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Quality of Care for Chronic Conditions Among Disabled Medicaid Enrollees: An Evaluation of a 1915(b) and (c) Waiver Program

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Abstract

Importance—Examining the impact of Medicaid managed care home- and community-based service (HCBS) alternatives to institutional care is critical given the recent rapid expansion of these models nationally.

Objective—We analyzed the effects of STAR+PLUS, a Texas Medicaid managed care HCBS waiver program for adults with disabilities on the quality of chronic disease care.

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SUPPLEMENTAL DIGITAL CONTENT

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Supplemental Digital Content 2.. Table comparing Fee For Service (FFS) and Primary Care Case Management (PCCM) on measure compliance at baseline and control variables. docx

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Design, Setting and Participants—We compared quality before and after a mandatory transition of disabled Medicaid enrollees >21 years from fee for service (FFS) or primary care case management (PCCM) to STAR+PLUS in 28 counties, relative to enrollees in counties remaining in the FFS or PCCM models.

Measures and Analysis—Person-level claims and encounter data for 2006–2010 were used to compute adherence to 6 quality measures. With county as the independent sampling unit, we employed a longitudinal linear mixed model analysis accounting for administrative clustering and geographic and individual factors.

Results—Although quality was similar among programs at baseline, STAR+PLUS enrollees experienced large and sustained improvements in use of beta-blockers after discharge for heart attack (49% vs 81% adherence post transition; $p<0.01$) and appropriate use of systemic corticosteroids and bronchodilators after a COPD event (39% vs 68% adherence post transition; $p<0.0001$) compared to FFS/PCCM enrollees. No statistically significant effects were identified for quality measures for asthma, diabetes or cardiovascular disease.

Conclusions—In one large Medicaid managed care HCBS program, the quality of chronic disease care linked to acute events improved while that provided during routine encounters appeared unaffected.

Keywords

Medicaid; managed care; home- and community-based services; long-term care; quality of care; policy evaluation; chronic disease; disabilities

INTRODUCTION

Home- and community-based service (HCBS) alternatives to institutional care have been emphasized as cost-effective, patient-oriented approaches that allow Medicaid enrollees to receive long-term services and supports (LTSS) in their homes and communities.[1] In 2011, more than 3.2 million Medicaid beneficiaries received HCBS, accounting for almost half of Medicaid expenditures on LTSS.[1] There has been rapid growth in the use of managed care to provide LTSS through 1915 (b)/(c) managed care/HCBS waivers or 1115 demonstration waivers, increasing from 8 state Medicaid programs in 2004 to 18 programs in 2014.[2]

However, little is known about the quality of care delivered through these programs. The Department of Health and Human Services (DHHS) Office of the Inspector General identified concerns with inconsistent monitoring of the quality of HCBS programs, noting that “the beneficiaries … are among Medicaid’s most vulnerable, and the nature of these programs puts beneficiaries at risk for receiving inadequate care.”[3] Although there is considerable research on the effect of Medicaid managed care delivery for children, their parents and other low-income beneficiaries, there is a paucity of information on the effects of managed care and HCBS waiver programs for adults with disabilities (AWD), which may be due to the relatively recent expansion of these programs or inconsistent and heterogeneous reporting of quality information.[4–6] Of the existing research, Burns found that Medicaid AWD in mandatory managed care were more likely to wait to see a provider, report difficulty obtaining specialty care, and less likely to receive a flu shot compared with

fee-for-service (FFS) enrollees; yet they were also more likely to report having a usual source of care.[5] Coughlin, Long and Graves also found that Medicaid managed care was positively associated with having a usual source of preventive care among AWD compared with FFS.[7] Neither study focused specifically on AWD enrolled in HCBS waiver programs.

More than one-third of AWD in Medicaid have three or more chronic conditions, and the chronic condition profile of AWD is different than for other Medicaid high-use groups. For example, AWD are more likely to have psychiatric illness, substance abuse, and developmental disability diagnoses compared with aged Medicaid enrollees.[8] The high rates of chronic disease comorbidity and differential chronic condition profile highlights the importance of understanding the impacts of HCBS on the quality of chronic disease care among Medicaid AWD.[8,9] Ensuring the delivery of recommended care contributes to improved disease management and the ability to remain in a home setting.

The purpose of our study was to examine the effects of a large acute care and HCBS program delivered through managed care organizations (MCOs) in Texas Medicaid – the STAR+PLUS program – on the quality of chronic disease care for AWD. In 2012, Texas Medicaid enrollees accounted for one-half of all enrollees nationally in Medicaid managed care LTSS programs.[10] A primary focus of STAR+PLUS is to improve the quality of care for enrollees with disabilities through coordinated and comprehensive care. The program delivers acute and LTSS through a single system; employs service coordinators who develop individual care plans and assist enrollees in receiving needed care; and emphasizes HCBS alternatives to institutional care.[11] Additionally, in a fully capitated health care delivery model like STAR+PLUS, evidence suggests that care which has the potential to reduce future visits, such as medications for chronic condition management, is provided more frequently compared with fee-for-service payment.[12]

Given this evidence and the key program objectives to provide more integrated and coordinated care compared to the pre-existing FFS and PCCM Medicaid program components, we hypothesized that the quality of care for chronic conditions would improve after STAR+PLUS enrollment and relative to a comparison group that remained enrolled in FFS or PCCM. To test this, we performed a series of longitudinal mixed model analyses with a comparison group.

Our study offers several contributions to the literature. First, it focuses specifically on Medicaid AWD <65 years in contrast to the more frequently studied Medicare-Medicaid dual-eligible populations.[13–16] Second, most research on HCBS has examined healthcare expenditures or access to care rather than specific quality indicators.[5,17] Third, we study a program with mandatory enrollment, overcoming the limitation of potential selection bias in prior research on waiver programs with voluntary enrollment. Thus, our study extends existing knowledge by examining the effects of HCBS delivered through an integrated managed care program on the quality of care provided for common chronic conditions among Medicaid AWD.

METHODS

Overview

Currently, there are 13 STAR+PLUS service areas (SAs) that encompass all 254 counties in Texas. SAs are contiguous counties grouped together to organize health care delivery for Texas Medicaid. STAR+PLUS was phased in over time by SA, and some individual SAs transitioned asynchronously (i.e., subsets of counties within a SA transitioned in different years). STAR+PLUS was piloted in 1998 in the Harris SA (initially comprised of Harris County). The program expanded to 40 additional counties in January and February of 2007, comprising subsets of 4 SAs. The remainder of the counties in these 4 SAs, plus six additional SAs, transitioned in 2011 and 2012. On September 1, 2014, STAR+PLUS completed statewide expansion (see Figure and Table, Supplemental Digital Content 1, for a listing of county transitions).[18] Texas selected SAs for initial implementation based on the presence of a strong health care infrastructure in order to increase the likelihood of successful program implementation. The phased implementation allowed us to compare the quality of care enrollees received for a range of chronic conditions before and after their transition to STAR+PLUS and relative to enrollees who were phased-in later.

We used Texas Medicaid administrative data from January 2006–December 2010 to estimate the treatment effect of the STAR+PLUS program on chronic care quality, focusing on the 2007 program expansions to allow for sufficient post-transition data for analysis. This time frame includes a baseline year (2006), a transition year (2007), and three years post-transition for enrollees in the treatment counties. FFS and PCCM enrollees in counties that did not switch to STAR+PLUS during the study period served as the comparison group. We did not further distinguish between FFS and PCCM enrollees in our analyses based on existing research indicating few differences in access to care among adult Medicaid enrollees in general and those with disabilities in particular.[19–22] In addition, post analysis comparison of the control variables and baseline measure compliance between FFS and PCCM revealed only small differences (see Table, Supplemental Digital Content 2). Our university's Institutional Review Board approved this study.

Population and Data Sources

The study population included individuals 21–64 years old who were enrolled during the study time period and qualified for Supplemental Security Income (SSI) and Medicaid due to disability. Dual Medicare-Medicaid eligible were excluded because Medicare data were not available for those enrollees. Individuals < 21 years old were excluded because STAR +PLUS enrollment was voluntary for this group. We excluded enrollees in the 1998 Harris SA pilot because it was not possible to generate separate program effect estimates to compare mature versus newly implemented STAR+PLUS with only a single observational unit.

Person-level administrative enrollment and claims/encounter data provided by the Texas Health and Human Services Commission were used to obtain enrollees' age, sex, race/ethnicity, county, service area, monthly enrollment, and delivery model (STAR+PLUS or FFS/PCCM). Enrollment records were linked to claims data that included International

Classification of Diseases (ICD-9-CM) diagnosis codes, Current Procedural Terminology (CPT) codes, and National Drug Codes. These data were supplemented with county, Zip Code Tabulation Area (ZCTA), and census tract- level data from the Area Resource File, U.S. Census Bureau, and U.S. Department of Commerce to capture geographic contextual factors. The sample size varied for each outcome according to the eligibility inclusion criteria for each quality measure described below.

Outcome Variables

We used chronic care quality indicators from the National Committee for Quality Assurance (NCQA)'s Healthcare Effectiveness Data and Information Set (HEDIS®): (1) Use of Appropriate Medication for People with Asthma, (2) Medication Management for People with Asthma at the 75% level, (3) Pharmacotherapy for COPD Exacerbation, (4) Cholesterol Management for People with Cardiovascular Conditions, (5) Persistence of Beta-Blocker Treatment after a Heart Attack, and (6) Comprehensive Diabetes Care. These measures were selected because they reflect quality of care for the Agency for Health Care Research and Quality's "Priority Conditions"[23] and were suggested by the Centers for Medicare & Medicaid Services (CMS) as initial health care quality core measures for adults in Medicaid. Strong performance on these indicators is linked to improved health outcomes.[24]

We used NCQA-certified software (Inovalon, Quality Spectrum Insight v15.2011), applying 2012 HEDIS® technical specifications to determine person-level compliance for each measure in each study year (see Table, Supplemental Digital Content 3, for measure definitions).[25] For COPD exacerbation pharmacotherapy, we calculated the average of the compliance rates for appropriate corticosteroid and bronchodilator dispensing. For diabetes care, we constructed a person-level composite measure used in prior research that averages the compliance rates of the subcomponents: annual hemoglobin A1c testing, eye-exam, LDL cholesterol screening, and nephropathy screening.[26] For the remaining measures, person-level dichotomous indicators of compliance were created.

Predictor Variables

For each member-year, we computed our main predictor variable as the number of STAR +PLUS enrollment months (0–12) (see Text, Supplemental Digital Content 4, for more detail on the main predictor's definition and behavior). We also controlled for several person-level and contextual variables.[5,27] First, for each outcome, person-level measure compliance in 2006 was used to control for baseline differences between the two studied groups. We constructed a variable to indicate if ≥ 5 enrollees were residing at the same address to identify group living arrangements. We also used the 3M Clinical Risk Groups (CRGs), which uses ICD-9-CM diagnosis codes from health care encounters for individuals enrolled ≥ six months to assign enrollees to the following hierarchically defined health status categories: healthy, significant acute conditions (e.g., chest pains), minor chronic conditions (e.g., migraine), moderate chronic conditions (e.g., asthma and diabetes), or major chronic conditions (e.g., cystic fibrosis and cancer).[28] Less than 1% of individuals lacked sufficient enrollment history for classification and were excluded. Additional individual characteristics included age at baseline (in years), gender, and race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other). Contextual geographic variables included the percentage of

the population living in poverty in the enrollee's census tract (or ZCTA if census tract was unavailable) and county-level median household income. Dummy variables for each year were controlled for secular trends. The full model included two-, three- and four-way predictor interactions and predictor interactions with time to test for time-varying treatment effects.

Model Specification

Although SAs represent administrative clustering and the approximate unit at which STAR +PLUS was implemented, there were too few units to have sufficient statistical power. In addition, some SAs were transitioned in phases. Accordingly, we selected an intermediate clustering unit (county), which provides sufficient power and accounts for potential non-independence among enrollees. The county reasonably represents the context within which enrollees seek health care and captures administrative similarity of the care environment, such as available health care resources that impact health service use.

We employed a two-stage, multilevel approach using general linear models. First, we computed person-level models separately for each year and outcome. Using individually-adjusted averages and assuming unstructured correlations over time, we then built the second tier model for each outcome, spanning the post-baseline years (2007–2010). With these 6 full models, fixed-order backwards selection of predictor variables with alpha = 0.05 was used to arrive at the reduced models. Finding general agreement in terms retained between the models, we established one final reduced model form for consistency. R^2 statistics were then estimated.[29] Finally, we computed the least-squares-mean predicted compliance rates for the STAR+PLUS and FFS/PCCM counties using group-specific covariate distributions. The difference between these estimates reflects the STAR+PLUS effect.

Our modeling approach is a mathematical generalization of a difference-in-difference (DD) approach. The standard DD model compares differences between two groups at two time points to isolate and test the presence of an effect, assumed to be a deviation from the baseline difference. In a design with more than two time points (e.g., in our study with 4 post-baseline measurements), DD requires aggregation of the post-period measurements as a single time point or computation of four separate DD models for each outcome. Our strategy models all post-period measurements simultaneously, while accounting for the covariance of repeated measurements, thus increasing power relative to the standard DD approaches. This generalized approach also relaxes the DD parallel trend assumption requiring similar rates of growth between groups by allowing for differing slopes (see Text, Supplemental Digital Content 5, for more technical detail). Analyses were performed using SAS 9.3 (SAS Institute Inc., Cary, NC, USA).

RESULTS

Table 1 provides summary demographic and health status information for Texas Medicaid AWD meeting the inclusion criteria, stratified by time period and delivery system (STAR +PLUS counties or FFS/PCCM counties). Eighty percent of enrollees were assigned to the most severe health status category. Two-thirds were >50 years, and a similar fraction was

female. Reflecting Texas' diversity, >50 percent of the sample was Hispanic or non-Hispanic black. Over half lived in census tracts designated as impoverished or extremely impoverished.

All descriptive statistics were stable over the study period. However, enrollees residing in STAR+PLUS counties were more likely to be Hispanic and less likely to be non-Hispanic black or non-Hispanic white compared with those in FFS/PCCM counties. STAR+PLUS enrollees also resided in areas with slightly lower levels of poverty and higher median household income. Distributions of age, gender and health status were similar.

Table 2 describes the sample size range (enrollees and counties) by delivery system and outcome measure (see Tables, Supplemental Digital Content 6, for full observation patterns by group and measure). The enrollee sample was largest for the diabetes care measure, reflecting relatively high prevalence. In contrast, the smallest enrollee sample was for Persistence of Beta-Blocker Treatment after a Heart Attack. Lower proportions of FFS/PCCM counties (225 in total) are represented in each measure compared to STAR+PLUS counties (28 in total), reflecting the smaller populations of many rural FFS/PCCM counties. The sample sizes remained relatively stable over time for each measure.

Table 3 provides unadjusted measure adherence rates by delivery system and time period. Measure adherence was similar between groups at baseline. However, baseline adherence rates varied widely between measures. For example, approximately 80% of enrollees with persistent asthma were dispensed at least one asthma controller medication, whereas <50% of those enrollees remained on the medication for the majority of the baseline year. In 2006, members discharged with COPD exacerbation received sustained bronchodilator or systemic corticosteroid 55% of time. Members were given long-term beta-blocker therapy for approximately 50% of discharges after a heart attack.

Two of the six measures demonstrated sizable pre-post improvements in STAR+PLUS, but not in FFS/PCCM. Beta-blocker treatment after a heart attack increased from 51% in the baseline year to 74% in the post-transition period for STAR+PLUS enrollees; while rates for FFS/PCCM enrollees decreased from 53% to 45%. Similarly, the percentage of STAR+PLUS enrollees who received pharmacotherapy following a hospitalization or emergency department visit for COPD increased from 56% to 82%, while rates for FFS/PCCM enrollees remained stable at 58%. Little change between the pre-post periods was observed for the remaining measures (diabetes, asthma, and cholesterol management).

Table 4 provides fit statistics and model-based estimates of the predicted means between groups for the final reduced models. R^2 statistics ranged from 0.166 to 0.517, indicating fair to good model fit. Our model did not converge for the diabetes outcome, and so while the point estimates for this measure are reliable, the standard errors and model fit are undetermined. Also note that the effect of treatment was stable across time (i.e., there was no interaction between time and the STAR+PLUS program variable). Correspondingly, all model-based estimates reflect the predicted county-level average effects of STAR+PLUS implementation on measure adherence across the four post-implementation years.

The model-based estimates, which were adjusted for control variables, administrative clustering, and correlation between outcomes over time, align closely with the unadjusted results. In STAR+PLUS counties, 28.5% (95% CI: 21.6%, 35.4%) more enrollees received appropriate medication following COPD exacerbation compared to FFS/PCCM counties. In addition, receipt of beta-blocker following heart attack discharge demonstrated improvement of 32.0% (95% CI; 6.8%, 57.2%) in the STAR+PLUS counties relative to the FFS/PCCM counties. We did not find statistically significant differences for the remaining measures (see Table, Supplemental Digital Content 7, for final model coefficients and standard errors).

DISCUSSION

Measuring the impact of Medicaid managed care HCBS waiver programs is critical given rapid expansion of these models nationally. In this study, we examined the effect of the Texas STAR+PLUS HCBS waiver program on the quality of chronic disease care for Medicaid AWD. Our results demonstrate large and sustained improvements in care following both heart attack and COPD exacerbation. However, differences were not observed in the quality of ambulatory care for diabetics or asthmatics, or for cholesterol screening for those with cardiovascular conditions.

Further research is necessary to identify the pathways through which the observed improvements were achieved and the reasons why improvements were not seen in all the measures. However, it is worth noting that the two measures for which we found significant improvements, Persistence of Beta Blockers after a Heart Attack and Pharmacotherapy for COPD Exacerbation, focus on care processes linked to an acute event. Thus, it may be that managed care quality improvement protocols were more readily implemented in the context of an acute event. For example, prior-authorization is sought during inpatient admissions concomitant with an acute event, thereby providing care-coordinators a near real-time opportunity to influence care. In contrast, difficulty with patient follow-up for the remaining measures may be a particularly important factor contributing to the lack of significant findings. The immediacy of costs of poor quality may also be an important motivator for these differences. For example, with the acutely-linked care examined here, the costs of poor quality care are realized quickly in re-admissions and emergency department visits, while the consequences of inadequate ambulatory diabetes care or lipid screening occur over longer time spans.

Our study has several strengths. First, the study was conducted in Texas, which has the second largest Medicaid program in the US. The population in STAR+PLUS is racially and ethnically diverse providing greater insight into the effects of a comprehensive HCBS program in a broad population. Second, this study is based on a natural experiment in which STAR+PLUS was mandatorily phased into different counties for Medicaid AWD, providing a high level of internal and ecological validity. As in all observational studies, there is possibility of residual confounding. However, bias introduced by non-random phase-in is largely attenuated through the study design, which included the baseline value of the outcome and modeled separate slopes for each study group. To threaten internal validity, an external influence would have (1) needed to mirror the implementation of STAR+PLUS, that is occurring only in the transitioned counties and during the same period under study in

this analysis and (2) not been closely correlated to the repeatedly-measured contextual and individual control variables.[30]

Our study also has limitations that should be considered when interpreting the results. First, the NCQA-certified software that we used to calculate the chronic care measures uses health care claims and encounter data, the quality of which may be affected by coding practices. As part of ongoing quality of care evaluation for the Texas Medicaid program, we conduct encounter data validation of the administrative claims data against medical records following CMS external quality review protocols.[31] A random sample of >1,100 medical records for STAR+PLUS are reviewed annually by certified medical record coders and compared to claims/encounter data fields (e.g., ICD-9-CM codes, CPT codes, date of service, place of service, and rendering provider) with >92% agreement, lending confidence in the data quality. Second, Medicaid managed care HCBS waiver programs implemented through MCOs differ throughout the U.S. Therefore, it is possible that the findings in our study are not generalizable to other Medicaid programs. Even so, the pattern of improved care linked to specific acute events, versus that delivered in routine care settings is seen frequently.[32] Further, information about the structure of the STAR+PLUS program is available, and policymakers and health care providers can examine the extent to which the program design characteristics are similar to existing or proposed programs.[11,33,34] Given variability in HCBS programs, future research should examine specific types of HCBS received and their association with quality of care. It also would be prudent to explore potential heterogeneity in program implementation and see if this heterogeneity leads to differences in quality improvements between health plans. Finally, this study examined process of care measures; future work should examine the extent to which these findings translate into improved health outcomes.

In summary, in one large Medicaid managed care HCBS program, the quality of chronic disease care linked to acute events improved while that provided during routine encounters appeared unaffected. Additional research is needed to further evaluate and refine care for this vulnerable population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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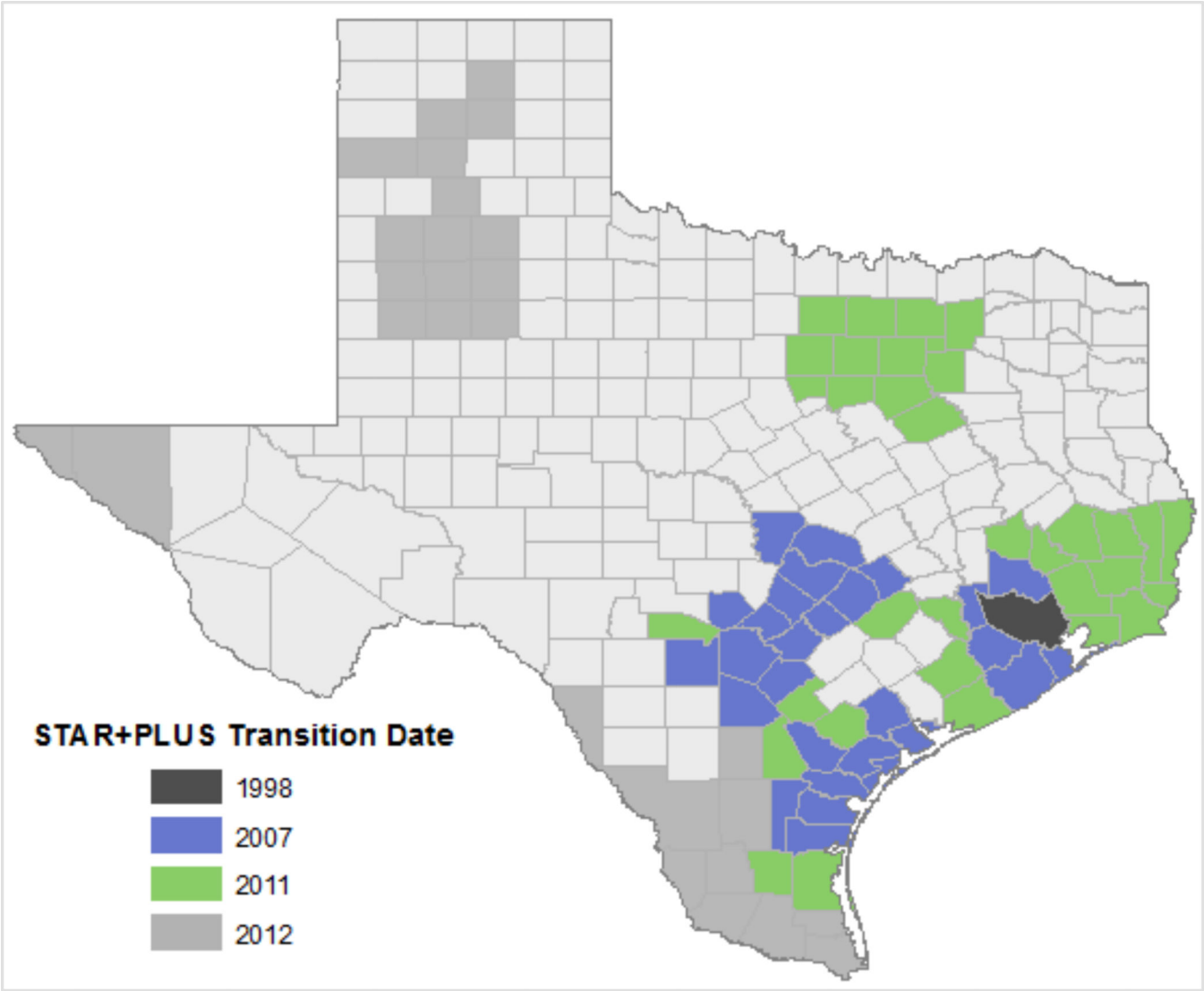

Figure.

Map of Texas counties, with color indicating the date of STAR+PLUS implementation. For adults with disabilities, Medicaid was delivered in Fee-For-Service and Primary Care Case Management models prior to STAR+PLUS implementation.

Table 1

Characteristics of eligible enrollees in transition and comparison counties during the baseline and post baseline periods.

	Transition counties (STAR+PLUS)		Comparison counties (FFS/PCCM)	
	Baseline (n=8,068)	**Average Post (n=9,571)**	**Baseline (n=21,746)**	**Average Post (n=16,714)**
Age (mean; std)	52.0 (9.8)	52.1 (9.6)	52.8 (9.5)	52.6 (9.6)
21–29	4.1%	3.8%	3.5%	3.9%
30–39	7.7%	7.5%	6.8%	6.9%
40–49	19.9%	20.7%	18.3%	18.5%
50–59	42.7%	43.2%	43.0%	43.1%
60–64	25.6%	24.8%	28.4%	27.6%
Female (n;%)	5304 (65.7%)	6350 (66.3%)	14281 (65.7%)	10836 (64.8%)
Race/Ethnicity (n;%)				
White, non-Hispanic	2460 (30.5%)	2876 (30.1%)	7811 (35.9%)	6536 (39.1%)
Black, non-Hispanic	975 (12.1%)	1225 (12.8%)	4392 (20.2%)	3028 (18.1%)
Hispanic	4159 (51.5%)	4834 (50.5%)	7492 (34.5%)	5684 (34.0%)
Other	474 (5.9%)	637 (6.7%)	2051 (9.4%)	1466 (8.8%)
Health status* (n;%)				
Healthy	216 (2.7%)	319 (3.3%)	543 (2.5%)	375 (2.2%)
Significant Acute	45 (0.6%)	58 (0.6%)	90 (0.4%)	70 (0.4%)
Minor Chronic	69 (0.9%)	90 (0.9%)	168 (0.8%)	142 (0.8%)
Moderate Chronic	1197 (14.8%)	1329 (13.9%)	2833 (13.0%)	2160 (12.9%)
Major Chronic	6541 (81.1%)	7776 (81.2%)	18112 (83.3%)	13967 (83.6%)
Census tract poverty (mean; std)	23.1% (0.120)	23.1% (0.121)	26.1% (0.136)	26.0% (0.132)
0.0%–4.9%	3.5%	3.7%	2.6%	1.9%
5.0%–9.9%	8.8%	9.3%	7.4%	7.3%
10.0%–19.9%	33.4%	32.3%	27.9%	29.0%
Poverty Area (20.0%–39.9%)	45.3%	45.7%	46.0%	45.9%
Extreme poverty area (> 40.0%)	9.1%	9.1%	16.1%	15.9%
County-level median income (mean; std)	$39,660 ($16,531)	$39,977 ($16,780)	$36,495 ($14,430)	$35,930 ($12,927)
Facility residence (n;%)	1751 (21.7%)	1876 (19.6%)	4849 (22.3%)	3677 (22.0%)
Years eligible for study, 2006–2010 (mean; std)	3.90 (0.38)		3.63 (0.75)	

*5-level Clinical risk group (3M)

Table 2

Enrollee and county sample sizes in transition and comparison counties, by measure.

Measure	Number of enrollees			
	Transition Counties		Comparison Counties	
	Baseline	Post-Baseline*	Baseline	Post-Baseline*
Use of Appropriate Medication for People with Asthma	429	291 – 739	491	352–508
Medication Management for People with Asthma	363	322–599	393	274–386
Pharmacotherapy for COPD Exacerbation	280	308–513	1260	1,034–1,508
Cholesterol Management for People with Cardiovascular Conditions	1420	1,186–1,777	3173	2,989–3,788
Persistence of Beta-Blocker Treatment after a Heart Attack	69	64–87	251	149–194
Comprehensive Diabetes Care	7293	7,827–9,709	20,168	13,036–17,045
Measure	Number of counties			
	Transition Counties (total = 28)		Comparison Counties (total = 225)	
	Baseline	Post-Baseline*	Baseline	Post-Baseline*
Use of Appropriate Medication for People with Asthma	26	24–26	86	70–86
Medication Management for People with Asthma	26	24–26	79	62–79
Pharmacotherapy for COPD Exacerbation	28	25–28	133	121–133
Cholesterol Management for People with Cardiovascular Conditions	28	28	154	126–154
Persistence of Beta-Blocker Treatment after a Heart Attack	11	8–11	46	41–46
Comprehensive Diabetes Care	28	28	207	177–207

* In the Post-Baseline period, data from four years were available; therefore, the range of enrollees/counties included in the analytic sample across these four years is given.

Table 3

Unadjusted measure adherence (raw proportions) in transition and comparison counties during the baseline and post-baseline periods.

	Transition counties (STAR+PLUS)						Comparison counties (FFS/PCCM)					
HEDIS Measure	**Baseline**	**Average Post**	**2007**	**2008**	**2009**	**2010**	**Baseline**	**Average Post**	**2007**	**2008**	**2009**	**2010**
Respiratory Condition Management												
Use of Appropriate Medication for People with Asthma	**84.6%**	**82.9%**	84.1%	84.9%	82.3%	81.1%	**80.0%**	**77.8%**	80.0%	77.8%	78.8%	75.0%
Medication Management for People with Asthma	**43.3%**	**42.9%**	42.6%	42.8%	44.6%	41.6%	**47.8%**	**47.0%**	45.7%	47.8%	45.9%	48.8%
Pharmacotherapy for COPD Exacerbation	**55.5%**	**82.0%**	73.2%	84.7%	82.3%	85.0%	**56.6%**	**57.9%**	55.5%	57.2%	58.5%	59.7%
Cardiovascular Condition Management												
Cholesterol Management for People with Cardiovascular Conditions	**74.6%**	**76.0%**	61.6%	78.6%	79.1%	80.9%	**76.1%**	**79.0%**	76.8%	79.3%	79.9%	80.0%
Persistence of Beta-Blocker Treatment after a Heart Attack	**50.7%**	**74.2%**	54.7%	75.0%	82.8%	79.5%	**52.6%**	**44.8%**	47.9%	44.4%	43.6%	42.6%
Diabetes Care												
Comprehensive Diabetes Care	**71.7%**	**73.1%**	63.4%	75.0%	75.0%	77.4%	**74.5%**	**75.8%**	75.6%	76.1%	74.9%	76.7%

Table 4

Model estimated average post-baseline compliance in transition and comparison counties, and their differences, by measure.

HEDIS Measure	Transition County Proportion	Comparison County Proportion	Mean Difference (Transition − Comparison) (99.167% CI)	p-value (α = 0.05/6 = 0.00833)	Final model R^2(p-value)
Respiratory Condition Management					
Use of Appropriate Medication for People with Asthma	0.819	0.801	0.018 (−0.128, 0.164)	.724	0.278 (0.0006)
Medication Management for People with Asthma	0.509	0.494	0.015 (−0.132, 0.161)	.785	0.1663 (0.0023)
Pharmacotherapy for COPD Exacerbation	0.677	0.393	**0.285 (0.216, 0.354)**	**< .001**	0.3582 (<.0001)
Cardiovascular Condition Management					
Cholesterol Management for People with Cardiovascular Conditions	0.763	0.744	−0.020 (−0.239, 0.200)	.697	0.517 (0.0023)
Persistence of Beta-Blocker Treatment after a Heart Attack	0.814	0.495	**0.320 (0.068, 0.572)**	**.001**	0.283 (0.011)
Diabetes Care					
Comprehensive Diabetes Care	0.618	0.638	−0.020 (−1.000, 1.000)	.707	---