital partner was responsible for hiring and employing its CT workers. The site was not always included in the hiring of new staff nor could it influence the speed at which new staff were brought onboard. In addition, the fast pace of the program was not anticipated by the site. Despite these challenges, there was no obvious explanation for the increase in hospital-level readmissions.

S.2.37. Site 83

S.2.37.1. Profile

Site Structure: The CBO is a hospice agency that partnered with four hospitals and local SNFs in a rural area of the South.

Intervention: The program utilized the Naylor and a modified CTI® model. Patients on the census were screened using the TCM risk assessment tool. Patients who had four or more risk factors were offered the Naylor model, while those with three or fewer risk factors were offered CTI®. The site utilized a hospital–field worker model. Clients in the Naylor arm received five home visits over 6 weeks, with phone calls during the off weeks. Clients in the CTI® arm received three home visits in 30 days, with phone calls in the off weeks. For patients discharged to SNFs, the process was the same, except that the field worker assigned to the patient conducted three follow-up visits in the facility. Eight tools were used in hospital and home to screen for various risks (e.g., home safety, depression, ADLs). There was not a service bundle included in the site's PEDR. When nurses identified a need, they referred the client to an appropriate service in the community or arranged service based on participant capabilities.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with any cause of admission.

Figure S.37. Site 83 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-11.69 (p=0.25)
Hospital Readmissions (% Chg)	-2.76 (p=0.13)
Average Net Differences in Expenditures Per Discharge	$-630 (p=0.12)
Enrollment Rate (%)	22.85

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	85%
Hospital & Home	100%
Home	97%
Phone	89%
Med Rec	99%

Strengths	Challenges
Good hospital relationships	Rural residents reluctant to have people in the home
CMO a champion and support from CEO and leadership	Low home visit completion rates
Nurses are well integrated, have all resources	
Site used PDSAs and adopted rapid changes	

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.37.2. Findings

Site 83 exhibited no statistically significant difference in readmission rates or Part A and Part B expenditures between participants and matched comparisons, likely due to low power to detect differences, given large differences in all three outcomes between participants and matched comparisons. The 31.05 percent lower inpatient expenditures for participants were statistically significant (p<0.01). This result implies that other Medicare Part A or Part B expenditures outweighed differences in inpatient expenditures. List Bill data suggest 85 percent of participants received CTB, with all participants visited in the hospital and 97 percent visited in their home. Almost all participants (99 percent) had medications reviewed and reconciled, and 89 percent were called. Estimates from the DiD impact analysis indicate CCTP participation did not result in statistically significant decreases in the 30-day readmission rate (2.76 percent; p=0.13), but did result in statistically significant decreases in 30-day Part A and Part B expenditures (11.18 percent; p<0.01) and 30-day inpatient expenditures (7.37 percent; p<0.01) when considering all discharges from CCTP partner hospitals. DiD estimates for this site should be interpreted with caution because of poor balance between treatment and matched comparison hospitals. CCTP partner hospitals and their matched comparisons had large differences in pre-CCTP rates of one or more outcome variables used in hospital matching (i.e., readmissions, expenditures, and mortality).

S.2.37.3. Factors

This site did not exhibit statistically significant hospital-level or participant-level findings. The site noted one other non-CCTP program in partner hospitals that placed scales and electronic monitoring devices that send alerts regarding weight and blood pressure changes in the homes of the most frequently readmitting patients. Interestingly, many of the site's CT workers were also hospital case managers who worked for the CCTP as needed. The experience doing home visits

may have changed their case management and discharge process because they have more knowledge about needs that arise in the home.

Many of this site's rural clients were reluctant to allow strangers in the home for a variety of reasons. The site stated that this resulted in a high dropout rate due to failure to complete the home visit.

S.2.38. Site 85

S.2.38.1. Profile

Site Structure: The CBO is an AAA that partnered with five hospitals in the South.

Intervention: The site used CTI® as the formal model for the intervention. The same coach followed the patient home and provides follow-up phone calls, except at the largest hospital, which used a hospital–field worker model. The site served patients discharged to SNFs and had two designated SNF coaches who built relationships with the facilities, visited patients in the SNF, and conducted the intervention at discharge. The site had 10 special meals and 6 hours of homemaker services included in its PEDR. The site also prioritized CCTP participants for its own agency services.

Eligibility Criteria: The program was open to Medicare beneficiaries age 65 or older, but eligibility criteria are specific diagnoses that vary by partner hospital. The site also utilized a modified LACE tool for patient identification that was embedded in its management information system.

Figure S.38. Site 85 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-14.94** (p=0.01)
Hospital Readmissions (% Chg)	-3.31 (p=0.23)
Average Net Differences in Expenditures Per Discharge	$-711*** (p<0.01)
Enrollment Rate (%)	20.43

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	95%
Hospital & Home	100%
Home	100%
Phone	95%
Med Rec	100%

Strengths	Challenges
Strong relationships with hospitals and SNFs	SNF turnover affected communication
Expanded geographic areas to increase patients	Poor data system impacted billing, readmission tracking
Motivates coaches with incentives	Low patient census, so they see everyone
Hospitals made changes due to coach feedback	Timely PCP visit impossible due to transportation

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.38.2. Findings

For Site 85, we found that readmission rates were 14.94 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.05). This site's 30-day post-discharge Part A and Part B expenditures were 17.33 percent (p<0.01) lower among participants than for matched comparisons. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $7,252,831 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. All participants are indicated in List Bill data as being visited in the hospital and at home. All also received medication review and reconciliation, and nearly all (95 percent) were called. As a result, 95 percent received CTB. Estimates from the DiD impact analysis indicate that CCTP participation did not result in a statistically significant decrease in the 30-day readmission rate (3.31 percent; p=0.23). Moreover, there was no statistically significant impact of the CCTP on 30-day Part A and Part B expenditures.

S.2.38.3. Factors

Factors which potentially contributed to the favorable participant-level outcomes may include the fact that this site conducted a CT pilot with its partner hospitals and developed strong partnerships with its hospital and SNF partners. The program was well integrated into the hospital setting at all hospital partners, and it focused on ongoing communication by two dedicated SNF coaches to overcome staff turnover at SNFs. The partnership's strength was demonstrated by the fact the hospitals responded to feedback from CT workers. For example, based on this feedback, a hospital changed its medication lists and the wording of discharge instructions to make them easier to understand.

The site did report several data challenges that affected enrollment and monitoring. Initially, the site was using the census lists to enroll participants and discovered that observation stay patients were included on the list, resulting in enrolling participants who were not eligible for reimbursement through the CCTP. The site worked with hospitals to resolve this issue by identifying a different way to filter the census lists. Additionally, the program was unable to track its own readmission data due to limited resources to invest in a software system, so the CBO relied on partner hospitals to obtain readmission information.

S.2.39. Site 88

S.2.39.1. Profile

Site Structure: The CBO is an AAA providing services in urban, suburban, and rural areas over two counties in a State in the Northeast and it partnered with three hospitals.

Intervention: The site used CTI® as the formal model for the intervention. The site used a hospital–field worker model. The site tracked patients discharged to SNFs to identify when they were discharged. If the patient went home within 21–28 days of hospital discharge, they could participate in the CCTP and receive a home visit. No CCTP intervention was provided to patients who spent more than 28 days in the SNF. The site had 37 days of meals included in the PEDR to ensure participants have long-term meal services if needed.

Eligibility Criteria: The program served Medicare beneficiaries of all ages who are determined at risk by the screening tools embedded in the hospitals' EHRs. One of these tools flagged 45 items in the EHR that may put a patient at risk for readmission; patients are targeted who have a score of 5–20. The other was a modified LACE assessment tool, and patients were targeted who meet two or more risk factors.

Figure S.39. Site 88 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-18.57*** (p<0.01)
Hospital Readmissions (% Chg)	6.77 (p=0.13)
Average Net Differences in Expenditures Per Discharge	$-1,579*** (p<0.01)
Enrollment Rate (%)	17.79

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	60%
Hospital & Home	100%
Home	100%
Phone	70%
Med Rec	96%

Strengths	Challenges
History working with hospitals; coaches integrated	Civil service hiring of coaches not timely
Robert Wood Johnson AF4Q grant before CCTP	Small hospital, did not produce discharge instructions
State funding for CTIÂ® training	Rural transportation
Hospitals delved hard into readmission analysis	Learning curve for new data system

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.39.2. Findings

Site 88 exhibited statistically significantly lower participant readmission rates relative to comparisons (18.57 percent; p<0.01). This site's 30-day post-discharge Part A and Part B expenditures for participants were 25.87 percent (p<0.01) lower than for matched comparisons, which translated into lower net differences in Medicare Part A and Part B expenditures of $9,713,807 (p<0.01) after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percentage of participants who received CTB was above the overall program average, with nearly all participants receiving a hospital visit, home visit, and medication review and reconciliation. Estimates from the DiD analysis indicate that differences for participants did not extend to improvements in outcomes across all discharges from CCTP partner hospitals. In fact, the DiD impact estimates show statistically significant increases in 30-day Part A and Part B expenditures (3.45 percent; p=0.09).

S.2.39.3. Factors

Factors that may have contributed to statistically significantly lower participant-level readmissions and lower net differences in Medicare Part A and Part B expenditures (relative to comparisons) could be due to longstanding relationships between the CBO and partner hospitals that included participating in a Robert Wood Johnson Aligning Forces for Quality grant and jointly developing the CCTP application. Their shared history resulted in excellent relationships and integration of coaches in the facilities. The site also valued QI, invested in a database solution, and performed readmission reviews of every readmitted patient. Both hospitals also had readmission teams that regularly analyze their own readmission data. One hospital shared its 7-day readmission findings with the site. The State supports CT, including agencies in its planning cycle and provided funds to cover CTI® training. The site was also able to engage all SNFs in the two counties it served.

One partner currently operates a TCM intervention, with coaches embedded in medical homes—a program started before the CCTP. Another hospital partner has implemented pharmacy follow-up for discharged patients.

S.2.40. Site 90

S.2.40.1. Profile

Site Structure: The CBO is a 102-year-old nonprofit organization providing senior healthcare services to an urban community in the West. It had three partner hospitals and three community partners.

Intervention: The site selected CTI® as the formal model for the intervention. Two hospitals were connected to the CBO's data system, enabling them to upload patient information to the system, which uses a LACE-like assessment tool. The other hospital did not have an EHR, and staff members relied on paper records to identify potential participants. The intervention was 35 days. Each coach was assigned to a hospital where they were responsible for recruitment and all phases of the intervention, including home visits. However, the home visit coach was selected based on language skills and geography, so coaches did not necessarily conduct home visits for the same participants they recruit. The site started enhanced hospital visits followed by a phone intervention in 2015 for out-of-area patients. The site also served patients discharged to SNFs, who were visited twice during their stay in the facility. The intervention started at SNF discharge, and included a home visit. The site had meals and transportation in its PEDR and purchased these services through contractors. Coaches had taxi vouchers and bus passes they could provide patients for transportation assistance to medical appointments.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who met its all-cause inclusion criteria and were screened at risk of readmission.

Figure S.40. Site 90 Snapshot

Metric	Assessment
Participant Readmissions	4.35
(% Chg)	(p=0.55)
Hospital Readmissions	-0.96
(% Chg)	(p=0.66)
Average Net Differences in	$-1,793***
Expenditures Per Discharge	(p<0.01)
Enrollment Rate (%)	10.22

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	57%
Hospital & Home	97%
Home	91%
Phone	87%
Med Rec	67%

Strengths	Challenges
Pilot one hospital; started CT at others before award	Total turnover at start delayed implementation
CBO long experience with CT and operating senior programs	48% of discharges to LTC
Coaches have resources and are integrated	Timely follow-up calls by coaches
CBO data and quality driven	Inadequate discharge instructions for SNF patients

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.40.2. Findings

For Site 90, we did not find a statistically significant difference in readmission rates between participants and matched comparisons. However, this site's 30-day post-discharge Part A and Part B expenditures were 20.39 percent (p<0.01) lower among participants than for matched comparisons, likely driven by differences in non-inpatient Medicare expenditures. After accounting for this site's average PEDR, this translated into lower net differences in Medicare Part A and Part B expenditures of $5,432,485 (p<0.01) between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percent of participants in this site's CCTP program that received CTB as well as the percentages with hospital and/or home visits, home visits, and phone calls were all above the average percentages recorded across all participants in all sites. The percentage recorded as receiving medication review and reconciliation (67 percent) was below the average for the pooled sample. The site had a relatively high volume of participants with no encounters (3.17 percent), which may reflect a reporting error in the List Bill data. Estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.40.3. Factors

Factors that led to statistically significant lower participant net differences in Medicare Part A and Part B expenditures may include the site's success in activating patients to manage their healthcare. The site shared that home health was underutilized, and that the partners made efforts to ensure better uptake and connection with agencies. In the root cause analysis of readmissions during the CCTP application process, one of the partner hospitals identified that 50 percent of Medicare patients needing HHA services were discharged without orders. Therefore, the CBO prioritized identifying patients who needed HHA services prior to discharge as an area for improvement. Because the site has been in the business of providing programming for seniors, it felt it had an advantage in implementing the CCTP due to its extensive knowledge of needs as well as experience transitioning patients through various levels of care. The site had outstanding relationships with its partner hospitals, conducting a pilot with one and implementing CT with the others prior to award. Two partner hospitals adopted the data solution selected by the site, allowing patient information to automatically load into the CBO's data system, which facilitated patient identification and reduced data entry requirements. The coaches were integrated into the facilities and were hired to match cultural and language needs of the beneficiary population. The site moved toward coach specialization by serving BH and SNF populations. The CBO also had financing and resources to support the program and did so generously because the CCTP aligns with its corporate vision and goals.
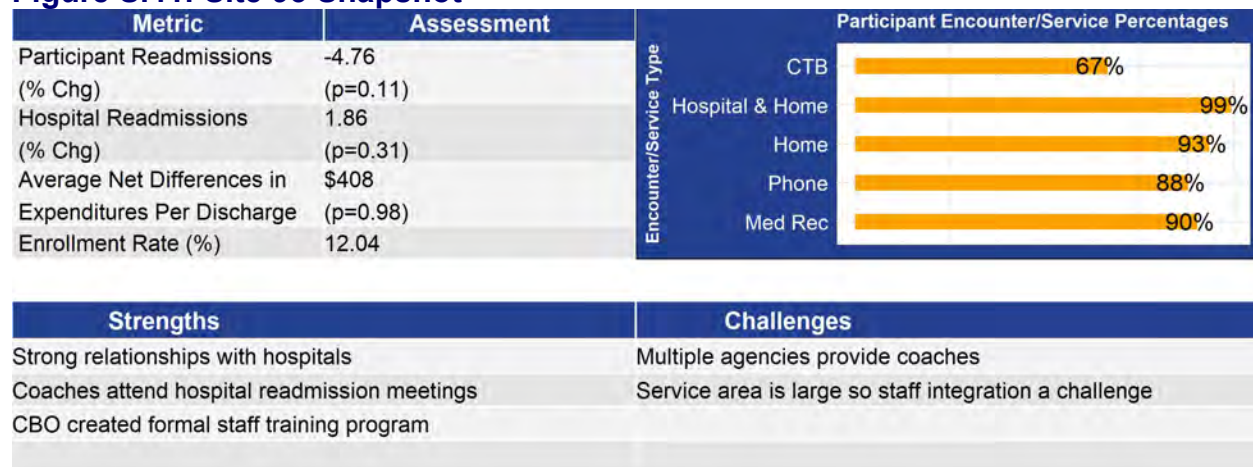
S.2.41. Site 93

S.2.41.1. Profile

Site Structure: The CBO is an HHA that partnered with six hospitals and eight community partners, with several of those partners providing coaches.

Intervention: The site chose CTI®, the Naylor Model, and Bridge as the formal models for the intervention. The intervention had three arms, and participants were stratified into the appropriate intervention based on the Blaylock risk stratification tool. Approximately 80 percent of participants received CTI®. High-risk participants received the Naylor intervention, and those with social needs receive Bridge. The site served participants discharged to SNFs, who received one face-to-face meeting in the SNF and follow-up calls; 99 percent received one visit at home after discharge. There were no additional social support services included in the PEDR, and no other sources of funds for CCTP services. Coaches made referrals to local AAAs or Visiting Nurse Associations, or assisted participants in accessing support services, depending on patient activation and needs.

Eligibility Criteria: The site served beneficiaries of all ages with any diagnosis.

Figure S.41. Site 93 Snapshot

Metric	Assessment
Participant Readmissions	-4.76
(% Chg)	(p=0.11)
Hospital Readmissions	1.86
(% Chg)	(p=0.31)
Average Net Differences in	$408
Expenditures Per Discharge	(p=0.98)
Enrollment Rate (%)	12.04

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	67%
Hospital & Home	99%
Home	93%
Phone	88%
Med Rec	90%

Strengths	Challenges
Strong relationships with hospitals	Multiple agencies provide coaches
Coaches attend hospital readmission meetings	Service area is large so staff integration a challenge
CBO created formal staff training program	

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.41.2. Findings

Site 93 exhibited no statistically significant difference in readmission rates or Part A and Part B expenditures between participants and matched comparisons. The percent of participants in this site's CCTP program that received CTB as well as the percentages with hospital and/or home visits, home visits, phone calls, and medication review and reconciliation were all above the average percentages recorded across all participants in all sites. Estimates from the DiD impact analysis indicate CCTP participation resulted in a statistically significant small increase in 30-day Part A and Part B expenditures (4.16 percent; p<0.01) when considering all discharges from CCTP partner hospitals. We found no statistically significant impact of the CCTP on the 30-day readmission rate.

S.2.41.3. Factors

The site reported a couple of key challenges that may have contributed to the lack of statistically significant findings. Because CT workers were employed by multiple agencies in the community, it was difficult to monitor performance and keep them motivated. The CT workers were scattered across three counties, so it was also logistically difficult to get them to one location for consistent education and training. The site also reported challenges with data and QM/QI. The site had trouble in tracking data and using data to improve the program due to limited data capabilities. In addition, the site does not conduct analysis of readmissions beyond root cause analyses on selected patients conducted during coach training sessions, which involve peer-to-peer mentoring with discussion of challenges and best practices.

S.2.42. Site 96

S.2.42.1. Profile

Site Structure: The CBO is an AAA that partnered with five hospitals.

Intervention: Patients in the program received either Project RED or CTI®, but one hospital only offered Project RED. The CBO provided coaches at three hospitals, and one hospital provided its own coach. Coaches only had EHR access at one hospital, and a discharge advocate shared a list of patients with the CTI® coach at the other hospitals. The program had a supportive services package in its PEDR that includes transportation and short-term medications. It also had a grant to provide respite to caregivers and support services to younger patients who did not qualify for services funded under the Older Americans Act. The site served patients discharged to SNFs. One coach visited SNFs daily, delivering the elements of the CTI® home visit and sometimes conducting additional visits over time to see if patients have additional needs.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with a diagnosis of HF/CHF, pneumonia, AMI, COPD, or diabetes, as well as those that score as high risk on the LACE or other risk assessment tool.

Figure S.42. Site 96 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-5.83 (p=0.74)
Hospital Readmissions (% Chg)	-1.47 (p=0.65)
Average Net Differences in Expenditures Per Discharge	$1,145 (p=0.48)
Enrollment Rate (%)	27.41

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	7%
Hospital & Home	100%
Home	8%
Phone	97%
Med Rec	92%

Strengths	Challenges
CBO has good relationships with discharge advocates	Getting appropriate referrals
Leaderships engagement has increased over time	Hospitals paid different rates; causes tension
CBO has grants for services for younger patients	Hospitals inconsistent in meeting enrollment targets

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.42.2. Findings

For Site 96, we found no statistically significant difference in readmission rates or Part A and Part B expenditures between participants and matched comparisons. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data suggest only 7 percent of participants received CTB. This low percentage was due to only 8 percent of participants being visited in their homes; 99 percent were visited in the hospital, 97 percent received a follow-up phone call, and 92 percent received medication review and reconciliation. The low home visit rate is consistent with the fact the program utilized Project RED for some participants, and one partner hospital only offered Project RED and did not offer CTI® to its patients. Congruent with the participant analysis, estimates from the DiD analysis indicate there were no statistically significant hospital-wide impacts on outcomes at CCTP partner hospitals.

S.2.42.3. Factors

Site 96 did not exhibit any statistically significant findings. The site had several key strengths, including obtaining grant funding to expand support services available to CCTP patients to address gaps in services available for younger participants. It reported having a close working relationship with hospital discharge advocates. They had offices onsite and are able to sit down and talk with them about the patients that they refer. The site also feels that it was been successful in increasing hospital leadership engagement over time, which was demonstrated by the fact the hospitals worked with the CBO to solve billing problems.

The CT workers initially struggled to get appropriate referrals from hospital staff. Too many patients with cognitive impairments or who met the diagnostic requirements but were too sick to participate in the home visit were being referred for CTI®. For example, the site reported coaches receiving referrals for patients who were in a coma. By continuing to educate staff and communicate with the hospital discharge advocates regularly, the quality of referrals improved. The site had challenges obtaining paperwork necessary from some partners to submit billing in a timely fashion. In addition, it struggled to maintain a balance in terms of budget and workload, with one hospital far exceeding its assigned enrollment target and several others lagging far behind. This presents a financial challenge because not all hospitals were reimbursed for CT services at the same rate by the CBO, and the overall financial balance of the project was dependent on specific hospitals serving their assigned number of participants.

S.2.43. Site 97

S.2.43.1. Profile

Site Structure: The CBO is a nonprofit healthcare provider of senior services serving a suburban and rural population in the West that partnered with three hospitals and three community partners.

Intervention: The site used CTI® as the formal model for the intervention. All referrals came from the hospitals using a LACE-like tool to risk stratify patients. The coaches were all nurses; they visited patients throughout their hospital stay and performed a home visit after discharge, during which they performed a medical assessment, home safety, and falls check. Licensed practical nurses made weekly phone calls to patients and extended the intervention an additional week if the patient continued to need support. The site served patients discharged to SNFs. In these cases, the intervention period started at discharge from the SNF for patients discharged for rehabilitation.

The site is not have support services in the PEDR, but the community is rich in resources so there were no wait lists for services.

Eligibility Criteria: The site served Medicare beneficiaries of all ages with chronic disease and specific medical diagnoses.

Figure S.43. Site 97 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	19.29 (p=0.40)
Hospital Readmissions (% Chg)	-0.81 (p=0.67)
Average Net Differences in Expenditures Per Discharge	$-1,211*** (p<0.01)
Enrollment Rate (%)	19.88

Participant Encounter/Service Percentages

Encounter/Service Type	Percentage
CTB	56%
Hospital & Home	98%
Home	94%
Phone	99%
Med Rec	99%

Strengths	Challenges
Pilots with hospitals; CMOs are proponents	Hospital leadership engagement
CBO does RCA on every readmission; shares with hospital	Took CBO 3 years to engage HHAs
CBO provides online medication management program	Lack of behavioral health resources
CBO started multiple support programs	Many people leave retirement community for seasonal leave

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.43.2. Findings

Site 97 exhibited no statistically significant difference in readmission rates or inpatient expenditures between participants and matched comparisons. This site's 30-day post-discharge Part A and Part B expenditures for participants were 32.54 percent (p<0.01) lower than for matched comparisons, suggesting that differences in non-inpatient expenditures may have driven the overall lower Medicare Part A and Part B expenditures. The Medicare Part A and Part B expenditure finding translated into lower net differences in Medicare Part A and Part B expenditures of $6,059,679 (p<0.01) between participants and matched comparisons after accounting for this site's average PEDR. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The percent of participants in this site's CCTP that received CTB as well as the percentages with hospital and/or home visits, home visits, phone calls, and medication review and reconciliation were all above the average percentages recorded across all participants in all sites. Estimates from the DiD impact analysis indicate that CCTP participation resulted in a statistically insignificant change in the 30-day readmission rate (-0.81 percent; p=0.67) and a statistically significant decrease in 30-day Part A and Part B expenditures (3.93 percent; p<0.01) when considering all discharges from CCTP partner hospitals.

S.2.43.3. Factors

Participant net differences in Medicare Part A and Part B expenditures for this site were lower relative to comparisons. This difference may have been due to activating patients to use healthcare services appropriately. The site succeeded in developing champions for its program in its partner hospitals so that coaches had access to needed resources. It offered support in addition to the CTI®, including its web-based medication management program; opening the Center for Health and Wellbeing to provide disease management, nutrition support, exercise programs, and support staff; and developing a transportation program. The site also communicated home visit information with the PCP and performed comprehensive readmission reviews with one of its partner hospitals. It operated a variety of senior housing options with supportive services and rapidly expanded its reach in meeting needs in this large retirement community. The site utilized fundraising and proceeds from other endeavors to support CT for other populations and could continue to do so after the award is over.

The hospital adapted to address the needs of the patient population, the most significant of which was the expansion of BH services on the inpatient and outpatient levels and improved coordination with SNFs. Analysis of this site's readmission measure did not, however, indicate any statistically significant differences or changes in participant- or hospital-level readmission measure analysis.

S.2.44. Site 103

S.2.44.1. Profile

Site Structure: The CBO is a nonprofit serving a suburban and rural population in the West that partnered with five hospitals and three community partners. It was also the CBO for Sites 60 and 71.

Intervention: The site used a blended model of CT that includes CTI®, Bridge, and its own adapted HyBridge model for patients, which was also utilized at the CBO's two other CCTP sites. HyBridge is a modified version of CTI® for participants having activation difficulties due to language, culture, or socioeconomic status who need more assistance to obtain appointments or services for themselves. The HyBridge client received one or more home visits, care coordination, assistance, and follow-up calls. In the HyBridge intervention, the coach facilitated making appointments, requesting services, filling out applications for assistance, or whatever the patient might need to remain safe in the home. A telephonic Bridge intervention was offered to patients living out of the area or who did not want people in their home. The site used a hospital–field worker model and had access to its partner hospitals' EHRs and resources. The site worked with 19 SNFs. A coordinator stayed in contact with the facility to determine the discharge date, and the 30-day intervention began after SNF discharge. The site did not have services in the PEDR, but coaches provided referrals to services for participants who needed them.

Eligibility Criteria: The site served Medicare beneficiaries of all ages who met the all-cause inclusion criteria who were screened as at risk.[8]

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[8] Some hospitals have screening tools embedded in their EHRs. For those that do not, the site uses the screening tool in its database.

Figure S.44. Site 103 Snapshot

Metric	Assessment
Participant Readmissions (% Chg)	-25.95*** (p<0.01)
Hospital Readmissions (% Chg)	-5.77** (p=0.03)
Average Net Differences in Expenditures Per Discharge	$359 (p=0.88)
Enrollment Rate (%)	28.45

Participant Encounter/Service Percentages

Encounter/Service Type:
- CTB: 47%
- Hospital & Home: 91%
- Home: 57%
- Phone: 98%
- Med Rec: 56%

Strengths	Challenges
Engaged CEOs and CM directors	Migrant population with language, culture, literacy issues
Coaches have all resources	Rural transportation and PCP access
CBO flexibility provides hospital structure they want	People are discharged without HHA; agencies overwhelmed
Hospital Council started coalition, engaged SNFs	Initially dependent on hospital staff for referrals

Notes: *p<0.1, **p<0.05, ***p<0.01.
CTB = care transitions bundle. A CTB includes a hospital visit, at least one home visit (within 3 days of discharge or after 3 days), at least one phone call (within 1 week of discharge or after 1 week), and medication review and reconciliation. Participant encounter/service data come from List Bill data reported by sites; strengths and challenges come from interview and focus group data; and metrics come from claims analyses, as detailed in Section 3 of the Final Evaluation Report, Appendix A of the Final Evaluation Report, and the start of this report. Average net expenditure difference estimates indicate whether CCTP participants were associated with lower (negative estimate) or higher (positive estimate) Medicare Part A and Part B expenditures relative to matched comparisons after accounting for a site's PEDR. Statistics in this site snapshot include a CCTP performance period from February 2012 through November 2015.

S.2.44.2. Findings

For Site 103, we found that readmission rates were 25.95 percent lower among participants relative to matched comparisons, a statistically significant result (p<0.01). We found large and statistically significant lower inpatient expenditures (25.51 percent, p<0.01), but no statistically significant difference in Part A and Part B expenditures between participants and matched comparisons. As previously discussed, findings from the participant cross-sectional model cannot be directly attributed to the CCTP. The types of services typically provided to individual participants may influence intervention effectiveness and program outcomes. List Bill data suggest only approximately 47 percent of participants received CTB, mainly because only 57 percent of participants had a home visit and only 56 percent had medications reviewed and reconciled. This is consistent with a multi-arm intervention that includes the telephonic Bridge model. Congruent with the participant cross-sectional analysis, estimates from the DiD impact analysis indicate CCTP participation resulted in a statistically significant decrease in the 30-day readmission rate (5.77 percent; p<0.05) and a similar-in-size, albeit statistically insignificant, decrease in inpatient expenditures when considering all discharges from CCTP partner hospitals. Furthermore, we found no statistically significant impact of CCTP on 30-day Part A and Part B expenditures.

S.2.44.3. Factors

Factors that may have contributed to the statistically significant lower participant readmissions and decrease in readmissions at the hospital-level may include the excellent cooperation and coordination with the site's partner hospitals. One hospital created a Medicare readmission team staffed with three people to work on the initiative and has very engaged senior leadership who were impressed with data demonstrating readmission reductions. The site also implemented a three-pronged intervention with CTI®, Bridge, and a hybrid model to provide additional support

to those patients with additional needs due to language, culture, and socioeconomic issues. Because this is an agricultural community attracting many migrant workers and is very rural, there are numerous issues to deal with in working with patients and providing support services. The site offered a web-based medication reconciliation program for CCTP patients providing pharmacist review and feedback. In addition, SNF readmissions were very high, so the site engaged with those facilities, and the Hospital Council started a SNF readmission workgroup under its coalition.

The hospitals embraced the CCTP and worked collaboratively with the site in significant ways. The hospitals also joined the BPCI initiative in 2015.