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Hospital to Home Transition for Patients With Stroke Under Bundled Payments

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Abstract

Bundled payments are a promising alternative payment model for reducing costs and improving the coordination of postacute stroke care, yet there is limited evidence supporting the effectiveness of bundled payments for stroke. This may be due to the lack of effective strategies to address the complex needs of stroke survivors. In this article, we describe COMprehensive Post-Acute Stroke Services (COMPASS), a comprehensive transitional care intervention focused on discharge from the acute care setting to home. COMPASS may serve as a potential care redesign strategy under bundled payments for stroke, such as the Centers for Medicare & Medicaid Innovation Bundled Payment for Care Improvement Initiative. The COMPASS care model is aligned with the incentive structures and essential components of bundled payments in terms of care coordination, patient assessment, patient and family involvement, and continuity of care. Ongoing evaluation will inform the design of incorporating COMPASS-like transitional care interventions into a stroke bundle.

Keywords

Episode of care; Sub-acute care; Transitional care; Stroke; Rehabilitation

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Postacute rehabilitation is critical to stroke care. After acute hospitalization, approximately two-thirds of stroke survivors need a variety of rehabilitation services,¹ ranging from informal home care and home health to institutional postacute care services. Yet, the current stroke systems of care are not designed in a way that optimizes these rehabilitation needs, which often span multiple settings. Payments associated with postacute care and secondary acute events are high and vary greatly by providers.^{2,3} This problem is compounded in the traditional fee-for-service payment model, in which different providers are paid separately for their services, leading to the lack of coordinated care, care redundancies, and compromised long-term health outcomes for stroke survivors.

Passage of the Affordable Care Act has offered many opportunities to restructure stroke systems of care. Emerging alternative payment models, such as bundled payments and accountable care organizations, have the potential to reduce costs and improve outcomes of stroke care. Bundled payments are especially suited for a well-defined health care event, also called an episode of care, that for patients with stroke starts with an acute care admission and transitions to postacute care settings. Since 2013, the Center for Medicare and Medicaid Innovation (CMMI) has developed the Bundled Payments for Care Improvement (BPCI) initiative and its next generation, BPCI-Advanced (BPCI-A), to test voluntary episode-based payment models on selected clinical episodes, including stroke. By bundling the cost of all services delivered to a patient over an entire episode, BPCI creates a financial incentive for providers along the care continuum to improve efficiency and quality of care, presumably through better care coordination, smooth patient transitions, and prevention of future hospital readmissions.

However, evidence on the effectiveness of BPCI on both Medicare payments and the quality of care for stroke has been limited.^{2,4} Although decreases in total payments were observed for hospitals participating in BPCI for stroke care, these changes did not reach statistical significance, nor did they improve quality of care.⁵ Many factors may contribute to such findings, including the complex rehabilitation needs of stroke survivors and gaps in secondary prevention postdischarge.² Furthermore, with over 50% of stroke survivors discharged directly home,⁶ concerns have been raised about the lack of coordinated rehabilitation plans for patients with stroke transitioning from acute care settings to home.⁷ In fact, little is known about how hospitals operating under a bundled payment model extend their efforts to coordinate care when there is strong incentive to discharge patients home rather than to an institutional setting.⁸

To better meet the complex rehabilitation needs of stroke survivors, especially those transitioning from acute care settings to home, the COMprehensive Post-Acute Stroke Services (COMPASS), a comprehensive stroke transitional care intervention, may serve as a potential care redesign strategy for hospitals participating in stroke episodes. Tested in 40 hospitals in North Carolina, COMPASS was designed to address the diverse and complex needs of stroke survivors discharged home and those of their care-givers. Aligned with the overarching goal of BPCI, COMPASS was expected to save costs by improving stroke survivors' functional status postdischarge and reducing hospital readmissions. The effects of COMPASS on reducing hospital readmissions and its return on investment are currently under evaluation; the trial protocol is documented elsewhere.⁷

In this article, we first provide background information on stroke care in BPCI initiatives and the COMPASS study. Using publicly available CMMI data on participating hospitals, we further describe characteristics and baseline outcomes related to the stroke care within BPCI and BPCI-A and compare these characteristics with COMPASS participating hospitals. Ultimately, we identify components in COMPASS that align with the incentive structure of stroke bundled payments and discuss the feasibility of incorporating COMPASS-like transitional care interventions into the existing BPCI stroke bundle.

Overview of BPCI

The BPCI initiative tested 4 payment models with varied emphases on acute and postacute care for 48 selected clinical episodes.²⁹ Among these 4 models, both models 2 and 3 are retrospective and have a postacute care component (the differences between these 2 models are shown in fig 1). We focused our analysis on BPCI model 2, which represented the most comprehensive model that bundled the total cost of the index hospitalization and the postacute care within 30, 60, or 90 days after hospital discharge.

In October 2018, after 5 years of implementation of BPCI, CMMI started testing BPCI-A, a new iteration of BPCI model 2.²⁸ Built on BPCI, BPCI-A is a retrospective payment model with only 1 risk track for a 90-day episode of care. In addition, BPCI-A moved further along the direction of increasing participant accountability. Although quality was continuously monitored in BPCI, BPCI-A has explicitly tied the financial incentive to participants' performance on a set of administrative or clinically aligned quality measures.

Under both BPCI model 2 and BPCI-A, the stroke episode included multiple diagnosis related groups (codes 61–66) for ischemic stroke and hemorrhagic infarction. The related services bundled in postacute stroke care could include home health nursing and therapy services; office visits to physicians and physical, occupational, and speech therapists; hospital outpatient visits to physicians and therapists; institutional postacute care services in an inpatient rehabilitation facility (IRF), a skilled nursing facility (SNF), or a long-term care hospital; and hospital readmissions. Participating providers continued to receive Medicare fee-for-service payments, but the total spending was reconciled with the target price set by the Centers for Medicare & Medicaid Services (CMS) for the entire stroke episode of care. As such, the hospital had an incentive to coordinate care with downstream postacute care providers to keep the total costs below the target price and to gain the residual savings.

Bundled payments and stroke care

Although the existing data suggest that stroke care would potentially be suitable for bundling,^{2,9,10} there was limited evidence that the implementation of BPCI was associated with payment reductions or improvements in the quality of care for stroke. According to the most recent CMS BPCI annual report, the total Medicare payments were lower for stroke episodes relative to a matched comparison group through the first 4 years of implementation; however, the impact was not statistically significant.⁵ Consistent with other clinical episodes, the decline in total payments was likely driven by a trade-off between decreased use of institutional postacute care services and increased use of home health

agency services. Participating in BPCI stroke episodes also had no statistically significant impact on the outcomes of emergency department visits, unplanned readmissions, or all-cause mortality in the 90-day postdischarge period.⁵

One reason for the limited effect of BPCI is that opportunities for savings achieved are condition specific. Under bundled payments, there are 2 types of episodes: procedure-based (such as knee and hip replacement) and condition-based (such as stroke, ischemic heart disease, and diabetes) episodes. They each have different financial risk and care coordination needs. So far, most of the evidence for savings under BPCI concentrates on elective surgical cases in which there is more opportunity to select healthier patients with fewer comorbidities to include in the BPCI calculations.⁴ This is most pronounced in orthopedic care and outcomes. Studies have shown that participating in hip and knee replacement episodes was associated with decreased length of stay and use of institutional postacute care services, which in turn resulted in cost savings.¹¹ In contrast, stroke episodes may be more heterogeneous and complex; thus, they are potentially more resource intensive and, as a population, these patients perhaps have greater illness severity at baseline. After the acute onset of stroke, survivors often live with long-term neurologic deficits, functional limitations, and disabilities that require complex and continuing care both from inpatient and outpatient settings. Additionally, the stroke episode itself may be the entrée into care where multiple other chronic conditions are uncovered, and patients may be naïve to having to engage in complex care treatment plans going forward.¹² These inherent variabilities generate greater financial risk for BPCI stroke bundle participants, especially for providers who treat more stroke survivors with multiple chronic conditions.

In addition to patient complexity, protocols for secondary prevention of stroke have yet to be incorporated into bundled payment models.² Secondary prevention such as blood pressure and diabetes management, cholesterol-lowering medication adherence, exercise and physical activity, and other lifestyle interventions present great opportunities to improve outcomes in patients with stroke and prevent recurrent events. These components of secondary prevention require more effective coordination and alignment with the incentives under the bundled payments.

Finally, formal postacute care guidelines are lacking, especially for stroke survivors discharged directly home. One consistent pattern across episodes under BPCI, aimed at cost reduction, is that participating hospitals tended to substitute more intensive settings—such as SNF and IRF services—with a less intensive setting, such as home health agency services.⁵ Such a pattern has coincided with the recent practices in stroke care, whereby over 50% of survivors of stroke are discharged directly home,⁶ of whom approximately 30% receive home health therapy and 11% receive outpatient therapy during the first 30 days postdischarge,¹³ suggesting the shift toward home-based rehabilitation. As BPCI moves forward, there is an increasing need for identification of transitional care from hospital to home to be tested under the bundled payment environment.

COMprehensive Post-Acute Stroke Services

Transitional care (TC) bridges acute care, primary care, and other complementary services with the aim to improve care coordination for chronically ill patients across different care settings.^{14,15} The provisions of TC are inherently aligned with the goal of BPCI that supports care redesign spanning across a patient's episode of care.¹⁶ BPCI also encompasses financial implications for organizations and providers incorporating TC services. Starting in 2013, CMS implemented new reimbursement policies to incentivize the adoption of TC services. Physicians and other qualified non-physician professionals can bill Medicare for 30-day postdischarge TC services using 2 new CPT codes, 99495 and 99496, and bundled payment models were required to cover the cost of TC services.¹⁷

Consistent with CMS TC policies, the COMPASS study is a cluster-randomized pragmatic trial of stroke postacute care, in which hospitals were randomized to an evidence-based stroke TC model or usual care. The COMPASS-TC model was designed with input from patients, caregivers, providers, and policymakers to ensure patient-centeredness and to optimize inpatient provider uptake. North Carolina hospitals were eligible to participate in COMPASS if they had an emergency department that treated patients with stroke and could identify patients with stroke and transient ischemic attack (TIA) concurrent with care. Eligible patients were aged ≥ 18 years; English- or Spanish-speaking; diagnosed with ischemic stroke, hemorrhagic stroke (excluding subdural or aneurysmal hemorrhage), or TIA; and discharged directly home. Patients were excluded from the study if they were discharged to prison, SNF, IRF, or hospice or comfort measures only.

The COMPASS study, conducted in 40 hospitals in North Carolina from July 2016 through March 2019, enrolled 6024 patients in phase 1 during a 1-year study period. Hospitals were given the opportunity to enroll in phase 2, a sustainability phase, during which intervention hospitals continued using the COMPASS-TC model without further study input, while the usual care hospitals switched to the intervention mode. A total of 31 hospitals participated in phase 2, enrolling 4037 patients. The primary outcome, examined at 90 days postdischarge, was patients' self-reported functional status measured by the Stroke Impact Scale-16. The Stroke Impact Scale-16 captures a range of physical function limitations of patients poststroke, including muscle strength, hand function, ability to perform activities of daily living, and mobility.¹⁸

Table 1 describes the characteristics of COMPASS hospitals and patients, comparing them with the characteristics of those enrolled under BPCI model 2 and BPCI-A for stroke episodes. Participants in BPCI and BPCI-A tend to be large, nonprofit hospitals located in urban areas, and about half of these hospitals have a medical school affiliation. In contrast, the majority of COMPASS hospitals did not have a medical school affiliation. The proportion of hospitals in rural/micropolitan areas was greater in COMPASS compared with BPCI hospitals. Reported 30-day mortality was higher in COMPASS compared with BPCI hospitals, with comparable reported rates of 30-day readmission at baseline.

Key components of the COMPASS-TC model align with bundled payment models

The key components of COMPASS interventions, such as care coordination, risk assessment, and patient and caregiver education, are central to the success of the stroke bundle under BPCI. Many BPCI participants have hired a care coordinator or a transition specialist to manage patients over the entire episode of care and to serve as a liaison for communications with different providers involved.²⁰ Likewise, the care transition under COMPASS is managed by an interdisciplinary team that requires at least 2 staff members, a postacute care coordinator (usually a registered nurse) and an advanced practice provider (APP), who work as a team to assess patient and caregiver needs, patient health status, and develop a longitudinal care plan.¹⁹ The postacute care coordinator is charged with proactively identifying eligible individuals with stroke discharged home; enrolling patients at the bedside; engaging in a 2-day call with the patient and/or caregiver to perform medication reconciliation; and assuring that postacute care medical appointments are scheduled, that access to care barriers are mitigated, and that outstanding procedures and tests are completed. The APP evaluates the patient at a postdischarge visit 7–14 days after hospital discharge to identify the unmet needs of the patient. The postacute care coordinator helps to coordinate primary and specialty care visits and outpatient therapy sessions as indicated. Thirty- and 60-day follow-up calls are placed by the coordinator to ensure that patients engage in appropriate longitudinal care and engage in community services that optimize wellness.

The risk assessment at key points of care transition is also an essential part of the bundled payment models and represents opportunities for future cost savings. That is, informed by informatics tools, a provider could better identify patients who meet the criteria of BPCI who need enhanced care management and determine how resources are distributed across the entire care continuum. For example, BPCI suggests several informatics tools to flag eligible patients, identify patients with high risk factors, and monitor patients' trajectories postdischarge.²⁰ Consistent with this data-driven management approach, COMPASS leverages a care plan-generating application (COMPASS-CP) to identify patients in the hospital and emergency department based on admission or discharge diagnosis and to create individualized care plans for self-management and referrals based on the patient's social and medical needs. The algorithm also embeds a stroke-specific community resources directory to provide information on local support groups, behavioral health services, and other recovery-related organizations.¹⁹

The success of BPCI models also underscores the importance of engaging patients and caregivers postdischarge. Survivors of stroke need to be involved in patient education on secondary prevention and in rehabilitation-related decisions, such as choosing rehabilitation settings and establishing rehabilitation goals postdischarge. Another important consideration is the role of caregivers, who are critical support persons for patients with stroke and key to enhanced outcomes. In fact, a study from Singapore showed that caregiver support (a "potential hidden workforce") was an important factor in the health care utilization of stroke survivors, suggesting an emphasis on family-centered clinical models for optimal

outcomes.²¹ This is accomplished in COMPASS through direct input from caregivers, assessment of the caregiver's capacity for assisting survivors of stroke, and educational and resource materials developed to address important areas of care for stroke recovery.¹⁹

Despite all of these synergies, the COMPASS trial focuses primarily on the patient who is discharged directly from a hospital to home, both with and without home health. This contrasts with the BPCI's effort that also focuses on coordinating care for patients who are discharged to an institutional postacute care facility, including SNF, IRF, and other long-term care hospital services. COMPASS provides patient-level information on the availability of postacute care resources in the community but does not directly coordinate the transition of care from acute inpatient care to an institutional postacute care setting. Nevertheless, with more patients in stroke bundles being discharged to home, COMPASS provides a care plan to organize postacute care, including rehabilitation services that this patient population needs.

COMPASS-TC also deviates from the BPCI stroke bundle in terms of the patient population. Notably, the COMPASS trial included both stroke and TIA patients, whereas BPCI tested TIA diagnosis as a separate episode. Unlike a full-scale stroke, patients with TIA generally do not have long-lasting sequela and require less intensive postacute care. The COMPASS study observed that compared with patients with a stroke diagnosis, patients with TIA were less likely to come back for follow-up clinical visits.²² Given that BPCI-A has already stopped testing the TIA episode, we may need additional evidence on whether TIA is suitable for bundled payments.

The feasibility of incorporating postacute care for patients with stroke discharged home in bundled payment models

The real-world evidence on transitional care intervention is particularly important for identifying best practices under bundled payments. The primary outcome of the pragmatic trial demonstrated that the COMPASS-TC model did not significantly improve the 90-day postdischarge functional status over the usual postacute stroke care in the intention-to-treat analysis.⁷ Nevertheless, patients under the intervention model reported a clinically meaningful improvement in blood pressure monitoring, signaling an enhanced effort in patient education and home care supports at the intervention hospitals.⁷ This was further ascertained by evaluating the implementation of COMPASS interventions; in fact, "63% of intervention hospitals using their own resources provided blood pressure monitors to patients at discharge."⁷ Given the pragmatic nature of the study design, the overall uptake of COMPASS-TC was low, averaging 35% overall and varying greatly among sites.^{7,22} In a post hoc adjusted analysis comparing patients in intervention hospitals who received the intervention with those who did not, functional status did improve at 90 days for those patients who received the interventions.⁷

Reengineering clinical workflow is challenging, especially when a model incorporates acute and postacute care, as with bundled payments. This is particularly evident in COMPASS, where only 35% of patients in the intervention arm actually received the intervention, which required a return visit to the clinic associated with the discharge hospital.²² Barriers

to implementation included both hospital characteristics, such as lack of organizational readiness and staff turnover, and patient characteristics, including diagnosis of TIA (vs stroke), lack of insurance, distance from the clinic, and urban (vs rural) residence.²²

COMPASS involved care coordination with a team of at least 2 providers (a nurse and an APP or physician), who focused on patient and caregiver preferences and goals for recovery, education, and referrals to appropriate postacute care services, all of which were delivered in an outpatient setting via individualized care plans. If bundled payment models were to incorporate a post-acute-focused care model such as COMPASS, there would need to be an acceptance of early investment in personnel, time, and resources to deliver the model. Provider and health system incentives would be required to reengineer the system to accommodate such a model. One commentary on the innovation of health care delivery noted that a lack of financial incentive was 1 of the major reasons value-based care models have not been widely implemented by providers or health systems.²³ When the incentives are complex, both the financial leaders and the clinical experts need to coordinate to tackle these challenges as a team.²³ Subsequently, distributing financial incentives across a multidisciplinary team and the acute/postacute care setting is equally important. Involved providers contributing to improved outcomes in a bundled payment model should receive part of the financial rewards. BPCI designed a gainsharing waiver as a way to distribute savings and incentivize engagement of all providers along the care continuum, but the waiver remains underutilized and is challenging if providers are not within the same system.²⁴

Value-based care, which is focused on quality, requires patient outcomes as 1 of the measurements of success. However, bundled payments participants aiming at cost reduction may circumvent necessary care to avoid higher cost settings.^{8,25} Over time, this could compromise overall outcomes of care. Some progress has been made in BPCI-A, and for stroke episodes proposed clinical measures include tobacco use screening and cessation intervention, a record of statin medications at discharge, and time to intravenous thrombolytic therapy.²⁶ These measures align with recommendations of the Get With The Guidelines–Stroke registry and are more focused on the acute stroke hospitalization. The COMPASS model, with its emphasis on care transitions and secondary prevention, may complement a set of postacute care quality indicators (eg, physical function for all patients, secondary prevention with blood pressure and cholesterol management, stroke education) to better align incentives. Moreover, physicians, rehabilitation professionals, and other billing providers, such as APPs, will need to see the value of operationalizing a new model of care. Although health professionals may be resistant to changes in clinical workflow, this may not be a major challenge if they believe that patient outcomes will be enhanced. The challenge is when the outcome is delayed or witnessed by a different provider along the continuum of care, whereas most of the work to produce that outcome occurs early in the acute and postacute care time frame.

Conclusions

In summary, as BPCI-A continues to gain acceptance nationwide, participating hospitals could consider employing a set of care redesign strategies to enhance transition of patients

with stroke into a postacute care setting without compromising the care quality, especially for patients discharged directly home. These strategies could be based on a COMPASS-like transitional care model. Consistent with CMS TC policies, COMPASS is well positioned to adapt to the financial incentives under a bundled payment model and to improve quality in postacute stroke care. This effort is not without its challenges, though. The COMPASS study did not yield a significant improvement in physical function, possibly because of the low uptake of the intervention in a pragmatic trial or the lack of preparedness overall for managing patients across the continuum. Future analysis should focus on testing COMPASS in different populations to determine its effect on value-based care across the sociodemographic and geographic spectrum.

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List of abbreviations:

APP	advanced practice provider
BPCI	Bundled Payments for Care Improvement
BPCI-A	Bundled Payments for Care Improvement Advanced
CMMI	Center for Medicare and Medicaid Innovation
CMS	Centers for Medicare & Medicaid Services
COMPASS	COMprehensive Post-Acute Stroke Services
IRF	inpatient rehabilitation facility SNF skilled nursing facility
TC	transitional care
TIA	transient ischemic attacks

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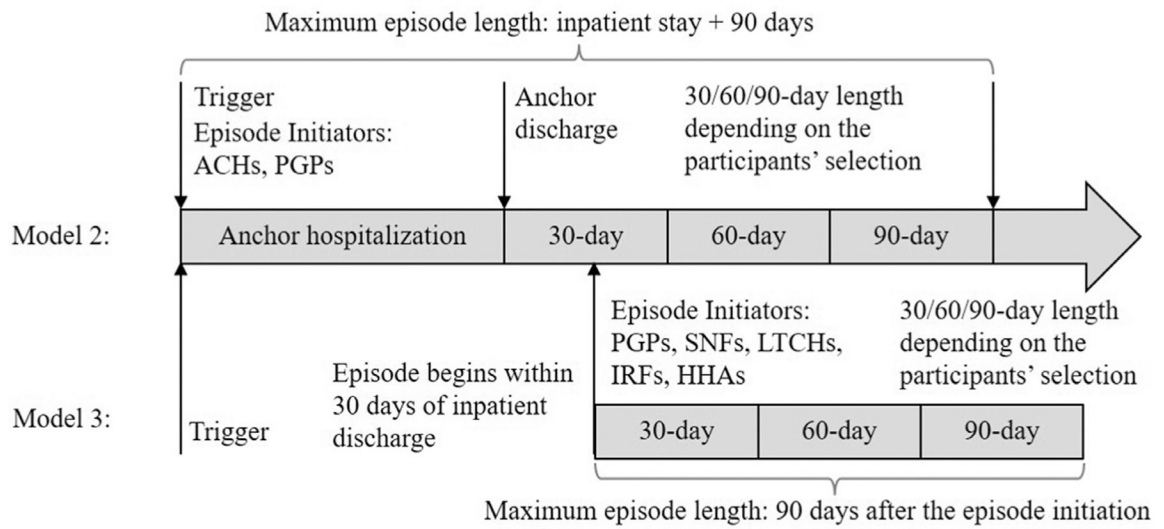


Fig 1. Timeline and length of episode of care under model 2 vs model 3. ACH, acute care hospital; HHA, home health agency; LTCH, long-term care hospital; PGP, physician group practice.

Table 1
 Characteristics of hospitals participating in the COMPASS study and the stroke episode under BPCI model 2 and BPCI-A

Characteristics	COMPASS	BPCI Model 2	BPCI-A
No. of hospital units	40 [*]	84 [†]	230 [‡]
No. of patients/episodes	6024	14,489 ^{†,§,}	NA
Payer sources	Medicare, Medicaid, and private/commercial	Medicare FFS	Medicare FFS
Diagnoses	Ischemic or hemorrhagic stroke and TIA	Ischemic or hemorrhagic stroke	Ischemic or hemorrhagic stroke
Ownership, n (%) [§]			
Nonprofit	18 (46)	47 (56)	137 (60)
Government	14 (36)	8 (9)	8 (3)
For-profit	3 (8)	20 (24)	63 (27)
Other	6 (10)	9 (11)	22 (10)
Medical school affiliation, n (%) [§]			
Major	3 (8)	24 (28)	49 (21)
Graduate or limited	5 (12)	20 (24)	65 (28)
None	32 (80)	40 (48)	116 (51)
Hospital bed size, n (%) [§]			
<100 beds	15 (38)	3 (4)	12 (5)
100–300 beds	15 (38)	31 (37)	108 (47)
300 beds	10 (25)	50 (59)	110 (48)
Urban/rural classification, n (%) [§]			
Rural	4 (10)	1 (1)	16 (7)
Metropolitan	15 (38)	83 (99)	214 (93)
Metropolitan	21 (53)		
Annual stroke discharge volume, n (%)			
<100 discharges	11 (28)	125 ^{,§,}	NA
100–299 discharges	17 (43)		
300+ discharges	12 (30)		
30-day rate for patient with stroke, # median (IQR)			

Characteristics	COMPASS	BPCI Model 2	BPCI-A
Mortality	15.5 (14.2–16.5)	14.6 (13.6–16.0)	13.9 (12.8–15.1)
Readmissions	12.8 (12.2–13.7)	13.3 (12.7–14.5)	12.1 (11.3–12.7)
CMS HCAHPS 5-star quality rating, # median (IQR)			
Overall summary score	3 (3–4)	3 (2–4)	3 (3–4)
Care transition score	3 (3–4)	3 (2–3)	3 (2–4)

Abbreviations: FFS, fee-for-service; HCAHPS, Centers for Medicare and Medicaid Services Hospital Consumer Assessment of Healthcare Providers and Systems; IQR, interquartile range; NA, not available.

* 41 participating hospitals in COMPASS study and 2 hospitals were paired as a single randomization unit because of a high degree of shared staff. All COMPASS hospitals were in North Carolina.

† Number of hospital units participated in the BPCI model 2 stroke bundle were obtained using CMS BPCI Initiative Episode Analytic File (Q42013-Q42016). Number of hospital units participated in BPCI Advanced stroke bundle were obtained using CMS BPCI Advanced Analytic File (model years 1–2 as of March 2019). BPCI and BPCI-A hospitals were in 23 and 35 states, respectively, including North Carolina.

‡ Patient episodes under BPCI model 2 stroke bundle initiated by hospitals were obtained from the CMS BPCI models 2–4; year 5 evaluation & monitoring annual report-appendices.

§ Ownership, medical school affiliation, hospital bed size, and urban/rural classification data were obtained using CMS 2014 and 2018 Provider of Services Files for BPCI model 2 and BPCI-Advanced.

|| Urban/rural status defined in the CMS Provider of Services file is based on the core-based statistical area. Providers are considered urban if located in a core-based statistical area, including metropolitan and micropolitan areas. Other providers are considered rural.

¶ Baseline mean discharges per hospital for BPCI model 2 stroke bundle participants were obtained from the Lewin Group analysis of 2011 Medicare claims in CMS BPCI models 2–4; year 5 evaluation & monitoring annual report-appendices.

30-day rate for stroke and HCAHPS 5-star quality rating data were obtained using 2014 and 2018 CMS Hospital Compare.