DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
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State Demonstrations Group

August 2, 2022

Stephanie Stephens
State Medicaid Director
Texas Health and Human Services Commission
4900 Lamar Boulevard MC: H100
P.O. Box 13247 Austin, Texas 78751

Dear Ms. Stephens:

The Centers for Medicare & Medicaid Services (CMS) completed its review of the Interim Evaluation Report, which was required by the Special Terms and Conditions (STCs) approved on December 21, 2017 for the period January 1, 2018 through September 30, 2022, specifically STC #69 "Interim Evaluation Report" of Texas's section 1115 demonstration, "Texas Healthcare Quality Transformation and Quality Improvement Program (THTQIP)" (Project No: 11-W00278/6). This report covers the demonstration period from October 1, 2017 through January 31, 2020. CMS determined that the evaluation report, submitted on September 14, 2021 and revised on February 4, 2022 is in alignment with the approved evaluation design and the requirements set forth in the STCs, and therefore, approves the state's Interim Evaluation Report.

In accordance with STC #72 "Public Access", the approved evaluation report may now be posted to the state's Medicaid website within thirty days. CMS will also post the evaluation report on Medicaid.gov.

Despite the limited time for evaluation, the Interim Evaluation Report exhibited some important findings. The proportion of demonstration system reform incentive payment (DSRIP) clients meeting HbA1c testing intervals increased across the post-Demonstration extension period. Additionally, interrupted time series analysis exhibited that there was a decline in the trend of Children's Medicaid Dental Services clients[1] reporting tooth decay. Potentially preventable emergency department visits suggest room for improvement, specifically for the adoption assistance and Medicaid for breast and cervical cancer client populations. Nonetheless, we look forward to the Interim Evaluation Report due on March 31, 2024 for the period of performance from January 15, 2021 through January 30, 2030 as the state continues to refine the ongoing quality improvement projects during the demonstration extension period.

[1] STC #29

We look forward to our continued partnership on the Texas Healthcare Transformation and Quality Improvement Program section 1115 demonstration. If you have any questions, please contact your CMS demonstration team.

Sincerely,

Danielle Daly -S

Digitally signed by Danielle Daly -S
Date: 2022.08.02 11:11:28 -04'00'

Danielle Daly
Director
Division of Demonstration Monitoring and Evaluation

cc: Ford Blunt, State Monitoring Lead, CMS Medicaid and CHIP Operations Group

TEXAS HEALTHCARE TRANSFORMATION AND QUALITY IMPROVEMENT RENEWAL EVALUATION

1115 Medicaid Waiver Demonstration Renewal in Texas DY7–DY11

Interim Report

For internal use only. Please do not share this confidential report with anyone.

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JANUARY 12, 2022

SCHOOL OF PUBLIC HEALTH

THE TEXAS A&M UNIVERSITY

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POPULATION INFORMATICS

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I. EXECUTIVE SUMMARY

BACKGROUND

The Texas Medicaid program is large and continues to grow, so it is important to ensure that the program considers adaptations to improve efficiency and control costs while maintaining access to quality care. Given the importance of the Texas Medicaid program for low-income Texans and the large scope of the program, the 82nd Texas Legislature, in 2011, directed the Texas Health and Human Services Commission (HHSC) to apply for an 1115 Demonstration Waiver, also known as the Texas Healthcare Transformation and Quality Improvement Program (Demonstration).

The main objectives of the Demonstration are to:

- Expand risk-based managed care to new populations and services
- Support the development and maintenance of a coordinated care delivery system
- Improve outcomes while containing cost growth
- Transition to quality-based payment systems across managed care and providers

The Demonstration has allowed Texas to implement the Delivery System Reform Incentive Payment (DSRIP) program and Uncompensated Care (UC) pools and to continue expanding its Medicaid Managed Care (MMC) program, the three main components of the Demonstration.

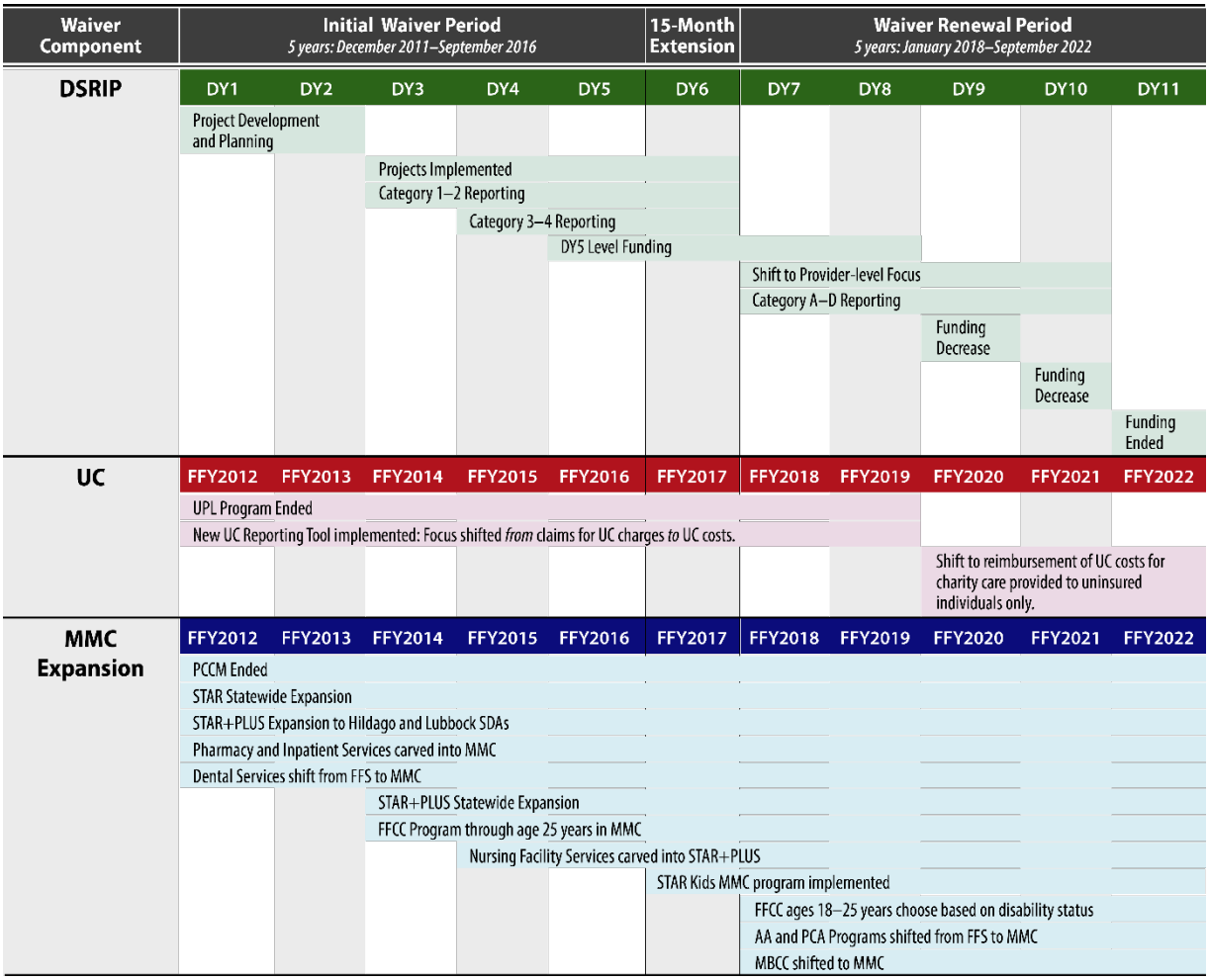
DSRIP is designed to promote transformation of the health care system and encourage health care providers to focus on value-based care, with an aim to improve care, cost-effective care coordination, and health outcomes for the Medicaid and low-income uninsured (MLIU) population in Texas. The UC pool reimburses Medicaid providers for UC costs incurred. The Demonstration aims to expand the MMC program to cover new areas, populations, and services. Additional background information and key findings on each component of the Demonstration will be provided in subsequent chapters with more details provided in the respective appendices.

The Centers for Medicare & Medicaid Services (CMS) initially approved the Demonstration in 2011, followed by a 15-month extension in 2016, and a renewal in 2017. Figure I.1 shows an overview of the Demonstration timeline for each main component. This Interim Report focuses on the Waiver Renewal Period of January 2018 through September 2022.[1]

The purpose of the Interim Report is to provide an overview of the evaluation plan, share preliminary findings from the first years of the Waiver Renewal Period and present plans for completing the evaluation. The report primarily relies on data from Demonstration Years (DYs) 7 and 8, but some sections include fewer or additional DYs, depending on data availability. Thus, it is premature to make conclusive statements in the Interim Report. With more time and data available, the Summative Report will more fully assess the evaluation questions for the Demonstration Renewal as specified in Appendix G. Evaluation Design Plan Revision v5.1.

[1] A ten-year demonstration extension was granted to Texas by CMS on January 15, 2021. On April 16, 2021, CMS sent a letter that purported to rescind its approval of the extension and invited HHSC to resubmit its extension request, which HHSC did on July 14, 2021. However, on August 20, 2021, the Federal District Court in the Eastern District of Texas granted a preliminary injunction enjoining CMS from implementing the rescission letter and requiring CMS to treat the January 2021 extension as currently remaining in effect.

Figure I.1 Demonstration Timeline Overview.



Note: CMS-Approved Evaluation Design. DSRIP = Delivery System Reform Incentive Payment; UC = Uncompensated Care; MMC = Medicaid managed care; DY = Demonstration year, October 1-September 30; FFY = Federal fiscal year, October 1-September 30; UPL = Upper Payment Limit; PCCM = Primary care case management; STAR = MMC program primarily serving children and pregnant women; STAR+PLUS = MMC program serving aged and disabled clients; SDA = Service Delivery Area; FFS = Fee-for-service; FFCC = Former Foster Care Children; STAR Kids = MMC program serving disabled individuals 20 years and younger; AA = Adoption Assistance; PCA = Permanency Care Assistance; MBCC = Medicaid for Breast and Cervical Cancer. Figure I.1 only includes MMC expansion activities evaluated during the Initial Waiver Period (DY1-5) and the Waiver Renewal Period (DY7-11).

EVALUATION QUESTIONS

The following five evaluation questions, submitted by HHSC and approved by CMS, assessed the impact of each individual component (DSRIP, UC, and MMC) in addition to the collective impact on quality-based payment systems and the overall transformation of the health system:

Evaluation Question 1: Did the DSRIP program incentivize changes to transform the health care system for the MLIU population in Texas?

Evaluation Question 2: Did the Demonstration impact unreimbursed costs associated with the provision of care to the MLIU population for UC providers?

Evaluation Question 3: Did the expansion of the MMC health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?

Evaluation Question 4: Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?

Evaluation Question 5: Did the Demonstration transform the health care system for the MLIU population in Texas?

DELIVERY SYSTEM REFORM INCENTIVE PAYMENT (DSRIP) FINDINGS

The evaluation question for the DSRIP component of the Demonstration was, "Did the DSRIP program incentivize changes to transform the health care system for the MLIU population in Texas?" (E1). A mixed-methods approach, with quantitative and some qualitative methods, was used to evaluate the following four hypotheses specified in Appendix G. Evaluation Design Plan Revision v5.1:

Hypothesis 1.1 (H 1.1): DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers.

Hypothesis 1.2 (H 1.2): DSRIP incentivized performing providers to improve continuity, quality, and cost of care for Medicaid clients with diabetes.

Hypothesis 1.3 (H 1.3): DSRIP incentivized performing providers to improve quality-related outcomes, specified as Category C population-based clinical outcome measures.

Hypothesis 1.4 (H 1.4): DSRIP transformed the health care system, resulting in improvements in population health, specified as DSRIP Category D outcomes.

Hypothesis 1.1: Social Network Analysis

In order to evaluate the impact of the DSRIP program on provider collaboration, a social network analysis with a trend analysis was conducted using survey data between 2013 and 2020. The trend analysis suggested that collaboration among DSRIP providers increased in terms of tangible resource sharing and data-sharing agreements over time, but collaboration decreased in terms of joint service delivery. For DSRIP providers that collaborated with one another, the analysis also indicated that their ties strengthened over time, with strength measured as the number of ties shared by the same two providers. In the 2020 survey, DSRIP providers also reported that the DSRIP program had a positive impact on increasing collaboration between DSRIP and non-DSRIP providers. Overall, the preliminary analyses suggested that DSRIP may have resulted in a general trend toward increased collaboration over time; but more follow up data is needed for a comprehensive analysis.

Hypothesis 1.2: Diabetes Claims Analysis

The purpose of this hypothesis was to establish the extent to which the DSRIP program improved diabetes care management among Medicaid clients with diabetes who were newly treated by DSRIP providers for the first time, compared to Medicaid clients with diabetes who were treated by non-DSRIP providers. The sample and analytic approach for Medicaid clients with diabetes are still being fine-tuned and results are tentative. Preliminary analysis suggested that the DSRIP program's impact on diabetes care management was mixed. Details can be found later in the report. Additional information will be presented in the Summative Report.

Hypothesis 1.3: Quality Outcomes

The objective of this hypothesis was to analyze the effectiveness of interventions geared toward improving management of diabetes and comorbidities, improving health outcomes and quality of life, preventing disease complications, and reducing unnecessary acute and emergency care use among MLIU populations. The hypothesis focused on five DSRIP Category C measures, including chronic diabetes management, behavioral health, and access to primary care.

At this time, the Interim Report is only able to include initial analyses using two years of performance data with fewer than 25 DSRIP providers for each measure, as not all providers track these measures in a pay-for-performance arrangement. In this short timeframe, DSRIP providers had a mix of successes and challenges with meeting their performance targets. While some DSRIP providers met their performance targets, others reported undesired changes or did not experience a large enough improvement over those two years to meet specified performance targets. DSRIP providers reported the greatest improvements in reducing ED visits associated with heart disease and acute conditions. Additional years of performance data are necessary to better understand quality-related health outcomes among the MLIU population served by DSRIP providers.

Hypothesis 1.4: Population Health

This hypothesis focused on DSRIP Category D population-level measures, known as potentially preventable events (PPEs), which include potentially preventable admissions (PPAs), potentially preventable complications (PPCs), potentially preventable readmissions (PPRs), and potentially preventable emergency department visits (PPVs).

The Interim Report only includes two years of PPE data (DY7 and DY8), and the PPE data are presented by the 20 DSRIP Regional Healthcare Partnerships (RHPs) through which DSRIP providers operate. The PPE rates varied from DY7 to DY8, but since these differences were not consistent across RHPs or among the different types of PPEs, additional years of data are necessary before trends or patterns in PPE rates can be detected.

UNCOMPENSATED CARE (UC)

The evaluation question for the UC Demonstration component was, “Did the Demonstration impact unreimbursed costs associated with the provision of care to the MLIU population for UC providers?” A quantitative approach was used to evaluate the following two hypotheses:

- Hypothesis 2.1 (H 2.1): The percentage of UC costs reimbursed through UC payments for each type of UC (overall, Medicaid shortfall, and uninsured shortfall) will decrease from DY1 to DY8.
- Hypothesis 2.2 (H 2.2): The UC cost growth rate will slow over time for UC providers participating in the Demonstration.

Hypothesis 2.1: Reimbursed UC Costs

Results for this hypothesis suggest that the average UC provider in Texas experienced an increase in eligible UC costs and a decrease in reimbursed UC costs from 2010 to 2017. The average reimbursement rate decreased from 70% in 2010 to 47% in 2017. However, substantial heterogeneities emerged in the subgroup analyses of hospitals. The findings imply that small and rural hospitals benefited by consistently receiving a higher rate of reimbursement for their provided UC care, while larger and more urban hospitals saw a sharp decline in the percentage of UC costs reimbursed.

Hypothesis 2.2: UC Cost Growth Rate

The adjusted average UC cost growth rate for all years was 14%, ranging from a low of 6% in 2014 to a high of 24% in 2012. The adjusted growth rates were higher in the first 2 years (FFY2011 and FFY2012), then seemed to drop somewhat in the later years. Statistically, there is little evidence of change in the adjusted UC cost growth rate over time with substantial variations by hospital type.

MEDICAID MANAGED CARE (MMC)

The evaluation question for this Demonstration component was, "Did the expansion of the MMC health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?" A quantitative approach was used to evaluate the following five hypotheses:

- Hypothesis 3.1 (H 3.1): Access to care will improve among clients whose Medicaid benefits shift from fee for service (FFS) to an MMC health care delivery model.
- Hypothesis 3.2 (H 3.2): Care coordination will improve among clients whose Medicaid benefits shift from FFS to an MMC health care delivery model.
- Hypothesis 3.3 (H 3.3): Quality of care will improve among clients whose Medicaid benefits shift from FFS to an MMC health care delivery model.
- Hypothesis 3.4 (H 3.4): Health and health care outcomes will improve among clients whose Medicaid benefits shift from FFS to an MMC health care delivery model.
- Hypothesis 3.5 (H 3.5): Client satisfaction will improve among clients whose Medicaid benefits shift from FFS to an MMC health care delivery model.

The evaluation of the Demonstration Renewal Period focused on five study populations: Children's Medicaid Dental Services (CMDS), Nursing Facility (NF), Former Foster Care Children (FFCC), Adoption Assistance (AA) and Permanency Care Assistance (PCA), and Medicaid Breast and Cervical Cancer (MBCC). Many of the measures for MMC need additional years of data to fully assess the Demonstration's impact because changes to health outcomes often need more time for the impact to be detected. In addition, some measures only have one year of post Demonstration data available at the current time which makes the analysis premature. Below we summarize preliminary trends from earlier years of the Demonstration Renewal Period.

Hypothesis 3.1: Access to Care

Initial findings indicate that most populations experienced improvements in access to care following the transition to MMC. CMDS clients experienced increased access to preventive dental care visits. Visits with a primary care physician increased among NF, AA, and PCA clients. Diagnosis of new cases of depression or bipolar disorder improved for NF and FFCC clients. For pharmacy benefits and adherence, there was evidence of improvement, but only for MBCC clients. However, FFCC clients experienced a decrease in visits with a primary care physician.

Hypothesis 3.2: Care Coordination

Support for this hypothesis was limited in the preliminary analysis. FFCC and MBCC clients did not experience changes in service coordination utilization, as defined by procedure codes for service coordination, following the transition to MMC. However, FFCC clients with a serious mental illness or serious emotional disturbance did experience increases in targeted case management after the MMC transition.

Hypothesis 3.3: Quality of Care

Support for this hypothesis was limited in the preliminary analysis. The strongest support for this hypothesis was the large increase, from 32% to 54%, in the receipt of the recommended treatment for MBCC clients. Assessment of antidepressant medication management among FFCC and NF clients, along with new prescriptions for antipsychotic medication among AA and PCA clients, was inconclusive.

Hypothesis 3.4: Health and Health Care Outcomes

Preliminary findings with respect to this hypothesis were mixed. The percentage of CMDS clients with tooth decay decreased post-Demonstration, but the rate of pressure ulcers in NF clients did not reflect a decrease in rates. However, NF clients experienced improvement in depression symptoms with treatment post-Demonstration. MBCC clients experienced no statistically significant changes in the rate of discharges for ambulatory care sensitive conditions. None of the populations experienced a desired decrease in the rate of potential preventable emergency department use. Only MBCC and NF clients experienced a desired decrease in the rate of emergency department visits with a primary or secondary diagnosis of behavioral health conditions or substance abuse, and the positive impact was minimal.

Hypothesis 3.5: Client Satisfaction

Collectively, the preliminary findings indicated no substantial change in satisfaction after the MMC transition, which does not support Hypothesis 3.5. A high percentage of NF clients reported satisfaction with their experience in the nursing facility and with the health care services received, both prior to and after the MMC transition. However, a slightly higher percentage of NF clients reported having concerns that were not addressed by the facility after the MMC transition.

QUALITY-BASED PAYMENT SYSTEMS

The next Demonstration evaluation question was, “Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?” A mixed-methods approach was used to evaluate the following hypothesis:

- Hypothesis 4.1 (H 4.1): The Demonstration will result in the development and/or implementation of a variety of alternative payment models (APMs) in Texas Medicaid.

Hypothesis 4.1: Alternative Payment Models

DSRIP’s mission is to improve the quality of care, drive health care delivery system improvements, and improve health outcomes. Thus, payments through the DSRIP program are earned based on performance and/or reporting on selected health outcomes for the MLIU population. Once the DSRIP program ends, providers will be encouraged to explore APMs with managed care organizations (MCOs) to continue this mission at least for the Medicaid managed care population. The evaluation used data collected from DSRIP providers to examine the Demonstration’s impact on the development and implementation of APMs.

Preliminary findings suggested that DSRIP providers and MCOs were engaging with APMs more frequently over time. However, DSRIP providers were unclear how APMs improved patient satisfaction, access to care, population health, and reduced costs. DSRIP providers indicated that MCO engagement was the primary barrier for implementing APMs, especially for smaller organizations. Researchers will continue to explore changes in APM implementation and perceptions of APMs in the Summative Report with additional survey data collection.

HEALTH CARE SYSTEM FOR THE MLIU POPULATION

The final Demonstration evaluation question was, "Did the Demonstration transform the health care system for the MLIU population in Texas?" Quantitative analyses were used to evaluate the following two hypotheses:

- Hypothesis 5.1 (H 5.1): The Demonstration will result in a reduction of potentially preventable emergency department use for the MLIU population.
- Hypothesis 5.2 (H 5.2): The Demonstration will result in overall cost savings compared to the Medicaid program without the Demonstration, as shown in the budget neutrality calculation.

Hypothesis 5.1: Potentially Preventable Emergency Department Use

This hypothesis focused on emergency department visits which potentially could have been preventable or treatable through primary care based on the client's primary diagnosis. Reducing preventable emergency department use promotes effective patient care and saves money and other resources. Preliminary ITS analysis using two years of pre- and post- Demonstration Renewal Period data found no statistically significant changes in the level and slope/trend for potentially preventable ED visits. Thus, there was little support for Hypothesis 5.1, that the Demonstration will reduce potentially preventable ED use for the MLIU population at this time. The full impact of the Demonstration Renewal Period on potentially preventable ED visits, as well as adjustments for seasonality and additional sub-group analysis, will be assessed in the Summative Report.

Hypothesis 5.2: Budget Neutrality

The budget neutrality calculation assessed whether the costs of the Demonstration were the same as the costs if the Demonstration had not existed. Preliminary analysis of DY1-DY8 suggested that total spending under the Demonstration (With Waiver costs) was less than the projected spending without the Demonstration (Without Waiver costs).

CONCLUSIONS AND IMPLICATIONS

Preliminary results suggested that the Demonstration Renewal Period achieved some, but not all, of its intended outcomes. With the transition to MMC, most populations saw improvements in access to care. In a few of the dimensions studied, DSRIP providers became increasingly collaborative. While some improvement in health outcomes were seen through MMC and by the DSRIP providers, these findings were mixed depending on the specific measure or subpopulation being served. Other findings included increased APM engagement among DSRIP providers and MCOs. A limitation of this evaluation is the difficulty in isolating the impact of the Demonstration Renewal since there are many factors outside the efforts of the Demonstration Renewal that may have also influenced changes in the health system.

For uncompensated care, the average UC reimbursement rate for a hospital in Texas decreased from 70% in 2010 to 47% in 2017. Larger and more urban hospitals saw a sharp decline in the percentage of UC costs reimbursed, while smaller and more rural hospitals had higher reimbursement rates. There was little evidence of change in the adjusted UC cost growth rate over time, although again there were substantial differences between hospital types. An analysis of budget neutrality suggested an overall cost savings when comparing the costs of the Demonstration to what costs would have been without it.

Many of the preliminary findings in the Interim Report are based only on data from the first two years of the Demonstration Renewal. Thus, it is premature to make conclusive statements on

the impact. With additional data available, the Summative Report will provide more comprehensive analyses of the health outcomes, health care costs, and other indicators of health system transformation as well as further insight into the impact of the Demonstration Renewal on the Texas health care system. Of note, additional years of data will also have been affected by the COVID-19 public health emergency. Due to the large impact of the COVID-19 pandemic on the overall health system, some variations in trends may be expected, and careful attention will need to be exercised to better understand the impact of the Demonstration Renewal in this complex context.

II. THE DELIVERY SYSTEM REFORM INCENTIVE PAYMENT (DSRIP) PROGRAM

INTRODUCTION

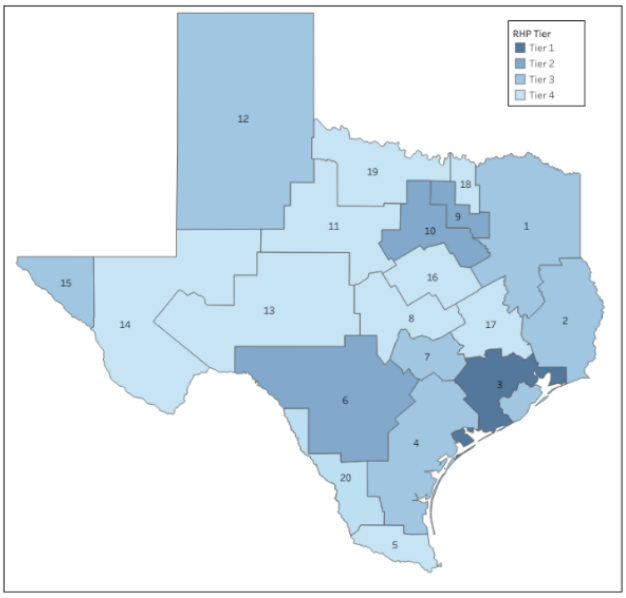
General Background Information

The Delivery System Reform Incentive Payment (DSRIP) program provides incentives to improve access to patient care, quality of patient care, and population health outcomes, and to reduce per capita costs. Providers engage in transformation activities to support these efforts and earn incentive payments for meeting program requirements and performance metrics related to these goals.

Approximately 290 providers in Texas participated in the DSRIP program as of 2021, including hospitals (the majority of participating providers), physician practices, local health departments (LHDs), and community mental health centers (CMHCs). Within DSRIP, providers have implemented core activities that focus on particular areas including, but not limited to, chronic care management, emergency department (ED) utilization, health promotion/disease prevention, integrated primary and behavioral health care, oral health, palliative care, patient navigation, primary care expansion, process improvement, patient experience, specialty care, and workforce development. Between the Initial Approval Period (2011-2016) and the Renewal Period (2018-2022), the DSRIP program shifted from project-level reporting to provider system-level reporting to focus on improving quality performance for the MLIU target population and move further towards sustainability of their transformed systems, including development of APMs to continue services for MLIU individuals after the waiver ends. Provider-level reporting began in June 2018, midway through the first year of the Renewal Period. By the end of the Renewal Period, the DSRIP program was scheduled to be phased out, with gradual decreases in funding over the last few years prior to termination.

The DSRIP program operates regionally through 20 distinct Regional Healthcare Partnerships (RHPs), which promote collaboration among and across DSRIP providers (Figure II.1). Many of the hypotheses for the evaluation of DSRIP are analyzed at the RHP level.

Figure II.1 Texas' 20 DSRIP Regional Healthcare Partnerships (RHPs) and RHP Tier Map.



Evaluation Question and Hypotheses

The DSRIP evaluation focused on answering one overarching evaluation question and four specific hypotheses, as specified in Appendix G. Evaluation Design Plan Revision v5.1. These four hypotheses, detailed in Table II.1, correspond to different subsections of the DSRIP evaluation.

Table II.1 DSRIP Evaluation Question and Hypotheses.

Evaluation Question 1: Did the DSRIP program incentivize changes to transform the health care system for the Medicaid and low-income or uninsured (MLIU) population in Texas?	
H 1.1 Collaboration Among Providers	Hypothesis 1.1: DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers.
H 1.2 Medicaid Clients with Diabetes	Hypothesis 1.2: DSRIP incentivized performing providers to improve continuity, quality, and cost of care for Medicaid clients with diabetes.
H 1.3 Quality-Related Outcomes	Hypothesis 1.3: DSRIP incentivized performing providers to improve quality-related outcomes, specified as Category C population-based clinical outcome measures.
H 1.4 Population Health	Hypothesis 1.4: DSRIP transformed the health care system, resulting in improvements in population health, specified as DSRIP Category D outcomes.

METHODOLOGY

Data

Multiple sources of data were used for the DSRIP evaluation. First, Hypothesis 1.1, Collaboration among Providers, relied heavily on primary data collected from social network

surveys with DSRIP providers. The social network survey asked DSRIP providers to report on their collaborative relationships with each DSRIP provider in their Regional Healthcare Partnership. As depicted in Table II.2, the social network survey was administered three times from 2013 through 2020. During the first survey administration, DSRIP survey respondents were asked to report on current collaboration among providers and to recall back to the pre-intervention period as it was not possible to survey DSRIP providers previously on collaboration prior to the Demonstration. As a result, the three administered surveys reflect four distinct time periods (T0, T1, T2, and T3). In addition to the surveys, Hypothesis 1.1 was also evaluated using DSRIP reporting data on Health Information Exchange (HIE) participation.

Table II.2 Survey Data Collection Schedule.

Demonstration Period	Initial Approval Period			Renewal Period
Survey Administration	Survey 1		Survey 2	Survey 3
Survey Reference	T0	T1	T2	T2
Time Period Reflected	12 months prior to RHP creation	2013	2015	2020

Note. Researchers plan to administer the social network survey again in 2021. Results from the final survey administration will be presented in the Summative Report.

Second, Hypothesis 1.2, Medicaid Clients with Diabetes, used claims and encounters data between June 1, 2016, and January 31, 2020. This date range aligned with the required measurement periods used for the performance measures during the Demonstration Renewal (see Appendix B for more details).

Finally, Hypotheses 1.3 and 1.4 used administrative data from DSRIP reporting provided by HHSC. Hypothesis 1.3, Quality-Related Outcomes, used DSRIP Category C measures for baseline, DY7, and DY8. Hypothesis 1.4, Population Health, used DSRIP Category D measures calculated by the state's External Quality Review Organization (EQRO) for calendar years 2017-2018. Due to changes in DSRIP reporting which were finalized in June 2018 and the natural lag in the collection and reporting of data, limited years of DSRIP reporting data are available for this Interim Report.

Measures

Hypothesis 1.1 Collaboration among Providers

A social network survey was administered to all participating DSRIP providers in June–July 2020, and the results were compared to prior social network survey data from an earlier evaluation of the Demonstration's Initial Approval Period completed in 2016. The social network survey asked DSRIP providers about three principal types of collaborative relationships, called "ties:"

- Joint service delivery (collaborating with another provider to provide services to patients).
- Tangible resource sharing (two providers sharing resources, e.g., office space).
- Data-sharing agreements (two providers having a formal data-sharing agreement to share patient data).

For all three types of ties, researchers calculated the average number of ties, the network density of ties, and the centralization of ties within each RHP. In addition, researchers also examined the strength of ties within each RHP (calculated based on how many ties were shared for the three types of ties with a minimum of 0 and a maximum of 3). Lastly, the survey asked DSRIP providers about their attitudes toward collaboration and participation in Health Information Exchanges (HIEs). Table II.3 summarizes measures used for Hypothesis 1.

Table II.3 H1.1 Collaboration among Providers Measures.

Measure	Data Source	Description
Measure 1.1.1 Type of collaboration	Survey	Ties, or collaborative relationships between providers. Types of collaboration include joint service delivery, resource sharing, and data sharing.
Measure 1.1.2 Number of ties	Survey	Number of times an organization indicates it collaborates with another organization. Following the rule outlined in Appendix G. Evaluation Design Plan Revision v5.1, the collaboration does not need to be confirmed by the other organization.
Measure 1.1.3 Strength of ties (multiplexity)	Survey	The count of the types of ties shared by two organizations.
Measure 1.1.4 Density	Survey	Number of ties among organizations divided by the total number of possible ties in a Regional Healthcare Partnership (RHP).
Measure 1.1.5 Centralization	Survey	The sum of the differences between the number of ties the most central provider has and all of the others in the network, divided by the maximum possible sum of the differences between the number of ties the most central provider has and all of the others in the network for a network of that size. (See Appendix B for more details.)
Measure 1.1.6 Attitude toward collaboration	Survey	Using a Likert scale, DSRIP survey respondents reported the extent to which they agreed DSRIP increased collaboration between providers.
Measure 1.1.7 HIE membership	Survey	DSRIP survey respondents were asked to report membership in HIEs and which HIEs, if any, they belonged to.
Measure 1.1.8 HIE use for DSRIP reporting	DSRIP reporting	DSRIP providers were asked to provide the source of information used in DSRIP reporting, and whether HIEs were used for this reporting.

Note: DSRIP = Delivery System Reform Incentive Payment; HIE = Health Information Exchange; RHP = Regional Healthcare Partnership.

Hypothesis 1.2 Medicaid Clients with Diabetes

The specific performance measures analyzed for Hypothesis 1.2, Medicaid Clients with Diabetes, fell within four dimensions of diabetes-care performance, as detailed in Table II.4. Detailed specifications for each measure are provided in Appendix G. Evaluation Design Plan Revision v5.1. Minor modifications to some of the measures are detailed in the table below. In the Interim Report, the full 24 months of follow-up data were not available. Thus, three measures used a 12-month timeframe, and two continuity of care measures and one HbA1c measure used 14 months, 8 months, and 14 months, respectively. Researchers expect to use the full 24-month timeframe in the Summative Report.

Table II.4 Medicaid Clients with Diabetes Measures.

Dimension of Care	Measures, Descriptions, and Modifications
Continuity of Care	**Measure 1.2.1 Usual provider of care:** Maximum value of proportion of visits to same provider **Measure 1.2.2 Interval between provider visits:** Longest interval between office visits to same PCP Modification: Place of service codes specified in the Evaluation Design were not used because analysis results indicated that use of codes was too restrictive and inconsistent.
Quality of Care	**Measure 1.2.3 Testing HbA1c levels:** Individuals with HbA1c tests **Measure 1.2.4 Diabetes medication adherence:** Overall proportion of days covered for diabetes medications Modification: None
Emergency Department Visits	**Measure 1.2.5 Emergency department visits for diabetes:** Total diabetes-related emergency department (ED) visits Modification: In addition to the ED visits relating to the diabetes diagnoses, researchers also examined all-causes ED visits. Furthermore, analysis was performed using incident rate ratios (negative binomial regression) rather than describing visits as per 1,000 enrollees.
Cost of Care	**Measure 1.2.6 Cost of Care:** Total Medicaid costs Modification: Vendor drug files were excluded from the total Medicaid costs analysis because initial analysis indicated that not all pharmacy costs seem to be reflected in the Medicaid claims files which may lead to potential bias. Researchers will revisit this issue for the Summative Report.

Note: ED = Emergency Department; HbA1c = Hemoglobin A1c; PCP = Primary Care Physician.

Hypothesis 1.3 Quality-Related Outcomes

Table II.5 details the selected DSRIP Category C population-based clinical outcome measures used for Hypothesis 1.3, Quality-Related Outcomes. The goal for each measure was a decrease from the baseline rate. Baseline 2017 rates were used to calculate targets for 2018 (a 2.5% decrease from baseline) and 2019 (a 10% decrease from baseline). In order to observe state-level trends, weighted mean rates were created for all Hypothesis 1.3 measures to account for the differing volume of MLIU patients served by each provider at baseline and the most recent year. The results shared here are based on the weighted mean rates. Unweighted results are found in Appendix B.

Table II.5 H1.3 Quality-Related Outcomes Measures.

Measure	Description of Numerator	Description of Denominator
Measure 1.3.1 Rate of ED Visits for Diabetes (A1-508)	The total number of ED visits with a primary or secondary diagnosis of diabetes.	DSRIP attributed target population for the provider system
Measure 1.3.2 Rate of ED Visits for Congestive Heart Failure, Angina, and Hypertension (A2-509)	Total number of ED visits with a primary or secondary diagnosis of heart failure and pulmonary edema, hypertension, or angina.	DSRIP attributed target population for the provider system
Measure 1.3.3 Rate of ED Visits for Behavioral Health and Substance Abuse (H2-510)	Behavioral Health: The total number of ED visits with a primary or secondary diagnosis of behavioral health conditions: schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders; mood (affective) disorders; anxiety, dissociative, stress-related, somatoform, and other nonpsychotic mental disorders; and disorders of adult personality and behavior Substance Abuse: The total number of ED visits with a primary or secondary diagnosis of substance abuse: mental and behavioral disorders due to psychoactive substance use.	DSRIP attributed target population for the provider system
Measure 1.3.4 PQI 91: Adult Acute Composite Indicator (C1-502)	Number of discharges for clients 18 years and older in DSRIP attributed target population for the provider system that meet the inclusion and exclusion rules in any of the following Prevention Quality Indicators (PQI): PQI 10 Dehydration Admission Rate, PQI 11 Bacterial Pneumonia Admission Rate, and PQI 12 Urinary Tract Infection Admission Rate.	DSRIP attributed target population for the provider system (18 years and older)
Measure 1.3.5 PDI 91: Child Acute Composite Indicator (D1-503)	Number of discharges for clients 3 months through 17 years that meet the inclusion and exclusion rules for the numerator in any of the following Pediatric Quality Indicators (PDI): PDI 16 Gastroenteritis Admission Rate and PDI 18 Urinary Tract Infection Admission Rate.	DSRIP attributed target population for the provider system (3 months through 17 years)

Note: DSRIP = Delivery System Reform Incentive Payment; ED = Emergency Department; PDI = Pediatric Quality Indicator; PQI = Prevention Quality Indicator.

Hypothesis 1.4 Population Health

As specified in Appendix G. Evaluation Design Plan Revision v5.1, the DSRIP Category D Hospital Statewide Reporting Measure Bundle was used to evaluate population health. The measure bundle calculates potentially preventable events (PPEs), which are hospital encounters that could lead to unnecessary service utilization. These may include PPA, PPR, PPC, and PPV. HHSC uses data on PPEs to improve the quality and efficiency of care in the state. Specifically, MCOs and hospitals are financially accountable for PPCs and PPAs flagged by HHSC. Performance for these measures leads to adjustments in FFS hospital inpatient claims. The External Quality Review Organization (EQRO) used 3M software to calculate PPE ratios for each eligible DSRIP provider system. The EQRO calculated PPEs across RHPs using data from all 20 RHPs as well as one "not assigned" (NA) group that consisted of performing providers that could not be linked to a specific RHP. A summary of the four measures for population health is provided in Table II.6. Additional details can be found in Appendix G. Evaluation Design Plan Revision v5.1.

Table II.6 H1.4 Population Health Measures.

Measure	Description
Measure 1.4.1 Potentially Preventable Admissions (PPA)	PPAs reflect unnecessary hospital ED admissions which may be the result of poor access to care or care coordination. This measure includes hospital admissions for any of the following ambulatory care sensitive conditions: CHF, diabetes, behavioral health/substance abuse, COPD, adult asthma, pediatric asthma, angina, coronary artery disease, hypertension, cellulitis, respiratory infection, pulmonary edema and respiratory failure, and others.
Measure 1.4.2 Potentially Preventable Readmissions (PPR)	This measure includes hospital readmissions for any of the following conditions within a specified time frame: CHF, diabetes, behavioral health/substance abuse, COPD, cerebrovascular accident, adult asthma, pediatric asthma, acute myocardial infarction, angina and coronary artery disease, hypertension, cellulitis, renal failure, Cesarean delivery, sepsis, and others.
Measure 1.4.3 Potentially Preventable Complications (PPC)	The measure includes complications that develop in the hospital, depending on risk assessment upon admission. The following conditions may qualify as PPCs: renal failure without dialysis; urinary tract infection; clostridium difficile colitis; encephalopathy; shock; pneumonia and other lung infections; acute pulmonary edema and respiratory failure without ventilation; stroke and intracranial hemorrhage; post hemorrhagic and other acute anemia with transfusion; venous thrombosis; ventricular fibrillation/cardiac arrest; major gastrointestinal complications without transfusion or significant bleeding; other complications of medical care; moderate infections; inflammation and other complications of devices, implants, or grafts except vascular infection; post-operative hemorrhage and hematoma without hemorrhage control procedure or incision and drainage (I&D) procedure; septicemia and severe infections; acute pulmonary edema and respiratory failure with ventilation; post-operative infection and deep wound disruption without procedure; or infections due to central venous catheters.
Measure 1.4.4 Potentially Preventable ED Visits (PPV)	ED visits for the following issue areas may be considered PPVs: skin and integumentary system; breast; musculoskeletal system; respiratory system; cardiovascular system; hematologic, lymphatic, and endocrine; gastrointestinal; genitourinary system; male reproductive system; female reproductive system; neurologic system; ophthalmologic system; otolaryngologic system; radiologic procedures; rehabilitation; mental illness and substance abuse therapies; nuclear medicine; radiation oncology; or dental procedures.

Note: CHF = Congestive Heart Failure; COPD = Chronic Obstructive Pulmonary Disease; ED = Emergency Department.

Analytic Methods

Mixed-Methods and Descriptive Analysis

A wide range of methods was used for the DSRIP evaluation. First, as detailed in Appendix G. Evaluation Design Plan Revision v5.1, mixed methods analysis, including social network analysis and content analysis, was used for Hypothesis 1.1. Researchers conducted univariate and bivariate analyses, including tests for differences using paired t-tests or Wilcoxon signed-rank tests when appropriate, depending on the distribution of data for Hypothesis 1.3. Measures under Hypotheses 1.3 and 1.4 did not have sufficient data to support any advanced modeling outlined in Appendix G. Evaluation Design Plan Revision v5.1 for the Interim Report. Researchers will investigate the possibility of conducting other analyses for the Summative Report when additional years of DSRIP reporting data are available.

Difference-in-Differences (DID) Model

For Hypothesis 1.2, Medicaid Clients with Diabetes, Appendix G. Evaluation Design Plan Revision v5.1 specifies using a DID analytic approach applied to the client-level propensity score matching (PSM) to assess trends in performance measures for DSRIP clients compared to matched non-DSRIP clients before and after implementation of the Demonstration Renewal Period. It is important to note that the DSRIP program has been a ubiquitous, long-standing program for Medicaid in Texas. Thus, identifying a sample of non-DSRIP clients in Texas that is reasonably comparable to DSRIP clients is difficult. In addition, there are no data elements in the claims and encounter data that could identify clients who received DSRIP services since the program is funded at the provider-level rather than client-level. Thus, the treatment group consists of clients who received services from a DSRIP provider who reported on diabetes-related measures and the comparison group consists of clients who received services from non-DSRIP providers.

Specifically, researchers cannot discern in the data whether the client received any DSRIP-specific services, only that the encounter or claim was with a DSRIP provider. DSRIP providers also serve the low-income and uninsured population which are not tracked through Medicaid claims and encounter data. Therefore, the treatment group in this analysis only covers a subpopulation of individuals with diabetes who received services through a DSRIP provider. With these fundamental issues on identifying both the treatment and comparison group, researchers are continuing to fine tune the analytic method for Hypothesis 1.2. It is unclear whether any evaluation design can yield insight using only claims data analysis. Researchers will explore additional analytic methods for the Summative Report.

More specific details on the sample inclusion and exclusion criteria and the PSM analysis plan are provided in Appendix B.

The general form of the DID model is:

$$Y_{it} = \alpha + \beta_1(Treat_i) + \beta_2(Post_t) + \delta(Treat_i \cdot Post_t) + \varphi T_{it} + \varepsilon_{it}$$

where:

- Y_{it} refers to the value of a specific diabetes performance metric for a Medicaid client (i) in time period (t).
- $Treat_i$ is a dummy variable equal to 1 for DSRIP treatment clients (zero for non-DSRIP comparison clients).
- $Post_t$ is a dummy variable equal to 1 for post-Demonstration Renewal time periods (zero for time periods before the Demonstration Renewal).
- ($Treat_i \cdot Post_t$) is an interaction term.

- T_{it} captures variation in the date of episode initiation within DY7.
- ε_{it} is an error term.

The estimated value of δ represents the estimated differential impact of the DSRIP program on specific diabetes performance measures (Y) among Medicaid clients with diabetes. In other words, $\hat{\delta}$ is an estimate of the change in the value of Y post/pre for the DSRIP treatment group relative to the change post/pre for the comparison non-DSRIP (i.e., the DID estimate of the DSRIP program "treatment" effect).

The specific analytic approach used to estimate $\hat{\delta}$ varied with the nature of the specific performance measure analyzed. For dichotomous performance metrics, logistic regression was used; for count outcomes (ED visits), negative binomial regression was used; and for cost, gamma regression with a log link was used.

KEY FINDINGS

For many hypotheses and measures, it is still premature to assess the impact of the Demonstration Renewal Period because the results need additional years of data for a comprehensive analysis. In this section, the main findings from the preliminary interim analyses are reported. More detailed results are reported in Appendix B: DSRIP Technical Details.

Hypothesis 1.1 Collaboration among Providers

Hypothesis 1.1 states: DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers. Multiple methodologies were used to address this hypothesis, including a survey of DSRIP providers, with the full results in Appendix B: DSRIP Technical Details.

Sample

By 2020, approximately 290 DSRIP providers participated in the Demonstration Renewal Period. The 2020 DSRIP Provider Survey (which included the Social Network Survey) took place near the beginning of the COVID-19 pandemic. Despite competing priorities associated with the COVID-19 pandemic, response rates were high across most RHPs, as shown in Table II.7.

Table II.7 Social Network Survey Response Rate (June–July 2020).

RHP	# of Providers	# Participated	Response Rate
1	20	17	85.0%
2	15	12	80.0%
3	25	19	76.0%
4	16	13	81.3%
5	10	9	90.0%
6	22	16	72.7%
7	7	7	100.0%
8	12	7	58.3%
9	22	13	59.1%
10	24	15	62.5%
11	14	11	78.6%
12	34	26	76.5%
13	13	10	76.9%
14	8	8	100.0%
15	8	8	100.0%
16	7	7	100.0%
17	12	9	75.0%
18	6	6	100.0%
19	11	10	90.9%
20	4	3	75.0%
Total	290	226	77.9%

Note: RHP = Regional Healthcare Partnership.

Analytic Results

The key findings of the social network analyses for DSRIP providers are below. The changes are measured from 2013 to 2020 (see Table II.2). Recall that ties are measured between DSRIP providers within the same RHP. Full results (and result tables) are found in Appendix B.

Number of ties between DSRIP providers in an RHP:

- The average number of *joint service delivery ties* per DSRIP provider was −1.8 (RHP averages ranged from −5.1 to +1.6), a 35% decrease from baseline.
- The average number of *tangible resource sharing ties* per DSRIP provider increased by 0.2 (RHP averages ranged from −1.8 to +2.0), a 9% increase from baseline.
- The average number of *data-sharing agreement ties* per DSRIP provider increased by 0.3 (RHP averages ranged from −1.4 to +2.6), a 24% increase from baseline.

Strength of ties between DSRIP providers in an RHP:

- The average strength of ties between DSRIP providers increased by 0.4 (RHP averages ranged from −0.1 to +1.2), a 28% increase from baseline. Recall that strength is measured by the sum of ties between two providers in all three domains (joint service delivery, tangible resource sharing, and data-sharing agreements).

Density of ties in an RHP:

- The average density of *joint service delivery ties* between DSRIP providers changed by −3 percentage points (RHPs ranged from −31 to +21), a 9% decrease from baseline.
- The average density of *tangible resource sharing ties* between DSRIP providers changed by +9 percentage points (RHPs ranged from −5 to +49), a 68% increase from baseline.
- The average density of *data-sharing agreement ties* between DSRIP providers changed by +9 percentage points (RHPs ranged from −9 to +69), a 93% increase from baseline.

Centralization in an RHP:

- *Joint service delivery ties* became more centralized among DSRIP providers over time, with a 6-point increase (RHPs ranged from −33 to +48), a 15% increase from baseline.
- *Tangible resource sharing ties* became more centralized among DSRIP providers over time, with a 3-point increase (RHPs ranged from −25 to +41), an 11% increase from baseline.
- *Data-sharing agreement ties* became more centralized among DSRIP providers over time, with a 13-point increase (RHPs ranged from −16 to +71), a 48% increase from baseline.

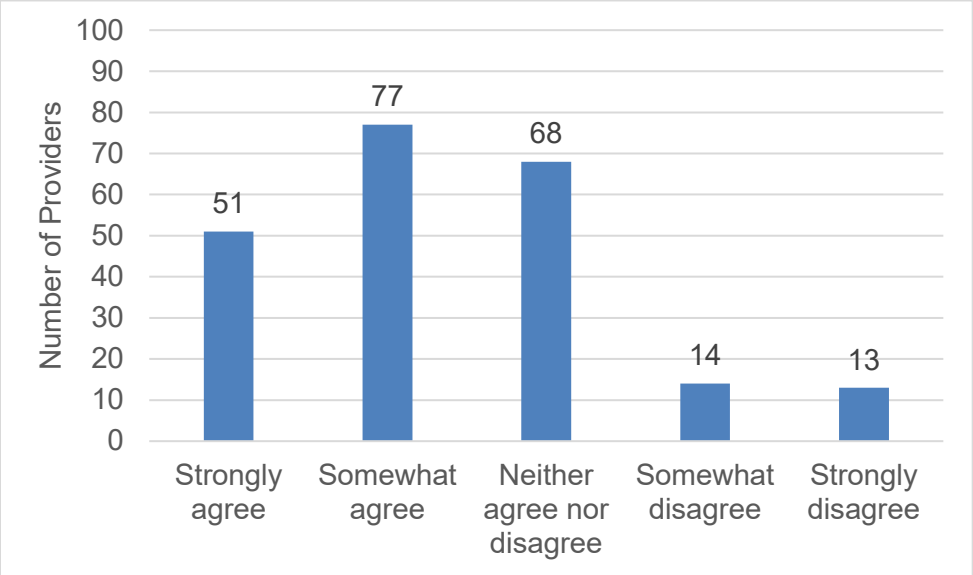
In summary, the network density data and the data on the average number of ties indicated increased collaboration between DSRIP providers in two of the three types of ties over time, i.e., increased tangible resource sharing and data-sharing agreements made, with no increase in joint service delivery. For those DSRIP providers with collaborative relationships, the strength of their ties (as defined by the presence of ties across the three types of ties) increased over time. The average level of centralization of ties increased across all three types of ties. In other words, providers with the most ties ("central providers") became even more centralized within the RHPs social network over time.

To better understand DSRIP providers' perceptions of DSRIP's impact on collaborative relationships, specifically care coordination, the 2020 DSRIP Provider Survey also asked DSRIP survey respondents the extent to which they agreed or disagreed with the following statements:

- DSRIP has increased the level of care coordination between different DSRIP providers.
- DSRIP has increased the level of care coordination between DSRIP and non-DSRIP providers.

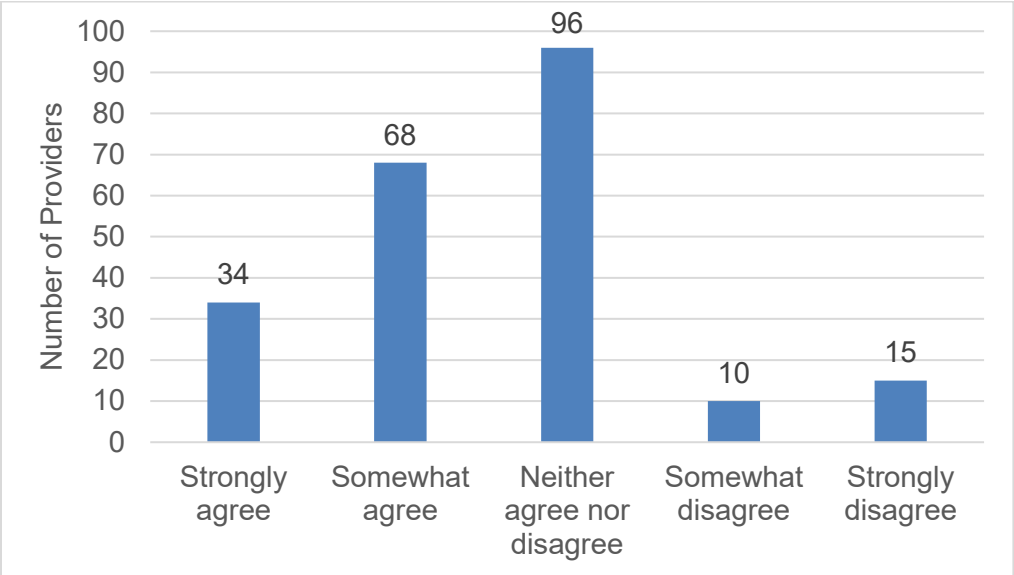
Overall, 57.4% of providers agreed or strongly agreed that DSRIP increased coordination between DSRIP providers, with 30.5% remaining neutral (Figure II.2). Nearly half (45.7%) of providers agreed or strongly agreed that DSRIP increased coordination between DSRIP and non-DSRIP providers, with 43.0% remaining neutral (Figure II.3). This finding suggests that DSRIP is perceived to have a positive impact on collaboration between providers, particularly when the providers participate in DSRIP.

Figure II.2 Collaboration between DSRIP Providers.



Note: 2020 DSRIP Provider Survey; N = 223 DSRIP providers. Three respondents did not answer this question. DSRIP = Delivery System Reform Incentive Payment.

Figure II.3 Collaboration between DSRIP and Non-DSRIP Providers.



Note: 2020 DSRIP Provider Survey; N = 223 DSRIP providers. Three respondents did not answer this question. DSRIP = Delivery System Reform Incentive Payment.

The 2020 DSRIP Provider Survey also asked DSRIP providers about their participation in HIEs. Only 28% of respondents stated that their organization belonged to an HIE. Several respondents (16%) did not know whether their organization belonged to an HIE.

More detailed results can be found in Appendix B: DSRIP Technical Details.

Hypothesis 1.2 Medicaid Clients with Diabetes

As discussed in the Methodology section, the sample and analytic approach for Medicaid clients with diabetes are still being fine-tuned. Thus, researchers do not have any stable results that may hold in the Summative Report at this time. The sample and tentative key findings briefly summarized in this section reflect current status as of the Interim Report. Additional information will be presented in the Summative Report.

Sample

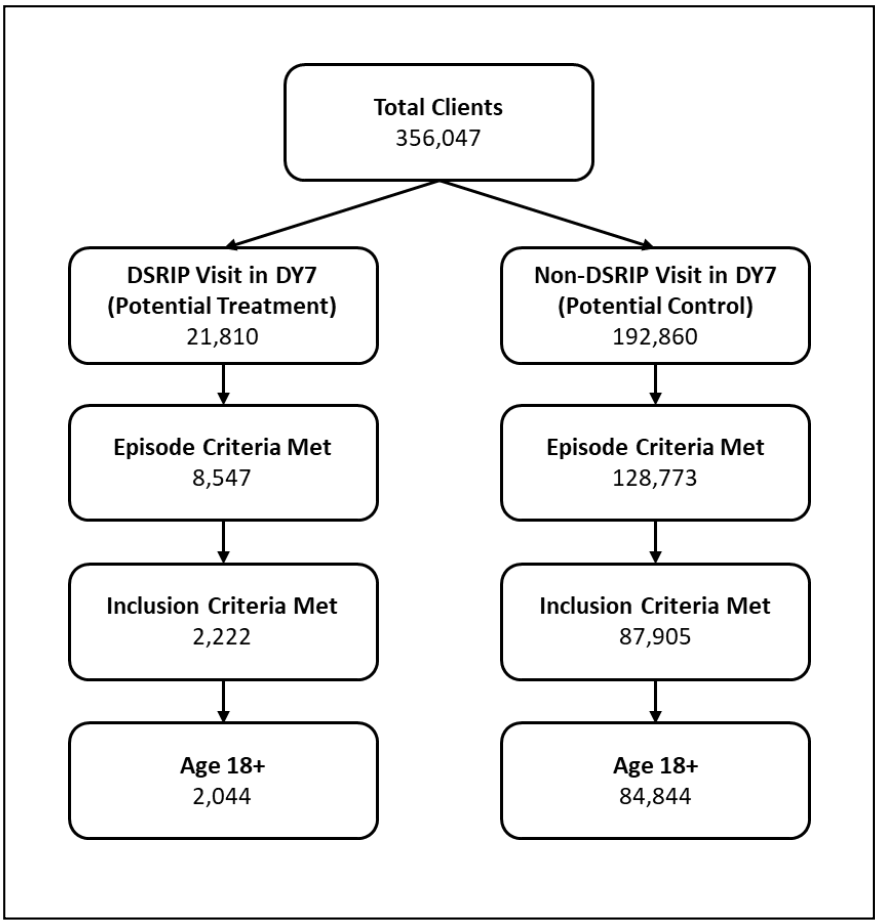
The initial sample of claims and encounter data included 356,047 unique Medicaid clients with diabetes. To implement the analysis plan, for both DSRIP and non-DSRIP clients, an index date was defined as the date of the client's first diabetes-related visit to a DSRIP provider (for DSRIP clients) or non-DSRIP provider (for non-DSRIP clients) during DY7 (October 1, 2017–September 30, 2018). Each client's index date determined the beginning of the post-period and the end of the pre-period for that client and varies across clients within DY7. Of the initial sample, 21,810 clients had at least one visit with a DSRIP provider in DY7, whereas 192,860 clients had no visits with a DSRIP provider in DY7 but at least one visit with a non-DSRIP provider in DY7 (the remaining 141,337 clients did not have a visit in DY7). For context, in 2018, DSRIP performing providers who reported on diabetes-related measures served over 38,000 Medicaid clients and 91,000 LIU clients.

The following inclusion criteria were applied to the samples identified for both DSRIP and non-DSRIP clients:

- Must have continuous Medicaid eligibility over 12 months before and 12 months after the index date.
- Must maintain continuous residency in the same RHP over 12 months before and 12 months after the index date (with a change of residency within the same RHP allowed).
- Must have had at least one diabetes-related office visit with a non-DSRIP performing provider over the 12-month period before the index date.
- Must not have had any visits to a DSRIP performing provider during the 12 months before the index date.

An additional restriction applied to the non-DSRIP clients is that they must not have had any visits to a DSRIP performing provider during the 12 months after the index date (i.e., they must be "never" DSRIP clients). Researchers did not apply the dual eligible exclusion criteria in the Interim Report. Researchers plan to investigate this in the Summative Report, along with the subgroup analysis. A sample flow chart is presented in Figure II.4.

Figure II.4 DSRIP Diabetes Claims Analysis Sample Flow Diagram.



Note: DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year.

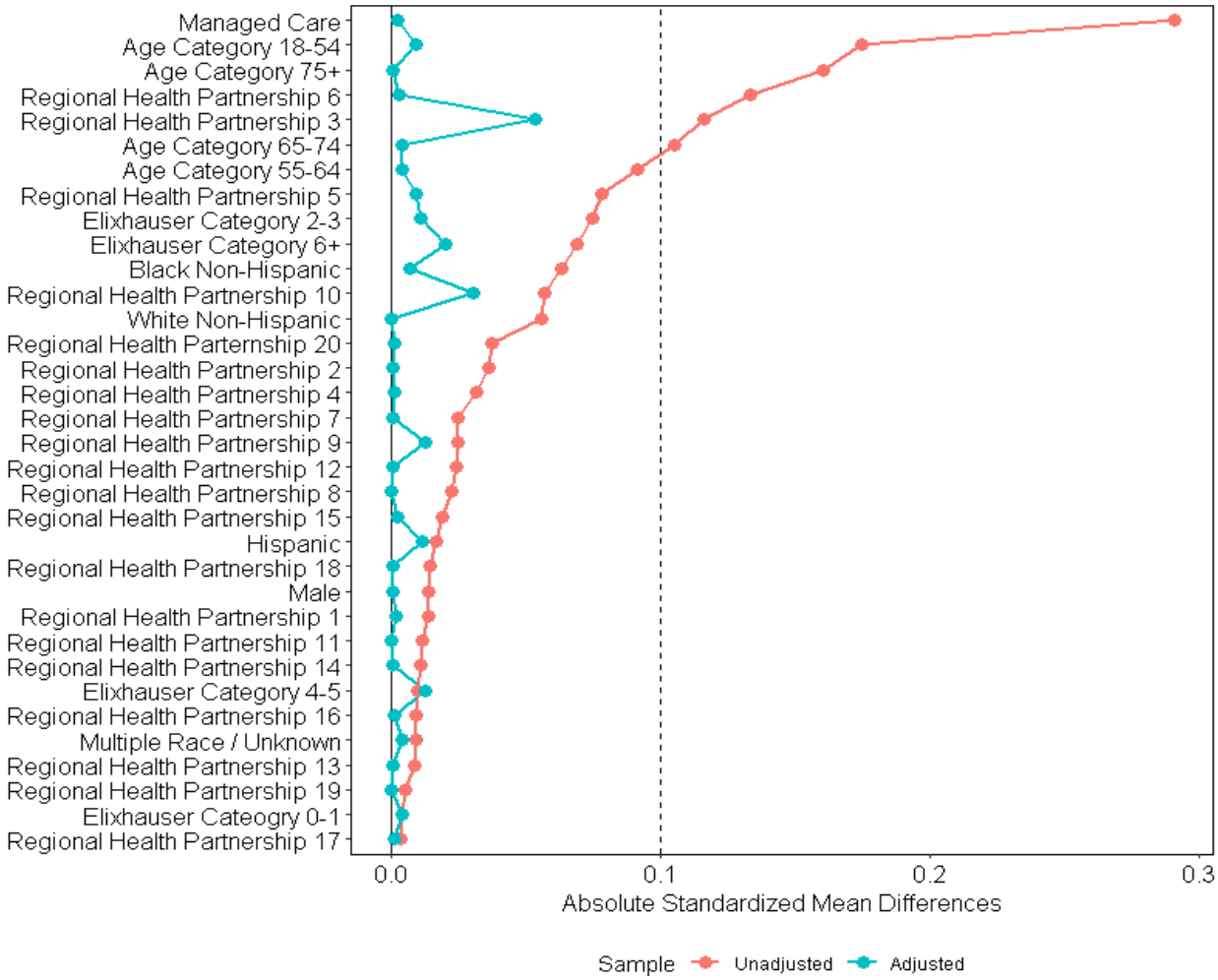
After excluding clients who do not meet the inclusion/exclusion criteria, a PSM approach was used to reduce dissimilarities in the DSRIP client ("treatment") sample and the non-DSRIP client ("comparison") sample (Austin, 2011). A treatment propensity score for each client was generated using logistic regression to predict treatment group category (treatment or comparison) based on client characteristics (sex, age, race/ethnicity, Elixhauser Comorbidity Index, and RHP residency location).

Because the sample of potential comparison clients was much larger than the sample of treatment patients, a 10 to 1 match rate for comparison to treatment clients was used with nearest-neighbor matching.

However, some of the DSRIP and non-DSRIP clients in the sample transitioned from an FFS to an MMC plan (or vice versa) during the 12-month post-index-date period. Excluding these clients resulted in a final sample of 2,034 DSRIP diabetes clients and 20,374 non-DSRIP comparison clients.

The PSM approach was highly effective in reducing dissimilarities between the sample, with post-match standardized distance values of less than 5% for all variables used to generate the propensity score (Figure II.5). See Appendix B: DSRIP Technical Details for details.

Figure II.5 Love Plot of Covariate Balance.



The PSM base sample was used for all measures where possible. However, events of interest for some measures differed from the index visit in DY7, resulting in difference sample sizes for those measures. For example, for Measure 1.2.3 Testing HbA1c Levels, the event of interest is when a provider orders an HbA1c test, which may not be the date of the index visit.

In those cases, there is insufficient follow-up data at the current time to determine if a follow-up HbA1c test was performed within 12 months after the first test. Thus, we excluded these cases from our sample if the measure was missing in either the pre-period or post-period. Table II.8 summarizes events of interest and corresponding sample size for each measure under Hypothesis 1.2. Sufficient follow-up time for all measures will be available for the Summative Report.

Table II.8 Samples of PSM DSRIP and Non-DSRIP Clients by Measure.

Measure	DSRIP	Non-DSRIP
Base Sample Measure 1.2.1 Usual provider of care Event of interest: visits to usual provider of care Measure 1.2.5 Emergency department visits for diabetes Event of interest: emergency department visits Measure 1.2.6 Cost of Care Event of interest: total medical costs	2,034	20,374
Measure 1.2.2a Interval between provider visits (6 months) Event of interest: first visit to PCP	1,690	18,480
Measure 1.2.2b Interval between provider visits (12 months) Event of interest: first visit to PCP	1,016	11,299
Measure 1.2.3 Testing HbA1c levels Event of interest: HbA1c test order	941	9,475
Measure 1.2.4 Diabetes medication adherence Event of interest: diabetes medication start date	306	3,860

Note: DSRIP = Delivery System Reform Incentive Payment; HbA1c = Hemoglobin A1c; PCP = primary care physician; PSM = propensity-score matched.

Tentative Analytic Results

Differences in continuity of care among DSRIP and non-DSRIP clients with diabetes were mixed. It is estimated DSRIP clients experienced a 9.1% decrease ($p<0.001$) in the share of the visits to the same usual provider of care (UPC) post-Demonstration Renewal (Table II.9). On the other hand, there was no statistically significant difference between DSRIP and non-DSRIP clients on the likelihood of adequate 6-month office visit interval frequency in the post-Demonstration Renewal Period (see the full results in Appendix B: DSRIP Technical Details). Of note, sensitivity analysis with 12-month office visit interval needs more investigation.

Table II.9 DID Truncated Regression Estimate of DSRIP UPC Effect.

	Coefficient	Std Error	*z*-value
Treat × Post	-0.09122***	0.006282	-14.52
Treat	-0.01828**	0.005511	-3.32
Post	0.00246	0.002058	1.19
DY7–Quarter 2	0.02319***	0.003413	6.79
DY7–Quarter 3	0.00421	0.005435	0.78
DY7–Quarter 4	0.00002	0.008421	0.00
Intercept	0.55721***	0.001517	367.3

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 22,408 clients; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year.*

The results regarding process measures of quality of care also were mixed. DSRIP clients experienced a 55% improvement ($p < 0.001$) in the likelihood of meeting the annual HbA1c testing interval in the post-Demonstration Renewal Period (Table II.10). However, changes in diabetes medication adherence did not significantly differ between DSRIP and non-DSRIP clients (see full results in Appendix B: DSRIP Technical Details). Given the small sample size in both treatment and comparison group, many of these patients had no pharmacy claims data; more investigation is needed for the diabetes medication adherence measure.

Table II.10 DID Logistic Regression Estimate of HbA1c Frequency Effect.

	Odds Ratio	Std Error	z-value
Treat x Post	1.552***	0.1565	4.36
Treat	1.047	0.0784	0.61
Post	1.095**	0.0320	3.11
DY7–Quarter 2	0.562***	0.0265	-12.21
DY7–Quarter 3	0.490***	0.0388	-9.02
DY7–Quarter 4	0.531***	0.0680	-4.95
Intercept	0.913***	0.0192	-4.33

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 16,749 clients. DY = Demonstration Year; DSRIP = Delivery System Reform Incentive Payment.*

The DID model results indicated no apparent relationship between the implementation of the Demonstration Renewal Period and the frequency of ED visits by clients with diabetes, either all-cause ED visits or diabetes-related visits. Finally, in terms of the impact of the Demonstration Renewal Period on Medicaid costs, the results were inconclusive and require more investigation. Two alternative DID model specifications were estimated to address the right-skewed cost distributions: (a) a model with the logarithm of cost as the dependent variable, and (b) a log-link gamma regression model. Both models hovered around the statistical significance threshold (α = 0.05), with the log (cost) model slightly under (p = 0.049), and the log-link gamma regression model slightly over (p = 0.06). Given the large sample size of over 20,000, and the tentative sample definition and low borderline statistical significance, the approximately 10% increase in Medicaid cost in these models needs more investigation. Full results can be found in Appendix B: DSRIP Technical Details.

Hypothesis 1.3 Quality-Related Outcomes

Hypothesis 1.3 stated that DSRIP incentivized performing providers to improve quality-related outcomes, specified as Category C population-based clinical outcome measures. This hypothesis was evaluated using five measures focused on serving the MLIU population.

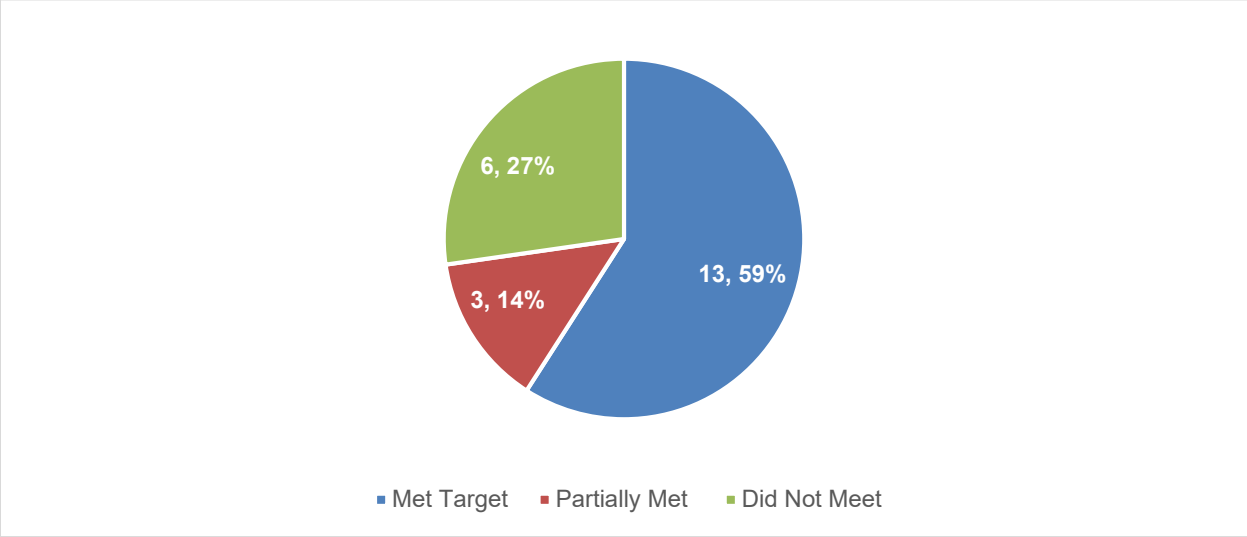
Sample

The sample for each of the analyses under Hypothesis 1.3 included DSRIP providers focusing on the MLIU population with performance incentives who report on the five measures analyzed below. Since only certain providers met these criteria, the sample sizes were small. The data source was the DSRIP report, Category C measures.

Analytic Results

For Measure 1.3.1 on the Rate of ED Visits for Diabetes, nearly three-quarters, 19 of the 22 DSRIP providers (73%), reported the desired decrease from 2017 (baseline) to 2018. Further, of these, 59% met the payment target of a 2.5% decrease (Figure II.6). In contrast, 6 DSRIP providers (27%) reported an increase from baseline and, therefore, did not meet the target.

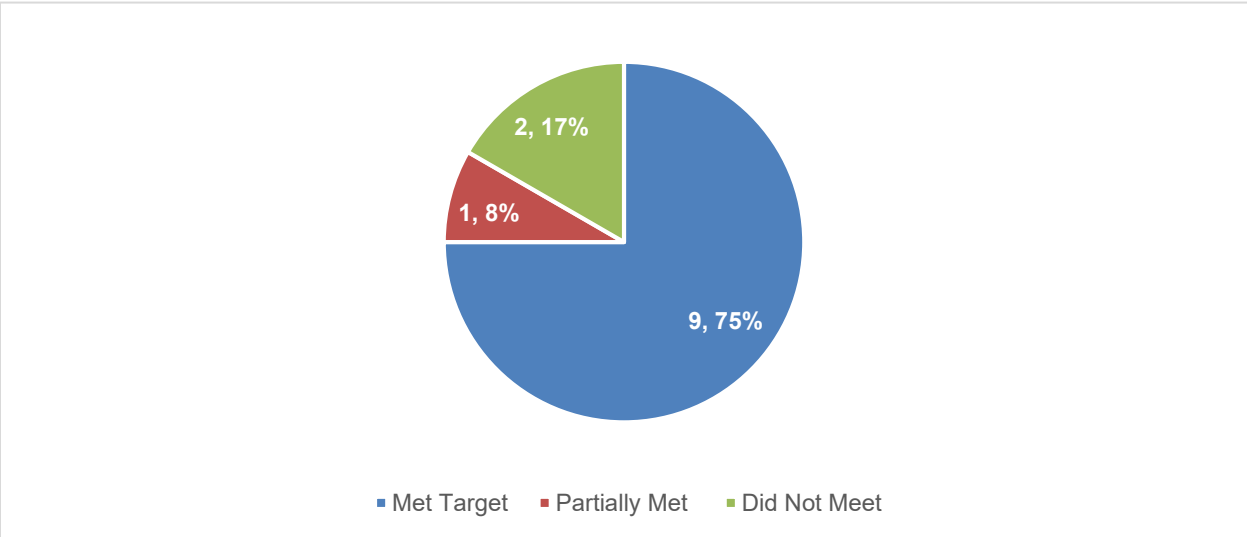
Figure II.6 Overall Provider Achievement for A1-508 Rate of ED Visits for Diabetes.



Note: Source is DSRIP report, Category C measures (See Table II.5). Figure includes 22 DSRIP providers who reported measure A1-508 as a performance-based incentive. ED = emergency department.

For Measure 1.3.2 on the Rate of ED Visits for CHF, Angina, and Hypertension, 10 (83%) of the 12 DSRIP providers reported the desired decrease from 2017 (baseline) to 2018 (Figure II.7). Seventy-five percent of DSRIP providers with the measure completely met the payment target of a 2.5% decrease from baseline. Two DSRIP providers (17%) reported an increase from the baseline and, as a result, did not meet the target.

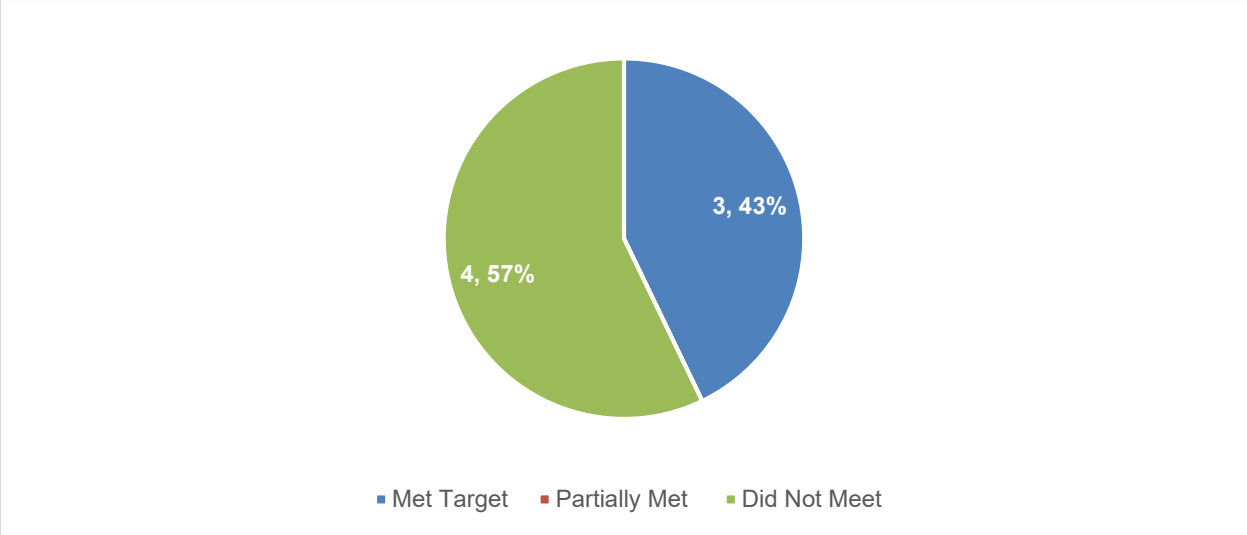
Figure II.7 Overall Provider Achievement for A2-509 Rate of ED Visits for CHF, Angina, and Hypertension.



Note: Source is DSRIP report, Category C measures (See Table II.5). Figure includes 12 DSRIP providers who reported measure A2-509 as a performance-based incentive. CHF = congestive heart failure; DSRIP = Delivery System Reform Incentive Payment; ED = emergency department.

For Measure 1.3.3 on the Rate of ED Visits for Behavioral Health and Substance Abuse, three (43%) of the seven DSRIP providers reported the desired decrease from 2017 (baseline) to 2018 and met the target of a 2.5% decrease (Figure II.8). Four DSRIP providers (57%) reported an increase from baseline and, as a result, did not meet the target.

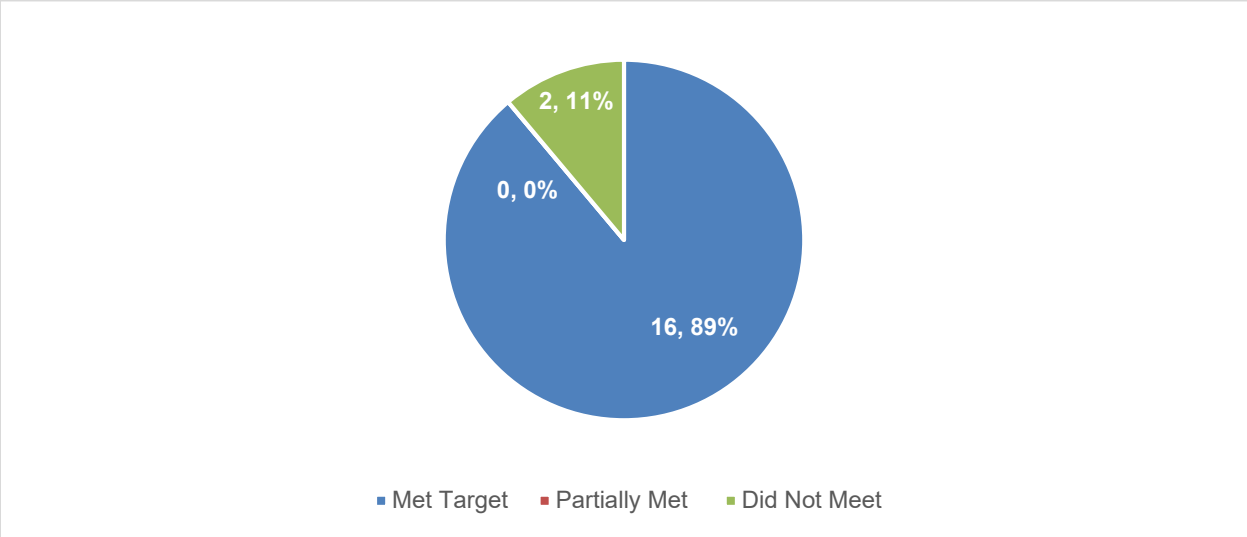
Figure II.8 Overall Provider Achievement for H2-510 Rate of Emergency Department Visits for Behavioral Health and Substance Abuse.



Note: DSRIP report, Category C measures (See Table II.5). Figure includes 7 DSRIP providers who reported measure H2-510 as a performance-based incentive. DSRIP = Delivery System Reform Incentive Payment.

For Measure 1.3.4 covering the Adult Acute Composite Indicator, 89% of the 18 DSRIP providers reported both the desired decrease from 2017 (baseline) to 2018 and met the payment target of a 2.5% decrease (Figure II.9). Two DSRIP providers (11%) reported an increase from baseline and, as a result, did not meet the target.

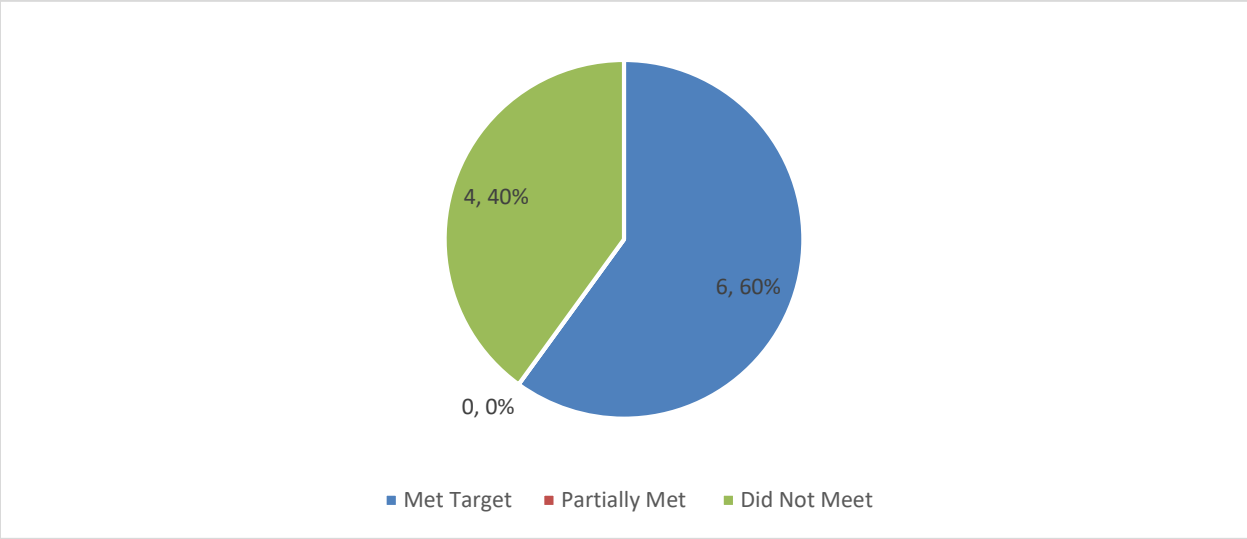
Figure II.9 Overall Provider Achievement C1-502 PQI 91 Adult Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (See Table II.5). Figure includes 18 DSRIP providers who reported measure C1-502 as a performance-based incentive. DSRIP = Delivery System Reform Incentive Payment.

For Measure 1.3.5, the Child Acute Composite Indicator, six (60%) of the 10 DSRIP providers reported the desired decrease from 2017 (baseline) to 2018 and met the payment target of a 2.5% decrease (Figure II.10). Four DSRIP providers (40%) reported an increase from baseline and, as a result, did not meet the target.

Figure II.10 Overall Provider Achievement for D1-503 PDI 91 Child Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (See Table II.5). Figure includes 10 DSRIP providers who reported measure D1-503 as a performance-based incentive. DSRIP = Delivery System Reform Incentive Payment.

In summary, DSRIP performing providers had a mix of successes and challenges with meeting their 2018 Category C measure targets. While most of the DSRIP providers met their targets for four of the measures, DSRIP providers struggled to meet 2018 targets for ED Visits for

Behavioral Health and Substance Abuse. Detailed results can be found in Appendix B: DSRIP Technical Details.

Hypothesis 1.4 Population Health

Hypothesis 1.4 stated that DSRIP transformed the health care system, resulting in improvements in population health, specified as DSRIP Category D outcomes. For the reporting of Category D, hospital providers use reports generated by the External Quality Review Organization (EQRO). Potentially preventable events were calculated at the RHP level.

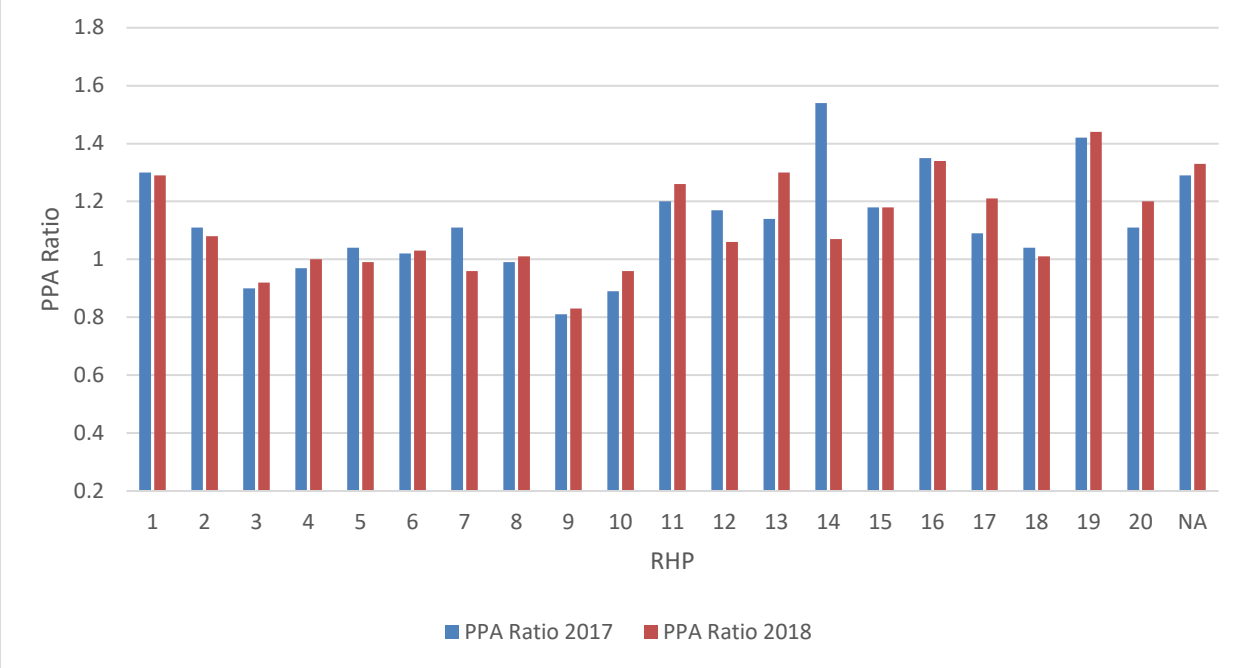
Sample

The sample for each of the analyses under Hypothesis 1.4 included the 20 RHPs of DSRIP providers, with results aggregated at the RHP level. The data sources were the EQRO reports to HHSC.

Analytic Results

For Measure 1.4.1, Potentially Preventable Admissions (PPA), eight RHPs (40%) reported a decrease, one RHP (5%) reported no change, and 11 RHPs (55%) reported an increase in potentially preventable admissions between 2017 and 2018 (Figure II.11).

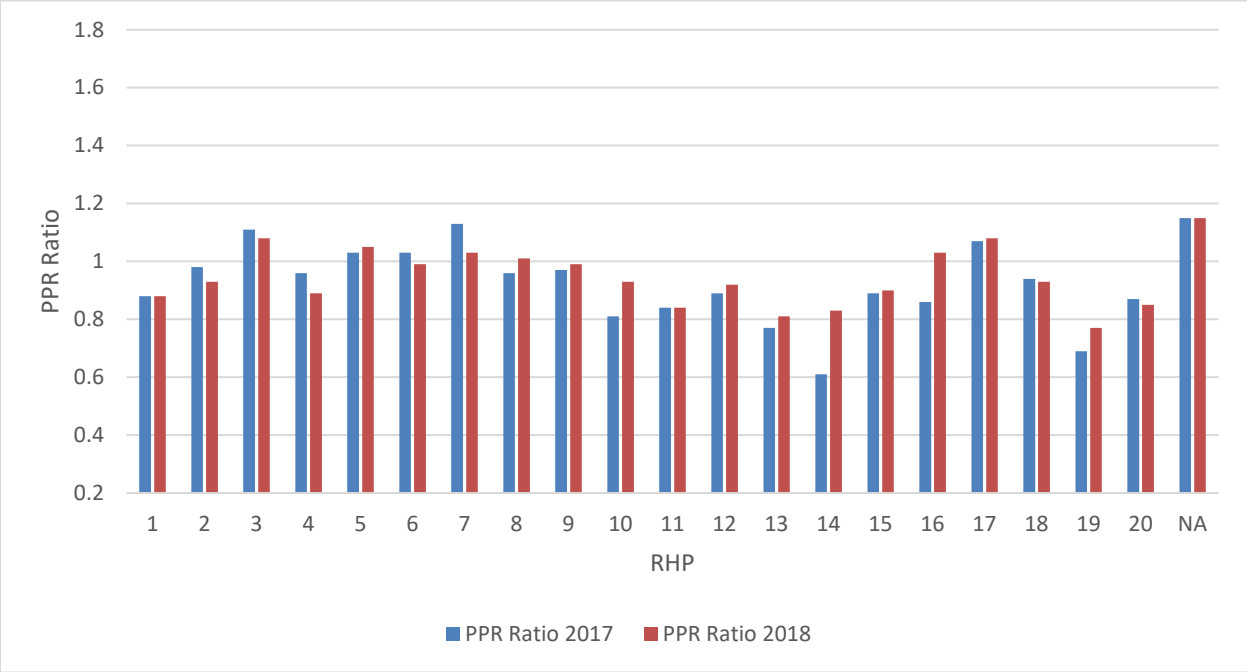
Figure II.11 Potentially Preventable Admissions Actual-to-Expected Ratios.



Note: An actual-to-expected ratio of > 1 means that more of these events occurred in the RHP in that year. The NA group consists of performing providers that could not be linked to an RHP by the EQRO. EQRO = External Quality Review Organization; PPA = Potentially Preventable Admission; RHP = Regional Healthcare Partnership.

For Measure 1.1.2, PPR, seven RHPs (35%) reported a decrease, two RHPs (10%) reported no change, and 11 RHPs (55%) reported an increase in PPAs between 2017 and 2018 (Figure II.12).

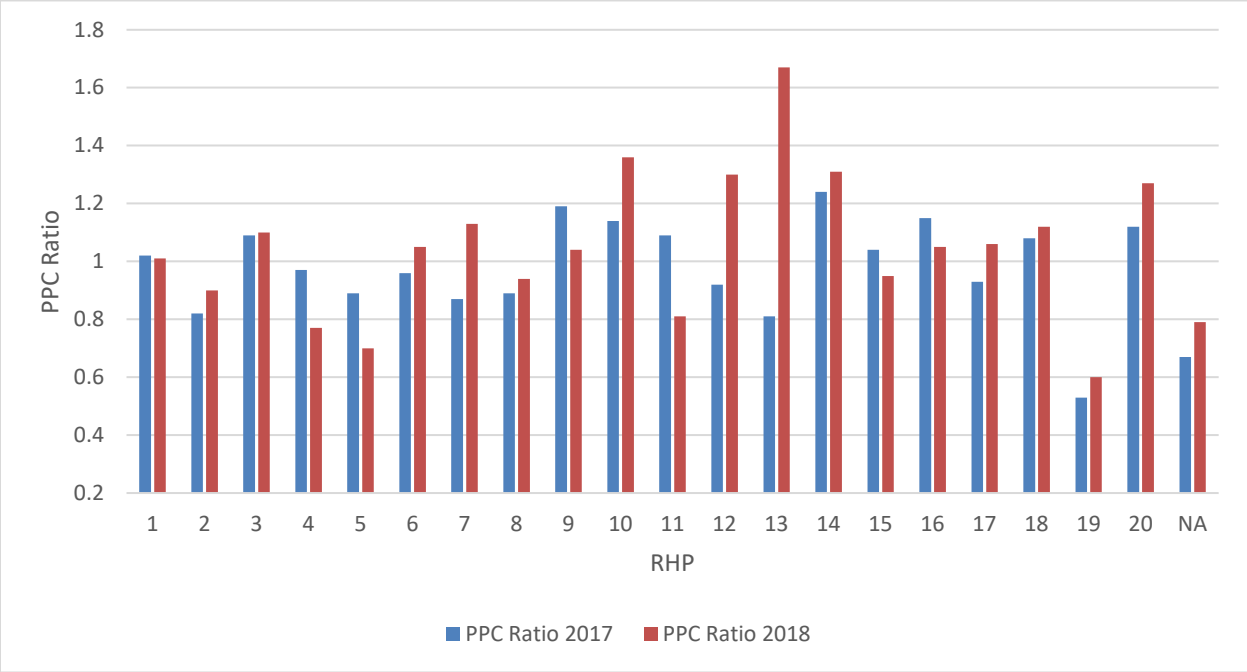
Figure II.12 Potentially Preventable Readmissions Actual-to-Expected Ratios.



Note: An actual-to-expected ratio of > 1 means that more of these events occurred in the RHP in that year. The NA group consists of performing providers that could not be linked to an RHP by the EQRO. EQRO = External Quality Review Organization; PPR = potentially preventable readmission; RHP = Regional Healthcare Partnership.

For Measure 1.4.3, Potentially Preventable Complications (PPC), seven RHPs (35%) reported a decrease, zero RHPs reported no change, and 13 RHPs (65%) reported an increase in PPAs between 2017 and 2018 (Figure II.13).

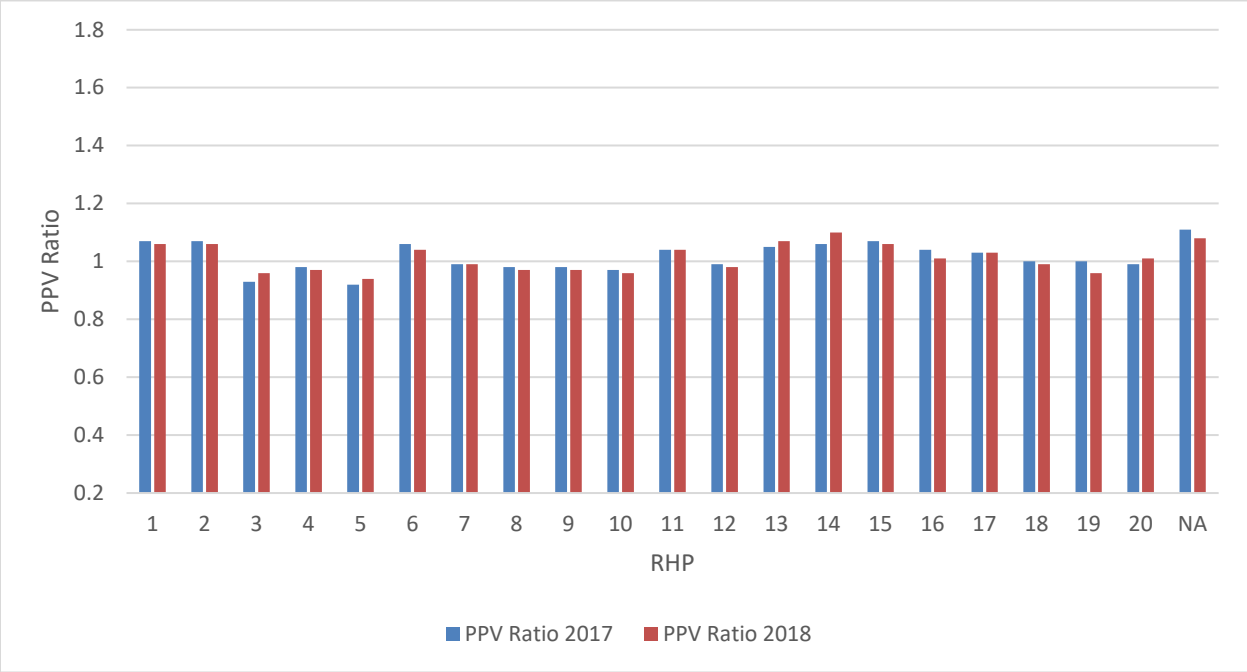
Figure II.13 Potentially Preventable Complications Actual-to-Expected Ratios.



Note: An actual-to-expected ratio of > 1 means that more of these events occurred in the RHP in that year. The NA group consists of performing providers that could not be linked to an RHP by the EQRO. EQRO = External Quality Review Organization; PPC = potentially preventable complication; RHP = Regional Healthcare Partnership.

For Measure 1.4.4, Potentially Preventable ED Visits (PPV), 12 RHPs (60%) reported a decrease, three RHPs (15%) reported no change, and five RHPs (25%) reported an increase in PPVs between 2017 and 2018 (Figure II.14).

Figure II.14 Potentially Preventable ED Visits Actual-to-Expected Ratios.



Note: An actual-to-expected ratio of > 1 means that more of these events occurred in the RHP in that year. The NA group consists of performing providers that could not be linked to an RHP by the EQRO. EQRO = External Quality Review Organization; PPV = potentially preventable visit; RHP = Regional Healthcare Partnership.

In summary, the actual-to-expected ratios for Potentially Preventable Events (PPEs) varied among RHPs, with less variation seen among Potentially Preventable ED Visits (PPV) between RHPs as well as over time. Potentially Preventable Complications (PPC) saw greater variation over time. Providers achieve their Category D goals by reporting this information, rather than by achieving a particular ratio.

LIMITATIONS

Hypothesis 1.1 Collaboration among Providers

When interpreting the evaluation results for Hypothesis 1.1 (Collaboration among Providers), causal relationships cannot be determined. Some of the observed trends may be related to changes external to the DSRIP program affecting the health care system over time. Other limitations include that some providers left the program over the course of the Demonstration, while others joined, effectively changing the RHP networks assessed in each administration of the social network survey. It is unclear the extent to which differences across administrations of the survey were the result of real changes in collaboration among DSRIP providers, or if differences reflected changes in RHP network. In summary, there are limitations to making comparisons over time when the networks are changing.

Hypothesis 1.2 Medicaid Clients with Diabetes

As noted, the claims and encounter data analysis of Medicaid clients with diabetes have some fundamental limitations that may be difficult to overcome due to the long-standing nature of DSRIP in Texas. The main limitation facing analyses of Medicaid clients with diabetes is the

sampling process. First, there is a fundamental limitation in identifying a representative sample of clients who received the diabetes DSRIP intervention because these programs are not identified in the Medicaid data. Second, this analysis excludes the many more LIU clients who are not in the Medicaid data that the DSRIP program serves. For example, in 2018, DSRIP performing providers who reported on diabetes-related measures served over 38,000 Medicaid clients and 91,000 LIU clients. The 2,034-member treatment group used in the Interim Report is only a very small, non-representative sample of all clients served by DSRIP providers.

Another limitation to the sampling process is the focus on episodes of "new" treatment by clients with DSRIP-performing providers. Many potential DSRIP clients for the study were already receiving care from a DSRIP provider prior to DY7. Including these clients as DSRIP "treatment" clients would have had the potential of biasing the DID model estimates toward no effect. However, excluding such clients resulted in a small fraction of total clients treated by DSRIP providers being retained in the final sample. This small study sample may not be representative of the larger sample of clients treated by DSRIP providers. Furthermore, DSRIP providers in this analysis are disproportionately hospitals. This will likely impact the measure because clients are less likely to have recurring visits to a hospital than to a PCP or specialist, as would be the case with the UPC measure. Lastly, there is also potential that clients that transitioned from a non-DSRIP provider to a DSRIP provider (i.e., hospital) in the study sample reflect those patients requiring more comprehensive diabetes care. This confounding would likely explain why such a large increase in Medicaid costs is seen for this sample.

To better understand potential biases in our sample selection process, Table II.11 compares selected characteristics of the 2,034 DSRIP clients included in the study sample to the 19,776 clients who had a DSRIP visit in DY7 but were excluded due to a visit to a DSRIP performing provider 12 months prior to their index visit in DY7 (Figure II.4). Characteristics include client age at the date of the first visit in DY7 (index date), client gender and race, and the number of office visits, ED visits and Elixhauser Index score based on claims during the 12 months prior to the client's index date.

Table II.11 Comparison of Initial and Final DSRIP Client Samples.

	Final DSRIP Sample (N = 2,034)	DSRIP Visit in DY7 (N = 19,776)[1]
Age in years,[2] mean	54.9	51.7
Women, %	67.4	65.1
Race/ethnicity, %		
White, non-Hispanic	16.8	17.2
Black, non-Hispanic	23.1	20.9
Hispanic	39.9	41.9
Elixhauser Index,[3] %		
0-1	28.8	16.3
2-3	40.7	45.9
4-5	20.8	26.0
6+	9.5	11.5
Office Visits,[3] mean	9.8	9.5
ED Visits,[3] mean	2.8	2.2

Note: [1] Excludes the 2,034 clients in the final sample. [2] Calculation performed using date of birth and date of index DSRIP visit. [3] Elixhauser Index are based on claims during 12-month period before index visit in DY7. DSRIP = Delivery System Reform Incentive Payment; ED = emergency department.

Compared to the initial DSRIP client sample, the final DSRIP client sample was older on average (by 3.2 years) and slightly more likely to be female, but similar in terms of race and ethnicity. However, the final DSRIP client sample had a greater proportion of lower Elixhauser Index scores. The final DSRIP sample also had more office visits and more ED visits prior to the index date, with the magnitude of the ED visit difference being the most notable (the final DSRIP client sample ED visit rate was 27% higher than the initial DSRIP client sample).

In addition, the final DSRIP client sample included Medicaid clients who also had Medicare insurance coverage (dual eligibility), including those with coverage through the end-stage renal disease program. Dual eligibility contributed to the high frequency of missing data for the diabetes medication adherence measure, given that limited pharmacy claims data were available for Medicaid clients with Medicare coverage. Of the 2,034 Medicaid clients in the DSRIP treatment group, 949 (46%) were dual eligible. Other measures, such as HbA1c testing frequency, may not be clinically relevant for clients with end-stage renal disease. Researchers will explore the feasibility of restricting the DSRIP sample to the Medicaid-only population and revising selected measures to account for missingness in Medicaid claims data and relevance for selected clinical subpopulations for the Summative Report.

A final overall limitation of the analyses of Medicaid clients with diabetes is that the analysis focused on changes in performance measures over a one-year period following the index date for the Demonstration Renewal Period as specified in Appendix G. Evaluation Design Plan Revision v5.1. However, because diabetes is a chronic condition, the impact of improved disease care management can take time to produce changes in clinical outcomes. Therefore, more time may be required to demonstrate improvement in some of the specific performance measures evaluated. Additional follow-up data will be available for the Summative Report.

Hypothesis 1.3 Quality-Related Outcomes

For Hypothesis 1.3, the primary limitation was the low number of DSRIP providers focused on the MLIU population with performance-based incentives that had completed reporting on these measures (fewer than 25 out of 290). Additional years of DSRIP reporting data will be necessary to gauge how these measures change over the Demonstration Renewal Period.

Hypothesis 1.4 Population Health

For Hypothesis 1.4, conclusions about the impact of DSRIP on population health outcomes are difficult to determine without a comparison group of non-DSRIP providers, which does not exist. Furthermore, weighted actual-to-expected ratios for each measure are reset to 1 each year across the state, meaning that only changes between RHPs can be analyzed over time, rather than any changes for DSRIP providers as a whole. Researchers will investigate alternative methods for analyzing PPE rates for the Summative Report.

CONCLUSIONS AND IMPLICATIONS

Evaluation Question 1 asked: Did the DSRIP program incentivize changes to transform the health care system for the MLIU population in Texas? This question was analyzed using a variety of analyses focusing on four primary hypotheses.

Hypothesis 1.1 stated that DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers. Making use of survey data, DSRIP providers reported increased collaboration within their RHPs when considering data-sharing agreements and tangible resource sharing since the beginning of the DSRIP program. DSRIP providers with collaborative ties also experienced increases in the number of different types of

ties over time, and collaboration also became more centralized since the beginning of DSRIP, with collaborative ties becoming more focused between highly connected providers in an RHP. However, joint service delivery did not increase over the same time frame. Providers with collaborative ties saw the number of different types of ties increase over time, as well. Collaboration also became more centralized since the beginning of DSRIP, with collaborative ties becoming more focused between highly connected providers in an RHP. This suggests that collaboration between well-connected DSRIP providers increased, while the same pattern did not hold for others. When asked, most DSRIP providers viewed DSRIP as supportive of collaborative efforts.

Hypothesis 1.2 focused on diabetes claims analysis, which states that DSRIP providers will improve continuity, quality, and cost of care for adult Medicaid clients with diabetes. The results for the interim evaluation of the Demonstration Renewal Period using claims data in a DID analytic framework are still preliminary, and further investigation and adjustments to the sample are needed to reduce bias. The tentative results using the current sample are mostly mixed across dimensions of care, except ED visits. Both all-cause and diabetes-specific ED visits had no statistical differences in the DSRIP and non-DSRIP group. Researchers will explore adjustments to the sampling plan and analytic method under Hypothesis 1.2 for the Summative Report. An inherent, unavoidable limitation of the DSRIP claims analysis relates to the fact that DSRIP has been a ubiquitous, long-standing program for Medicaid in Texas. This makes the task of identifying a sample of non-DSRIP clients in Texas that is reasonably comparable to DSRIP clients difficult. Thus, achieving adequate “balance” between DSRIP treatment clients and non-DSRIP comparison clients in terms of the types of providers who provide their care is nearly impossible.

Hypothesis 1.3 stated that DSRIP incentivized performing providers to improve quality-related outcomes. Most DSRIP providers met their goals of 2.5% improvement in the first year of data collection for the Rate of ED Visits for Diabetes (Measure 1.3.1), Rate of ED Visits for Congestive Heart Failure, Angina, and Hypertension (Measure 1.3.2), and Adult and Child Composite Indicators (Measures 1.3.4 and 1.3.5). However, DSRIP providers struggled to meet goals for the Rate of Emergency Department Visits for Behavioral Health and Substance Abuse (Measure 1.3.3).

Hypothesis 1.4 stated that DSRIP transformed the health care system, resulting in improvements in population health. These outcomes are Potentially Preventable Admissions, Potentially Preventable Readmissions, Potentially Preventable Complications, and Potentially Preventable ED Visits. The data provided by the EQRO allowed for analysis at the RHP level, and trends over time were observable only in terms of the level of variation between RHPs, rather than how much improvement was observed over time. The actual-to-expected ratios for potentially preventable events varied among RHPs. Potentially Preventable ED Visits was most consistent across RHPs and over time. Potentially Preventable Complications saw the most variation across RHPs and over time.

Overall, some of the trends suggested stable or increasing collaboration between DSRIP providers (H 1.1) and the achievement of quality outcome indicator goals (H 1.3) for the MLIU population of interest. Yet, as noted in the limitations, some of these trends may reflect changes in the overall health system. For the other hypotheses (H 1.2 and H 1.4), additional analyses will be needed to determine the impact of DSRIP. The Summative Report should be able to provide a more conclusive and broader understanding of trends within the DSRIP program over time.

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III. UNCOMPENSATED CARE

INTRODUCTION

General Background Information

Hospitals play a crucial role in the U.S. health care system. In addition to providing inpatient care, a hospital's emergency department (ED) provides access for acute care needs, especially for individuals who do not have or cannot show proof of insurance. Federal law (Emergency Medical Treatment and Active Labor Act (EMTALA)) requires hospitals to provide an appropriate medical screening examination to anyone seeking treatment for a medical condition through the hospital's ED. As a result, EDs may be an important access point for low-income individuals.

An ongoing challenge to hospitals' financial health is the large amount of care provided to individuals who are uninsured, underinsured, or insured through the Medicaid program (Nikpay et al., 2015, 2016). Hospitals can bill and receive funds for care provided to underinsured individuals and those with Medicaid coverage. However, hospitals may not be reimbursed for all costs of care (Gruber & Rodriguez, 2007). The uninsured are the most challenging group from which to recoup payment, since they have to pay out of pocket but generally lack the means to do so.

Shifting patients who receive acute care in an ED to more appropriate primary care settings would help address hospitals' financial challenges. However, this transition is difficult because high-quality outpatient care clusters in high-income areas and usually only treat patients with insurance coverage or some prepayment plan. Thus, use of ED is not the best option, but it may continue being the only or default option for meeting the health care needs of uninsured and low-income populations for the foreseeable future.

The overreliance on EDs for health care needs among the uninsured and low-income populations represents a significant problem as hospitals cannot continue to operate if a large share of patients does not pay for their care. Medicaid payments have the lowest reimbursement rates of all types of insurance, and the payment rates for care have long been considered to be below the cost of care (Camilleri, 2018; Dranove et al., 2016). Thus, many states established pools of uncompensated care (UC) funding to help offset this financial shortfall and stabilize hospital budgets. Several studies (Dunn & Chen, 1994; Hadley et al., 2005) have shown that these payment pools have helped hospitals remain open, especially public hospitals that are usually located in areas of underinsurance and rural hospitals.

Uncompensated Care in Texas

The federal government's efforts to improve care coordination and quality include Section 1115 Medicaid Demonstration waivers, which allow states to test programs that depart from existing federal Medicaid rules while remaining consistent with the overarching goals of the program (Cunningham et al., 2016). Under such a Demonstration, Texas implemented a care coordination and quality improvement program that incentivizes hospitals to provide higher quality of care with the goal of reducing downstream health care needs and thus reduce UC (Coughlin, 2014).

Beginning with the 1115 Demonstration in 2011, the former Upper Payment Limit (UPL) funds and savings from the expansion of Medicaid managed care (MMC) were combined to create two new funding pools for providers, and these make up the DSRIP pool and UC pool. The non-

federal share of UC and DSRIP payments were funded through intergovernmental transfers (IGTs), public funds used to match the federal share. The UPL was replaced with the UC pool because many providers could not afford to continue serving Medicaid patients without additional financial support.

The UC payment pool reimburses providers for UC costs incurred. Similar to the prior UPL program, the UC payment pool provides a supplemental payment to providers and is based on UC costs submitted to the state (and some adjustments). To receive payments from the UC pool, a provider must complete an application listing its uncompensated costs for Medicaid and uninsured patients. A hospital may claim uncompensated costs for inpatient and outpatient services from the uninsured and those with Medicaid coverage, as well as related costs for physician and pharmacy services. The UC payment pool has ranged from $5.2 billion in state fiscal year 2012 (DY1) to $3.1 billion in 2019 (DY8). Beginning in DY3, the UC pool was split into four UC payment pools based on the type of hospital (large public, small public, state, and private). Additionally, the UC pool uses different payment formulas for specific types of hospitals (e.g., Rider 38 hospitals) to ensure small, public, and private hospitals in rural counties receive additional funds.

CMS specifies the methodology to calculate the eligible UC costs, known as hospital-specific limits (HSLs). From DY1 to DY7, CMS required that Medicare, Medicaid, and other insurance payments received for patients be subtracted from the submitted UC costs before arriving at the HSL. The Children's Hospital Association of Texas (CHAT) challenged this rule in court, leading the D.C. District Court to rule that the Medicare and Medicaid payment deductions could no longer be considered in the HSL calculation. CMS officially changed the methodology in December 2018 (CMS, 2021a). As a result, starting in DY7, the HSL calculation no longer deducted payments from Medicare, Medicaid, and other insurance payments of patients for whom hospitals submitted UC costs. As a result, starting in DY7, the HSL calculation no longer deducted payments from Medicare, Medicaid, and other insurance payments of patients for whom hospitals submitted UC costs, which makes it difficult to assess the UC cost growth rate trend over time. The UC payment pool will undergo additional changes at the beginning of DY9, when reimbursements will be limited to UC costs for charity care only.

There are three reasons for conducting a trend analysis of the UC payment pools. First, the Demonstration expanded MMC to new service delivery areas that were previously covered through a traditional fee-for-service (FFS) payment system. If MMC delivers services more efficiently than FFS through better care management and utilization review, UC costs may increase less rapidly or decline in the form of a reduced Medicaid shortfall. Second, the DSRIP project-program implementation changes care delivery with the goal of improved care continuity and quality of care. If patient-provider care continuity and provider quality improve, then the uninsured and Medicaid shortfall could be reduced. Finally, the private insurance marketplace of the Affordable Care Act (ACA) came online in January 2014, with the goal of reducing the number of uninsured individuals (Courtemanche et al., 2017). Over 1 million Texas residents signed up for coverage through the exchange (Healthinsurance.org, 2021). If some of these individuals were previously uninsured, then one could expect the uninsured shortfall to decrease beginning in DY4.

Evaluation Question and Hypotheses

As specified in Appendix G. Evaluation Design Plan Revision v5.1, the UC evaluation focuses on answering one overarching question through two specific hypotheses, which are listed in Table III.1 for hospitals that submitted UC costs between DY1 and DY8.

Table III.1 UC Evaluation Question and Hypotheses.

UC Evaluation Question: Did the Demonstration impact unreimbursed costs associated with the provision of care to the Medicaid and low-income uninsured (MLIU) population for UC providers?
Hypothesis 2.1 (H 2.1): The percentage of UC costs reimbursed through UC payments for each type of UC (overall, Medicaid shortfall, and uninsured shortfall) will decrease throughout DY1–DY8 of the Demonstration
Hypothesis 2.2 (H 2.2): The UC cost growth rate will slow over time for hospitals participating in the Demonstration.

Note: DY = Demonstration Year; UC = Uncompensated Care.

METHODOLOGY

Data

Several data sources were used to describe the hospitals receiving UC payments. The most important data source was the DSH/UC Application data from HHSC covering the years from 2012 to 2019 (DY1–DY8). The data include all relevant information about the calculation of UC payments. To describe the characteristics of the hospitals applying for and receiving UC payments, data from the American Hospital Association (AHA) annual survey, the Healthcare Cost Reports Information System (HCRIS), and the rural-urban classification of counties were merged with the DSH/UC Application data for this analysis. See Appendix C for details.

One challenge in analyzing DSH/UC Application data is that the application is submitted to HHSC annually, but the UC payments are made based on a two-year data lag. This means that the 2012 report summarizes UC costs incurred by hospitals between October 1, 2009, and September 30, 2010, which were paid during DY1 (October 1, 2011, to September 30, 2012).

Table III.2 displays the available years of data, the payment demonstration year, the year the costs were incurred, and the time period of the incurred cost. For the purposes of this Interim Report, the incurred cost year was the main unit for analysis because it can be applied to all UC measures.

Table III.2 Uncompensated Care Cost Data.

UC Report	Payment DY	Incurred Cost Year	Incurred Cost Period	
UC 2012	DY1	FFY2010	10/1/2009	9/30/2010
UC 2013	DY2	FFY2011	10/1/2010	9/30/2011
UC 2014	DY3	FFY2012	10/1/2011	9/30/2012
UC 2015	DY4	FFY2013	10/1/2012	9/30/2013
UC 2016	DY5	FFY2014	10/1/2013	9/30/2014
UC 2017	DY6	FFY2015	10/1/2014	9/30/2015
UC 2018	DY7	FFY2016	10/1/2015	9/30/2016
UC 2019	DY8	FFY2017	10/1/2016	9/30/2017

Note: UC = Uncompensated Care; DY = Demonstration Year; FFY = Federal Fiscal Year.

The DSH/UC Application data also included the hospital's name, county of location, regional health care partnership (RHP) region, Rider 38 status (indicating the rurality of the hospital), and hospital program pool within the UC pool (large public, small public, state, and private). These variables are used in the descriptive analyses to underscore dimensions of cohesion and heterogeneity between hospitals submitting UC costs and receiving UC payments. The DSH/UC

Application data also included data for non-acute care hospitals and physician groups. These have been excluded from the analysis and only represent a small number of cases (30 out of 439 providers). All UC costs and payments were adjusted for inflation to 2020 dollars based on the medical cost CPI provided by the Bureau of Labor Statistics.

Measures

There are two main measures (share of reimbursed UC costs and UC cost growth rate) specified in Appendix G. Evaluation Design Plan Revision v5.1. Both are reported in two different units: one at the state level (i.e., Texas, estimated as the sum of all hospitals in the sample) and the other at the hospital level. First, the state level analysis summed all UC cost and UC payments across all hospitals in the sample that provide a good context. Then, the hospital level analysis was presented as the average of these measures calculated for each hospital in the sample that better depict how each hospital is doing. The hospital level analysis will be influenced more by the many smaller hospitals compared to the few larger hospitals.

In addition, the UC cost growth rate analyses were conducted using both the actual (i.e., unadjusted) and adjusted rate due to the change in definition in DY7 as a result of the CHAT lawsuit. Unadjusted growth rates used the actual UC cost data without any changes that can result in a drastic increase due to the change in definition. Adjusted growth rates were calculated by changing the eligible UC costs in 2016 and 2017 (DY7–DY8) to be consistent with the definition of eligible UC costs in earlier years (DY1–DY6). This allowed testing of the hypothetical question of change in growth rate if there had been no change in definition, and thus provided more insight. Here, total eligible UC costs (from which growth rates are calculated) were defined similarly across all years by first summing the uninsured shortfall, Medicaid shortfall, and pharmacy and physician care shortfall. From this total eligible cost value, payments made for patients from Medicaid and Medicare and other private insurance payments were subtracted, leading to a comparable eligible UC cost measure in all years. The new definition of costs did not change the growth rates for 2011 to 2015 and only affects the latter 2 years. Table III.3 summarizes the measure definitions.

Table III.3 Measure Definitions.

Hypothesis	Measure	Unit of Analysis
H.2.1	2.2.1 Percentage of UC costs reimbursed	State level and hospital level
H 2.2	2.2.2 Actual (i.e., unadjusted) and adjusted UC cost growth rate	State level and hospital level

Note: UC = Uncompensated Care.

Analytic Methods

H 2.1: Reimbursed UC Costs

Researchers performed Wilcoxon signed-rank tests to evaluate whether the distribution of the hospitals' percentage of eligible UC costs reimbursed changed from 2010 to 2017.

In addition, researchers parametrically evaluated the trend in the reimbursement share over time using the following ordinary least square regressions model:

$$UC\ \text{cost}\ reimbursed_{it} = \beta_0 + \beta_1 Time_{it} + \delta X_{it} + \gamma_i + \varepsilon_{it}$$

where:

- The $UC\ cost\ reimbursed_{it}$ is the percentage of eligible UC costs reimbursed for hospital *i* in year *t*.
- $Time$ is a continuous variable measuring the change in reimbursement rate in each year (e.g., 2010, 2011, etc.).
- The vector X_{it} includes time-varying hospital characteristics (DSH payment, UC pool participation, total UC pool, participating hospitals in the UC pool, Rider 38 status, profit status, AHA hospital, long-term acute care designation, HMO and PPO contracts, total hospital admissions, total outpatient visits, and electronic medical records adoption).
- γ_i is a hospital fixed effect that adjusts the regression model by the time constant characteristics of the hospital, such as location-specific factors of hospitals, and also limits the data used for estimation of the coefficient β_1 in such a way that it only captures changes in UC costs within the same hospital over time.
- ε_{it} is the error term.

The analysis accounted for clustering of errors at the hospital level.

H 2.2: UC Cost Growth Rate

Researchers conducted descriptive trend analysis on both the actual and adjusted UC growth rate. In addition, researchers conducted the following multivariate regression model using the adjusted growth rate:

$$UC\ growth\ rate_{it} = \beta_0 + \beta_1 Time_{it} + \delta X_{it} + \gamma_i + \varepsilon_{it}$$

where:

- The $UC\ growth\ rate_{it}$ is broadly defined as (eligible UC costs in year *t* – eligible UC costs in year *t-1*) divided by eligible UC costs in year *t-1* for each hospital in year *t*.
- $Time$ is a continuous time trend (e.g., 2010, 2011, etc.) variable of interest that is included in the model to assess the linear trend in UC costs.
- The vector X_{it} includes time-varying hospital characteristics (DSH payment, UC pool participation, total UC pool, participating hospitals in the UC pool, Rider 38 status, profit status, AHA hospital, long-term acute care designation, HMO and PPO contracts, total hospital admissions, total outpatient visits, and electronic medical records adoption).
- γ_i is a hospital fixed effect that adjusts the regression model by the time constant characteristics of the hospital, such as location-specific factors, and also limits the data used for estimation of the coefficient β_1 in such a way that it only captures changes in UC costs within the same hospital over time.
- ε_{it} is the error term.

The analysis accounted for clustering of errors at the hospital level. In addition, researchers also estimated robust regressions by reweighting outlier observations (e.g., hospitals with large changes in UC costs across time) to reduce the influence of these observations in the regression.

KEY FINDINGS

In total, our sample consisted of 290 hospitals that were present in most years of the DSH/UC Application data. Limiting the sample to these providers has the advantage of comparing the same hospitals across time, while including hospitals that sparsely report UC costs complicates comparisons across time. Overall, we observed 439 providers, including physician practices and non-acute care hospitals, leaving us with about 71% of all providers in the final sample. Details of the sample characteristics can be found in Appendix C.

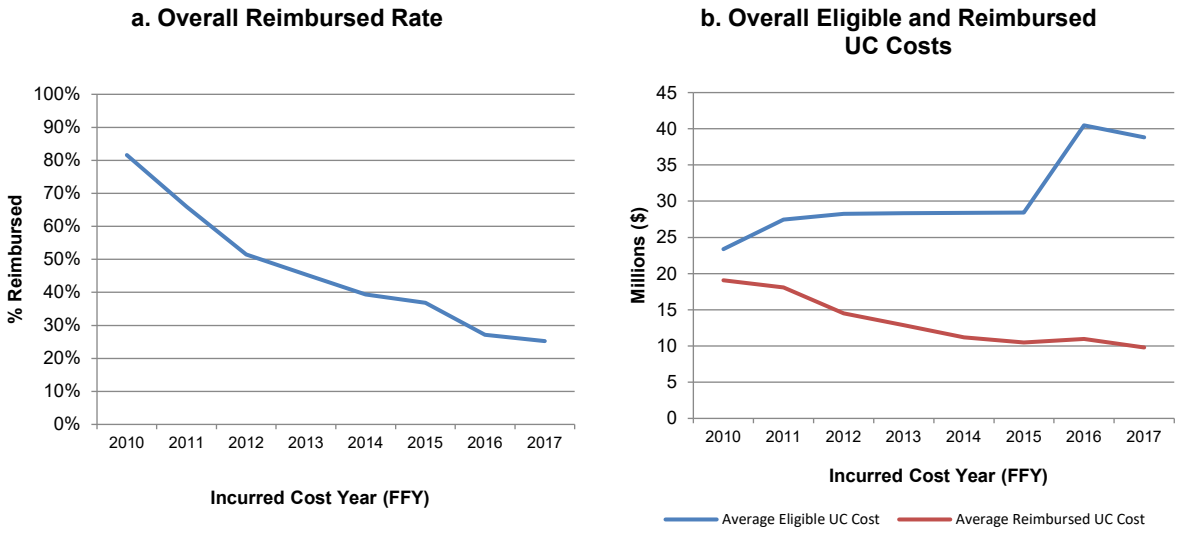
Hypothesis 2.1 Percentage of UC Costs Reimbursed

The following figures display trends for the reimbursement rate of UC costs, total amount of eligible UC costs (submitted UC costs less adjustments), and total UC reimbursement to providers.

Overall Trend in Reimbursed UC Costs

Figure III.1 displays the trends in UC costs for the UC providers in the sample. Figure III.1(a) displays the percentage of UC costs reimbursed, and Figure III.1(b) displays the average eligible and the average reimbursed UC costs (UC payment) per year for all hospitals in the sample. In 2010, the eligible UC costs were $23.4 million, and the reimbursed amount was $19.1 million. Total eligible UC costs increased significantly from 2015 to 2016 due to the CHAT lawsuit that did not allow payments received from other insurance sources to be deducted when determining eligible UC costs. By 2017, the average hospital reported $38.8 million in eligible UC costs, out of which only $9.8 million was reimbursed.

Figure III.1 Overall UC Costs Trends.



Note: N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2010 were reported to HHSC in FFY2012 or DY1. DY = Demonstration Year; FFY = Federal Fiscal Year; UC = Uncompensated Care.

Thus, the average reimbursement rate for the entire hospital sample decreased from approximately 80% in FFY2010 to approximately 25% in FFY2017. Decreases in the average

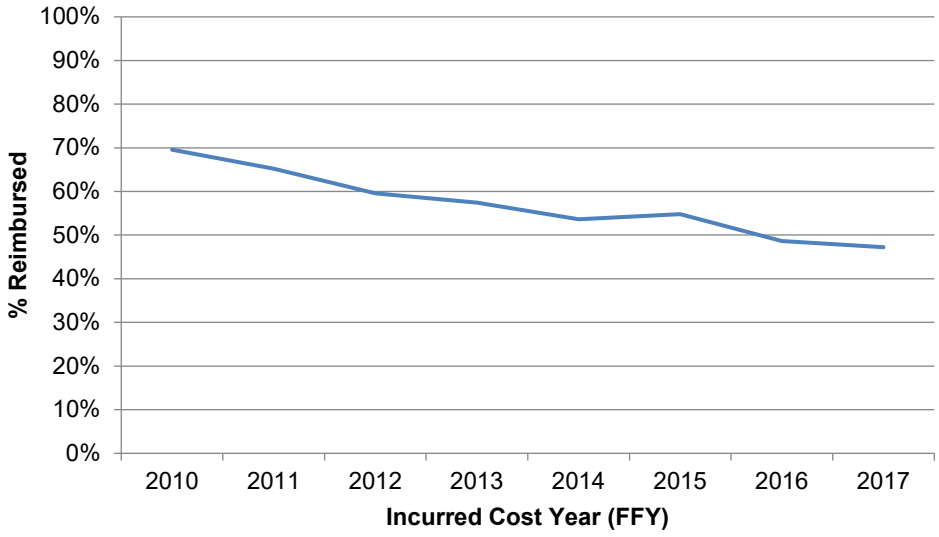
reimbursement rate over time are due to increases in UC eligible costs paired with decreases in reimbursement amounts over time (Figure III.1(b)). The reduction in average reimbursement rate was primarily driven by large urban hospitals, which have the largest eligible UC costs, but tend to have lower reimbursement rates. Appendix C provides additional information on average reimbursement rates across different hospital types.

Trend in Average Hospital Reimbursed UC Costs

Figure III.2 displays the average reimbursement rate for all hospitals in the sample. The average reimbursement rate per hospital decreased from approximately 70% in 2010 to approximately 47% in 2017. This measure better reflected how hospitals were reimbursed relative to their own eligible UC costs as compared to the previous overall measure. However, since the measure is an average of each hospital's reimbursement rate, the measure placed more weight on small and medium-sized hospitals, which represent a large number of hospitals in the sample, and which generally have higher reimbursement rates than large hospitals. In summary, relative to the overall reimbursement rate, the average hospital reimbursement rate did not decrease as dramatically because many small hospital reimbursement rates did not decrease as much as those of the large hospitals.

The change in the rate of UC costs reimbursed was confirmed statistically by both a Wilcoxon signed-rank test comparing 2010 and 2017 rates and regression results. In addition, substantial heterogeneities emerged in the subgroup analyses of hospitals, with larger and more urban hospitals experiencing a sharp decline in the reimbursement rate of UC costs. Detailed results of the statistical analysis and trend in the average reimbursement rate for all subsamples can be found in Appendix C.

Figure III.2 Trends in Average Reimbursed UC Costs per Hospital.



Note: N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2010 were reported to HHSC in FFY2012 or DY1. DY = Demonstration Year; FFY = Federal Fiscal Year; UC = Uncompensated Care.

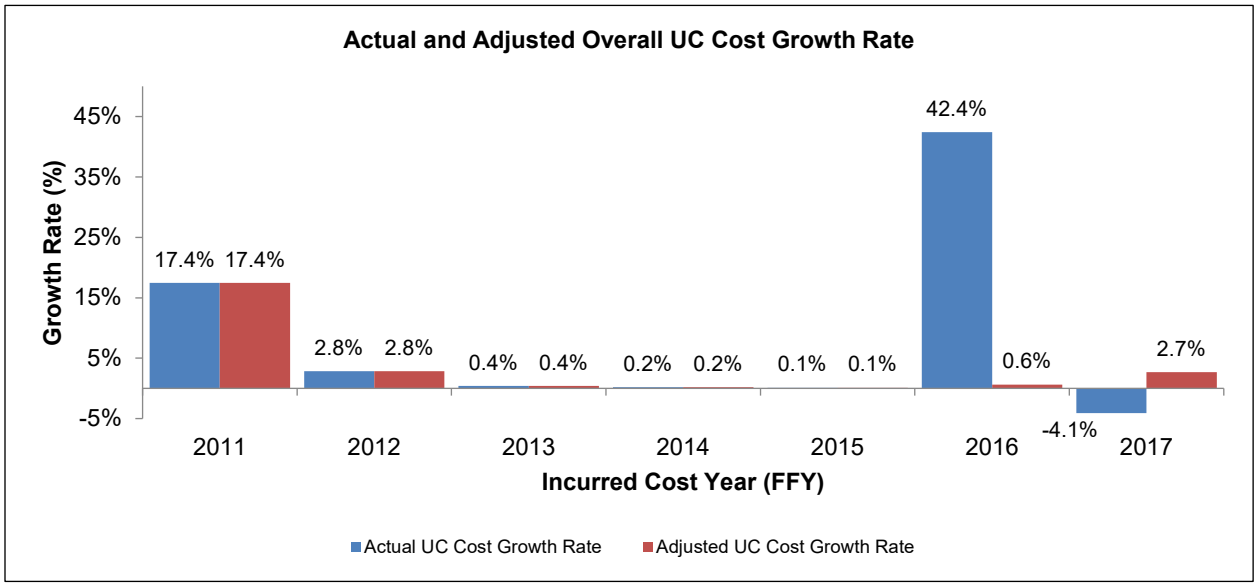
Hypothesis 2.2 UC Cost Growth Rate

Actual and Adjusted Overall UC Cost Growth Trend

Figure III.3 displays both the actual (in blue) and adjusted (in red) overall growth rate in UC costs in the sample using incurred costs between FFY2010 and FFY2017 (costs reimbursed between DY1 and DY8). The 8 years of data led to seven growth rates because the first year does not have a growth rate. The overall UC cost growth rate for the sample provided a state perspective.

The actual UC cost growth rate was relatively constant across many years, though ranging from a low of –4% in 2017 to a high of 42% in 2016 due to the change in how UC costs were defined in the last two years. Overall, the average actual UC cost growth rate was 8% for all years. Growth rates were high in 2011 and plateaued in 2015, after which the change in eligible UC costs methodology led to a jump in growth rate to 42%. The adjusted UC cost growth rate was about 4% per year and was highest in 2011 at 17%. Growth rates for the following years were below 1% until 2017, when the growth rate increased to about 3%. Generally, UC growth rates were relatively small and flat throughout the Demonstration.

Figure III.3 Actual and Adjusted Overall UC Cost Growth Rate.



Note: N = 290 hospitals. The incurred cost year FFY 2010 is omitted from Figure III.3 as UC costs prior to this year are not available so a growth rate cannot be calculated. The x-axis displays the year the hospitals incurred the UC costs reported to the state. For example, 2011 reflects the growth rate from 2010 (FFY2012 or DY1) to 2011. DY = Demonstration Year; FFY = Federal Fiscal Year; UC = Uncompensated Care.

Actual and Adjusted Average Hospital-Level UC Cost Growth Trend

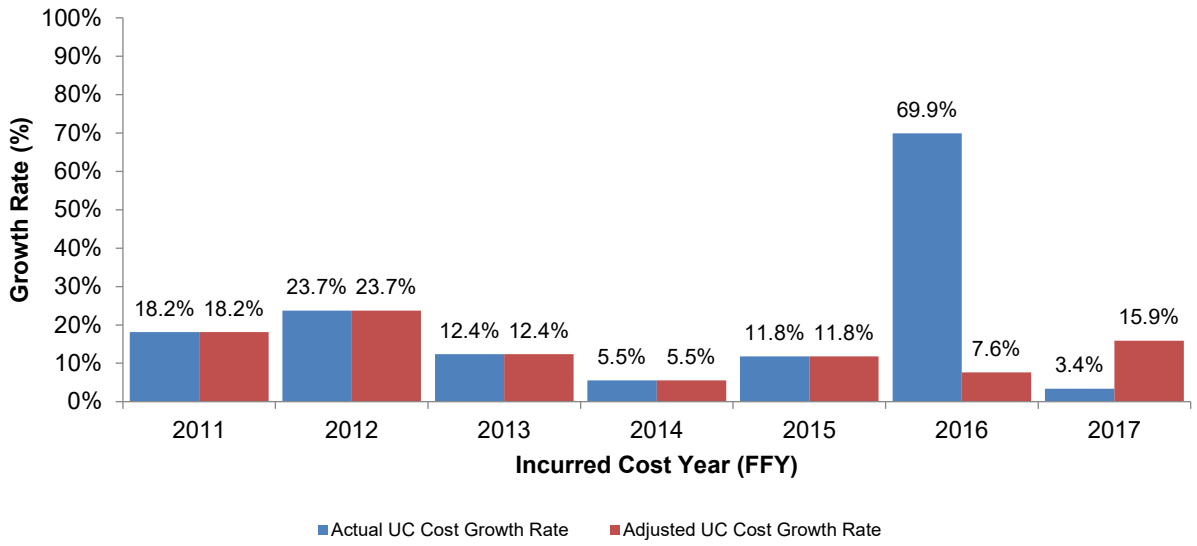
Figure III.4 displays both the actual (in blue) and adjusted (in red) average hospital-level UC cost growth rate between FFY2011 and FFY2017. This measure better reflected the growth rate that hospitals experienced compared to the overall measure discussed in the previous section. Hospital-level UC cost growth rates were higher, with more variations, compared to the growth rates across the entire hospital sample. The higher growth rates emerged relative to Figure III.3 because many small and medium-sized hospitals seemed to experience larger growth in UC costs over time compared to larger hospitals. These smaller hospitals represent a considerable

number of hospitals in the sample and thus impacted the hospital level analysis more than the overall level analysis in the previous section, which tended to be dominated by hospitals with larger UC costs. See Appendix C for more details on the differences of UC cost growth trend by subgroups.

The actual unadjusted average growth rate per hospital was 21% and was above 10% in 5 out of the 7 years. The FFY2016 (DY7) growth rate of 70% was a clear outlier and emerged due to the change in how eligible UC costs were defined following the CHAT lawsuit.

After adjusting for the change in definition to be more comparable, the average adjusted growth rate for all years was 14%, ranging from a low of 6% in 2014 to a high of 24% in 2012. The adjusted growth rates were higher in the first 2 years (FFY2011 and FFY2012), then seem to drop somewhat in the later years.

Figure III.4 Actual and Adjusted Average UC Cost Growth Rate per Hospital.



Note: N = 290 hospitals. The incurred cost year FFY 2010 is omitted from Figure III.4 as UC costs prior to this year are not available so a growth rate cannot be calculated. The x-axis displays the year the hospitals incurred the UC costs reported to the state. For example, 2011 reflects the growth rate from 2010 (FFY2012 or DY1) to 2011. DY = Demonstration Year; FFY = Federal Fiscal Year; UC = Uncompensated Care.

Statistically, there was little evidence of change in the adjusted UC cost growth rate over time. The full sample regression analysis of the hospital data suggested that the adjusted UC cost growth rate decreased by 2.1 percentage points per year on average. However, the effect was not statistically significant. Similarly, most subgroup effects also provided little statistical evidence of a decreasing trend in UC cost growth. The only consistent evidence across different regression specifications emerged among small hospitals and state hospitals when considering a p-value of less than 0.10. Specifically, the UC cost growth rate for small hospitals decreased between 1.7 and 3.6 percentage points per year. State hospitals had statistically significant large results that suggested that the UC cost growth rate decreased by 12 to 23 percentage points per year. Rider 38 hospitals experienced a decrease in the UC cost growth rate between 1.7 and 3.3 percentage points each year, though the effect was almost statistically significant ($p = 0.15$) in the robust regression results. See Appendix C for full details of the statistical analysis and subgroup analysis.

LIMITATIONS

Several challenges remain for evaluation of the UC program. First, there was a 2-year data lag between the hospitals' UC cost and reimbursement for UC. The lag occurred because hospitals needed to adjudicate claims with and without payments, and states and federal agencies needed to validate UC costs. Providers submitted UC requests annually, but during the first waiver evaluation of the UC program, only 1 year of UC cost data incurred during the Demonstration was available for the final evaluation report (Texas Department of State Health Services [DSHS], 2021). The current evaluation aims to continue the previous analysis by extending the UC costs analysis into additional years of UC costs reports. This means that the current UC cost analysis will have data from DSH/UC Application for DY1 to DY8, but only six UC costs reports (DY3–DY8) will provide insights into the trend in UC costs during the Demonstration period because UC cost data in DY1 and DY2 cover cost incurred before the Demonstration started.

Second, HHSC produces biennial reports on UC costs in the state, and the impact of healthcare reform efforts on funding streams that reimburse UC costs. Because this evaluation relies on a sample of 290 hospitals that continuously submit UC costs, rather than the full population of providers participating in the UC program, UC-related costs and reimbursements presented in this Interim Report may not align with biennial reporting. As a result, direct comparisons between the results in this report and other ongoing UC reporting should be avoided.

Third, changes in the definition of eligible UC costs as a result of the CHAT lawsuit complicated the UC growth trend analysis for DY7 and DY8. Descriptive analyses included an adjusted UC growth rate that translates UC costs in DY7 and DY8 to the definition of UC costs used in earlier years and regression analysis was done only with the adjusted UC cost measure, but the adjustments were only estimates for DY7 and DY8 and may not fully account for all factors. Additionally, changes to the eligible UC costs in DY9, which only allowed for submission of charity care (and eliminated submission of UC costs for the Medicaid shortfall), will not allow a comparison of future Demonstration years to earlier Demonstration years. The elimination of the Medicaid shortfall as a source eligible for reimbursement may especially financially weaken hospitals that have historically experienced shortfalls that predominately originated from care for Medicaid-covered individuals. How these hospitals will fare remains to be seen.

Fourth, UC participating providers may participate in other initiatives that have been introduced over the course of the Demonstration. These initiatives may influence UC costs incurred over time. The evaluators attempted to adjust regression models to account for competing factors, such as operational changes within the hospital, but the influence of competing factors as part of the Demonstration on UC costs could not be fully removed.

Finally, Texas experienced significant population growth during DY1 and DY8 that varied across region. Our empirical analysis includes a general time trend that accounts for increases in population growth that may impact UC costs through higher care needs at local hospitals. However, not all counties may have experienced the same growth in population and unequal population growth may therefore lead to differential growth in UC costs by hospitals over time. The current analysis does not account for differential population growth and the resulting differential UC cost growth by region.

CONCLUSIONS AND IMPLICATIONS

Evaluation Question 2 asks the following: Did the Demonstration impact unreimbursed costs associated with the provision of care to the MLIU population for UC providers? There are two hypotheses.

H 2.1 states that the percentage of UC costs reimbursed through UC payments for each type of UC (overall, Medicaid shortfall, and uninsured shortfall) will decrease throughout DY1–DY8 of the Demonstration. H 2.2 states that the UC cost growth rate will slow over time for hospitals participating in the Demonstration.

This interim evaluation of the ongoing Demonstration shows that on average, hospitals experienced a decrease in the percentage of UC eligible costs reimbursed since the implementation of the Demonstration. These preliminary findings are supported by descriptive trend analyses and regression modeling provide support for hypothesis 2.1. However, substantial heterogeneities emerged in the subgroup analyses of hospitals. Specifically, the share of reimbursed UC costs remained flat for small, rural, suburban, and small public Rider 38 hospitals, while larger and more urban hospitals saw a sharp decline in the percentage of eligible UC costs reimbursed.

There is little evidence of change in the growth rate over time. In comparison, an HHSC report from 2013 showed that growth rates in UC costs using AHA/DSHS/THA Annual Survey data were about 8% per year from 2002 to 2011 before the Demonstration (DSHS, 2013). Although the method and data source used for UC costs differed from those used in this report, this may suggest that the implementation of the Demonstration could have had an impact in lowering growth rates, which were 4% during the Demonstration. However, the current method specified in Appendix G. Evaluation Design Plan Revision v5.1 does not include a pre and post analysis. Thus, further analyses and discussions are needed to assess the feasibility and necessity of a pre and post analysis. At the same time, substantial heterogeneities emerged in the subgroup analyses of hospitals. Small, state, and Rider 38 hospitals experienced a decreasing trend in the UC growth rate, while there was little change in the UC cost growth rate trend for other hospitals. This is important because rural areas are more likely to have a larger share of uninsured individuals, for whom these hospitals may be their only source of care (Health Policy Institute, 2021).

The current findings provided some room for policy implications. The UC costs reimbursement methodology was designed to support rural hospitals that have traditionally been more likely to limit or cease operations due to unsustainable financial losses. As a result, small and rural hospitals were able to reduce UC cost growth and received the highest reimbursement rates through the UC payment pool. This should help rural and small hospitals remain open and provide needed access in areas that sometimes are classified as health care deserts, meaning that residents there have little access to care.

The findings also suggested that large and urban hospitals, which experienced the most uncompensated care, are the least likely to receive compensation for the UC care provided. The state should continue to monitor large and urban hospitals to ensure that reimbursement rates established in the UC payment pool do not unintentionally result in unsustainable financial losses for these hospitals. Continuing to reduce reimbursements for UC costs for large hospitals also implies that these hospitals likely will try to minimize UC costs to the extent possible legally. Challenges remain, and many questions are unanswered, with further analysis needed in the Summative Report for more conclusive results.

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IV. MEDICAID MANAGED CARE

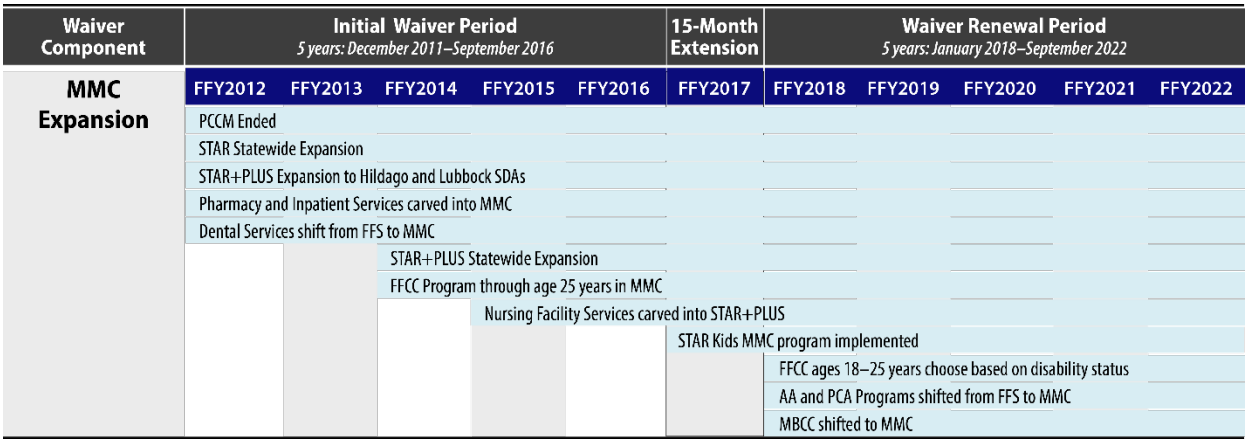
INTRODUCTION

General Background Information

Medicaid and the Children's Health Insurance Plan (CHIP) are important sources of health care coverage in Texas. More than 4 million Texans, or 15% of the population, are enrolled in Medicaid and CHIP, and enrollment grew by 12% from 2010 to 2019 (Texas Health and Human Services Commission [HHSC], 2020b). Texans receive services under Medicaid and CHIP through one of two health care delivery models: fee for service (FFS) and Medicaid managed care (MMC) (HHSC, 2020b).

MMC was introduced in 1993, when Texas began reforming the Medicaid payment structure through the STAR managed care program in select urban areas (HHSC, 2017). MMC has grown substantially over the past three decades as Texas transitioned additional populations and services from FFS to MMC. Figure IV.1 displays key MMC expansions across the initial Demonstration period and Demonstration Renewal Period. As of December 2020, 94 percent of Medicaid clients in Texas were enrolled in MMC (HHSC, 2020b). MMC provides services through contracts with managed care organizations (MCOs) based on a pre-established, per member, per month payment (Centers for Medicare & Medicaid Services [CMS], n.d.). It seeks to provide care through a single provider or organization with a goal of maintaining or improving the quality of care without the higher costs of the traditional FFS model (HHSC, 2020b).

Figure IV.1 Medicaid Managed Care Timeline.



Note: CMS-Approved Evaluation Design Plan. Includes only MMC expansion activities evaluated during the Initial Waiver Period (DY1-5) or current Demonstration Renewal Period (DY7-11). AA = Adoption Assistance; FFCC = Former Foster Care Children; FFS = Fee-For-Service; FFY = Federal Fiscal Year, October 1-September 30; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid Managed Care; PCA = Permanency Care Assistance; PCCM = Primary Care Case Management; SDA = Service Delivery Area; STAR = MMC program primarily serving children and pregnant women; STAR+PLUS = MMC program serving aged and disabled clients; STAR Kids = MMC program serving disabled individuals 20 years and younger.

This evaluation focused on services or populations that most recently incorporated into MMC, and continued evaluation of dental and nursing facility (NF) services, as specified in Appendix G. Evaluation Design Plan Revision v5.1. Dental and NF services were included in a previous evaluation, which examined the expansion of MMC during FFY 2012 to 2015. However, the

data at that time were not sufficient to fully evaluate the impact of transitioning these services into MMC. All other populations included in Appendix G. Evaluation Design Plan Revision v5.1 reflect services or populations that transitioned to MMC more recently. The exact timelines for populations' transition to MMC are given in the data section below. More details on the populations can be found in the CMS-Approved Evaluation Design Plan.

Evaluation Question and Hypotheses

As noted in Appendix G. Evaluation Design, the MMC evaluation focuses on answering one overarching question and five specific hypotheses (Table IV.1).

Table IV.1 MMC Evaluation Question and Hypotheses.

MMC Evaluation Question: Did the expansion of the MMC health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?
Hypothesis 3.1: Access to care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.
Hypothesis 3.2: Care coordination will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.
Hypothesis 3.3: Quality of care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.
Hypothesis 3.4: Health and health care outcomes will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.
Hypothesis 3.5: Client satisfaction will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Note: FFS = fee-for-service; MMC = Medicaid managed care.

METHODOLOGY

MMC Transition Periods

Populations transitioned to MMC at different times, so pre and post periods varied by population. The pre-period, or baseline period, was defined as the 24 months prior to the population's carve in to MMC or change in MMC program. The pre-period included clients who would have been eligible for MMC had it been available. The post period included clients in each population enrolled in MMC. For the Interim Report, the post period included data up to August 2019 for all populations except the CMDS population, which only had data available up to February 2018. Specific pre- and post-MMC transition periods, and the study period for each MMC population used in the Interim Report, are listed in Table IV.2.

Table IV.2 Pre- and Post-MMC Transition Periods Used in the Interim Report.

Population	Pre Period	Post Period	Study Period
Children's Medicaid Dental Services (CMDS)	3/1/2010 to 2/29/2012	3/1/2012 to 2/28/2018	Mar - Feb
Nursing Facility (NF)	3/1/2013 to 2/28/2015	3/1/2015 to 2/28/2019	Mar - Feb
Former Foster Care Children (FFCC)	9/1/2015 to 8/31/2017	9/1/2017 to 8/31/2019	Sep - Aug
Medicaid for Breast and Cervical Cancer (MBCC)	9/1/2015 to 8/31/2017	9/1/2017 to 8/31/2019	Sep - Aug
Adoption Assistance (AA)	9/1/2015 to 8/31/2017	9/1/2017 to 8/31/2019	Sep - Aug
Permanency Care Assistance (PCA)	9/1/2015 to 8/31/2017	9/1/2017 to 8/31/2019	Sep - Aug

Data

As specified in Appendix G. Evaluation Design Plan Revision v5.1, both administrative data and survey data were used to evaluate MMC. Administrative data were used to facilitate interrupted time series (ITS) analysis to evaluate 6 different populations carved into MMC over time (CMDS, NF, FFCC, AA, PCA, and MBCC). Thus, populations before and after the MMC carve-in are compared using claims, encounters, enrollment, and pharmacy data. Dental-related services are managed differently than other MMC services, so researchers also relied on dental-specific claims, encounters, and enrollment data.

In addition to administrative data, survey data from the Consumer Assessment of Healthcare Providers and Systems (CAHPS) Health Plan Survey and the Nursing Facility Quality Review (NFQR) survey were examined for client satisfaction and health and health care outcomes (depression, behavior modification with psychotropic medications). No pre-data were available for the CAHPS survey because 2019 and 2020 were the first years the survey was conducted with children and adults, respectively. Pre-data for the NFQR survey include 2009, 2010, and 2013. The only NFQR post-data currently available were from 2015.

Measures

Table IV.3 summarizes the measurement period and approach for each of the 19 measures used to evaluate the MMC transition. The measurement period was determined by the data source and measure specification. For measures that use the survey data, the measurement period was dictated by the data collection schedule. For measures that use administrative data, the measurement period was monthly, when possible, to support data points necessary for ITS analysis. However, certain measure definitions using claims data required longer time periods (i.e., quarterly or annual).

Details of each of the 19 measures are provided in Appendix G. Evaluation Design Plan Revision v5.1. There was one change to Measure 3.1.4: CMS Screening for Depression and Follow-Up Plan because the follow-up plan CPT II codes were rarely used in claims and encounter data, making it difficult to capture the follow-up plan. Thus, researchers modified the numerator to capture newly diagnosed depression among clients with an outpatient visit for behavioral health. See Appendix D: MMC Technical Details for additional information.

Table IV.3 Measurement Periods and Approach.

Measure	Population	Measurement Period	Approach
3.1.1: CMS percentage of eligible who received preventive dental services[1]	CMDS	90 days (3 months)	ITS
3.1.2: Adult access to preventive/ambulatory health services	NF, FFCC, MBCC	12 months	Descriptive
3.1.3: Children and adolescent access to primary care services	AA, PCA	12 months	Descriptive
3.1.4: Newly diagnosed for depression[2]	NF, FFCC, MBCC, AA, PCA	12 months	Descriptive
3.1.5: Utilization of pharmacy benefits	NF, FFCC, MBCC, AA, PCA	12 months	Descriptive
3.2.1: Rate of service coordination utilization[3]	NF, FFCC, MBCC	1 month	ITS
3.2.2: Rate of clients with SMI/SED receiving targeted case management	FFCC, AA, PCA	1 month	ITS
3.3.1: Antidepressant medication management	NF, FFCC	24 months	Descriptive
3.3.2: Use of first-line psychosocial care for children & adolescents on antipsychotics	FFCC, AA, PCA	17 months	Descriptive
3.3.3: Percent of MBCC clients receiving recommended treatment	MBCC	12 months	Descriptive
3.3.4: Behavior modification	NF	NFQR	Descriptive
3.4.1: CMS children who have dental decay or cavities	CMDS	1 month	ITS
3.4.2: Pressure ulcers	NF	1 month	ITS
3.4.3: Symptoms of depression	NF	NFQR	Descriptive
3.4.4: Prevention/pediatric quality overall composite	NF, FFCC, MBCC, AA, PCA	1 month	ITS
3.4.5: Rate of potentially preventable emergency department use[4]	NF, FFCC, MBCC, AA, PCA	1 month	ITS
3.4.6: H2-510: Rate of ED visits for BH and SA	NF, FFCC, MBCC, AA, PCA	1 month	ITS
3.5.1: Client satisfaction—NF	NF	NFQR[5]	Descriptive
3.5.2: Client satisfaction—CAHPS	MBCC, AA, PCA	CAHPS[6]	Descriptive

Note: [1] The results in this report for Measure 3.1.1 may not align with ongoing state reporting due to differences in the measurement period used for the current evaluation. [2] Researchers modified Measure 3.1.4, so this measure does not match Appendix G: Evaluation Design. [3] Service coordination pertains to procedures codes for service coordination (i.e., T1017). [4] Measure 3.4.5 is based on the New York University Emergency Department algorithm (Johnston et al. (2017) – please refer to the measure specification for Hypothesis 5.1 for a complete description in VI. Health Care System for the MLIU Population. [5] NFQR survey data is only available for 2009,2010, 2013, and 2015. [6] CAHPS survey data is only available for 2019 and 2020. AA = Adoption Assistance; BH = Behavioral Health; CAHPS = Consumer Assessment of Healthcare Providers and Systems; CMDS = Children's Medicaid Dental Services; CMS = Centers for Medicare & Medicaid Services; ED = Emergency Department; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; NF = Nursing Facility; NFQR = Nursing Facility Quality Review; PCA = Permanency Care Assistance; SA = Substance Abuse; SED = Serious Emotional Disturbance; SMI = Serious Mental Illness.

Analytic Methods

When possible (e.g., when monthly and quarterly measures were available), a pre/post study design was used to evaluate the MMC component of the Demonstration Renewal Period, using the ITS analysis as specified in Appendix G. Evaluation Design Plan Revision v5.1. This is not a longitudinal study, because it evaluated whoever met the eligibility criteria at different time points, rather than following the same people over time. Researchers investigated the use of rolling monthly measurements for measures with insufficient time points to support ITS (i.e., annual measures), but the standard ITS method did not allow for a proper statistical comparison for the pre and post trends. See Appendix D.1. Analyzing Annual Measures for more details on the issues. Researchers will continue to investigate different methods that may allow for a more rigorous evaluation of these annual measures for the Summative Report.

Thus, in the Interim Report, for annual measures that had insufficient time points to support ITS, descriptive statistics were used. Descriptive analyses consisted of univariate and bivariate computation of percentages or rates. To assess whether a statistical difference exists between pre and post periods with the descriptive analyses, a Fisher's Exact Test (FET) using a two-tailed test was employed ($\alpha = 0.05$).

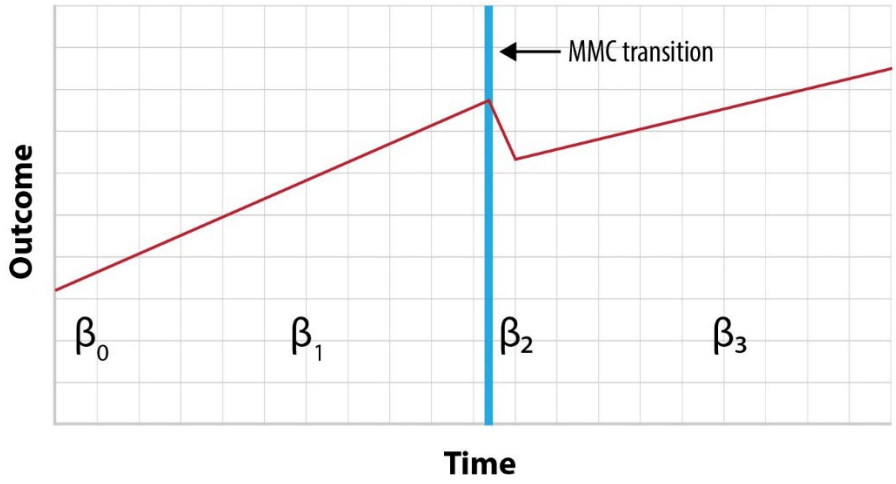
Specifically, the latest pre-period was compared to the latest post-period measure. In instances where pre-period measures did not exist, the earliest post-period measure was compared to the latest post-period measure to track trends over time. All descriptive analysis results are reported in appropriate bar or line graphs with FET result given in the notes below the graph. A sensitivity analysis examining this independent-like approach as compared to a paired-like analysis for a subset of measures is presented in Appendix D. Medicaid Managed Care Technical Details.

Below is a brief overview of the ITS analysis details. More details can be found in Appendix G. Evaluation Design Plan Revision v5.1. As conceptually presented by Wagner and colleagues (2002), the ITS model used in this Interim Report is specified below, and a plot of the ITS model is shown in Figure IV.2.

$$Y_t = \beta_0 + \beta_1 * \text{time} + \beta_2 * \text{MMC M} + \beta_3 * \text{postslope} + \varepsilon_t$$

- β_0 = baseline level of outcome at beginning of pre-MMC period.
- β_1 = trend pre-MMC transition (i.e., slope).
- β_2 = immediate impact of MMC transition (i.e., level).
- β_3 = trend post-MMC transition (i.e., slope).

Figure IV.2 Example Interrupted Time Series Model.



Note: MMC = Medicaid managed care.

The main section of the Interim Report discusses only the key results. Full ITS results in both figure and tabular form for all ITS models constructed can be found in the Appendix D: MMC Technical Details. ITS result tables include estimated rates at the beginning (baseline) and end (endline) of the study period, as well as the values for the pre-MMC trend (i.e., slope) and post-MMC trend(s). The post-MMC trend was the trend in the measure in the post-MMC period, not the difference between the pre-MMC and post-MMC trends. When the post-MMC trend was demarcated as statistically significant, it means that the post-MMC trend value differed significantly from the pre-MMC trend value. In addition, ITS result tables include a change in level immediately following the transition to MMC (level change post-MMC).

Researchers used the ITS models to identify two types of changes pre- versus post-MMC transition, as described above: a change in slope or trend and a change in intercept or level. A slope can change direction (i.e., positive versus negative) and intensity (i.e., steepness). A change in intercept or level refers to a change in the starting point for the trend pre- versus post-MMC transition. The change in intercept or level represents the immediate impact of the MMC transition. Statistically significant changes were indicated as * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ throughout the key findings section.

KEY FINDINGS

This section presents selected key findings for observed changes relative to the transition from FFS to MMC, with abbreviated figures. All full figures can be found in Appendix D, along with complete results, including figures not included in this section.

Sample

Table IV.4 provides the available sample size in member months for the analyses by study year and MMC population. As mentioned above, depending on when the population transitioned to MMC, the annual study period was either March to February or September to August. The largest population each year was CMDS, followed by AA.

Table IV.4 Sample Sizes: Number of Member Months by Year, Period, and Population.

MMC Pop.	Period	Population Study Year (PSY)								
		PSY2010	PSY2011	PSY2012	PSY2013	PSY2014	PSY2015	PSY2016	PSY2017	PSY2018
CMDS	Mar–Feb	31,764,131	32,636,760	32,441,709	33,269,771	36,786,939	36,855,317	36,865,908	36,335,337	Not Available
NF	Mar–Feb	Not Applicable			76,610	74,524	70,204	70,848	73,188	78,473
FFCC	Sep–Aug					56,499	56,572	56,328	55,849	56,499
MBCC	Sep–Aug					47,486	49,340	52,181	53,842	47,486
AA	Sep–Aug					564,917	588,115	606,985	633,103	564,917
PCA	Sep–Aug					31,430	38,628	46,926	54,189	31,430

Note: AA = Adoption Assistance; CMDS = Children's Medicaid Dental Services; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance; Pop = Population.

Hypothesis 3.1: Access to Care

Hypothesis 3.1 stated that access to care will improve among clients whose Medicaid benefits shift from FFS to an MMC health care delivery model. There were five key takeaways from the Hypothesis 3.1 measures.

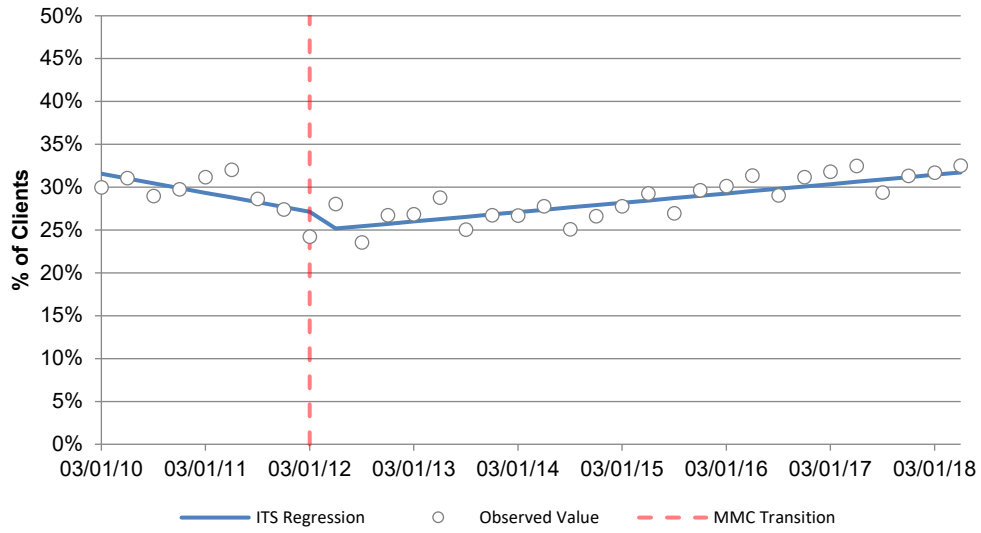
First, the percent of CMDS clients who received at least one preventive dental visit experienced a desirable change in trend after the MMC transition (Measure 3.1.1). Specifically, the trend before the transition to MMC was decreasing at -0.55 percent per quarter but changed direction to an increasing trend at 0.27 percent per quarter. However, the level significantly decreased initially by 1.95 percentage points at the transition to MMC. This level change was statistically significant but was not in the desired direction. The desired increasing change in trend counterbalanced the immediate level drop at the MMC transition point so that overall, the impact was supportive of Hypothesis 3.1, as shown in Table IV.5.

Table IV.5 Preventive Dental Services (Measure 3.1.1).

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.1.1: CMS Percentage of eligible who received preventive dental services (Quarterly Rate)[2]						
CMDS (N = 2,808,181)	Mar 2010 –Jun 2018	31.55	-0.55	-1.95*	0.27***	31.99

Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in June 2018.
*[2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. CMDS = Children's Medicaid Dental Services; CMS = Centers for Medicare & Medicaid Services; MMC = Medicaid managed care.*

Figure IV.3 Preventive Dental Services (Measure 3.1.1).

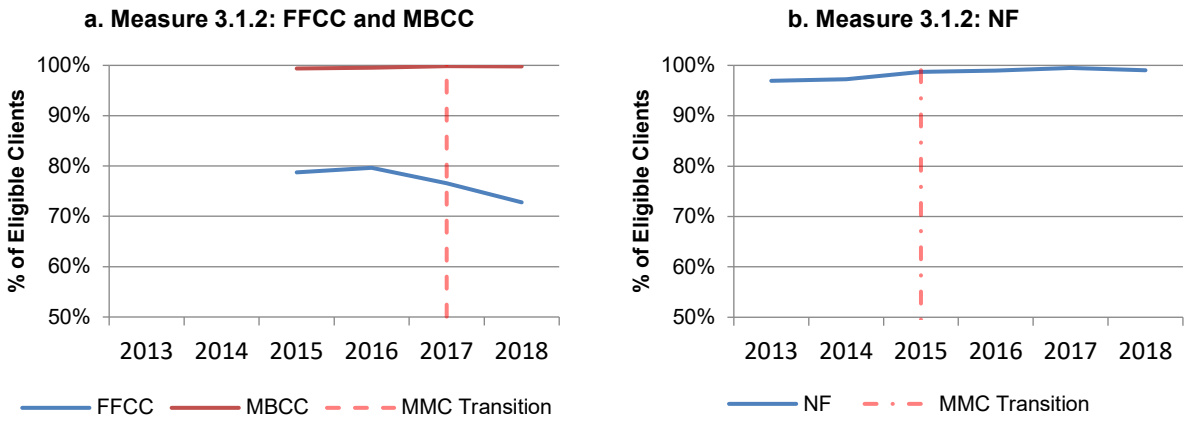


Note: ITS = Interrupted Time Series; MMC = Medicaid managed care.

Second, adult access to preventive or ambulatory health services provided minimal support for Hypothesis 3.1 (Measure 3.1.2.). Desired changes were increases in percentages. FFCC clients experienced a statistically significant change, but not in the desired direction, and MBCC clients experienced no change in this measure due to extremely high rates of ambulatory or preventive care visits prior to the MMC transition (Figure IV.4(a)).

For FFCC clients, the percentage of clients who had at least one ambulatory or preventive care visit in the last year decreased from 79.6% pre-MMC transition to 72.7% post-MMC transition. NF clients experienced a statistically significant increase for the percent of clients who had at least one ambulatory or preventive care visit in the last year, from 97.2% to 99.0%, pre- versus post-transition, respectively (Figure IV.4(b)). This was the only finding in support of Hypothesis 3.1 for this measure.

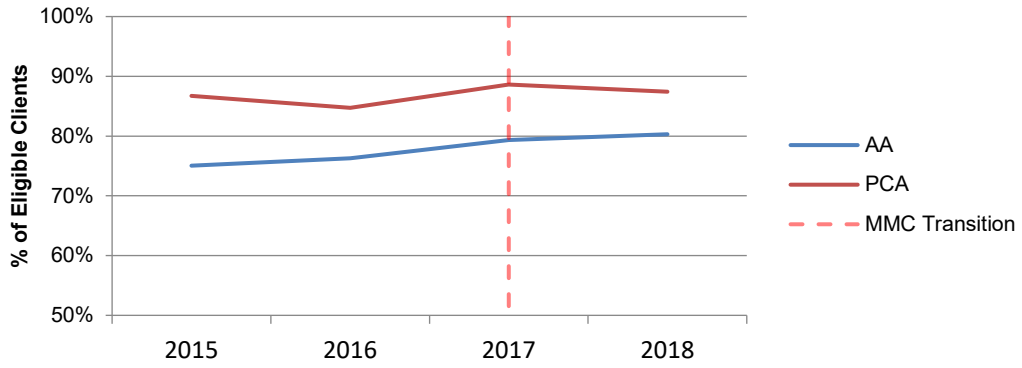
Figure IV.4 Adult Access to Preventive/Ambulatory Health Services (Measures 3.1.2).



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***FFCC*** *** (pre-transition 79.6%, post-transition 72.7%, FET; N = 2,491).* ***MBCC*** *(pre-transition 99.5%, post-transition 99.7%, FET; N = 3,188).* ***NF*** *** (pre-transition 97.2%, post-transition 99.0%, FET; N = 3,517). See Appendix D. Medicaid Managed Care Technical Details for paired sample test results. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2018. FET = Fisher's Exact Test; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.*

Third, for children and adolescent access to primary care, there was consistent support for Hypothesis 3.1 (Measure 3.1.3). Both AA and PCA clients experienced statistically significant increases for the percentage of clients who saw a primary care physician in the last year, which was in the desired direction (Figure IV.5). AA clients increased from 76.3% pre-MMC transition to 80.3% post MMC transition. Similarly, PCA clients increased from 84.7% to 87.4% pre and post the MMC transition, respectively.

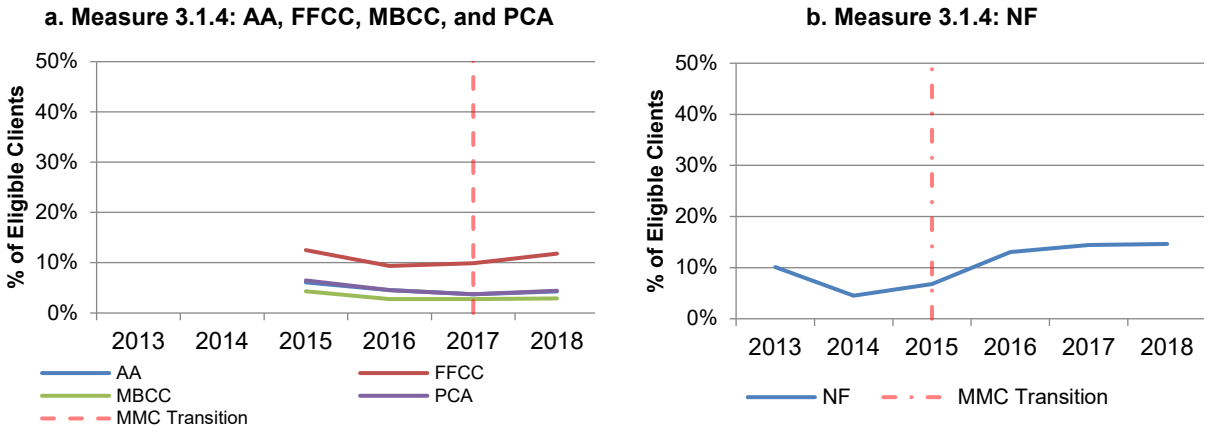
Figure IV.5 Children and Adolescent Access to Primary Care Services (Measures 3.1.3).



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***AA*** *** (pre-transition 76.3%, post-transition 80.3%, FET; N = 47,730).* ***PCA*** ** *(pre-transition 84.7%, post-transition 87.4%, FET; N = 4,024). See Appendix D. Medicaid Managed Care Technical Details for paired sample test results. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2018. AA = Adoption Assistance; FET = Fisher's Exact Test; MMC = Medicaid managed care; PCA = Permanency Care Assistance.*

Fourth, the findings for newly diagnosed depression clients were mixed in their support for Hypothesis 3.1 (Measure 3.1.4). The desired direction was an increase in the percentage of clients with a behavioral health visit who were newly diagnosed with depression or bipolar disorder. FFCC and NF clients experienced statistically significant increases in new diagnoses for depression following the MMC expansion, but MBCC, AA, and PCA clients experienced little variation in percentages over time (Figure IV.6). FFCC clients increased from 9.3% to 11.8% while the increase for NF clients more than doubled, from 4.5% to 11.6%, pre- versus post-MMC transition, respectively.

Figure IV.6 Newly Diagnosed with Depression (Measures 3.1.4).

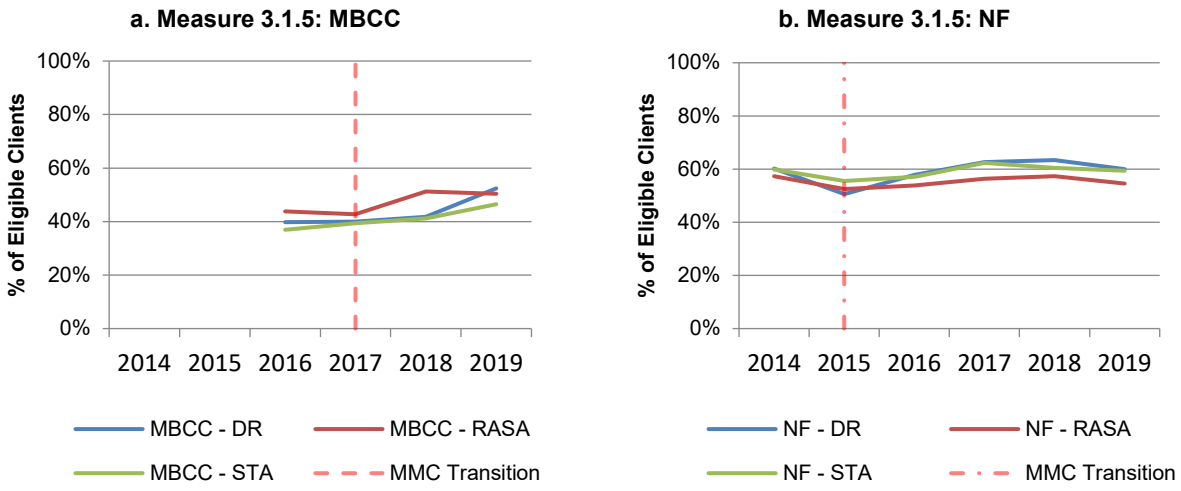


*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***AA*** *(pre-transition 4.5%, post-transition 4.2%, FET; N = 15,888).* ***FFCC*** ** *(pre-transition 9.3%, post-transition 11.8%, FET; N = 2,209).* ***MBCC*** *(pre-transition 2.7%, post-transition 2.9%, FET; N = 4,946).* ***NF*** *** *(pre-transition 4.5%, post-transition 14.6%, FET; N = 4,934).* ***PCA*** *(pre-transition 4.5%, post-transition 4.4%. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2019 for NF and 2018 for all other client types. AA = Adoption Assistance; FET = Fisher's Exact Test; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.*

Fifth, the pharmacy benefits and medication adherence measure provided minimal support for Hypothesis 3.1. Researchers examined the use of pharmacy benefits for three therapeutic drug categories: renin angiotensin system antagonists (RASA), diabetes all classes (DR), and statins (STA) (Measure 3.1.5). Support for Hypothesis 3.1 was found only for MBCC clients (Figure IV.7(a)).

There were statistically significant increases in the percentage of MBCC clients who met the 80% threshold for population level measures of adherence for RASA, DR, and STA. Comparing values pre- versus post-MMC transition, percentages increased from 43.8% to 50.3% for RASA, from 39.7% to 52.4% for DR, and from 36.9% to 46.4% for STA. A similar increasing pattern was not observed for NF clients (Figure IV.7(b)). The sample size for FFCC, AA, and PCA clients was not sufficient to produce stable estimates and therefore was excluded from this measure. The medications in the PDC measure are not commonly administered to children.

Figure IV.7 Utilization of Pharmacy Benefits (Measures 3.1.5)



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***MBCC-DR ** (pre-transition 39.7%, post-transition 52.4%, FET; N = 229).*** ***MBCC-RASA ** (pre-transition 43.8%, post-transition 50.3%, FET; N = 576).*** ***MBCC-STA ** (pre-transition 36.9%, post-transition 46.4%, FET; N = 482).*** ***NF-DR** (pre-transition 60.1%, post-transition 59.9%, FET; N = 422).* ***NF-RASA** (pre-transition 57.3%, post-transition 54.5%, FET; N = 2,280).* ***NF-STA** (pre-transition 59.8%, post-transition 59.3%, FET; N = 2,707). See Appendix D. Medicaid Managed Care Technical Details for paired sample test results. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2019. PDC was only calculated for sample sizes greater than 50 to ensure stability in the measure. DR = Diabetes All Classes; FET = Fisher's Exact Test; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; RASA = Renin Angiotensin System Antagonists; STA = Statins.*

Hypothesis 3.2: Care Coordination

Hypothesis 3.2 states that care coordination will improve for Medicaid clients who are moved from an FFS health care delivery model to an MMC health care delivery model. There are two key takeaways from the Hypothesis 3.2 measures.

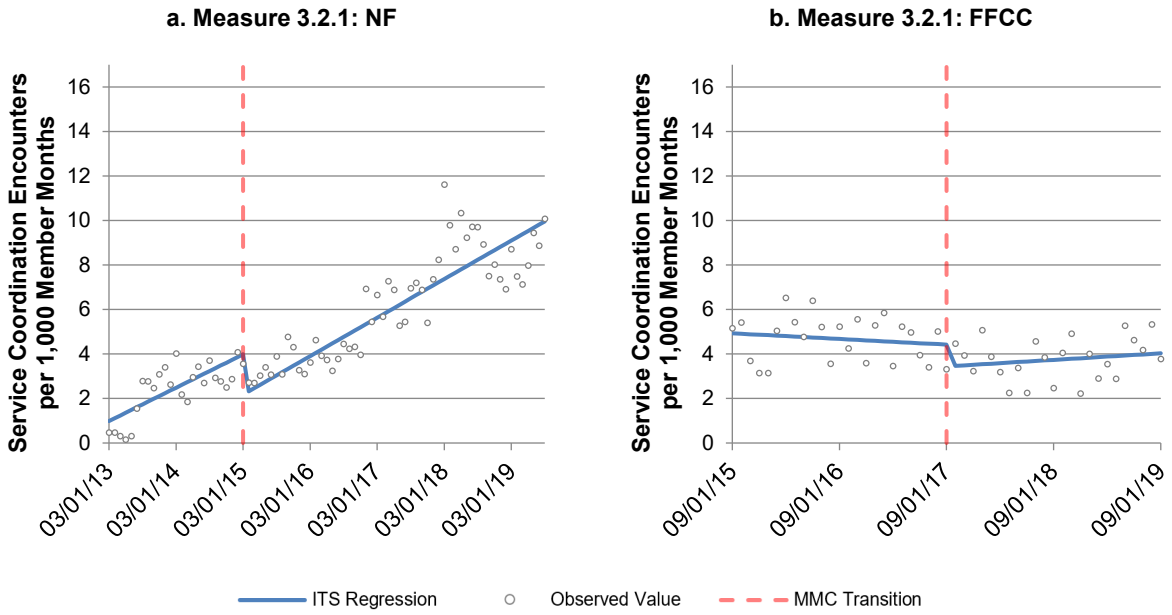
First, findings for service coordination utilization for all three populations were limited in their support of Hypothesis 3.2 (Measure 3.2.1). It is important to note that service coordination used in Measure 3.2.1 is a different concept from "service coordination" in the context of managed care contracts. For Measure 3.2.1, service coordination is the rate of paid and partially paid encounters of procedure codes for service coordination using the T1017 code. For NF clients, the rate of service coordination was increasing in the desired direction at a rate of 0.12 percentage points per month before the transition to MMC. This rate continued to improve after the MMC transition, and at a faster pace of 0.14 percentage points per month, but this increase was not statistically significant. In contrast, FFCC and MBCC clients experienced no change in service coordination rates before or after the MMC transition (Figure IV.8) (Measure 3.2.1).

Table IV.6 Service Coordination Utilization (Measure 3.2.1).

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.2.1: Rate of service coordination utilization (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	4.93	-0.02	-0.95	0.02	4.05
MBCC (N = 4,703)	Sep 2015 – Sep 2019	2.81	-0.01	-0.06	0.02	3.13
NF (N = 6,547)	Mar 2013 – Sep 2019	0.98	0.12	-1.66**	0.14	10.10

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.*

Figure IV.8 Service Coordination Utilization (Measure 3.2.1).



Note: FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MMC = Medicaid managed care; NF = Nursing Facility.

Second, the rate of targeted case management for clients with a serious mental illness or serious emotional disturbance (SMI/SED) had mixed findings regarding Hypothesis 3.2 (Measure 3.2.2). All three client populations—FFCC, AA, and PCA—had statistically significant changes in the trend before and after the MMC transition (Table IV.7). However, only FFCC clients experienced a positive impact, from a decreasing trend of -0.17 percentage points per month before the MMC transition to a stabilizing trend of -0.002 percentage points per month after the MMC transition (Figure IV.9(a)). In contrast, both AA and PCA clients experienced an increasing trend prior to the MMC transition that slowed after the MMC transition. This was not a desired change, but AA and PCA clients also experienced a statistically significant increase of

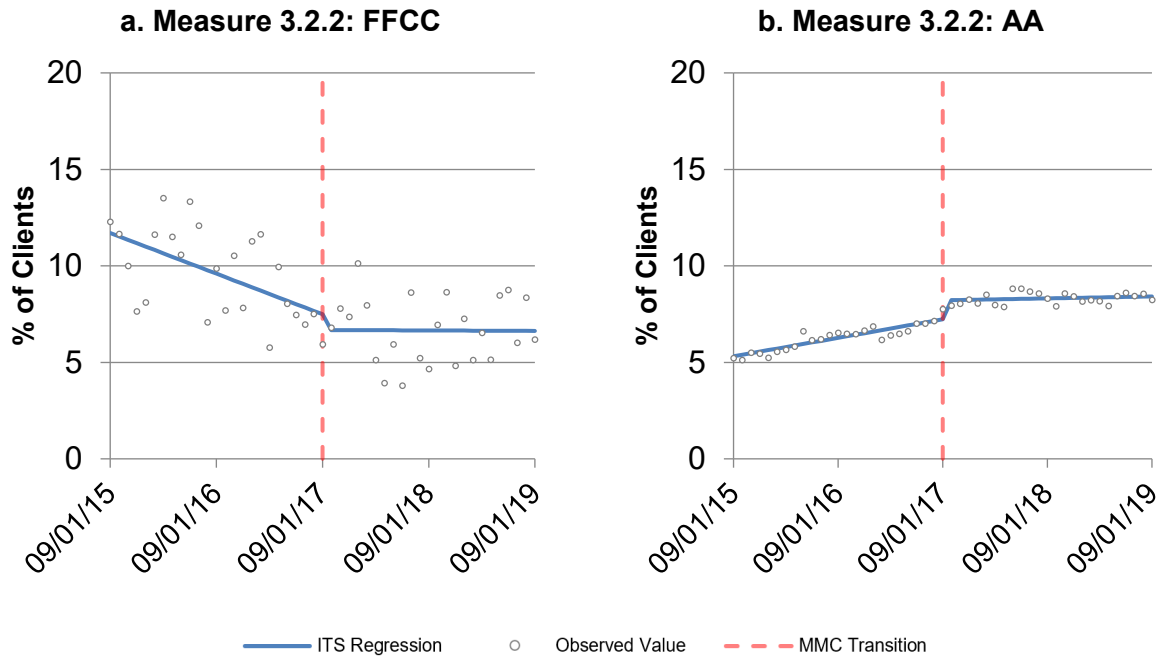
0.99 percent and 1.42 percent, respectively, immediately following the MMC transition, which is in the desired direction (Figure IV.9(b). PCA figure not shown here. See Appendix D).

Table IV.7 Clients with SMI/SED Receiving Targeted Case Management (Measure 3.2.2).

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.2.2: Rate clients with SMI/SED receiving targeted case management (Monthly Rate)[2]						
FFCC (N = 275)	Sep 2015 – Sep 2019	11.70	-0.17	-0.81	-0.002*	6.62
AA (N = 7,891)	Sep 2015 – Sep 2019	5.31	0.07	0.99***	0.008***	8.42
PCA (N = 740)	Sep 2015 – Sep 2019	5.54	0.08	1.42*	-0.02*	8.51

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. AA = Adoption Assistance; FFCC = Former Foster Care Children; MMC = Medicaid managed care; PCA = Permanency Care Assistance; SMI/SED = Severe Mental Illness/Severe Emotional Disturbance.*

Figure IV.9 Clients with SMI/SED Receiving Targeted Case Management (Measure 3.2.2).



Note: AA = Adoption Assistance; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MMC = Medicaid managed care; SMI/SED = Severe Mental Illness/Severe Emotional Disturbance.

Hypothesis 3.3: Quality of Care

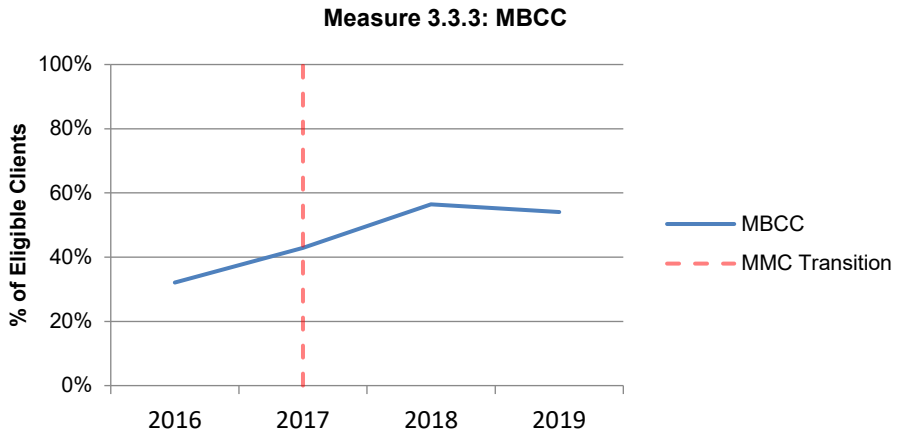
Hypothesis 3.3 stated that quality of care will improve for Medicaid clients who are moved from an FFS health care delivery model to an MMC health care delivery model. There are three key takeaways from the Hypothesis 3.3 measures.

First, the findings for antidepressant medication management were not statistically significant for FFCC or NF clients (Measure 3.3.1). The desired impact was a higher percentage of clients remaining on medication during the acute and continuous treatment phases. However, only limited data points were available for this Interim Report. Therefore, the findings for this measure are inconclusive with respect to Hypothesis 3.3 at this time.

Second, the percentage of children and adolescents with a new prescription for an antipsychotic medication who also had psychosocial care documented as a first-line treatment did not statistically change for AA and PCA clients following the MMC transition (Measure 3.3.2). However, only limited data points were available for this Interim Report. Therefore, the findings for this measure are presently inconclusive with respect to Hypothesis 3.3.

Third, receipt of the recommended treatment (i.e., tamoxifen or aromatase inhibitor) for MBCC patients significantly increased from 32% before the transition to MMC to 54%after the transition to MMC (Measure 3.3.3), a large increase in the desired direction. This finding supports Hypothesis 3.3 (Figure IV.10).

Figure IV.10 MBCC Clients Receiving Recommended Treatment (Measures 3.3.3).



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***MBCC*** *** (pre-transition 32.0%, post-transition 54.0%, FET; N = 819). FET = Fisher's Exact Test. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2019. MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care.*

Hypothesis 3.4: Health and Health Care Outcomes

Hypothesis 3.4 stated that health and health care outcomes will improve for Medicaid clients who are moved from an FFS health care delivery model to an MMC health care delivery model. There are six key takeaways from the Hypothesis 3.4 measures.

First, the percentage of CMDS clients who had tooth decay or cavities during the measurement period was increasing before the transition to MMC and then reversed direction to a desired decreasing trend after the transition to MMC (Measure 3.4.1). The trend was 0.13% per month before the transition to MMC and -0.03% per month afterward. There was also a 2.00

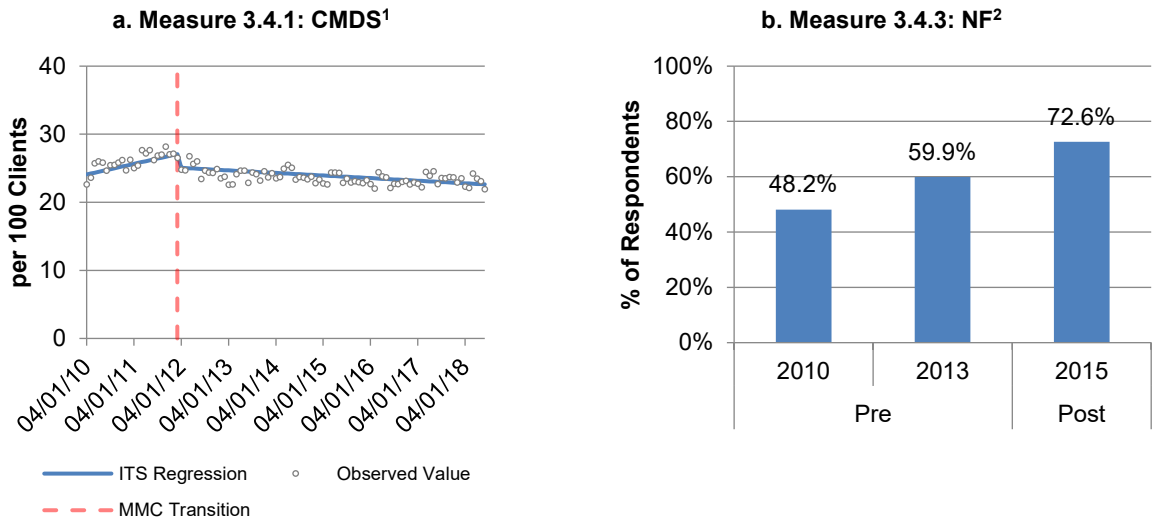
percentage point decrease in the level at the transition. Both of these changes were statistically significant and support Hypothesis 3.4 (Table IV.8 and Figure IV.11(a)).

Table IV.8 Rate of Tooth Decay (Measure 3.4.1).

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.1: Percentage of children ages 0–20 years who had tooth decay or cavities (Monthly Rate)[2]						
CMDS (N = 2,987,363)	Apr 2010 –Sep 2018	24.08	0.13	-2.00***	-0.03***	22.57

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2018. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. CMDS = Children's Medicaid Dental Services; ITS = Interrupted Time Series; MMC = Medicaid managed care.*

Figure IV.11 Rate of Tooth Decay and Symptoms of Depression (Measures 3.4.1 & 3.4.3).



*Note: [1] Lower numbers are better; CMDS = Children's Medicaid Dental Services; ITS = Interrupted Time Series; MMC = Medicaid managed care. [2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. Data for 2009 are unavailable (question was not asked at the time).* ***NF*** *(pre-transition 59.9%, post-transition 72.6%, FET; n = 799). FET = Fisher's Exact Test. Survey question (for residents diagnosed with a depressive disorder): "Does the chart indicate that the resident has responded to treatment?" Sample size (n) refers to the number of respondents in 2015. NF = Nursing Facility.*

Second, NF clients experienced an increase in the rate of pressure ulcers after the MMC transition (Measure 3.4.2), which does not support Hypothesis 3.4. The trend was increasing before the transition to MMC, at 0.06 per 1,000 member months. This increasing trend doubled to 0.16 per 1,000 member months after the transition, opposite of the desired impact. However, this increase was not statistically significant (See Appendix D for figure and table).

Third, NFQR survey data showed that NF clients with depression experienced improvement with treatment after the transition to MMC (Measure 3.4.3). Before the transition, 59.9% of NF clients with depression reported improvement with treatment, compared to 72.6% after the transition to MMC. This large, statistically significant increase supports Hypothesis 3.4 (Figure IV.11(b)).

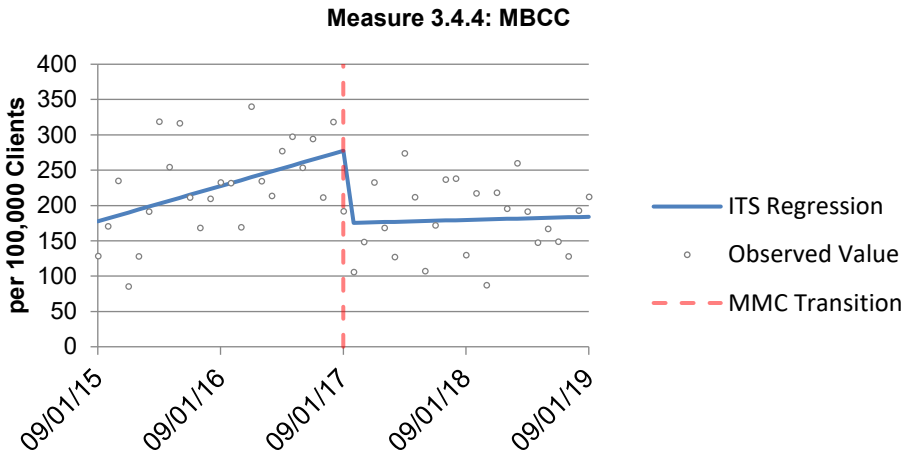
Fourth, there were limited reductions in emergency department discharges for ambulatory care sensitive (ACS) conditions (Measure 3.4.4). MBCC clients experienced the most pronounced and desired impact, with a statistically significant drop in the rate of emergency department discharges for ACS conditions immediately following the MMC transition by -102.09 discharges per 100,000 clients (Table IV.9 and Figure IV.12). FFCC, NF, or AA clients did not experience statistically significant changes after the MMC transition. Therefore, support for Hypothesis 3.4 was limited.

Table IV.9 Prevention/Pediatric Quality Overall Composite (Measures 3.4.4).

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.4: Rate of discharges for an ACS condition per 100,000 (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	71.71	-0.09	55.04	-2.19	71.96
MBCC (N = 4,703)	Sep 2015 – Sep 2019	177.53	4.16	-102.09**	0.38	184.46
NF (N = 6,499)	Mar 2013 – Sep 2019	845.92	21.73	-187.41	7.98	1610.77
AA (N = 53,141)	Sep 2015 – Sep 2019	11.47	-0.05	5.38	-0.32	7.90

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. Estimates not presented for PCA due to numerous zero count observations, which rendered spurious model results. AA = Adoption Assistance; ACS = Ambulatory Care Sensitive; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.*

Figure IV.12 Prevention/Pediatric Quality Overall Composite (Measures 3.4.4).



Note: ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care.

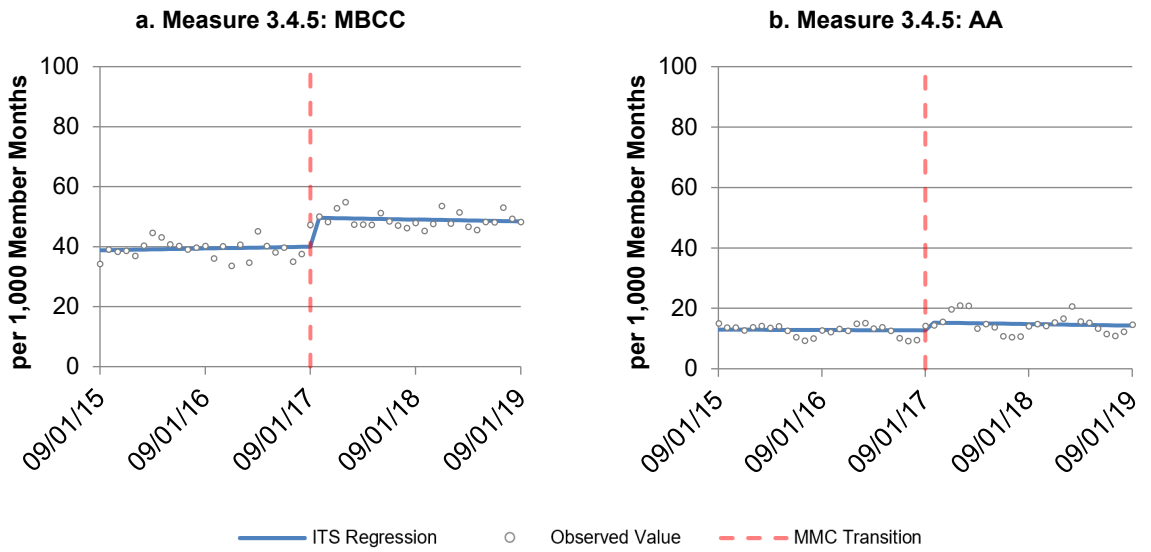
Fifth, analysis of potentially preventable emergency department visits yielded no support for Hypothesis 3.4. None of the populations experienced the desired impact of a statistically significant decrease in the trend or level of potentially preventable emergency department visits following the MMC transition (Measure 3.4.5). The only statistically significant changes were non-desirable level increases for MBCC clients (9.62 visits per 1,000 member months) and AA clients (2.57 visits per 1,000 member months) immediately following the MMC transition (Table IV.10 and Figure IV.13).

Table IV.10 Potentially Preventable Emergency Department Use (Measure 3.4.5)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.5: Rate of potentially preventable ED visits per 1,000 member months (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	86.58	-0.14	4.12	-0.33	79.38
MBCC (N = 4,703)	Sep 2015 – Sep 2019	38.79	0.05	9.62***	-0.05	48.36
NF (N = 6,547)	Mar 2013 – Sep 2019	43.57	0.77	7.09	0.19	79.47
AA (N = 54,162)	Sep 2015 – Sep 2019	12.96	-0.01	2.57*	-0.04	14.24
PCA (N = 4,866)	Sep 2015 – Sep 2019	17.35	-0.09	3.53	-0.15	15.25

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. AA = Adoption Assistance; ED = Emergency Department; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.*

Figure IV.13 Potentially Preventable Emergency Department Use (Measure 3.4.5).



Note: Note: AA = Adoption Assistance; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care.

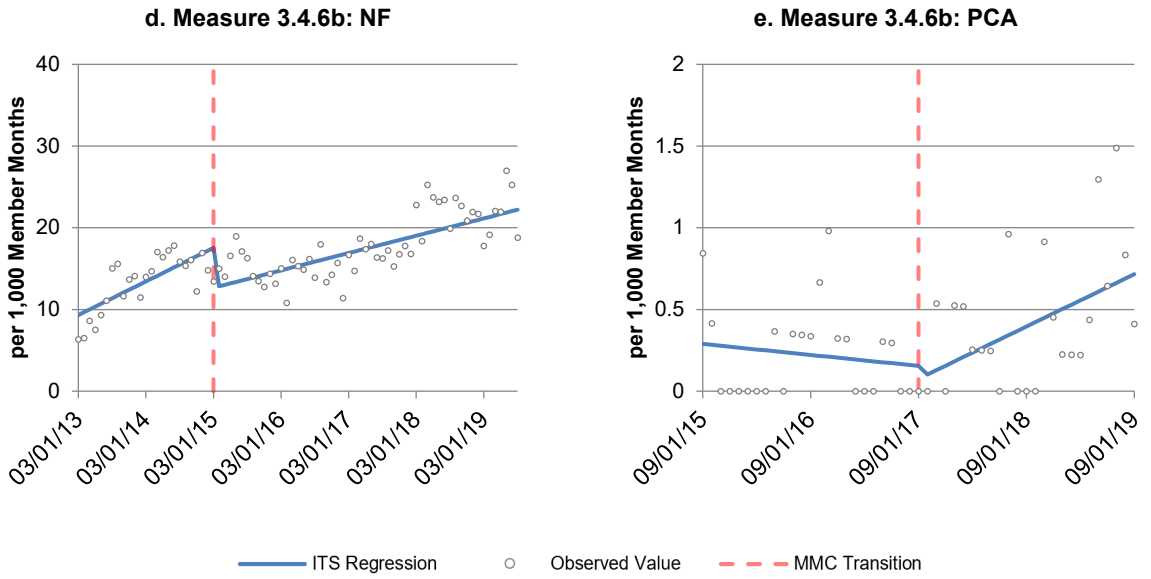
Sixth, the rate of emergency department visits resulting from behavioral health and substance abuse varied by population, with minimal support for Hypothesis 3.4 (Measure 3.4.6). None of the populations experienced statistically significant changes in emergency department visits resulting from behavioral health. All the notable findings pertained to emergency department visits resulting from substance abuse (Table IV.11). MBCC and NF clients experienced statistically significant level decreases for the rate of emergency department visits resulting from substance abuse, which were desired (Figure IV.14(a). MBCC figure is not shown here (see Appendix D). For MBCC clients, the decrease was -0.68 visits per 1,000 member months. The decrease was larger for NF clients, at -4.70 per 1,000 member months. These two findings were the only support for Hypothesis 3.4. For the remaining populations, changes in trends or the level of emergency department visits resulting from substance abuse following the MMC transition did not significantly change (FFCC and AA), or significantly changed in a non-desirable direction (trend increased among PCA clients).

Table IV.11 Rate of Emergency Department visits for Substance Abuse (Measure 3.4.6b).

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.6b Rate of ED visits with a primary or secondary diagnosis of SA (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	8.28	0.10	-1.50	0.10	11.75
MBCC (N = 4,703)	Sep 2015 – Sep 2019	2.27	0.02	-0.68*	0.06	3.56
NF (N = 6,547)	Sep 2013 – Sep 2019	9.31	0.34	-4.70**	0.18	22.39
AA (N = 54,162)	Sep 2015 – Sep 2019	0.41	0.00	0.10	0.00	0.56
PCA (N = 4,866)	Sep 2015 – Sep 2019	0.29	-0.01	-0.05	0.03*	0.74

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. AA = Adoption Assistance; ED = Emergency Department; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance; SA = Substance Abuse.*

Figure IV.14 Rate of Emergency Department visits for Substance Abuse (Measure 3.4.6b).



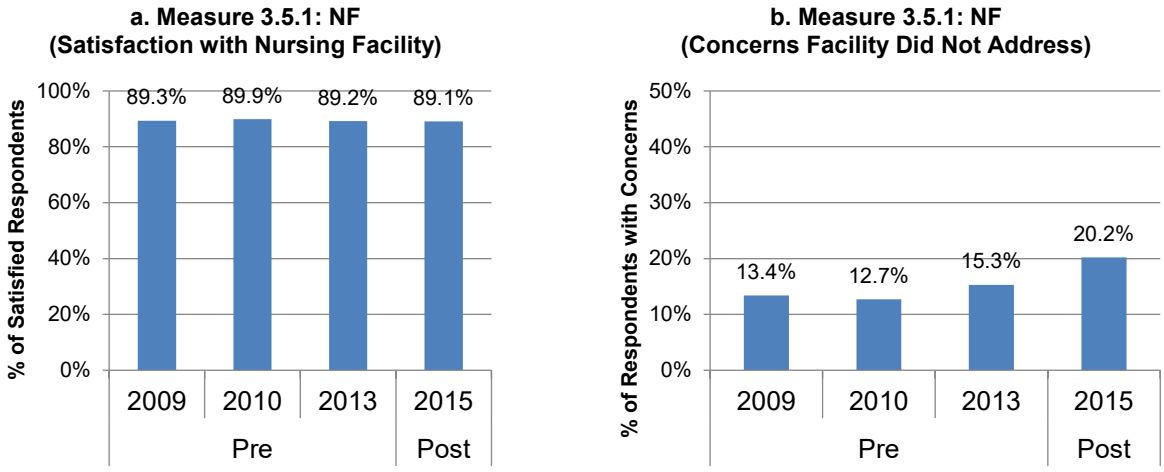
Note: ITS = Interrupted Time Series; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.

Hypothesis 3.5: Client Satisfaction

Hypothesis 3.5 states that client satisfaction will improve for Medicaid clients who are moved from an FFS health care delivery model to an MMC health care delivery model. There is one key takeaway for the Hypothesis 3.5 measures.

Overall satisfaction among NF clients did not improve after the MMC transition (Measure 3.5.1). However, satisfaction among NF clients was high prior to the MMC transition, so there was little opportunity for this measure to improve. In each of four survey waves (2009, 2010, 2013, and 2015), the percentage of NF clients reporting satisfaction with their experience in the nursing facility was approximately 89% (Figure IV.15(a)). Similarly, each year 89 to 90 % of NF clients reported being satisfied with their health care services (not shown). The only statistically significant change was unfavorable. The percentage of NF clients reporting concerns that the nursing facility did not address increased after the MMC transition, from 15.3% in 2013 to 20.2 in 2015 (Figure IV.15(b)).

Figure IV.15 Client Satisfaction - NFQR (Measure 3.5.1).



*Note: NFQR. Note: * p < 0.05, ** p < 0.01, *** p < 0.001.* ***NF satisfaction with nursing facility*** *(higher numbers are better; pre-transition 89.2%, post-transition 89.1%, FET; N = 1,187).* ***NF concerns facility did not address**** *(lower numbers are better; pre-transition 15.3%, post-transition 20.2%, FET; N = 1,361). FET = Fisher's Exact Test. NF = Nursing Facility.*

LIMITATIONS

Five key limitations should be considered when reviewing the analyses in this Interim Report. First, the analytic methods outlined in Appendix G. Evaluation Design Plan Revision v5.1 relied on ITS analysis. Autocorrelation, non-stationarity, and seasonality are important issues that were considered preliminarily during the ITS modeling process (HHSC, 2018; Wagner et al., 2002). The preliminary assessment showed that these issues did not strongly influence the interim report findings. However, these issues need to be further assessed in greater depth when additional data are available for the Summative Report.

Second, as discussed in the Methodology section, many measures that relied on administrative data or on the NFQR and CAHPS survey data did not have sufficient pre and post measurement points for ITS modeling. Researchers will be able to run ITS analyses for additional evaluation measures in the Summative Report, after more data points are available. In addition, the Summative Report will include additional appropriate sub-group analyses to examine demographic differences as specified in the Appendix G. Evaluation Design Plan Revision v5.1.

Third, FFS claims and MMC encounter data are different data sources. Under FFS, providers submit bills to Medicaid for services rendered, and Medicaid adjudicates these in a timely manner to make payments. This process validates the FFS claims data. On the other hand, the MMC program is a capitated payment system in which Medicaid pays a managed care organization for each enrolled beneficiary on a monthly basis. Thus, providers are paid by the managed care organization rather than directly from Medicaid. Thus, the MMC encounter data are adjudicated differently than FFS claims data. Differences in how the FFS claims and MMC encounter data are collected and adjudicated, and the purpose of their collection, can affect their comparability. Therefore, observed differences that appear to be the result of the transition to MMC may not reflect actual differences in health status or health care. Additionally, services and activities performed by MCOs after the transition to MMC are not identifiable through MMC

encounters. For example, MCO-provided service coordination is a design feature of the managed care delivery system, but is not tracked through MMC encounter data. Measure 3.2.1 relies on procedure code T1017 to identify provider-delivered service coordination in FFS claims and MMC encounter data. However this measure does not reflect the full extent of service coordination delivered through MMC, and may therefore fail to detect possible differences after the transition to MMC.

Fourth, some measures used in this evaluation are similar to measures included in the state's ongoing quality data reporting. However, due to differences in data sources, measure stewards, measurement periods, and study populations, findings presented in this Interim Report may not align with state- or MMC program-level reporting. As a result, direct comparisons between the results in this report and other ongoing quality data reporting should be avoided.

Fifth, in October 2015, providers phased out the ICD-9 coding system and started using ICD-10. The more-detailed ICD-10 system significantly changed the documentation of health conditions in the FFS and MMC data. Consequently, the fundamental nature of what can be measured before and after October 2015 has changed, with some measures more comparable than others. Changes at or near the transition point from ICD-9 to ICD-10 will reflect these administrative changes to a degree that may confound the real differences in health status or health care. For example, the NF population transitioned to MMC in March 2015, and the transition to ICD-10 was in October 2015. Thus, all pre-period measures use ICD-9 codes, while most post-period measures use ICD-10 codes. Therefore, unexpected findings should be interpreted with caution.

CONCLUSIONS AND IMPLICATIONS

Evaluation Question 3 asked the following: Did the expansion of the MMC health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients? The full impact of the expansion of the MMC health care delivery model to the populations of focus in this evaluation cannot be determined until additional years of data are available for the Summative Report. However, there were sufficient data to conduct preliminary analyses, which yielded the following findings.

Hypothesis 3.1: Access to care will improve for Medicaid clients who transition from an FFS health care delivery model to an MMC health care delivery model. Across most populations, there was support for Hypothesis 3.1. Findings indicated that access to preventive dental care visits among CMDS clients, visits with a primary care physician among NF, AA, and PCA clients, diagnoses of new cases of depression for NF and FFCC clients, and medication adherence for MBCC clients all improved after the MMC transition. However, FFCC clients experienced a decrease in visits with a primary care physician after the MMC transition.

Hypothesis 3.2: Care coordination will improve for Medicaid clients who transition from an FFS health care delivery model to an MMC health care delivery model. Support for Hypothesis 3.2 was limited. Of clients who had an SMI/SED, a beneficial impact was observed only for FFCC clients with respect to increases in the percentage of clients receiving targeted case management. No impact of the transition to MMC on service coordination utilization was observed for FFCC and MBCC clients.

Hypothesis 3.3: Quality of care will improve for Medicaid clients who transition from an FFS health care delivery model to an MMC health care delivery model. There was limited support for Hypothesis 3.3. MBCC clients experienced significant increases in the receipt of the recommended treatment after the MMC transition. Assessment of antidepressant medication

management among FFCC and NF clients, along with new prescriptions for antipsychotic medication among AA and PCA clients, was inconclusive. Additional data are needed to fully assess the changes in the quality of the health care delivery model following the MMC transition.

Hypothesis 3.4: Health and health care outcomes will improve for Medicaid clients who transition from an FFS health care delivery model to an MMC health care delivery model. Support for Hypothesis 3.4 was mixed. While the percentage of CMDS clients with tooth decay and cavities decreased, a similar decrease in the rate of pressure ulcers was not observed among NF clients. However, NF clients experienced improvement in depression symptoms with treatment. Across populations, findings were mixed with respect to measures of emergency department use for three measures. First, only MBCC clients experienced a significant drop in the rate of emergency department discharges for ACS conditions immediately following the transition to MMC. Second, none of the populations experienced a significant decrease in potentially preventable emergency department visits. Third, only MBCC and NF clients experienced significant level decreases for the rate of emergency department visits resulting from substance abuse, while none of the populations experienced a significant decrease for behavioral health.

Hypothesis 3.5: Client satisfaction will improve for Medicaid clients who transitioned from an FFS health care delivery model to an MMC health care delivery model. Overall findings indicated no substantial change in satisfaction after the MMC transition, which does not support Hypothesis 3.5. Data from the NFQR survey illustrated that a high percentage of NF clients were satisfied with their experience in the nursing facility and with the health care services received both prior to and after the MMC transition. However, a slightly higher percentage of NF clients reported having concerns that the facility did not address after the MMC transition.

In sum, support for the five hypotheses varies across populations and measures. For some individual populations and hypotheses, the available data yielded insufficient or no evidence of a change post-MMC transition. As additional data become available, further analyses will be conducted for all measures, along with sub-analyses to fully evaluate each of the five hypotheses under Evaluation Question 3. The complete analysis, along with additional discussion of the findings, will be included in the Summative Report.

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V. QUALITY-BASED PAYMENT SYSTEMS

INTRODUCTION

General Background Information

The DSRIP program in the Demonstration seeks to address the critical health needs of the Medicaid and low-income or uninsured (MLIU) population. Payments for DSRIP are tied to reporting and/or performance on clinical, quality, cost, and population health outcomes. Additionally, Texas HHSC encourages alternative payment model (APM)/value-based payment (VBP) arrangements in MCO contracts. Once DSRIP expires at the end of the renewal period, providers are expected to continue addressing this population's health needs through APMs.

Evaluation Question and Hypotheses

As specified in Appendix G. Evaluation Design Plan Revision v5, the APM evaluation focused on answering one question through one hypothesis (Table V.1).

Table V.1 APM Evaluation Question and Hypothesis.

Evaluation Question 4: Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?
Hypothesis 4.1 (H 4.1): The Demonstration will result in the development and/or implementation of a variety of alternative payment models (APMs) in Texas Medicaid.

METHODOLOGY

Data

Researchers used two administrative data sources to examine planning and implementation of APMs: the DSRIP reporting in DY7 and DY8, and the Managed Care Organization (MCO) APM Reporting Tool from 2016 to 2018. DSRIP providers are required to report on APM efforts as part of DSRIP Category A measures. The MCO APM reporting tool is an annual summary of APM arrangements submitted by Medicaid/CHIP MCOs to HHSC. It covers the type of APMs each MCO implements (including quality measures used), the volume of APMs through each calendar year, and information about dental contractors' APMs.

In addition to the administrative data, the DSRIP provider survey (June–July 2020) was used to assess DSRIP providers' perceptions of benefits of and barriers to APMs. DSRIP providers were asked Likert-style questions and open-ended questions. The Likert-style questions focused on four dimensions: 1) the triple aim of health care (population health, experience of care, and per-capita cost) (The IHI Triple Aim | IHI - Institute for Healthcare Improvement, n.d.), 2) provider satisfaction, 3) organizational capacity for APM participation, and 4) whether DSRIP promoted the use of APMs. The scale for Likert-style questions was 1 for strongly disagree, and 5 for strongly agree. Open-ended questions focused on perceived benefits and barriers to the development/implementation of APMs.

Measures

Hypothesis 4.1 has three corresponding measures, detailed in Table V.2.

Table V.2 Measures and Description.

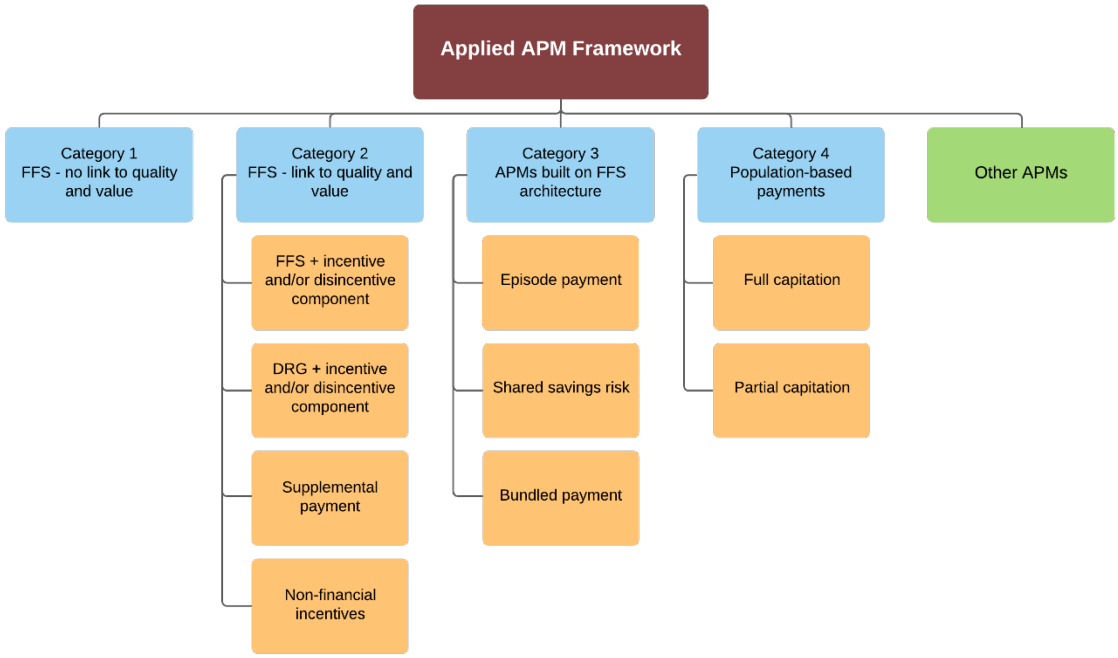
Measures	Description	Data
4.1.1	APMs (planned and/or implemented)	DSRIP Reporting Category A & C (DY7, DY8) MCO APM Reporting (2016-2018)
4.1.2	Perceived barriers to developing and/or implementing APMs	DSRIP Provider Survey 2020
4.1.3	Perceived benefits to developing and/or implementing APMs	DSRIP Provider Survey 2020

Note: APM = Alternative payment model; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year; MCO = managed care organization.

Analytic Methods

Researchers categorized APMs using the APM framework developed by the Health Care Payment Learning and Action Network (HCPLAN), a multi-stakeholder collaborative that tracks progress toward implementing APMs (HCPLAN, 2017) (Figure V.1). Categories 2 through Other APMs were used in this analysis to succinctly enumerate and describe APMs within the Demonstration (refer to Appendix E Quality-Based Payment Systems Technical Details). Applying this framework, researchers performed a mixed-methods approach using descriptive statistics and thematic content analysis.

Figure V.1 Applied APM Framework.



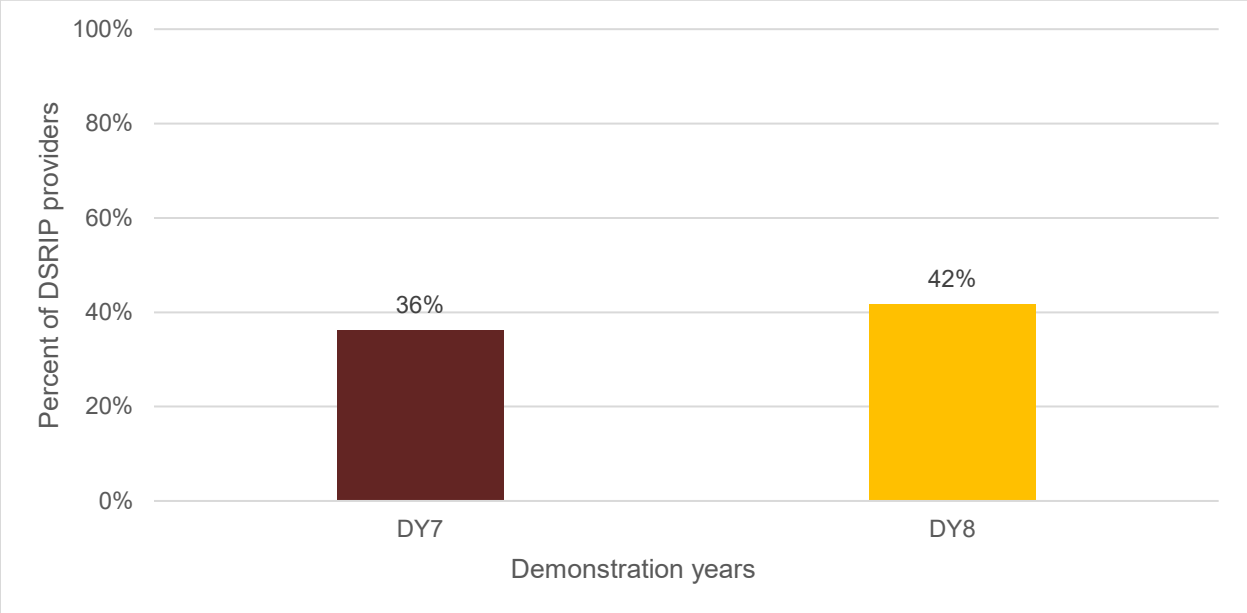
Note: The blue boxes reflect the four categories from the HCPLAN APM framework. Orange boxes depcit how the researchers assigned state-level reporting APM types into the HCPLAN APM framework . The green box reflects other APMs that could not be categorized into the HCPLAN framework. APM = alternate payment model; FFS = fee-for-service; HCP = health care payment; LAN = Learning and Action Network.

KEY FINDINGS

APM Arrangements

A total of 290 DSRIP providers were included from the DSRIP reporting tool, representing all DSRIP providers in the program. Figure V.2 presents the percentage of DSRIP providers who had APM arrangements during DY7 and DY8. There was an increase in APM arrangements, from 36% in DY7 to 42% in DY8.

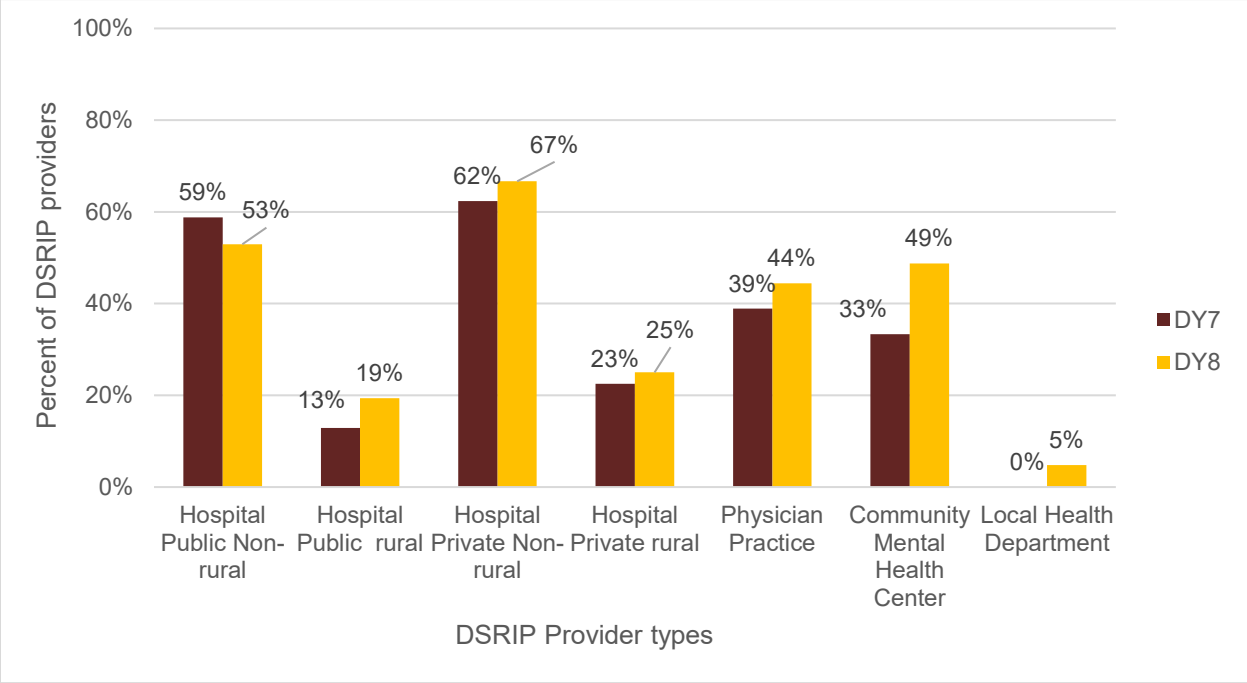
Figure V.2 Percentage of DSRIP Providers that Have APM Arrangements by DY.



Note: Category A DSRIP reporting. Total number of providers for each DY = 290. APM = Alternative payment model; DSRIP = Delivery System Reform Incentive Payment.

Private non-rural hospitals were most likely to have APM arrangements in both DY7 and DY8, while local health departments were least likely to have APM arrangements (Figure V.3). All DSRIP provider types except public non-rural hospitals experienced an increase in APM arrangements between DY7 and DY8.

Figure V.3 Percentage of DSRIP Providers with any APM Arrangements, by Provider Type.

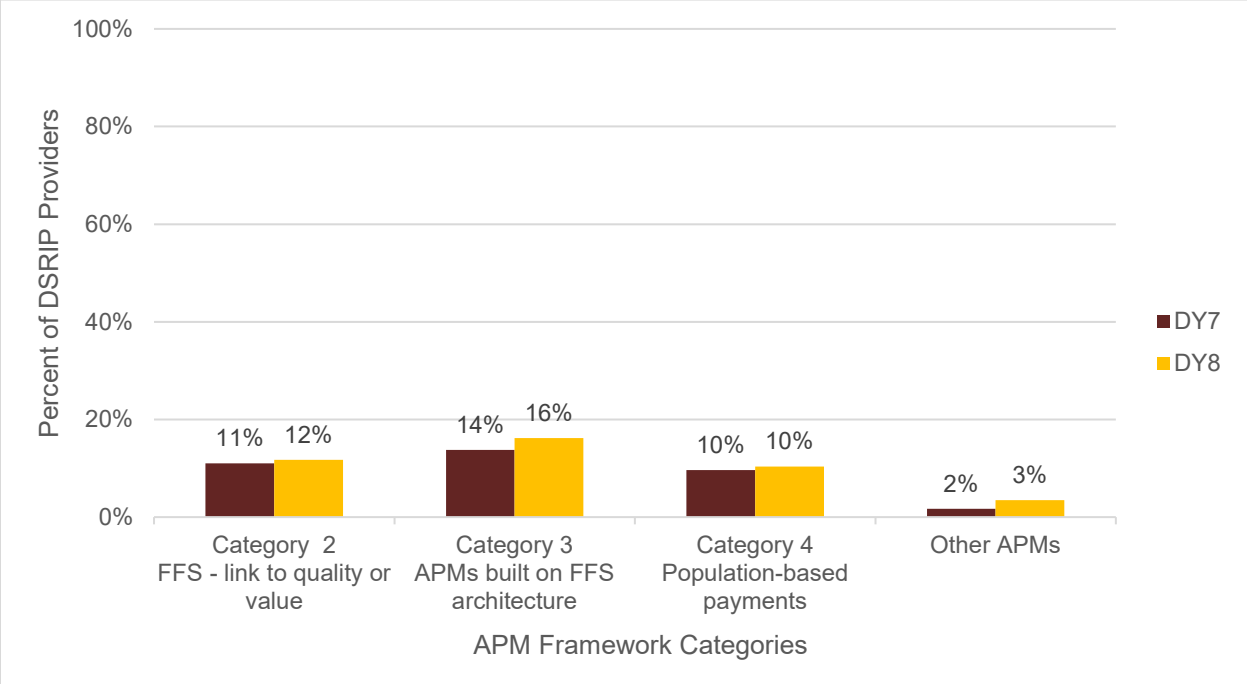


Note: Category A and C DSRIP reporting. Total number of providers for each DY = 290. APM = Alternative payment model; DSRIP = Delivery System Reform Incentive Payment.

Type of APM Arrangements

Overall, DSRIP providers reported an increase in Categories 2, 3, and 4 of the APM framework. Most of the APM arrangements among DSRIP providers were Category 3, APMs built on Fee-For-Service (FFS) architecture (Figure V.4), which included episode payments, shared savings risk, and bundled payments (for definitions, refer to Appendix E Quality-Based Payment Systems Technical Details).

Figure V.4 Percentage of DSRIP Providers with APM Arrangements by APM Framework.



Note: Category A DSRIP reporting. Total number of providers for each DY = 290. Category 1 is traditional fee-for-service and was excluded. Over 50% of DSRIP providers reported no APM arrangements in DY7 or DY8. APM = Alternative payment model; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year; FFS = Fee-For-Service.

MCO Health Plans

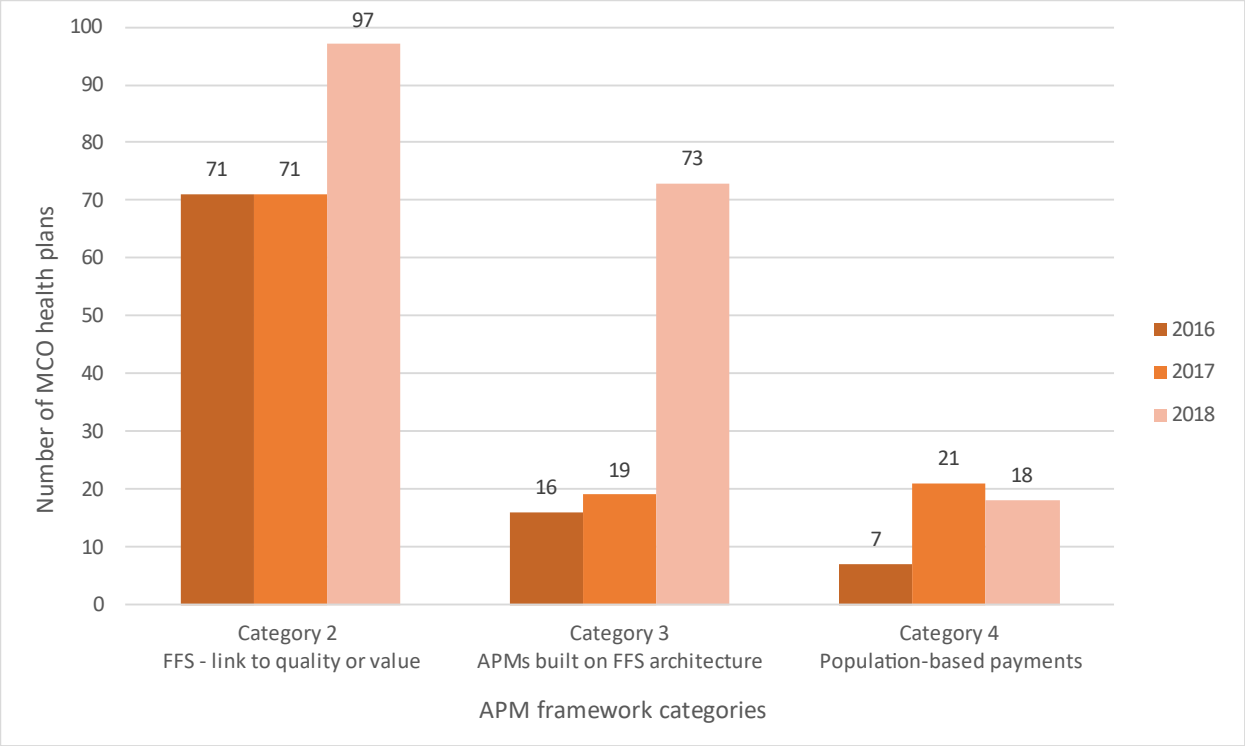
Medicaid/CHIP MCOs aim to provide high-quality care by lowering the cost of care and managing health care utilization. HHSC contracts with MCOs to deliver Medicaid managed care services statewide. Additionally, HHSC contractually requires MCOs to develop APMs with their providers[2].

The annual summaries of APM arrangements submitted by the MCOs to HHSC showed that a total of 94 MCO health plans had APM arrangements in 2016. This increased to 111 in 2017 and 188 in 2018. The data source for this information (MCO APM Reporting Tool) includes only health plans with APM arrangements reported by MCOs. It does not include information about health plans without APM arrangements or other MCOs. Therefore, it is unclear if this increase in plans with APM arrangements reflects a greater percentage of all health plans implementing APMs. It is also unknown whether these plans were being implemented with a larger number of providers.

MCOs were most likely to report engaging in APMs built on Category 2–FFS with a Link to Quality and Value (Figure V.5). MCOs experienced an annual rise in APM arrangements built on FFS architecture (Category 3) with the greatest percentage increase among all types of plans from 2017 to 2018. However, population based APMs experienced a slight decline in number in 2018.

[2] HHSC assessed payment methodologies between MCOs and providers in 2012 and determined that MCOs predominantly reimbursed contracted providers using a fee-for service approach, thus maintaining incentives for volume over value in the payment model. To help push value-based incentives to the provider level, HHSC added contractual targets requiring MCOs to tie a minimum portion of provider payments to measures of value and quality using APMs. The MCO contract requirements include target percentages for total dollars spent in APMs or risk-based APMs relative to total MCO-paid medical, pharmacy and long-term care expenditures. Beginning with calendar year (CY) 2018, initial targets were set at 25 percent for overall APMs and 10 percent for risk-based APMs for Medicaid and CHIP MCOs. The targets increase by at least 25% every year from CY 2018 to CY 2021. By CY 2021, MCOs are expected to have at least 50 percent of total provider payments for medical and prescription expenses in APMs and at least 25 percent in a risk-based model. The initiative generally aligns with the HCPLAN, a public-private partnership launched in 2015 by the U.S. Department of Health and Human Services to accelerate the healthcare system's transition to value-based care.

Figure V.5 MCO Health Plans with APM Arrangements by APM Framework Annually.



Note: MCO APM reporting tool. Note: Total number of MCO health plans for 2016 = 94, 2017 = 111, 2018 = 188. APM = Alternative Payment Model; FFS = Fee-For-Service; MCO = Managed Care Organization.

DSRIP Provider perceptions on development/implementation of APMs

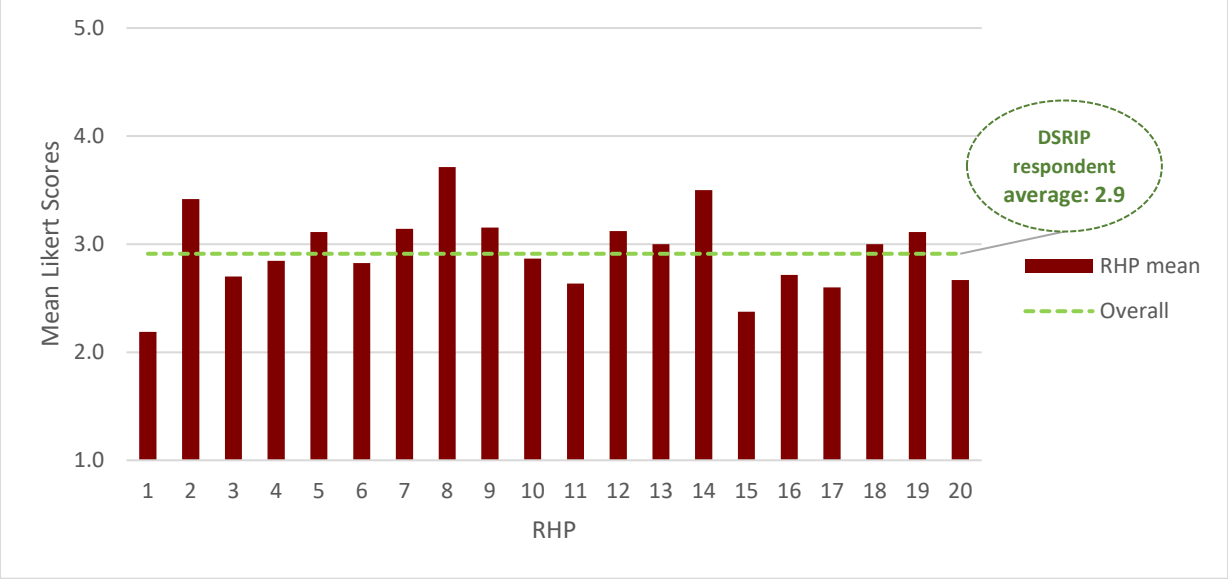
A total of 225 DSRIP providers responded to the APM section of the DSRIP provider survey (one DSRIP respondent did not complete the APM section). The sample size of DSRIP survey respondents by RHP is shown in Table V.3. Overall, DSRIP providers neither agreed nor disagreed that DSRIP promoted the use of APMs within their organizations (mean score = 2.91) (Figure V.6).

Table V.3 DSRIP Survey Respondent Sample Size by RHP.

RHP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
N	16	12	20	13	9	17	7	7	13	15	11	25	9	8	8	7	10	6	9	3

Note: N = sample size; RHP = Regional Healthcare Partnership.

Figure V.6 DSRIP Provider Survey Respondents' Mean Likert Response Scores on whether DSRIP Promoted the Use of APMs within the Organization.



Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: The experience with DSRIP has promoted the use of Alternative Payment Models within your organization. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree. APM = Alternative Payment Model; DSRIP = Delivery System Reform Incentive Payment; RHP = Regional Healthcare Health Care Partnership.

On average, DSRIP providers scored close to neutral for all Likert-scale questions (with some variation between RHPs) on patient satisfaction, improved access, improved population health, reduced per-capita cost of providing care, managing administrative burden, allocating sufficient time to APM activities, having financial capacity, and having data infrastructure (refer to Appendix E: Quality-Based Payment Systems Technical Details).

Perceived Barriers

DSRIP survey respondents were asked open-ended questions about the perceived barriers to participating in APMs. Common barriers to participating in APMs included a lack of MCO

engagement (the most common barrier), administrative burden, low volume setting, small organization, rurality, non-uniformity of quality/performance measures, and financial burden. Many DSRIP survey respondents believed that MCOs do not pay attention to smaller hospitals. One wrote that "We are a small organization and administrative burden will be difficult as well as getting MCOs to provide realistic APMs to our area. They pay more attention to population areas, not us." Another DSRIP provider pointed to the cumbersome data-sharing process with MCOs as a barrier to APMs: "Not all of the MCOs were willing to participate and obtaining data from the MCO was difficult." Table V.4 provides exemplary quotes for each theme.

Table V.4 Perceived Barriers to Developing and/or Implementing APMs.

Barriers	Exemplary Quotes
Lack of MCO engagement	"MCOs have not been very willing and open partners to this—they struggle to share data in a timely and meaningful way. It took over a year to come to an agreement, get data sources identified and vetted and then the payout was not all that significant." "MCOs have not been willing to work due to the low volume of patients that we serve who receive Medicaid."
Administrative burden	"Challenges for alternative payment model participation include increased administrative burden regarding documentation and reporting."
Low volume setting	"Organization is a small rural critical access hospital. Small volumes make it difficult to adopt APMs."
Small organization	"We are a small non-profit with very limited administrative bandwidth." "As a smaller entity we don't have the resources."
Rurality	"When a provider such as a small rural hospital does not have the depth of patients in any one insurance provider, participating in an APM would be tremendously risky financially."
Non-uniformity of quality/performance measures	"A major challenge faced by entering into VBP arrangements is the disparity in performance measurement criteria from different payers, which may not align with an organization's quality goals or governmental performance criteria. Tracking multiple quality metrics in a meaningful way places a heavy burden on a health system's resources."
Financial burden	"While we have definitely achieved success, it has been difficult to sustain positive performance and we continue to leave significant dollars on the table."

Note: DSRIP Provider Survey. Survey question: Please describe any challenges of participating in Alternative Payment Model initiatives for your organization. APM = alternative payment model; MCO = managed care organization; VBP = value-based payment.

Perceived Benefits

DSRIP survey respondents were also asked open-ended questions about the perceived benefits of participating in APMs. The main themes that emerged on perceived benefits of APMs included financial efficiency, data sharing, quality of care, collaboration, and care

coordination. Financial efficiency was the most frequently stated benefit by DSRIP survey respondents. One DSRIP provider noted that "First, [our organization] has received marginal incentive payments during this implementation year with the expectation that those payments will continue and grow over time." Another DSRIP provider stated that "benefits for alternative payment model participation include ... increased revenue to system." Table V.5 provides exemplary quotes for each theme.

Table V.5 Perceived Benefits to Developing and/or Implementing APMs.

Benefits	Exemplary Quotes
Financial efficiency	"Participation in APMs have resulted in some increased revenue for the organization."
Data sharing	"[Our organization] has also been able to grow the data sharing capacities through the implementation of care coordination, which has been incorporated into some of the APM agreements."
Quality of care	"Benefits for alternative payment model participation include improved quality of patient care."
Collaboration	"One of the benefits we have noted in participation in APMs is a better sharing of client data between [our organization] and the MCO. We have also been able to develop a more collaborative relationship with the MCOs and have been able to demonstrate the value that [our organization] provides to the MCOs members."
Care coordination	"Alternative arrangements have allowed [our organization] to invest in the areas demonstrably better for the client such as care coordination."

Note: DSRIP Provider Survey. Survey question: Please describe any benefits of participating in Alternative Payment Model initiatives for your organization. APM = Alternative Payment Model; MCO = Managed Care Organization.

LIMITATIONS

The primary limitation in assessing the implementation of APMs was the lack of data available for the Interim Report. With only 2 years of DSRIP reporting on APM activities, 3 years of MCO reporting tool, and one DSRIP provider survey, identifying clear trends of APM use within DSRIP providers was difficult. Additionally, researchers did not have information on the total number of MCO plans. Furthermore, as data are not collected on the use of APMs by non-DSRIP providers, comparisons between DSRIP providers and non-DSRIP providers are not possible. As a result, findings presented in the Interim Report should be interpreted with caution until additional years of data are available.

CONCLUSIONS AND IMPLICATIONS

Evaluation Question 4 asked the following: Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid? Hypothesis 4.1 states that the Demonstration will result in the development and/or implementation of a variety of alternative payment models (APMs) in Texas Medicaid.

This Interim Report shows that DSRIP providers experienced an increase in APM arrangements, from 36% in DY7 to 42% in DY8. However, this increase did not occur for public non-rural hospitals. The number of available MCO plans with APM arrangements also increased from 94 in 2016 to 188 in 2018. For DSRIP providers that engaged with APMs, most APM arrangements were built on FFS architecture. Overall, DSRIP survey respondents did not signal strong agreement or disagreement with statements about the development, implementation, or benefits of APMs. The lack of MCO engagement was the most frequent barrier to implementing APMs, whereas financial efficiency was the most frequent benefit for implementing APMs. Despite the state's encouragement of APM approaches and APM engagement increasing over the past few years, smaller DSRIP providers report that MCOs still seem hesitant to contract with them, as reflected in the thematic content analysis.

Greater partnerships between providers and MCOs should be encouraged and strengthened to advance the use of APMs. Smaller organizations may need additional support to further APM development and implementation efforts. As APMs develop over time, additional research will be needed to evaluate their impact on health care cost and quality, as well as mechanisms that could further facilitate their adoption and implementation.

In summary, Hypothesis 4.1 is neither accepted nor rejected at this time. Early data show increasing engagement with APMs among DSRIP providers, and MCOs are offering more plans with APM arrangements, but whether these result from general changes in the overall health system and whether the trends will continue cannot be known at this time.

REFERENCES

Health Care Payment Learning & Action Network. (2017). *APM framework* [White Paper]. Retrieved May 21, 2021, from https://hcp-lan.org/apm-refresh-white-paper/

Institute for Healthcare Improvement. (n.d.) *The IHI Triple Aim*. Retrieved January 12, 2021, from http://www.ihi.org:80/Engage/Initiatives/TripleAim/Pages/default.aspx

VI. HEALTH CARE SYSTEM FOR THE MLIU POPULATION

INTRODUCTION

General Background Information

Evaluation Question 5 focused on whether the Demonstration transformed the health care system for the Medicaid and low-income uninsured (MLIU) population in Texas. This evaluation question was answered through the assessment of two topics: potentially preventable emergency department use and a determination of budget neutrality.

Patients frequently seek care in emergency departments (EDs) for conditions that may have been treatable in a primary care, urgent care, or other facility, and this is referred to as potentially preventable ED use. Potentially preventable ED use may reflect lack of access to primary care or inadequate quality of care (Delcher et al., 2017). Potentially preventable ED use places a burden on the health care system as resource-intense services are used for non-emergencies. Medicaid enrollees have higher ED use compared to privately insured individuals, which is believed to be due to higher rates of chronic conditions (Sommers, 2014, Giannouchos et al., 2020). Assessing whether the post-Demonstration Renewal Period has reduced potentially preventable ED use is an important step in evaluating the health care system for the MLIU population.

When calculating budget neutrality, the Centers for Medicare & Medicaid Services (CMS) refers to expenditures that were projected to have occurred absent the Demonstration as “without waiver” (WOW) expenditures or “baseline” expenditures. Baseline expenditures are the basis for the budget neutrality expenditure limit. CMS refers to actual expenditures under the Demonstration as “with waiver” (WW) expenditures (CMS, 2018). While cost is neither the primary nor the only consideration in the provision of health care, its importance cannot be overlooked. Budget neutrality does not address any other factors—such as efficiency, effectiveness, or quality—that cost or economic analyses usually consider. Instead, budget neutrality compares only the estimated cost of care without the Demonstration to the actual cost of care with the Demonstration. WW expenditures which are equal to or less than WOW expenditures would suggest the Demonstration resulted in cost savings to the overall Medicaid program in Texas.

Evaluation Questions and Hypotheses

As specified in Appendix G. Evaluation Design Plan Revision v5.1, the health care system evaluation focuses on answering one overarching question through two specific hypotheses, listed in Table VI.1.

Table VI.1 Health Care System Evaluation Question and Hypotheses.

Health Care System Evaluation Question: Did the Demonstration transform the health care system for the MLIU population in Texas?
Hypothesis 5.1: The Demonstration will result in a reduction of potentially preventable ED use for the MLIU population.
Hypothesis 5.2: The Demonstration will result in overall cost savings compared to the Medicaid program without the Demonstration, as shown in the budget neutrality calculation.

Note: ED = emergency department; MLIU = Medicaid, low income, uninsured.

METHODOLOGY

Data

The ED data came from the Texas Department of State Health Services (DSHS) Texas Hospital Emergency Department Research Data File (ED RDF). As specified in Attachment G. Evaluation Design Plan Revision v5.1, ED data are used to compare potentially preventable ED use before (2016 and 2017) and after (2018 through 2022) the Demonstration Renewal Period. The interim report only includes data through calendar year 2019, resulting in a two-year pre-period and two-year post-period on either side of the Demonstration renewal date. A complete analysis incorporating the full post-Demonstration period will be available in the Summative Report.

The data used for the budget neutrality calculations are from the Demonstration Budget Neutrality Worksheet, which is updated annually from the CMS64 paid data. The most recent worksheet available for the interim report included actual expenditures through FFY19 (DY8). The WOW expenditures are projections based on what the services provided would cost without the Demonstration. The WW calculations are based on actual expenditures for the Demonstration.

Measures

Table VI.2 provides an overview description, data, and measures for Hypotheses 5.1 and 5.2. A complete description of these components follows in the sub-sections.

Table VI.2 Measure Summary.

Measure	Description	Data	Approach
5.1.1 Rate of potentially preventable ED use (PPV)	Identification of potentially preventable ED use through the application of the NYU ED Algorithm	Texas Hospital Emergency Department Research Data File (CY 2016-2019)	ITS
5.1.2 Demonstration cost growth rate	Comparison of total expenditures for WW and WOW, annual growth rates, and average trends.	Form CMS-64, Demonstration Budget Neutrality Worksheet (FY 2012-2019)	DTA

Note: CY = Calendar Year; DTA = Descriptive Trend Analysis; ED = Emergency Department; ITS = Interrupted Time Series; FY = Federal Year; MLIU = Medicaid, Low Income, Uninsured; NYU = New York University; PPV = Potentially Preventable Visits; WOW = Without Waiver; WW = With Waiver. Measure 5.1.1 will include data through CY 2022 in the Summative Report. Measure 5.1.2 will include data through FY 2022 in the Summative Report.

Hypothesis 5.1: Potentially Preventable Emergency Department Use

The New York University (NYU) ED algorithm is widely used to assess the probability of whether an ED visit required emergency care, was potentially preventable, or whether the visit was associated with drugs, alcohol, injury, or mental health (NYU, n.d.). Johnston et al. (2017) developed a patch to the algorithm that classified new codes from the International Classification of Diseases (ICD) into the original NYU ED algorithm categories. Researchers utilized the publicly available Stata code for classifying ED visits (Johnston et al., 2017). The NYU algorithm estimates the probability of each visit occurring across the following five categories based on the ICD Clinical Modification (CM) primary diagnosis code for the visit:

1. Emergent–ED care needed (not preventable/avoidable)
2. Emergent–ED care needed (preventable/avoidable)
3. Emergent/primary care treatable

4. Non-emergent
5. Other (mental health, alcohol, substance abuse, injury, and unclassified)

ED visits are flagged as potentially preventable when the summed probabilities of (2) emergent–ED care needed (preventable/avoidable), (3) emergent/primary, care treatable, and (4) non-emergent exceed 50%. The following examples provide context about what diagnoses fall within each category:

- Emergent–ED care needed (not preventable/avoidable)
  - Cardiac arrest due to underlying cardiac condition
  - Acute appendicitis with localized peritonitis
  - Respiratory failure, unspecified; unspecified whether with hypoxia or hypercapnia
- Emergent–ED care needed (preventable/avoidable)
  - Tuberculosis of lung
  - Type 1 diabetes mellitus with ketoacidosis without coma
  - Unstable angina
- Emergent/primary care treatable
  - Patellar tendinitis, unspecified knee
  - Disorder of kidney and ureter, unspecified
  - Cardiac murmur, unspecified
- Non-emergent
  - Plantar wart
  - Pure hypercholesterolemia
  - Psoriasis, unspecified
- Other (mental health, alcohol, substance abuse, injury, and unclassified)
  - Alcohol dependence, uncomplicated
  - Opioid abuse with intoxication, uncomplicated
  - Psychotic disorder with hallucinations due to known physiological condition

Hypothesis 5.2: Budget Neutrality

Evaluation of budget neutrality requires a comparison of total expenditures. The primary analysis includes a comparison of total expenditures for WW and WOW expenditures for DY1 to DY8 in terms of total expenditures, annual growth rates, and average trends. The remaining years will be included in the Summative Report, at which time the expenditures no longer will be mere projections. A more detailed analysis that discusses subcomponent differences in WW and WOW expenditures is available in Appendix F. While the analysis is somewhat straightforward, the following definitions are provided for consistency and transparency.

The annual growth rate:

$$\frac{\text{Annual Waiver Costs for Dy}_{\mathbf{t}} \; - \; \text{Annual Waiver Costs for Dy}_{\mathbf{t-1}}}{\text{Annual Waiver Cost for Dy}_{\mathbf{t-1}}} * 100$$

where:

- Dy is Demonstration year.
- t represents the annual time interval.

The average trend calculation:

$$\left(\frac{\text{End Cost}}{\text{Start Cost}}\right)^{\left(\frac{1}{\#\text{ of changes}}\right)} - 1$$

The following calculates aggregate limits for Demonstrations:
BN expenditure limit = projected WOW total spending

Analytic Methods

Potentially Preventable Emergency Department Use

An interrupted time series (ITS) model was used to assess Hypothesis 5.1.1. A key strength of ITS is that a control site is not required, thus providing an alternate method of measuring the effect of an intervention "when randomization or identification of a comparison group are impractical" (Cochrane Effective Practice and Organisation of Care, 2017). The ITS model included one change point, reflecting when the Demonstration Renewal Period began (January 2018). The ITS model is represented in the following form:

$$Y_t = \beta0 + \beta1 * \text{time} + \beta2 * \text{Demonstration renewal} + \beta3 * \text{postslope} + \varepsilon_t$$

where:

- Y_t = rate of potentially preventable visits per 100 MLIU ED visits
- β0 = baseline level of outcome at beginning of pre-Demonstration Renewal Period
- β1 = trend pre-Demonstration renewal (i.e., slope)
- β2 = immediate impact of the Demonstration renewal (i.e., level)
- β3 = trend post-Demonstration renewal (i.e., slope)

Budget Neutrality

A budget-neutral Demonstration keeps Medicaid costs to the federal government equal to or lower than what the costs likely would have been if the Demonstration had not existed. The analysis is a descriptive trend analysis based on costs, the annual growth rate, and the average trend.

KEY FINDINGS

Hypothesis 5.1: Potentially Preventable Emergency Department Use

Sample

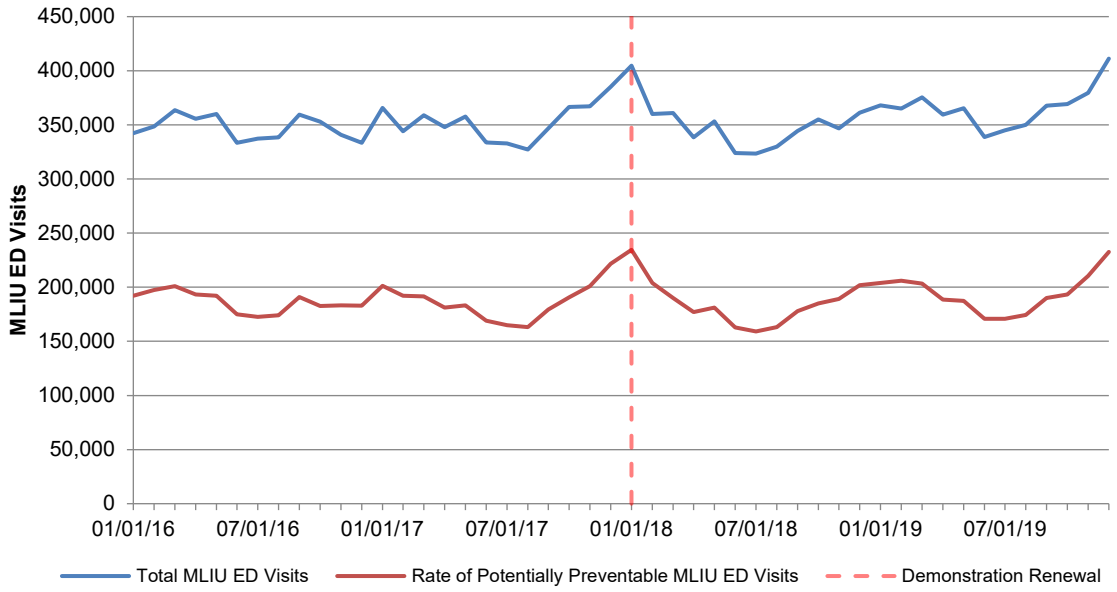
For potentially preventable ED use, inclusion criteria consisted of outpatient encounters with a primary diagnosis code and patients categorized as MLIU. An outpatient visit is defined as "outpatient services that do not go more than twenty-four (24) hours from the time they are being treated in the hospital or ambulatory surgery center (ASC)" (Center for Health Statistics, 2021a). Researchers categorized patients as MLIU patients if their primary source of payment was either self-pay, Medicaid, charity, indigent, or unknown (Center for Health Statistics, 2019). Researchers excluded ED visits that resulted in an inpatient admission because these ED visits differ greatly from same-day outpatient ED visits and tend to represent the most serious emergent conditions (Giannuouchos et al., 2020; Moe et al., 2016). Over the entire study period

from 2016-2019, there were 34,166,190 outpatient ED visits. Of these total visits, 16,997,262 (49.7%) were from MLIU patients.

Analytic Results

Figure VI.1 displays all monthly MLIU ED visits, and potentially preventable monthly MLIU ED visits. The potentially preventable MLIU ED visits almost directly trend with the total MLIU ED visits, with overall 53% of MLIU ED visits being potentially preventable. This finding is consistent with Johnston et al. (2017), who found that 47% of the Nationwide Emergency Department Sample (NEDS) fell into potentially preventable categories.

Figure VI.1 Total MLIU ED Visits and Potentially Preventable MLIU ED Visits.



Note: ED = emergency department; MLIU = Medicaid, low income, uninsured.

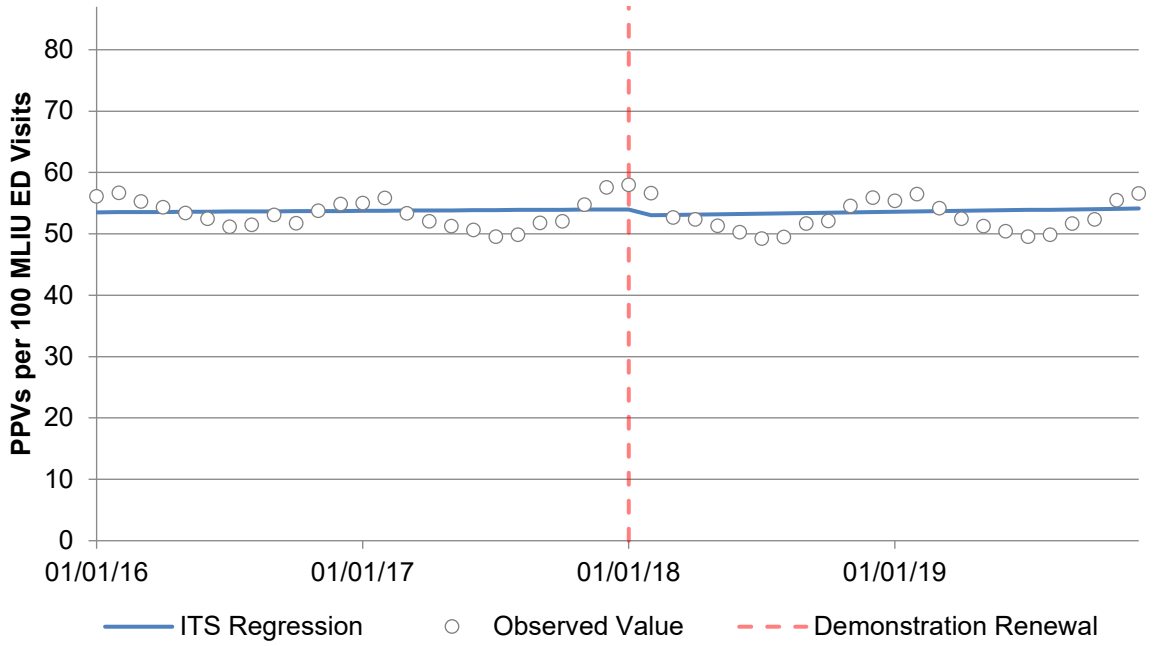
Table VI.3 displays the results of the ITS model for the rate of potentially preventable MLIU ED visits per 100 MLIU ED visits. There were no observed changes in level or slope/trend after the Demonstration Renewal Period. The slope/trend remained relatively flat before (0.02) and after (0.05) the Demonstration Renewal Period. The estimated rates per 100 potentially preventable MLIU ED visits at the beginning and end of the study period were approximately 53. Figure IV.2 displays the observed values from the model along with an overlay of both the pre- and post-Demonstration ITS model slopes.

Table VI.3 Summary of ITS Results for Hypothesis 5.1.

Population	Measure Period	Baseline Value	Pre-Trend	Post-Level Change	Post-Trend	Endline Value
Measure 5.1.1: Rate of potentially preventable ED visits per 100 MLIU ED visits.						
MLIU (N = 16,997,262)	2016-2019	53.51	0.02	-0.95	0.05	53.35

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. Desired direction: lower is better. Sample size (n) refers to the number of total MLIU ED visits in the measure period. ED = emergency department; MLIU = Medicaid, low income, uninsured.*

Figure VI.2 Display of ITS Model for Hypothesis 5.1.



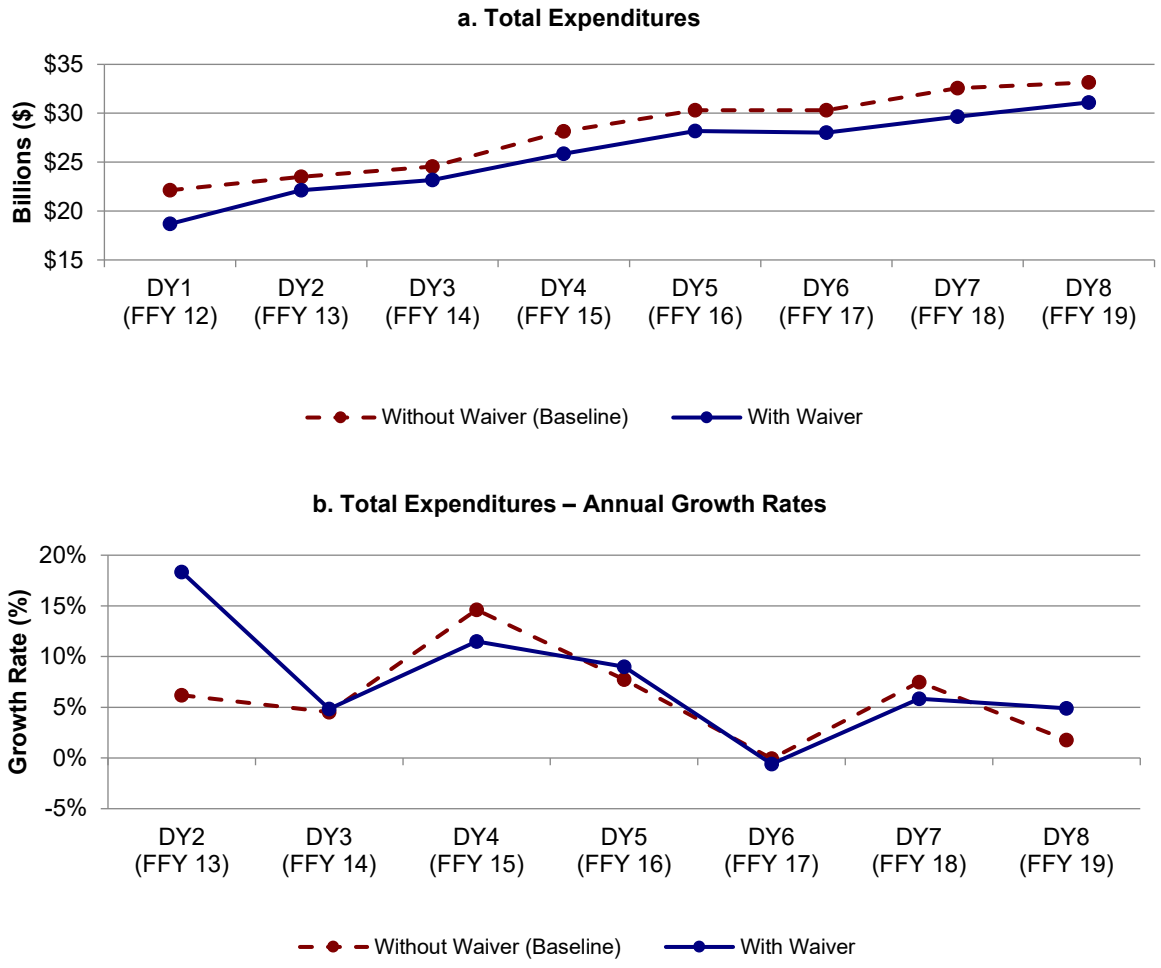
Note: ED = emergency department; ITS = interrupted time series; MLIU = Medicaid, low income, uninsured; PPV = potentially preventable visit.

Hypothesis 5.2: Budget Neutrality

This section presents key findings for budget neutrality, with abbreviated figures. Full results including figures and table not presented in this section can be found in Appendix F.

The analysis of total expenditures (shown in Figure VI.3.a) supports the hypothesis that the Demonstration results in overall cost savings. Although the annual growth rate (Figure VI.3.b) was greater in some years for WW compared to WOW, the differences were small. The average trend for total expenditures for DY1–DY8 was lower for the WOW than for the WW, at 5.95% and 7.55%, respectively, for an absolute difference of 1.6%. Despite the slightly higher WW growth rate, the Demonstration was still budget neutral since the total spending for the Demonstration was less than the WOW spending.

Figure VI.3 Total Expenditures.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

Limitations

For potentially preventable ED use, one notable limitation is how the MLIU population was identified. To identify MLIU patients, the first payment source was utilized. A visit was classified as MLIU if the first payment source was either self-pay or Medicaid, or charity, indigent, or unknown (Center for Health Statistics, 2019). There is the potential that payment sources are not updated at the time of patient registration or are unknown and do not accurately reflect the patient's actual payment source, which could bias the findings by potentially including additional patients not actually considered MLIU. A second limitation exists with the ITS modeling, which did not account for potential seasonality by incorporating appropriate lags in the Interim Report. This modeling adjustment will be tested and then addressed in the Summative Report. Lastly, Texas calculates and reports statewide potentially preventable ED use as part of its ongoing quality data reporting. However, due to differences in data sources, measure stewards, and study populations, rates of potentially preventable ED use among the MLIU population in this Interim Report may not align with state- or MMC program-level reporting. As a result, direct comparisons between the results in this report and other ongoing quality data reporting should be avoided.

As discussed, the Budget Neutrality Worksheet includes actual Demonstration costs for years in which data are available (WW), but WOW costs are projections. While these simulated costs allow for a comparison of costs under Demonstration and non-Demonstration conditions, actual costs for the WOW group do not exist. As a result, the magnitude of the cost savings is only an estimate and may not accurately reflect true costs if the Demonstration had not existed.

Conclusions and Implications

Evaluation Question 5 asks: Did the Demonstration transform the health care system for the MLIU population in Texas?

Preliminary ITS analysis using two years of pre- and post- Demonstration Renewal Period data found no statistically significant changes in the level and slope/trend for potentially preventable ED visits. Thus, there is little support for Hypothesis 5.1, that the Demonstration will reduce potentially preventable ED use for the MLIU population at this time. The full impact of the Demonstration Renewal Period on potentially preventable ED visits, as well as adjustments for seasonality and additional sub-group analysis, will be assessed in the Summative Report.

The full costs of the Demonstration and a complete evaluation of budget neutrality will be reported in the Summative Report after actual costs for the full Demonstration Renewal Period are available. Preliminary analysis suggests that this Demonstration is budget neutral, in support of Hypothesis 5.2. At this time, the Demonstration has resulted in overall cost savings compared to the Medicaid program without the Demonstration. In recent years, beginning with Demonstration extension periods with effective dates on or after January 1, 2021, CMS started to rebase the Demonstration's budget neutrality expenditure limits to better reflect the state's most recent historical experience.

Savings for Texas already have been subject to these more conservative limits; however, at each new extension, CMS plans to adjust Without Waiver Per-Member Per-Month (WOW PMPM) cost estimates to match recent actual PMPM costs experienced during the prior Demonstration approval period. CMS also expects to apply its current policy of trending PMPM costs using the lower of either the state historical trend or the President's budget to the rebased WOW baseline (CMS, 2016).

Overall, the tentative mixed findings suggest that to date, potentially preventable ED use has not changed much in the MLIU population, but the Demonstration seems to be on track to be budget neutral. These preliminary results highlight challenges to health care system transformation as well as the need for proper follow-up time required to assess any potential changes to population health outcomes. Thus, it is premature to report on population health outcomes with only two years of data during the Demonstration Renewal Period. A more comprehensive analysis using data from additional follow-up time of these population health outcomes and costs should provide more concrete evidence in the Summative Report.

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VII. PLANS FOR SUMMATIVE REPORT

Preliminary results suggest the Demonstration Renewal Period has achieved some, but not all of the intended outcomes. While it is premature to report on certain components of the Demonstration at this time, there is evidence of increased collaboration between DSRIP providers among some, but not all, of the dimensions studied. Similarly, there were improvements in some, but not all, of the health and process outcomes analyzed in DSRIP and MMC.

The strongest evidence was for improvements in access to care following the transition to MMC with most populations experiencing improvements. However, findings were mixed across some measures and/or populations examined. Furthermore, preliminary findings suggest that DSRIP providers and MCOs are engaging with APMs more frequently over time. DSRIP providers indicated MCO engagement is the primary barrier for implementing APMs, especially for smaller organizations.

In terms of uncompensated care, the average UC reimbursement rate for a hospital in Texas decreased from 70% in 2010 to 47% in 2017. However, substantial heterogeneities emerged in the subgroup analyses of hospitals with larger and more urban hospitals seeing a sharp decline in the percentage of UC costs reimbursed while smaller and more rural hospitals having higher reimbursement rates. Statistically, there is little evidence of change in the adjusted UC cost growth rate over time, although again there were substantial differences between hospital types. Budget neutrality also suggests an overall cost savings.

The Summative Report, with additional years of data, will provide a more comprehensive analysis of the health outcomes, indicators of health system transformation, and costs, which can provide additional insight on the impact of the Demonstration Renewal on the Texas health care system. The following sections highlight the plans for each section of the Summative Report.

Delivery System Reform Incentive Payment (DSRIP)

For the Summative Report, at least three additional administrations of the DSRIP provider survey will take place, in the summers of 2022 and 2023 (2021 survey is underway) to provide three additional years of comparison for the social network analyses covering Hypothesis 1.1.

For Hypothesis 1.2, Medicaid Clients with Diabetes, researchers will explore a revised analysis with updated sample inclusion and exclusion criteria with a primary objective of exploring ways to increase sample size and representativeness for the treatment client sample, and a secondary objective of refining the comparison client sample to enhance comparability to the treatment client sample.

Researchers will also exclude all dual-eligible Medicare-Medicaid clients, and re-run analyses using the full 24-month pre-post index date measurement windows for the Summative Report. In addition, under the assumption that claims and encounter data through September 2022 will be available for the Summative Report, the client index visit identification window will be extended from DY7 only to DY7 and DY8. Lastly, researchers will review and adjust measure specifications as necessary. Any changes needed to the Evaluation Design will be discussed with HHSC.

For Hypothesis 1.3 on DSRIP quality outcomes, at least three years of additional data should be available by the Summative Report, allowing for researchers to observe and report on trends.

For Hypothesis 1.4 and the Potentially Preventable Event (PPE) measures, researchers will discuss alternative methods for measuring provider- or RHP-level changes in PPE rates with Texas' External Quality Review Organization (EQRO). Additionally, three years of additional data should be available for the Summative Report, allowing for researchers to observe and report on trends.

Uncompensated Care (UC)

The Summative Report will continue to evaluate the trend in the percentage of reimbursed UC costs and the growth rate of UC costs. However, the UC pool shifted to charity care only at the beginning of DY9. It is unclear at this time if or how researchers may compare UC costs before and after DY9. Researchers will work with HHSC to determine priorities for UC in the Summative Report.

Medicaid Managed Care (MMC)

For the Summative Report, researchers will re-conduct analyses using the full post-measurement windows. Researchers will also explore alternative analytic methods, as discussed in the report, for annual measures which may not have sufficient measurement points necessary to support interrupted time series. In addition to identifying other coding approaches, we expect to include additional data for claims and CAHPS and NFQR survey data. Claims data should cover up to the end of the Renewal Period, September 2022. The additional time points should also help to better assess the trend in annual measures. Any changes needed to the Evaluation Design will be discussed with HHSC.

Lastly, the additional data will also support appropriate sub-group analyses as specified in the CMS-Approved Evaluation Design Plan. The main objective of the sub-group analysis is to determine if the transition to MMC had a different impact on demographic sub-populations (e.g., gender, age, race/ethnicity). For example, for a single measure, the transition to MMC could have a desired impact for one subgroup but not in another subgroup.

Quality-Based Payment Systems

Researchers expect to have Category A DSRIP reporting, which includes information on APM arrangements, for all five years of the Demonstration Renewal Period, and data from the MCO APM Reporting tool for four years, by the Summative Report. Trend analysis will be conducted making use of statistical testing to understand if changes in APMS across years are statistically significant. Furthermore, for Measures 4.1.2 and 4.1.3, researchers will administer the DSRIP provider survey, which gathers insight into DSRIP provider perceptions of APM development and/or implementation, multiple times between 2021 to 2023.

Health Care System for the MLIU Population

For the analysis of potentially preventable emergency department use (Hypothesis 5.1), additional years of post-Demonstration Renewal Period data will be incorporated into the interrupted time series modeling. In the Interim Report, the pre-Demonstration Renewal Period was CY16-17, and the post-Demonstration Renewal Period was CY18-19. In the Summative Report, the pre-Demonstration Renewal Period will remain the same, but the post-Demonstration Renewal Period will extend into CY22, pending data availability.

The budget neutrality section of the Summative Report (Hypothesis 5.2) will extend the analysis to include the remaining years of the Demonstration Renewal Period to account for all expenditures. Additional breakouts by subcomponents of total expenditures may be completed based on any relevant findings, feedback from HHSC, or changes to CMS methodology.

Impact of COVID-19 Pandemic on the Evaluation

The COVID-19 pandemic has had a significant impact on the health system and the health of Texans since it began, yet it is unclear at this time how much the impact of the COVID-19 public health emergency will confound the results as the Interim Report focuses on data prior to the pandemic. The COVID-19 pandemic may impact the ability to execute future analyses proposed for the Summative Report. Careful review of current and future data and proposed analytic methods, in the context of the pandemic, will be critical for the Summative Report in order to provide an accurate evaluation of the Demonstration Renewal.

APPENDIX A. ACRONYMS

Acronym	Full Term
AA	Adoption Assistance
ACA	Affordable Care Act
ACS	Ambulatory Care Sensitive
AHA	American Hospital Association
AHRQ	Agency for Healthcare Research and Quality
AI	Aromatase Inhibitor
APM	Alternative Payment Model
APR-DRG	All Patient-Refined Diagnosis-Related Groups
ASC	Ambulatory Surgery Center
BH	Behavioral Health
BL	Baseline Rate
BN	Budget Neutrality
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CDC	Centers for Disease Control and Prevention
CHAT	Children's Hospital Association of Texas
CHF	Congestive Heart Failure
CHIP	Children's Health Insurance Plan
CHW	Community Health Worker
CM	Clinical Modification
CMDS	Children's Medicaid Dental Services
CMS	Centers for Medicare & Medicaid Services
COC	Bice-Boxerman Continuity of Care
COPD	Chronic Obstructive Pulmonary Disease
CPI	Consumer Price Index
CPT	Current Procedural Terminology
DID	Difference in Differences
DSH	Disproportionate Share Hospital
DSHS	Texas Department of State Health Services
DSRIP	Delivery System Reform Incentive Payment

DY	Demonstration Year
EAPG	Enhanced Ambulatory Patient Groups
ED	Emergency Department
ED RDF	Emergency Department Research Data File
EGS	Eligible Groups Served
EQRO	External Quality Review Organization
ESRD	End-Stage Renal Disease
FFCC	Former Foster Care Children
FFS	Fee for Service
FFY	Federal Fiscal Year
HCPLAN	Health Care Payment Learning and Action Network
HCRIS	Healthcare Cost Reports Information System
HCUP	Healthcare Cost and Utilization Project
HHSC	Texas Health and Human Services Commission
HI	Herfindahl Index
HIE	Health Information Exchange
HMO	Health Maintenance Organization
HSL	Hospital-Specific Limits
ICD	International Classification of Diseases
ICD-10-CM	International Classification of Diseases 10th Revision; Clinical Modification
IGT	Intergovernmental Transfer
ITS	Interrupted Time Series
LHD	Local Health Department
LTAC	Long-Term Acute Care
MBCC	Medicaid for Breast and Cervical Cancer
MCO	Managed Care Organization
MLIU	Medicaid and Low-Income Uninsured
MMC	Medicaid Managed Care
N/A	Not Applicable
NA	Not Assigned
NAIP	Network Access Improvement Project
NF	Nursing Facility

NFQR	Nursing Facility Quality Review
NYU	New York University
PCA	Permanency Care Assistance
PCCM	Primary Care Case Management
PCP	Primary Care Provider
PCPI	Physician Consortium for Performance Improvement
PDC	Proportion of Days Covered
PDC-DR	Diabetes Drugs of All Classes (Proportion of Days Covered)
PDC-RASA	Renin-Angiotensin System Antagonists (Proportion of Days Covered)
PDC-STA	Statins (Proportion of Days Covered)
PDI	Pediatric Quality Indicator
PMPM	Per-Member Per-Month
PPA	Potentially Preventable Admission
PPC	Potentially Preventable Complication
PPE	Potentially Preventable Event
PPO	Preferred Provider Organization
PPR	Potentially Preventable Readmission
PPV	Potentially Preventable Emergency Department Visit
PQA	Pharmacy Quality Alliance
PQI	Prevention Quality Indicator
PSM	Propensity Score Matching
QI	Quality Indicators™
RHP	Regional Healthcare Partnership
RUCC	Rural-Urban Continuum Code
SA	Substance Abuse
SDA	Service Delivery Area
SED	Severe Emotional Disturbance
SMI	Severe Mental Illness
STAR	State of Texas Access Reform
STAR+PLUS	State of Texas Access Reform Plus
STC	Special Terms and Conditions
THCIC	Texas Health Care Information Collection

TMHP	Texas Medicaid and Healthcare Partnership
TPI	Texas Provider Identifier
UC	Uncompensated Care
UHRIP	Uniform Hospital Rate Increase Program
UPC	Usual Provider of Care
UPL	Upper Payment Limit
USDA	U.S. Department of Agriculture
UTI	Urinary Tract Infection
VBP	Value-Based Payment
WOW	Without Waiver
WW	With Waiver

APPENDIX B. DSRIP TECHNICAL DETAILS

1. HYPOTHESIS 1.1 CENTRALIZATION MEASURE

Centralization is measured by the sum of the differences between the number of ties the most central provider has, and all the others in the network, divided by the maximum possible sum of the differences between the number of ties the most central provider has and all the others in the network for a network of that size. This calculation is shown in the following equation: (see Hoff, n.d.)

$$C^d = \frac{\sum_i [c^{d*} - c_i^d]}{\max_Y \sum_i [c^{d*} - c_i^d]}$$

where:

- C^d is the level of centralization (with $0 <= C^d <= 1$).
- c^{d*} is the number of ties of the most central provider.
- c_i^d is the number of ties of the provider i.

This formula mathematically equates to the following:

$$C^d(\mathbf{Y}) = \frac{\sum_i [c^{d*} - c_i^d]}{(n-1)(n-2)}$$

2. HYPOTHESIS 1.2 STUDY DESIGN

Appendix G. Evaluation Plan Revision v5.1 provides an overview of the analytic approach for Medicaid clients with diabetes; the evaluation plan proposes using the client-level PSM approach to assess trends in performance measures for DSRIP clients compared to matched non-DSRIP clients before and after the Demonstration Renewal Period.

This section provides specific details about the implementation of the Evaluation Plan as it pertains to the analysis of Medicaid clients with diabetes presented in the Interim Report.

The study design is based on comparing study performance measures for client-episodes of care for DSRIP clients and non-DSRIP clients. To implement the analysis plan, for both DSRIP and non-DSRIP clients, an index date was defined as the date of the client's first diabetes-related visit to a DSRIP provider (for DSRIP clients) or non-DSRIP provider (for non-DSRIP clients) during DY7 (October 1, 2017–September 30, 2018).

Each client's index date determines the beginning of the post-period episode of care and the end of the pre-period episode of care for that client and varies across clients within DY7 (see Figure B.2.1).

The following inclusion criteria were applied to the samples for both DSRIP and non-DSRIP clients:

- Must have continuous Medicaid eligibility over 12 months before and 12 months after the index date.
- Must maintain continuous residency in the same RHP over 12 months before and 12 months after the index date (with a change of residency within the same RHP allowed).

- Must have had at least one diabetes-related office visit with a non-DSRIP performing provider over the 12-month period before the index date.
- Must not have had any visits to a DSRIP-performing provider during the 12 months before the index date.

An additional restriction applied to the non-DSRIP clients is that they must not have had any visits to a DSRIP-performing provider during the 12 months after the index date (i.e., must be "never" DSRIP clients).

While 12 month pre- and post-index date periods are used to identify DSRIP and non-DSRIP clients, measures will be calculated using wider 24 month pre- and post-index date measurement windows (see Figure B.2.1).

However, the 24-month measurement windows were not available for the Interim Report, so narrower measurement periods were used (the Summative Report will use the full 24-month pre- and post-index date measurement periods). The measurement window was 12 months before and after the client's index date for the following performance measures:

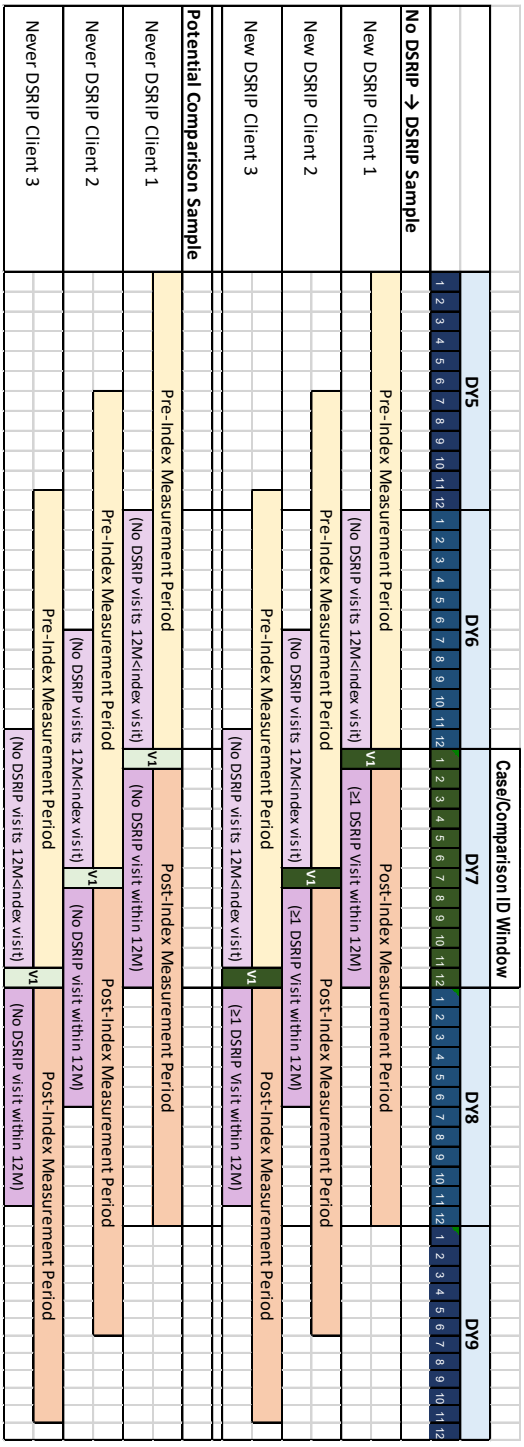
- Measure 1.2.1: Proportion of Visits with Usual Provider of Care
- Measure 1.2.5: ED visits with a primary or secondary diagnosis of diabetes (and all-cause ED visits)
- Measure 1.2.6: Medicaid Cost of Care

Given that the initial event creating the starting point for an interval measure (e.g., the first HbA1c test) often did not occur at the beginning of the episode of care, the measurement window was extended to 14 months before and after the client's index date for the 12-month interval measures, to reduce the extent of missing values for these measures. The measurement window was 14 months before and after the client's index date for the following performance measures based on intervals between office visits or HbA1c tests:

- Measure 1.2.2: Interval between Visits, 1 Year (± 1 Month)
- Measure 1.2.3: Testing HbA1c Frequency (Two tests within 12 months, ± 1 Month)

Of note, the secondary measurement window for the interval between visits was 8 months for Measure 1.2.2.a, Interval between Visits, 6 Months (± 1 Month).

Figure B.2.1 Performance Measurement Period Pre/Post-Index Dates for DSRIP/Comparison Clients.



Note: DY7 = October 1, 2017–September 30, 2018. V1 = First office visit with DSRIP/non-DSRIP provider in DY7. The lower set of bars in each row (purple) show the time interval for applying inclusion/exclusion criteria to identify DSRIP/non-DSRIP clients based on each client's index visit date in DY7. The top set of bars in each row (orange) show the pre/post measurement periods for performance measures for clients with different index dates in DY7. DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year.

3. HYPOTHESIS 1.2 SAMPLE

The initial sample of claims and encounter data included 356,047 unique Medicaid clients with diabetes. To implement the analysis plan, for both DSRIP and non-DSRIP clients, an index date was defined as the date of the client's first diabetes-related visit to a DSRIP provider (for DSRIP clients) or non-DSRIP provider (for non-DSRIP clients) during DY7 (October 1, 2017–September 30, 2018). Each client's index date determines the beginning of the post-period and the end of the pre-period for that client and varies across clients within DY7.

Of the initial sample, 21,810 clients had at least one visit with a DSRIP provider in DY7, whereas 192,860 clients had no visits with a DSRIP provider in DY7, but at least one visit with a non-DSRIP provider in DY7 (the remaining 141,337 clients did not have a visit in DY7). For context, in 2018, DSRIP performing providers who reported on diabetes-related measures served over 38,000 Medicaid clients and 91,000 LIU clients.

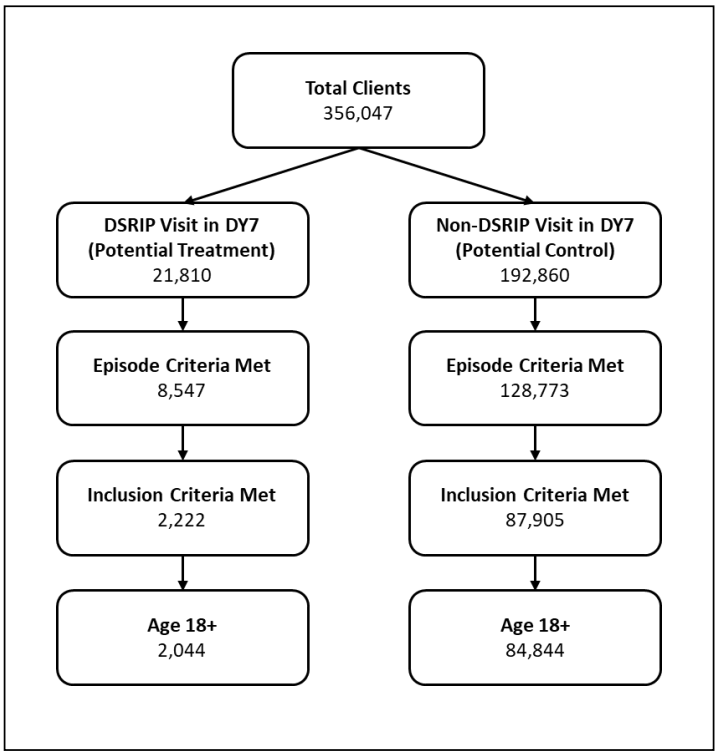
The following inclusion criteria were applied to the samples identified for both DSRIP and non-DSRIP clients:

- Must have continuous Medicaid eligibility over 12 months before and 12 months after the index date.
- Must maintain continuous residency in the same RHP over 12 months before and 12 months after the index date (with a change of residency within the same RHP allowed).
- Must have had at least one diabetes-related office visit with a non-DSRIP performing provider over the 12-month period before the index date.
- Must not have had any visits to a DSRIP performing provider during the 12 months before the index date.

An additional restriction applied to the non-DSRIP clients is that they must not have had any visits to a DSRIP performing provider during the 12 months after the index date (i.e., they must be "never" DSRIP clients). Researchers did not apply the dual eligible exclusion criteria in the Interim Report. Researchers plan to investigate this in the Summative Report, along with the subgroup analysis.

After the episode definition restrictions, continuous enrollment and residency requirements, and age restrictions, there were 2,044 DSRIP treatment clients and 84,844 potential non-DSRIP comparison clients (see Figure B.3.1).

Figure B.3.1 DSRIP Diabetes Claims Analysis Sample Flow Diagram.



Note: DSRIP = Delivery System Reform Incentive Payment.

Propensity Score Matching

Before proceeding to the DID analysis, as noted in Appendix G. Evaluation Plan Revision v5.1, the comparability of comparison clients to the treatment clients was enhanced using PSM. PSM is one form of propensity score adjustment, which refers to a family of related analytic approaches for improving the comparability of condition severity or other risk factors across individuals in treatment and comparison samples in non-experimental settings (Austin, 2011). A propensity score is a number that reflects an estimate of the likelihood that an individual is a member of the treatment group versus the comparison group based on the individual's characteristics. PSM entails identifying one or more individuals in the comparison sample group with a propensity score that is sufficiently similar to a specific individual in the treatment sample to constitute a match. The analysis then focuses on matched treatment and comparison samples.

Treatment Assignment Model

The first step in implementing PSM was to generate propensity score estimates for the 2,044 clients in the DSRIP treatment sample and the 84,844 clients in the non-DSRIP comparison sample (86,888 total) using a logistic regression treatment assignment model (Table B.3.1). Variables included in the model to predict treatment assignment (DSRIP or not) were the client's gender, race and ethnicity, age category, Elixhauser Comorbidity Index Score category (based on claims data over the 12-month pre-index date period), RHP residency location, and whether the client was enrolled in an FFS or MMC plan.

Each client's propensity score was calculated as the predicted log odds or "logit" value using the estimated coefficients from the treatment assignment logistic regression model results applied

to each client's values for all of the variables included in the treatment assignment model (i.e., the predicted "Xβ" value). Defining a propensity score to be used for matching based on the predicted logit generally is preferred to defining the score based on the predicted probability of treatment because the former preserves more variation at the tails of the score distribution (Austin, 2011).

Given that individuals in the treatment sample by definition actually received treatment, they generally will tend to have higher propensity scores (that is, a higher predicted likelihood of treatment) than individuals in the comparison sample. The potential for successful implementation of PSM depends on the degree of support for matching, meaning the degree to which the propensity score distribution for individuals in the treatment sample overlaps the distribution for the individuals in the comparison sample.

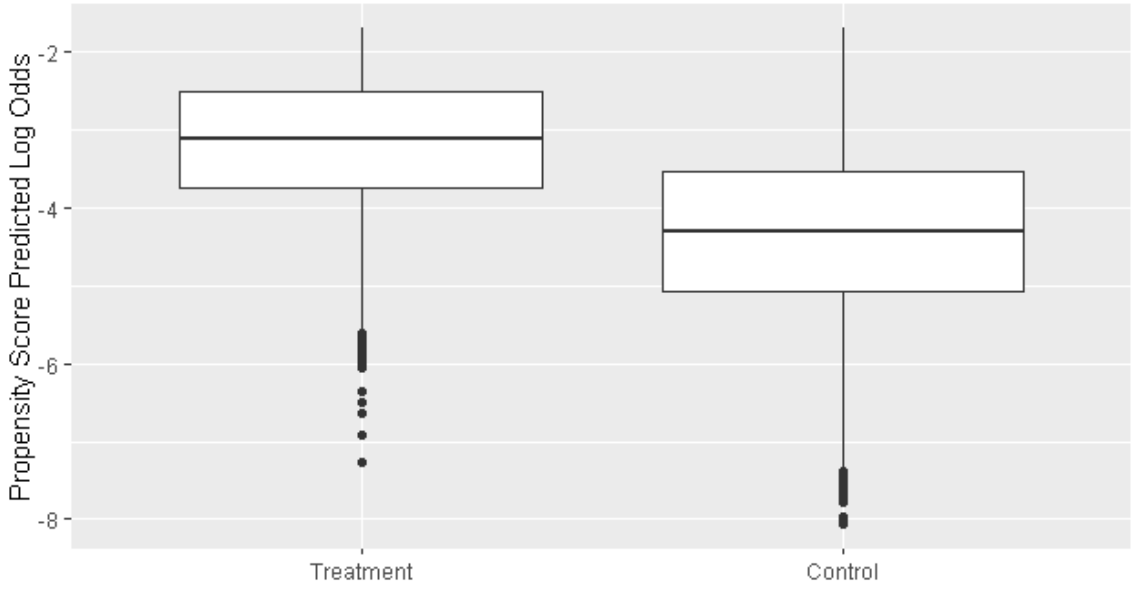
Figure B.3.2 provides box plots of the propensity score distributions for the DSRIP treatment clients and the non-DSRIP comparison (control) clients; the plots were generated using the predicted probabilities based on the logistic regression results reported in Table B.3.1. As expected, the propensity scores for DSRIP treatment clients generally were higher than the scores for non-DSRIP comparison clients, but there was a substantial range of support across the distributions for PSM.

Table B.3.1 Logistic Regression Treatment Assignment Model, DSRIP Treatment versus Non-DSRIP Comparison Client Episodes.

Independent Variable	Coefficient	Std Error	Odds Ratio	z-value
Intercept	-4.19***	0.15	0.015	-27.93
Age Category 75+	-1.11***	0.09	0.330	-12.33
Age Category 65–74	-0.65***	0.07	0.522	-9.29
Age Category 55–64	-0.21***	0.05	0.811	-4.20
Age Category 18–54	reference	–	–	–
Elixhauser Category 6+	0.6***	0.10	1.822	6.00
Elixhauser Category 4–5	0.3**	0.10	1.350	3.00
Elixhauser Category 2–3	0.01	0.10	1.010	0.10
Elixhauser Category 0–1	reference	–	–	–
RHP 20	-0.93***	0.23	0.395	-4.04
RHP 19	-0.31	0.28	0.733	-1.11
RHP 18	-1.7**	0.51	0.183	-3.33
RHP 17	-0.07	0.20	0.932	-0.35
RHP 16	-0.63*	0.26	0.533	-2.42
RHP 15	-0.57**	0.18	0.566	-3.17
RHP 14	0.91***	0.17	2.484	5.35
RHP 13	-0.63	0.33	0.533	-1.91
RHP 12	-0.9***	0.23	0.407	-3.91
RHP 11	-0.5*	0.25	0.607	-2.00
RHP 10	1.04***	0.12	2.829	8.67
RHP 9	0.49***	0.12	1.632	4.08
RHP 8	-2.39***	0.51	0.092	-4.69
RHP 7	-1.9***	0.36	0.150	-5.28
RHP 6	1.06***	0.11	2.886	9.64
RHP 5	-0.07	0.12	0.932	-0.58
RHP 4	-1.05***	0.21	0.350	-5.00
RHP 3	0.75***	0.11	2.117	6.82
RHP 2	-0.78***	0.17	0.458	-4.59
RHP 1	reference	–	–	–
Male	-0.09*	0.04	0.914	-2.25
Female	reference	–	–	–
Hispanic	0.04	0.07	1.041	0.57
White Non-Hispanic	-0.27***	0.07	0.763	-3.86
Multi-Race/Unknown	0.02	0.07	1.020	0.29
Black Non-Hispanic	reference	–	–	–
Medicaid Managed Care	0.78***	0.05	2.181	15.60
Fee for Service	reference	–	–	–

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 86,888. DSRIP = Delivery System Reform Incentive Payment; RHP = Regional Healthcare Partnership.*

Figure B.3.2 Propensity Score Distributions for Treatment and Control Samples.



Most commonly, PSM employs a match rate of one, two, or three comparison individuals matched to each treatment individual. However, given the large sample of non-DSRIP comparison clients (84,844) relative to the available sample of DSRIP treatment clients (2,044), the DSRIP diabetes claims evaluation plan specified a 10-to-1 match ratio. The PSM process was implemented with the "Matchit" algorithm in R using nearest-neighbor matching without replacement. This resulted in a sample of 2,044 DSRIP treatment client episodes matched to 20,440 non-DSRIP comparison client episodes for the DID analysis (Table B.3.2). However, some of the DSRIP and non-DSRIP clients in the sample transitioned from an FFS to an MMC plan (or vice versa) during the 12-month post-index-date period. Excluding these clients resulted in a final sample of 2,034 DSRIP diabetes clients and 20,374 non-DSRIP comparison clients.

Table B.3.2 Samples of Unmatched and PSM DSRIP and Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Before PSM	2,044	84,844
After PSM	2,044	20,440
After dropping duplicates	2,034	20,374

Note: DSRIP = Delivery System Reform Incentive Payment; PSM = Propensity Score Matching.

The next step in implementing the PSM approach was to confirm that the PSM samples of DSRIP and non-DSRIP clients were sufficiently similar in terms of the variables used to generate the propensity score values used for matching. This was accomplished by examining the standardized mean difference values for the DSRIP and non-DSRIP client samples after matching. Ideally, the post-match absolute values of standardized mean differences should be small for all variables included in the treatment assignment model to assure the two samples are comparable. A rule-of-thumb standard for "small" is that the absolute standardized mean differences ideally should be no larger than 0.1, or 10% (Austin, 2011). As reported in Table B.3.3, the post-match standardized mean difference absolute values were less than 10% for all variables. The post-match balance across the two groups is illustrated in Figure II.6 in the main report.

Table B.3.3 Standardized Mean Difference Before and After PSM.

Variable	Mean (Before PSM)			Mean (After PSM)		
	Treatment	Control	Standardized Difference	Treatment	Control	Standardized Difference
Age Category 18–54	0.431	0.256	0.353	0.431	0.421	0.019
Age Category 55–64	0.356	0.264	0.191	0.356	0.360	-0.009
Age Category 65–74	0.131	0.237	-0.313	0.131	0.136	-0.013
Age Category 75+	0.083	0.243	-0.583	0.083	0.084	-0.003
Elixhauser Category 0–1	0.058	0.063	-0.018	0.058	0.054	0.018
Elixhauser Category 2–3	0.305	0.380	-0.163	0.305	0.317	-0.025
Elixhauser Category 4–5	0.327	0.317	0.022	0.327	0.340	-0.027
Elixhauser Category 6+	0.309	0.240	0.150	0.309	0.289	0.043
RHP 1	0.049	0.063	-0.064	0.049	0.047	0.010
RHP 2	0.025	0.062	-0.233	0.025	0.026	-0.004
RHP 3	0.237	0.121	0.274	0.237	0.290	-0.013
RHP 4	0.015	0.046	-0.263	0.015	0.016	-0.012
RHP 5	0.120	0.198	-0.242	0.120	0.111	0.028
RHP 6	0.217	0.083	0.325	0.217	0.214	0.008
RHP 7	0.004	0.029	-0.401	0.004	0.004	-0.008
RHP 8	0.002	0.025	-0.517	0.002	0.002	0.003
RHP 9	0.103	0.078	0.081	0.103	0.090	0.043
RHP 10	0.107	0.050	0.184	0.107	0.076	0.099
RHP 11	0.009	0.021	-0.123	0.009	0.009	0.000
RHP 12	0.012	0.036	-0.228	0.012	0.011	0.006
RHP 13	0.005	0.014	-0.123	0.005	0.004	0.011
RHP 14	0.028	0.017	0.067	0.028	0.029	-0.006
RHP 15	0.025	0.044	-0.125	0.025	0.027	-0.016
RHP 16	0.008	0.018	-0.102	0.008	0.007	0.017
RHP 17	0.015	0.019	-0.031	0.015	0.016	-0.010
RHP 18	0.002	0.016	-0.324	0.002	0.001	0.019
RHP 19	0.007	0.012	-0.065	0.007	0.006	0.005
RHP 20	0.011	0.049	-0.354	0.011	0.013	-0.015
Female	0.674	0.660	0.030	0.674	0.675	-0.001
Male	0.326	0.340	-0.030	0.326	0.325	0.001
Black Non-Hispanic	0.209	0.146	0.156	0.209	0.202	0.017
Hispanic	0.420	0.437	-0.034	0.420	0.431	-0.024
Asian/Multi-Race/Unknown	0.200	0.191	0.023	0.200	0.195	0.011
White Non-Hispanic	0.172	0.228	-0.148	0.172	0.171	0.001
Fee for Service	0.334	0.625	-0.617	0.334	0.331	0.005
Medicaid Managed Care	0.666	0.376	0.617	0.666	0.669	-0.005

Note: PSM = Propensity Score Matching; RHP = Regional Healthcare Partnership.

4. FULL RESULTS: HYPOTHESIS 1.1 COLLABORATION AMONG PROVIDERS

Average Number of Ties by Type (Measures 1.1.1 and 1.1.2)

The first measures of collaborative relationships are the various types of ties (Measure 1.1.1) and the average number of ties (Measure 1.1.2) each provider had within its RHP for each type. The types of ties are joint service delivery, tangible resource sharing, and data-sharing agreements. Each of the 20 RHPs within Texas has a different number of providers participating in the DSRIP program. The evaluation computed the average number of ties for each type per provider in each RHP.

Table B.4.1 Average Ties: Joint Service Delivery.

	# OF PROVIDERS FOR EACH TIME PERIOD				AVERAGE TIES: JOINT SERVICE DELIVERY				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	Point Change	% Change
RHP 1	37	38	40	20	5.0	7.7	6.5	6.6	1.6	33%
RHP 2	17	17	17	15	5.4	5.6	2.9	4.7	-0.7	-14%
RHP 3	30	30	33	25	5.4	5.9	7.1	3.8	-1.6	-29%
RHP 4	25	25	25	17	4.7	6.2	4.9	3.8	-1.0	-21%
RHP 5	8	8	8	10	3.0	4.8	3.0	3.0	0.0	0%
RHP 6	27	27	27	23	3.7	4.2	11.0	4.8	1.1	30%
RHP 7	16	16	17	7	3.6	3.8	5.3	2.3	-1.3	-37%
RHP 8	16	16	18	13	4.4	4.3	5.1	2.2	-2.2	-50%
RHP 9	25	25	25	23	6.2	6.7	6.3	3.5	-2.8	-45%
RHP 10	30	30	33	24	6.7	6.8	5.6	2.6	-4.1	-61%
RHP 11	19	19	19	15	7.7	8.9	3.4	2.6	-5.1	-67%
RHP 12	37	37	39	36	10.1	10.0	7.3	6.3	-3.8	-38%
RHP 13	21	21	21	13	4.9	8.6	5.6	2.3	-2.5	-52%
RHP 14	12	12	13	10	5.3	6.0	6.0	3.3	-2.1	-39%
RHP 15	8	8	8	8	4.0	6.3	4.3	5.0	1.0	25%
RHP 16	9	9	10	7	4.9	6.7	5.2	3.1	-1.7	-36%
RHP 17	19	19	20	12	5.9	5.9	6.2	3.0	-2.9	-49%
RHP 18	10	10	10	6	3.4	4.8	3.2	1.7	-1.7	-51%
RHP 19	13	13	15	12	5.1	6.5	4.7	1.1	-4.0	-79%
RHP 20	8	8	8	4	4.0	4.0	4.0	2.0	-2.0	-50%
Mean across RHPs					5.2	6.2	5.4	3.4	-1.8	-35%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey.
RHP = Regional Healthcare Partnership.

The number of participating providers decreased from the beginning of the Waiver (T0) to 2020 (T3). Thus, there were often fewer providers with which to potentially share ties in most of the RHPs. The average change in joint service delivery ties per provider across all the RHPs was −1.8 (range of −5.1 to +1.6), a 35% decrease (Table B.4.1).

Table B.4.2 Average Ties: Tangible Resource Sharing.

	# OF PROVIDERS FOR EACH TIME PERIOD				AVERAGE TIES: TANGIBLE RESOURCE SHARING				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	Point Change	% Change
RHP 1	37	38	40	20	3.4	4.6	3.1	2.7	-0.7	-19%
RHP 2	17	17	17	15	2.1	2.9	1.4	1.6	-0.5	-24%
RHP 3	30	30	33	25	1.5	1.5	1.9	2.6	1.1	75%
RHP 4	25	25	25	17	1.4	2.1	2.6	0.8	-0.7	-48%
RHP 5	8	8	8	10	1.3	1.8	1.3	2.4	1.2	92%
RHP 6	27	27	27	23	3.4	5.0	3.7	1.6	-1.8	-52%
RHP 7	16	16	17	7	1.5	2.1	2.9	2.3	0.8	52%
RHP 8	16	16	18	13	1.3	1.5	2.7	1.8	0.6	47%
RHP 9	25	25	25	23	2.3	2.3	3.2	2.4	0.1	2%
RHP 10	30	30	33	24	1.7	2.0	2.7	2.0	0.3	15%
RHP 11	19	19	19	15	1.2	1.4	1.6	2.4	1.3	110%
RHP 12	37	37	39	36	2.6	3.2	3.5	3.5	0.8	31%
RHP 13	21	21	21	13	1.4	3.2	1.9	1.1	-0.4	-25%
RHP 14	12	12	13	10	2.0	1.8	1.2	4.0	2.0	100%
RHP 15	8	8	8	8	2.8	4.3	1.3	3.5	0.8	27%
RHP 16	9	9	10	7	1.1	4.4	3.4	1.1	0.0	3%
RHP 17	19	19	20	12	3.8	3.5	3.2	2.3	-1.5	-38%
RHP 18	10	10	10	6	1.6	1.6	2.6	1.0	-0.6	-38%
RHP 19	13	13	15	12	1.1	2.3	1.6	0.9	-0.2	-16%
RHP 20	8	8	8	4	1.3	1.8	0.3	2.0	0.8	60%
Mean across RHPs					1.9	2.7	2.3	2.1	0.2	9%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey. RHP = Regional Healthcare Partnership.

The average change in tangible resource sharing ties per provider increased by 0.2 (range of −1.8 to +2.0), a 9% increase (Table B.4.2).

Table B.4.3 Average Ties: Data-Sharing Agreements.

	# OF PROVIDERS FOR EACH TIME PERIOD				AVERAGE TIES: DATA-SHARING AGREEMENTS				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	Point Change	% Change
RHP 1	37	38	40	20	1.0	1.5	2.0	3.6	2.6	270%
RHP 2	17	17	17	15	0.9	1.2	1.8	2.8	1.9	198%
RHP 3	30	30	33	25	2.6	3.5	2.5	1.4	-1.2	-48%
RHP 4	25	25	25	17	0.9	2.1	1.5	1.3	0.4	42%
RHP 5	8	8	8	10	1.3	2.0	1.5	2.8	1.6	124%
RHP 6	27	27	27	23	1.6	2.4	3.9	2.2	0.6	34%
RHP 7	16	16	17	7	1.1	1.8	2.1	1.4	0.3	27%
RHP 8	16	16	18	13	1.4	1.5	2.2	0.7	-0.7	-52%
RHP 9	25	25	25	23	2.1	2.5	3.7	2.4	0.3	14%
RHP 10	30	30	33	24	2.8	2.5	2.0	2.2	-0.6	-23%
RHP 11	19	19	19	15	0.8	1.1	0.9	0.7	-0.1	-15%
RHP 12	37	37	39	36	1.2	2.1	2.0	2.1	0.8	66%
RHP 13	21	21	21	13	2.2	3.0	2.1	0.8	-1.4	-65%
RHP 14	12	12	13	10	1.3	1.3	1.2	2.0	0.7	50%
RHP 15	8	8	8	8	1.8	4.5	3.0	2.8	1.0	57%
RHP 16	9	9	10	7	0.7	2.0	1.0	1.4	0.8	114%
RHP 17	19	19	20	12	2.3	2.5	2.7	1.8	-0.5	-21%
RHP 18	10	10	10	6	1.4	2.0	1.8	0.3	-1.1	-76%
RHP 19	13	13	15	12	0.2	2.0	0.7	0.4	0.2	136%
RHP 20	8	8	8	4	1.0	0.8	3.5	2.5	1.5	150%
Mean across RHPs					1.4	2.1	2.1	1.8	0.3	24%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey.
RHP = Regional Healthcare Partnership.

The average change in data-sharing agreement ties per provider within RHPs was 0.3 (range of −1.4 to +2.6), a 24% increase (Table B.4.3).

Strength of Ties (Measure 1.1.3)

Strength of ties relates to the extent to which providers are linked in multiple activities. To calculate the strength of ties between providers, the number of different types of ties (joint service delivery, sharing tangible resources, and data sharing) a pair of providers shared was summed so that a tie could have a strength of 0 (no ties reported) through 3 (where each type of tie was shared).

Table B.4.4 Strength of Ties.

	STRENGTH OF TIES BETWEEN PROVIDERS (0–3 maximum)				OVERALL CHANGE T0 TO T3	
	T0 (N = 387) Pre-Waiver	T1 (N = 388) 2013	T2 (N = 406) 2015	T3 (N = 300) 2020	Point Change	% Change
RHP 1	1.8	1.7	1.7	1.9	0.1	5%
RHP 2	1.4	1.6	2.1	1.5	0.1	7%
RHP 3	1.7	1.7	1.6	1.8	0.1	8%
RHP 4	1.4	1.6	1.7	1.4	0.0	1%
RHP 5	1.6	1.7	1.9	2.7	1.2	74%
RHP 6	1.6	1.8	1.6	1.6	0.0	3%
RHP 7	1.6	2.0	1.7	2.6	1.0	63%
RHP 8	1.6	1.7	2.0	2.2	0.6	38%
RHP 9	1.6	1.7	2.1	2.2	0.6	37%
RHP 10	1.4	1.5	1.8	2.5	1.1	77%
RHP 11	1.3	1.3	1.5	2.1	0.8	67%
RHP 12	1.2	1.5	1.7	1.8	0.5	42%
RHP 13	1.6	1.7	1.6	1.7	0.1	4%
RHP 14	1.6	1.5	1.4	1.9	0.2	14%
RHP 15	2.1	2.4	1.8	2.3	0.1	6%
RHP 16	1.4	2.0	1.8	1.5	0.2	13%
RHP 17	1.9	1.9	2.0	2.4	0.5	26%
RHP 18	1.9	1.8	2.1	1.8	-0.1	-4%
RHP 19	1.2	1.6	1.5	1.9	0.7	59%
RHP 20	1.6	1.6	1.9	2.6	1.0	66%
Mean across RHPs	1.6	1.7	1.8	2.0	0.4	28%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey.
RHP = Regional Healthcare Partnership.

Across RHPs, the extent of multiple linkages increased. The average strength of ties between providers increased by 0.4 (range of −0.1 to +1.2), a 28% increase from baseline (Table B.4.4).

Network Density (Measure 1.1.4)

A more accurate estimate of trends in joint service delivery, tangible resource sharing, and data-sharing agreements between DSRIP providers in an RHP is network density, which controls for any changes in the number of providers in each RHP over time. Network density is the number of existing ties between any of the providers in an RHP divided by the total number of possible ties in that RHP. The network density results for each type of tie (joint service delivery, tangible resource sharing, data-sharing agreements) are shown in Tables B.4.5, B.4.6, and B.4.7.

Table B.4.5 Network Density: Joint Service Delivery.

	# OF PROVIDERS FOR EACH TIME PERIOD				NETWORK DENSITY: JOINT SERVICE DELIVERY				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	% Point Change	% Change
RHP 1	37	38	40	20	14%	21%	17%	35%	21%	151%
RHP 2	17	17	17	15	34%	35%	18%	33%	0%	-1%
RHP 3	30	30	33	25	19%	20%	22%	16%	-3%	-14%
RHP 4	25	25	25	17	20%	26%	20%	25%	5%	27%
RHP 5	8	8	8	10	43%	68%	43%	33%	-10%	-22%
RHP 6	27	27	27	23	14%	16%	42%	23%	9%	61%
RHP 7	16	16	17	7	24%	25%	33%	38%	14%	58%
RHP 8	16	16	18	13	29%	28%	30%	20%	-9%	-32%
RHP 9	25	25	25	23	26%	28%	26%	16%	-10%	-37%
RHP 10	30	30	33	24	23%	23%	17%	11%	-12%	-51%
RHP 11	19	19	19	15	43%	50%	19%	20%	-23%	-54%
RHP 12	37	37	39	36	28%	28%	19%	19%	-9%	-32%
RHP 13	21	21	21	13	24%	43%	28%	19%	-5%	-21%
RHP 14	12	12	13	10	48%	55%	50%	46%	-2%	-4%
RHP 15	8	8	8	8	57%	89%	61%	71%	14%	25%
RHP 16	9	9	10	7	61%	83%	58%	52%	-9%	-14%
RHP 17	19	19	20	12	33%	33%	33%	27%	-5%	-17%
RHP 18	10	10	10	6	38%	53%	36%	33%	-4%	-12%
RHP 19	13	13	15	12	42%	54%	33%	11%	-31%	-74%
RHP 20	8	8	8	4	57%	57%	57%	67%	10%	17%
Mean across RHPs					34%	42%	33%	31%	**-3%**	**-9%**

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey.
RHP = Regional Healthcare Partnership.

From the pre-Waiver baseline, the average density of joint service delivery ties between DSRIP providers within an RHP changed by −3 percentage points (range of −31 to +21), a 9% decrease (Table B.4.5).

Table B.4.6 Network Density: Tangible Resource Sharing.

	# OF PROVIDERS FOR EACH TIME PERIOD				NETWORK DENSITY: TANGIBLE RESOURCE SHARING				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	% Point Change	% Change
RHP 1	37	38	40	20	9%	13%	8%	14%	5%	53%
RHP 2	17	17	17	15	13%	18%	9%	11%	-2%	-14%
RHP 3	30	30	33	25	5%	5%	6%	11%	6%	111%
RHP 4	25	25	25	17	6%	9%	11%	5%	-1%	-17%
RHP 5	8	8	8	10	18%	25%	18%	27%	9%	49%
RHP 6	27	27	27	23	13%	19%	14%	8%	-5%	-41%
RHP 7	16	16	17	7	10%	14%	18%	38%	28%	281%
RHP 8	16	16	18	13	8%	10%	16%	17%	8%	100%
RHP 9	25	25	25	23	10%	10%	13%	11%	2%	16%
RHP 10	30	30	33	24	6%	7%	8%	9%	3%	45%
RHP 11	19	19	19	15	6%	8%	9%	19%	12%	190%
RHP 12	37	37	39	36	7%	9%	9%	11%	3%	43%
RHP 13	21	21	21	13	7%	16%	10%	9%	2%	26%
RHP 14	12	12	13	10	18%	17%	10%	57%	39%	214%
RHP 15	8	8	8	8	39%	61%	18%	50%	11%	27%
RHP 16	9	9	10	7	14%	56%	38%	19%	5%	37%
RHP 17	19	19	20	12	21%	19%	17%	21%	0%	1%
RHP 18	10	10	10	6	18%	18%	29%	20%	2%	13%
RHP 19	13	13	15	12	9%	19%	11%	9%	0%	1%
RHP 20	8	8	8	4	18%	25%	4%	67%	49%	273%
Mean across RHPs					13%	19%	14%	22%	9%	68%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey
RHP = Regional Healthcare Partnership.

From the pre-Waiver baseline, the average density of tangible resource sharing ties between DSRIP providers within an RHP changed by +9 percentage points (range of −5 to 49), a 68% increase (Table B.4.6).

Table B.4.7 Network Density: Data-Sharing Agreements.

	# OF PROVIDERS FOR EACH TIME PERIOD				NETWORK DENSITY: DATA-SHARING AGREEMENTS				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	% Point Change	% Change
RHP 1	37	38	40	20	3%	4%	5%	19%	16%	601%
RHP 2	17	17	17	15	6%	7%	11%	20%	14%	240%
RHP 3	30	30	33	25	9%	12%	8%	6%	-3%	-37%
RHP 4	25	25	25	17	4%	9%	6%	8%	5%	127%
RHP 5	8	8	8	10	18%	29%	21%	31%	13%	74%
RHP 6	27	27	27	23	6%	9%	15%	10%	4%	66%
RHP 7	16	16	17	7	8%	12%	13%	24%	16%	217%
RHP 8	16	16	18	13	9%	10%	13%	6%	-3%	-34%
RHP 9	25	25	25	23	9%	10%	15%	11%	3%	30%
RHP 10	30	30	33	24	10%	9%	6%	9%	0%	-2%
RHP 11	19	19	19	15	5%	6%	5%	5%	1%	17%
RHP 12	37	37	39	36	3%	6%	5%	6%	3%	81%
RHP 13	21	21	21	13	11%	15%	10%	6%	-5%	-41%
RHP 14	12	12	13	10	12%	12%	10%	29%	16%	136%
RHP 15	8	8	8	8	25%	64%	43%	39%	14%	57%
RHP 16	9	9	10	7	8%	25%	11%	24%	15%	186%
RHP 17	19	19	20	12	13%	14%	14%	17%	4%	30%
RHP 18	10	10	10	6	16%	22%	20%	7%	-9%	-57%
RHP 19	13	13	15	12	1%	17%	5%	4%	2%	184%
RHP 20	8	8	8	4	14%	11%	50%	83%	69%	483%
Mean across RHPs					9%	15%	14%	18%	9%	93%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey. RHP = Regional Healthcare Partnership.

From the pre-Waiver baseline, the average density of data-sharing agreement ties between DSRIP providers within an RHP changed by +9 percentage points (range of −9 to +69), a 93% increase (Table B.4.7).

Centralization (Measure 1.1.5)

Another network measure that was evaluated was the extent to which ties in any of the dimensions (joint service delivery, tangible resource sharing, or data-sharing agreements) were centralized around any particular provider. If a provider has a tie to everyone else in the RHP but no other provider shares ties with a provider other than the central provider, the degree of centralization will be 100%.

Table B.4.8 Network Centralization: Joint Service Delivery.

	NETWORK CENTRALIZATION: JOINT SERVICE DELIVERY				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	% Point Change	% Change
RHP 1	53%	58%	45%	61%	8%	15%
RHP 2	25%	73%	36%	36%	10%	41%
RHP 3	35%	52%	36%	32%	-3%	-9%
RHP 4	24%	22%	32%	25%	1%	4%
RHP 5	38%	43%	19%	42%	4%	9%
RHP 6	26%	36%	50%	59%	32%	124%
RHP 7	26%	32%	33%	63%	38%	146%
RHP 8	50%	51%	39%	53%	2%	4%
RHP 9	35%	38%	35%	40%	4%	12%
RHP 10	53%	52%	75%	40%	-13%	-25%
RHP 11	52%	56%	35%	31%	-21%	-40%
RHP 12	70%	68%	30%	38%	-32%	-46%
RHP 13	45%	63%	57%	56%	11%	25%
RHP 14	40%	44%	49%	71%	31%	79%
RHP 15	38%	14%	52%	38%	0%	0%
RHP 16	34%	21%	39%	43%	9%	28%
RHP 17	44%	32%	34%	33%	-11%	-26%
RHP 18	22%	31%	39%	70%	48%	215%
RHP 19	68%	55%	60%	36%	-33%	-48%
RHP 20	19%	38%	38%	67%	48%	250%
Mean across RHPs	40%	44%	42%	46%	6%	15%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey. The number of respondents for each time period and RHP were the same as found in prior tables for the social network analysis. RHP = Regional Healthcare Partnership.

Joint service delivery ties became more centralized over time, with a 6 percentage point increase (range of −33 to +48) from the pre-waiver baseline, a 15% increase (Table B.4.8).

Table B.4.9 Network Centralization: Tangible Resource Sharing.

	NETWORK CENTRALIZATION: TANGIBLE RESOURCE SHARING				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	% Point Change	% Change
RHP 1	43%	35%	21%	25%	-18%	-42%
RHP 2	28%	36%	40%	28%	1%	2%
RHP 3	28%	17%	24%	34%	6%	21%
RHP 4	21%	22%	43%	17%	-4%	-17%
RHP 5	33%	43%	33%	8%	-25%	-75%
RHP 6	23%	83%	30%	33%	10%	43%
RHP 7	34%	45%	36%	63%	29%	85%
RHP 8	13%	27%	42%	56%	43%	323%
RHP 9	35%	30%	22%	24%	-10%	-30%
RHP 10	19%	26%	54%	33%	14%	71%
RHP 11	30%	16%	34%	23%	-7%	-23%
RHP 12	22%	17%	32%	24%	3%	12%
RHP 13	36%	65%	39%	19%	-17%	-48%
RHP 14	55%	56%	37%	95%	41%	75%
RHP 15	62%	52%	33%	48%	-14%	-23%
RHP 16	30%	57%	50%	20%	-10%	-34%
RHP 17	32%	28%	46%	29%	-3%	-10%
RHP 18	33%	19%	19%	30%	-3%	-10%
RHP 19	19%	95%	77%	26%	7%	35%
RHP 20	33%	24%	14%	67%	33%	100%
Mean across RHPs	32%	40%	36%	35%	3%	11%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey. The number of respondents for each time period and RHP were the same as found in prior tables for the social network analysis. RHP = Regional Healthcare Partnership.

Tangible resource sharing ties became more centralized over time, with a 3 percentage point increase (range of −25 to +41) from the pre-waiver baseline, an 11% increase (Table B.4.9).

Table B.4.10 Network Centralization: Data-Sharing Agreements.

	NETWORK CENTRALIZATION: DATA-SHARING AGREEMENTS				OVERALL CHANGE T0 TO T3	
	T0 Pre-Waiver	T1 2013	T2 2015	T3 2020	% Point Change	% Change
RHP 1	29%	39%	22%	73%	43%	146%
RHP 2	22%	34%	37%	92%	71%	326%
RHP 3	38%	46%	32%	48%	10%	25%
RHP 4	14%	18%	16%	21%	7%	48%
RHP 5	33%	38%	29%	44%	11%	33%
RHP 6	31%	32%	38%	62%	31%	102%
RHP 7	22%	25%	28%	37%	15%	67%
RHP 8	28%	19%	51%	15%	-13%	-47%
RHP 9	22%	20%	15%	19%	-3%	-15%
RHP 10	23%	20%	63%	42%	19%	83%
RHP 11	20%	18%	38%	29%	10%	50%
RHP 12	20%	15%	25%	38%	19%	94%
RHP 13	27%	72%	60%	42%	15%	57%
RHP 14	40%	40%	37%	38%	-2%	-5%
RHP 15	24%	29%	38%	43%	19%	80%
RHP 16	21%	96%	42%	37%	15%	71%
RHP 17	29%	22%	25%	24%	-5%	-19%
RHP 18	36%	28%	31%	20%	-16%	-45%
RHP 19	8%	98%	36%	20%	12%	140%
RHP 20	38%	24%	48%	33%	-5%	-12%
Mean across RHPs	26%	37%	35%	39%	13%	48%

Note: Respondents for T0 were asked about their pre-waiver ties retrospectively during a 2013 survey. The number of respondents for each time period and RHP were the same as found in prior tables for the social network analysis. RHP = Regional Healthcare Partnership.

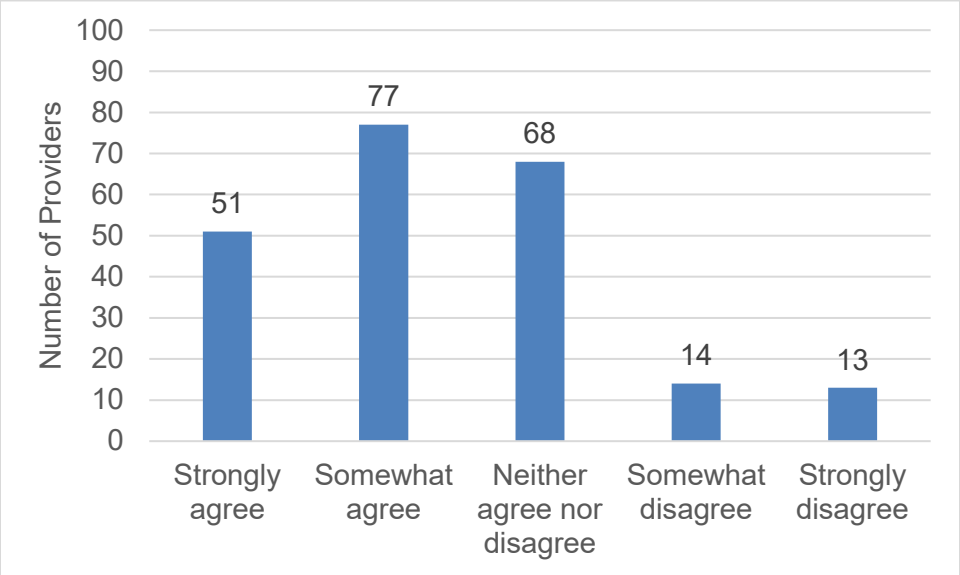
Data-sharing agreement ties became more centralized over time, with a 13 percentage point increase (range of −16 to +71) from the pre-waiver baseline, a 48% increase (Table B.4.10).

Attitude toward Collaboration (Measure 1.1.6)

To understand the attitudes of DSRIP-participating providers toward DSRIP's impact on collaborative relationships, specifically care coordination, in the June–July 2020 survey, providers were asked about the extent to which they agreed or disagreed with the following statements:

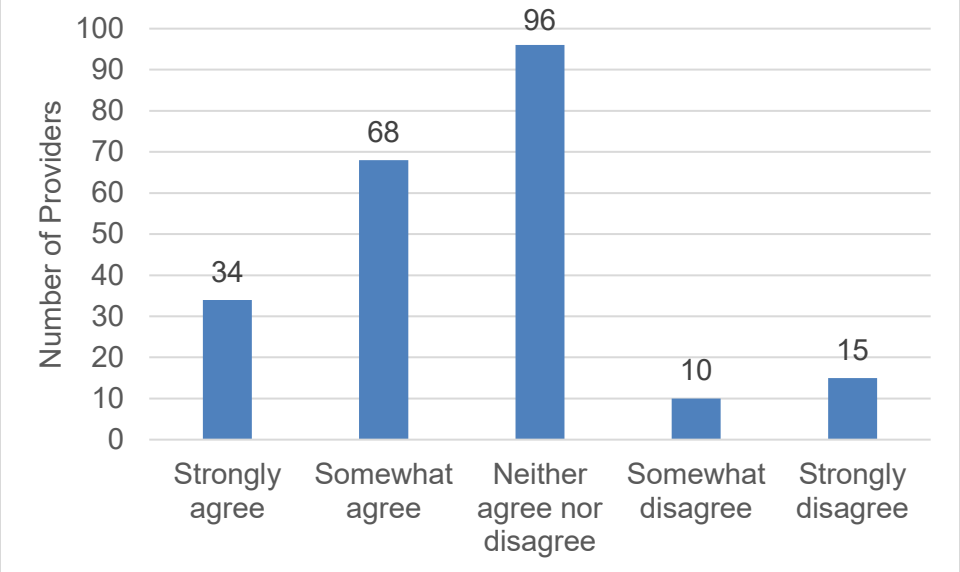
- DSRIP has increased the level of care coordination between different DSRIP providers.
- DSRIP has increased the level of care coordination between DSRIP and non-DSRIP providers.

Figure B.4.1 Collaboration between DSRIP Providers.



Note: N = 223. DSRIP = Delivery System Reform Incentive Payment.

Figure B.4.2 Collaboration between DSRIP and Non-DSRIP Providers.



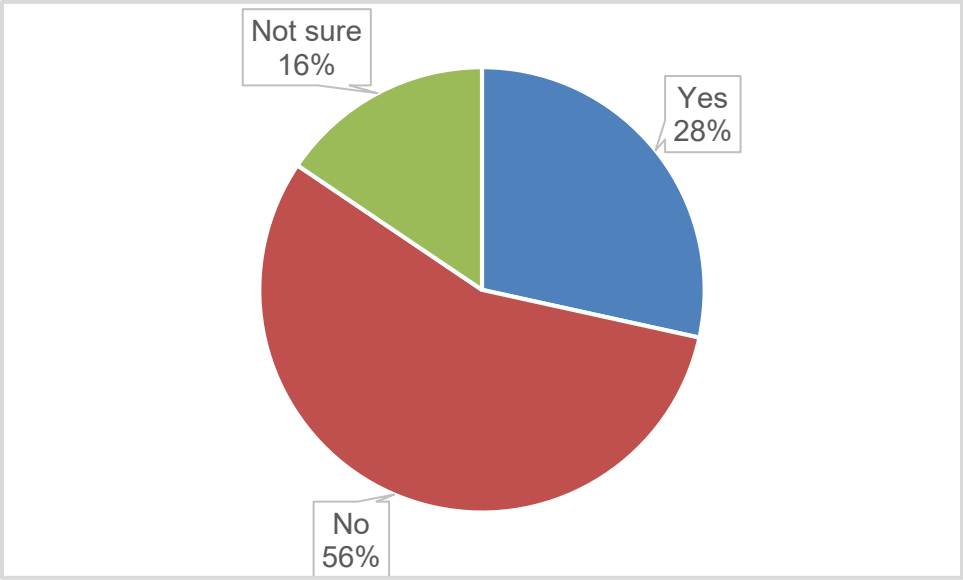
Note: N = 223. DSRIP = Delivery System Reform Incentive Payment.

Overall, 57.4% of providers agreed or strongly agreed that DSRIP increased coordination between DSRIP providers, with 30.5% remaining neutral (Figure B.4.1). Nearly half (45.7%) of providers agreed or strongly agreed that DSRIP increased coordination between DSRIP and non-DSRIP providers, with 43.0% remaining neutral (Figure B.4.2). This finding suggests that DSRIP is perceived to have a positive impact on collaboration between two providers, particularly when both providers participate in DSRIP.

HIE Membership (Measure 1.1.7)

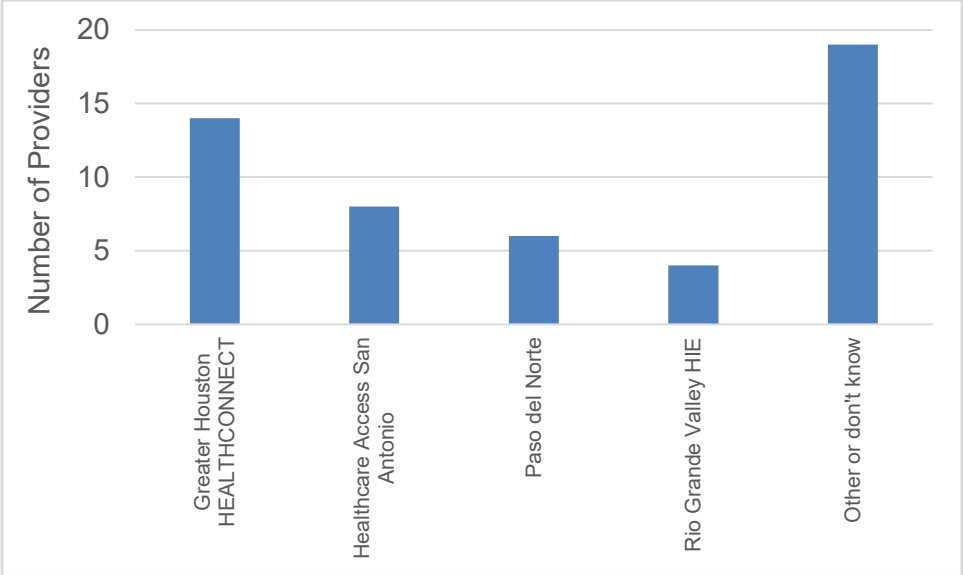
In the June–July 2020 social network survey, DSRIP survey respondents also were asked about participation in HIEs. Twenty-eight percent of DSRIP survey respondents reported membership in an HIE. Of those who knew they participated in an HIE, the majority participated in HIE Texas, a consortium that includes Greater Houston HEALTHCONNECT, Healthcare Access San Antonio, Paso del Norte HIE, and Rio Grande Valley HIE (Figure B.4.3 and Figure B.4.4).

Figure B.4.3 Is Your Organization a Member of an HIE?



Note: 2020 DSRIP Provider Survey. Note: N = 225. HIE = Health Information Exchange.

Figure B.4.4 Which HIE Does Your Organization Participate In?



Note: 2020 DSRIP Provider Survey. Note: N = 51 DSRIP providers. Not all providers who knew their organization participated in an HIE answered this question. HIE = Health Information Exchange.

HIE Use for DSRIP Reporting (Measure 1.1.8)

Only a very small number of DSRIP providers noted using an HIE for DSRIP reporting purposes. Of the 2,889 total DSRIP Category C measures (quality and clinical outcomes measures) reported to the state across all providers, DSRIP providers stated that an HIE they participated in was used (or could be used) to assist in Category C reporting in only five cases (0.17%). However, these administrative records exhibit a large amount of missing data regarding HIE use for these reporting measures, and no conclusions should be drawn from these data at this time.

5. FULL RESULTS: HYPOTHESIS 1.2 MEDICAID CLIENTS WITH DIABETES

Continuity of Care: Usual provider of care

The share-based measure of continuity of care is defined based on the proportion of claims classified as office visits with the same service provider, regardless of provider specialty, over a 12-month period, using the following measure: Measure 1.2.1.a: Proportion of Visits with Usual Provider of Care—The proportion of office visits to the most-visited provider as a proportion of all office visits (UPC) over a 12-month period.

A UPC value was measured for each client for the 12-month pre-index period and for the 12-month post-index period. In the case of ties (e.g., two providers each with a 50% share), a single UPC was used (50%). A small number of clients with less than two total visits during a measurement period were assigned a value of 0 for UPC for that period. Simple descriptive statistics for UPC for the matched DSRIP and non-DSRIP clients in the pre- and post-index periods are reported in Table B.5.1. Over the 12-month pre-index to post-index periods, a decrease in UPC of about 9 percentage points was observed for DSRIP clients, compared to a modest increase in UPC among non-DSRIP clients.

Table B.5.1 Pre/Post Mean UPC, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	0.570 (N = 2,034)	0.604 (N = 20,374)
Post-Index Period	0.474 (N = 2,034)	0.612 (N = 20.374)

Note: Pre-index and post-index periods were 12 months before and after client index date within October 1, 2017–September 30, 2018. DSRIP = Delivery System Reform Incentive Payment.

The DID estimate of the DSRIP treatment effect on UPC is the estimated coefficient of the interaction term (Treat × Post) in the UPC model. As reported in Table B.5.2, the estimated coefficient of −0.091 indicates that the DSRIP program was associated with a 9.1 percentage point decrease in UPC among Medicaid clients treated by DSRIP diabetes-participating providers, relative to the change in UPC among similar non-DSRIP Medicaid clients over the same time period ($p < 0.001$).

The estimated coefficients of the time dummy variables indicated that treatment episodes with index dates occurring in the second quarter of DY7 were estimated to have a 2.3 percentage point higher value of UPC compared to episodes with start dates during the first quarter, but no other statistically significant differences in UPC related to episode start date were indicated.

Table B.5.2 DID Truncated Regression Estimate of DSRIP UPC Effect.

	Coefficient	Std Error	*z*-value
Treat × Post	-0.09122***	0.006282	-14.52
Treat	-0.01828***	0.005511	-3.32
Post	0.00246	0.002058	1.19
DY7—Quarter 2	0.02319***	0.003413	6.79
DY7—Quarter 3	0.00421	0.005435	0.78
DY7—Quarter 4	0.00002	0.008421	0.00
Intercept	0.55721***	0.001517	367.3

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 44,816 (Number of observations in the DID model). DID = Difference in Differences; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year; UPC = Usual Provider of Care.*

Continuity of Care: Interval between provider visits

Two interval-based measures of continuity of care were analyzed. The first was the following measure: Measure 1.2.2a: Interval between Visits, 6 Months—A dichotomous indicator of continuity of care equal to 1 when the longest interval between two office visits to the same PCP is 8 months or less (6 months plus 1-month tolerance) and 0 otherwise.

For the Interim Report, the measurement of the 6-month interval measure of continuity was limited to a minimum 8-month period from the client's first visit with his or her UPC. However, for visits that occurred later than DY7, the available data for measurement of the 6--month interval measure of continuity after the first visit with the client's provider was not sufficient to determine if a second visit with the same provider occurred within the required interval.

Thus, the post-index period 6-month measure was missing for 307 DSRIP treatment episodes and 2,219 non-DSRIP comparison episodes. An episode relates to the episode of care for a particular client. Similarly, in the pre-period measurement window, in some cases the first visit with the client's usual source of care occurred at a date leaving less than 8 months remaining in the pre-period window. As a result, the pre-period 6-month measure of continuity was not measurable for 381 DSRIP treatment episodes and 1,568 non-DSRIP comparison episodes. Taken together, the 6-month interval measure was missing in either the pre-period or post-period window for 688 DSRIP treatment episodes and 3,787 non-DSRIP comparison episodes.

Simple descriptive statistics for the 6-month interval measure are reported in Table B.5.3. Comparison of the pre-measurement and post-measurement periods revealed an increase of about 12 percentage points in the likelihood of adequate 6-month visit frequency with the same provider for DSRIP clients, versus about an 11 percentage-point increase in the likelihood of adequate visit frequency with the same provider among non-DSRIP clients.

Table B.5.3 Pre/Post 6-Month Interval Mean, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	0.805 (N = 1,653)	0.797 (N = 18,806)
Post-Index Period	0.922 (N = 1,727)	0.905 (N = 18,155)

Note: Pre-index and post-index period measurement periods were 14 months before and after client index date within October 1, 2017–September 30, 2018. Interval measurement begins with client's first visit to usual provider during measurement period. DSRIP = Delivery System Reform Incentive Payment.

As Table B.5.4 shows, excluding the 4,475 episodes with missing values from the analysis, the DID model results indicate that there was no statistically significant association between the DSRIP program and an improvement in the likelihood of 6-month office visit interval frequency with the same provider among clients treated by DSRIP performing providers compared to clients treated by non-DSRIP providers.

Table B.5.4 DID Logistic Regression Estimate of 6-Month Interval Effect.

	Odds Ratio	Std Error	*z*-value
Treat × Post	1.186	0.1414	1.43
Treat	3.250***	0.2722	14.1
Post	2.486***	0.0804	28.2
DY7—Quarter 2	0.219***	0.0086	-38.8
DY7—Quarter 3	0.156***	0.0107	-27.1
DY7—Quarter 4	0.178***	0.0208	-14.8
Intercept	5.001***	0.0967	83.3

*Note: * p<0.05, ** p<0.01, *** p<0.001. N = 40,341 (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year.*

The second interval-based measure of continuity of care was the following measure: Measure 1.2.2b: Interval between Visits, 1 Year—A dichotomous indicator of continuity of care equal to 1 when the longest interval between two office visits to the same provider is 14 months or less (12 months plus 1-month tolerance) and 0 otherwise.

The missing value issue noted for the 6-month interval measure of continuity was more severe for the 12-month interval measure for the Interim Report analysis, given the need for 14 months of data for measurement. The available data for measurement of the 12-month interval measure of continuity for the post-index period were not sufficient for measurement for 974 DSRIP treatment episodes and 9,132 non-DSRIP comparison episodes. Similarly, for the pre-index period, the 12-month measure of continuity was missing for 1,062 DSRIP treatment episodes and 9,018 non-DSRIP comparison episodes. Taken together, the 12-month interval measure was missing in either the pre-index period or post-index period for 2,036 DSRIP treatment episodes and 18,150 non-DSRIP comparison episodes.

Simple descriptive statistics for the 12-month interval measure are reported in Table B.5.5. Comparison of the pre-measurement and post-measurement periods revealed an increase of about 9 percentage points in the likelihood of adequate 12-month visit frequency with the same provider for DSRIP clients, versus about a 6 percentage-point increase in the likelihood of adequate 12-month visit frequency with the same provider among non-DSRIP clients.

Table B.5.5 Pre/Post 12-Month Interval Mean, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	0.882 (N = 972)	0.888 (N = 11,356)
Post-Index Period	0.970 (N = 1,060)	0.951 (N = 11,242)

Note: Pre-index and post-index period measurement periods were 14 months before and after client index date within October 1, 2017–September 30, 2018. Interval measurement begins with client's first visit to usual provider during measurement period. DSRIP = Delivery System Reform Incentive Payment.

As Table B.5.6 shows, the DID model for the sample excluding the 20,186 episodes with missing values estimated that the DSRIP sample was associated with approximately 75% higher odds in the likelihood of 12-month office visit interval frequency with the same provider as compared to the non-DSRIP sample. The magnitude of the estimated treatment effect is quite large but should be interpreted with caution given the substantial share of clients with missing values for this measure and the dramatic pre/post increase in 12-month continuity in both the DSRIP treatment and non-DSRIP comparison samples.

Table B.5.6 DID Logistic Regression Estimate of 12-Month Interval Effect.

	Odds Ratio	Std Error	*z*-value
Treat × Post	1.753**	0.214	2.622
Treat	3.687***	0.125	10.358
Post	2.528***	0.053	17.233
DY7—Quarter 2	0.239***	0.065	-22.000
DY7—Quarter 3	0.108***	0.107	-20.618
DY7—Quarter 4	0.124***	0.198	-10.479
Intercept	9.891***	0.032	70.094

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 24,630. (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year.*

Quality of Care: Testing HbA1c levels

Two process measures were used to assess the impact of DSRIP on the quality of diabetes care. Diabetes treatment guidelines generally recommend measuring HbA1c at least once every 12 months. Less frequent HbA1c measurement may be associated with poor glycemic control. Thus, one process measure is the presence of claims for two HbA1c tests within 14 months (12 months plus a 1-month tolerance): Measure 1.2.3: Testing HbA1c Frequency—Dichotomous indicator for the presence of a claim for two HbA1c tests within 14 months or less (12 months plus 1-month tolerance).

For the Interim Report, the measurement of the HbA1c testing frequency was limited to a 14-month period (the Summative Report will measure 24 months). As a result, the missing values issue noted for the interval measures of office visit frequency also applied to the measurement of HbA1c testing frequency. However, the extent of the issue was more severe. The first HbA1c test during the measurement window interval often was not proximate in time to the index office visit date. As a result, as reported in Table B.5.7, 2,186 (54%) of DSRIP treatment episodes and 21,798 (49%) of non-DSRIP comparison episodes were missing with respect to follow-up periods for HbA1c testing frequency measurement.

Table B.5.7 Episodes with Missing HbA1c Intervals, DSRIP/Non-DSRIP Clients.

	DSRIP (N = 4,068)	Non-DSRIP (N = 40,748)
Pre-Index Period	1,026	10,668
Post-Index Period	1,160	11,130
Either Period	2,186	21,798

Note: Pre-index and post-index period measurement periods were 14 months before and after client index date within October 1, 2017–September 30, 2018. Interval measurement begins with client's first HbA1c test during measurement period. There are two measurement periods for each client (pre-period

and post-period), so the total sample size for the DID analysis is two times the number of clients for each sample. DID = Difference in Differences; DSRIP = Delivery System Reform Incentive Payment.

Simple descriptive statistics for the HbA1c testing frequency measure for the matched DSRIP and non-DSRIP clients in the pre-index and post-index periods, excluding the 23,984 episodes with missing values, are reported in Table B.5.8. Comparison of the pre-measurement and post-measurement periods revealed an increase of about 12 percentage points in the likelihood of adequate HbA1c test frequency for DSRIP clients, versus a 2.5 percentage point increase in the likelihood of adequate HbA1c test frequency among non-DSRIP clients.

Table B.5.8 Pre/Post HbA1c Test Frequency Mean, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	0.382 (N = 1,008)	0.459 (N = 9,706)
Post-Index Period	0.505 (N = 874)	0.484 (N = 9,244)

Note: Pre-index and post-index period measurement periods were 14 months before and after client index date within October 1, 2017–September 30, 2018. Interval measurement begins with client's first HbA1c test during measurement period. DSRIP = Delivery System Reform Incentive Payment.

As Table B.5.9 shows, the DID model results for the sample excluding the 23,984 episodes with missing values indicated that the DSRIP program was associated with a 55% increase in the odds of adequate HbA1c testing frequency among clients treated by DSRIP providers, compared to clients treated by non-DSRIP providers over the same period. However, this result should be interpreted with caution given the high number of clients with missing values for the measurement of HbA1c testing frequency.

Table B.5.9 DID Logistic Regression Estimate of HbA1c Frequency Effect.

	Odds Ratio	Std Error	*z*-value
Treat x Post	1.552***	0.1565	4.36
Treat	1.047	0.0784	0.61
Post	1.095**	0.0320	3.11
DY7—Quarter 2	0.562***	0.0265	-12.21
DY7—Quarter 3	0.490***	0.0388	-9.02
DY7—Quarter 4	0.531***	0.0680	-4.95
Intercept	0.913***	0.0192	-4.33

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 20,832 (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year.*

Quality of Care: Diabetes medication adherence

Research has shown that better adherence to diabetes medications is associated with improved glycemic control (lower HbA1c values), which in turn is associated with a reduced risk of diabetes complications and lower diabetes treatment costs. Adherence to diabetes medications was assessed using the PQA PDC Diabetes All Class Medication Adherence measure. The PQA measure includes multiple diabetes drug classes (excluding insulin) and assesses the percentage of patients who were covered by at least one antidiabetic medication class within a measurement year. Clients were excluded from the measurement of PDC, as specified in the PQA diabetes adherence measurement protocol, if they met any of the following conditions in

either the 12-month pre-index period or the 12--month post-index period: (a) filled a prescription for any form of insulin, (b) did not fill at least two prescriptions for non-insulin diabetes drugs, or (c) had any claims with an end-stage renal disease (ESRD) diagnosis.

A total of 306 DSRIP clients (15% of the total DSRIP treatment sample) had a valid measure of PDC in both measurement periods, and 3,860 non-DSRIP comparison clients (17% of the total non-DSRIP comparison sample) had a valid measure of PDC in both measurement periods. The PQA measure specifies that PDC, which is a percentage value, be transformed to a dichotomous measure of adherence with a value equal to 1 for values of PDC equal to or greater than 80% and 0 otherwise.

Descriptive statistics for the values of the diabetes medication adherence measure for the DSRIP and non-DSRIP clients with valid adherence values are reported in Table B.5.10. Comparison of the pre-index date and post-index date periods revealed a decrease of about 1.3 percentage points in the likelihood of diabetes medication adherence for DSRIP clients, versus a 2.1 percentage point decrease in the likelihood of diabetes medication adherence among non-DSRIP clients.

Table B.5.10 Pre/Post Medication Adherence Mean, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	0.601 (N = 306)	0.635 (N = 3,860)
Post-Index Period	0.588 (N = 306)	0.614 (N = 3,860)

Note: Pre-index and post-index periods were 12 months before and after client index date within October 1, 2017–September 30, 2018. DSRIP = Delivery System Reform Incentive Payment.

As Table B.5.11 shows, the DID model results indicated that there was no statistically significant association between the implementation of the DSRIP and the likelihood of diabetes medication adherence among Medicaid clients with diabetes treated by DSRIP diabetes-performing providers. However, this result should be interpreted with caution given the high percentage of clients without valid measures of medication adherence.

Table B.5.11 DID Logistic Regression Estimate of Medication Adherence Effect.

	Odds Ratio	Std Error	*z*-value
Treat × Post	1.037	0.1796	0.21
Treat	1.012	0.1393	0.09
Post	0.913	0.0429	-1.93
DY7—Quarter 2	0.811**	0.0653	-2.60
DY7—Quarter 3	0.659**	0.0937	-2.93
DY7—Quarter 4	1.018	0.2306	0.08
Intercept	1.781***	0.0608	16.92

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 8,332 (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year.*

ED Visit Frequency

Simple descriptive statistics for ED visit frequency (all causes) for the matched DSRIP and non-DSRIP clients in the pre- and post-index periods are reported in Table B.5.12. The mean number of ED visits increased by about 0.39 visits among clients in the DSRIP treatment group,

compared to an increase of about 0.15 ED visits among matched clients in the non-DSRIP comparison group.

Table B.5.12 Pre/Post Mean All-Cause ED Visits, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	2.885 (N = 2,034)	2.191 (N = 20,374)
Post-Index Period	3.277 (N = 2,034)	2.343 (N = 20,374)

Note: Pre-index and post-index periods were 12 months before and after client index date within October 1, 2017–September 30, 2018. ED = Emergency Department; DSRIP = Delivery System Reform Incentive Payment.

The DID model for total ED visit frequency was estimated using negative binomial regression. The results, shown in Table B.5.13, report the estimated coefficients transformed to incident rate ratios. The DID model results suggest that the DSRIP program was not associated with a statistically significant change in the frequency of all-cause ED visits.

Table B.5.13 DID Negative Binomial Regression Estimate of Effect on Frequency of All-Cause ED Visits.

	Incident Rate Ratio	Std Error	*z*-value
Treat × Post	1.064	0.1050	0.63
Treat	1.337***	0.1045	3.71
Post	1.070***	0.0214	3.38
DY7—Quarter 2	0.910*	0.0362	-2.37
DY7—Quarter 3	0.909	0.0561	-1.55
DY7—Quarter 4	1.192	0.1281	1.64
Intercept	2.211***	0.0338	51.88

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 44,816 (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year; ED = Emergency Department.*

Table B.5.14 reports descriptive statistics for diabetes-related ED visits (ED visits with one or more diabetes-related diagnosis codes) for the matched DSRIP and non-DSRIP clients in the pre- and post-index periods. The mean number of diabetes-related ED visits increased by about 0.08 visits among clients in the DSRIP treatment group, compared to an increase of about 0.01 diabetes-related ED visits among matched clients in the non-DSRIP comparison group.

Table B.5.14 Pre/Post Mean Diabetes-Related ED Visits, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Pre-Index Period	0.437 (N = 2,034)	0.380 (N = 20,374)
Post-Index Period	0.514 (N = 2,034)	0.392 (N = 20,374)

Note: Pre-index and post-index periods were 12 months before and after client index date within October 1, 2017–September 30, 2018.

As Table B.5.15 shows, the DID negative binominal regression model estimated that there was no statistically significant association between the implementation of the Demonstration Renewal Period and the frequency of diabetes-related ED visits.

Table B.5.15 DID Negative Binomial Regression Estimate of Effect on Frequency of Diabetes-Related ED Visits.

	Incident Rate Ratio	Std Error	*z*-value
Treat × Post	1.1381	0.1166	1.26
Treat	1.2464**	0.0902	3.05
Post	1.0309	0.0299	1.05
DY7—Quarter 2	0.8013***	0.0374	-4.75
DY7—Quarter 3	0.8277*	0.0627	-2.50
DY7—Quarter 4	1.0545	0.1274	0.44
Intercept	0.3887***	0.0085	-43.01

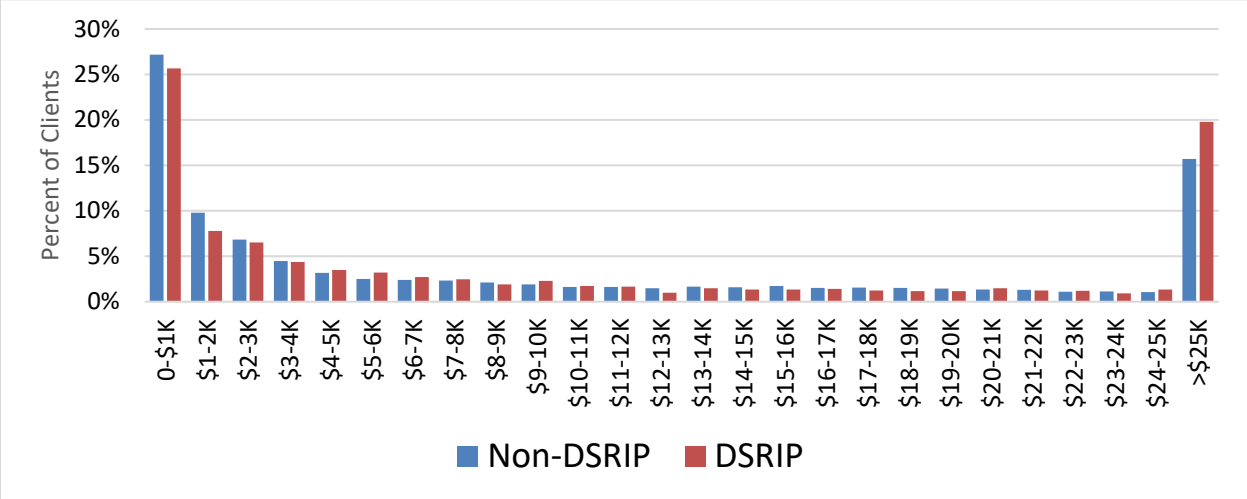
*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 44,816 (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year; ED = Emergency Department.*

Cost of Care

A common issue encountered when attempting to compare costs across groups is the fact that cost distributions often are highly skewed. This issue is illustrated in Figure B.5.1, which shows that the distributions for total one-year Medicaid costs have very long right tails for both the DSRIP treatment and non-DSRIP comparison samples. The histogram in the figure was truncated at an annual cost greater than $25,000 (the maximum value in the sample was $962,190). Given this, common measures of central tendency for cost within a group, such as the arithmetic mean, may be highly influenced by extreme values in the cost distribution for the group.

For this reason, more robust measures of central tendency, such as medians, often are examined for descriptive analyses of medical care costs. For multivariable modeling, various approaches have been employed in the literature (e.g., Mihaylova et al., 2011). Among the most common approaches are a simple log-transformation of the cost-dependent variable and a variant of a generalized linear model often labeled as gamma regression with a log link, or log-link gamma regression.

Figure B.5.1 Distribution of 1-Year Medicaid Costs, DSRIP/Non-DSRIP Clients.



Note: DSRIP = Delivery System Reform Incentive Payment.

As reported in Table B.5.16, the median annual Medicaid costs increased by about $1,830 among DSRIP clients, compared to an increase in median costs of about $1,454 among matched clients in the non-DSRIP comparison group.

Table B.5.16 Pre/Post Medicaid Costs, DSRIP/Non-DSRIP Clients.

	DSRIP	Non-DSRIP
Mean		
Pre-Index Period	$13,493 (N = 2,034)	$11,900 (N = 20,374)
Post-Index Period	$18,306 (N = 2,034)	$14,618 (N = 20,374)
Median		
Pre-Index Period	$4,895 (N = 2,034)	$3,861 (N = 20,374)
Post-Index Period	$6,725 (N = 2,034)	$5,315 (N= 20,374)

Note: Pre-index and post-index periods were 12 months before and after client index date within October 1, 2017–September 30, 2018. DSRIP = Delivery System Reform Incentive Payment.

Two DID cost models were estimated. The first utilized a simple log-transformation of the Medicaid cost-dependent variable to diminish the degree of skew. Results for the DID log-Medicaid cost model, reported in Table B.5.17, indicate that DSRIP was associated with a statistically significant (p = 0.049) increase in Medicaid cost for clients treated by providers participating in the DSRIP program compared to clients not treated by providers participating in the program.

Table B.5.17 DID Estimate of DSRIP Effect on Log of Medicaid Cost.

	Coefficient	Std Error	*t*-value
Treat × Post	0.1286*	0.0653	1.97
Treat	0.2310***	0.0510	4.53
Post	0.2371***	0.0197	12.03
DY7—Quarter 2	-0.3814***	0.0315	-12.12
DY7—Quarter 3	-0.2329***	0.0533	-4.37
DY7—Quarter 4	-0.0101	0.0856	-0.12
Intercept	8.2094***	0.0143	574.5

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001. N = 44,816 (Number of observations in the DID model). DID = Difference in Differences; DY = Demonstration Year.*

Following Kennedy (1981), interpreting the magnitude of this estimated effect in dollar terms requires a retransformation from the estimated effect in log-dollar terms accounting for the assumed lognormality of the error term in the DID model. Specifically, the percentage effect in dollar terms is estimated as:

$$\text{Effect} = \exp\left[\hat{\delta} - \left(\frac{1}{2}Var(\hat{\delta})\right)\right] - 1$$

In this case, the estimated coefficient ($\hat{\delta}$) of 0.1286 and the estimated variance ($Var(\hat{\delta})$) of 0.0043 (or 0.06532) translate into an estimated 13.5% increase in Medicaid cost associated with the DSRIP program (p = 0.049).

As Table B.5.18 shows, the DID log-link gamma regression model also estimated that the DSRIP program was associated with about an 10% increase in Medicaid costs, but with a p-value (0.06) that would not be considered statistically significant at standard significance thresholds.

Table B.5.18 DID Log-Link Gamma Regression Estimate of DSRIP Effect on Medicaid Cost.

	Coefficient	Std Error	*t*-value
Treat × Post	0.0995^{+}	0.0528	1.88
Treat	0.1416**	0.0435	3.25
Post	0.2060***	0.0171	12.08
DY7—Quarter 2	-0.1371***	0.0314	-4.37
DY7—Quarter 3	-0.0066	0.0477	-0.14
DY7—Quarter 4	0.0894	0.0661	1.35
Intercept	9.3958***	0.0122	772.88

*Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, $^{+}$ $p < 0.10$. N = 44,816. (Number of observations in the DID model). DID = Difference in Differences; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year.*

The cost results should be interpreted cautiously, however, as the PSM methodology did not match clients based on diabetes severity (more detail on this is found in the Limitations section). Given that the DID approach focuses on differences in the changes in total costs from the pre- to post periods, to explore the sources of the apparent cost differences, the components of total Medicaid costs for DSRIP clients and non-DSRIP comparison clients during the pre- and post-periods are shown in Table B.5.19. The table reports the mean of costs for ED visits, inpatient costs, and outpatient-other costs excluding pharmacy claims cost, and the associated shares of total costs (excluding pharmacy cost).

Table B.5.19 Components of Medicaid Cost for DSRIP and Non-DSRIP Clients.

	DSRIP Pre-period (N = 2,034)	DSRIP Post-period (N = 2,034)	Non-DSRIP Pre-period (N = 20,374)	Non-DSRIP Post-period (N = 20,374)
ED Visit Cost	$232 (1.8%)	$260 (1.6%)	$204 (1.8%)	$155 (1.1%)
Inpatient Cost	$3,494 (28.0%)	$5,073 (30.5%)	$2,352 (21.2%)	$3,612 (26.7%)
Outpatient/ Other	$8,774 (70.2%)	$11,290 (67.9%)	$8,568 (77.0%)	$9,774 (72.2%)

Note: Pre-index and post-index periods were 12 months before and after client index date within October 1, 2017–September 30, 2018. Medicaid costs are total claims cost excluding pharmacy claims. DSRIP = Delivery System Reform Incentive Payment; ED = Emergency Department.

For the sample of DSRIP clients, mean outpatient and other non-acute care costs (excluding pharmacy) increased by $2,516 from the pre-period to the post-period, compared to an increase in mean outpatient-other costs of $1,206 for the matched non-DSRIP comparison patients. For DSRIP clients in the study sample, mean inpatient costs increased by $1,579 from the pre-period to the post-period, compared to an increase in mean inpatient costs of $1,260 for the matched non-DSRIP comparison patients. This represented an increase of 2.5 percentage

points in the inpatient share of total costs, compared to a 5.5 percentage point increase in the inpatient share of total costs for the non-DSRIP clients. ED visit costs were negligible for both groups in both periods.

Taken together, the cost component analysis suggests that a key driver of the cost differential in the DID analysis may be higher growth in outpatient costs for DSRIP clients after DSRIP implementation. This is consistent with the notion that more-intensive diabetes care management may increase resource use and costs over the short term, whereas the benefits in the form of reduced costs for diabetes-related treatments avoided are likely to be realized over a longer time horizon.

Limitations

The cost results should be interpreted cautiously. First, the PSM approach was able to match DSRIP clients to non-DSRIP clients on age, gender, and comorbid conditions. Despite this, it is difficult to develop baseline measures of diabetes severity or complexity using claims data. Common proxy measures used in the literature are based on use of insulin or multiple diabetes drugs as indicators of severity or complexity, but such measures were not available for the analysis given the lack of pharmacy claims data for about half of the clients in the study sample. Thus, the PSM was not able to match DSRIP clients to non-DSRIP clients on underlying diabetes severity. It is plausible that, even after PSM, clients treated by DSRIP performing providers may represent higher diabetes severity on average compared to non-DSRIP clients, given the differences between DSRIP performing providers and non-DSRIP providers.

A second potential limitation of the cost analysis is that, due to the study design, the DSRIP treatment clients are receiving at least some of their care during the post-period from “new” providers, whereas the same restriction is not applied to the non-DSRIP comparison clients. This could create a source of bias in the measurement of pre/post-period changes in resource use and cost for DSRIP clients relative to non-DSRIP clients. As most DSRIP providers are large hospitals, there is also potential that clients that transitioned from a non-DSRIP provider to a DSRIP provider (i.e., hospital) in the study sample reflect those patients requiring more comprehensive or invasive diabetes care. This confounding would likely explain why such a large increase in Medicaid costs is seen for this sample.

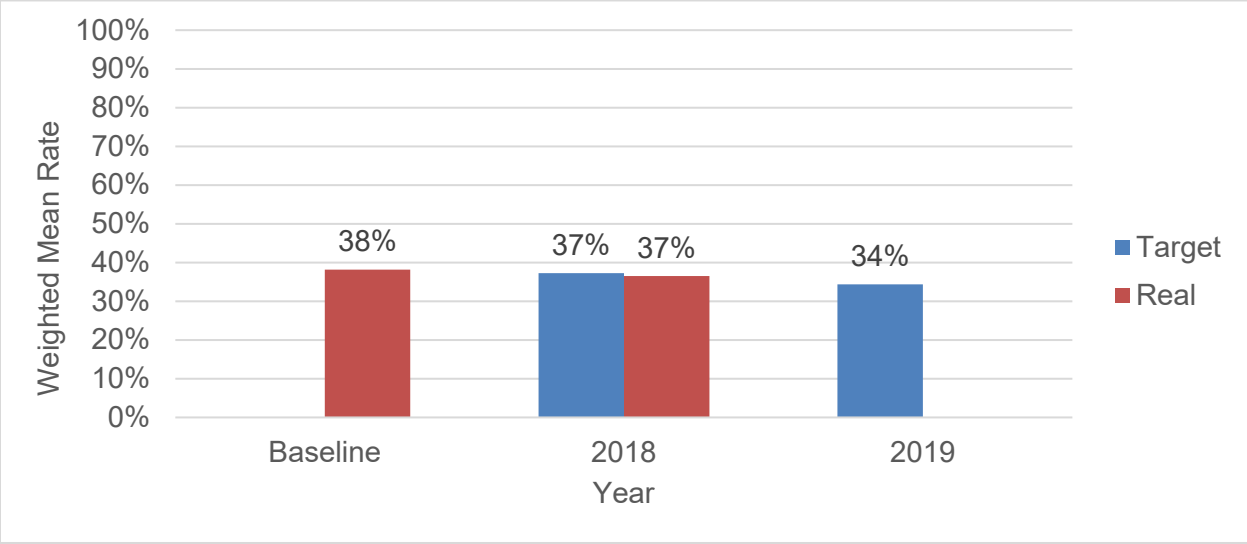
6. DETAILED RESULTS: HYPOTHESIS 1.3 QUALITY-RELATED OUTCOMES

Hypothesis 1.3 states that DSRIP incentivized performing providers to improve quality related outcomes, specified as Category C population-based clinical outcome (PBCO) measures. This hypothesis was evaluated using five measures focused on serving the MLIU population. This section presents the weighted results, accounting for provider volume. The unweighted results are found in the next section of the appendix.

Rate of Emergency Department Visits for Diabetes (A1-508: DSRIP Category C Measure 1.3.1)

On average, after weighting based on volume, DSRIP providers tracking the A1-508 measure saw a slight decrease (improvement) between baseline and 2018 though this was not statistically significant (Figure B.6.1).

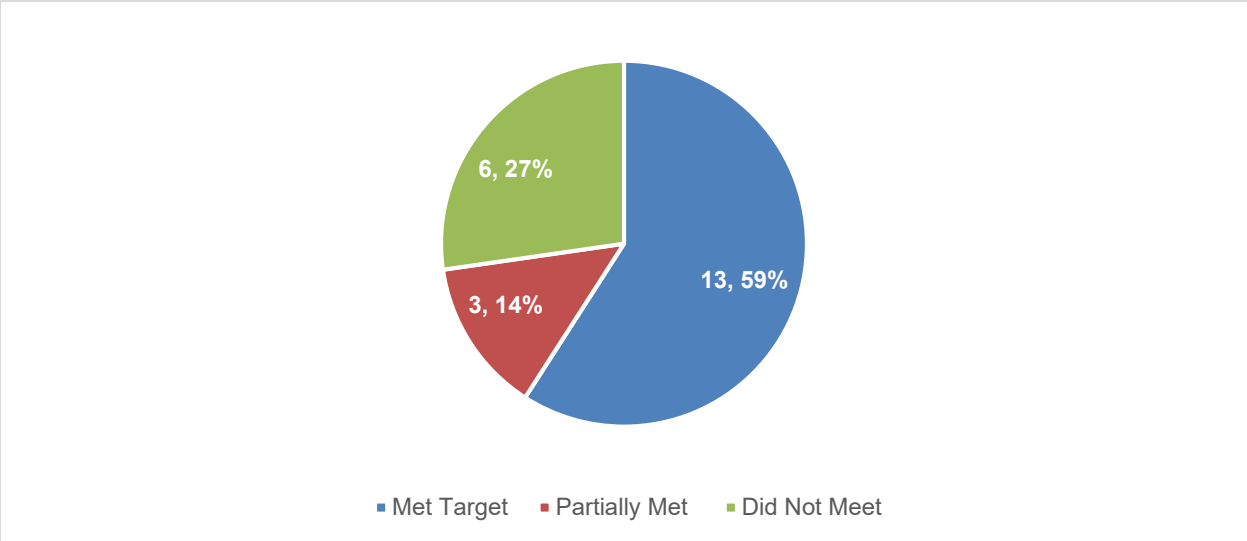
Figure B.6.1 Change in Weighted Mean Rate: A1-508 Rate of ED Visits for Diabetes.



Note: Source is DSRIP report, Category C measures (see Table II.5). Difference between baseline rate and 2018 rate not statistically significant after conducting Wilcoxon signed rank sum test (p = 0.1021). N = 22 (Number of DSRIP providers reporting on measure A1-508). DSRIP = Delivery System Reform Incentive Payment; ED = Emergency Department.

Nearly three-quarters (73%) of the 22 DSRIP providers reported a decrease from 2017 (baseline) to 2018, although only 59% met the target of a 2.5% decrease (Figure B.6.2). More than a quarter (27%) of providers reported an increase from baseline and, therefore, did not meet the target.

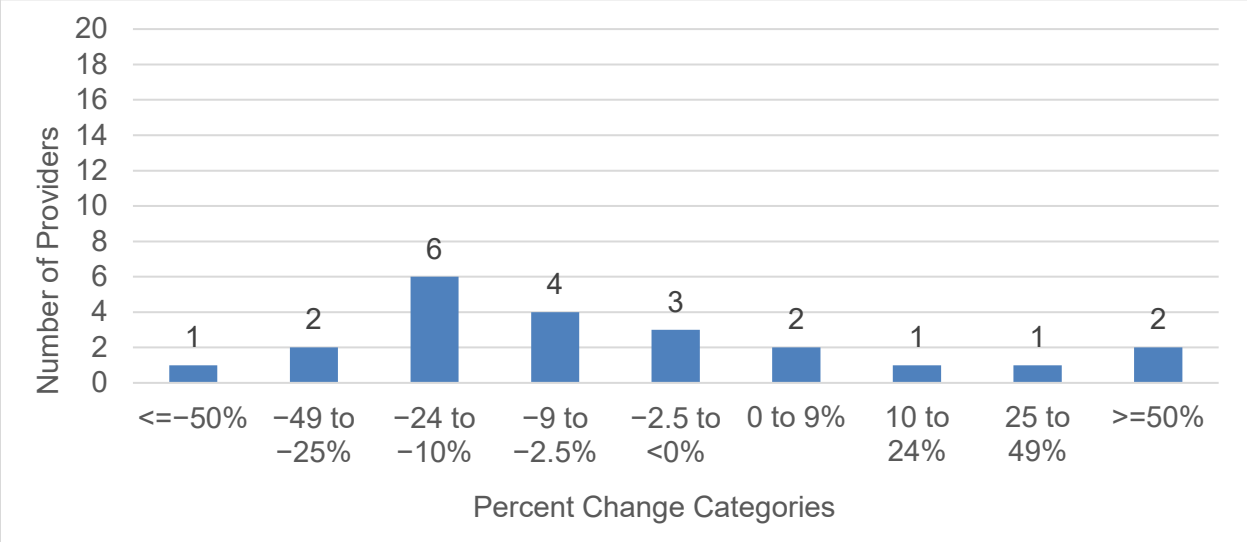
Figure B.6.2 Overall Provider Achievement for A1-508 Rate of ED Visits for Diabetes.



Note: Source is DSRIP report, Category C measures (see Table II.5). N = 22 (Number of DSRIP providers reporting on measure A1-508). ED = Emergency Department.

Most DSRIP providers that met the target reported a 2.5–24% decrease from the baseline MLIU rate (Figure B.6.3). Nine DSRIP providers met both their 2018 (2.5% improvement) and 2019 (10% improvement) targets in 2018.

Figure B.6.3 Provider Achievement by Percent Change Categories for A1-508 Rate of ED Visits for Diabetes.

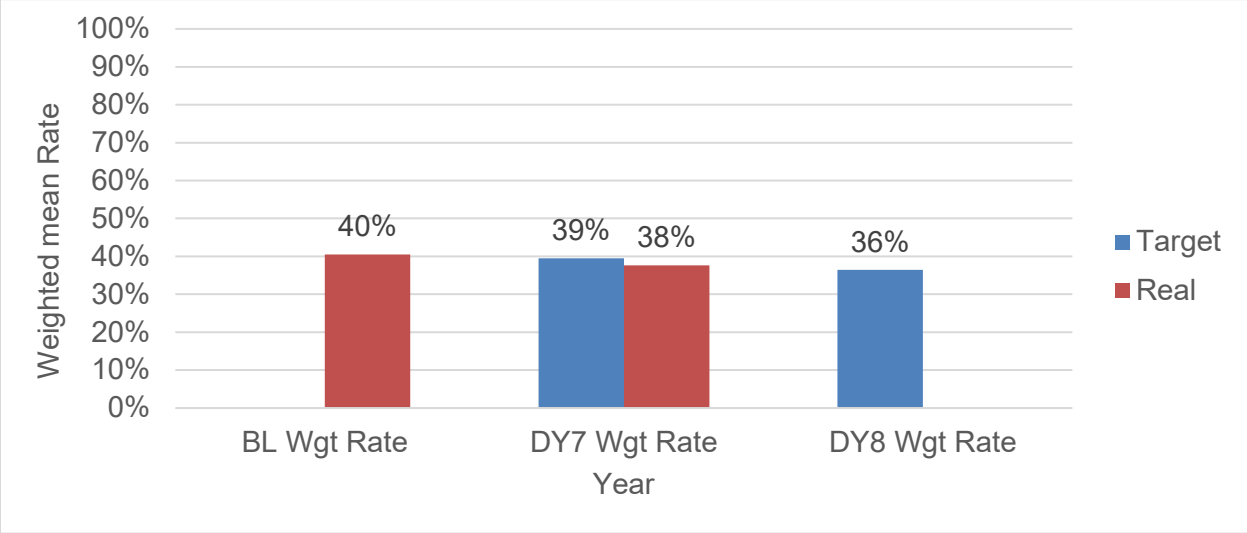


Note: Source is DSRIP report, Category C measures (see Table II.5). N = 22 (Number of DSRIP providers reporting on measure A1-508). DSRIP = Delivery System Reform Incentive Payment; ED = Emergency Department.

Rate of Emergency Department Visits for Congestive Heart Failure, Angina, and Hypertension (A2-509: DSRIP Category C Measure 1.3.2)

On average, after weighting based on volume, DSRIP providers tracking the A2-509 measure saw a slight decrease (improvement) between baseline and 2018, which was statistically significant (Figure B.6.4).

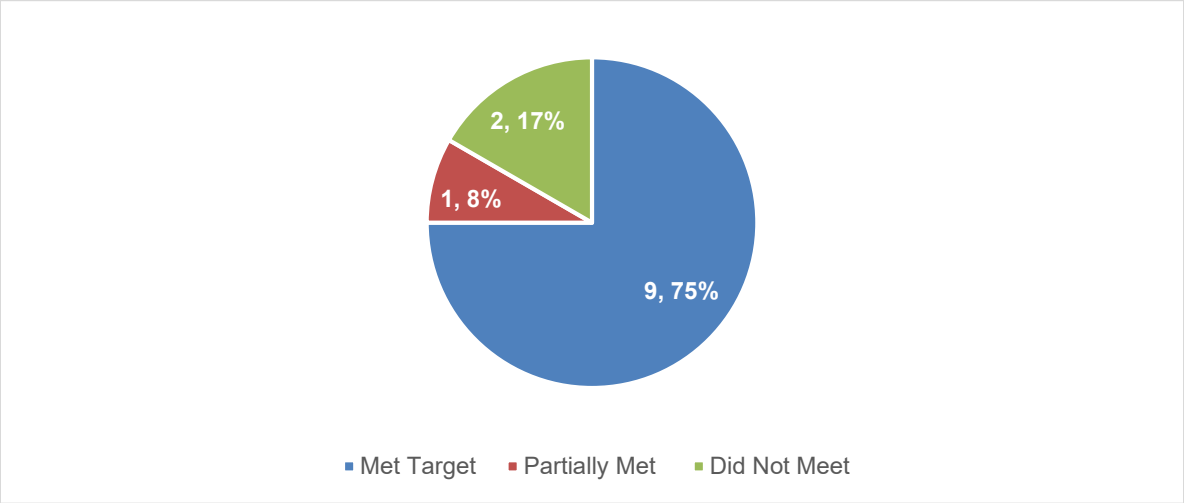
Figure B.6.4 Change in Weighted Mean Rate: A2-509 Rate of ED Visits for CHF, Angina, and Hypertension.



Note: Source is DSRIP report, Category C measures (see Table II.5). Difference between baseline (BL) rate and 2018 (DY7) rate statistically significant after conducting Wilcoxon signed rank sum test (p = 0.0161). N = 12 (Number of DSRIP providers reporting on measure A2-509). BL = Baseline; CHF = Congestive Heart Failure; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year; ED = Emergency Department.

Eighty three percent of the 12 DSRIP providers reported a decrease from 2017 (baseline) to 2018 (Figure B.6.5). Seventy five percent of DSRIP providers completely met the target of a 2.5% decrease from baseline. Seventeen percent of DSRIP providers reported an increase from the baseline and, as a result, did not meet the target.

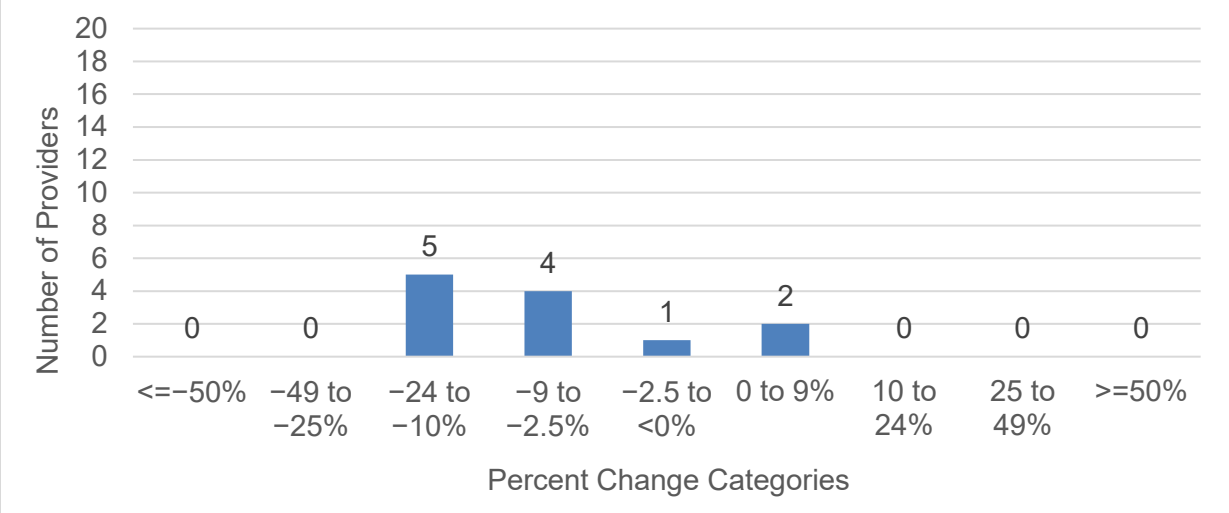
Figure B.6.5 Overall Provider Achievement for A2-509 Rate of ED Visits for CHF, Angina, and Hypertension.



Note: Source is DSRIP report, Category C measures (see Table II.5). N = 12 (Number of DSRIP providers reporting on measure A2-509). CHF = Congestive Heart Failure; DSRIP = Delivery System Reform Incentive Payment; ED = Emergency Department.

Most DSRIP providers that met the target reported a 2.5–24% decrease from baseline (Figure B.6.6). Five DSRIP providers met their 2019 target of 10% in 2018.

Figure B.6.6 Provider Achievement by Percent Change Categories for A2-509 Rate of ED Visits for CHF, Angina, and Hypertension.

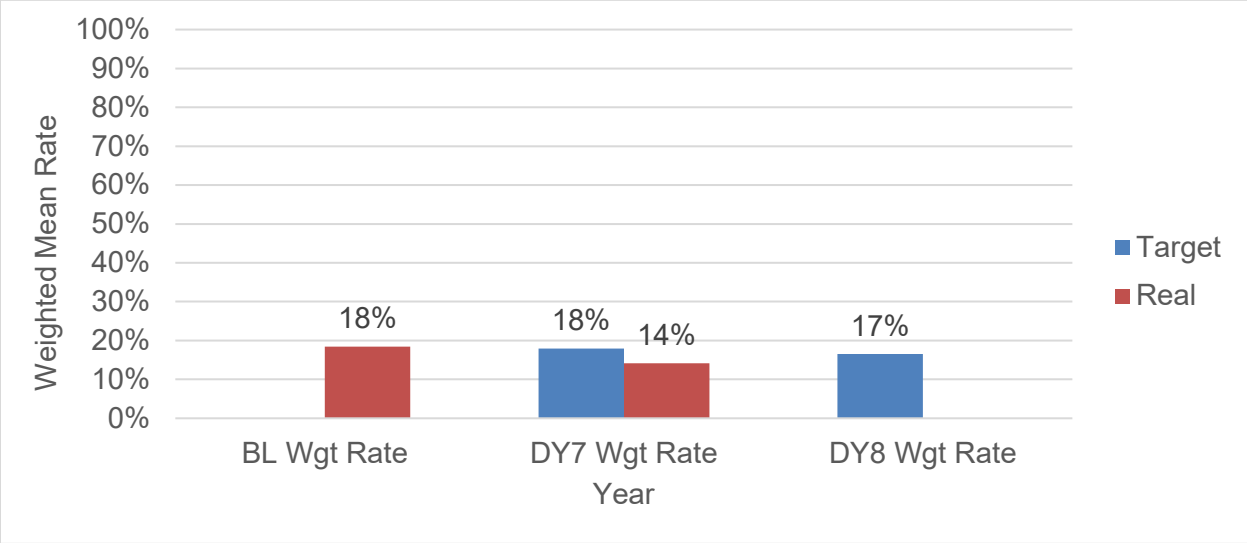


Note: Source is DSRIP report, Category C measures. N = 12 (Number of DSRIP providers reporting on measure A2-509). CHF = Congestive Heart Failure; DSRIP = Delivery System Reform Incentive Payment; ED = Emergency Department.

Rate of Emergency Department Visits for Behavioral Health and Substance Abuse (H2-510: DSRIP Category C Measure 1.3.3)

On average, after weighting based on volume, DSRIP providers tracking the H2-510 measure saw a slight decrease (improvement) between baseline and 2018, though this was not statistically significant (Figure B.6.7).

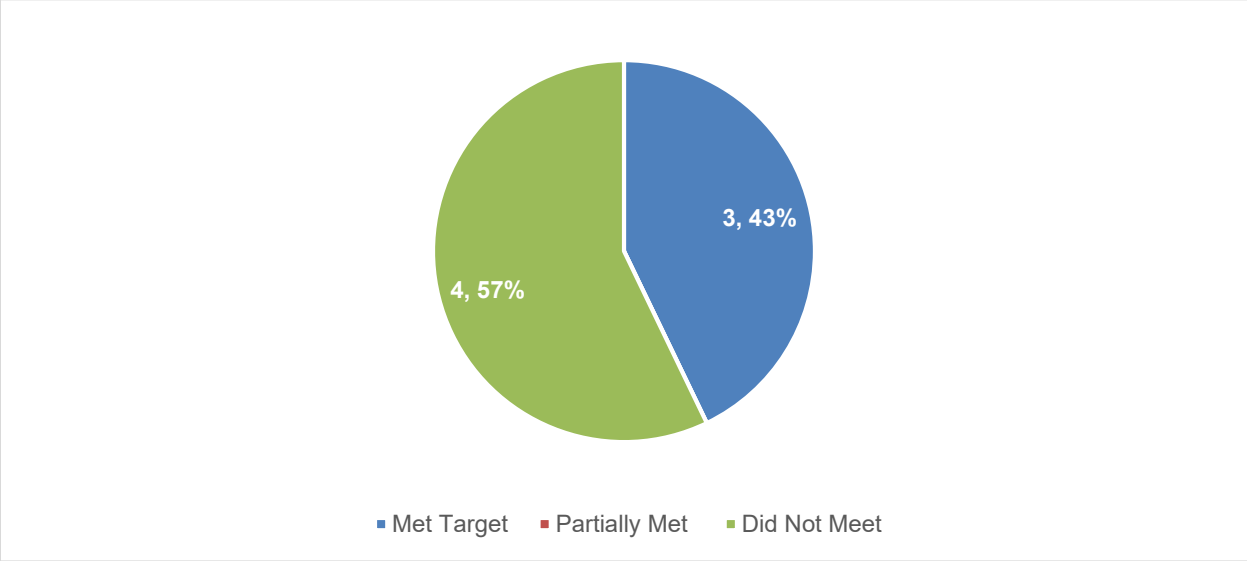
Figure B.6.7 Change in Weighted Mean Rate: H2-510 Rate of Emergency Department Visits for Behavioral Health and Substance Abuse.



Note: Source is DSRIP report, Category C measures (see Table II.5). Difference between baseline (BL) rate and 2018 (DY7) rate not statistically significant after conducting Wilcoxon signed rank sum test (p = 0.9375). N = 7 (Number of DSRIP providers reporting on measure H2-510). BL = Baseline; DSRIP = Delivery System Reform Incentive Payment; DY = Demonstration Year.

Forty-three percent of the seven DSRIP providers reported a decrease from 2017 (baseline) to 2018 and met the target of a 2.5% decrease (Figure B.6.8). Overall, 57% of DSRIP providers reported an increase from baseline and, as a result, did not meet the target.

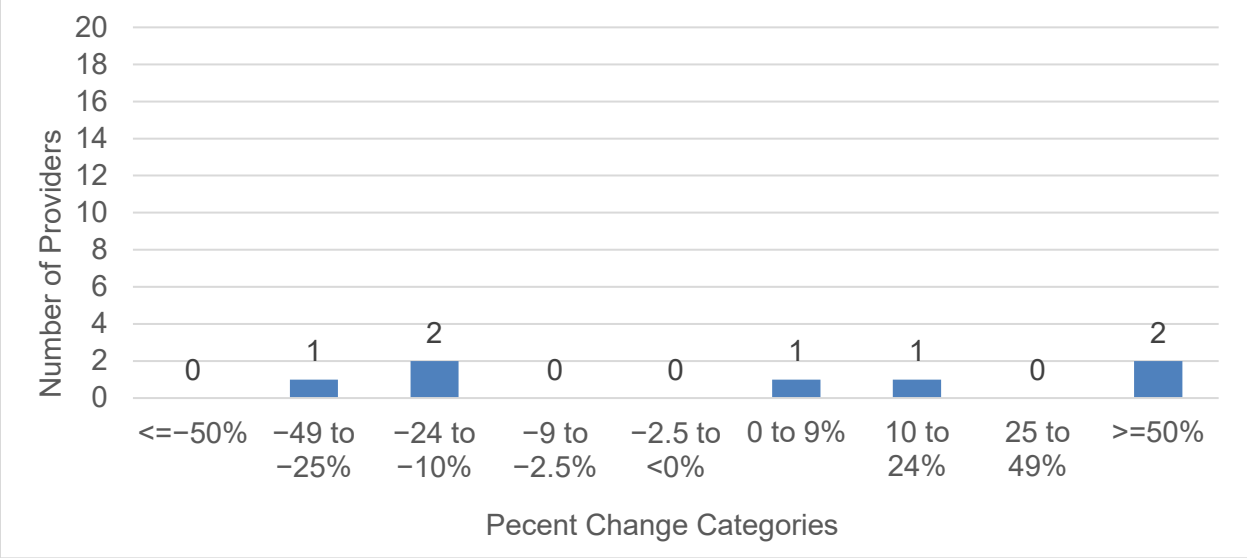
Figure B.6.8 Overall Provider Achievement for H2-510 Rate of Emergency Department Visits for Behavioral Health and Substance Abuse.



Note: Source is DSRIP report, Category C measures (see Table II.5). N = 7 (Number of DSRIP providers reporting on measure H2-510).

Three DSRIP providers met both 2018 and 2019 targets in 2018. DSRIP providers that met the target reported a 10–49% decrease from baseline (Figure B.6.9).

Figure B.6.9 Provider Achievement by Percent Change Categories for H2-510 Rate of Emergency Department Visits for Behavioral Health and Substance Abuse.

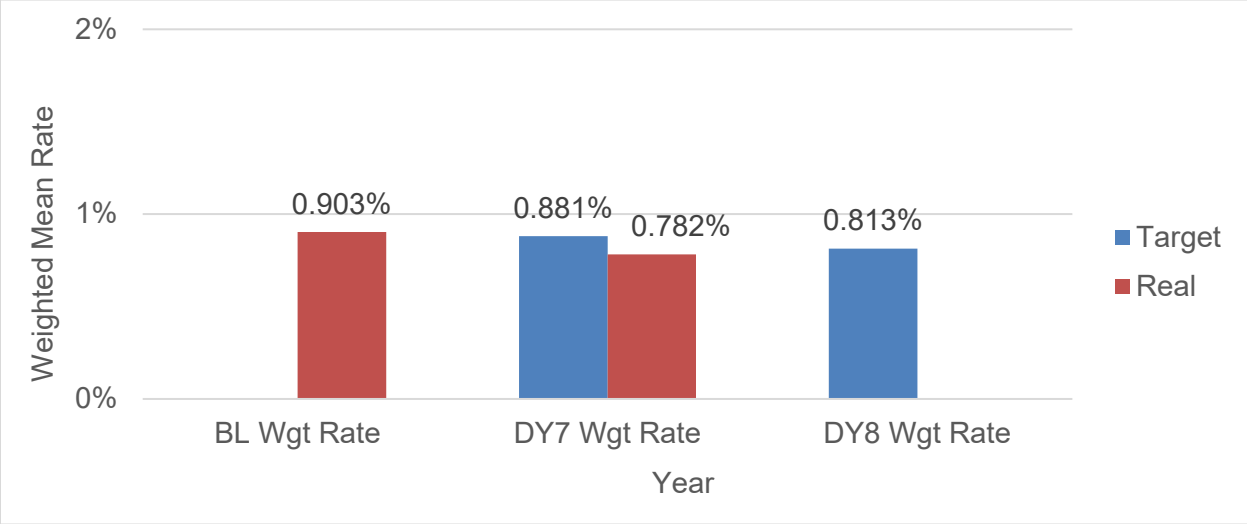


Note: Source is DSRIP report, Category C measures (see Table II.5). N = 7 (Number of DSRIP providers reporting on measure H2-510).

Prevention Quality Indicator 91: Adult Acute Composite indicator (Adult Dehydration, Bacterial Pneumonia, Urinary Tract Infection Admission Rates) (C1-502: DSRIP Category C Measure 1.3.4)

On average, after weighting based on volume, DSRIP providers tracking the C1-502 measure saw a slight decrease (improvement) between baseline and 2018 which was statistically significant (Figure B.6.10).

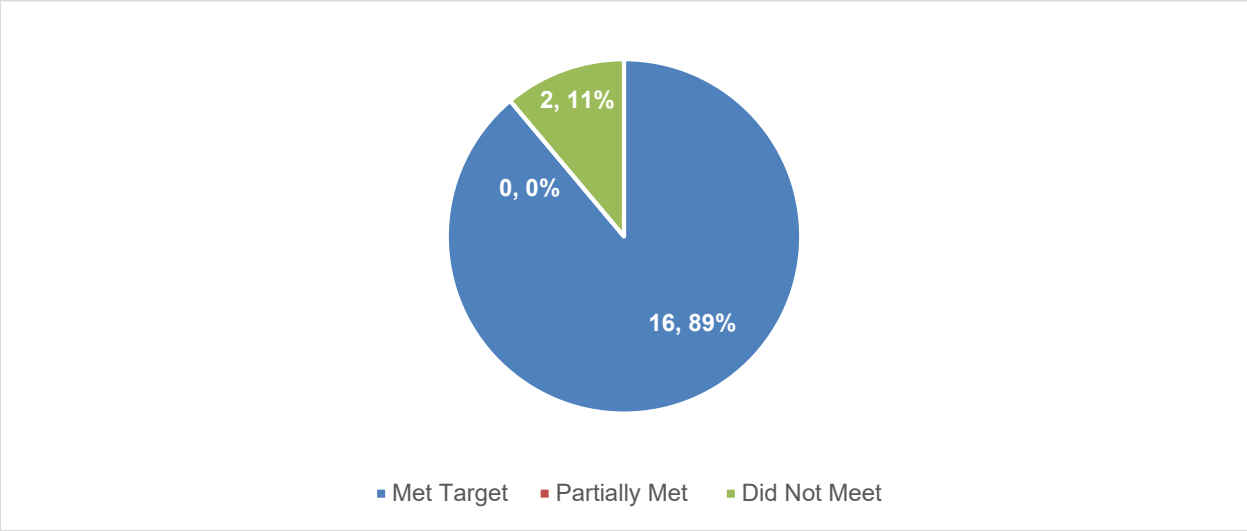
Figure B.6.10 Change in Weighted Mean Rate: C1-502 PQI 91 Adult Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (see Table II.5). Difference between baseline (BL) rate and 2018 (DY7) rate statistically significant after conducting Wilcoxon signed rank sum test (p = 0.0034). N = 8 (Number of DSRIP providers reporting on measure C1-502).

Eighty-nine percent of the 18 DSRIP providers both reported a decrease from 2017 (baseline) to 2018 and met the target (Figure B.6.11). Eleven percent of DSRIP providers reported an increase from baseline and, as a result, did not meet the target.

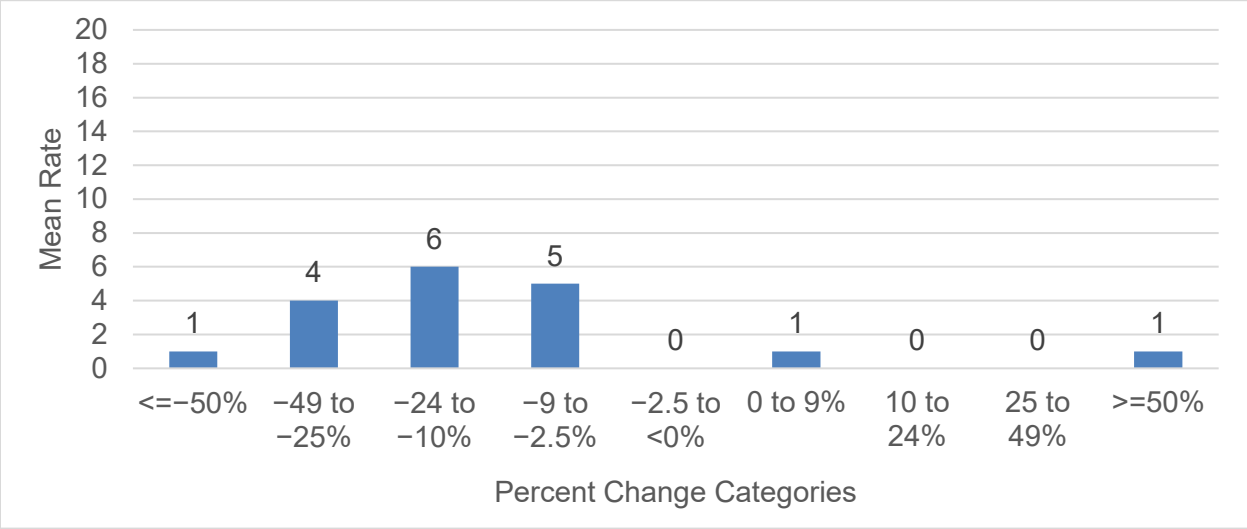
Figure B.6.11 Overall Provider Achievement C1-502 PQI 91 Adult Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (see Table II.5). N =18 (Number of DSRIP providers reporting on measure C1-502).

Most DSRIP providers that met the target reported a 2.5–49% decrease from baseline (Figure B.6.12). Eleven DSRIP providers met both of their 2018 and 2019 targets in 2018.

Figure B.6.12 Provider Achievement by Percent Change Categories C1-502 PQI 91 Adult Acute Composite Indicator.

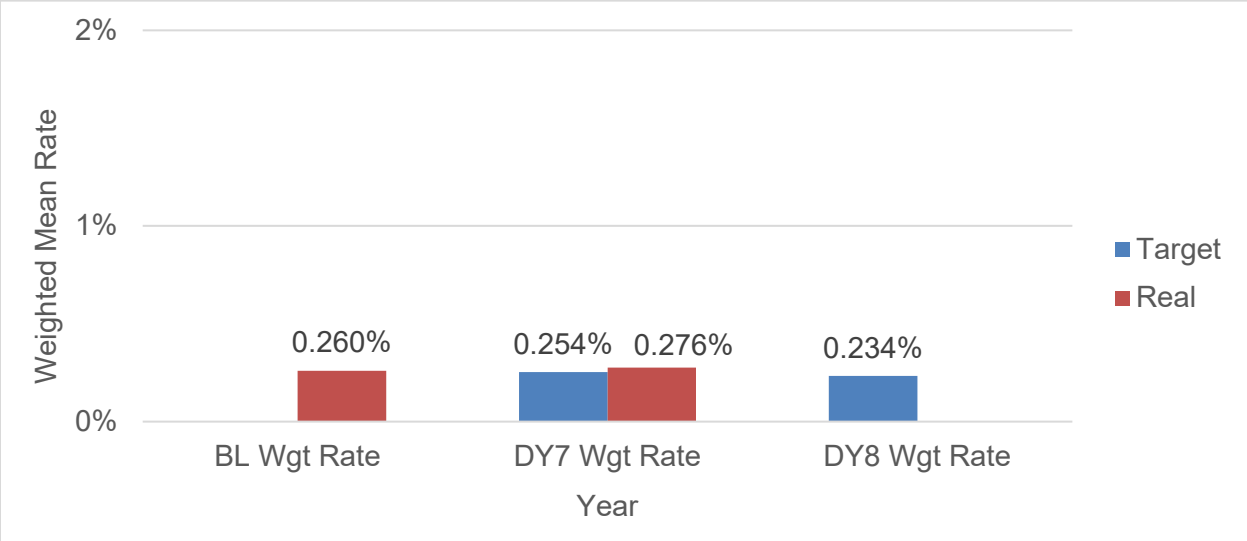


Note: Source is DSRIP report, Category C measures (see Table II.5). N = 18 (Number of DSRIP providers reporting on measure C1-502).

Pediatric Quality Indicator 91 (PDI 91) Child Acute Composite Indicator (D1-503: DSRIP Category C Measure 1.3.5)

On average, after weighting based on volume, DSRIP providers tracking the D1-503 measure saw a slight increase (not improvement) between baseline and 2018, though this was not statistically significant (Figure B.6.13).

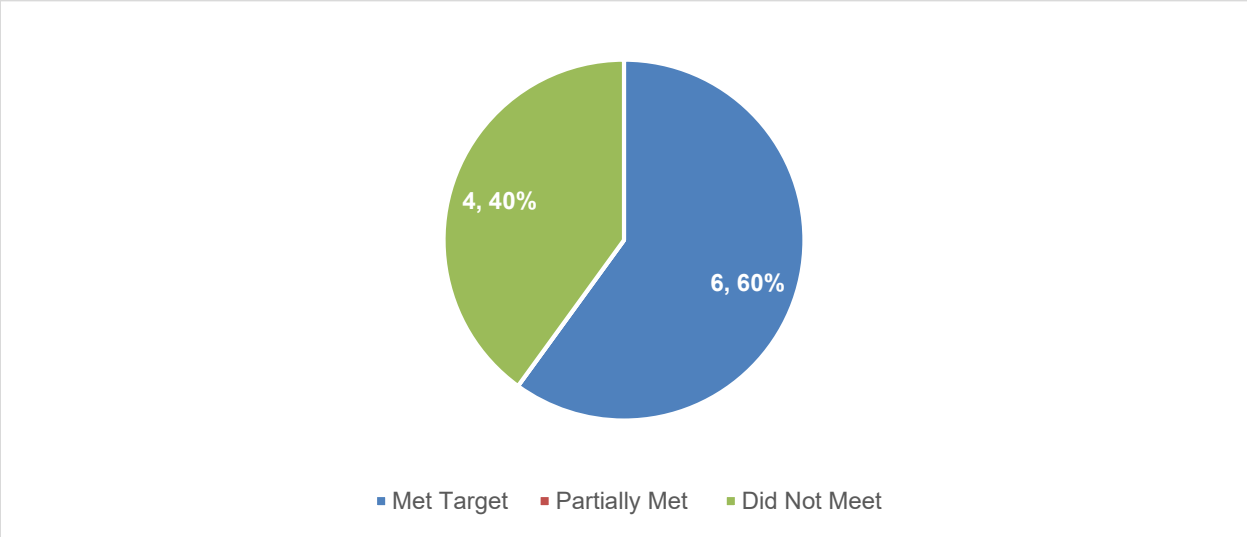
Figure B.6.13 Change in Weighted Mean Rate D1-503 PDI 91 Child Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (see Table II.5). Difference between BL rate and 2018 rate not statistically significant after conducting Wilcoxon signed rank sum test (p = 0.8457). N = 10 (Number of DSRIP providers reporting on measure D1-503).

Sixty percent of the 10 DSRIP providers reported a decrease from 2017 (baseline) to 2018 and met the target of a 2.5% decrease (Figure B.6.14). Forty percent of DSRIP providers reported an increase from baseline and, as a result, did not meet the target.

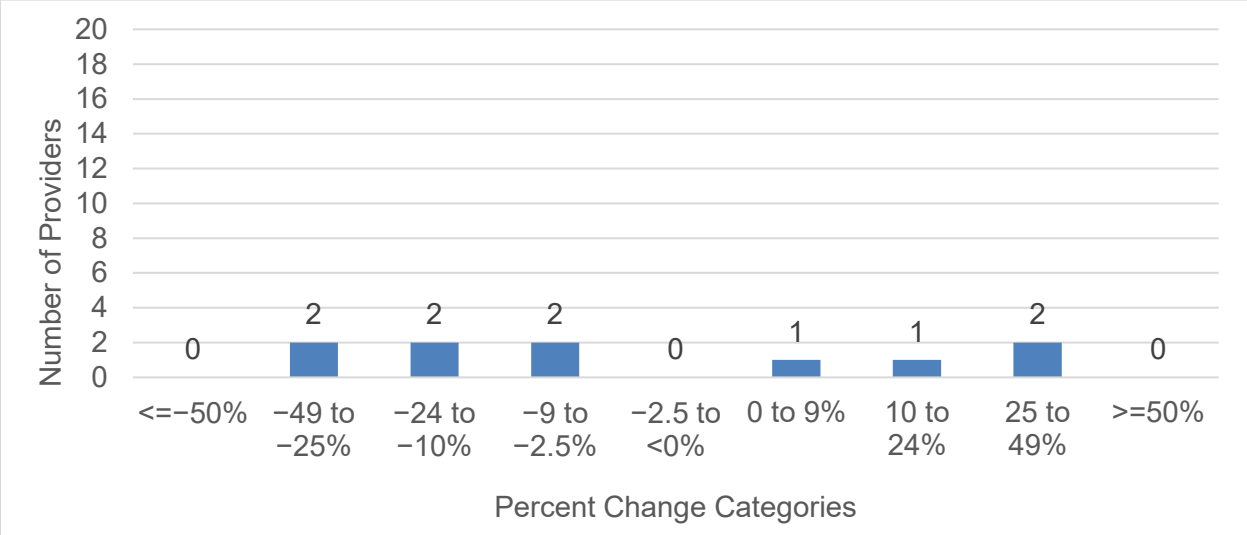
Figure B.6.14 Overall Provider Achievement for D1-503 PDI 91 Child Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (see Table II.5). N = 10 (Number of DSRIP providers reporting on measure D1-503).

DSRIP providers that met the target reported a 2.5–49% decrease from baseline (Figure B.6.15). Four DSRIP providers met both their 2018 and 2019 targets in 2018.

Figure B.6.15 Provider Achievement by Percent Change Categories for D1-503 PDI 91 Child Acute Composite Indicator.



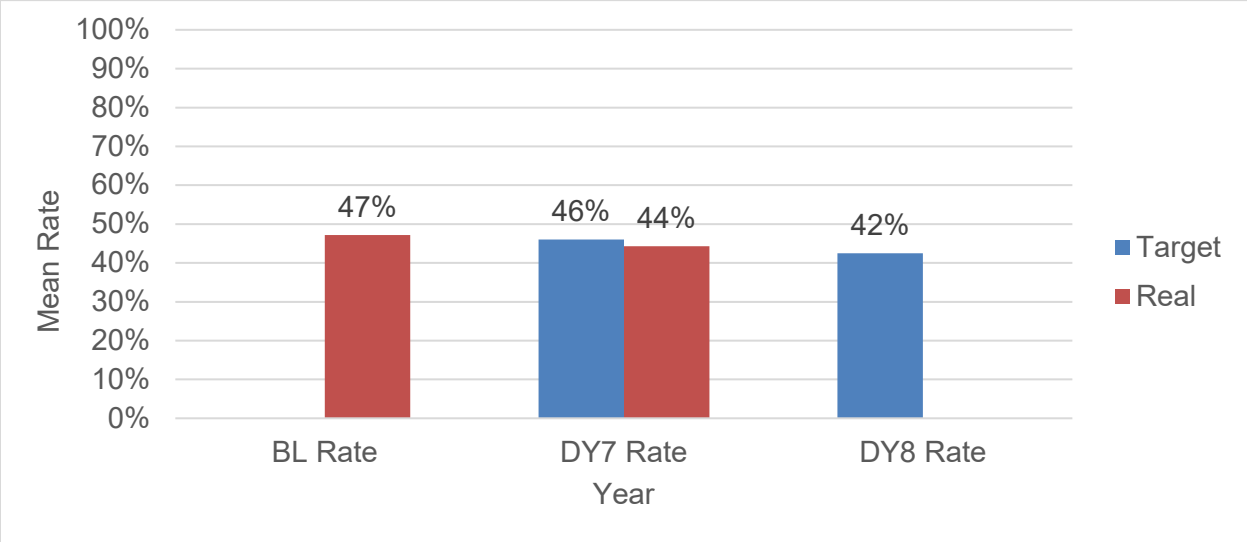
Note: Source is DSRIP report, Category C measures (see Table II.5). N = 10 (Number of DSRIP providers reporting on measure D1-503).

7. UNWEIGHTED RESULTS FOR HYPOTHESIS 1.3: QUALITY-RELATED OUTCOMES

This section provides the unweighted results, which do not account for provider volume, for Hypothesis 1.3.

Rate of Emergency Department Visits for Diabetes (A1-508: DSRIP Category C Measure 1.3.1)

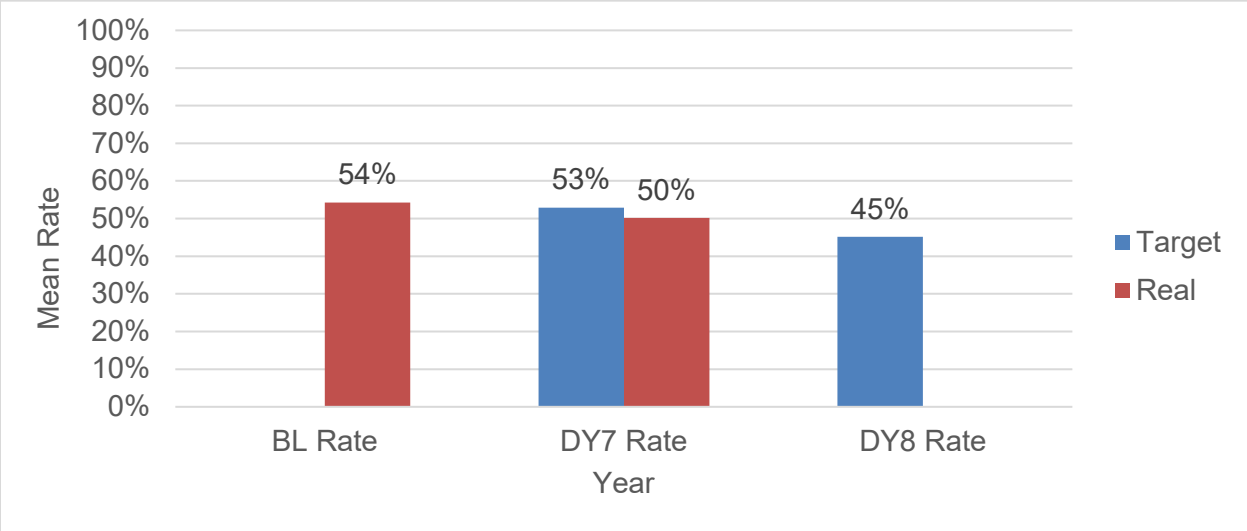
Figure B.7.1 Change in Unweighted Mean Rate: A1-508 Rate of ED Visits for Diabetes.



Note: Source is DSRIP report, Category C measures (see Table II.5). Improvement is a decrease in rates. BL = Baseline rate; DY7 = 2018; DY8 = 2019; N = 22 (Number of DSRIP providers reporting on measure A1-508).

Rate of Emergency Department Visits for Congestive Heart Failure, Angina, and Hypertension (A2-509: DSRIP Category C Measure 1.3.2)

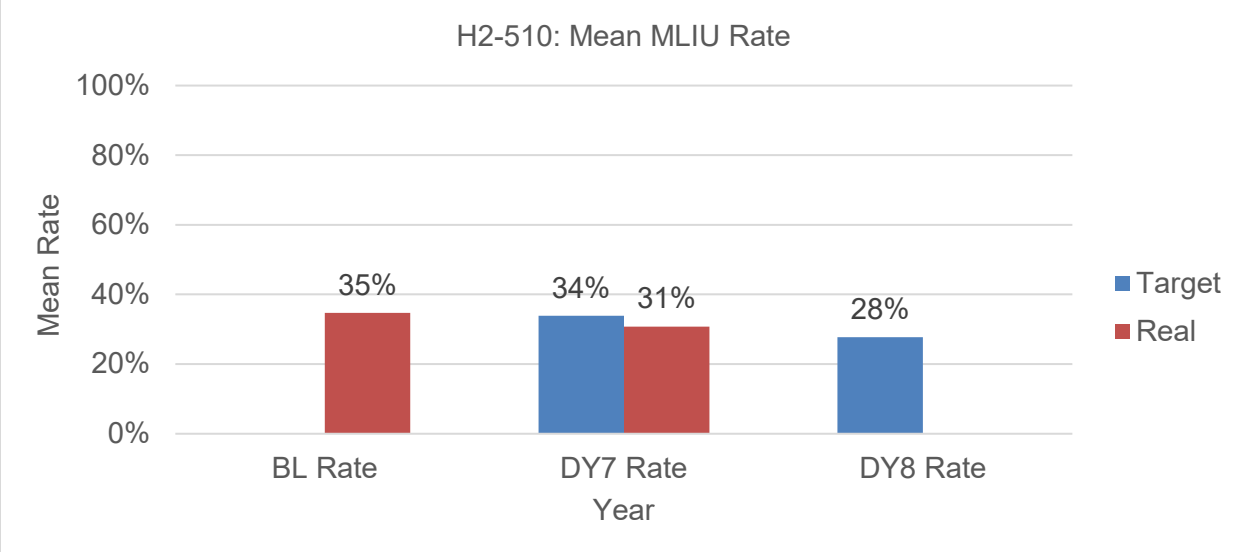
Figure B.7.2 Change in Unweighted Mean Rate: A2-509 Rate of ED Visits for CHF, Angina, and Hypertension.



Note: Source is DSRIP report, Category C measures (see Table II.5). Improvement is a decrease in rates. BL = Baseline rate; DY7 = 2018; DY8 = 2019; N = 12 (Number of DSRIP providers reporting on measure A2-509).

Rate of Emergency Department visits for Behavioral Health and Substance Abuse (H2-510: DSRIP Category C Measure 1.3.3)

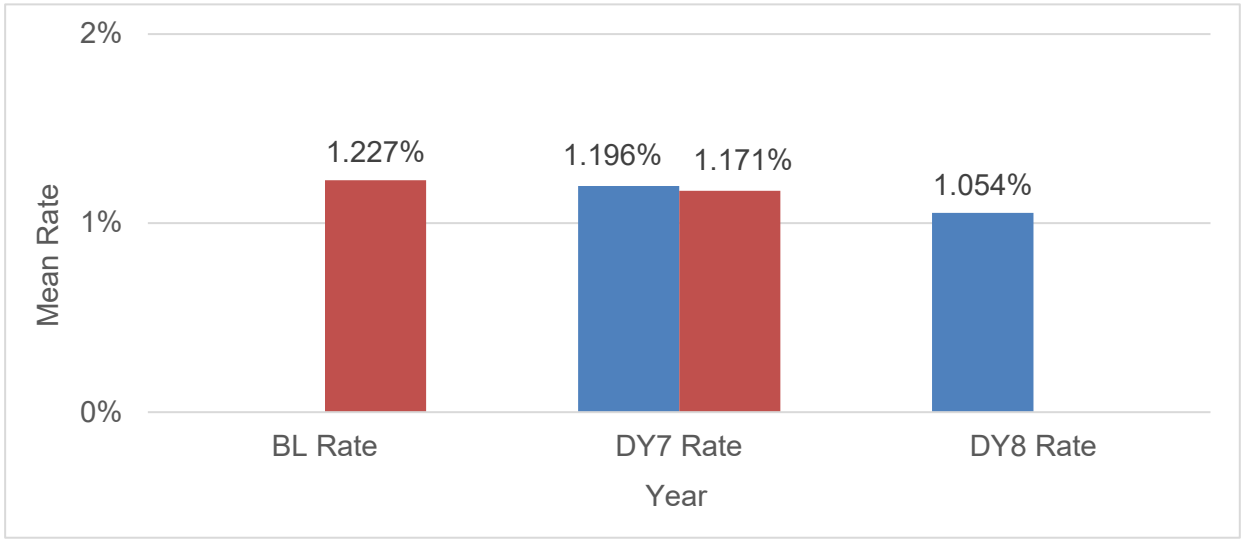
Figure B.7.3 Change in Unweighted Mean Rate: H2-510 Rate of Emergency Department Visits for Behavioral Health and Substance Abuse.



Note: Source is DSRIP report, Category C measures (see Table II.5). Improvement is a decrease in rates. BL = Baseline rate; DY7 = 2018; DY8 = 2019; N = 7 (Number of DSRIP providers reporting on measure H2-510).

Prevention Quality Indicator 91: Adult Acute Composite indicator (Adult Dehydration, Bacterial Pneumonia, Urinary Tract Infection Admission Rates) (C1-502: DSRIP Category C Measure 1.3.4)

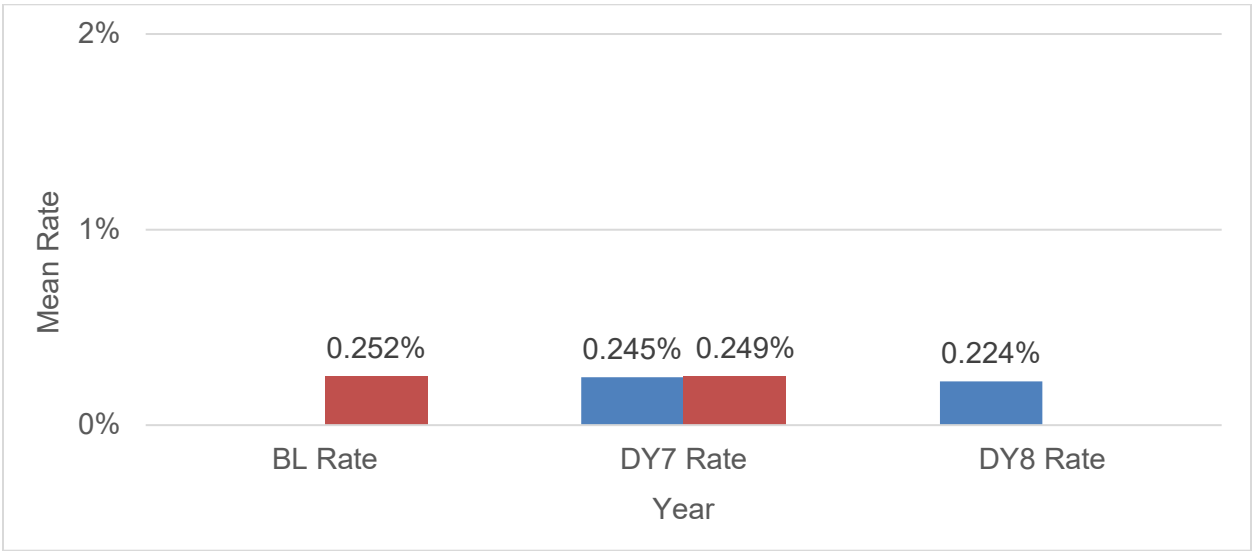
Figure B.7.4 Change in Unweighted Mean Rate: C1-502 PQI 91 Adult Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (see Table II.5). Improvement is a decrease in rates. BL = Baseline rate; DY7 = 2018; DY8 = 2019; N = 18 (Number of DSRIP providers reporting on measure C1-502).

Pediatric Quality Indicator 91 (PDI 91) Child Acute Composite indicator (D1-503: DSRIP Category C Measure 1.3.5)

Figure B.7.5 Change in Unweighted Mean Rate: D1-503 PDI 91 Child Acute Composite Indicator.



Note: Source is DSRIP report, Category C measures (see Table II.5). Improvement is a decrease in rates. BL = Baseline rate; DY7 = 2018; DY8 = 2019; N = 10 (Number of DSRIP providers reporting on measure D1-503).

APPENDIX C. UNCOMPENSATED CARE TECHNICAL APPENDIX

1. MEASURING UC COST

The DSH/UC Application data include a wide array of variables describing sources of submitted UC costs, UC pool payments, and hospitals. Researchers used the following data to formulate the main variables of interest for the analysis: the total amount of eligible UC costs, the total UC payment amount, and the percent of UC costs reimbursed (total UC payment divided by total eligible UC costs).

Hospitals were allowed to submit UC costs from three distinct sources of care: the Medicaid shortfall (the cost of care provided to Medicaid members that was left after any Medicaid payments); the uninsured shortfall (the cost of care provided to uninsured individuals that was not paid for); and the physician, clinics, and pharmacy shortfall (unreimbursed costs incurred by the hospital for the three affiliated services). The costs of care received by the state are the submitted charges, and these are translated into costs with cost-to-charge ratios as negotiated with CMS.

To arrive at the final total amount of eligible UC costs for each hospital, researchers combined all three shortfalls and subtracted the DSH payment hospitals received from CMS (payments for hospitals that provide a large share of care to Medicare and Medicaid members), and other payments hospitals received for services provided. Researchers calculated the percentage of reimbursed UC costs by dividing the total UC payment by the total eligible UC costs. If sufficient UC pool funds were available, all hospitals would have received a UC payment equal to the amount of the eligible UC costs. However, the UC pool was limited, and most hospitals received less than their realized UC costs.

2. EXTERNAL DATA SOURCE VARIABLES

In addition to the DSH/UC Application data, researchers used the following three external sources, also shown in Table C.2.1: (1) the AHA voluntary annual survey of hospitals, which includes a comprehensive set of hospital characteristics; (2) HCRIS data, which include descriptive and financial information on all Medicare-certified institutions; and (3) the rural-urban county classification from the U.S. Department of Agriculture (USDA).

The AHA data are beneficial because they have a high response rate and give insight into the hospital's operational structure since they include information on capabilities and care provision. For example, the data include information on total hospital beds, total inpatient and outpatient visits, and adoption of electronic medical records. The HCRIS data are beneficial because Medicare-certified institutions are required to submit an annual cost report to CMS, which means that most acute care hospitals have to submit information. The cost reports include information on the financial well-being of hospitals, such as total operating cost. For both AHA and HCRIS data, researchers used annual data from 2010 to 2017. The USDA data includes the geographic designation of the county based on the 2013 rural-urban continuum classification. These codes assign counties to three metro and six non-metro categories that can identify urban and rural counties.

Specifically, researchers used these three data sources to obtain information such as hospital's profit status, total number of hospital beds, total hospital admissions, and hospital county designation. Researchers created three different geographic groups from the USDA data that designate counties into nine categories: (1) urban (counties in metro areas with populations of 250,000 or more), (2) suburban (counties in metro areas with populations less than 250,000 and

all non-metro counties with urban populations of 2,500 or more), and (3) rural (completely rural counties and those with less than 2,500 in urban population). Table C.2.1 provides a summary of all variables used from the three external data sources.

Table C.2.1 External Data Sources and Variables.

External Data Sources and Variables	Definition
AHA	
Profit status	Whether the hospital is for profit or non-profit
Community designation	Whether the hospital is a community hospital
Health maintenance organization (HMO) contract	Whether the hospital has a written HMO contract
Preferred provider organization (PPO) contract	Whether the hospital has a written PPO contract
Total hospital beds	Total hospital beds
Acute long-term care designation	Whether the hospital is an acute long-term care hospital
Total Medicare facility charges	Total facility Medicare discharges
Outpatient visits	Total outpatient visits in a year
Hospital admissions	Total facility admissions in a year
Electronic medical records	Whether the hospital has an electronic medical record
HCRIS	
Operating revenue	Operating revenue of the hospital in a fiscal year
USDA	
Rural-urban classifier	County-level classification of urban or rural status

Note: AHA = American Hospital Association; HCRIS = Health Care Cost Report Information System; USDA = United States Department of Agriculture.

A complicating factor in adding data is the discrepancy between when UC costs are incurred and when they are reported (UC costs are reported two years after they are incurred) for UC payments. To accurately reflect the hospital's characteristics at the time of the realized UC costs, researchers merged the AHA and HCRIS external data to the year in which the UC costs were incurred. For example, researchers merged the AHA and HCRIS data available in 2010 with the 2012 DSH/UC Application data (DY1) that reflects UC costs incurred during FFY2010. No adjustment for USDA data was necessary because county designation did not change during the data period.

3. DETAILED RESULTS

Sample

This section provides tables and graphs that describe the UC hospitals. Table C.3.1 provides an overview of the characteristics of hospitals that submitted UC costs. The second column displays summary statistics for all hospitals that submitted UC costs in any DY, while the third column displays characteristics for the hospital sample which only includes hospitals that submitted UC costs in most years that allow for a trend analysis (UC cost reported in 7 or more

DYs). Overall, 409 hospitals submitted UC costs in any DY, and these had an average of 175 hospital beds with about 7,500 hospital admissions and 119,000 outpatient visits. The annual operating cost of the average hospital was $182 million in 2020 dollars, and hospitals submitted on average $25 million in UC costs ($113,342 per hospital bed) for which they were reimbursed $12 million ($64,413 per hospital bed) through the UC pool. All cost outcomes are displayed in CPI-adjusted 2020 dollars. Compared to all hospitals, the hospital sample was slightly larger, experienced roughly 10% more inpatient admissions and outpatient visits, and had 10% higher operating and 10% higher UC costs.

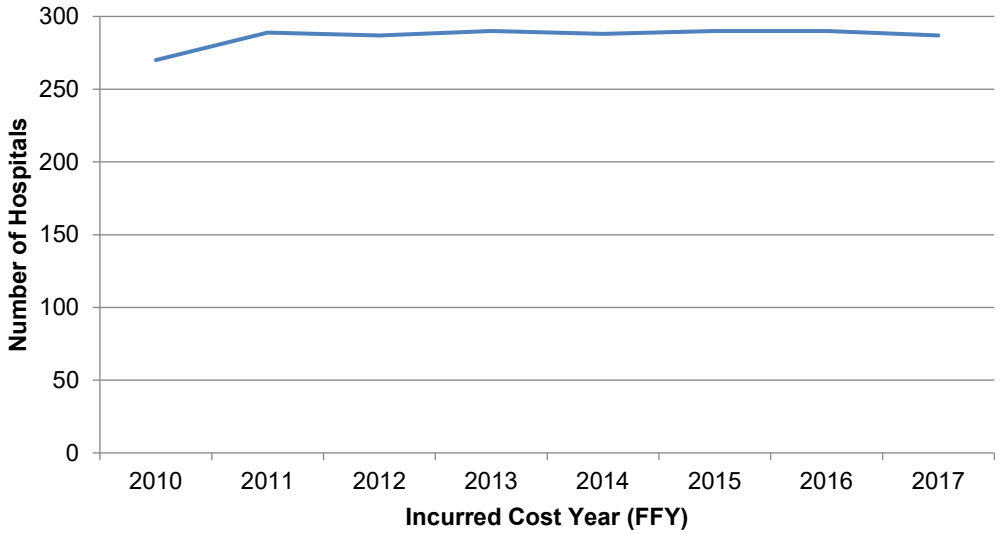
Table C.3.1 General Characteristics of the Average UC Hospital.

Average Hospital Characteristics	All Hospitals in UC Data	Hospital Sample (Hospitals with UC Costs in 7 or more DYs)
Number of hospitals	409	290
Hospital beds	175	189
Hospital admissions	7,440	8,094
Outpatient visits	119,224	130,017
Operating cost*	$182 million	$199 million
UC costs*	$25 million	$27.8 million
UC payment*	$12 million	$13.3 million
UC costs per bed	$113,342	$113,678
UC payments per bed	$64,413	$64,803
Hospital-year observations	2,663	2,291

*Note: *This outcome is measured in millions per year. Cost numbers are adjusted for medical inflation to 2020 dollars.*

Figure C.3.1 presents the number of hospitals in the hospital sample reporting UC costs over time. Hospitals that only submitted UC costs in 7DYs were most likely to be excluded in 2010 (DY1, the first year of the UC supplemental payment pool). Out of the 290 hospitals in the hospital sample, 253 reported UC costs in all years. Only 19 hospitals were excluded in 2010 (DY1), and nine hospitals were excluded in a later DY.

Figure C.3.1 Hospitals in Sample Submitting UC Costs by Year.



Note: Sample size N = 290 hospitals. The year displayed on the x-axis reflects the year the hospital incurred the UC costs, not the year the costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2010 were reported to HHSC in FFY2012 or DY1.

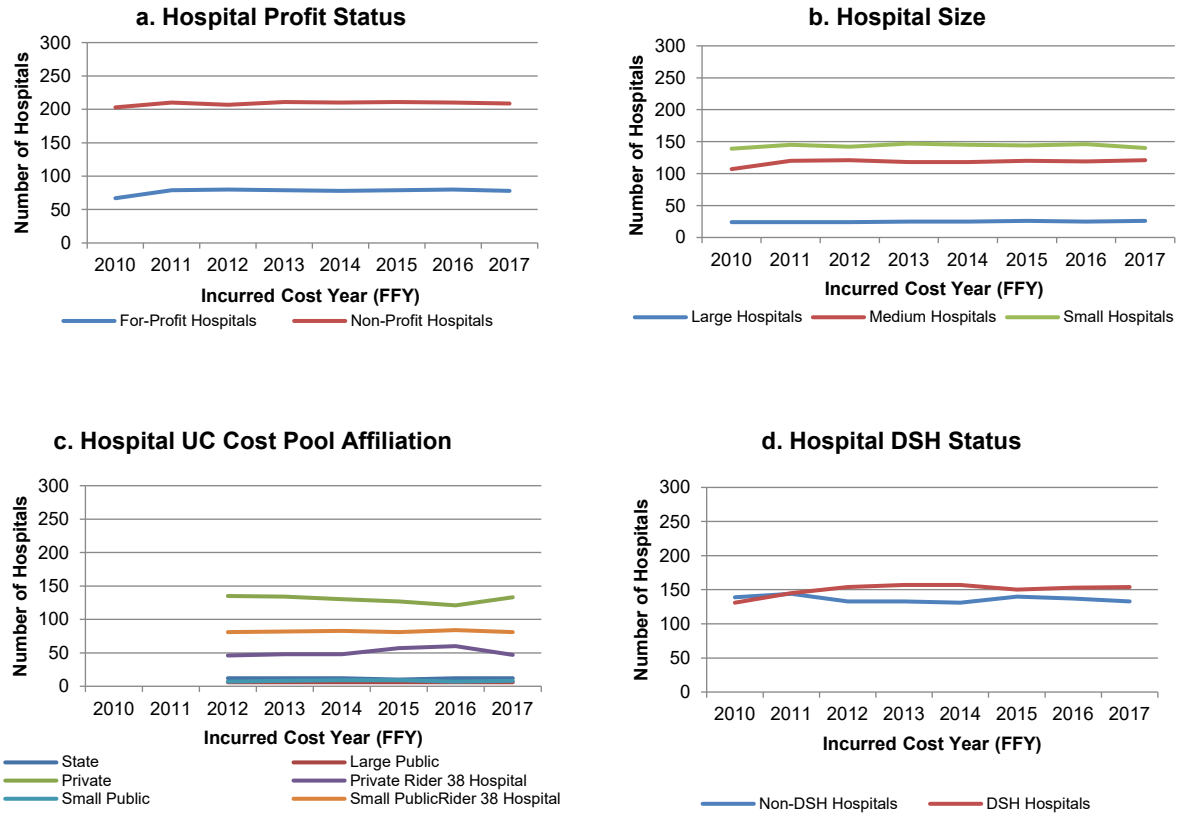
Below, only trends for the 290-hospital sample present in most years of the data are given. Limiting the sample has the advantage of comparing the same hospitals across time, while including hospitals that sparsely report UC costs complicates comparisons across time. Further, the fiscal year of the incurred UC costs is referred to as the incurred cost year.

The next figures display the descriptive subgroup analyses for the hospital sample. Figure C.3.2(a) displays the number of hospitals that were for profit and non-profit across time. Approximately 200 hospitals were for profit and 90 hospitals were non-profit across all FFYs. Figure C.3.2(b) presents the hospital size, measured by total hospital beds, by for-profit status. Overall, the average number of hospital beds across hospitals remained the same. This is especially true for small hospitals, whose bed count averaged 24 in 2010 and 26 in 2017. Researchers observed small growth in the composition of medium hospitals (between 100 and 500 beds) and large hospitals (500 beds or more) over time. In reporting year 2010, researchers observed 107 medium hospitals and 139 large hospitals; in the latest reporting year, researchers observed 121 medium hospitals and 140 large hospitals. Some of the shifts have to do with the fact that 13 medium and nine large hospitals did not report UC costs in reporting year 2010.

Figure C.3.2(c) and Figure C.3.2(d) present the hospitals' UC pool affiliation and whether hospitals received a DSH payment, respectively. Hospitals' UC pool affiliation moved little in early years, but some switched affiliation later. In 2015, researchers observed nine additional hospitals in the private Rider 38 hospital pool affiliation compared to 2014, but the change in composition was short lived; 13 hospitals transitioned from the private Rider 38 pool to the

private pool from 2016 to 2017. In terms of hospitals that received DSH payments, little movement was observed. This is mostly due to the fact that hospitals do not experience large shifts in patient mix within a short period of time; thus, hospitals that qualify for DSH payments at one point in time also tend to do so in the near future.

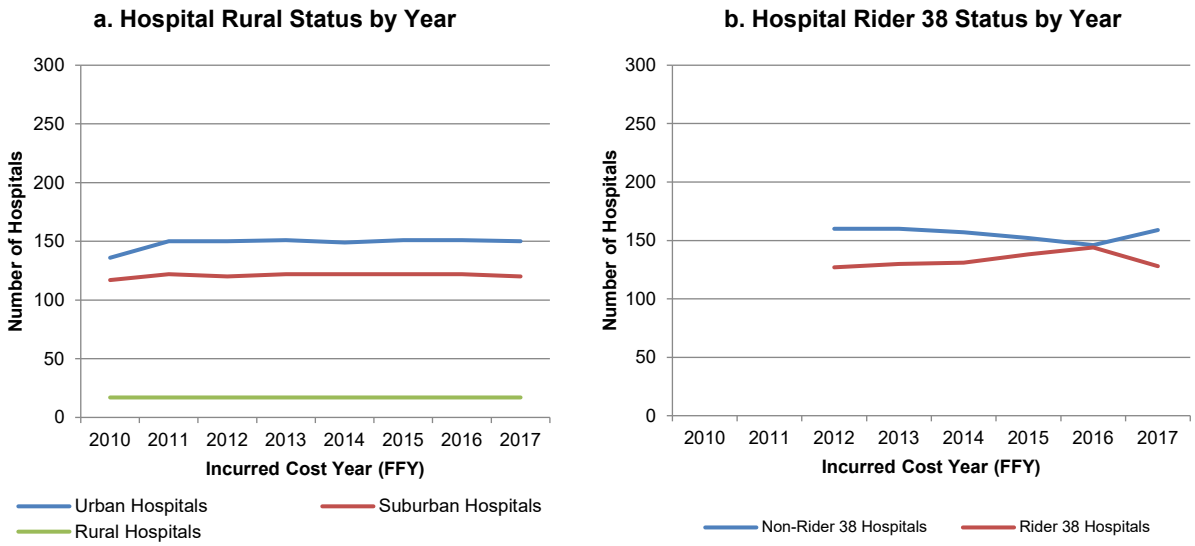
Figure C.3.2 Hospitals' Profit Status, Size, UC Pool, and DSH Payment Trend.



Note: Sample size N = 290 hospitals. The year displayed on the x-axis reflects the year the hospital incurred the UC costs that were reported to the state. For example, 2010 reflects FFY2012 or DY1. The UC pool affiliation figure begins in 2012 because all hospitals were in the same pool in the first 2 years of the Demonstration (i.e., 2010–2011). The UC pool affiliation figure begins in 2012 because all hospitals were in the same pool in the first 2 years of the Demonstration.

Figure C.3.3(a) displays the distribution of hospitals based on the urban-rural classification (using the three geographic regions defined from the nine rural-urban continuum codes) and Figure C.3.3(b) displays the Rider 38 designation from the state. Generally, the composition of the geography of hospitals stayed the same. Hospitals that reported incurred UC costs in 2010 were more likely to be urban and suburban, while the number of rural hospitals remained constant across all years. In terms of Rider 38 status, researchers only observed a small uptick in 2015 and 2016, and a reversal in 2017. These findings are consistent with the UC pool findings because Rider 38 classification leads to a shift in the UC pool, as well.

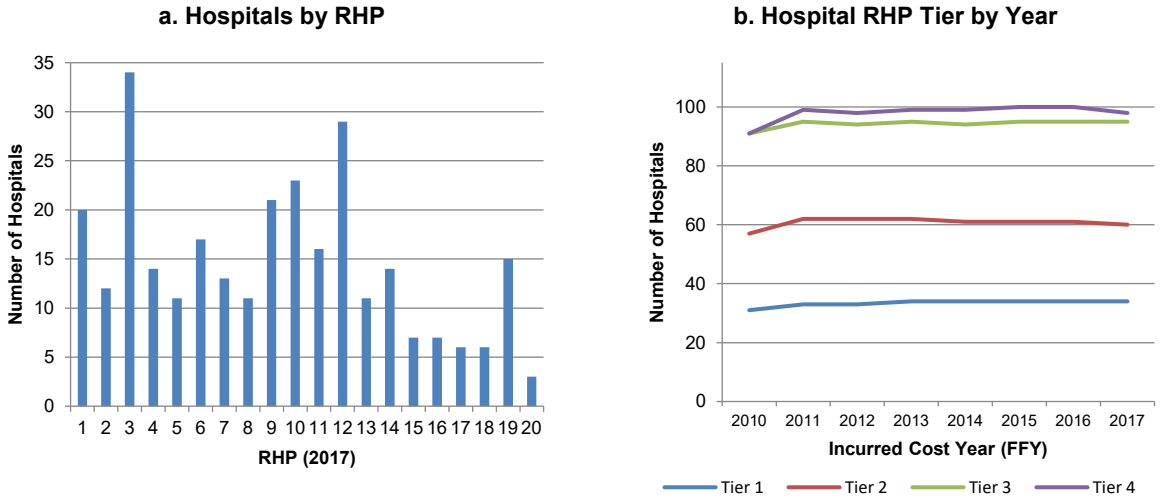
Figure C.3.3 Hospitals' County Rural Status and Rider 38 Status.



Note: Sample size N = 290 hospitals. The year displayed on the x-axis reflects the year the hospital incurred the UC costs that were reported to the state. For example, 2010 reflects FFY2012 or DY1. The Rider 38 affiliation figure begins in 2012 because all hospitals were in the same pool in the first 2 years of the Demonstration (i.e., 2010–2011).

Finally, Figure C.3.4(a) displays the location of hospitals as of the most recent FFY by RHP region and Figure C.3.4(b) displays the RHP tier (RHPs cluster participating hospitals within the same region). The majority of hospitals were in Houston RHP 3 (N = 34) and Lubbock RHP 12 (N = 29), closely followed by Dallas RHP 9 (N = 22) and RHP 10 (N = 23). RHPs were grouped into tiers based on the number of approved DSRIP projects in the first waiver, with Tier 1 having the most projects (i.e., large RHPs) and Tier 4 having the fewest (i.e., small RHPs). The RHP Tier map can be found in section II (Figure II.1). The majority of hospitals were in small RHPs (Tier 3 and Tier 4). Only one RHP met the criteria for Tier 1 (Houston RHP 3), and three RHPs met the criteria for Tier 2, leading to a relatively small number of hospitals represented in Tier 1 and Tier 2.

Figure C.3.4 Hospitals' RHP and RHP Tier.



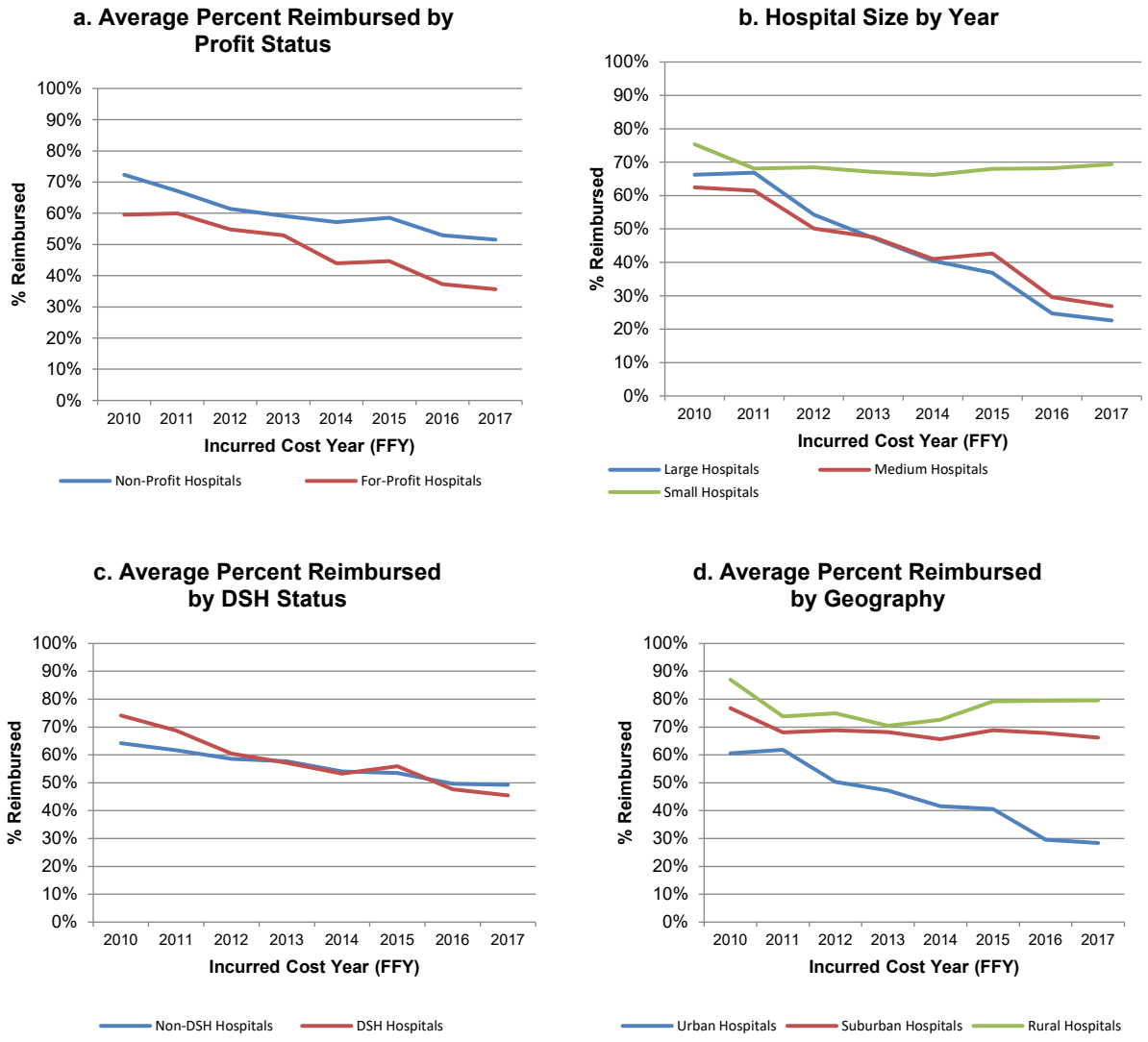
Note: Sample size N = 290 hospitals. Figure C.3.4(a) displays the number of hospitals in each RHP as of the most recent costs incurred FFY. Figure C.3.4(b) displays on the x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2010 were reported to HHSC in FFY2012 or DY1.

Hypothesis 2.1 Reimbursed UC Costs

Average Hospital Reimbursed UC Costs Subsample Analysis

Figure C.3.5 and Figure C.3.6 display the trend in the average percentage of eligible UC costs reimbursed for all subsamples. Figure C.3.5 displays the trends by hospital profit status, size, DSH status, and urbanicity, respectively. Figure C.3.6 displays the trends by Hospital Rider 38 Status, UC Pool Status, and RHP Tier, respectively.

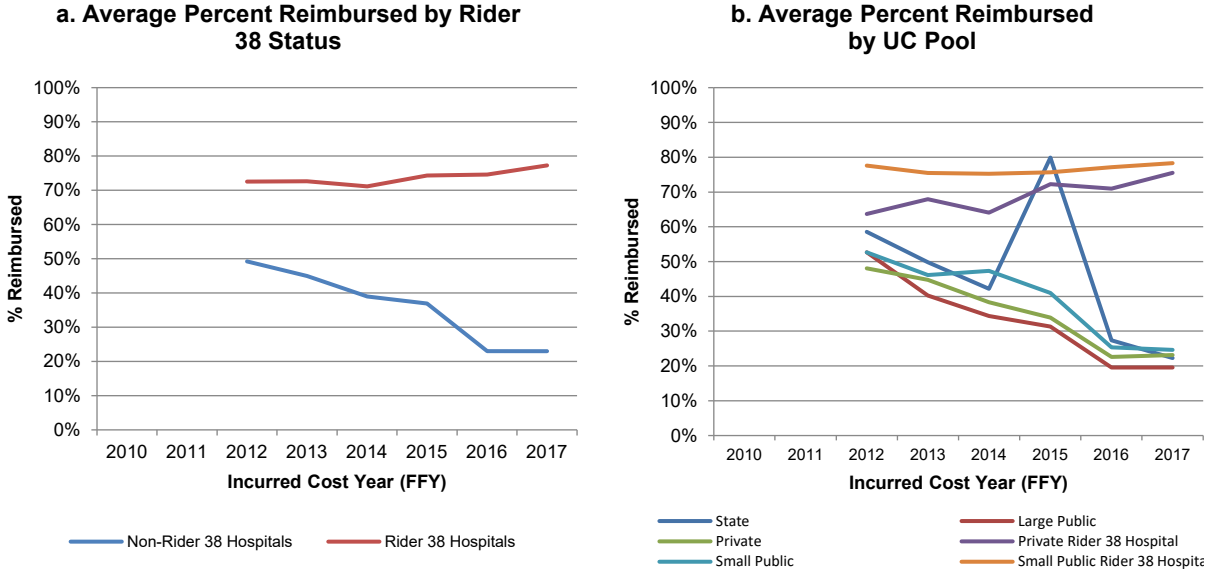
Figure C.3.5 UC Reimbursement Rate by Hospital Profit Status, Size, DSH Status, Geography.



Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2010 were reported to HHSC in FFY2012 or DY1.

Figure C.3.5(a) shows that the level and the trend in the percent of reimbursed costs were very similar for non-profit and for-profit hospitals, though both experienced a continuous decrease over the years, from about 72% and 60% to 52% and 36%, respectively. In terms of hospital size, small, medium, and large hospitals had similar reimbursement rates in the early years of the waiver (75%, 63%, and 66%, respectively). Medium-sized and large hospitals saw a negative trend in their reimbursement rate and were only reimbursed for 27% and 23%, respectively, in 2017, while the small hospital reimbursement rate stayed mostly flat (70% in 2017). Trends by DSH status closely followed the full sample results, where the share of reimbursed UC costs decreased from 2010 (74% and 64%) to 2017 (46% and 49%) for DSH hospitals and non-DSH hospitals, respectively. Finally, there is wide variation in reimbursement rate trends by urban-rural status. Urban hospitals saw a large decline in reimbursement rate, reimbursed for 61% of UC costs in 2010 and only 28% in 2017. Suburban hospitals fared better and saw a smaller decrease in the share of reimbursed costs, with 77% in 2010 and 66% in 2017. Rural hospitals received the highest reimbursement rate in 2010 (87%), and reimbursements were only somewhat lower in 2017 (80%).

Figure C.3.6 UC Reimbursement Rate by Hospital Rider 38 Status, UC Pool Status, and RHP Tier.



Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2010 were reported to HHSC in FFY2012 or DY1. Rider 38 affiliation and UC pool affiliation were the same for all hospitals in 2010 and 2011.

Figure C.3.6 displays trends in reimbursement rate for Rider 38 hospital status by hospitals' UC payment pool affiliation and by RHP tier. Figure C.3.6(a) shows that non-Rider 38 hospitals experienced a small, negative trend in the reimbursement rate between 2012 and 2017, with the reimbursement rate decreasing from 49% in 2012 to 23% in 2017. Rider 38 hospitals, on the other hand, had a positive trend in their reimbursement rate, which was 73% in 2012 and 77% in 2017. These findings are somewhat expected because rural hospitals have seen a strong increase in their reimbursement rate. Rider 38 hospitals receive special treatment and have an additional amount of payment set aside compared to all non-Rider 38 hospitals (similar conclusions can be drawn from Figure C.3.5).

In terms of the UC pool, private and small public Rider 38-designated hospitals were reimbursed for 64% and 78% in 2012, respectively, and held their reimbursement rate steady (76% and 78% in 2017). The remaining four groups saw their reimbursement rates decrease. Specifically, large and small public hospitals saw their percentage of eligible UC costs reimbursed decline from 53% and 53% in 2012 to 20% and 25% in 2017, respectively. State hospitals' reimbursement rate decreased from 59% in 2012 to 22% in 2017.

Finally, all RHP tiers saw a decrease in the average reimbursement rate, though Tier 3 and 4 only experienced modest declines, leading to a reimbursement rate of about 60% in 2017 from about 70% in 2010, while Tiers 1 and 2 saw their reimbursement rate decrease to about 30% in 2017 from over 50% in 2010. This is in line with large hospitals having the greatest reduction in reimbursement rates.

Regression and Wilcoxon Analysis of Reimbursed UC Share

Table C.3.3 displays the average share in reimbursed UC costs per hospital in 2010 and 2017 for the full sample and all subsamples. Researchers compared the 2010 and 2017 distribution of hospitals' reimbursement rates using the Wilcoxon signed-rank test (the p-value of the test is shown in the fourth column) to evaluate whether these are statistically different from each other. The last column displays the results from the linear trend regression model, which measures the impact of time on the share of reimbursed UC costs (each cell represents a different regression, with the top number representing the coefficient on the time variable and the bottom number in parentheses representing the standard error).

The test on the distribution of the percentage of eligible UC costs reimbursed between 2010 and 2017 for the same hospitals suggests that for all samples—the full sample and all subsamples except the UC pool subsample—the distributions are statistically different. In all cases, the p-value was less than or equal to 0.10. These findings suggest that the distribution of the percentage of UC costs reimbursed significantly decreased for all but one hospital subsample; Private Rider 38 hospitals did not experience a significant change in the distribution of the reimbursement rate from 2010-2017 (p-value of 0.86).

The regression results formalize the change in percentage of eligible UC costs reimbursed experienced throughout the Demonstration in each year. In the full sample regression results we found that hospitals' percentage of reimbursement UC costs decreased by 2.3 percentage points in each year. Subsequent stratifications of the sample show that the reduction in the share of reimbursed UC costs were highest among full sample for for-profit hospitals (3.7 percentage points), medium-sized hospitals (4.6 percentage points), large hospitals (5.7 percentage points), DSH hospitals (3.1 percentage points), urban hospitals (4.3 percentage points), non-Rider hospitals (5.3 percentage points), state hospitals (3.6 percentage points), large, public hospitals (5.9 percentage points), private hospitals (5.4 percentage points), and small, public hospitals (6.8 percentage points).

Table C.3.3 Trend in Percentage of Eligible UC Costs Reimbursed.

Sample (N = Hospitals)	Percent of UC Costs Reimbursed in 2010 (DY1)	Percent of UC Costs Reimbursed in 2017 (DY8)	P-Value Wilcoxon Signed-Rank Test	Regression Percent Reimbursed
Full sample (N = 240)	0.70	0.47	0.00	-0.023***
				(0.004)
Profit Status				
Not for profit (N = 188)	0.70	0.52	0.00	-0.017***
				(0.004)
For profit (N = 52)	0.60	0.36	0.00	-0.037***
				(0.007)
Hospital Size				
Large (N = 20)	0.66	0.23	0.00	-0.057***
				(0.006)
Medium (N = 94)	0.63	0.27	0.00	-0.046***
				(0.005)
Small (N = 126)	0.75	0.69	0.00	-0.001
				(0.005)
DSH Status				
DSH (N = 131)	0.74	0.46	0.00	-0.031***
				(0.005)
Non-DSH (109)	0.64	0.49	0.00	-0.018***
				(0.006)
RUCC				
Urban (N = 117)	0.61	0.28	0.00	-0.043***
				(0.004)
Suburban (N = 108)	0.77	0.66	0.00	-0.003
				(0.006)
Rural (N = 15)	0.87	0.80	0.01	0.022
				(0.015)
Rider Status				
Non-Rider (N = 124)	0.49	0.23	0.00	-0.053***
				(0.003)
Rider (N = 113)	0.73	0.77	0.00	0.012*
				(0.005)
UC Pool Affiliation				
State hospital (N = 11)	0.59	0.22	0.00	-0.036***
				(0.006)
Large public (N = 6)	0.53	0.20	0.03	-0.059***
				(0.004)
Private (N = 100)	0.48	0.23	0.00	-0.054***
				(0.003)
Private Rider (N = 38)	0.64	0.76	0.86	0.028*
				(0.012)
Small public (N = 7)	0.53	0.25	0.02	-0.068***
				(0.001)
Small public Rider (N = 75)	0.78	0.78	0.00	0.003
				(0.003)

Note: The first two columns display the average hospital's percentage of eligible UC costs reimbursed of UC costs. The third column displays p-values from the Wilcoxon Signed-Rank Test that evaluates whether the distribution of the percentage of eligible UC costs reimbursed in the first two columns differ. The last column displays regression coefficients and standard errors in parenthesis from the trend regression analysis described in the Methods section of H2.1. ***p < 0.001, **p < 0.01, *p < 0.05.

Hypothesis 2.2 UC Cost Growth Rate

Adjusted Average Hospital-Level Subsample Trends

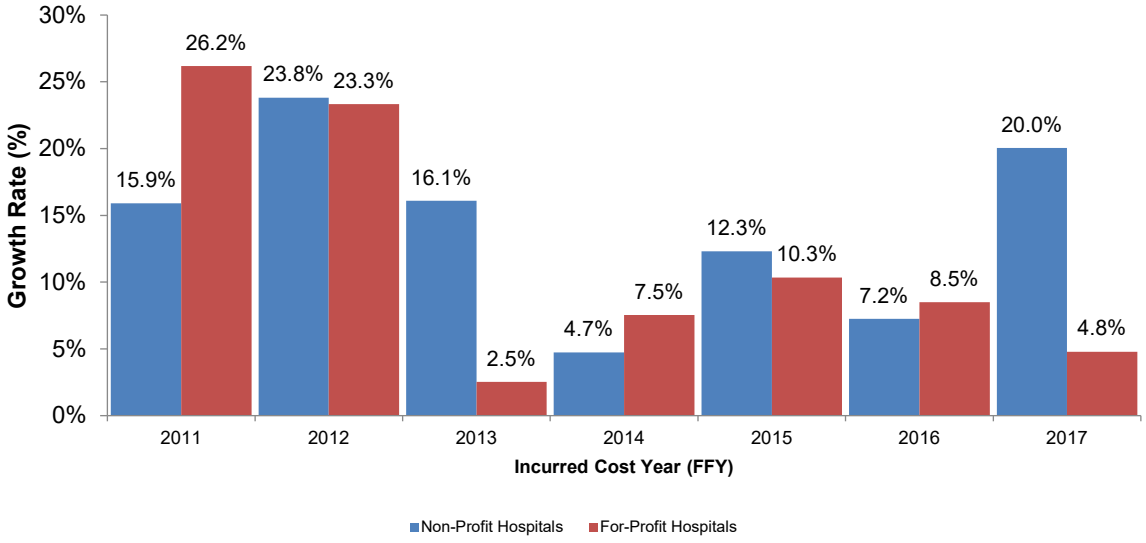
Figure C.3.7 through Figure C.3.13 display the UC cost growth rates along subsample analyses by hospital profit status, size, DSH status, rural-urban continuum, and Rider 38 status. These figures summarize the descriptive analyses that are not adjusted for any covariates.

The UC cost growth rates for non-profit hospitals closely resembled the growth rate levels of the full sample (Figure III.4), with a decreasing trend in early years and higher growth rates in 2015 and 2017. The average growth rate was 14% and ranged from 5% in 2014 to 24% in 2012. The average growth rate was 12% and ranged from 2% in 2013 to 26% in 2011 among for-profit hospitals. However, for-profit hospitals experienced a very different UC cost growth trend. For-profit hospitals displayed large cost growth in 2011 and 2012 that topped 20% but then fell to under 10% in all subsequent Demonstration years.

Wide variation in UC growth rates emerged by hospital size (Figure C.3.8). Large hospitals experienced large but sporadic growth in UC costs, with more than 30% in 2012, 2015, and 2017, but little growth in 2013 and 2014 (with an average growth rate of 22%). Medium-sized hospitals had the least variation in UC cost growth rates across years, with relatively consistent UC cost growth rates below 10% in all years except in 2011 (average growth rate 9%). Small hospitals were able to reduce UC cost growth rates beginning in 2012, which led to a growth rate of about 1% in 2014, but rates grew after 2014 and surpassed 20% in 2017, resulting in an average growth rate of 16% per year.

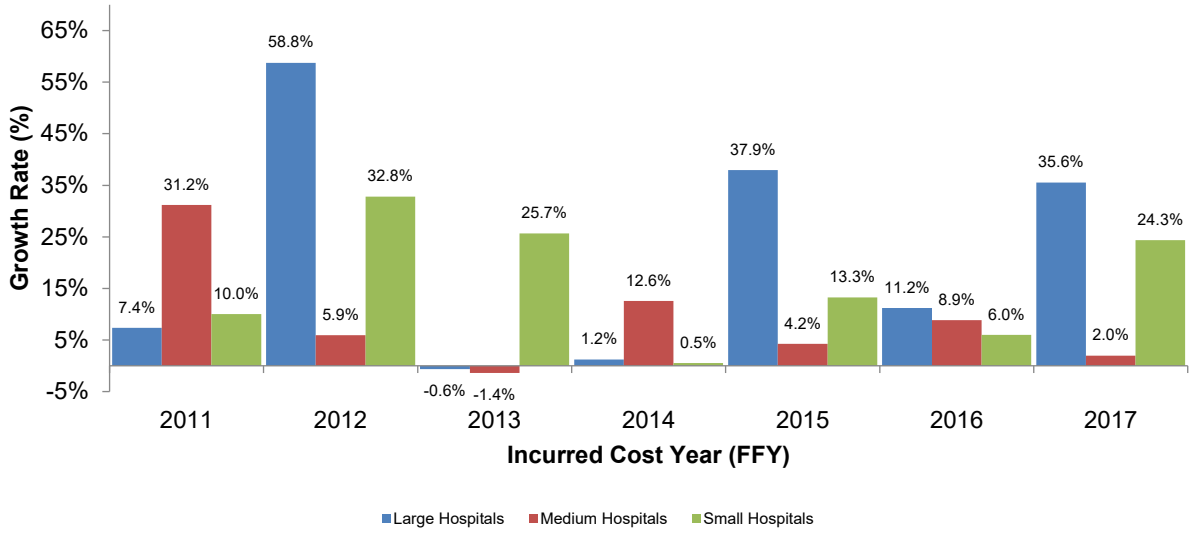
Stratification of hospitals by DSH status suggests that hospitals serving a larger share of Medicare and Medicaid patients follow a UC cost growth trend that is comparable to the full sample trend (Figure C.3.9). For non-DSH hospitals, the UC growth rate trend was generally moderate, with a decreasing trend. Overall, average growth rates between DSH and non-DSH hospitals were similar, at 13% and 14%, respectively.

Figure C.3.7 Adjusted Average UC Cost Growth by Hospital Profit Status.



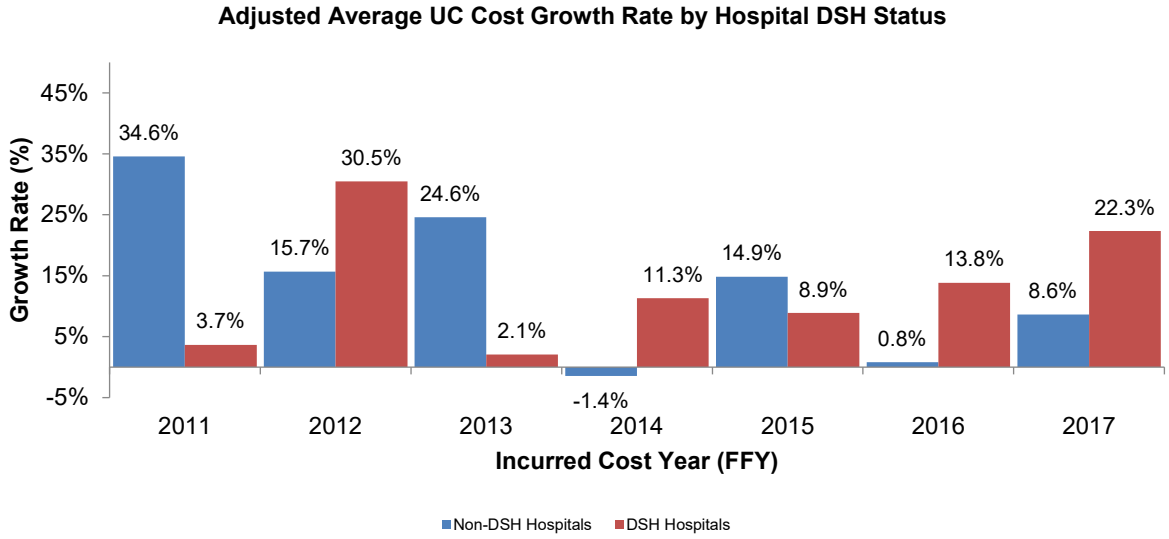
Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011.

Figure C.3.8 Adjusted Average UC Cost Growth by Hospital Size.



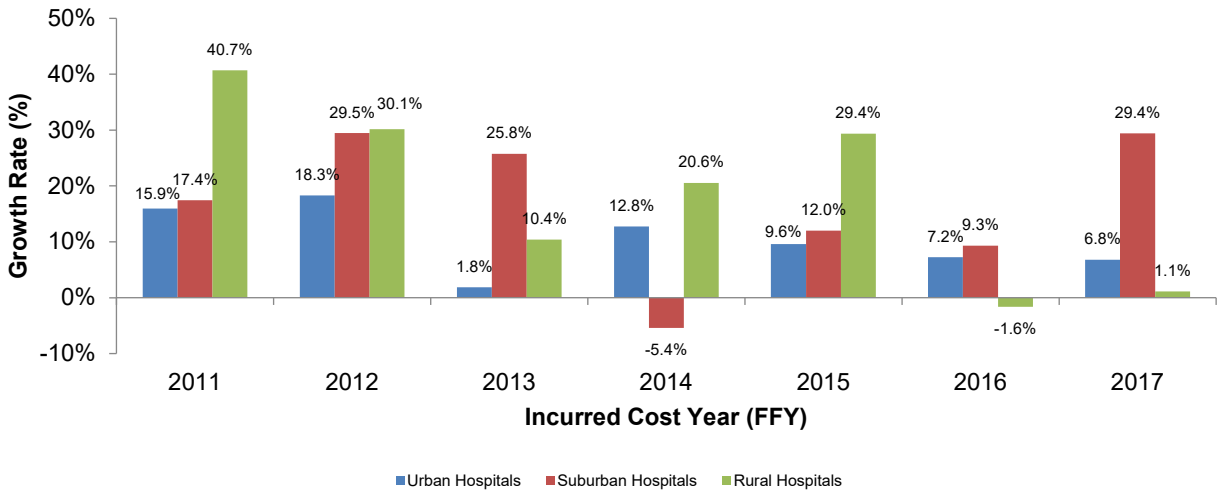
Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011.

Figure C.3.9 Adjusted Average UC Cost Growth by Hospital DSH Status.



Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011.

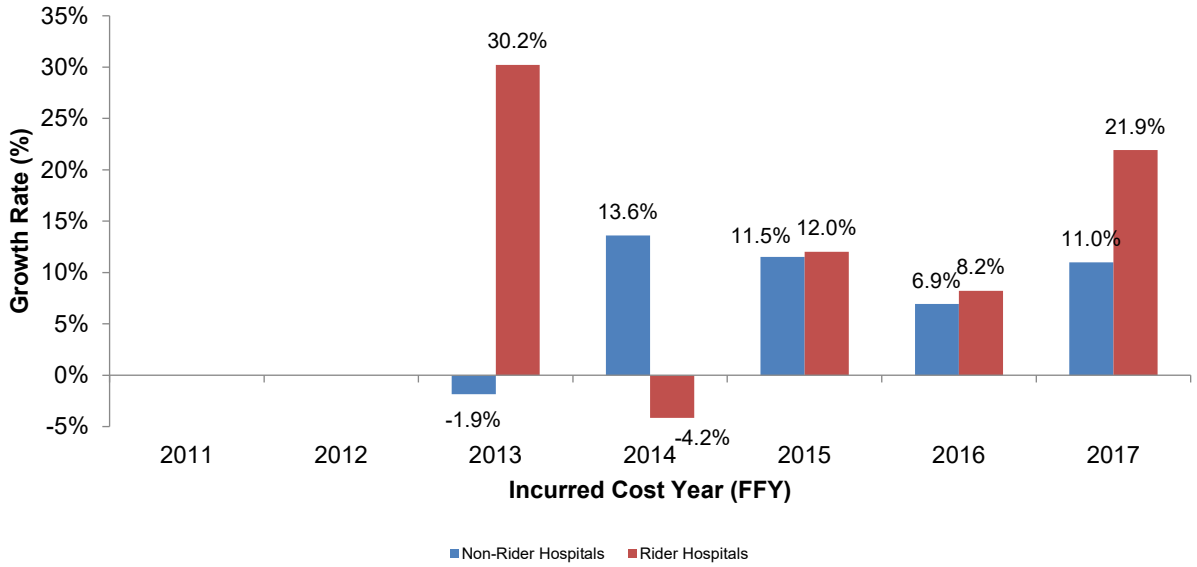
Figure C.3.10 Adjusted Average UC Cost Growth by Hospital Rural-Urban Status.



Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011.

In terms of geography, urban hospitals, which are generally larger, experienced a consistently low growth rate that oscillated around 10%, while suburban hospitals experienced a flat trend in UC cost growth rates of around 20% from 2011 to 2013, a negative growth rate in 2014 (potentially affected directly by the ACA), and then a positive trend that jumped from 10% in 2015 and 2016 to about 30% in 2017 (leading to a 17% average growth rate). Rural hospitals also had high rates of growth in the early years that topped 40% in 2011 and receded to a still substantial 30% growth rate by 2015 (with an average growth rate of 19%). In 2016 and 2017, the growth rate was negative and close to zero, respectively, suggesting fundamentally different shifts in care delivery. The shift in growth in post-2014 may partially be explained by the generally larger effect of the ACA on the uninsured in rural areas that generally had lower insurance rates before the ACA (Figure C.3.10).

Figure C.3.11 Adjusted Average UC Cost Growth by Hospital Rider 38 Status.

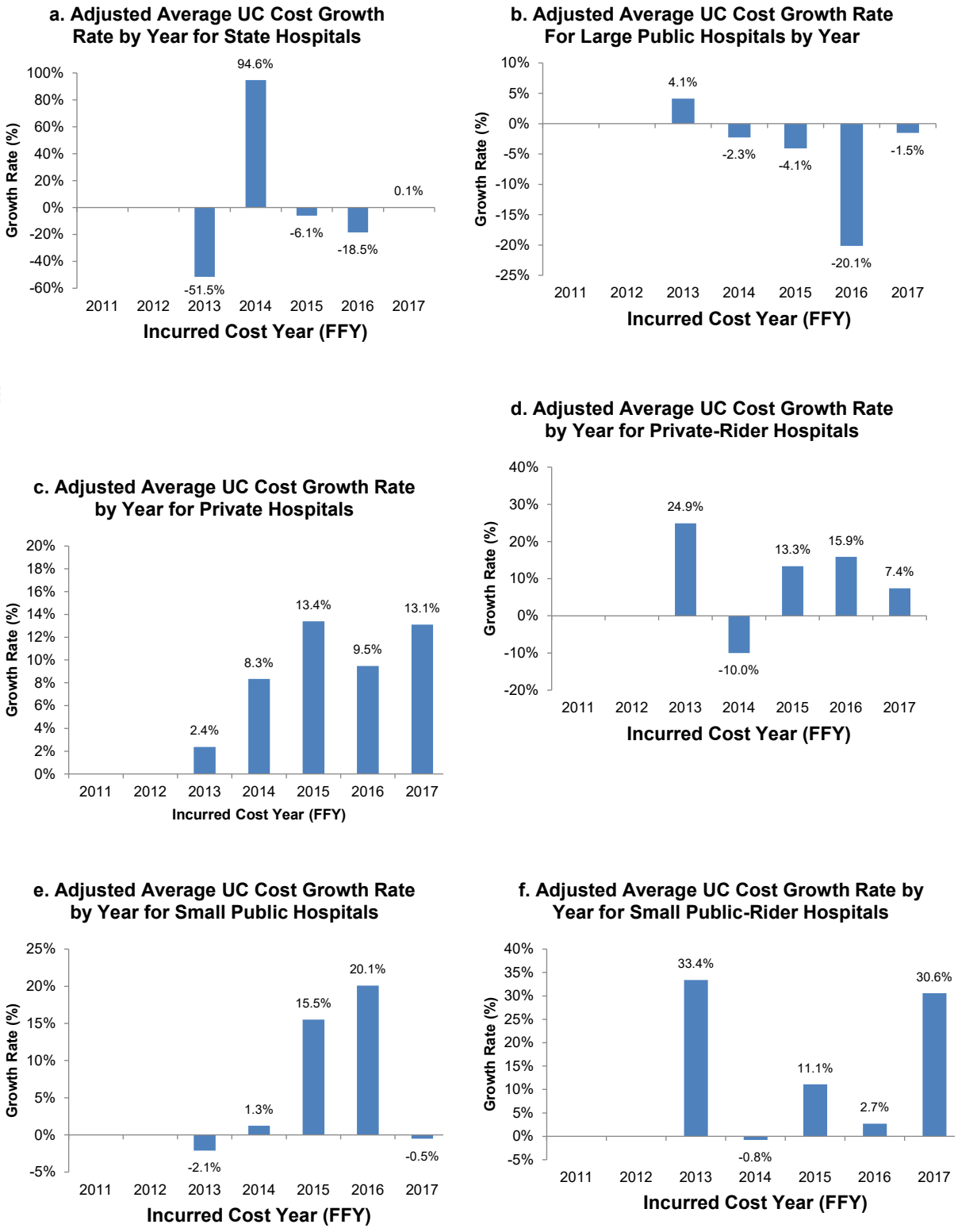


Note: Sample size N = 290 hospitals. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011. The Rider 38 affiliation figure begins in 2012 because all hospitals were in the same pool in the first 2 years of the Demonstration.

The analysis stratifying hospitals by Rider 38 status is closely related to the geography subsample analysis and thus provides similar—but somewhat different—trends than the urban-rural stratification (Figure C.3.11). Rider 38 hospitals, which are generally more rural and suburban, experienced high growth rates in 2013 that slowed between 2014 and 2016 but surpassed 20% in 2017 (leading to an average growth rate of 16%). Non-Rider 38 hospitals, which are mostly urban hospitals, experienced a consistent, low level of growth across all years that plateaued in 2013 with a negative growth rate of –2% and then increased to roughly 10% in all later years (for an average growth rate of 10%).

Figure C.3.12 and Figure C.3.13 display the trend in UC cost growth by UC pool and RHP tier. Hospitals' UC cost growth varied widely depending on the association of the UC pool. State and large, public hospitals saw negative growth rates in 4 out of the 5 years, with especially strong evidence of continuously declining growth beginning in 2014. Private, private Rider 38, and small hospitals saw tepid, consistent positive growth rates across all years that was generally below 10%. Small, public Rider 38 hospitals saw larger UC cost growth in 2013 and 2017, with low growth rates in between. In terms of RHP tier, hospitals in Tier 1 and Tier 4 had the highest growth rates in some years, with average growth rates above 10%, while Tier 2 and Tier 3 hospitals saw growth rates that were moderate across years, and in many cases below 10%.

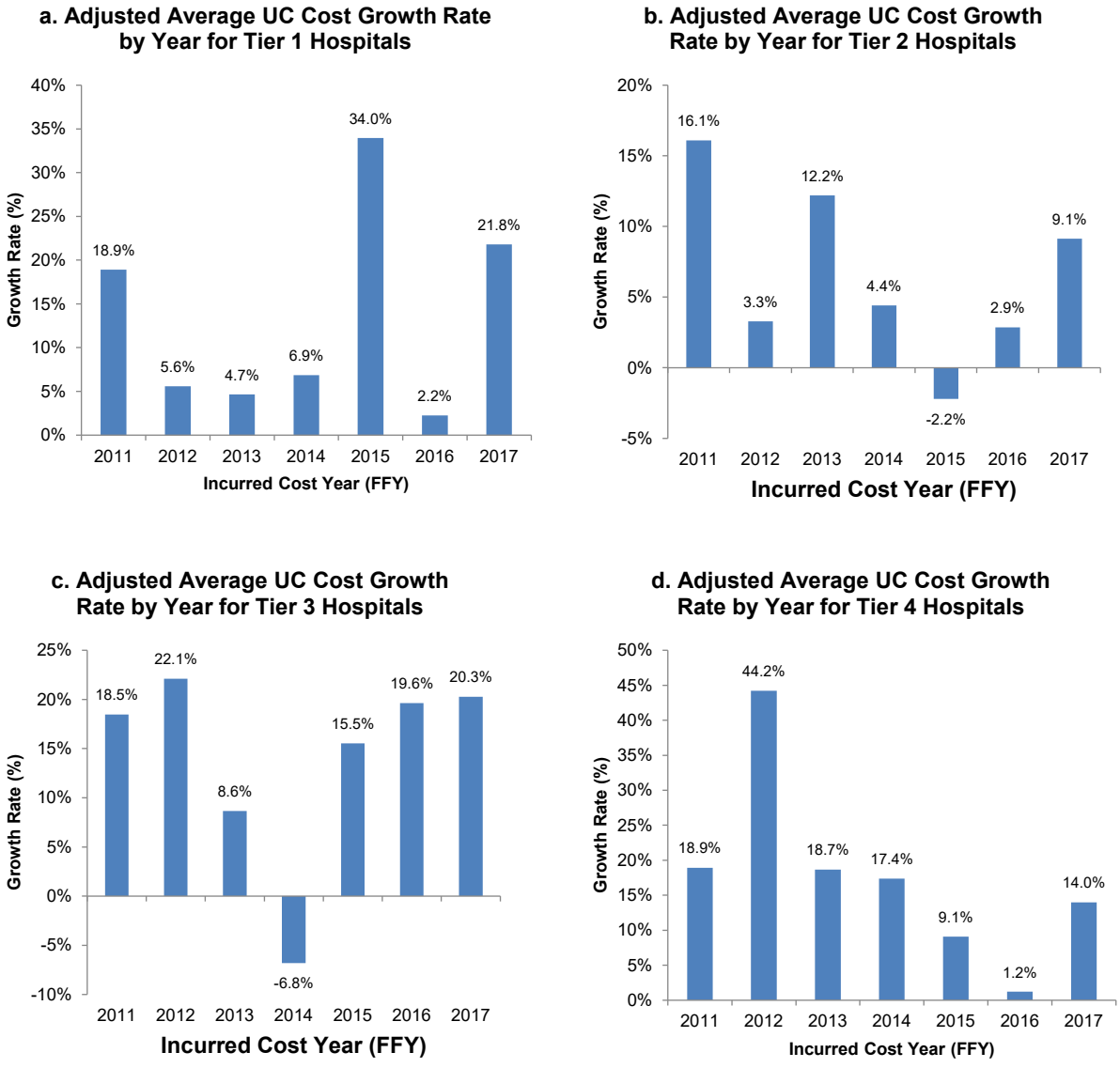
Figure C.3.12 Adjusted Average UC Cost Growth by Hospital UC Pool.



Note: Sample size State Hospitals N = 12, Large Public Hospitals N = 6, Private Hospitals N = 134, Private-Rider Hospitals N = 48, Small Public Hospitals N = 8, and Public Rider Hospitals N = 82. The x-

axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011. The UC pool affiliation begins in 2012 because all hospitals were in the same pool in the first 2 years of the Demonstration.

Figure C.3.13 Adjusted Average UC Cost Growth by Hospital RHP Tier.



Note: Sample size Tier 1 Hospitals N = 34, Tier 2 Hospitals N = 62, Tier 3 Hospitals N = 95, Tier 4 Hospitals N = 99. The x-axis displays the year the hospital incurred the UC costs, not the year costs were reported to the state (two years after costs were incurred). For example, costs incurred in FFY2011 were reported to HHSC in FFY2013 or DY2. The y-axis displays the average growth rate of UC costs for hospitals from one year to the next, with the first year being omitted as the baseline year to calculate the first growth rate in 2011.

Adjusted UC Costs Regression Analysis

Table C.3.4 provides the growth rate regression results for the full sample and the subsamples. Each column displays estimates from a different regression model, with the top number representing the coefficient on the time variable, and the bottom representing the standard error in parenthesis. The first row shows the results from the full sample 2011–2017 regular linear trend regression models, and the second column displays the results for the same sample estimating robust regressions.

There is little evidence of change in the growth rate over time. The results suggest that the UC cost growth rate decreased by 2.1 percentage points. However, the effect is not statistically significant. Similarly, most subgroup effects also provide little statistical evidence of a decreasing trend in UC cost growth. The only consistent evidence across both regression specifications emerges among small hospitals and state hospitals at p-value of 10%. Specifically, small hospitals decreased UC costs between 1.7 to 3.6 percentage points per year. State hospitals had substantially large results that suggest that the UC cost growth rate decreased by 12 to 23 percentage points per year. Rider 38 hospitals experienced a decrease in the UC cost growth rate of 3.3 percentage points each year in the regression results, though the effect is almost statistically significant and smaller with 1.7 percentage points in the robust regression results (p-value of 0.15).

Table C.3.4 Regression Analyses on Adjusted UC Growth Rate.

Sample (N = Observations)	UC Cost Growth (Cost 2011-2017)	Robust Regression UC Cost Growth (Cost 2011-2017)
Full Sample (N = 1,951)	-0.021	-0.001
	(0.013)	(0.005)
Profit Status		
Not for profit (N = 1,429)	-0.018	-0.005
	(0.013)	(0.006)
For profit (N = 522)	0.004	0.010
	(0.016)	(0.007)
Hospital Size		
Large (N = 169)	-0.073	0.016
	(0.137)	(0.014)
Medium (N = 800)	0.003	0.002
	(0.013)	(0.006)
Small (N = 982)	-0.036+	-0.017+
	(0.016)	(0.009)
DSH Status		
DSH (N = 1,039)	-0.012	0.006
	(0.024)	(0.007)
Non-DSH (912)	-0.036*	-0.002
	(0.013)	(0.006)
RUCC		
Urban (N = 1,008)	-0.022	-0.007
	(0.021)	(0.005)
Suburban (N = 829)	-0.012	-0.015
	(0.018)	(0.011)
Rural (N = 117)	-0.049	0.014
	(0.062)	(0.040)
Rider Status		
Non-Rider (N = 1,160)	-0.026	-0.003
	(0.023)	(0.005)
Rider (N = 791)	-0.033+	-0.017
	(0.017)	(0.012)
UC Pool Affiliation		
State hospital (N = 64)	-0.228+	-0.121*
	(0.116)	(0.045)
Large public (N = 36)	-0.036	0.008
	(0.058)	(0.005)
Private (N = 771)	0.005	-0.001
	(0.017)	(0.006)
Private Rider (N = 305)	-0.032	-0.003
	(0.021)	(0.017)
Small public (N = 48)	-0.034	-0.018
	(0.043)	(0.035)
Small public Rider (N = 488)	-0.009	-0.012
	(0.028)	(0.017)

Note: Each cell displays coefficient results where the dependent variable is the UC cost growth. Standard errors are displayed in parentheses. ***p < 0.001, **p < 0.01, *p < 0.05, +p < 0.1

APPENDIX D. MEDICAID MANAGED CARE TECHNICAL DETAILS

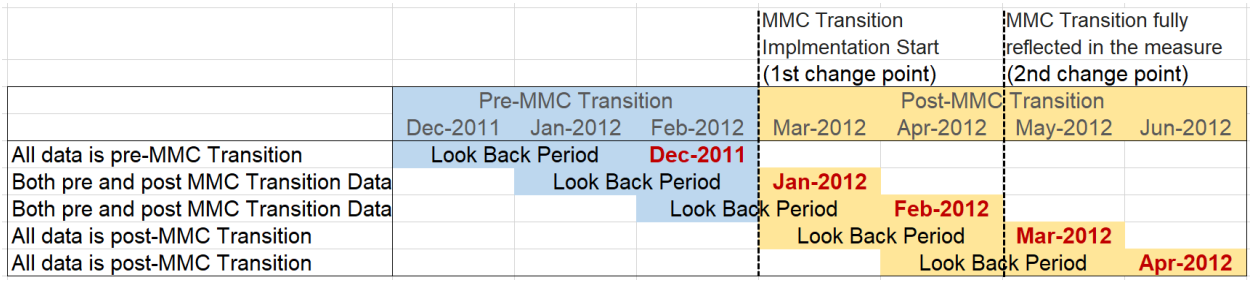
1. ANALYZING ANNUAL MEASURES

ITS analysis is one of the best methods to evaluate policy impact because it allows for a statistical comparison of pre and post trends. The main drawback is that ITS, in general, requires a minimum of eight pre- and eight post-measurement time points (Penfold & Zhang, 2013). For annual measures, 16 years of data are not available for this evaluation, so ITS is not an option without recoding of the data. Therefore, for this Interim Report, we investigated the possibility of using a rolling monthly measurement period for annual measures to create sufficient measurement time points for ITS. Ultimately, researchers determined that the standard ITS analysis using rolling monthly measures will not allow for a statistical comparison of pre and post trends. Therefore, results from the rolling method are exploratory in nature and are not included in the interim report. Below, we detail the issues encountered in trying to use rolling monthly measures.

Measure definitions longer than a month (e.g., quarterly or annual) require more time (i.e., the look back period) to fully capture the MMC transition in the data. Therefore, we used the rolling monthly time unit with a moving window denoted as the first month of the measurement period (e.g., measurement period April 2017 to March 2018 was denoted as April 2017). This approach resulted in data point for each month, which enabled an ITS analysis.

Figure D.1.1 provides an example of a 90-day rolling window. A measure calculated in March 2012 (when CMDS services transitioned to MMC) using a 90-day rolling window would include data from January 2012 to March 2012 (labeled Jan 2012), resulting in some reflecting pre-MMC transition data (January and February) and some post-MMC transition data (March). As a result, the 90-day rolling window would not fully reflect outcomes after the MMC transition until the full rolling window period has passed March 2012 (in May 2012). Therefore, we used two change points in the ITS model. In this example, the first change point is March 2012, and the second change point is May 2012, when all the data fully reflect the time after the MMC transition.

Figure D.1.1 Example of Rolling Measure with 90-Day Look Back Period.



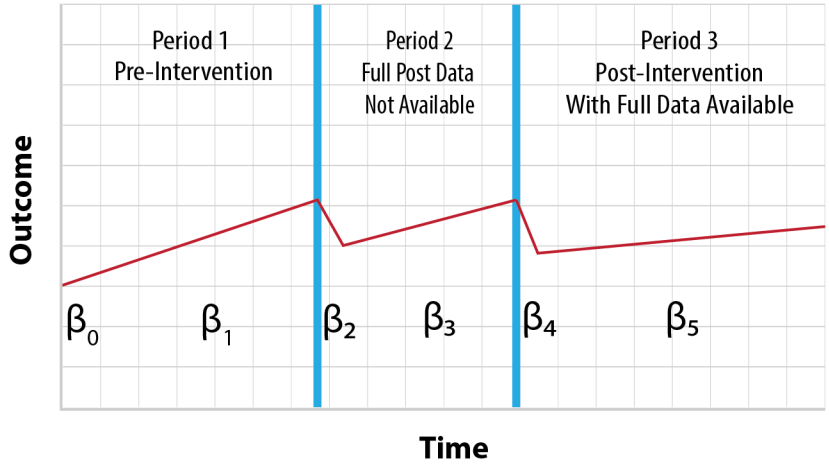
As conceptually presented by Wagner and colleagues (2002), the two change points in the ITS models would be specified as below. The corresponding plot of the ITS model is shown in Figure D.1.2 where the two change points split the measures into 3 time periods. Period 1 is the pre-MMC transition period; period 2 is the temporary period after MMC transition but when rolling windows reflect pre-and post-MMC transition data; and period 3 is when sufficient follow-up time has passed for rolling windows to reflect post-MMC transition data only. The full impact of the MMC transition would need to compare the trend in period 1 and in period 3.

$$Yt = \beta0 + \beta1 * time + \beta2 * MMC1 + \beta3 * postslope1 + \beta4 * MMC2 + \beta5 * postslope2 + \varepsilon t$$

where:

- β0 = baseline level of outcome at beginning of pre-MMC period [period 1]
- β1 = trend pre-MMC transition (i.e., slope) [period 1]
- β2 = immediate impact of MMC transition not fully reflected in the data yet (i.e., level), [period 2]
- B3 = trend post-MMC transition but before full measurement is available (i.e., slope) [period 2]
- β4 = immediate impact post-MMC transition period when full impact can be measured (i.e., level) [period 3]
- β5 = trend post-MMC transition period when full impact measured can be measured (i.e., slope) [period 3]

Figure D.1.2 Example ITS Model with Rolling Measure.



In this model, the standard ITS analysis is used to compare trend and level shifts in each period to the previous period (i.e., period 2 is compared to period 1, and period 3 is compared to period 2). This can compare only pre-MMC transition data (period 1) with post-MMC transition data (period 3) indirectly, through the temporary period 2 where the measurements are not reliable because they use a mix of data from both pre- and post-MMC transition data, with each point in the temporary period reflecting a different mix of pre and post data. Thus, although graphing may be possible with a rolling monthly measure, using ITS analysis to determine the full impact of the MMC transition is not possible.

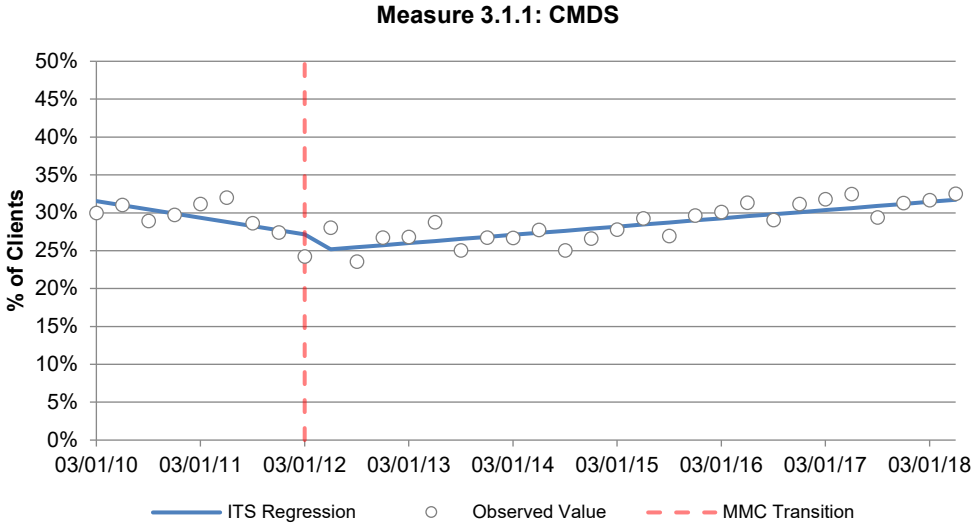
Researchers are currently investigating other approaches that may allow for a more rigorous analysis of annual measures for the Summative Report, such as utilizing additional analytic approaches to directly compare two slope changes (e.g., period 1 versus period 3), or adjusting the annual measures to quarterly or monthly measures, where possible. More time is needed to complete these investigations.

2. FULL MMC RESULTS

3.1.1 CMS percentage of eligible clients who received preventive dental services (ITS)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.1.1: CMS Percentage of eligible who received preventive dental services (Quarterly Rate)[2]						
CMDS (N = 2,808,181)	Mar 2010 –Jun 2018	31.55	-0.55	-1.95*	0.27***	31.99

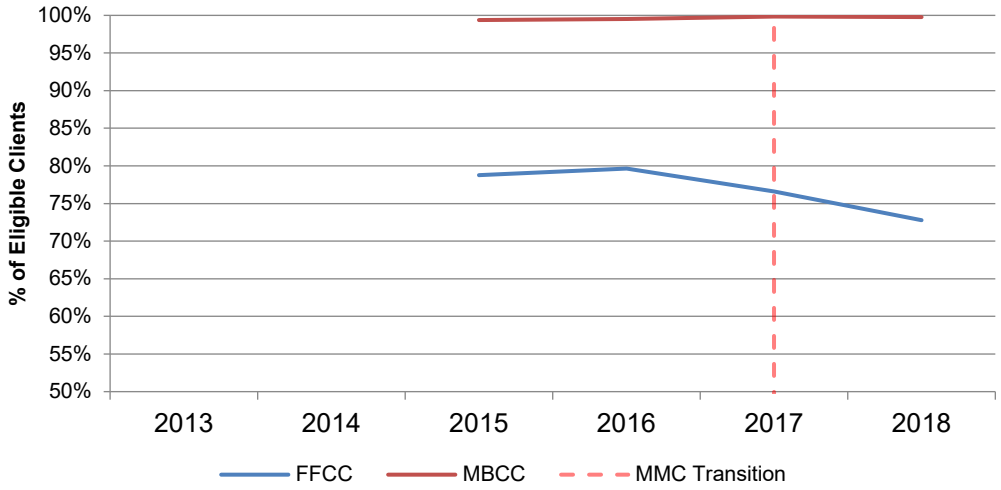
*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in June 2018. [2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. Rate is presented quarterly. CMS = Centers for Medicare & Medicaid Services; CMDS = Children's Medicaid Dental Services; MMC = Medicaid managed care. The results in this report for Measure 3.1.1 may not align with ongoing state reporting due to differences in the measurement period used for the current evaluation.*



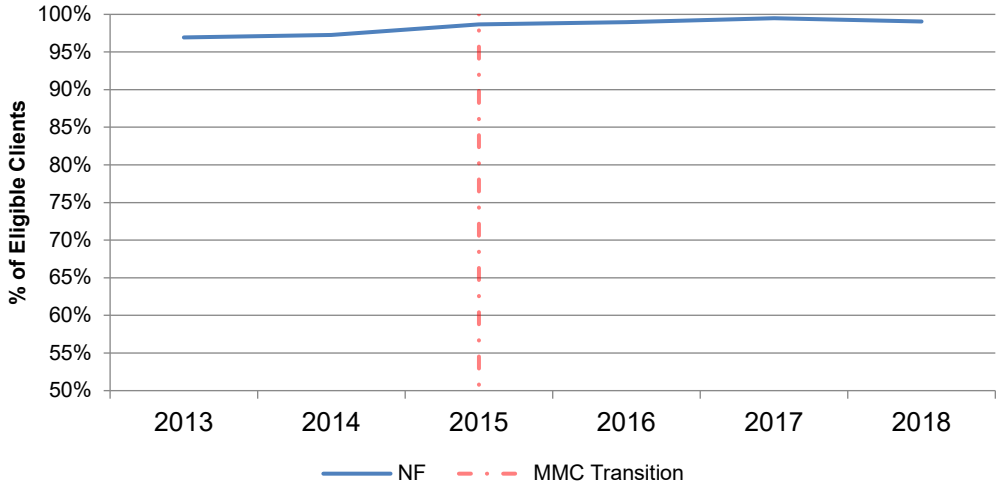
Note: CMDS = Children's Medicaid Dental Services; ITS = Interrupted Time Series; MMC = Medicaid managed care.

3.1.2 Adult access to preventive/ambulatory health services (Descriptive)

a. Measure 3.1.2: FFCC and MBCC

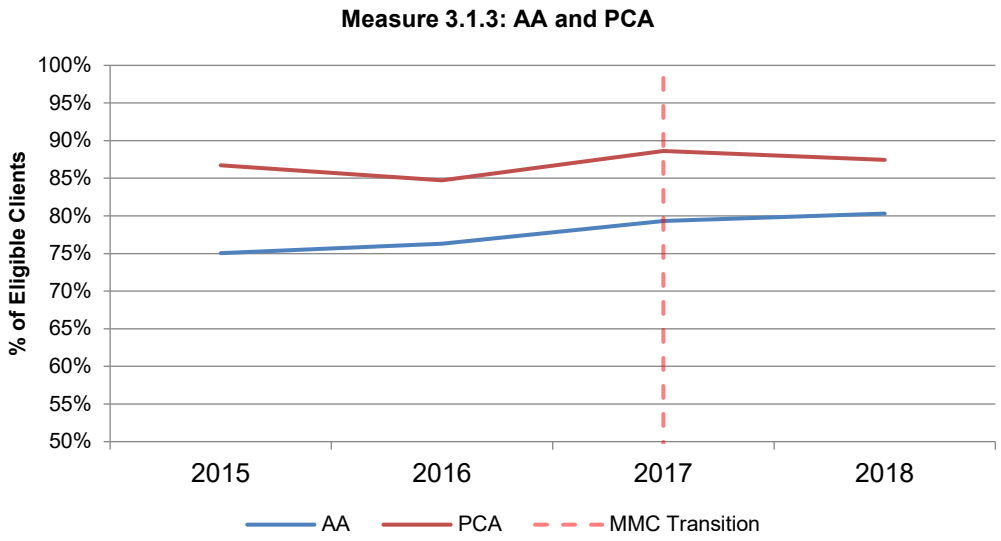


b. Measure 3.1.2: NF



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***FFCC*** *** (pre-transition 79.6%, post-transition 72.7%, FET; N = 2,491).* ***MBCC*** *(pre-transition 99.5%, post-transition 99.7%, FET; N = 3,188).* ***NF*** *** (pre-transition 97.2%, post-transition 99.0%, FET; N = 3,517). See Appendix D. Medicaid Managed Care Technical Details for paired sample test results. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2018. FET = Fisher's Exact Test; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.*

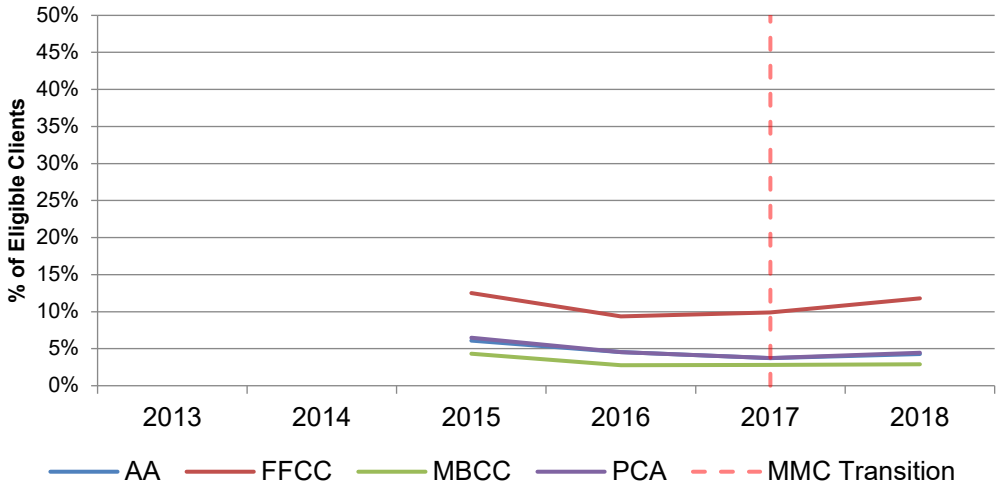
3.1.3 Children and adolescent access to primary care services (Descriptive).



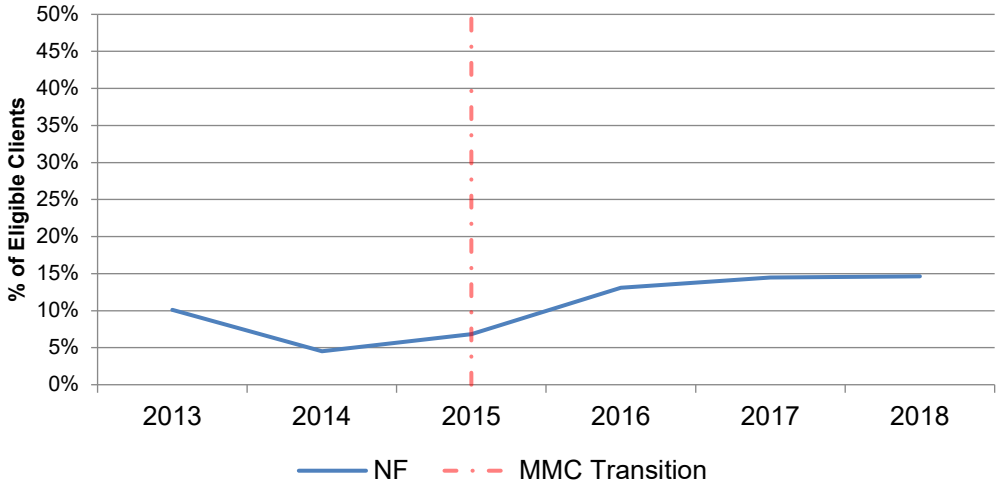
*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***AA*** *** (pre-transition 76.3%, post-transition 80.3%, FET; N = 47,730).* ***PCA*** ** *(pre-transition 84.7%, post-transition 87.4%, FET; N = 4,024). See Appendix D. Medicaid Managed Care Technical Details for paired sample test results. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2018. AA = Adoption Assistance; FET = Fisher's Exact Test; MMC = Medicaid managed care; PCA = Permanency Care Assistance.*

3.1.4 Newly diagnosed for depression (Descriptive)

a. Measure 3.1.4: AA, FFCC, MBCC, and PCA



b. Measure 3.1.4: NF

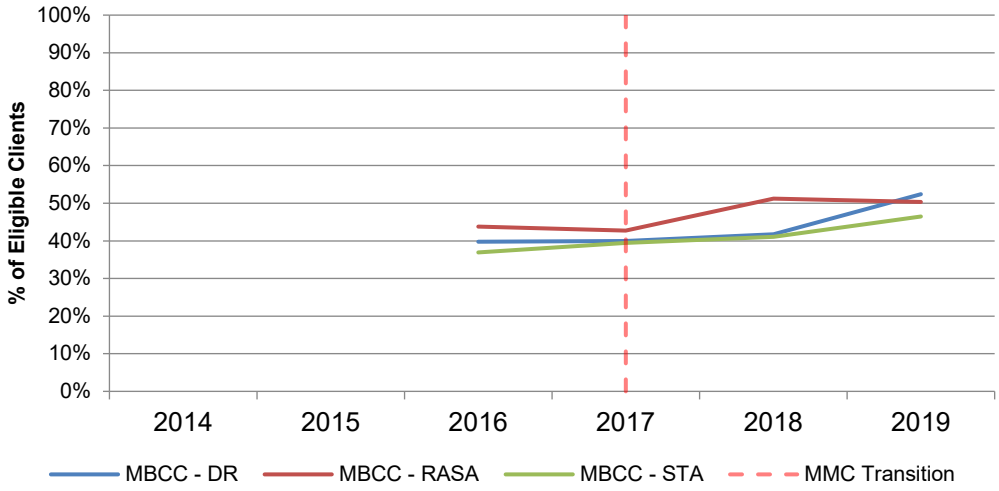


*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***AA*** *(pre-transition 4.5%, post-transition 4.2%, FET; N = 15,888).* ***FFCC**** *(pre-transition 9.3%, post-transition 11.8%, FET; N = 2,209).* ***MBCC*** *(pre-transition 2.7%, post-transition 2.9%, FET; N = 4,946).* ***NF***** *(pre-transition 4.5%, post-transition 14.6%, FET; N = 4,934).* ***PCA*** *(pre-transition 4.5%, post-transition 4.4%, FET; N = 1,217). Sample size (N) refers to the number of unique, eligible clients (denominator) in 2019 for NF and 2018 for all other client types. AA = Adoption Assistance; FET = Fisher's Exact Test; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.*

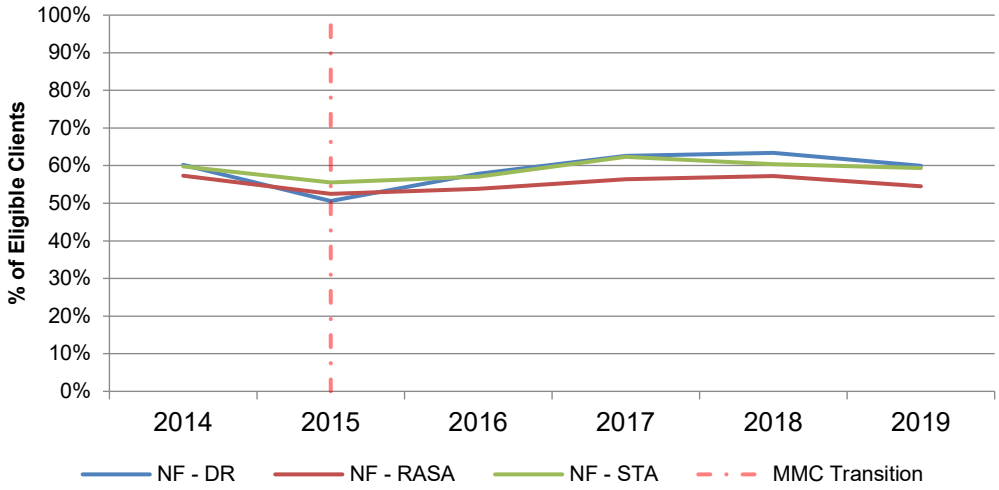
3.1.5 Utilization of pharmacy benefits (Descriptive)

OBJ

a. Measure 3.1.5: MBCC



b. Measure 3.1.5: NF



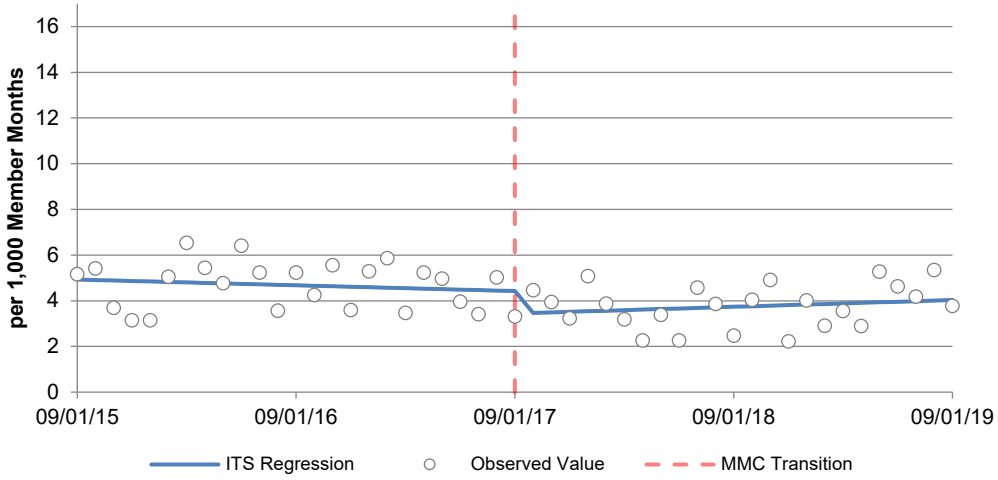
*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***MBCC-DR** * (pre-transition 39.7%, post-transition 52.4%, FET; N = 229).* ***MBCC-RASA** * (pre-transition 43.8%, post-transition 50.3%, FET; N = 576).* ***MBCC-STA** ** (pre-transition 36.9%, post-transition 46.4%, FET; N = 482).* ***NF-DR*** *(pre-transition 60.1%, post-transition 59.9%, FET; N = 422).* ***NF-RASA*** *(pre-transition 57.3%, post-transition 54.5%, FET; N = 2,280).* ***NF-STA*** *(pre-transition 59.8%, post-transition 59.3%, FET; N = 2,707). See Appendix D. Medicaid Managed Care Technical Details for paired sample test results. Sample size (N) refers to the number of unique, eligible clients (denominator) in 2019. DR = Diabetes All Class; FET = Fisher's Exact Test; MBCC = Medicaid for Breast and Cervical Cancer; NF = Nursing Facility; RASA = Renin Angiotensin System Antagonists; STA = Statins.*

3.2.1 Rate of service coordination utilization (ITS)

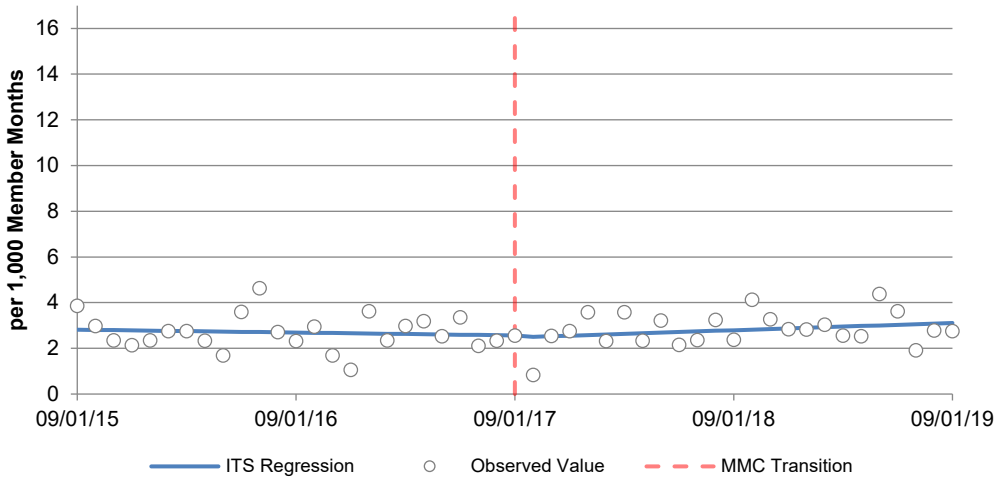
Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.2.1: Rate of service coordination utilization (Monthly Rate)[2]						
FFCC (n = 4,490)	Sep 2015 – Sep 2019	4.93	-0.02	-0.95	0.02	4.05
MBCC (n = 4,703)	Sep 2015 – Sep 2019	2.81	-0.01	-0.06	0.02	3.13
NF (n = 6,547)	Mar 2013 – Sep 2019	0.98	0.12	-1.66**	0.14	10.10

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.*

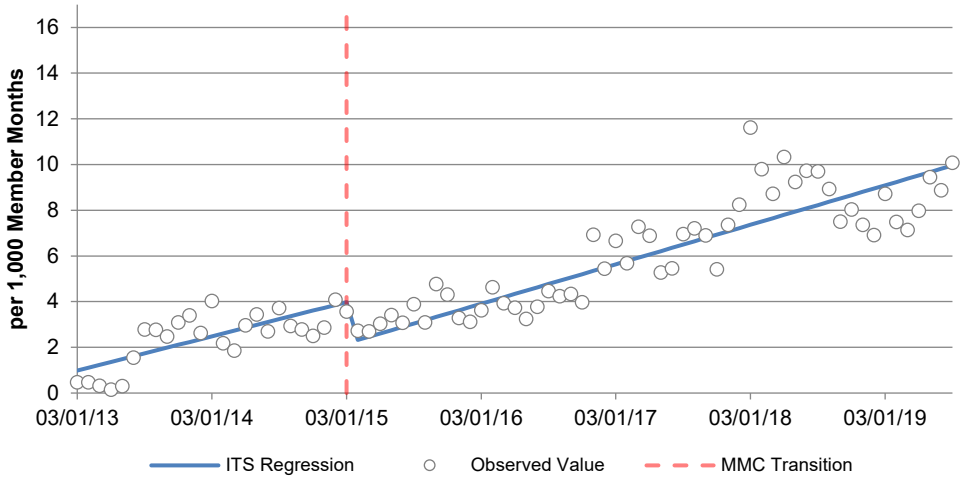
a. Measure 3.2.1: FFCC



b. Measure 3.2.1: MBCC



c. Measure 3.2.1: NF

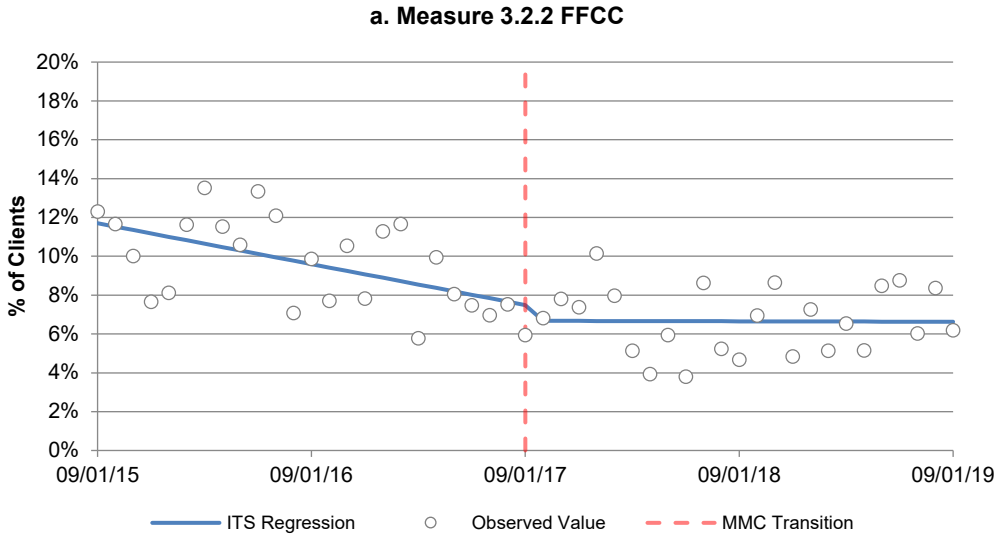


Note: FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.

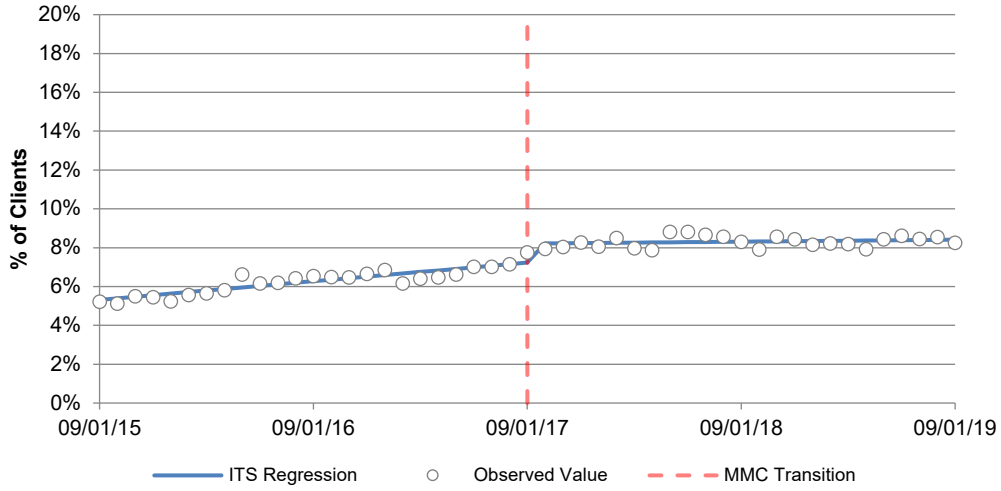
3.2.2 Rate of clients with SMI/SED receiving Targeted Case Management (ITS)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.2.2: Rate clients with SMI/SED receiving targeted case management (Monthly Rate)[2]						
FFCC (N = 275)	Sep 2015 – Sep 2019	11.70	-0.17	-0.81	-0.002*	6.62
AA (N = 7,891)	Sep 2015 – Sep 2019	5.31	0.07	0.99***	0.008***	8.42
PCA (N = 740)	Sep 2015 – Sep 2019	5.54	0.08	1.42*	-0.02*	8.51

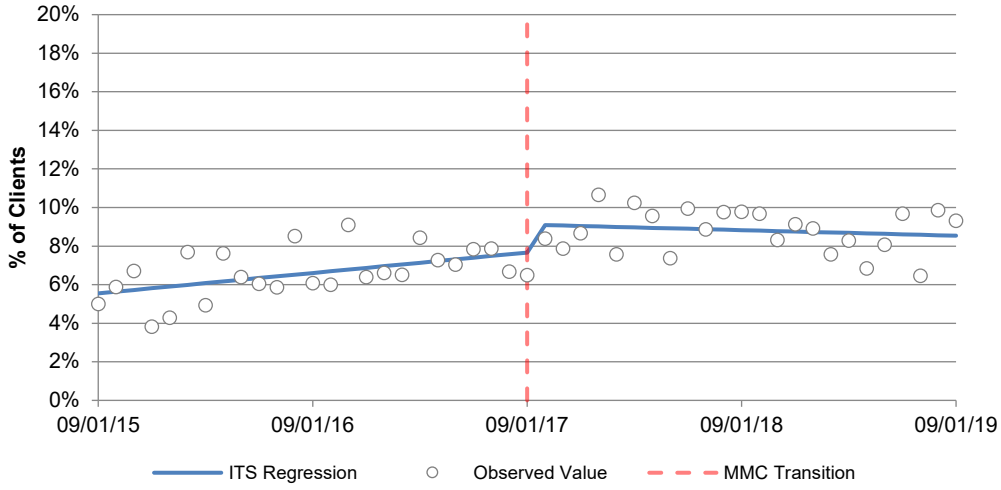
*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. AA = Adoption Assistance; FFCC = Former Foster Care Children; MMC = Medicaid managed care; PCA = Permanency Care Assistance.*



b. Measure 3.2.2 AA



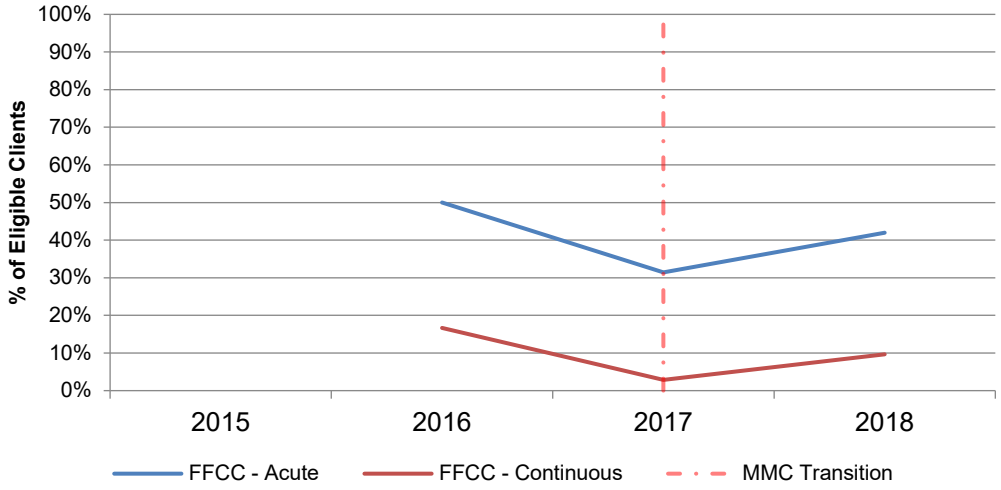
c. Measure 3.2.2 PCA



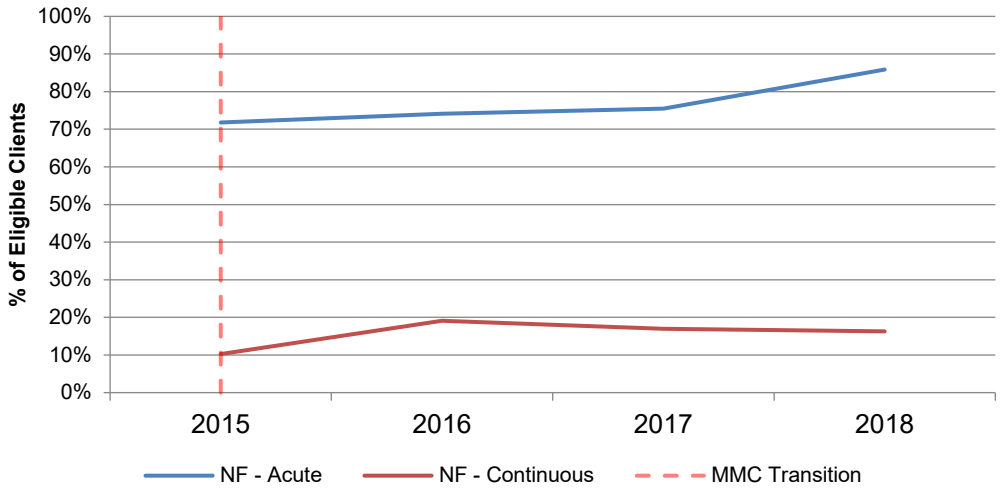
Note: AA = Adoption Assistance; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MMC = Medicaid managed care; PCA = Permanency Care Assistance.

3.3.1 Antidepressant medication management (Descriptive)

a. Measure 3.3.1: FFCC

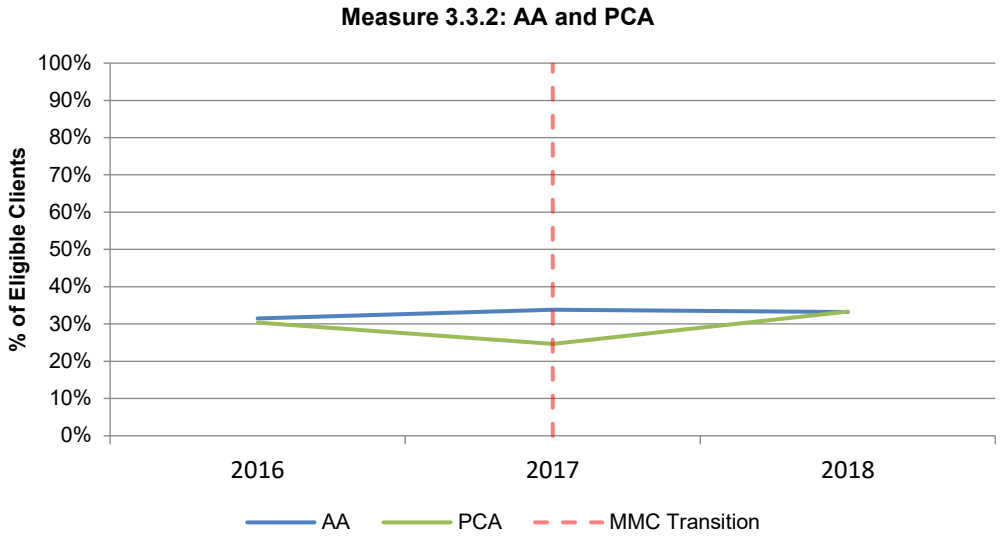


b. Measure 3.3.1: NF



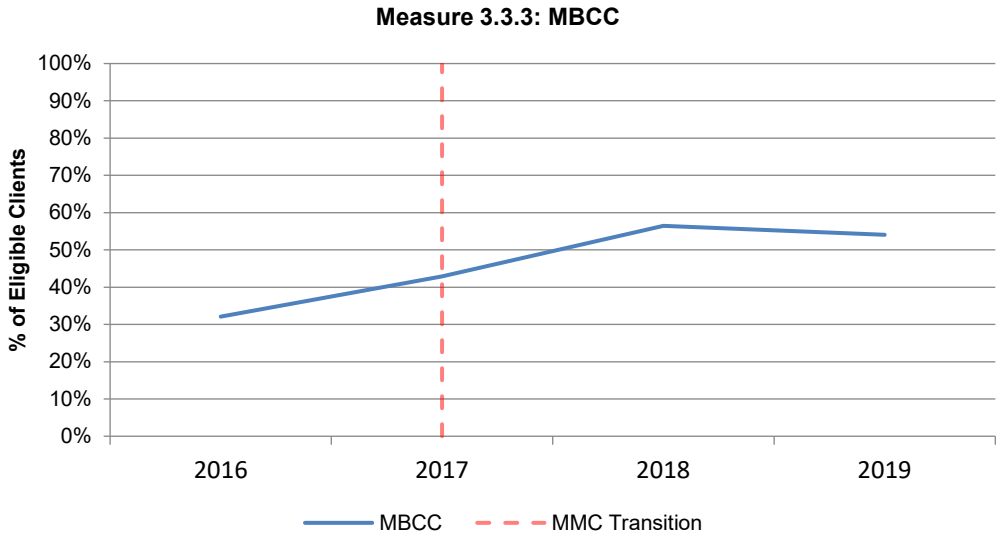
*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***NF-Acute*** *(earliest post-transition 71.7%, latest post-transition 85.8%, FET; N = 92).* ***NF-Continuous*** *(earliest post-transition 10.2%, latest post-transition 16.3%, FET; N = 92). Sample size (N) refers to the number of unique, eligible clients (denominator) in 2018. FFCC client population excluded due to denominators with less than 50 clients. Pre-transition data for NF will be requested for the Summative Report. FET = Fisher's Exact Test; FFCC = Former Foster Care Children; MMC = Medicaid managed care; NF = Nursing Facility.*

3.3.2 Use of first-line psychosocial care for children and adolescents on antipsychotics (Descriptive)



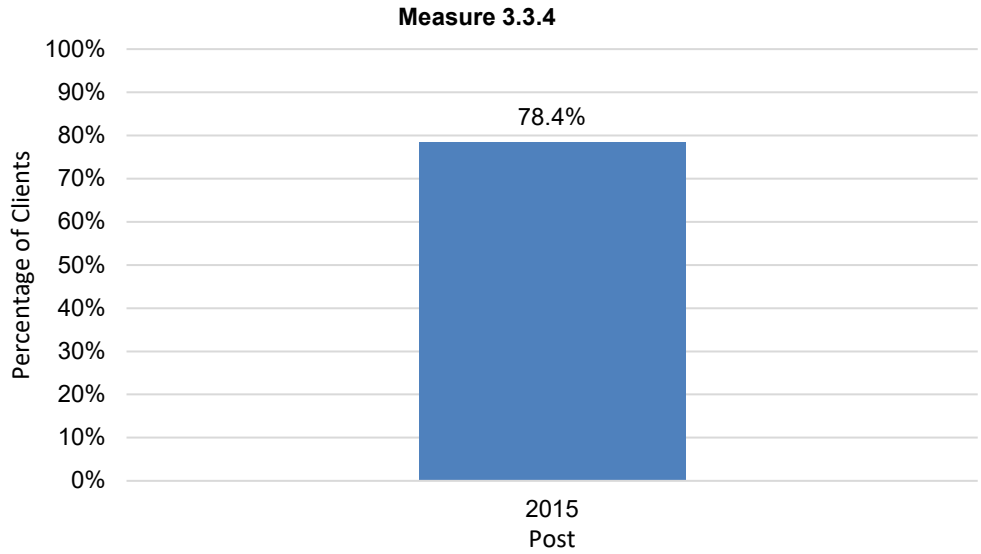
*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***AA*** *(pre-transition 31.4%, post-transition 33.1%, FET; N = 865).* ***PCA*** *(pre-transition 30.3%, post-transition 33.3%, FET; N = 63). Sample size (N) refers to the number of unique, eligible clients (denominator) in 2018. FFCC client population excluded due to denominators with less than 50 clients. AA = Adoption Assistance; FET = Fisher's Exact Test; MMC = Medicaid managed care; PCA = Permanency Care Assistance.*

3.3.3 Percent of Medicaid for Breast and Cervical Cancer clients receiving recommended treatment (Descriptive)



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***MBCC**** *(pre-transition 32.0%, post-transition 54.0%, FET; N = 819). Sample size (N) refers to the number of unique, eligible clients (denominator) in 2019. FET = Fisher's Exact Test; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care.*

3.3.4 Behavior Modification

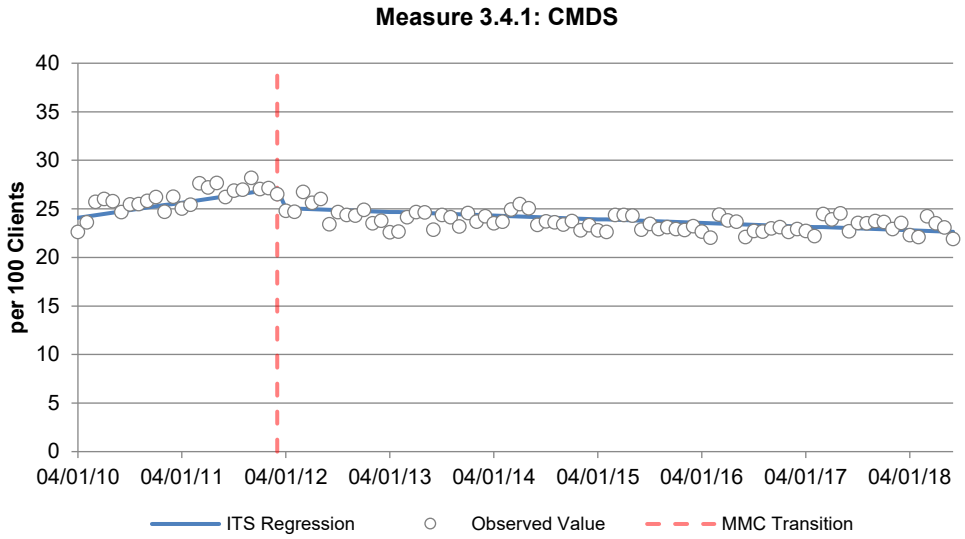


Note: Questions to examine psychotropic medication use were not added until 2015. Survey question: "Does the resident's care plan include behavior modification interventions, addressing the specific behaviors for which psychoactive medications were prescribed?" N = 1,163.

3.4.1 CMS Children who have dental decay or cavities (ITS)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.1: Percentage of children ages 0–20 years who had tooth decay or cavities (Monthly Rate)[2]						
CMDS (N = 2,987,363)	Apr 2010 – Sep 2018	24.08	0.13	-2.00***	-0.03***	22.57

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2018. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. CMDS = Children's Medicaid Dental Services; MMC = Medicaid managed care.*

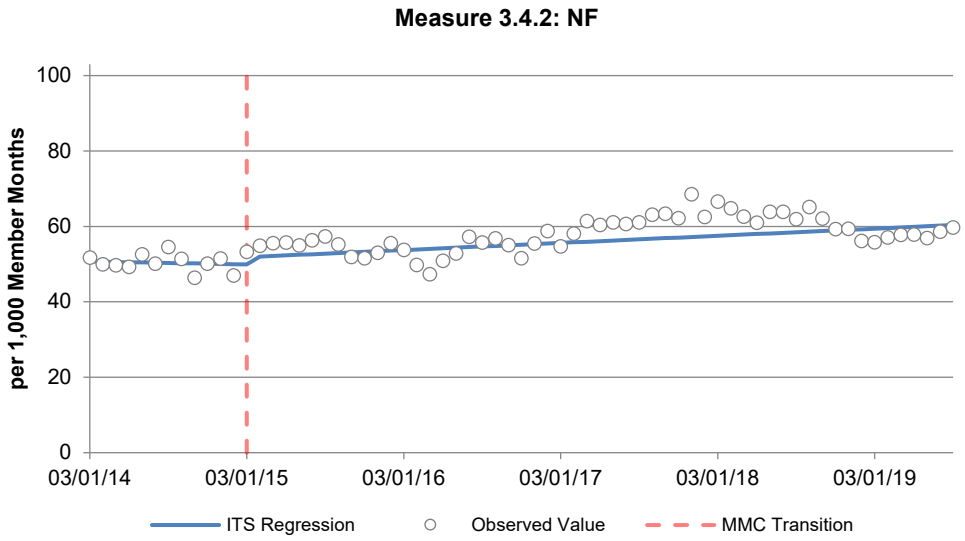


Note: CMDS = Children's Medicaid Dental Services; ITS = Interrupted Time Series; MMC = Medicaid managed care.

3.4.2 Pressure Ulcers (ITS)

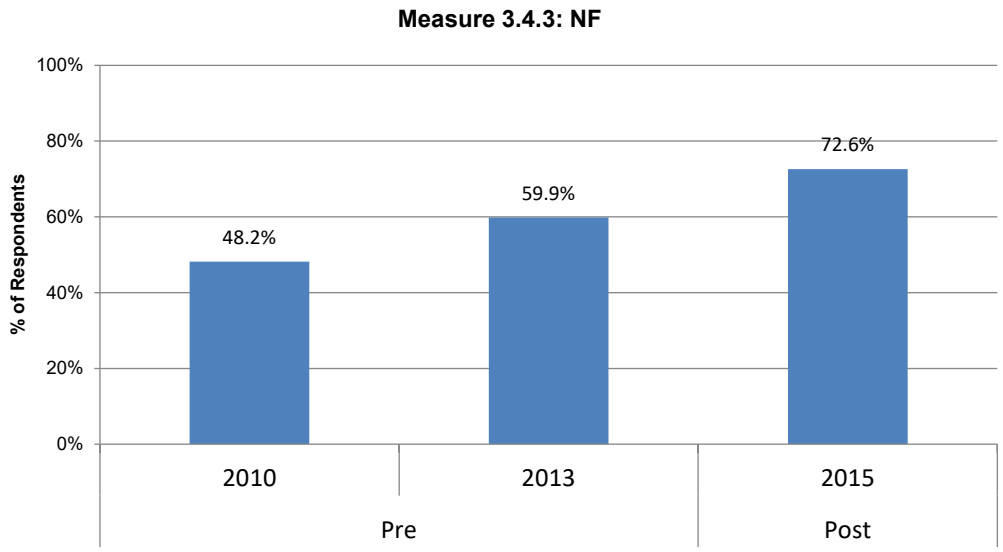
Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.2: Rate of pressure ulcers per 1,000 member months (Monthly Rate)[2]						
NF (n = 6,547)	Mar 2014 – Sep 2019	50.70	0.06	2.08	0.16	62.06

*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. The initial 12 months of data between March 2013 and February 2014 exhibited a rapidly increasing pattern that appeared implausible given the patterns observed for the other populations and measures. Therefore, these data were excluded to avoid introducing bias into the interim findings. MMC = Medicaid managed care; NF = Nursing Facility.*



Note: ITS = Interrupted Time Series; MMC = Medicaid managed care; NF = Nursing Facility.

3.4.3 Symptoms of depression (Descriptive)

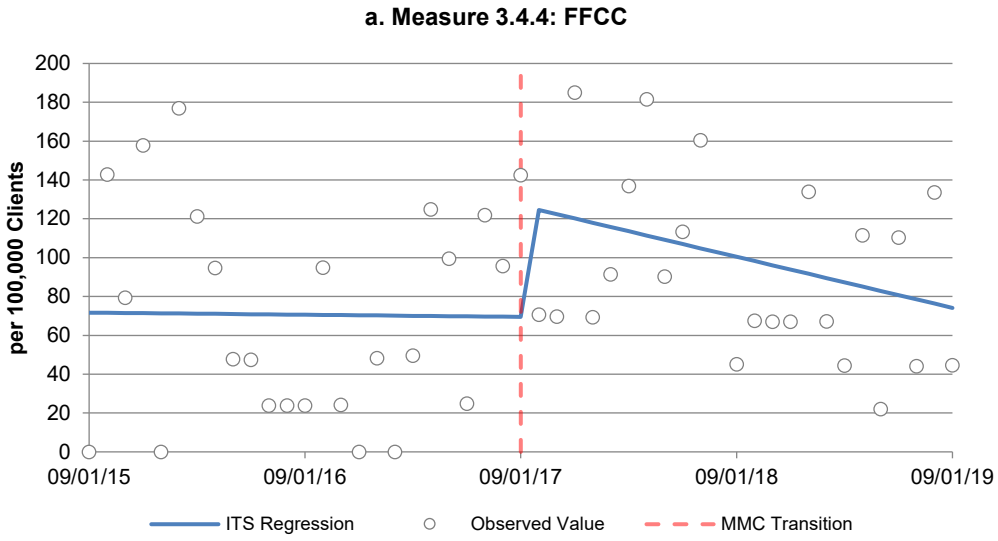


*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. Data for 2009 are unavailable (question was not asked at the time).* ***NF*** *** (pre-transition 59.9%, post-transition 72.6%, FET; N = 799). Survey question (for residents diagnosed with a depressive disorder): "Does the chart indicate that the resident has responded to treatment?" Sample size (N) refers to the number of respondents in 2015. FET = Fisher's Exact Test; NF = Nursing Facility.*

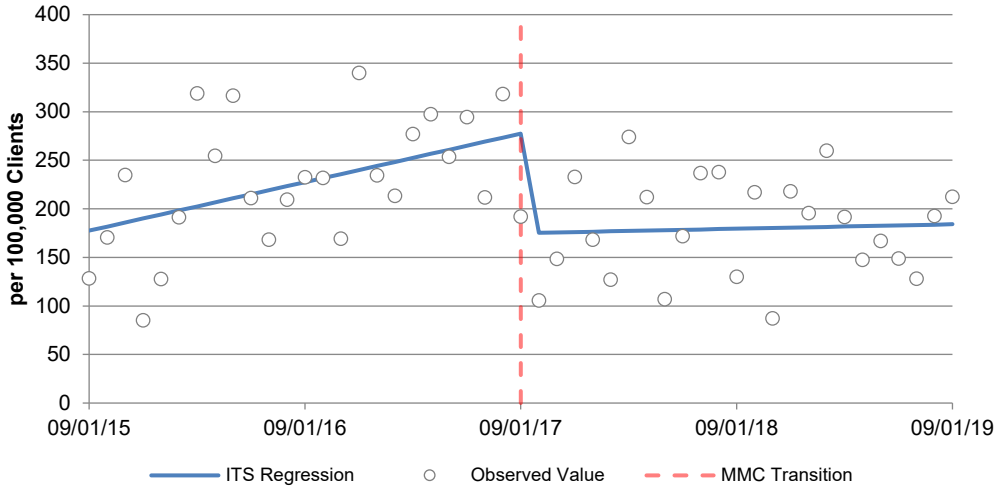
3.4.4 Prevention/Pediatric Quality Overall Composite (ITS)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.4: Rate of discharges for an ACS condition per 100,000 (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	71.71	-0.09	55.04	-2.19	71.96
MBCC (N = 4,703)	Sep 2015 – Sep 2019	177.53	4.16	-102.09**	0.38	184.46
NF (N = 6,499)	Mar 2013 – Sep 2019	845.92	21.73	-187.41	7.98	1610.77
AA (N = 53,141)	Sep 2015 – Sep 2019	11.47	-0.05	5.38	-0.32	7.90

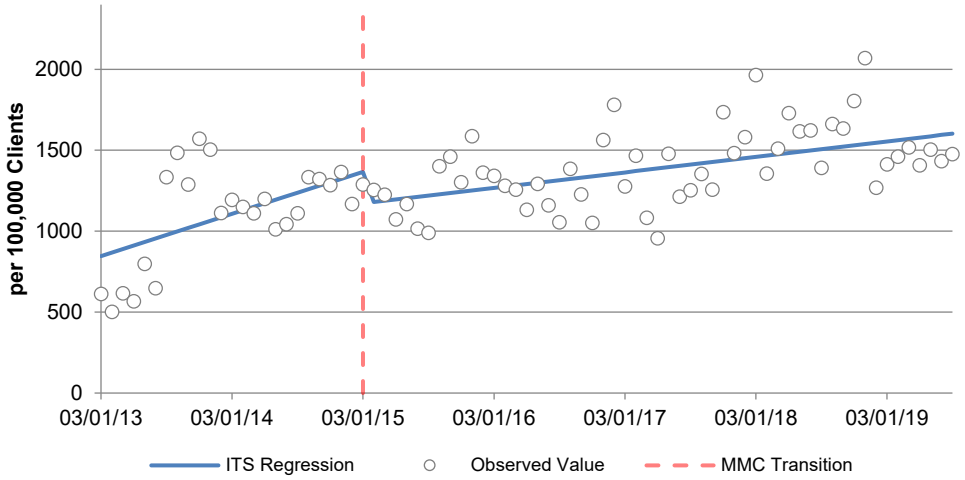
*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. Estimates not presented for PCA due to numerous zero count observations, which rendered spurious model results. AA = Adoption Assistance; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.*

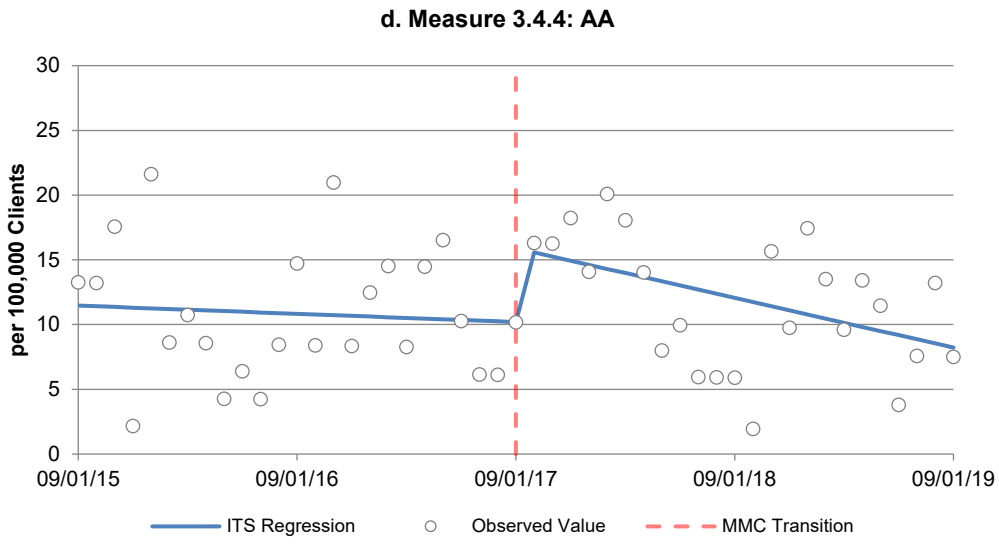


b. Measure 3.4.4: MBCC



c. Measure 3.4.4: NF



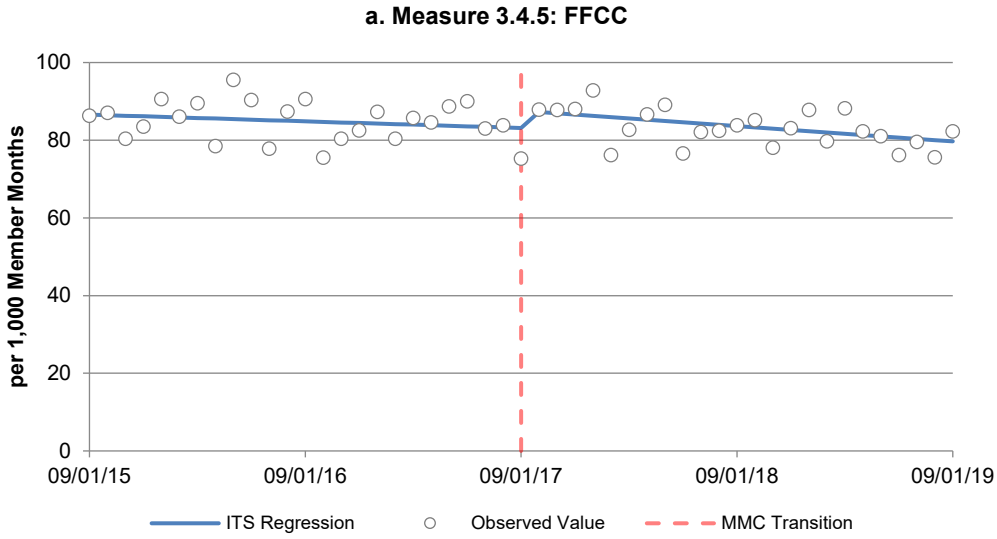


Note: AA = Adoption Assistance; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility.

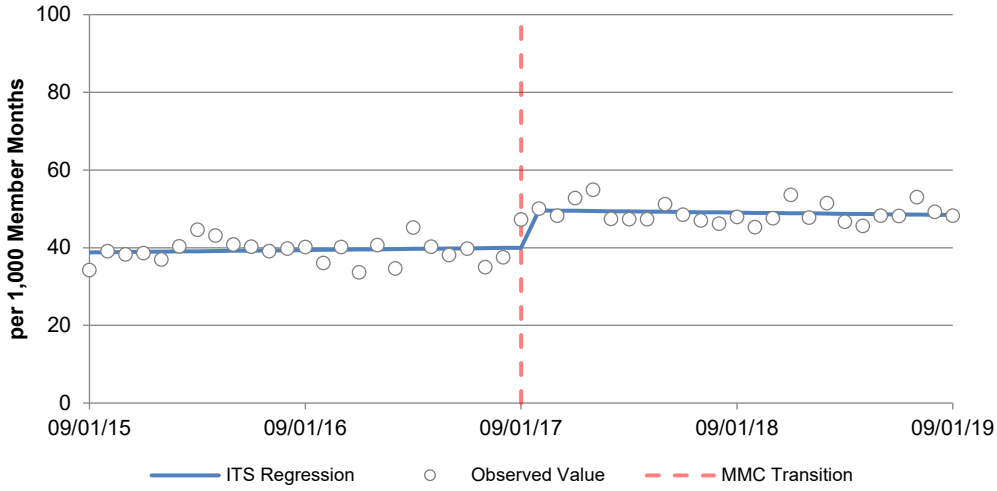
3.4.5 Rate of potentially preventable emergency department use (ITS)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.5: Rate of potentially preventable ED visits per 1,000 member months (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	86.58	-0.14	4.12	-0.33	79.38
MBCC (N = 4,703)	Sep 2015 – Sep 2019	38.79	0.05	9.62***	-0.05	48.36
NF (N = 6,547)	Mar 2013 – Sep 2019	43.57	0.77	7.09	0.19	79.47
AA (N = 54,162)	Sep 2015 – Sep 2019	12.96	-0.01	2.57*	-0.04	14.24
PCA (N = 4,866)	Sep 2015 – Sep 2019	17.35	-0.09	3.53	-0.15	15.25

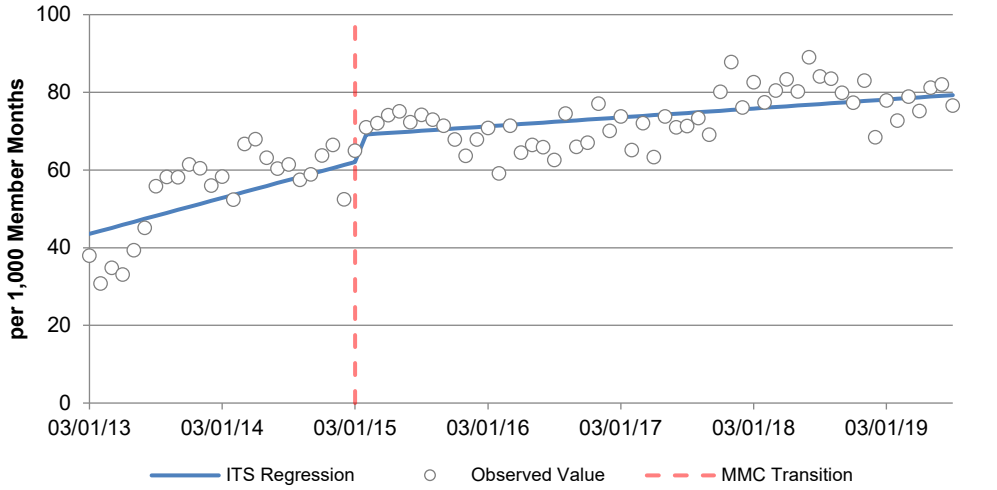
*Note: 1 Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. 2 Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. AA = Adoption Assistance; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid Managed Care; NF = Nursing Facility; PCA = Permanency Care Assistance.*

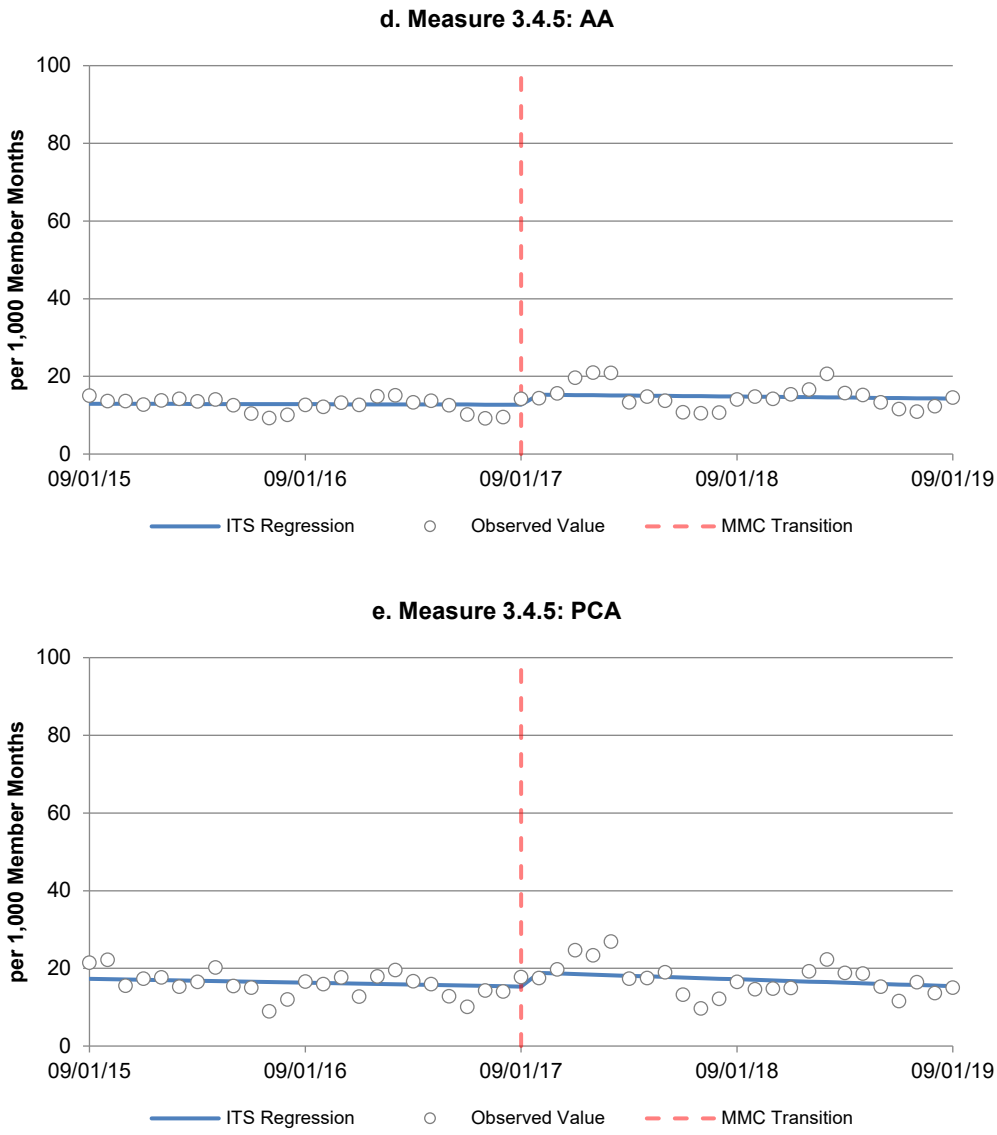


b. Measure 3.4.5: MBCC



c. Measure 3.4.5: NF



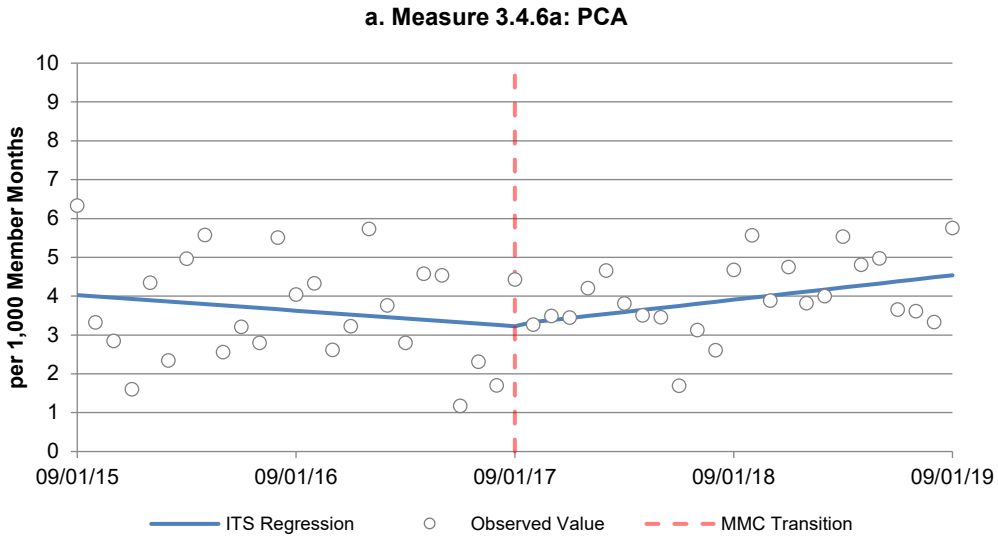


Note: AA = Adoption Assistance; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.

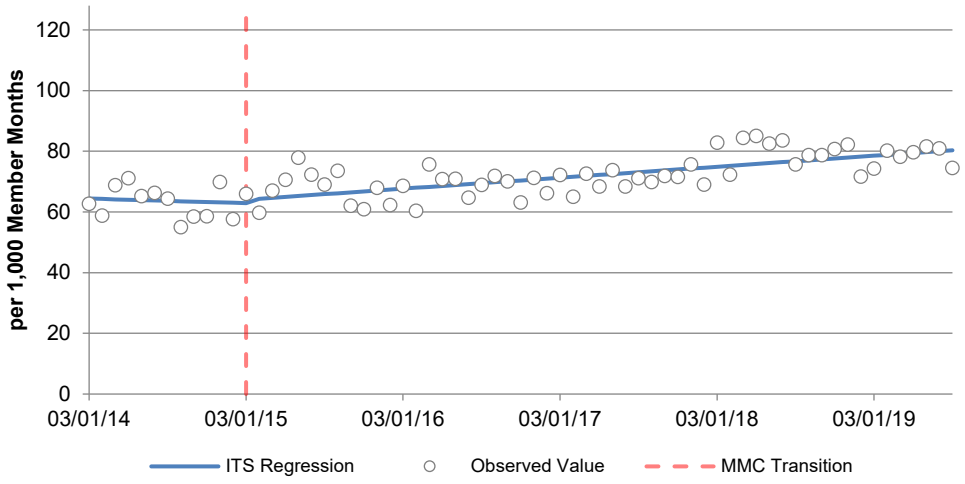
3.4.6 H2-510: Rate of ED visits for BH and SA (ITS)

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.6.a: Rate of ED visits w/ a primary or secondary diagnosis of BH conditions (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	22.00	0.24	-1.75	0.21	31.18
MBCC (N = 4,703)	Sep 2015 – Sep 2019	15.28	0.14	-1.03	0.20	22.41
NF (N = 6,547)	Sep 2013 – Sep 2019	64.42	-0.13	1.45	0.30	80.62
AA (N = 54,162)	Sep 2015 – Sep 2019	3.80	0.03	-0.17	0.02	4.84
PCA (N = 4,866)	Sep 2015 – Sep 2019	4.03	-0.03	0.11	0.05	4.59

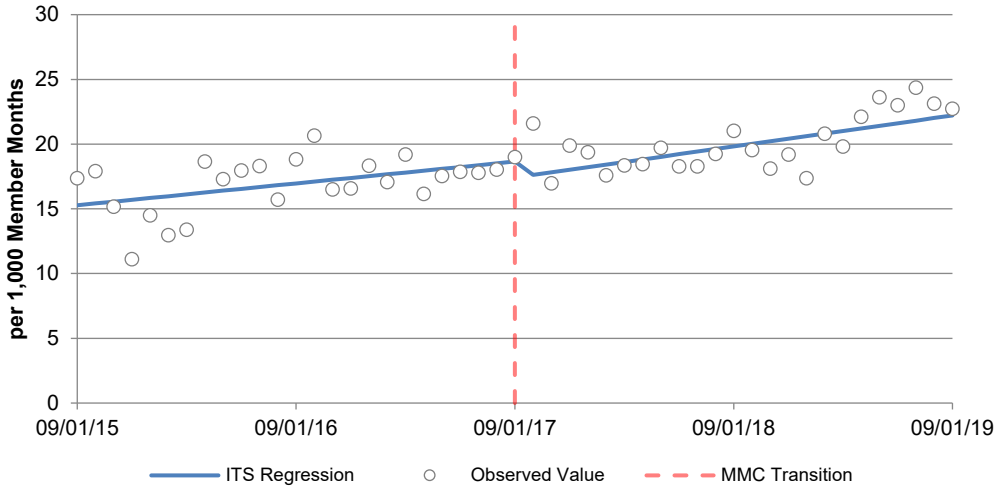
*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. The initial 12 months of data between March 2013 and Feb 2014 for NF exhibited a rapidly increasing pattern that appeared implausible given the patterns observed for the other populations and measures. Therefore, these data were excluded to avoid introducing bias into the interim findings. AA = Adoption Assistance; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.*

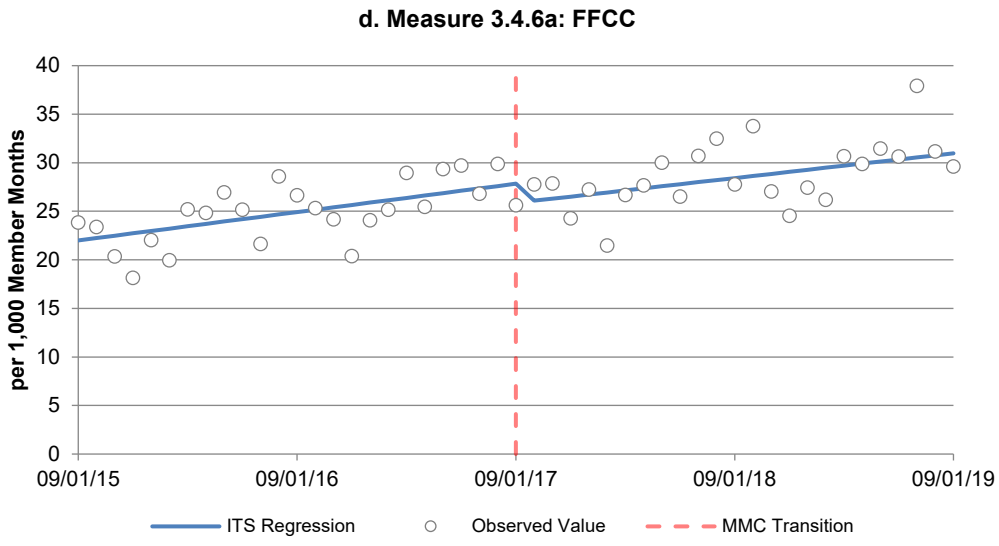


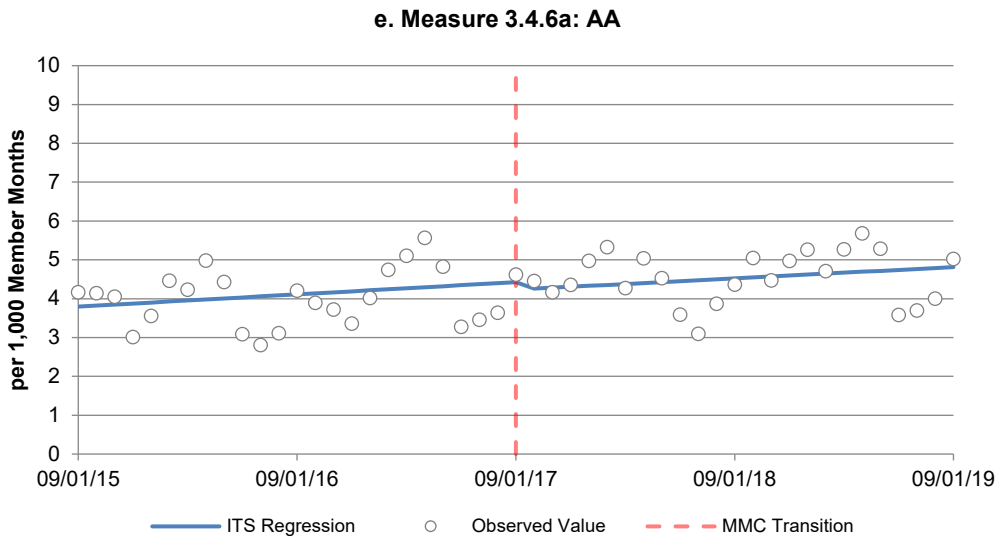
b. Measure 3.4.6a: NF



c. Measure 3.4.6a: MBCC



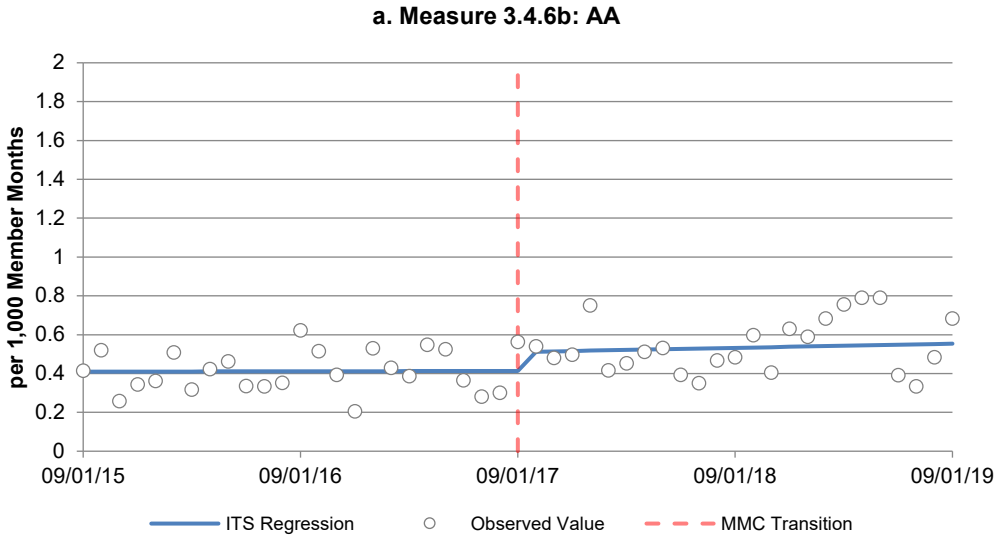




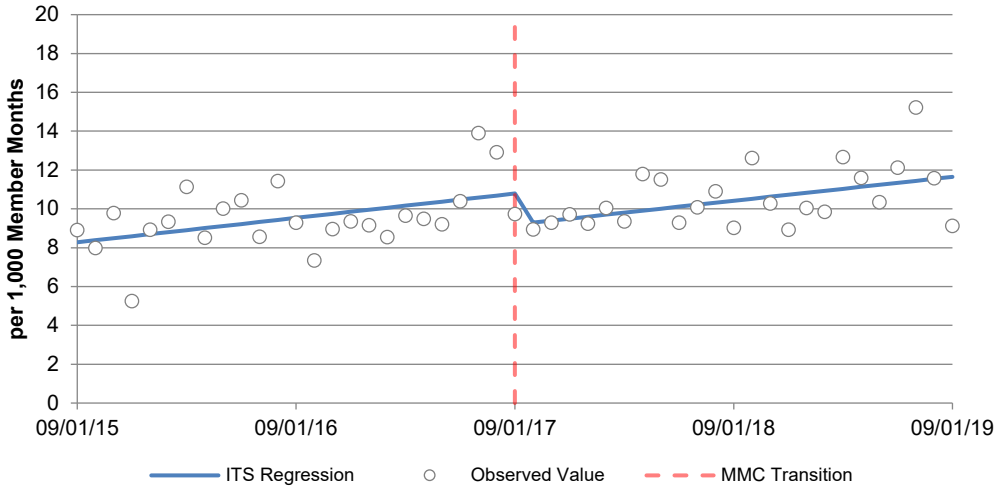
Note: AA = Adoption Assistance; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.

Population (n[1])	Measure Period	Baseline Value	Pre-MMC Trend	Post-MMC Level Change	Post-MMC Trend	Endline Value
Measure 3.4.6b Rate of ED visits with a primary or secondary diagnosis of SA (Monthly Rate)[2]						
FFCC (N = 4,490)	Sep 2015 – Sep 2019	8.28	0.10	-1.50	0.10	11.75
MBCC (N = 4,703)	Sep 2015 – Sep 2019	2.27	0.02	-0.68*	0.06	3.56
NF (N = 6,547)	Sep 2013 – Sep 2019	9.31	0.34	-4.70**	0.18	22.39
AA (N = 54,162)	Sep 2015 – Sep 2019	0.41	0.00	0.10	0.00	0.56
PCA (N = 4,866)	Sep 2015 – Sep 2019	0.29	-0.01	-0.05	0.03*	0.74

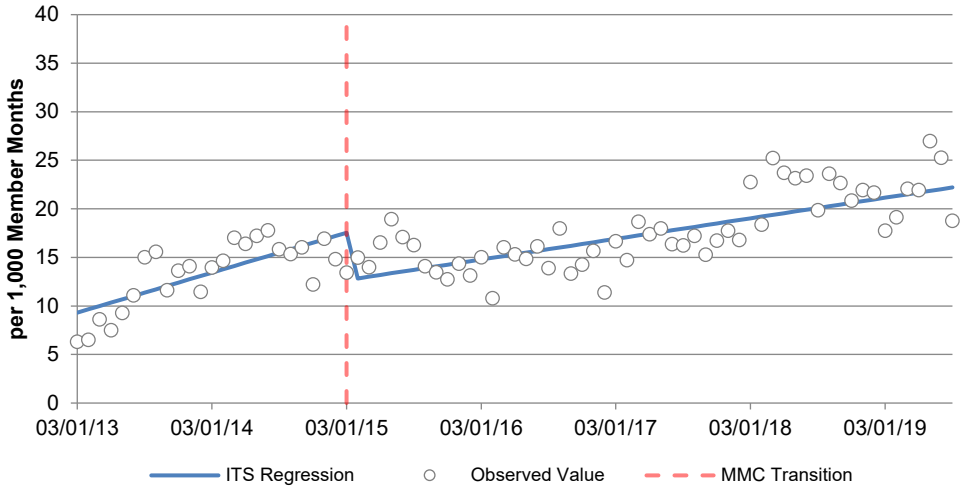
*Note: [1] Sample size (N) refers to the number of unique, eligible clients (denominator) in September 2019. [2] Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. AA = Adoption Assistance; FFCC = Former Foster Care Children; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.*



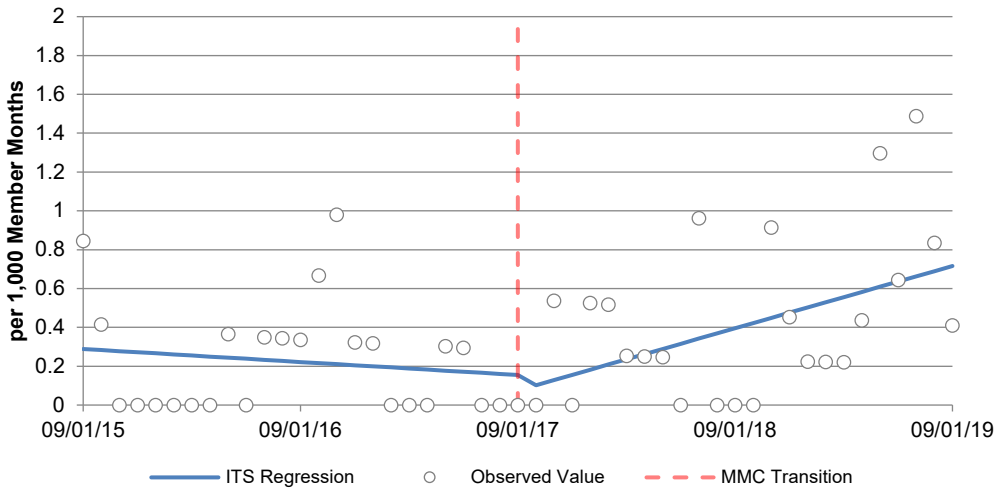
b. Measure 3.4.6b: FFCC



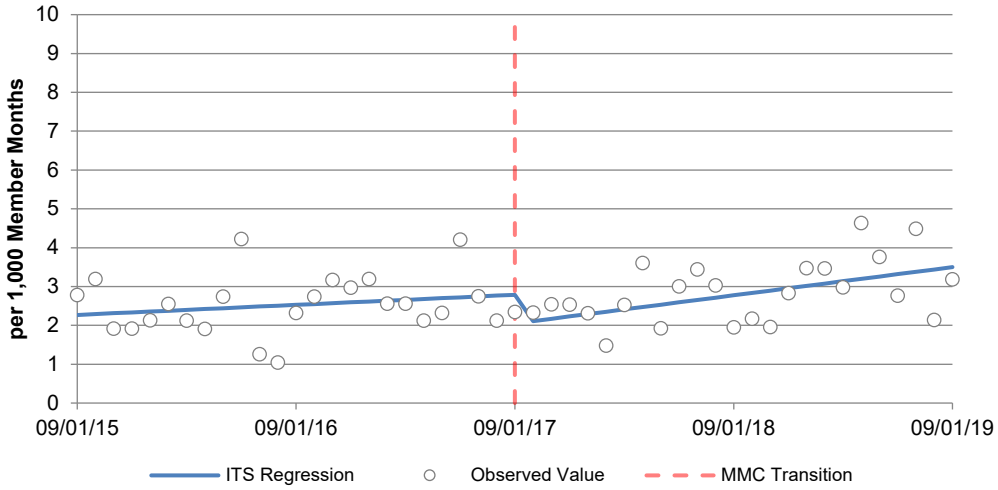
c. Measure 3.4.6b: NF



d. Measure 3.4.6b: PCA



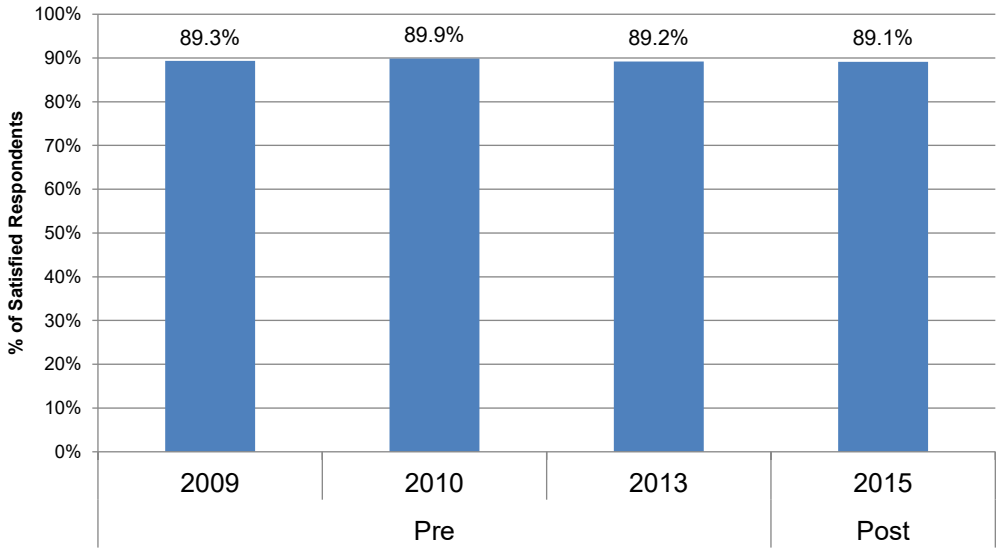
e. Measure 3.4.6b: MBCC



Note: AA = Adoption Assistance; FFCC = Former Foster Care Children; ITS = Interrupted Time Series; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance.

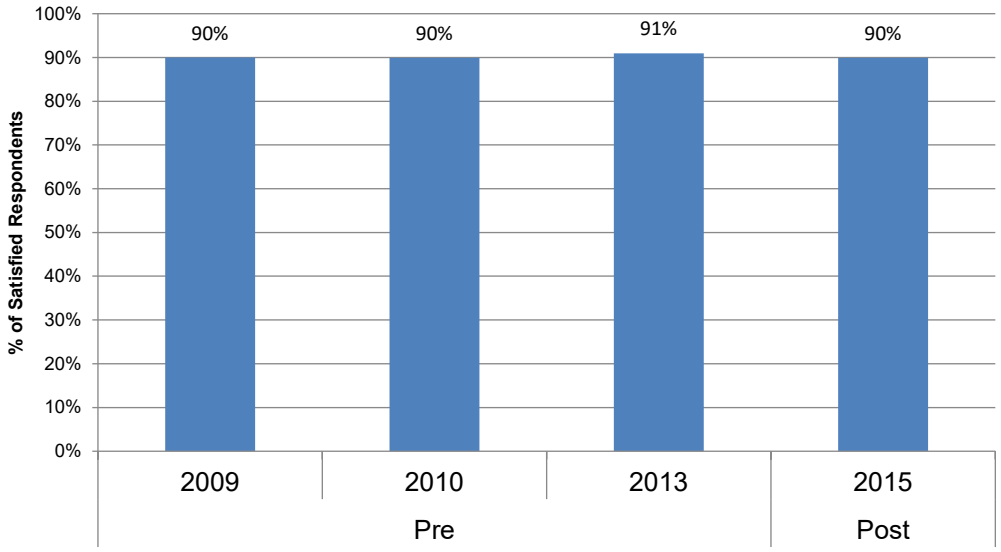
3.5.1 Client satisfaction – NF (Descriptive)

NFQR Reported Satisfaction with Experience in Nursing Facility, by Survey Year (Measure 3.5.1).



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. NF (pre-transition 89.2%, post-transition 89.1%, FET; N = 1,187). Survey question: "Overall, how satisfied are you with your (or your family member's) experience in this nursing facility?" Responses were dichotomized into satisfaction classification by consolidating responses on a 7-point Likert scale from very satisfied to very dissatisfied. Sample size (N) refers to the number of respondents in 2015. FET = Fisher's Exact Test; NF = Nursing Facility.*

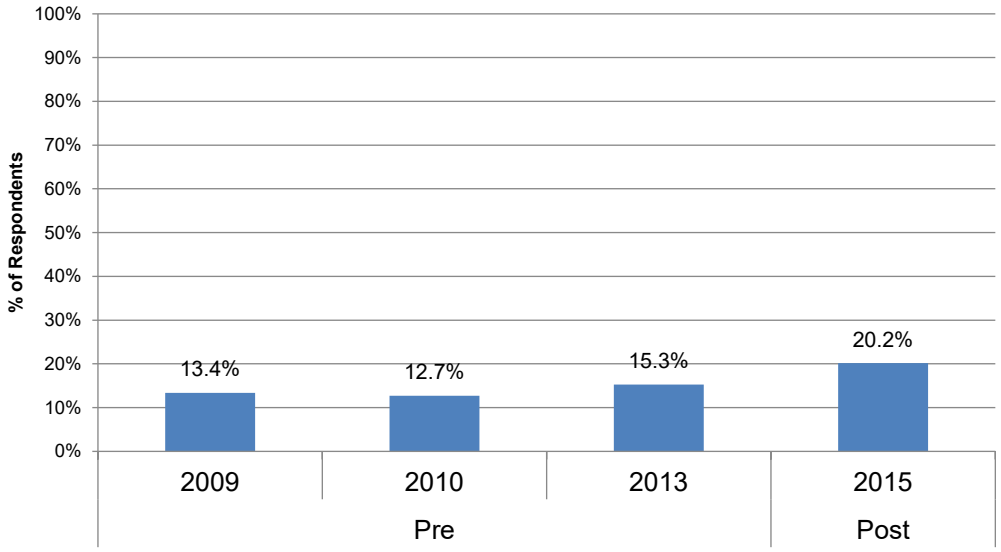
NFQR Reported Satisfaction with Health Care Services Received, by Survey Year (Measure 3.5.1).



*Note: Higher numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001. **NF** (pre-transition 90.9%, post-transition 89.9%, FET; N = 1,163). Survey question: "Overall, how satisfied are you with your (or your family member's) health care services?" Responses were dichotomized into satisfaction classification by consolidating responses on a 7-point Likert*

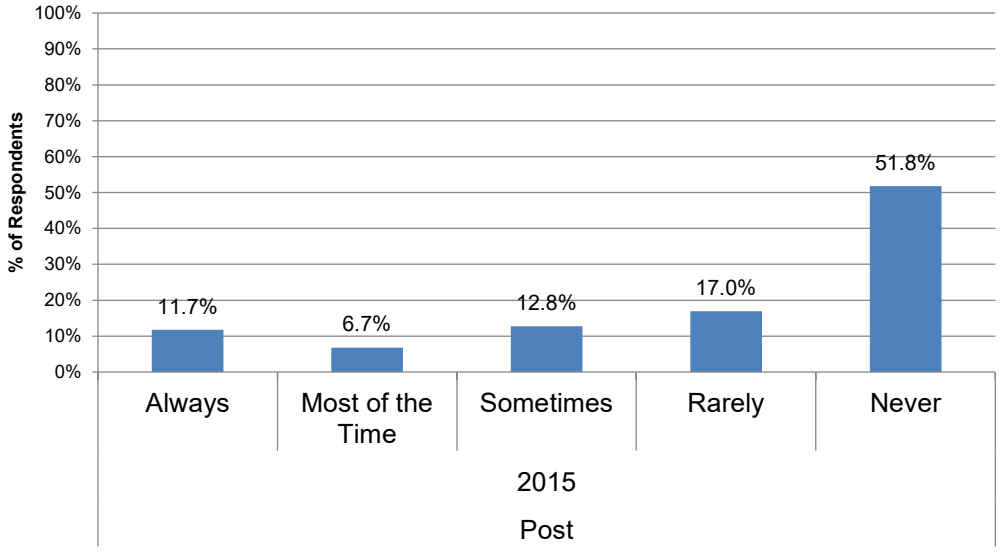
scale from very satisfied to very dissatisfied. Sample size (N) refers to the number of respondents in 2015. FET = Fisher's Exact Test; NF = Nursing Facility.

NFQR Reported Percentage of Clients with Concerns the Facility Did Not Address, by Survey Year (Measure 3.5.1).



*Note: Lower numbers are better, * p < 0.05, ** p < 0.01, *** p < 0.001.* ***NF ** (pre-transition 15.3%, post-transition 20.2%, FET; N = 1,361). Survey question: "Do you ever have concerns that the facility does not address?" Sample size (N) refers to the number of respondents in 2015. FET = Fisher's Exact Test; NF = Nursing Facility.*

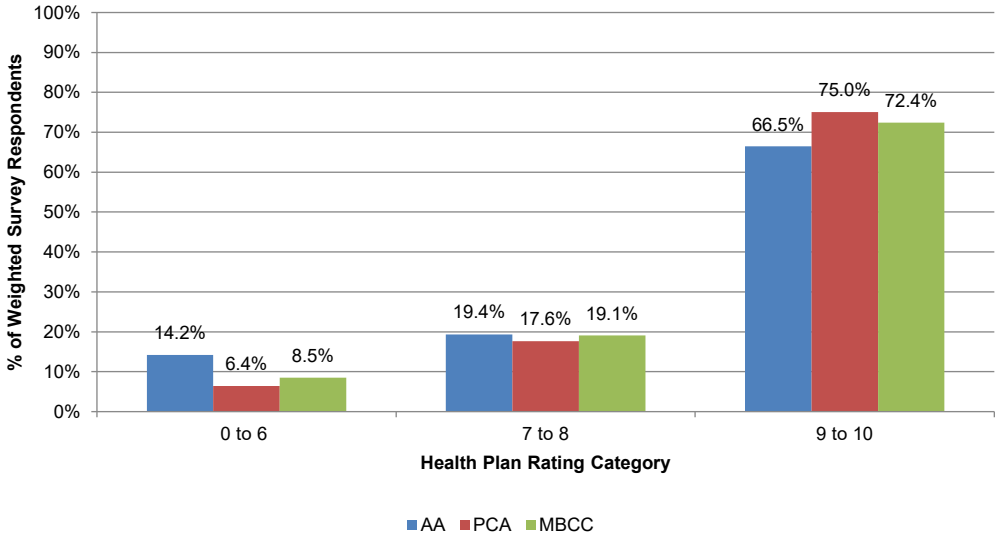
NFQR Reported Participation in Care Plan Meetings, 2015 (Measure 3.5.1).



Note: Desired category: "always." Data prior to 2015 are unavailable as this is a new question asked in 2015. Survey question: "Do you participate in meetings for planning your care?" N = 100. Sample size (N) refers to the number of respondents in 2015.

3.5.2 Client satisfaction – CAHPS

CAHPS Health Plan Rating by Population (Measure 3.5.2).



Note: Higher numbers are better. Data are for survey year 2019; data prior to 2019 are unavailable as this is a new survey. AA (N = 19,127), PCA (N = 2,152), MBCC (N = 3,445). Survey question: "Using any number from 0 to 10, where 0 is the worst health plan possible and 10 is the best health plan possible, what number would you use to rate your/your child's health plan?" Sample size (N) refers to the number of respondents in 2019. AA = Adoption Assistance; MBCC = Medicaid for Breast and Cervical Cancer; PCA = Permanency Care Assistance.

3. SENSITIVITY ANALYSIS

Introduction and Background

For measures where interrupted time series analysis (ITS) could not be performed due to insufficient time points, a Fisher's Exact Test (FET) was performed to compare the latest pre-period annual measure with the latest post-period annual measure. In cases where a pre-period annual measure was unavailable, the earliest post-period annual measure was compared to the latest post-period annual measure. The pre-period refers to the time before MMC transition and the post-period refers to the time after MMC transition. A key assumption underpinning the FET is that of independence – the compared annual measures are unrelated. Given that Medicaid populations under this evaluation question may be present in both measurement years, the assumption of independence requires further assessment.

Methodology

After careful examination of the nine annual measures where FET was performed, three measures were selected for sensitivity analysis using a paired-like methodology due to concern that the assumption of independence was violated. Reasons for exclusion among the other six measures included relevant denominator exclusions such that clients can not appear in both the pre- and post-periods, sample size limitations, or data sampling methodologies which could bias results. The following measures and populations were included in the sensitivity analysis.

- Measure 3.1.2 – Adult access to preventive/ambulatory health services
    - Former Foster Care Children (FFCC)
    - Medicaid Breast and Cervical Cancer (MBCC)
    - Nursing Facility (NF)
- Measure 3.1.3 – Children and adolescent access to primary care services
    - Adoption Assistance (AA)
    - Permanency Care Assistance (PCA)
- Measure 3.1.5 – Utilization of Pharmacy Benefits
    - MBCC – Diabetes All Class (DR)
    - MBCC - Renin Angiotensin System Antagonists (RASA)
    - MBCC – Statins (STA)
    - NF – DR
    - NF – RASA
    - NF - STA

For the sensitivity analysis, researchers used the McNemar's Test (paired chi-square) as the data that make up these annual rates are nominal (i.e., a 2 x 2 contingency table can be generated for each measure) and are not continuous (as would be the case in using a paired t-test). For the McNemar's Test, the first step is to identify clients that were in both the pre- and post-periods (paired). Thus, if clients were not in both the pre- and post-period samples, they were excluded from the overall paired sample resulting in sample loss. The percentage of intersection was calculated by dividing the actual number of unique clients in both the pre- and post-period measures by the number of unique clients in the pre-period measure. After the

paired sample was identified, new paired rates were constructed and a McNemar's Test was performed on the paired sample.

Results

Table D.3.1 presents the sample size results from both the full sample and paired sample. Across the three measures and population types, the percentage of intersection was relatively low, except for the populations involving children and adolescents (Measure 3.1.3). AA and PCA intersections were relatively high at 83.2% and 87.7%, respectively. FFCC intersection was 51.4% (Measure 3.1.2), MBCC intersection ranged from 19.9% to 52.4% (Measures 3.1.2 and 3.1.5), and NF intersection ranged from 9.3% to 28.5% (Measures 3.1.2 and 3.1.5). As compared to the full sample, when measures and populations were treated as paired, some measures and populations had extremely small samples, such as 22 clients for NF-DR and 35 clients for MBCC-DR.

Table D.3.1 Full and Paired Sample Sizes

Measure	Population	Full Pre-Period Sample[1]	Full Post-Period Sample[2]	Paired Sample[3]	Intersection[4]
3.1.2 – Adult access to preventive/ambulatory health services	FFCC	1,906	2,491	981	51.4%
	MBCC	3,251	3,188	1,706	52.4%
	NF	3,385	3,517	966	28.5%
3.1.3 – Children and adolescent access to primary care services	AA	44,147	47,730	36,701	83.2%
	PCA	2,828	4,024	2,480	87.7%
3.1.5 – Utilization of pharmacy benefits	MBCC (DR)	176	229	35	19.9%
	MBCC (RASA)	454	576	131	28.9%
	MBCC (STA)	306	482	75	24.5%
	NF (DR)	236	422	22	9.3%
	NF (RASA)	1,893	2,280	185	9.8%
	NF (STA)	1,931	2,707	221	11.4%

Note: [1] Number of unique, eligible clients in the pre-period. [2] Number of unique, eligible clients (denominator) in September 2019 (post-period). [3] Number of clients in both the pre- and post-measurement periods. [4] The percentage of intersection was calculated by dividing the actual number of unique clients in both the pre- and post-period measures by the number of unique clients in the pre-period measure. AA = Adoption Assistance; DR = Diabetes All Class; FFCC = Former Foster Care Children; MBCC = Medicaid Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance; RASA = Renin Angiotensin System Antagonists; STA = Statins.

Table D.3.2 presents the testing results of the full sample and the paired sample. Of note, when examining the pre- and post-period rates of both the full and paired samples, higher rates indicate improvement. Measures and populations where both the direction of rates and testing results agreed between the full and paired samples included Measure 3.1.2 (FFCC, MBCC, and NF) and Measure 3.1.3 (AA only). Measures and populations where either the direction of rates or testing results disagreed between the full and paired samples included Measure 3.1.3 (PCA only), and all population and drug types for Measure 3.1.5.

Table D.3.2 Pre- and Post-Period Testing Results for Full and Paired Samples

Measure	Population	Full Sample Rates (Pre, Post)	FET Results	Paired Rates (Pre, Post)	McNemar Results
3.1.2 – Adult access to preventive/ambulatory health services	FFCC	79.6, 72.7	***	80.8, 75.8	**
	MBCC	99.5, 99.7		99.8, 99.6	
	NF	97.2, 99.0	***	97.7, 99.2	**
3.1.3 – Children and adolescent access to primary care services	AA	76.3, 80.3	***	77.6, 79.1	***
	PCA	84.7, 87.4	**	85.5, 86.5	
3.1.5 – Utilization of pharmacy benefits	MBCC (DR)	39.8, 52.4	*	48.6, 71.4	
	MBCC (RASA)	43.8, 50.3	*	57.3, 56.5	
	MBCC (STA)	36.9, 46.5	**	42.7, 44.0	
	NF (DR)	60.2, 60.0		95.5, 77.3	
	NF (RASA)	57.3, 54.5		87.0, 70.3	***
	NF (STA)	59.8, 59.4		84.2, 71.0	***

*Note: * p < 0.05, ** p < 0.01, *** p < 0.001; AA = Adoption Assistance; DR = Diabetes All Class; FET = Fisher's Exact Test; FFCC = Former Foster Care Children; MBCC = Medicaid Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance; RASA = Renin Angiotensin System Antagonists; STA = Statins.*

Discussion

Overall results from the sensitivity analysis demonstrate a relatively low degree of intersection in the annual measures making paired tests inappropriate for many measures and populations. In particular, Measure 3.1.5 had low rates of intersection across all populations, resulting in paired samples that were too small (lowest amount of intersection was 9.3% and the highest amount of intersection was 28.9%) to infer the results of the McNemar's Test. On the other hand, pediatric and adolescent Medicaid populations (i.e., AA, PCA) for Measure 3.1.3 had substantially higher intersection rates, resulting in a relatively high degree of agreement between rates and the direction of change between pre- and post-period annual rates when comparing the full and paired samples. The statistical test result findings were identical for the AA population at $p < 0.001$, but different for the PCA population where the full sample indicated $p < 0.01$ (the paired sample indicated no statistical difference). Regarding PCA, the sample size decreased in the paired sample and the difference in pre- and post-period rates (1.0) was less than the difference in the pre- and post-period rates of the full sample (2.7). Given these two aspects, the ability to detect a statistically significant change was diminished. Findings suggest that intersection between pre- and post-samples was relatively low, and the paired sample tests do not substantially deviate from the Interim Report findings.

4. UPDATED MEASURE 3.1.4 DEFINITION

Measure 3.1.4	Newly diagnosed for depression
Definition	Measures the percentage of members aged 12 years and older newly diagnosed for clinical depression on the date of the encounter
Study Population(s)	AA FFCC MBCC NF PCA
Measure Steward or Source	NA
Technical Specifications	Adapting the CMS measure specifications for 2017, claims and encounter data will be used to determine the numerator and denominator to calculate the CDF-CH/AD measure by month or quarter. Exclusion criteria will be applied to the extent possible using claims and encounter data. Numerator: Newly diagnosed for depression Denominator: Number of clients (12–64 years of age) with an outpatient visit for behavioral health. Annual rate: (Numerator/denominator)
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older. Denominator exclusion criteria: Active diagnosis of depression or bipolar disorder.
Data Source(s)/ Data Collection Method(s)	FFS claims and MMC encounter data Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	Pre/post comparison SDA Client demographics (age, sex, race/ethnicity)
Analytic Methods	Descriptive analysis
Benchmark	Not available

Note. AA = Adoption Assistance; FFCC = Former Foster Care Youth; FFS = Fee-For-Service; MBCC = Medicaid for Breast and Cervical Cancer; MMC = Medicaid managed care; NF = Nursing Facility; PCA = Permanency Care Assistance; SDA = Service Delivery Area.

APPENDIX E. QUALITY-BASED PAYMENT SYSTEMS TECHNICAL DETAILS

1. APPLIED APM FRAMEWORK

Based on the HCPLAN framework and the definition of APM arrangements (Table E.1.1), APM arrangements from the DSRIP reporting tool were categorized as follows (Figure E.1.1):

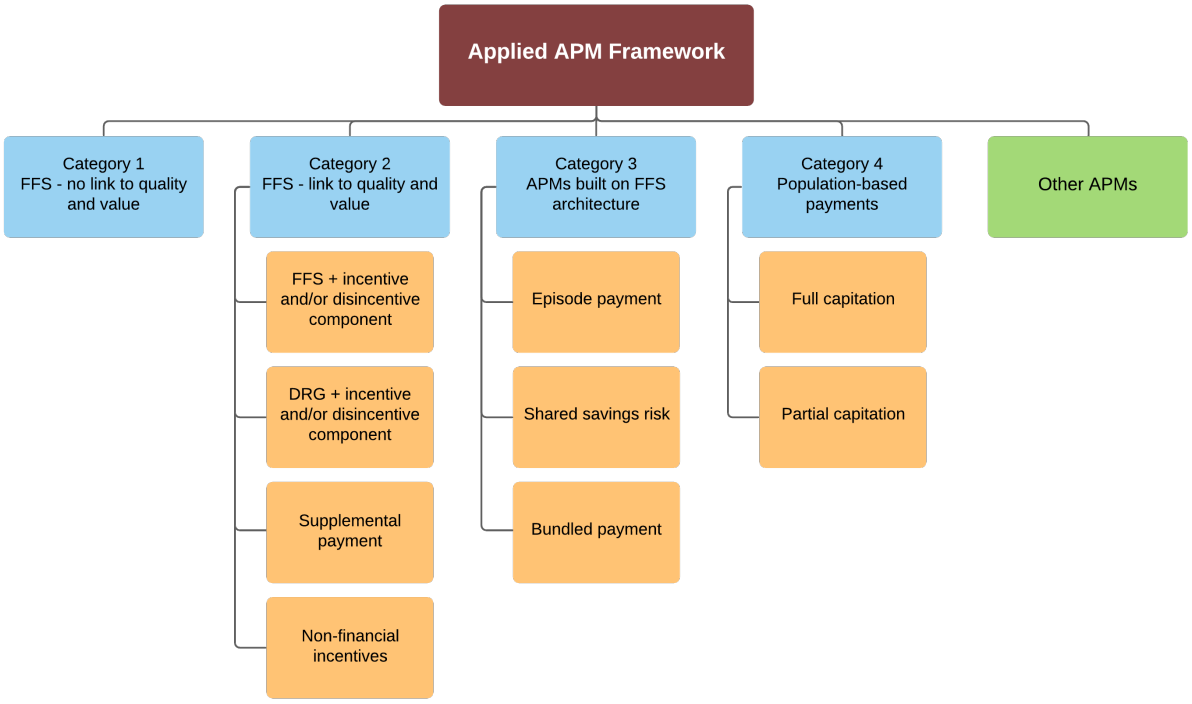
- **Category 2 (FFS—link to quality and value)**: FFS + incentive and/or disincentive component, DRG + incentive and/or disincentive component, supplemental payment, non-financial incentives
- **Category 3 (APMs built on FFS architecture)**: Episode payment, shared savings risk, bundled payment in Category 3 (APMs built on FFS architecture).
- **Category 4 (Population-based payments)**: Full and partial capitation in Category 4 (Population-based payments).
- **Other APMs category** was added to the HCPLAN framework to accommodate DSRIP APMs that did not fit in categories 2, 3, and 4. As Category 1 was FFS with no link to quality and value, we did not incorporate it for this section.

Table E.1.1 Definition of APM Arrangements.

APM Type	Description
Fee for service (FFS)	A payment model where services are unbundled and paid for separately.
Diagnosis-Related Group (DRG)	A statistical system of classifying any inpatient stay into groups for the purposes of payment (CMS) and quality performance evaluation (3M).
Capitation	A fixed, pre-arranged, and prospective payment received by a health plan or provider per patient enrolled in the respective plan or provider.
Bundled Payment	A single payment to providers or health care facilities (or jointly to both) for all services to treat a given condition or provide a given treatment.
Episode payment	Payment to a professional for all care associated with an event, such as childbirth (includes prenatal, delivery, and postpartum care).
Non-financial Incentive	Recognition through awards, report cards, administrative relief, and other venues.
Supplemental payment	Payment for provider investment in infrastructure such as HIE connectivity, EHR, and so on.
Shared savings	A payment strategy that offers providers a percentage of net savings realized due to their efforts to reduce health care spending for a defined patient population.

Note: MCO APM reporting tool.

Figure E.1.1 Applied APM Framework.



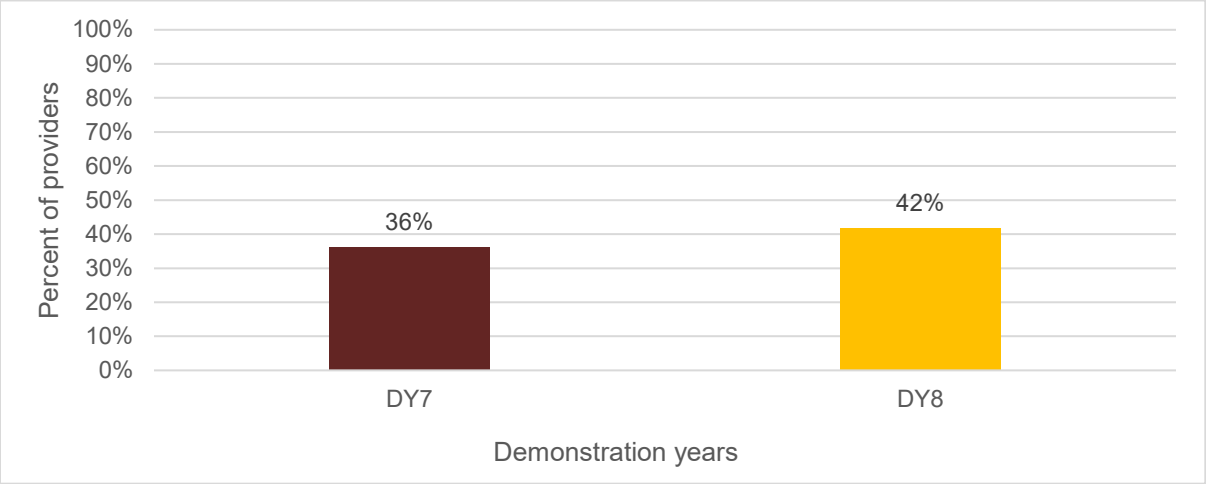
Note: The blue boxes reflect the four categories from the HCPLAN APM framework. Orange boxes depcit how the researchers assigned state-level reporting APM types into the HCPLAN APM framework. The green box reflects other APMs which could not be categorized into the HCPLAN framework.

2. DETAILED RESULTS

APM Arrangements

A total of 290 DSRIP providers were included from the DSRIP reporting tool. Figure E.2.1 presents the percentage of DSRIP providers that have APM arrangements for each DY. Researchers found an increase in APM arrangements, from 36% in DY7 to 42% in DY8.

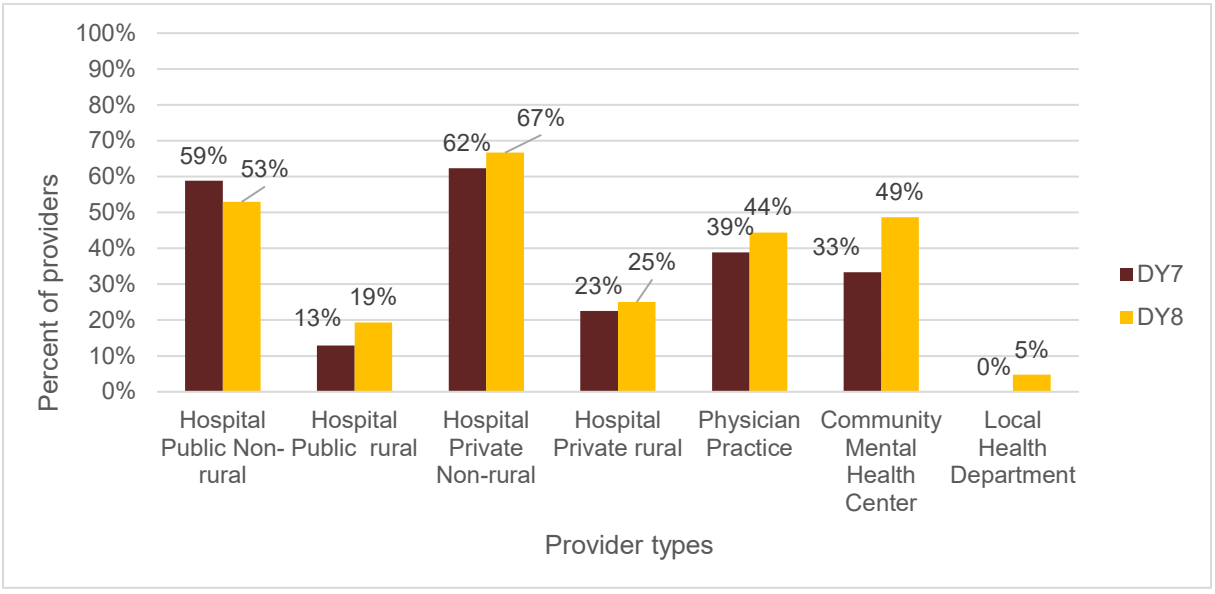
Figure E.2.1 Percentage of DSRIP Providers that Have APM Arrangements.



Note: Category A DSRIP reporting. Total number of providers for each DY = 290.

Providers with the highest and lowest percentage of APM arrangements in both DY7 and DY8 were private non-rural hospitals and local health departments, respectively (Figure E.2.2). All DSRIP provider types except public non-rural hospitals experienced increased APM arrangements between DY7 and DY8. The percentage of public non-rural providers with APMs decreased from 58.8% in DY7 to 52.9% in DY8.

Figure E.2.2 Percentage of DSRIP Providers with APM Arrangements by Provider Type.

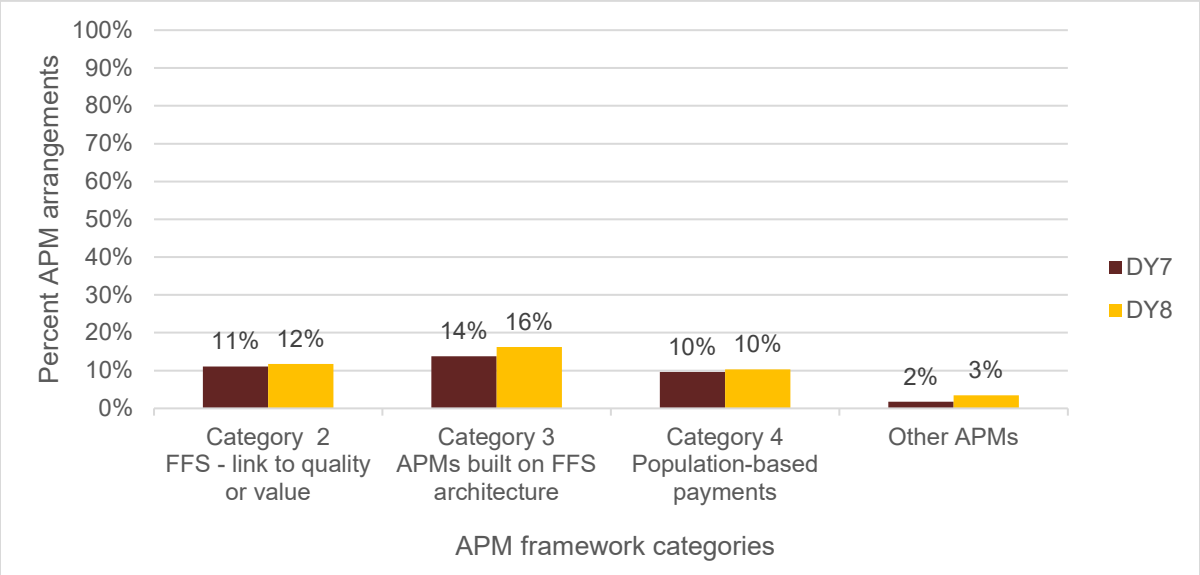


Note: Category A and C DSRIP reporting. Total number of providers for each DY = 290.

Type of APM Arrangements

Overall, DSRIP providers reported an increase in Categories 2, 3, and 4 of the APM framework. Most of the APM arrangements in DSRIP were Category 3—in other words, APMs built on FFS architecture (Figure E.2.3)—which included episodic payments, shared savings risk, and bundled payment models (for definitions, see Table E.1.1).

Figure E.2.3 Percentage of DSRIP Providers with APM Arrangements by APM Framework.



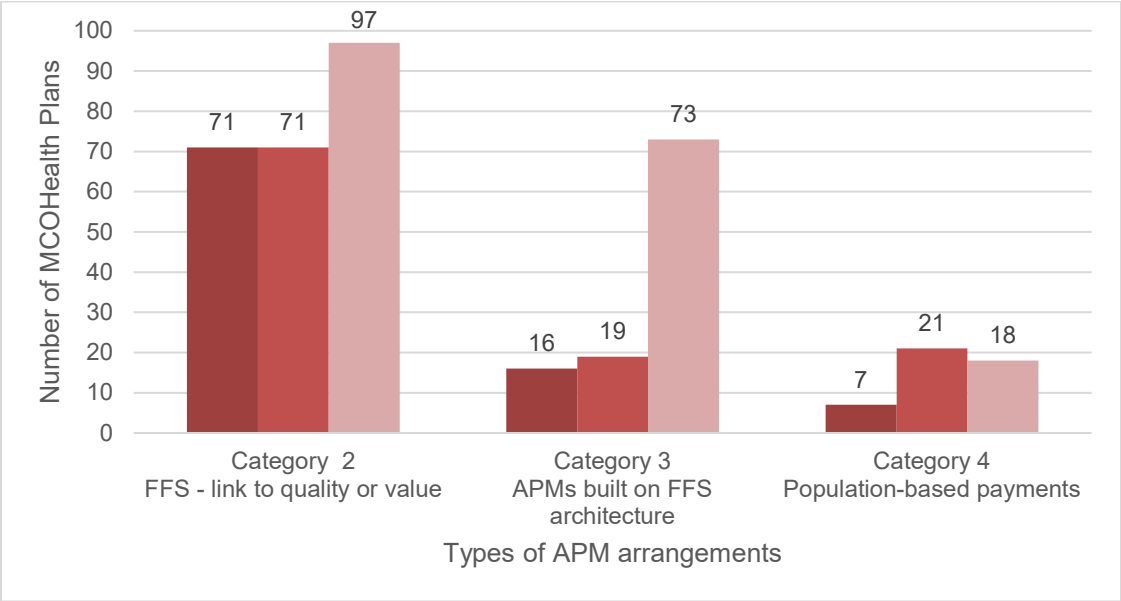
Note: DSRIP Category A reporting. Total number of providers for each DY = 290.

MCO Health Plans

Medicaid/CHIP MCOs aim to provide high-quality care to beneficiaries by lowering the cost of care and managing health care utilization. HHSC contracts with these MCOs to deliver Medicaid managed care services statewide. Additionally, it contractually requires MCOs to develop APMs with their providers.

From the annual summaries of APM arrangements submitted by the MCOs to HHSC, a total of 94 health plans that included APM arrangements were operating in 2016. This number increased to 111 in 2017 and 188 in 2018. The data source for this information (MCO APM Reporting Tool) includes only health plans with APM arrangements reported by MCOs. It does not include information about health plans without APM arrangements or other MCOs. The unit of analysis is at the health plan level, specifically, the number of health plans with APM arrangements that MCOs report to the state of Texas. MCOs were most likely to report engaging in APMs built on Category 2–FFS Architecture with a Link to Quality and Value (Figure E.2.4). MCOs experienced an annual rise in APM arrangements built on FFS architecture. However, population based APMs experienced a slight decline in number in 2018.

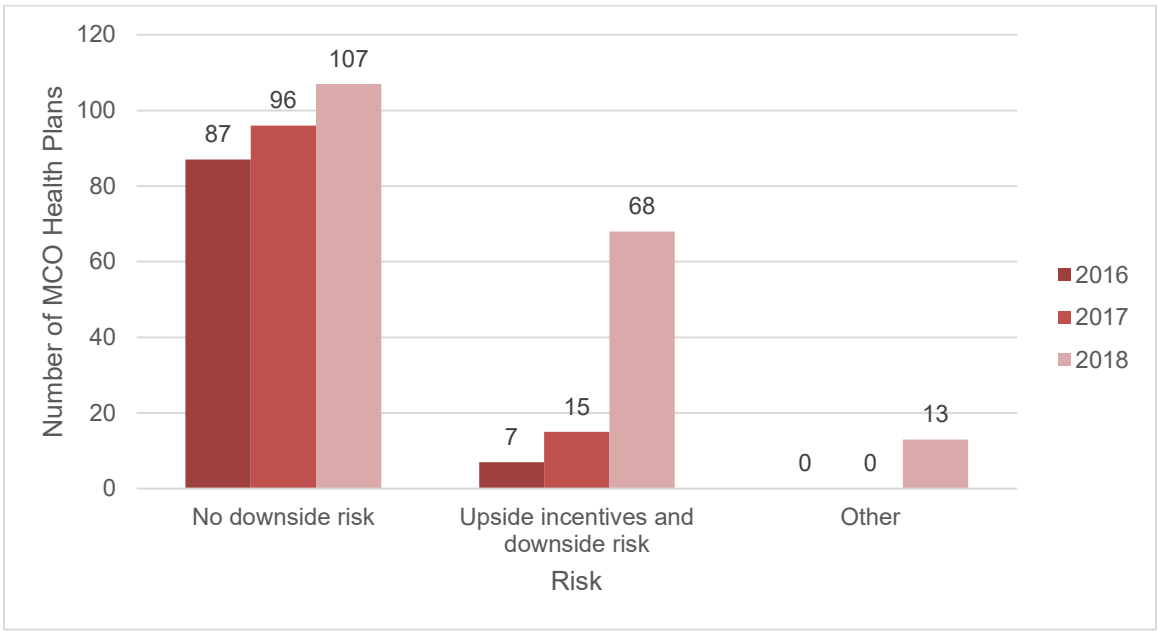
Figure E.2.4 Number of MCO Health Plans with APM Arrangements by APM Framework.



Note: MCO APM reporting tool. Total number of MCO health plans for 2016 = 94, for 2017 = 111, for 2018 = 188.

Most MCO plans had no downside risk for providers over each of the years studied (Figure E.2.5). However, MCOs reported an increase in upside incentive and downside arrangements in 2018.

Figure E.2.5 Number of MCO Health Plans having APM Arrangements by Provider Risk.



Note: MCO APM reporting tool. Total number of MCO health plans for 2016 = 94, for 2018 = 111, for 2019 = 188.

DSRIP Provider perceptions on development/implementation of APMs

Sample

Researchers received a total of 225 responses to the APM survey from DSRIP providers, a 77.6% response rate. The sample size of DSRIP survey respondents by RHP is shown in Table E.2.1.

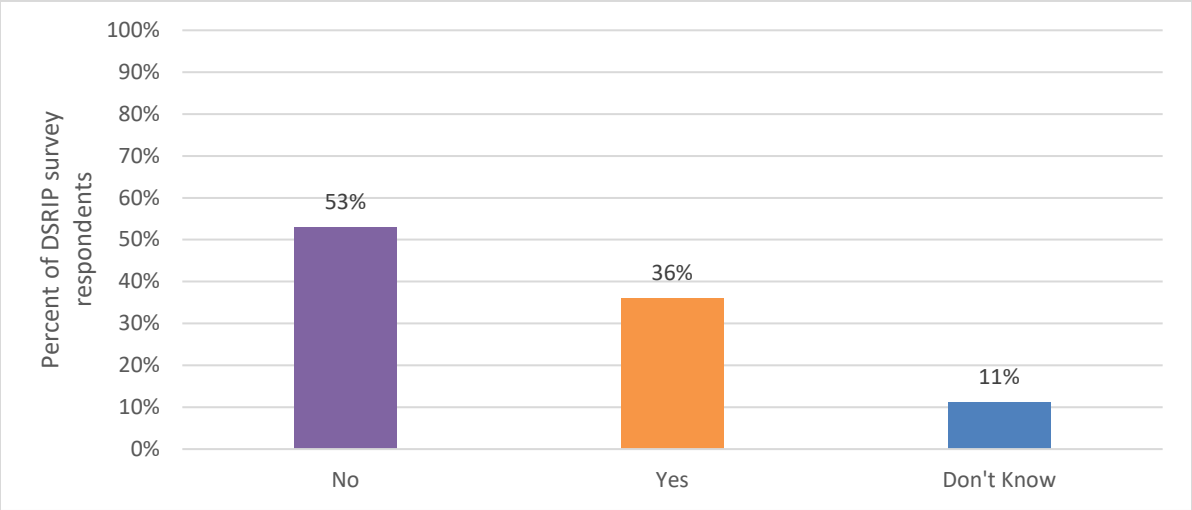
Table E.2.1 DSRIP Survey Respondent Sample Size by RHP

RHP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
N	16	12	20	13	9	17	7	7	13	15	11	25	9	8	8	7	10	6	9	3

Note: N = sample size; RHP = Regional Healthcare Partnership.

Overall, only 36% of DSRIP survey respondents (N = 81) responded "yes" to participating in any APMs (Figure E.2.6).

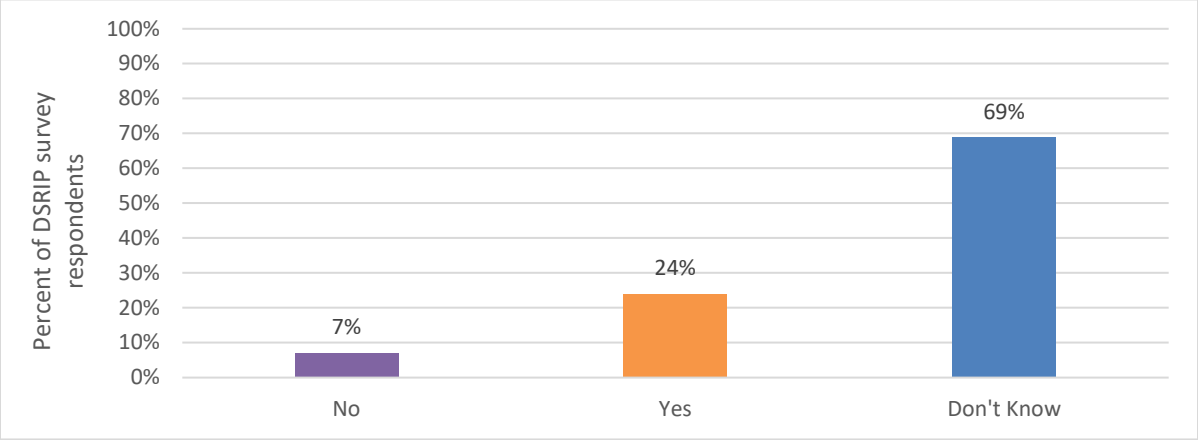
Figure E.2.6 Survey Respondents Participating in APMs.



Note: DSRIP Provider Survey. Survey question: Does your organization participate in any Alternative Payment Models? Survey response "yes:" N = 81; survey response "no:" N = 119; survey response "don't know:" N = 25.

DSRIP survey respondents were asked whether they planned to participate in APMs in the future. Only 24% responded answered "yes," while most (69%) did not know (Figure E.2.7).

Figure E.2.7 Survey Respondents Planning to Participate in Other APMs in the Future.

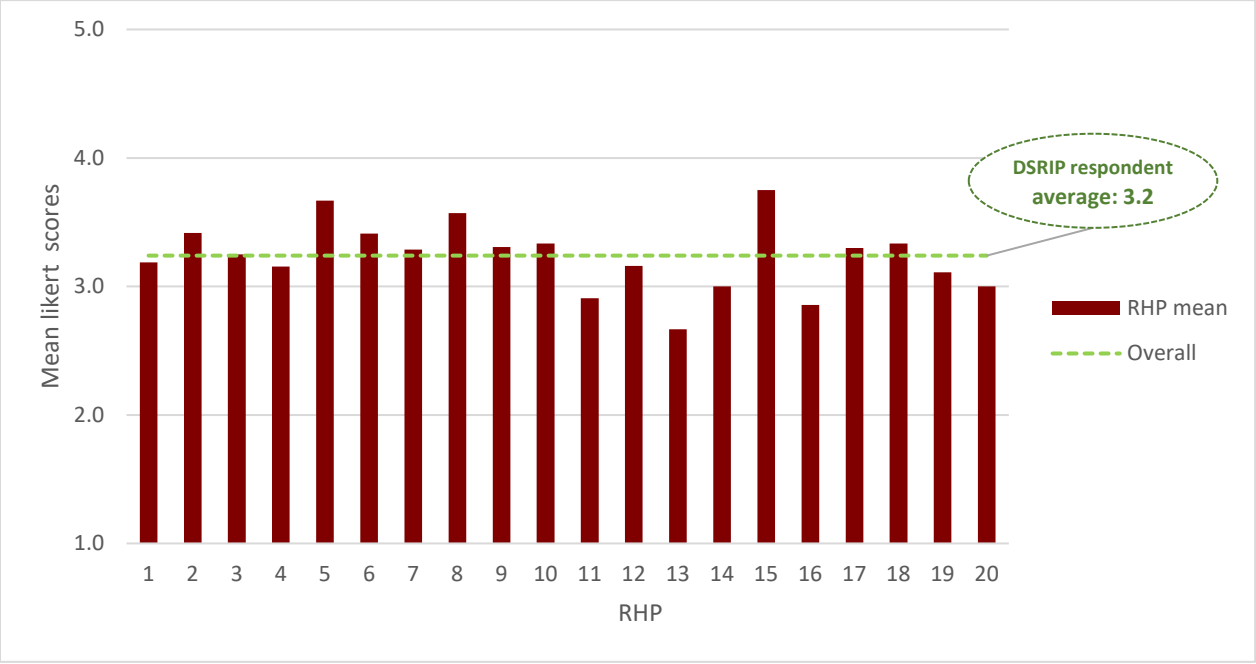


Note: DSRIP Provider Survey. Survey question: Is your organization planning to participate in other Alternative Payment Models in the future? Survey response "yes:" N = 54; survey response "no:" N = 16; survey response "don't know:" N = 155.

Triple Aim of Health Care

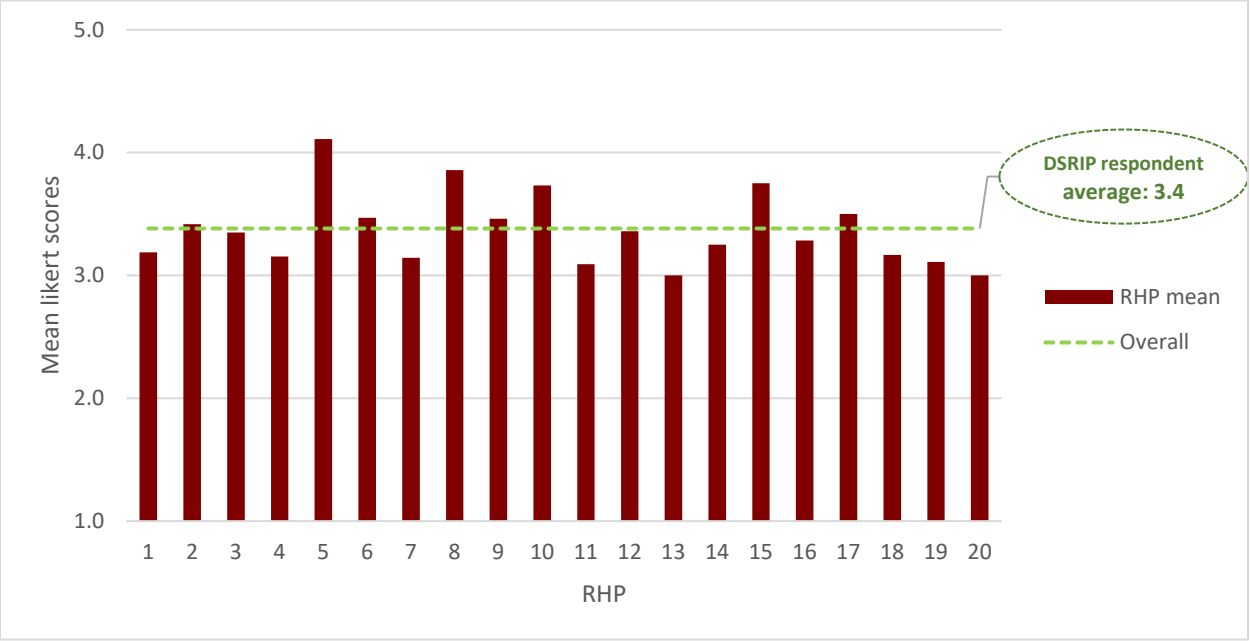
On average, DSRIP survey respondents neither agreed nor disagreed (DSRIP respondent average = 3.2) that APMs improve patient satisfaction, quality, access, population health, or the per-capita cost of providing care (Figure E.2.8–Figure E.2.12).

Figure E.2.8 APMs Improve Patient's Satisfaction of Care.



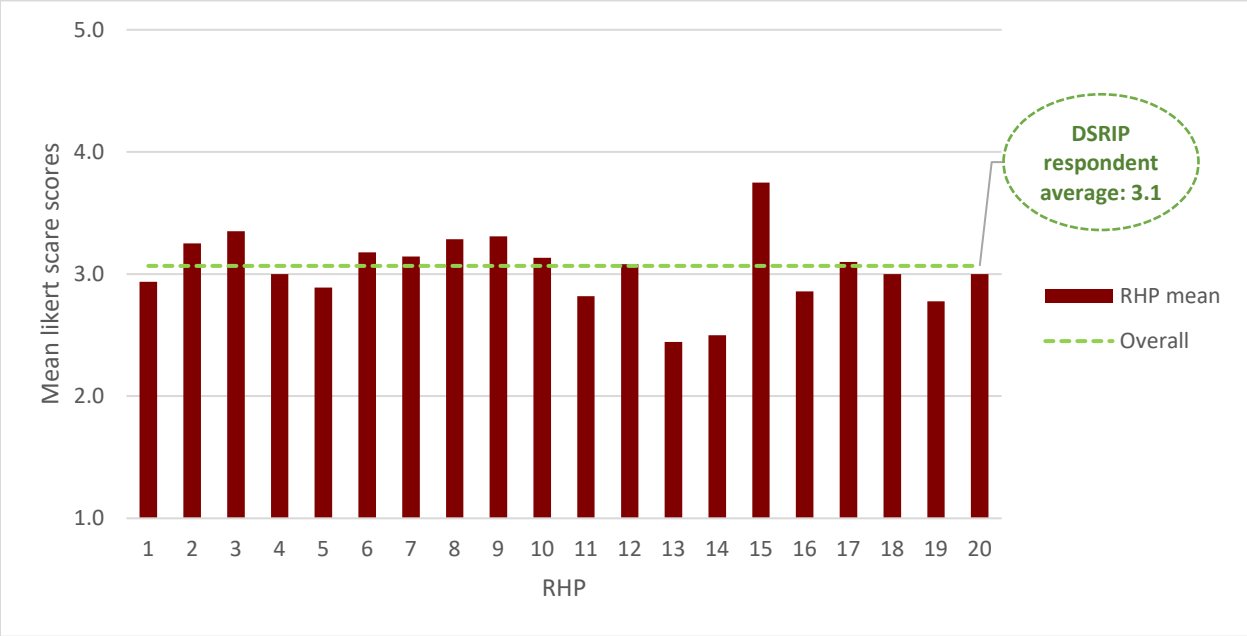
Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Alternative Payment Models in Texas Medicaid improve the satisfaction of participating patients with their health care. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.9 APMs Improve Quality of Care for Patients.



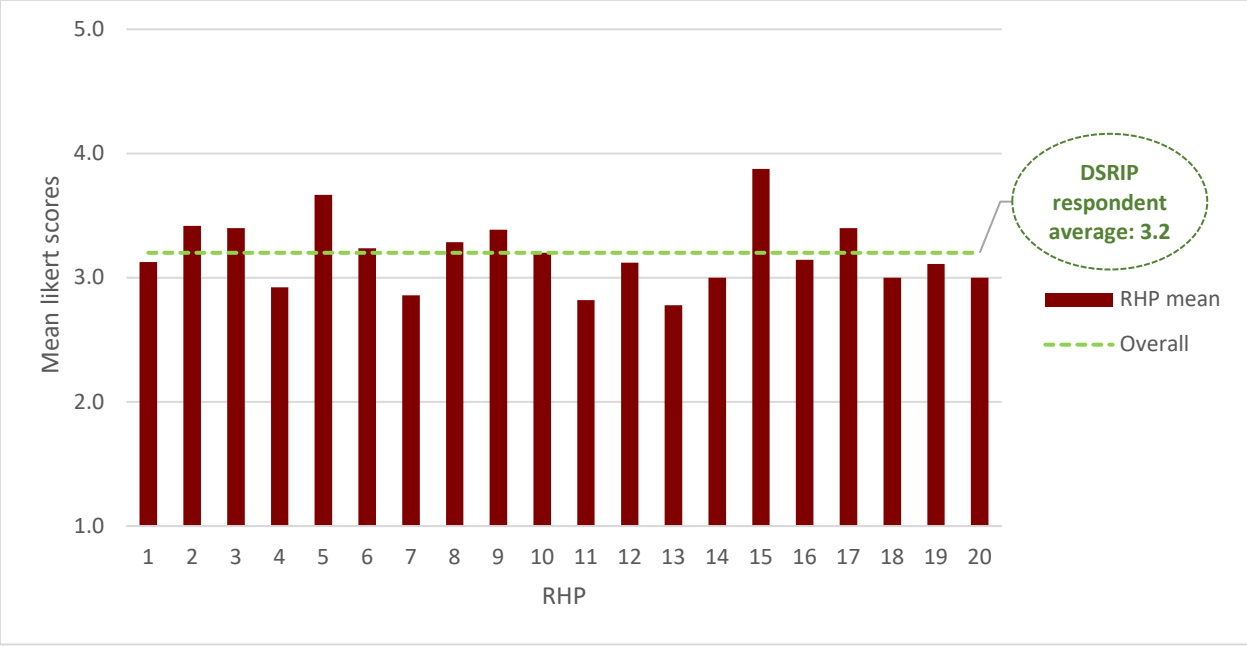
Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Alternative Payment Models in Texas Medicaid improve quality of care for patients. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.10 APMs Improve Access to Health Care.



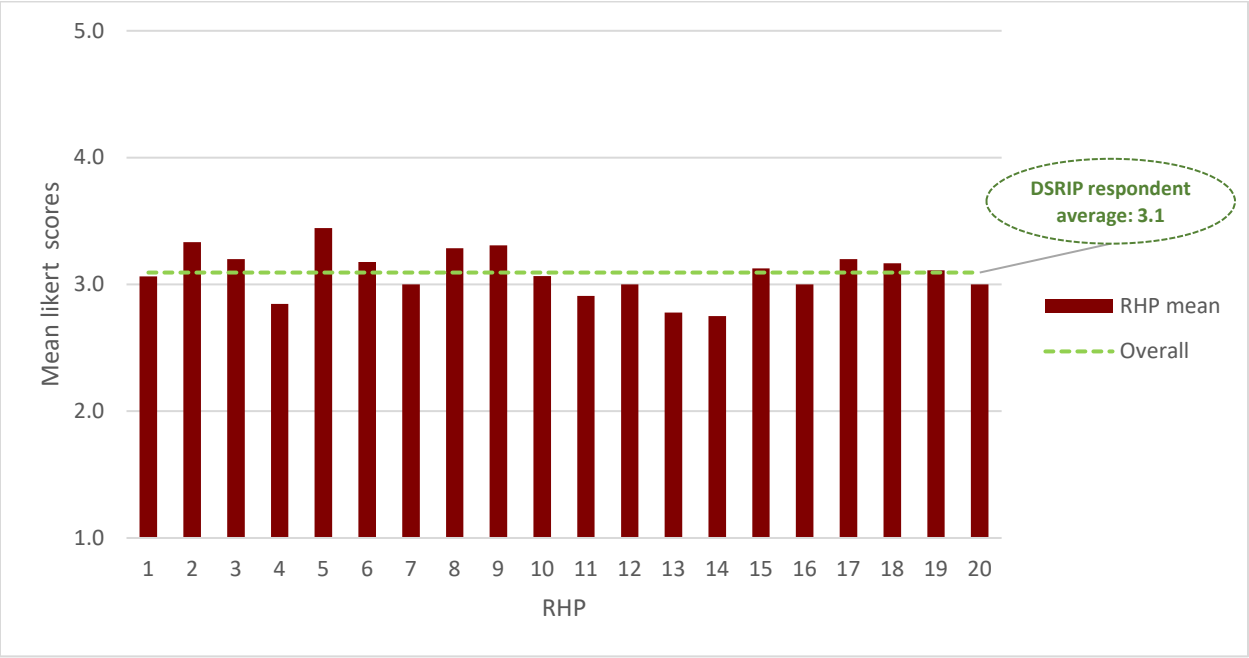
Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Alternative Payment Models in Texas Medicaid improve access to health care in your service area. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.11 APMs Improve Population Health.



Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Alternative Payment Models in Texas Medicaid improve population health within your service delivery area (SDA). Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.12 APMs Reduce Per-Capita Cost of Providing Health Care.

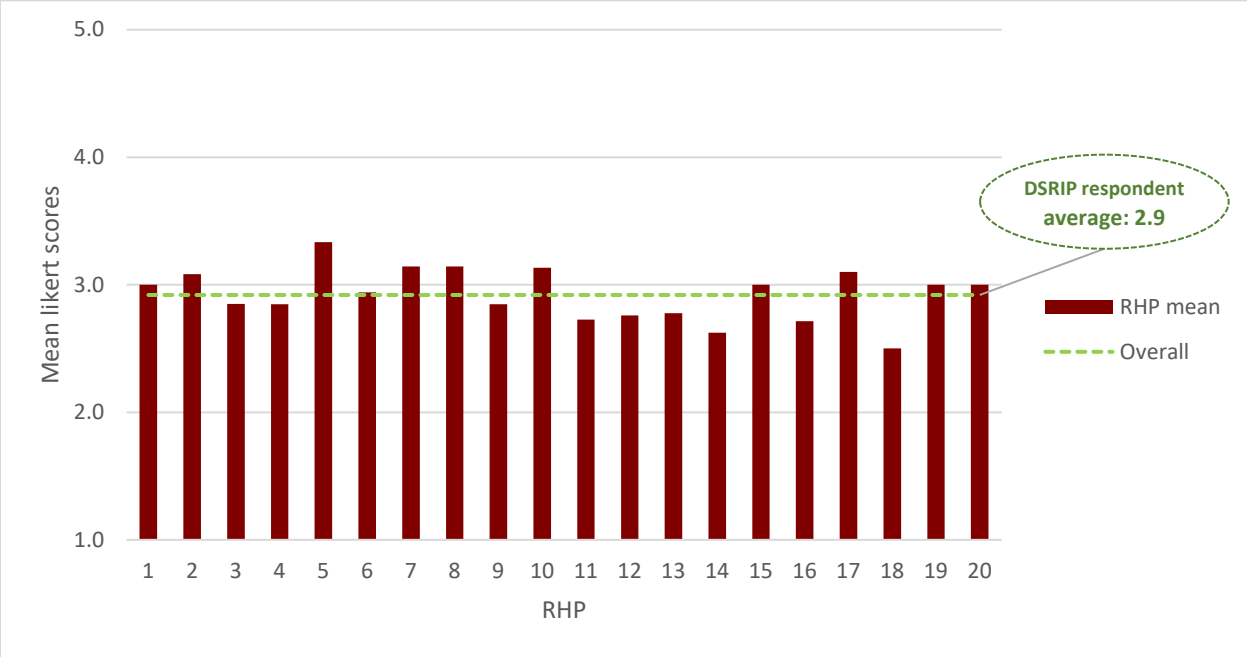


Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Alternative Payment Models in Texas Medicaid reduce the per capita cost of providing health care for patients. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Provider Satisfaction

DSRIP survey respondents, on average, neither agreed nor disagreed that the health care providers were satisfied with APMs (Figure E.2.13). RHP 5 scored the highest among all RHPs for this question (mean score = 3.3) continuing to be one of the overall high-scoring RHPs.

Figure E.2.13 Health Care Providers are Satisfied with APMs.

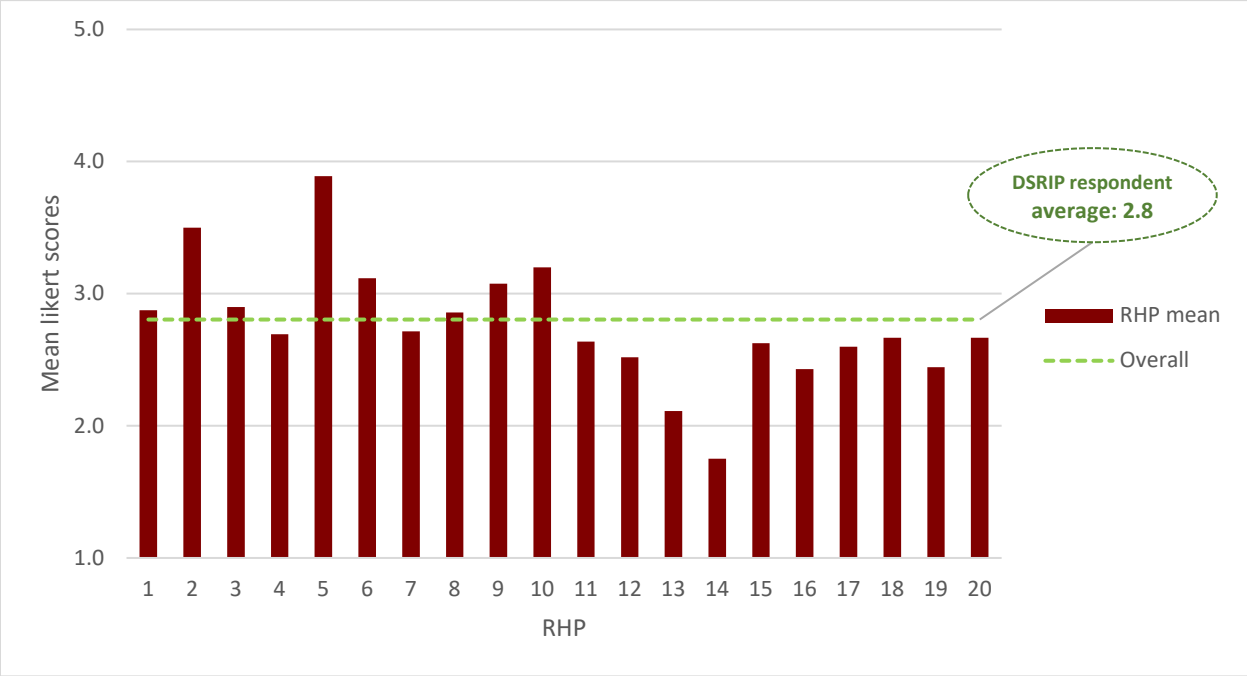


Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Our health care providers in Texas Medicaid are satisfied with Alternative Payment Models. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Organizational Capacity

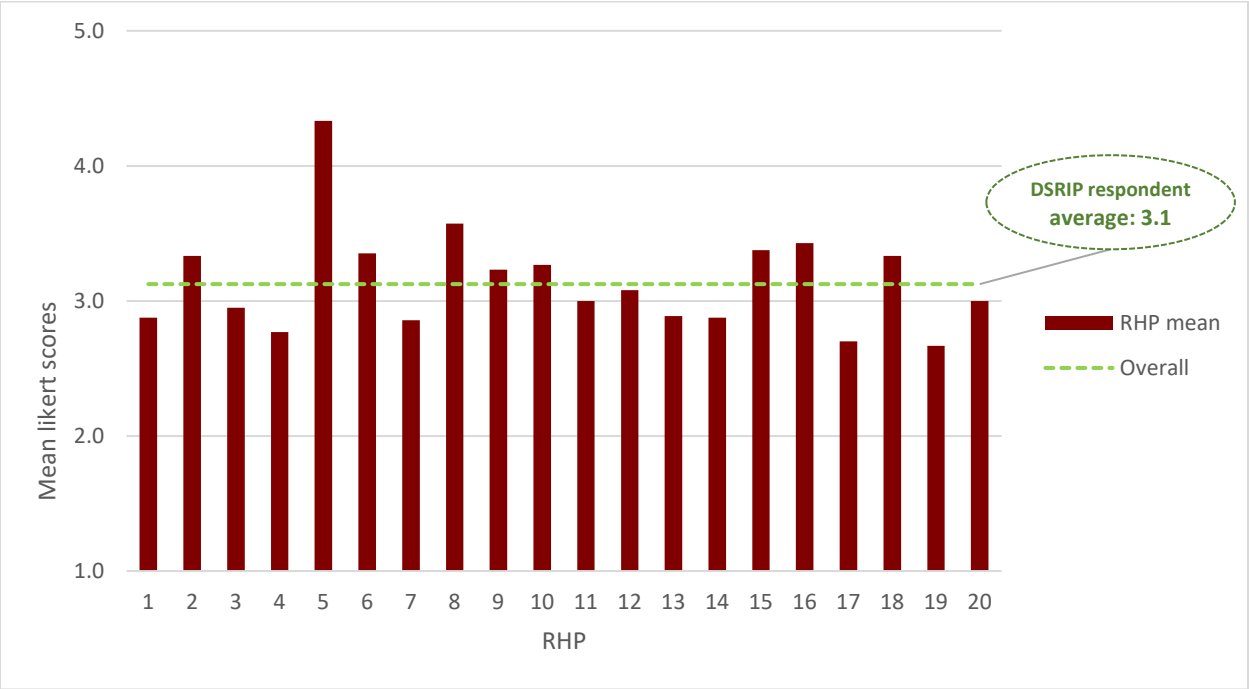
DSRIP survey respondents neither agreed nor disagreed when it came to managing administrative burden, allocating sufficient time to APM activities, having financial capacity, and having data infrastructure (Figure E.2.14–Figure E.2.17).

Figure E.2.14 Manage All Administrative Burden Associated with Participating in APMs.



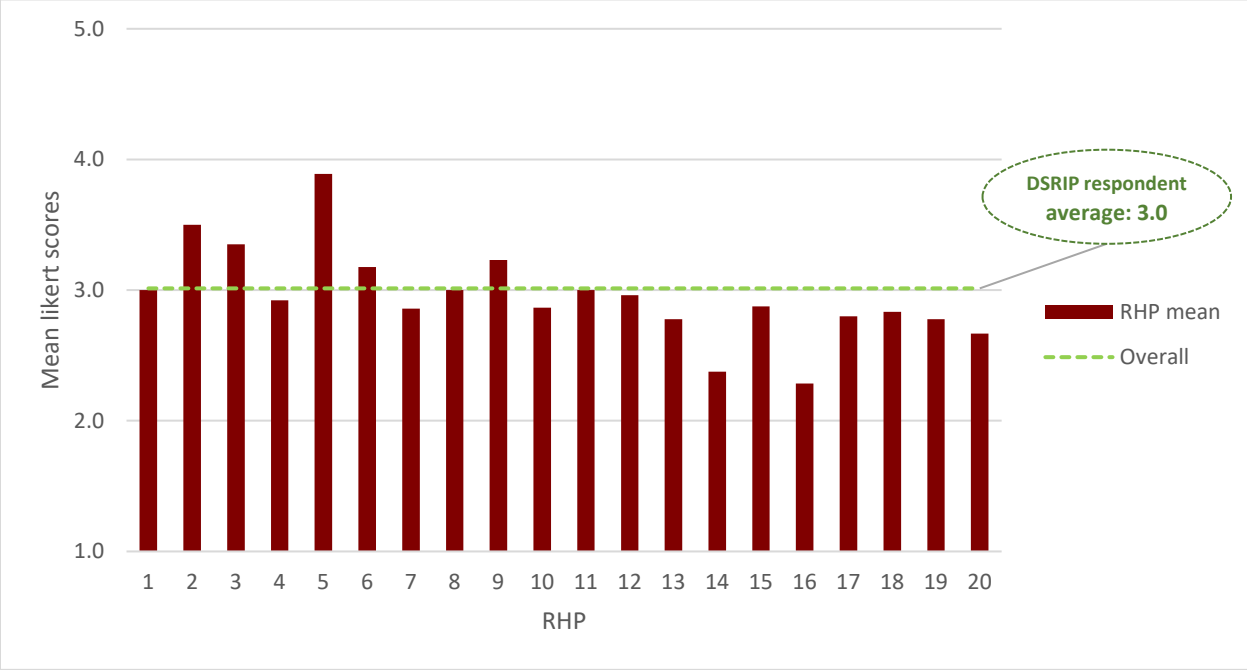
Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Your Organization can manage all of the administrative burdens associated with participating in Alternative Payment Model initiatives in Texas Medicaid. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.15 Allocate Sufficient Time for Participating in APMs.



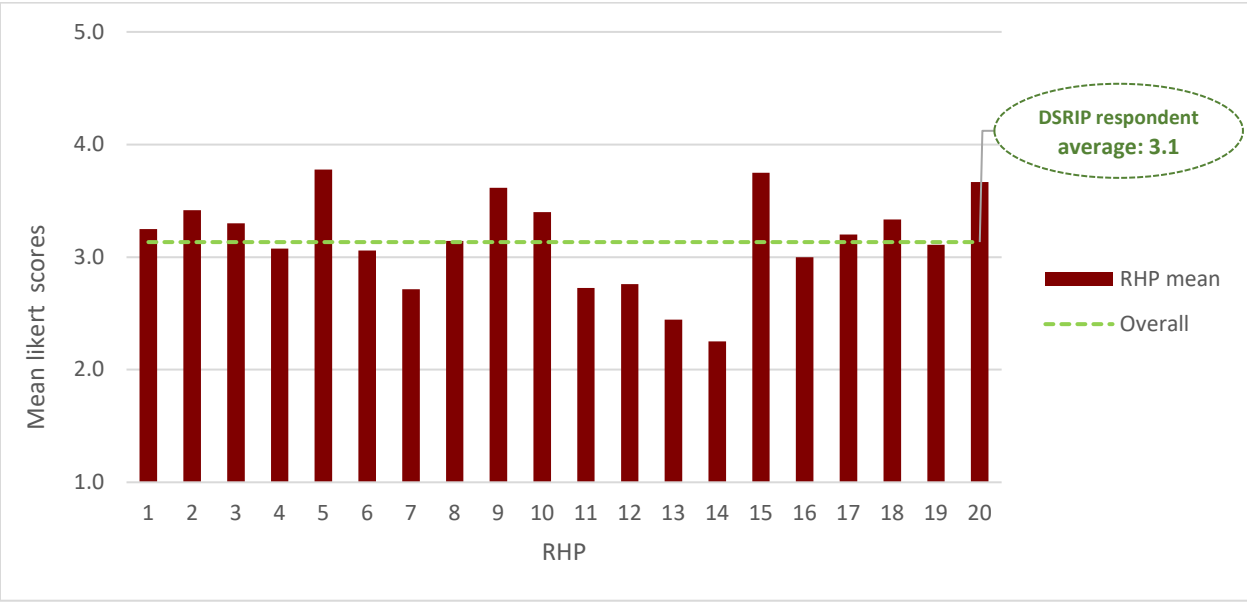
Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Your organization has allocated sufficient time for participating in Alternative Payment Model initiatives in Texas Medicaid. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.16 Sufficient Financial Capacity for Participating in APMs.



Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Your organization has sufficient financial capacity for participating in Alternative Payment Model initiatives in Texas Medicaid. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

Figure E.2.17 Data Infrastructure Necessary for Participating in APMs.

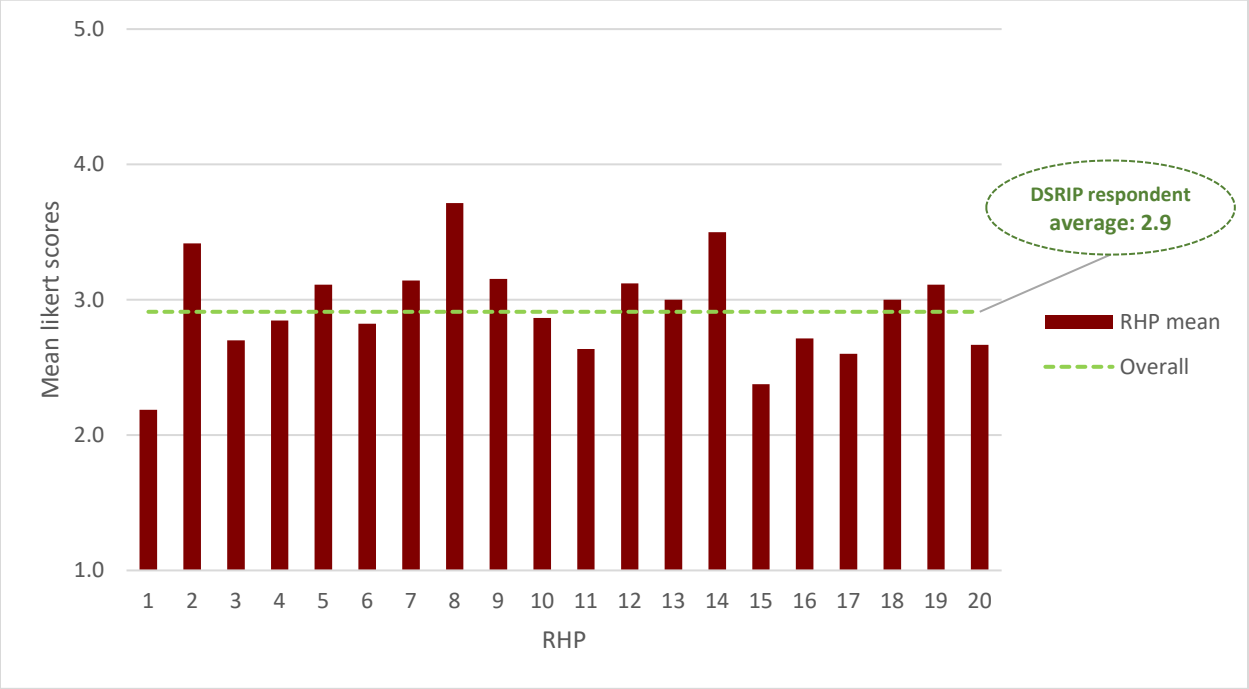


Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: Your organization is equipped with the data infrastructure necessary for participating in Alternative Payment Model initiatives in Texas Medicaid. Likert scale: 1: Strongly disagree; 2: Somewhat disagree; 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

DSRIP Promoting the Use of APMs

Overall, DSRIP survey respondents neither agreed nor disagreed that DSRIP promoted the use of APMs within their organizations (mean score = 2.91) (Figure E.2.18).

Figure E.2.18 DSRIP Promoted the Use of APMs within the Organization.



Note: DSRIP Provider Survey. Survey question: Please respond with the extent to which you agree/disagree with the following statement: The experience with DSRIP has promoted the use of Alternative Payment Models within your organization. Likert scale: 1: Strongly disagree, 2: Somewhat disagree, 3: Neither agree nor disagree; 4: Somewhat agree; 5: Strongly agree.

APPENDIX F. HEALTH CARE SYSTEM FOR THE MLIU POPULATION TECHNICAL DETAILS

1. BUDGET NEUTRALITY METHODS DETAILS

Components of Expenditures

Prior to the Demonstration, Texas Medicaid expenditures (WOW) were essentially two primary programs: Eligible Groups Served (EGS) and Other Upper Payment Limit (UPL). The combination of EGS and Other UPL programs is the total expenditures for the Without Waiver (baseline). The EGS group can be further subdivided into aged and Medicare related, blind and disabled, adults, and children. The Other UPL programs include UPL for the excluded, physician UPL, and outpatient UPL.

The state's prior success with MMC in 2012 (Texas Health and Human Services, 2021) led to this specific Demonstration waiver to allow Texas to continue to expand MMC and implement the DSRIP pool and the UC pool. The expenditures previously used for the UPL programs and the savings from MMC expansion were combined to create the Demonstration Funding Pools, which include the DSRIP and Uncompensated Care pools, the Network Access Improvement Project (NAIP), and two Delivery System and Provider Payment Incentive Programs. Table F.1.1 provides a comparison of the cost components included in WOW and WW expenditures.

When comparing expenditures, the analysis will compare total expenditures and EGS expenditures, and then consolidate and compare the Non-EGS components (the Demonstration Funding Pools, the Network Access Improvement Project, and the Delivery System and Provider Payment Incentives for the With Waiver and Other UPL programs for the Without Waiver). A direct comparison of the different sub-components of Non-EGS is not meaningful in terms of a comparison of program performance or outcomes, as they each serve different purposes. Even direct comparisons between the EGS of WOW and WW is not always a straightforward comparison, since the WW expenditures include CMS64 expenditures to direct payment programs (NAIP, QIPP, UHRIP) in the EGS categories. Despite these differences, this comparison is useful in understanding differences in expenditures.

Table F.1.1 Comparison of Components of WOW and WW.

Without Waiver	With Waiver
Eligible Groups Served • Aged and Medicare Related • Blind and Disabled • Adults • Children	Eligible Groups Served • Aged and Medicare Related • Blind and Disabled • Adults • Children
Other UPL Programs • UPL for Excluded Population • UPL for Included Population • Physician UPL • Outpatient UPL	Demonstration Funding Pools • Delivery System Reform Incentive Payment Pool • Uncompensated Care Pool
	Network Access Improvement Project • NAIP Expenditures • Nursing Facility Direct Payments
	Delivery System and Provider Payment Incentives • Quality Incentive Payment Program • Uniform Hospital Rate Increase Program

Note: NAIP = Network Access Improvement Program; UPL = Upper Payment Limit.

PMPM Background

Generally, calculation of the WOW budget neutrality expenditure limit(s) is based on spending per eligible individual per month. This per-member per-month (PMPM) approach prevents the state from being at risk for increased costs associated with changes in enrollment. Therefore, there is neither a risk based on increased enrollment nor a benefit for decreased enrollment. PMPM expenditure limits are obtained using projected WOW PMPM costs multiplied by the state's actual member month caseload. This per-capita PMPM budget neutrality test is the model most employed in Medicaid Section 1115(a) Demonstrations (CMS, 2018).

The following formula is used to calculate PMPM expenditure limits for Demonstrations:

$$BN\ expenditure\ limit\ =\ (projected\ WOW\ PMPM) \times (actual\ member\ months)$$

Whether calculating PMPM or in aggregate, total budget neutrality expenditure limits often comprise multiple sub-limits. The overall budget neutrality expenditure limit is determined by adding the sub-limits together to create a single limit. The single budget neutrality limit applies to all relevant categories of Medicaid expenditure as specified in the Demonstration's Special Terms and Conditions, and is currently the sole determinant in assessing whether the Demonstration is budget neutral (CMS, 2018). It is acceptable for states to exceed individual sub-limits if they do not exceed the overall budget neutrality expenditure limit.

2. BUDGET NEUTRALITY FULL RESULTS

Total Expenditures

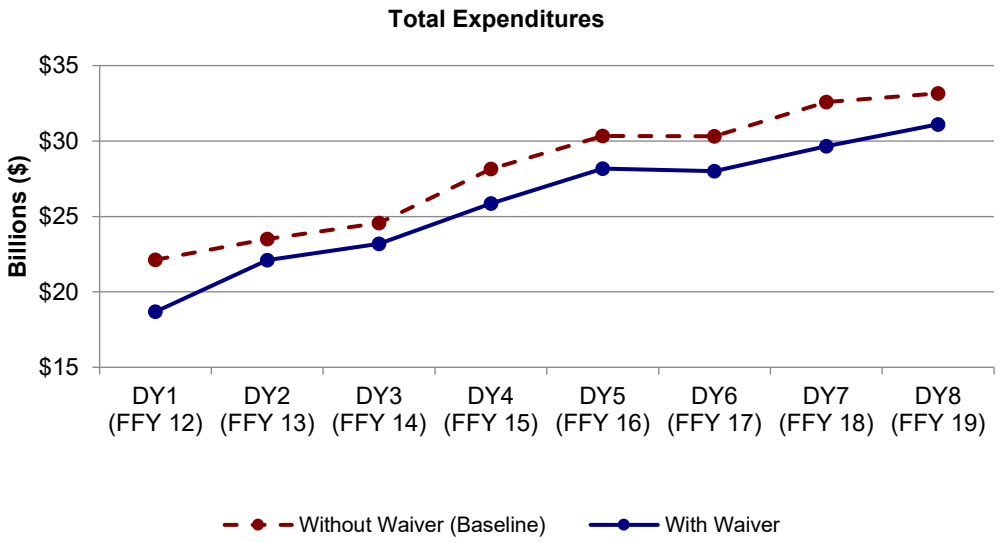
Table F.2.1 and Figure F.2.1 provide a comparison of the WW and WOW total expenditures for DY1-DY8. WOW total expenditures started DY1 nearly $3.5 billion higher (Table F.2.1) than WW total expenditures. WW total expenditures remained less than WOW total expenditures throughout the Demonstration. The last column of Table F.2.1 shows the difference between the WOW and WW total expenditures. A positive number indicates a cost savings from the Demonstration.

Table F.2.1 Total Expenditures.

	Without Waiver (Baseline)	With Waiver	Difference (WOW-WW)
DY1 (FFY12)	$22,127,175,153	$18,685,243,859	$3,441,931,294
DY2 (FFY13)	$23,497,338,055	$22,114,696,800	$1,382,641,255
DY3 (FFY 14)	$24,559,160,149	$23,181,854,359	$1,377,305,790
DY4 (FFY15)	$28,146,406,876	$25,850,362,287	$2,296,044,589
DY5 (FFY16)	$30,324,738,117	$28,177,124,764	$2,147,613,353
DY6 (FFY17)	$30,306,085,630	$28,009,533,851	$2,296,551,779
DY7 (FFY18)	$32,580,445,634	$29,650,473,466	$2,929,972,168
DY8 (FFY19)	$33,156,012,061	$31,107,754,642	$2,048,257,418

Note: DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.1 Total Expenditures.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

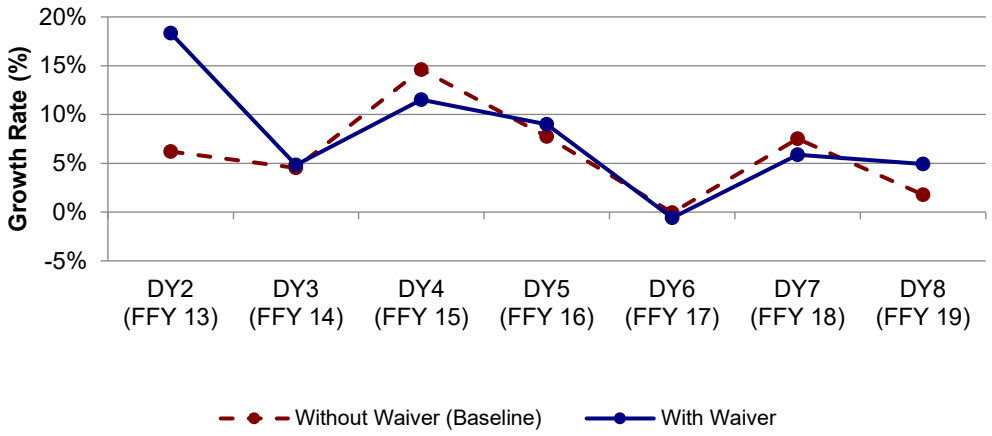
Table F.2.2 and Figure F.2.2 present the annual growth rates for total expenditures over DY1 to DY8. The last column of Table F.2.2 is the difference between the WOW annual growth rate and the WW annual growth rate. A positive number in the last column would represent a year when the growth rate for the WOW costs was higher than the WW rate. Although the WW annual growth rate was higher than the WOW annual growth rate for most years, most of the differences were small. The average trend for total expenditures for DY1–DY8 was lower for the WOW than for the WW, at 5.95% and 7.55%, respectively, for an absolute difference of 1.6%.

Table F.2.2 Total Expenditures–Annual Growth Rates.

	Without Waiver (Baseline)	With Waiver	Difference (WOW-WW)
DY1 (FFY 12)	-	-	-
DY2 (FFY 13)	6.19%	18.35%	-12.16%
DY3 (FFY 14)	4.52%	4.83%	-0.31%
DY4 (FFY 15)	14.61%	11.51%	3.10%
DY5 (FFY 16)	7.74%	9.00%	-1.26%
DY6 (FFY 17)	-0.06%	-0.59%	0.53%
DY7 (FFY 18)	7.50%	5.86%	1.64%
DY8 (FFY 19)	1.77%	4.91%	-3.14%

Note: Dash in table indicates no value since this is the base year. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.2 Total Expenditures–Annual Growth Rates.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

Eligible Groups Served

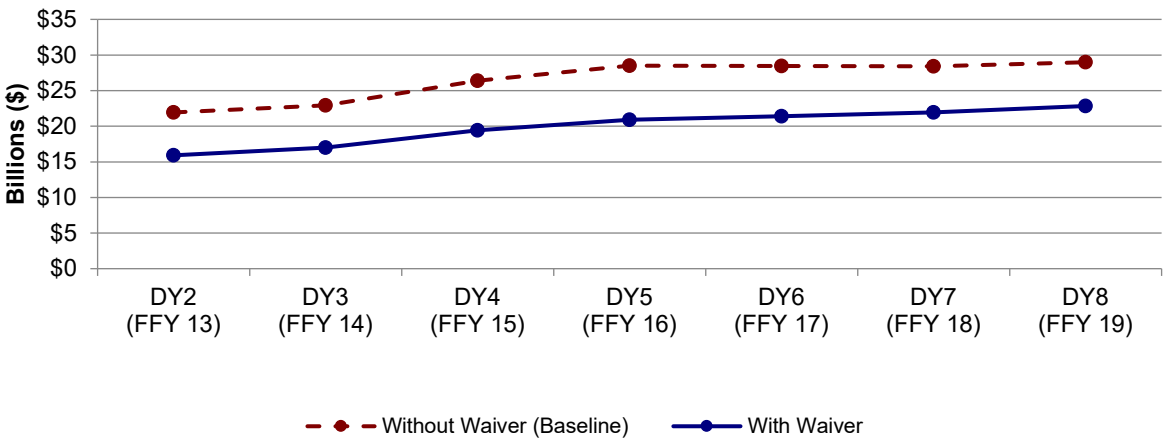
This section more closely examines the annual expenditures for the EGS components of both the WW and WOW. Table F.2.3 and Figure F.2.3 provide a comparison of WW and WOW annual expenditures across all EGS over DY1 to DY8. The expenditures for the WW provided in this table have removed CMS64 expenditures for direct payment programs (NAIP, QIPP, UHRIP). This allows for a more standardized comparison of spending for the EGS. As previously discussed, the last column of Table F.2.3 provides the difference in annual expenditures, with the WW costs being subtracted from the WOW costs. A positive number represents the cost savings within EGS from the Demonstration.

Table F.2.3 Annual Expenditures across all Eligible Groups Served.

	Without Waiver (Baseline)	With Waiver	Difference (WOW - WW)
DY1 (FFY12)	$20,648,115,262	$14,485,243,859	$6,162,871,403
DY2 (FFY13)	$21,935,711,693	$15,914,696,800	$6,021,014,893
DY3 (FFY14)	$22,910,305,585	$16,981,854,359	$5,928,451,226
DY4 (FFY15)	$26,405,397,563	$19,416,315,658	$6,989,081,905
DY5 (FFY16)	$28,486,367,595	$20,906,229,810	$7,580,137,785
DY6 (FFY17)	$28,467,715,108	$21,384,579,592	$7,083,135,516
DY7 (FFY18)	$28,407,572,618	$21,961,528,574	$6,446,044,044
DY8 (FFY19)	$28,983,139,044	$22,838,380,648	$6,144,758,397

Note: The expenditures for the WW provided in this table have removed CMS64 expenditures for direct payment programs (NAIP, QIPP, UHRIP). DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.3 Annual Expenditures across all Eligible Groups Served.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

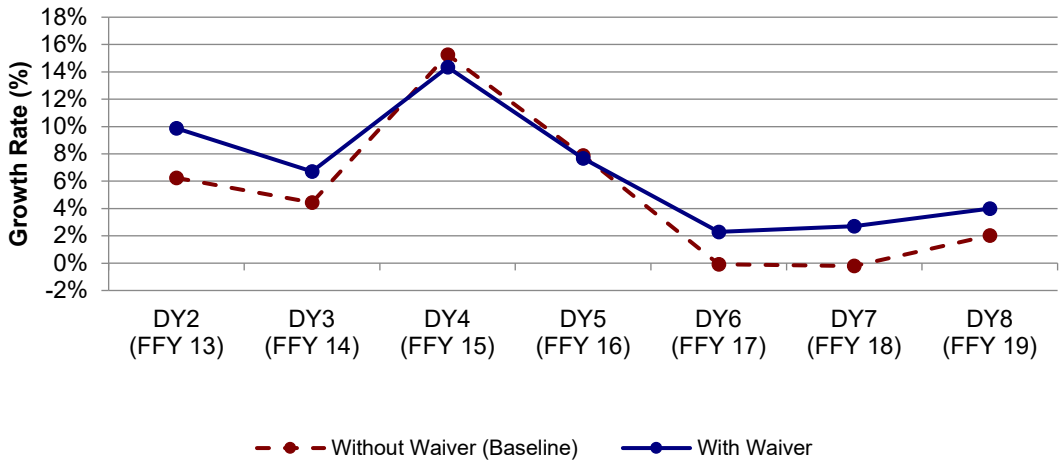
Table F.2.4, and Figure F.2.4 provide a comparison of the annual growth rates across all EGS. Like the annual growth rate for total expenditures, the annual growth rate for the Demonstration (WW) was higher than the growth rate for the WOW group in most DYs. However, as shown in the last column of Table F.2.4, the difference was relatively small. The average trend in EGS was 4.96% for the WOW and 6.72% for the WW, an absolute difference of 1.76%. The WW still has lower overall expenditures than the WOW for EGS.

Table F.2.4 Eligible Groups Served–Annual Growth Rates.

	Without Waiver (Baseline)	With Waiver	Difference (WOW-WW)
DY1 (FFY 12)	-	-	-
DY2 (FFY 13)	6.24%	9.87%	-3.63%
DY3 (FFY 14)	4.44%	6.71%	-2.27%
DY4 (FFY 15)	15.26%	14.34%	0.92%
DY5 (FFY 16)	7.88%	7.67%	0.21%
DY6 (FFY 17)	-0.07%	2.29%	-2.36%
DY7 (FFY 18)	-0.21%	2.70%	-2.91%
DY8 (FFY 19)	2.03%	3.99%	-1.96%

Note: Dash in table indicates no value since this is the base year. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.4 Eligible Groups Served–Annual Growth Rates.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

EGS by Subcomponent

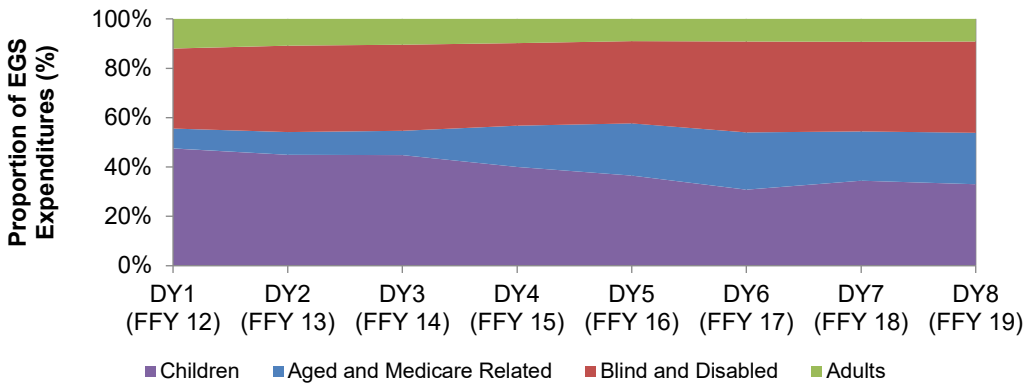
Table F.2.5 provides the amount of expenditures, and Figure F.2.5 shows the proportion of expenditures for EGS subcomponents of WW. CMS64 expenditures for direct payments programs have been removed.

Table F.2.5 With Waiver Annual Expenditures by EGS Subcomponent.

	Aged and Medicare Related	Blind and Disabled	Adults	Children
DY1 (FFY12)	$1,177,336,276	$4,691,415,315	$1,737,536,171	$6,878,956,097
DY2 (FFY13)	$1,482,586,850	$5,565,062,120	$1,723,939,563	$7,143,108,267
DY3 (FFY14)	$1,675,335,985	$5,909,237,136	$1,781,306,866	$7,615,974,372
DY4 (FFY15)	$3,250,663,131	$6,498,072,862	$1,910,510,965	$7,757,068,700
DY5 (FFY16)	$4,432,211,120	$6,963,121,301	$1,883,898,218	$7,626,999,171
DY6 (FFY17)	$4,963,489,095	$7,877,842,265	$1,952,365,880	$6,590,882,351
DY7 (FFY18)	$4,376,613,029	$7,981,456,175	$2,045,139,397	$7,558,319,972
DY8 (FFY19)	$4,764,851,003	$8,433,485,219	$2,107,971,149	$7,532,073,276

Note: The expenditures provided in this table have had CMS64 expenditures for direct payment programs (NAIP, QIPP, UHRIP) removed. This allows for a more standardized comparison of spending for the EGS. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.5 With Waiver Annual Expenditures by EGS Subcomponent.



Note: This figure shows each of the four subcomponents of EGS as a proportion of total EGS expenditures. The expenditures provided in this figure have had CMS64 expenditures for direct payment programs (NAIP, QIPP, UHRIP) removed. DY = Demonstration Year; FFY = Federal Fiscal Year.

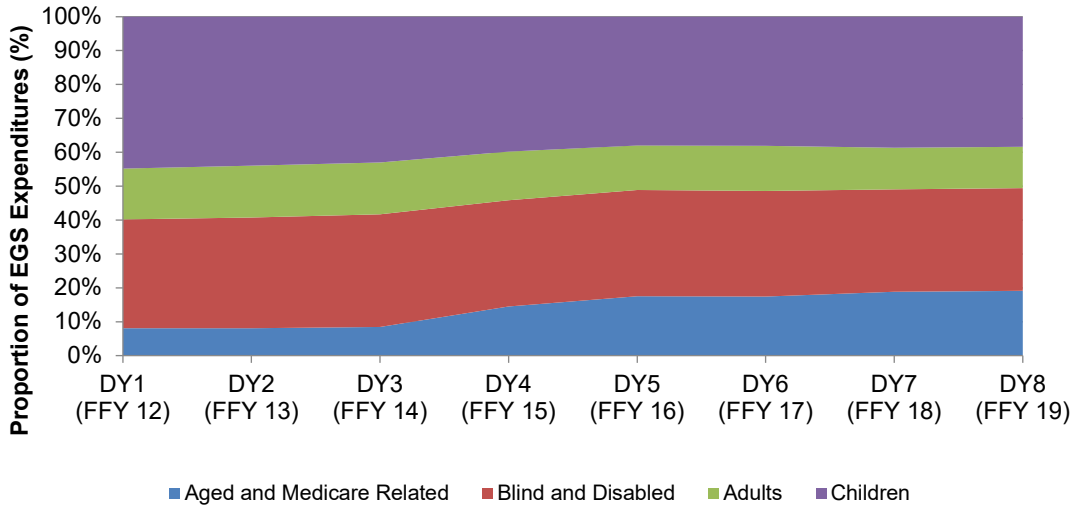
Table F.2.6 provides the amount of expenditures, and Figure F.2.6 shows the proportion of expenditures for EGS subcomponents of WOW.

Table F.2.6 Without Waiver Annual Expenditures by EGS Subcomponent.

	Aged and Medicare Related	Blind and Disabled	Adults	Children
DY1 (FFY12)	$1,672,219,286	$6,626,928,709	$3,095,202,596	$9,253,764,671
DY2 (FFY13)	$1,777,474,231	$7,156,659,413	$3,358,275,145	$9,643,302,903
DY3 (FFY14)	$1,935,824,003	$7,622,128,242	$3,493,565,328	$9,858,788,013
DY4 (FFY15)	$3,816,413,873	$8,302,635,124	$3,777,107,164	$10,509,241,403
DY5 (FFY16)	$4,978,845,414	$8,945,847,623	$3,749,632,600	$10,812,041,958
DY6 (FFY17)	$4,971,952,782	$8,853,645,215	$3,803,242,295	$10,838,874,816
DY7 (FFY18)	$5,340,592,179	$8,598,840,670	$3,495,499,658	$10,972,640,111
DY8 (FFY19)	$5,535,642,846	$8,787,746,076	$3,528,146,288	$11,131,603,835

Note: This table only includes the subcomponents of all EGS expenditures for the Without Waiver. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.6 Without Waiver Annual Expenditures by EGS Subcomponent.



Note: This figure shows each of the four subcomponents of EGS as a proportion of total EGS expenditures. DY = Demonstration Year; FFY = Federal Fiscal Year.

EGS on a PMPM Basis

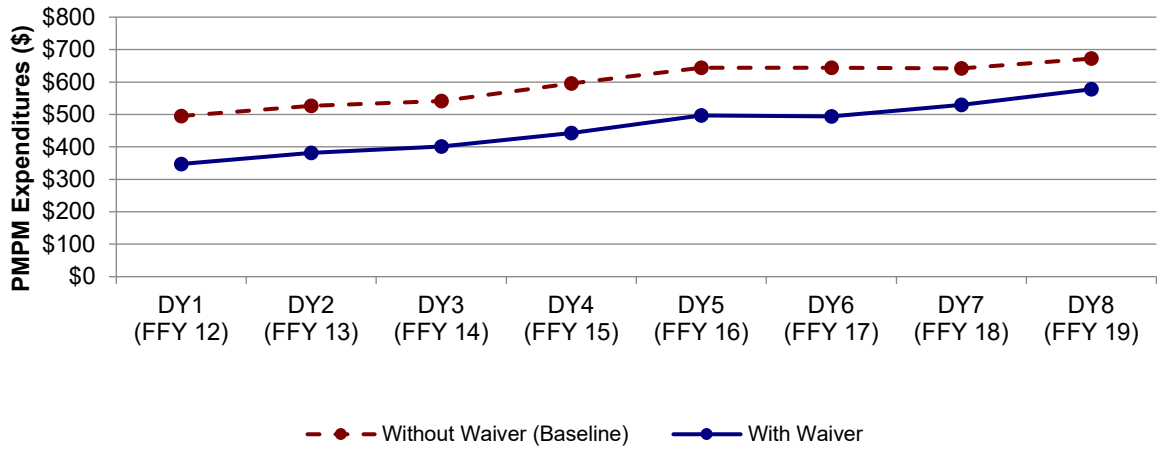
Table F.2.7 and Figure F.2.7 provide a comparison of EGS Expenditures for WOW and WW on a PMPM basis. An important point is that the PMPM basis includes the CMS64 spending for direct payment programs (NAIP, QIPP, UHRIP) included within the EGS expenditures. This is consistent with the methodology used by CMS, as it includes the full cost of the WW. It does make direct comparisons between WOW and WW misleading if the analysis was evaluating programs or outcomes to determine effectiveness or efficiency of expenditures. Since budget neutrality is focused only on a comparison of the amount of expenditures, this is a meaningful comparison. The final column of Table F.2.7 provides the PMPM Demonstration cost savings, which were $94.56 PMPM in DY8.

Table F.2.7 Eligible Groups Served on a PMPM Basis.

	Without Waiver (Baseline)	With Waiver	Difference (WOW - WW)
DY1 (FFY12)	$495.27	$347.44	$147.82
DY2 (FFY13)	$526.51	$381.99	$144.52
DY3 (FFY14)	$541.12	$401.09	$140.02
DY4 (FFY15)	$595.13	$442.88	$152.25
DY5 (FFY16)	$643.96	$496.81	$147.15
DY6 (FFY17)	$644.25	$493.57	$150.68
DY7 (FFY18)	$641.53	$529.54	$111.99
DY8 (FFY19)	$672.17	$577.61	$94.56

Note: This table includes all EGS expenditures expressed as PMPM. The WOW costs include CMS64 direct payment expenditures. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.7 Eligible Groups Served on a PMPM Basis.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

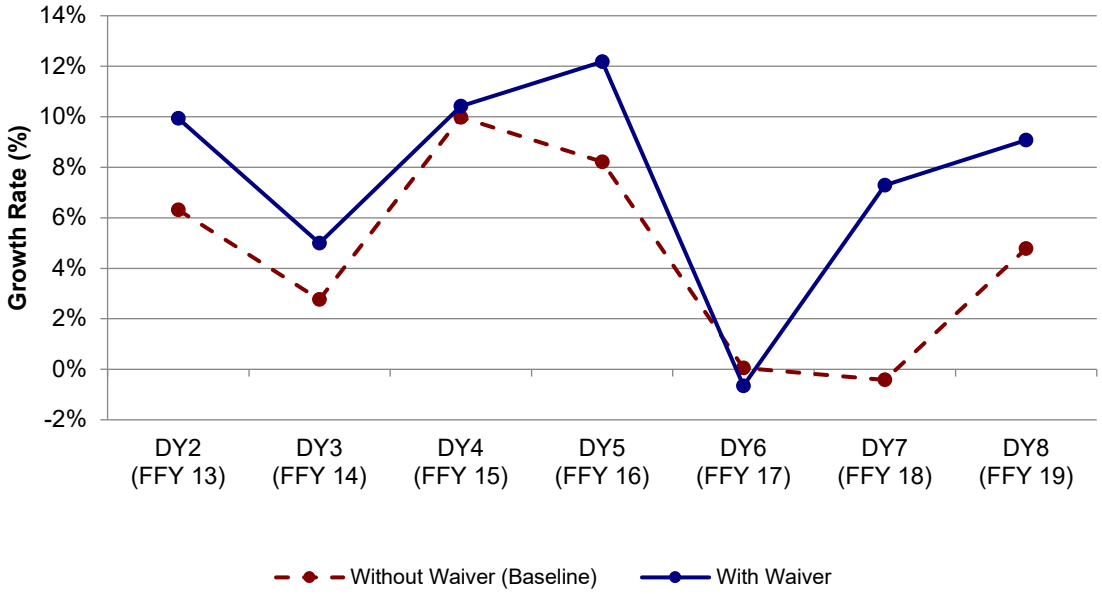
Table F.2.8 and Figure F.2.8 show the annual growth rates of the PMPM expenditures for the EGS on a PMPM basis. The WW annual growth rate was higher than the WOW annual growth rate for all by one DY (DY6). The average trend in PMPM expenditures for WOW expenditures was 4.46% and 7.53% for WW expenditures, an absolute difference of 3.07%.

Table F.2.8 Eligible Groups Served on a PMPM Basis–Annual Growth Rates.

	Without Waiver (Baseline)	With Waiver	Difference (WOW - WW)
DY1 (FFY12)	-	-	-
DY2 (FFY13)	6.31%	9.94%	-3.63%
DY3 (FFY14)	2.77%	5.00%	-2.23%
DY4 (FFY15)	9.98%	10.42%	-0.44%
DY5 (FFY16)	8.21%	12.18%	-3.97%
DY6 (FFY17)	0.05%	-0.65%	0.70%
DY7 (FFY18)	-0.42%	7.29%	-7.71%
DY8 (FFY19)	4.78%	9.08%	-4.30%

Note: Dash in table indicates no value since this is the base year. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.8 Eligible Groups Served on a PMPM Basis–Annual Growth Rates.



Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year.

Non-Eligible Groups Served

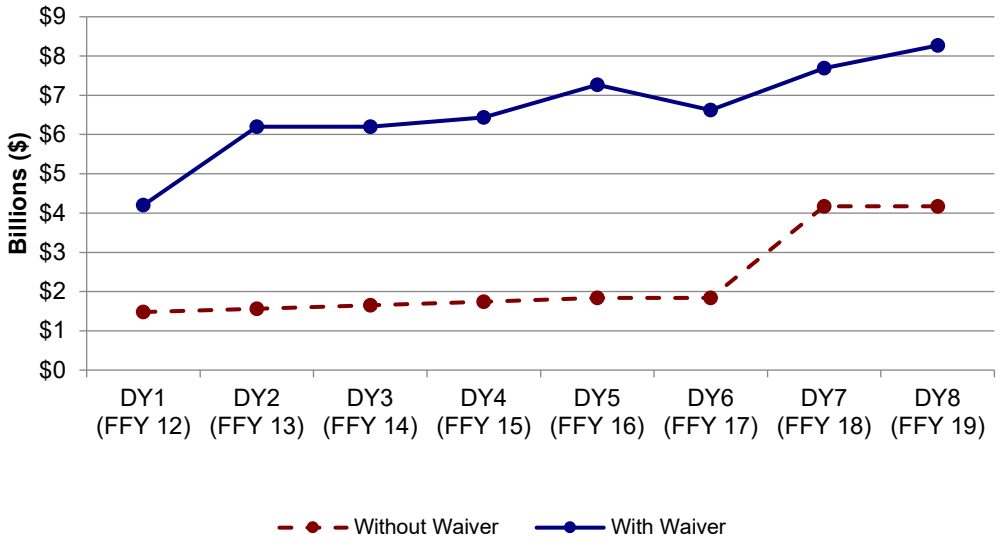
For WOW, Non-EGS expenditures include Other UPL programs, and for WW Non-EGS expenditures includes the Demonstration Funding Pools, the Network Access Improvement Project, and the Delivery System and Provider Payment Incentives. Table F.2.9 and Figure F.2.9 show that Non-EGS WW expenditures were consistently higher than WOW expenditures; however, the expenditures represented a much smaller proportion of overall total expenditures. The last column of Table F.2.9 provides the magnitude of the increase expenditures for the WW. The cost savings associated with MMC expansion are leveraged to administer new funding pools and direct payment programs not available prior to the Demonstration, so the increase in expenditures for the WW is expected and is the result of policy design.

Table F.2.9 Annual Expenditures across all Non-Eligible Groups Served.

	Without Waiver (Baseline)	With Waiver	Difference (WOW - WW)
DY1 (FFY12)	$1,479,059,891	$4,200,000,000	-$2,720,940,109
DY2 (FFY13)	$1,561,626,362	$6,200,000,000	-$4,638,373,638
DY3 (FFY14)	$1,648,854,564	$6,200,000,000	-$4,551,145,436
DY4 (FFY15)	$1,741,009,313	$6,434,046,628	-$4,693,037,315
DY5 (FFY16)	$1,838,370,522	$7,270,894,954	-$5,432,524,432
DY6 (FFY17)	$1,838,370,522	$6,624,954,260	-$4,786,583,738
DY7 (FFY18)	$4,172,873,016	$7,688,944,892	-$3,516,071,876
DY8 (FFY19)	$4,172,873,016	$8,269,373,995	-$4,096,500,978

Note: For WW this includes the Demonstration Funding Pools, Network Access Improvement Project, and the Delivery System and Provider Payment Incentives. For WOW, this includes Other UPL Programs. DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.9 Annual Expenditures across all Non-Eligible Groups Served.

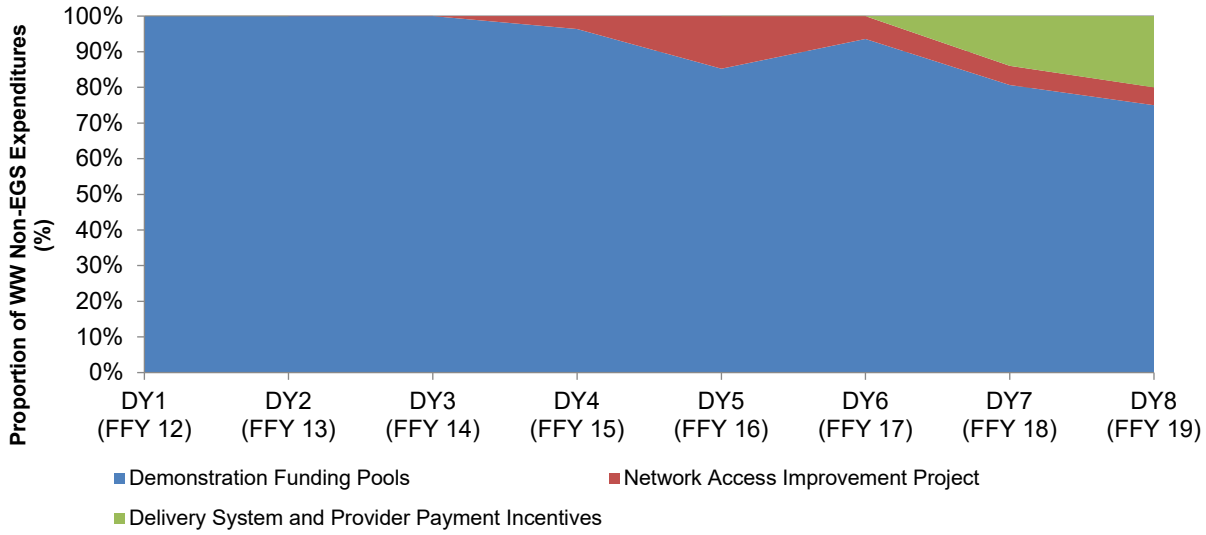


Note: WOW costs are projected costs if the Demonstration did not exist, WW costs reflect actual costs incurred under the Demonstration. DY = Demonstration Year; FFY = Federal Fiscal Year. For WW this includes the Demonstration Funding Pools, Network Access Improvement Project, and the Delivery System and Provider Payment Incentives. For WOW, this includes Other UPL Programs.

Details of Non-EGS Components and Subcomponents for With Waiver.

This section provides additional detail for the WW Non-EGS subcomponents: Demonstration Funding Pools, Network Access Improvement Project (NAIP), and Delivery System and Provider Payment Incentives. Since there is not a meaningful comparison to be made between these subcomponents of EGS for WW and WOW, the intent here is to provide an overview of the relative proportion of spending for these categories. Figure F.2.10 shows the largest subcomponent on Non-EGS expenditures was the Demonstration Funding Pools. NAIP was funded longer than Delivery System and Provider Payment Incentives, but starting in DY7, Delivery System and Provider Payment Incentives represented a larger proportion of Non-EGS expenditures than NAIP.

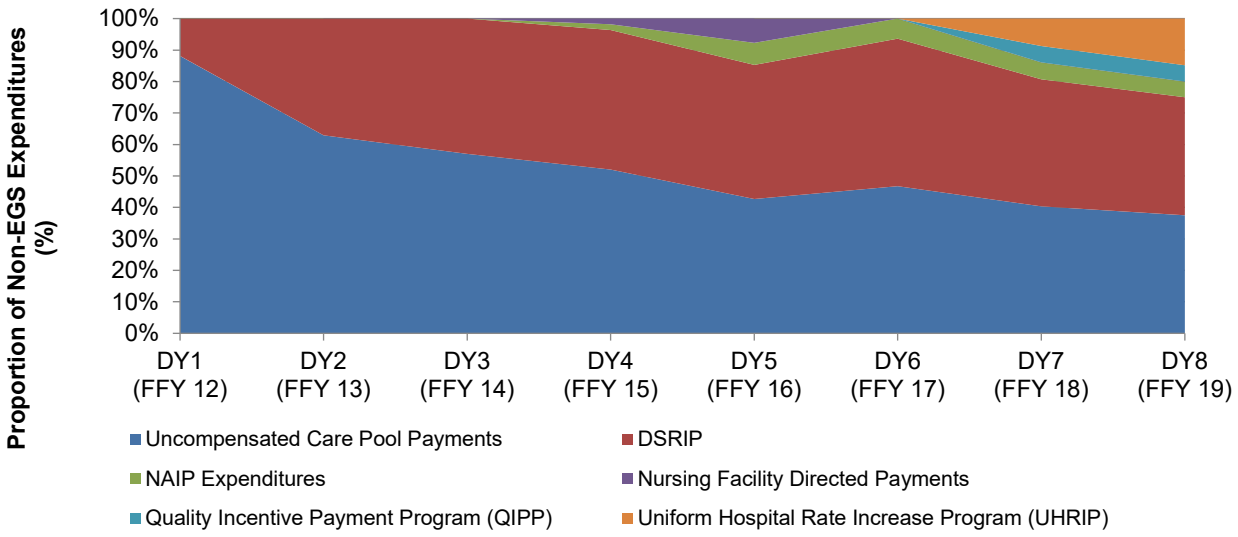
Figure F.2.10 Major Components of Non-Eligible Groups Served (WW).



Note: DY = Demonstration Year; FFY = Federal Fiscal Year.

Figure F.2.11 builds on the previous figure and breaks down the three major categories into their individual subcomponents. The Demonstration Funding Pool is composed of the Delivery System Reform Incentive Payment Pool and Uncompensated Care Pool. The Network Access Improvement Project includes NAIP Expenditures and Nursing Facility Direct Payments. Finally, the Delivery System and Provider Payment Incentives is composed of the Quality Incentive Payment Program and the Uniform Hospital Rate Increase Program. The Uncompensated Care Pool and DSRIP represented the largest Non-EGS WW expenditures.

Figure F.2.11 Detailed Subcomponents of Non-Eligible Groups Served (WW).



Note: DY = Demonstration Year; FFY = Federal Fiscal Year.

APPENDIX G. EVALUATION DESIGN PLAN REVISION V5.1

Following is the evaluation design plan revision v5.1 that was submitted to CMS on January 8, 2021 for approval with no changes made to title, page numbers, or table of content to minimize confusion. Thus, it includes its own appendices as well.

Texas Healthcare Transformation and Quality Improvement Program Demonstration Waiver Evaluation Design Plan

As Required by

Centers for Medicare and Medicaid Services

Texas Health and Human Services Commission

Center for Analytics and Decision Support

Revision 5.1
Submitted to CMS January 8, 2021
Pending CMS Approval

TEXAS
Health and Human Services

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Background and Introduction

Medicaid is an important source of health care coverage in Texas. In 2015, the Texas Health and Human Services Commission (HHSC) provided Medicaid benefits to approximately one in seven Texans, or 4.06 million people (Texas Health and Human Services Commission, 2017). Medicaid is jointly funded by the federal and state governments. The Texas Medicaid program cost the state and federal governments a combined total of approximately $29 billion in 2015, up from $10 billion in 2000, accounting for 28.6 percent and 20.2 percent of the state budget in 2015 and 2000, respectively (Texas Health and Human Services Commission, 2017).

The Texas Medicaid program continues to grow in the number of individuals eligible for services and the types of services provided. The biggest issue facing the Texas Medicaid program is that of coordination of the healthcare system, specifically how to provide coordinated, high quality services to over four million people while containing costs. The lack of coordination of care can lead to less effective use of care, use of more expensive resources, and ultimately increased costs for a program that already represents over one-quarter of the state's annual budget. Additionally, HHSC provides hospitals supplemental payments to make up for the unreimbursed cost of services provided to Medicaid and uninsured patients. Previously these payments were made under the Upper Payment Limit (UPL) system, and without it, many providers would not be able to afford to provide services to Medicaid clients and patients who cannot afford to pay. These payments are an important source of funding for safety net providers.

Given the scope and importance of the Medicaid program to provide safety net care to low-income Texans, it is vital to consider adaptations to improve efficiency and contain costs while maintaining access to, coordination, and quality of care. Texas had success implementing Medicaid managed care (MMC) in urban areas prior to expansion to rural areas in 2012. MMC in urban areas resulted in cost savings as compared to the traditional fee-for-service (FFS) delivery model, while maintaining or increasing access to care and quality of services for Medicaid clients.

Given the history of success with MMC, the 82nd Texas Legislature, 2011, directed HHSC to expand Medicaid managed care (Texas Health and Human Services Commission, 2017) statewide from predominantly urban areas to include rural

areas, additional populations, and services traditionally provided through a FFS or primary care case management (PCCM) service delivery model. Additionally, the Legislature "directed HHSC to preserve federal hospital funding historically received as supplemental payments under the UPL program" (Texas Health and Human Services Commission, 2017). The combination of these two directives, however, was not allowable under federal regulations enforced by the Centers for Medicare and Medicaid Services (CMS).

To address these issues and execute the directives of the Legislature, HHSC applied for an 1115 demonstration waiver. This waiver allows Texas to continue to expand MMC and implement the Delivery System Reform Incentive Payment (DSRIP) and Uncompensated Care (UC) funding pools. With a focus on value-based care, the coordination and cost effectiveness of care and health outcomes are expected to improve. Additionally, healthcare system innovations and improvements realized through DSRIP are expected to result in more coordinated, higher quality, cost-effective care for the Medicaid and low-income uninsured (MLIU) population in Texas. The improvements to the system through DSRIP are, in turn, expected to result in a slower rate of growth in UC costs borne by providers.

This waiver, the Texas Healthcare Transformation and Quality Improvement Program (Demonstration), was initially approved by CMS in December 2011 for five years through September 30, 2016. A 15-month extension was granted from October 1, 2016 through December 31, 2017. The current version of the Demonstration was approved on December 21, 2017, renewing the waiver for five years through September 30, 2022.

The overarching objectives of the Demonstration have remained consistent since the initial approval:

- Expand risk-based managed care to new populations and services.
- Support the development and maintenance of a coordinated care delivery system.
- Improve outcomes while containing cost growth.
- Transition to quality-based payment systems across managed care and providers.

To achieve these objectives, HHSC ended the UPL program "for services under managed care capitation and for residual FFS Medicaid services" (Texas Health and Human Services Commission, n.d.). The former UPL funds and savings from the expansion of MMC are combined to create two new funding pools for providers. These two funding pools and MMC comprise the three components of the Demonstration:

- Delivery System Reform Incentive Payment (DSRIP) Pool
- Uncompensated Care (UC) Pool
- Medicaid managed care (MMC) expansion

The current evaluation, as outlined in this evaluation design plan, focuses primarily on the Demonstration renewal timeframe, building upon the evaluation conducted during the initial approval timeframe (Texas Health and Human Services Commission, 2017). This evaluation aims to evaluate the DSRIP Pool throughout demonstration years (DY) 7-11, the five years covered through this renewal (appending previous years, if feasible), UC through federal fiscal year (FFY) 2021 (ten years of the Demonstration), and MMC populations and services carved into MMC during and after FFY 2015 through FFY 2022. The various timeframes for each component reflect the anticipated availability of data for each Demonstration component.

The Demonstration components have remained consistent throughout the life of the Demonstration, but operational activities have evolved over time. The DSRIP component has experienced the most change; requirements related to the UC Pool will change in FFY 2020, and MMC has continued to expand to include additional populations and services (Figure 1).

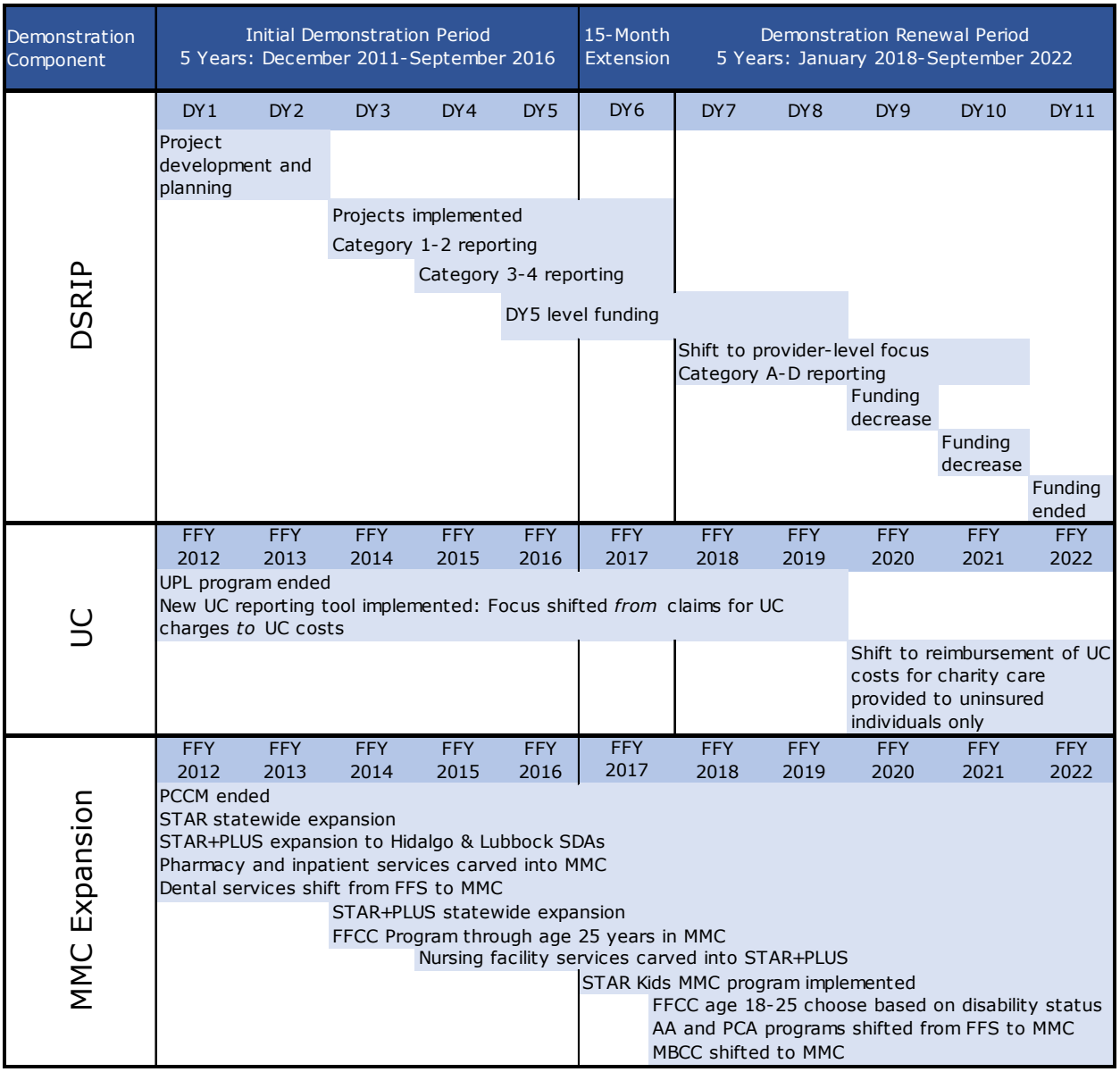


Figure 1. Demonstration Overview

Note. DSRIP=Delivery System Reform Incentive Payment; UC=Uncompensated Care; MMC=Medicaid managed care; DY=Demonstration year, October 1-September 30; FFY=Federal fiscal year, October 1-September 30; UPL=Upper Payment Limit; PCCM=Primary care case management; STAR=MMC program primarily serving children and pregnant women; STAR+PLUS=MMC program serving aged and disabled clients; SDA=Service Delivery Area; FFS=Fee-for-service; FFCC=Former Foster Care Children; STAR Kids=MMC program serving disabled individuals 20 years and younger; AA=Adoption Assistance; PCA=Permanency Care Assistance; MBCC=Medicaid for Breast and Cervical Cancer.

Delivery System Reform Incentive Payment Pool

The DSRIP Pool provides incentive payments to providers who engage in reforms that improve access to care, quality of patient care, population health outcomes, and reduce per capita costs. To participate in DSRIP, performing providers must be members of their local Regional Healthcare Partnership (RHP). There are 20 geographically distinct RHPs throughout the state through which the DSRIP and UC components of the Demonstration are implemented (Figure 2).

Performing providers, broadly defined, initially selected improvement projects from a menu aligned with the reform objectives of the state and addressed local needs.

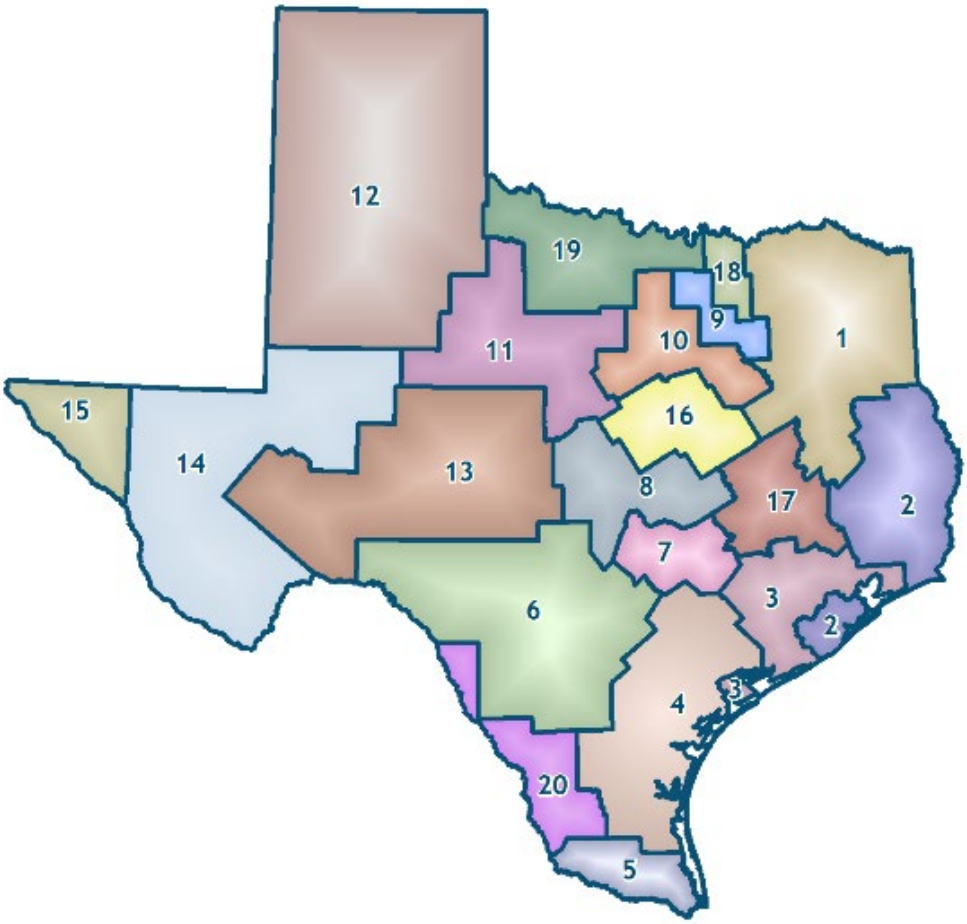


Figure 2. Texas 20 Regional Healthcare Partnerships

These projects were categorized as either Category 1, Infrastructure Development, or Category 2, Program Innovation and Redesign. Performing providers reported on Category 1 and 2 process measures and Category 3 quality improvement outcomes for each of their projects. Certain performing providers, namely large hospitals, also reported on Category 4 population-based measures.

A major change from the initial and extension Demonstration timeframes (DY1-6) to the renewal timeframe (DY7-11) is the shift from *project-level* reporting to *provider-level* reporting. This change reflects an effort to streamline reporting for performing providers and ease the administrative burden of semi-annual reporting on performing providers and HHSC. To illustrate the scope of the DSRIP program, in DY5 there were over 1,400 projects implemented by approximately 300 performing providers. This shift to provider-level reporting is accompanied by a shift from reporting on isolated metrics and measures to reporting on Measure Bundles - sets of measures clinically related to one another - by hospitals and physician groups. Additionally, unique measures were developed for both community mental health centers (CMHCs) and local health departments (LHDs). In DY7, performing providers will submit a description of their "provider system" as well as descriptions of Core Activities they will implement to achieve outcomes in their pre-selected Measure Bundles and Measures. While these Core Activities may include DSRIP projects continued from the previous time period, outcomes will be measured at the provider level rather than the Core Activity or project level. These changes will reduce the reporting burden and distill the number of outcomes on which performing providers can report as compared to reporting in the initial and extension timeframes.

This shift in reporting requirements is reflected in new reporting categories. The DSRIP reporting will no longer include Category 1 or Category 2 process measures, or Category 3 outcome measures. Population-level outcomes will still be reported, but the Category 4 reporting that was only required of hospitals is expanding to include all performing provider types. Now reporting will be in categories A-D (Texas Health and Human Services Commission, 2018):

- **Category A** includes descriptive reporting on Core Activities, alternative payment model (APM) efforts, collaborative activities, and certain providers will report costs and savings associated with at least one Core Activity.

- **Category B** reporting reflects the MLIU population served by the performing provider.

- **Category C** reporting includes outcomes grouped together in Measure Bundles for hospital and physician group performing providers and Measures for LHD and CMHC performing providers. Performing providers will report baseline levels based on calendar year 2017 for their selected Measure Bundles and Measures.

- **Category D** measures make up statewide Measure Bundles to allow for population-level reporting by all performing provider types. The measures will be calculated by the state's External Quality Review Organization (EQRO), the Institute for Child Health Policy. Potentially preventable events will be calculated for each hospital and RHP as well as other indicators of population health specific to the other performing provider types. Performing providers will be required to respond qualitatively to the results specific to their hospital and/or RHP (Texas Health and Human Services Commission, 2018).

In addition to the shift from project- to provider-level reporting and newly established reporting requirements, the DSRIP program will be phased out by the end of the renewal timeframe. This reflects the "time-limited" nature of DSRIP as stated in the Special Terms and Conditions (STCs), the contractual agreement between HHSC and CMS for the Demonstration (Centers for Medicare and Medicaid Services, 2017). The DSRIP program will operate with DY5 level funding in DY7-8, the first two years of the renewal timeframe, but funding will be reduced in DY9, again in DY10, and the DSRIP Pool will be terminated in DY11. Given this timeline, performing providers are encouraged to explore and establish APMs to sustain DSRIP Core Activities upon the termination of DSRIP funding.

Uncompensated Care Payment Pool

Upon implementation of the Demonstration, the previously utilized UPL was replaced with the UC payment pool. This payment pool reimburses providers for UC costs incurred as reported in the annual Disproportionate Share Hospital/Uncompensated Care (DSH/UC) application (Texas Health and Human Services Commission, 2017). Similar to the prior UPL program, the UC payment pool provides a supplemental payment to providers, but is based on UC costs, rather than claims for UC charges.

To receive payments from the UC Pool, a provider must complete an application listing its uncompensated costs for charity care services provided. A hospital may claim uncompensated costs for inpatient and outpatient services, as well as related costs for physician, and pharmacy services.

The UC Pool payment methodology has remained steady since DY1, but two challenges remain. The first challenge is the two-year data lag needed to finalize and validate UC costs at the state and federal levels. Providers submit UC requests annually, but these requests are based on data from two years prior. In the initial evaluation, only one year of post-UC data were available for analysis in the Final Evaluation Report (Texas Health and Human Services Commission, 2017). The current evaluation aims to continue the previous analysis (Texas Health and Human Services Commission, 2017), but the UC rules will change in FFY 2020 such that UC Pool payments will serve to reimburse uncompensated costs for charity care provided to uninsured individuals only (as opposed to uninsured and Medicaid eligible individuals). These changes are to be negotiated between HHSC and CMS as a part of the Demonstration renewal to reflect the application of updated federal policies (Centers for Medicare and Medicaid Services, 2017).

Medicaid Managed Care

The MMC program has been vastly expanded throughout the Demonstration timeframe. Upon implementation of the Demonstration in FFY 2012, the PCCM health care delivery model ended; the STAR MMC program, providing coverage primarily to children and pregnant women, expanded statewide; and the STAR+PLUS MMC program, which provides services to the aged and disabled population, expanded to two new service delivery areas (SDAs). Additionally, pharmacy benefits and non-behavioral health inpatient hospital stays were carved into MMC and the dental program shifted from a FFS to a MMC health care delivery model.

Through a series of waiver amendments, several other populations and services have transitioned to MMC from FFS. In FFY 2014 STAR+PLUS expanded statewide to provide coverage in Medicaid Rural Service Areas and to non-dual eligible individuals with intellectual and developmental disabilities receiving services through a 1915(C) waiver or residing in an intermediate care facility. In FFY 2015 nursing facility services were carved into MMC. A new MMC program, STAR Kids, was established for disabled children and adults 20 years old and younger in FFY 2016.

On September 1, 2017, smaller program populations experienced changes in their Medicaid service delivery. These changed to the MMC program include: Children in the Adoption Assistance (AA) and Permanency Care Assistance (PCA) programs became eligible for STAR or STAR Kids; Former Foster Care Children (FFCC) ages 18 to 20 years, who meet STAR Kids criteria may choose between STAR Health and STAR Kids, and FFCC, ages 21 to 26, who meet STAR+PLUS criteria will be enrolled in STAR+PLUS; and Medicaid for Breast and Cervical Cancer (MBCC) program shifted from the FFS health care delivery model to STAR+PLUS.

The CMS and HHSC are not making any substantive changes to the requirements of the MMC programs with the renewal of the Demonstration. Therefore, the evaluation of the continued expansion of MMC through the Demonstration will focus on the most recently incorporated populations (AA, PCA, FFCC, MBCC, STAR Kids[3]) and continued evaluation of dental and nursing facility services. These new and unique MMC clients provide a natural experiment to compare the FFS and MMC health care delivery models for populations with challenging and diverse health needs.

Evaluation Implications

The evaluation design plan for the initial approval period of the Demonstration has been updated to reflect changes to the Demonstration as described above. The Final Evaluation Report for the initial Demonstration approval period included a comparative case study of 10 DSRIP projects representing 10 "research regions" covering the entire state; a social network analysis measuring change in collaboration at the RHP level; a descriptive study of the changes in the composition of UC from 2012 through 2015; a pre/post comparison of access to, coordination, and quality of care for the STAR and STAR+PLUS populations as MMC expanded statewide; and a stakeholder survey (Texas Health and Human Services Commission, 2017).

The proposed evaluation design plan expands its evaluation of DSRIP to include an analysis of DSRIP provider reporting of clinical population health measures and a comparison of specific outcomes among Medicaid clients served by DSRIP providers

[3] On November 1, 2016, Medicaid managed care was expanded to children and young adults (20 years and younger) with disabilities. A pre/post implementation evaluation is being conducted by Texas External Quality Review Organization, the University of Florida Institute for Child Health Policy. Results from all deliverables (last deliverable due May 3, 2019) may inform additional Demonstration evaluation questions, hypotheses, and analyses.

compared to clients of non-DSRIP providers. The social network analysis will continue with the addition of a new type of connection among RHP members through health information exchanges (HIEs). The proposed UC evaluation continues to analyze the percentage of UC costs reimbursed through UC payments and expands to examine the UC growth rate over time. The UC program will undergo changes starting in FFY 2020, but those changes are still under negotiation so the evaluation design plan may be amended, if necessary, to accommodate the revised UC program. The MMC evaluation continues to be a pre/post evaluation of access to, coordination, and quality of care measures, but is limited to populations and services new to MMC (i.e., AA, PCA, MBCC), those not included in the previous evaluation due to timing of the carve-in (i.e., nursing facility services (NF)), and those shifting from one MMC program to another (i.e., FFCC). STAR Kids, a MMC program for disabled children launched in SFY 2016, is currently being evaluated by the EQRO. If additional evaluation issues remain, this evaluation design plan may be revised to include this MMC population as well. Due to challenges with the sampling frame used for the stakeholder survey and a low response rate, the previously conducted stakeholder survey is not proposed for the renewal period. HHSC is currently investigating the feasibility of including the MMC sub-populations included in this evaluation in the biannual Consumer Assessment of Healthcare Providers and Systems (CAHPS) surveys conducted for the STAR and STAR+PLUS populations by the EQRO. Finally, the Demonstration will be evaluated overall by analyzing the transition to quality-based payment systems, changes in potentially preventable emergency department (ED) utilization, and overall costs.

Evaluation Questions and Hypotheses

Given the focus of the evaluation is to determine if the Demonstration achieved its intended objectives through the three components, the proposed evaluation questions were developed to align with the Demonstration objectives (Table 1).

Table 1. Demonstration Alignment

Demonstration Objective	Demonstration Component	Proposed Evaluation Question(s)
Expand risk-based managed care to new populations and services	MMC	Did the expansion of the MMC health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?
Support the development and maintenance of a coordinated care delivery system	DSRIP MMC	Did the DSRIP program incentivize changes to transform the health care system for the MLIU population in Texas? Did the Demonstration transform the health care system for the MLIU population in Texas?
Improve outcomes while containing cost growth	DSRIP MMC UC	Did the Demonstration impact unreimbursed costs associated with the provision of health care to the MLIU population for UC providers?
Transition to quality-based payment systems across managed care and providers	DSRIP MMC	Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?

Note. MMC=Medicaid managed care; DSRIP=Delivery System Reform Incentive Payment; MLIU=Medicaid and low-income uninsured; UC=Uncompensated Care.

Logic Model

The logic model (Figure 3) illustrates the theory of change, or the pathways through which the Demonstration will work to achieve these objectives during the renewal timeframe (DY7-11, FFY 2018-2022).

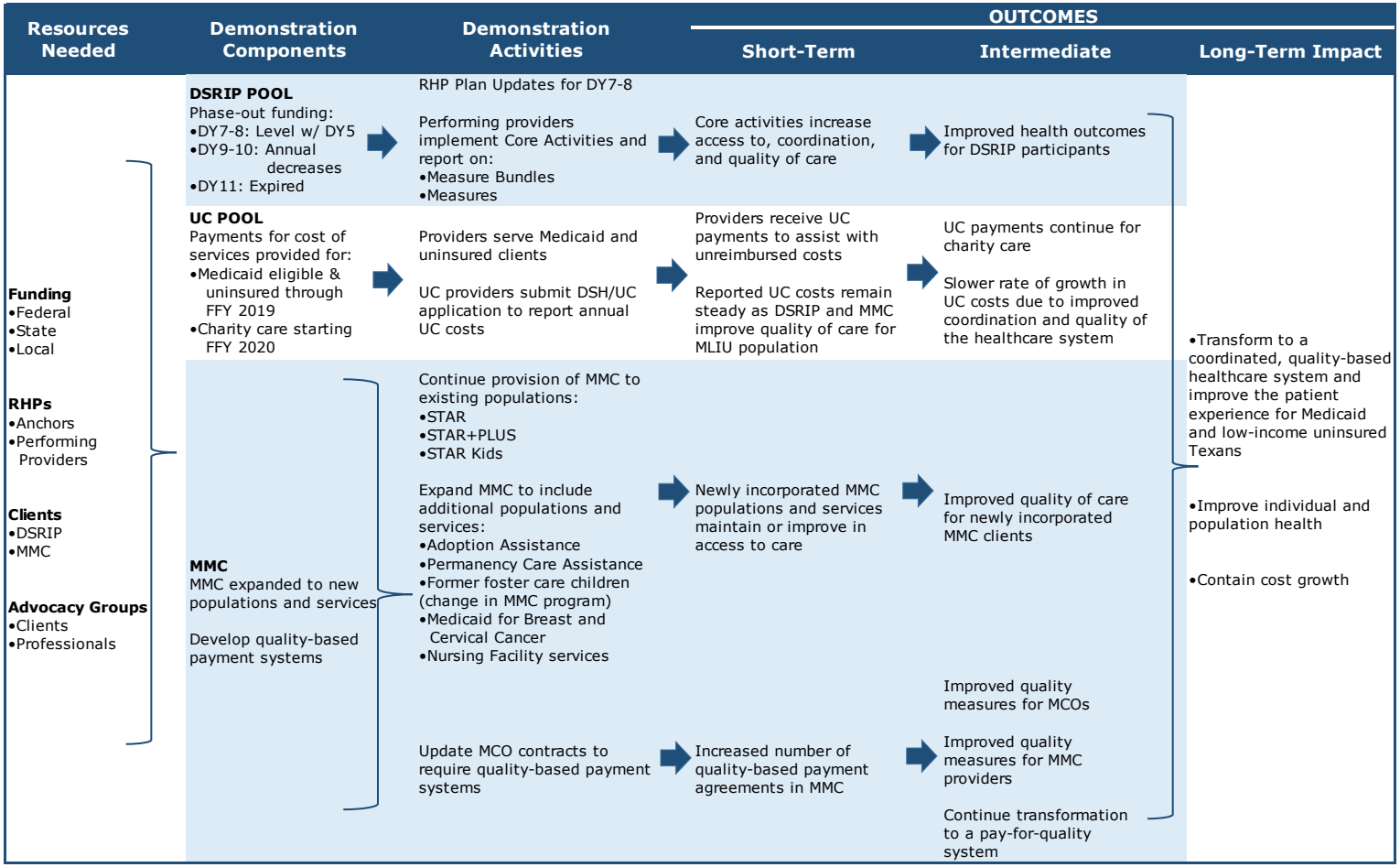


Figure 3. Demonstration Logic Model: Renewal Timeframe

Note. RHP=Regional Health care Partnership; DSRIP=Delivery System Reform Incentive Payment; MMC=Medicaid managed care; DY=Demonstration year, October 1-September 30; UC=Uncompensated Care; FFY=Federal fiscal year, October 1-September 30; DSH=Disproportionate Share Hospital; MLIU=Medicaid and low-income uninsured; STAR=MMC program for children and pregnant women; STAR+PLUS=MMC program for aged and disabled age 21 and older; STAR Kids=MMC program for disabled through 20 years; MCO=Managed care organization.

The Demonstration is carried out through three components described previously, DSRIP, UC, and MMC. As illustrated in the logic model for the renewal timeframe (DY7-11, FFY 2018-2022), DSRIP performing providers implement Core Activities working toward quality-related outcomes as indicated through selected Measure Bundles and Measures (e.g., chronic disease management, reduction of unnecessary ED visits, etc.). Ultimately, implementation of these Core Activities will lead to improved quality of care and health outcomes for individuals served through the DSRIP Provider Systems. UC providers deliver care to the MLIU population, sometimes without being paid for their services. These providers submit the UC application to request reimbursement for the cost of UC provided, allowing them to continue to provide much needed safety net care to the MLIU population who otherwise may not receive services. Due to the improvements in the health care system, the growth rate of UC costs is expected to slow over time.

Finally, operating in parallel with DSRIP and UC efforts, MMC continues to expand to include additional populations and services. Access to care will be maintained or improved in MMC as compared to FFS. Quality of care is expected to improve for clients in MMC due to increased efficiency and coordination of care. Finally, managed care organizations (MCOs) and providers will be required to move toward quality-based payment systems (i.e., alternative payment models) such that payments are (at least partially) contingent upon meeting certain quality outcomes. Overall, through the simultaneous implementation of DSRIP, UC, and the expansion of MMC, it is anticipated that these efforts to improve access, coordination, and quality of care will result in a transformed health care system and improved population health for MLIU individuals, all while containing cost growth.

Based on this proposed theory of change, the Demonstration evaluation aims to examine:

- How DSRIP activities have influenced collaboration among providers, improved quality of care, and individual and population health outcomes.
- The impact of the Demonstration on UC costs over time.
- The impact of the Demonstration on access to care, coordination of care, quality of care, and health outcomes among MMC clients.
- The impact of the Demonstration on the health care system for the MLIU population in terms of payment reform and population health outcomes.

To accomplish these aims and determine if the Demonstration meets its objectives, the proposed evaluation design plan includes five evaluation questions operationalized through corresponding hypotheses and associated measures. The methods used to test the hypotheses and answer the evaluation questions are described in the Methodology section. Data sources and technical specifications for measures are described in Appendix C.

Evaluation Questions

The proposed evaluation questions address the three Demonstration components and promote the objectives of Title XIX. All study populations and related services studied through these questions are Medicaid-eligible populations or services through the State Plan[4] and/or authorities specifically granted through this Demonstration.

The evaluation questions and hypotheses are grouped by Demonstration component, with one question each pertaining to DSRIP, UC, MMC, and two overall questions. Each evaluation question is addressed through a minimum of one corresponding hypothesis and measure.

Evaluation Question 1: Did the DSRIP program incentivize changes to transform the health care system for the MLIU population in Texas?

Hypothesis 1.1 DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers.

Hypothesis 1.2 DSRIP incentivized performing providers to improve continuity, quality, and cost of care for Medicaid clients with diabetes.

Hypothesis 1.3 DSRIP incentivized performing providers to improve quality-related outcomes, specified as Category C population-based clinical outcome measures.

Hypothesis 1.4 DSRIP transformed the health care system, resulting in improvements in population health, specified as DSRIP Category D outcomes.

[4] The Medicaid State Plan describes the "nature and scope" of the Texas Medicaid program. It is available through: https://hhs.texas.gov/services/health/medicaid-chip/about-medicaid-chip/state-plan

Evaluation Question 2: Did the Demonstration impact unreimbursed costs associated with the provision of care to the MLIU population for UC providers?

Hypothesis 2.1 The percentage of UC costs reimbursed through UC payments for each type of UC (overall, Medicaid shortfall, uninsured shortfall) will decrease throughout DY1-DY8.

Hypothesis 2.2 The UC cost growth rate will slow over time for UC providers participating in the Demonstration.

Evaluation Question 3: Did the expansion of the MMC health care delivery model to additional populations and services improve healthcare (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?

Hypothesis 3.1 Access to care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Hypothesis 3.2 Care coordination will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Hypothesis 3.3 Quality of care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Hypothesis 3.4 Health and health care outcomes will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Hypothesis 3.5 Client satisfaction will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Evaluation Question 4: Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?

Hypothesis 4.1 The Demonstration will result in the development and/or implementation of a variety of APMs in Texas Medicaid.

Evaluation Question 5: Did the Demonstration transform the health care system for the MLIU population in Texas?

Hypothesis 5.1 The Demonstration will result in a reduction of potentially preventable ED use for the MLIU population.

Hypothesis 5.2 The Demonstration will result in overall cost savings as compared to the Medicaid program without the Demonstration, as shown in the budget neutrality calculation.

Methodology

The Demonstration evaluation design plan includes 5 evaluation questions and 14 hypotheses that explore and examine the effectiveness and impact of the Demonstration through a set of sentinel outcome measures collected at select times throughout the Demonstration timeframe. Given the multi-pronged approach of health care transformation (i.e., DSRIP, UC, MMC), the evaluation plans to capture outcome measures for each Demonstration component as well as measure the overall impact of all Demonstration components on common population health outcome measures (e.g., potentially preventable ED utilization).

The Methodology section is divided into four major sections to describe the proposed evaluation design for each component of the Demonstration: DSRIP, UC, MMC, and overall. Methods for each component include: Study population, data sources and collection plan, analytic methods, proposed measures, and methodological limitations. Following the evaluation design for each component are sections that apply to the evaluation of the Demonstration overall: Special Methodological Considerations and Communication, Dissemination, and Reporting.

The technical specifications for each evaluation measure are described in Appendix C: Detailed Tables. Specific details include the measure definition, study population, measure steward, technical specifications, exclusion criteria, data source or collection method, comparison group or subgroups, analytic methods, and benchmark, as appropriate for each individual measure. Although methodological plans for addressing each question are provided, these plans may change as key data sources are assessed for completeness, level of required detail, and necessary quality required for the proposed analyses. Changes to the evaluation design plan will be documented in Appendix A: Document History Log.

Data, analytic methods, and reporting will meet traditional standards of scientific and academic rigor, as appropriate and feasible for each aspect of the evaluation: Evaluation design, data collection and analysis, and the interpretation and reporting of findings. The evaluation will use primary data along with the best available secondary data, and will report the respective limitations and their effects on interpreting the results.

DSRIP Evaluation Methods

A mixed-methods approach will be used to evaluate four hypotheses specific to the DSRIP component of the Demonstration. Sections following this overview provide more detail regarding the proposed measures, study populations, data sources/data collection methods, and proposed analytic methods.

DSRIP Proposed Measures

A measure, or a series of measures, has been selected or developed to operationalize each hypothesis. Table 2 provides an overview of all DSRIP-specific evaluation questions and hypotheses aligned with their respective measures. Specific details regarding each of the proposed measures can be found in Appendix C: Detailed Tables.

Table 2. Delivery System Reform Incentive Payment Evaluation Design Overview

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
Evaluation Question 1: To what extent did the DSRIP program incentivize changes to transform the health care system for the MLIU population in Texas?				
1.1 DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers.	1.1.1 Type of collaboration 1.1.2 Number of ties 1.1.3 Strength of ties (multiplexity) 1.1.4 Density 1.1.5 Centralization 1.1.6 Attitude toward collaboration	• DSRIP performing providers	• Social network analysis survey • Learning collaborative reporting, if necessary	• Social network analysis • Descriptive statistics, including trend analysis with DY2-5 data, if possible • Thematic content analysis of open-ended responses
	1.1.7 HIE membership 1.1.8 Use of HIE data for DSRIP reporting	• DSRIP performing providers	• DSRIP reporting	• Descriptive statistics: frequency of HIE membership
1.2 DSRIP incentivized performing providers to improve continuity, quality, and cost of care for Medicaid clients with diabetes.	1.2.1 Usual provider of care 1.2.2 Interval between provider visits 1.2.3 Testing HbA1c levels 1.2.4 Diabetes medication adherence 1.2.5 ED visits due to diabetes 1.2.6 Cost of care	• Medicaid clients served by DSRIP providers • Medicaid clients served by non-DSRIP providers	• FFS claims and MMC encounter data • Member-level enrollment files • Member-level pharmacy data	• Difference-in-difference

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
1.3 DSRIP incentivized performing providers to maintain or improve quality-related outcomes, specified as Category C population-based clinical outcome measures.	Category C Measures*: 1.3.1 A1-508: Rate of ED visits for diabetes 1.3.2 A2-509: Rate of ED visits for CHF, angina, and hypertension 1.3.3 H2-510 / L1-387 / M1-387: Rate of ED visits for BH and SA 1.3.4 C1-502: Adult acute composite indicator 1.3.5 D1-503: Child acute composite indicator	• DSRIP performing providers	• DSRIP reporting • RHP plan update • DSRIP administrative data	• Descriptive trend analysis • Hierarchical linear modeling, if feasible
1.4 DSRIP transformed the health care system, resulting in improvements in population health, specified as DSRIP Category D outcomes.	Category 4/D Measures*: 1.4.1 PPAs 1.4.2 PPRs 1.4.3 PPCs 1.4.4 PPVs	• DSRIP performing providers	• DSRIP reporting	• Descriptive trend analysis
	1.4.5 Category D-related activities	• DSRIP performing providers	• DSRIP reporting	• Thematic content analysis • Descriptive statistics, if feasible

Note. DSRIP=Delivery System Reform Incentive Payment; MLIU=Medicaid and low-income uninsured; DY=Demonstration year, October 1-September 30; HIE=Health information exchange; HbA1c = Glycosylated Hemoglobin, Type A1C; ED=Emergency department; CHF=Congestive heart failure; BH=Behavioral health; SA=Substance abuse; RHP=Regional Healthcare Partnership; PPA=Potentially preventable admission; PPR=Potentially preventable readmission; PPC=Potentially preventable complication; PPV=Potentially preventable ED visit.

*Selected Category C and Category D measures from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018).

DSRIP Study Populations

The primary unit of analysis for DSRIP outcomes is the performing provider, which includes hospitals, CMHCs, LHDs, and physician practices participating in the DSRIP program. While DSRIP participants cannot be directly identified, Medicaid clients seen by DSRIP providers and non-DSRIP providers will be used to approximate client-level outcomes related to DSRIP.

- **DSRIP Performing providers** – Providers who are eligible to receive DSRIP incentive payments must have a current Medicaid provider identification number. Performing providers include hospitals, CMHCs, LHDs, and physician practices. Performing providers are responsible for: 1) implementing Core Activities to achieve the Category C Measure Bundles and Measures; and 2) measuring, reporting, and improving performance on the Category C Measures and Measure Bundles. In DY6 there were a total of 296 providers (Table 3). These numbers may change slightly as RHP Plan Updates are finalized for DY7-8.

Table 3. Delivery System Reform Incentive Payment Providers - Demonstration Year 6

Provider Type	Count
Hospital	218
Physician Practices	18
Community Mental Health Centers	39
Local Health Departments	21

Note. Numbers may vary slightly after regional healthcare partnership (RHP) plans are finalized for demonstration years (DY) 7-8.

- **Medicaid clients served by DSRIP performing providers** – Medicaid clients served by DSRIP performing providers that reported on diabetes-related measures will be identified through Medicaid claims, encounter, and pharmacy data. Medicaid clients included in the DSRIP analyses will have at least one diabetes-related visit or prescription drug from a relevant DSRIP provider during DY7, but no visits with or prescriptions from a relevant DSRIP provider in the previous 12 months. Medicaid clients who receive DSRIP-specific services are not flagged or identified in the FFS claim or MMC encounter databases, so this does not necessarily indicate this individual is a "DSRIP participant" but does indicate the provider visited participates in DSRIP.

- **Medicaid clients served by non-DSRIP performing providers -** Medicaid clients served by non-DSRIP performing providers with similar provider types and specialties will be identified through Medicaid claims, encounter, and pharmacy data. Medicaid clients included in the DSRIP comparison group will have at least one diabetes-related visit or prescription drug from a non-DSRIP provider during DY7, and no visits with or prescriptions from a DSRIP provider in the 12 months before or after the first diabetes-related visit during DY7.

DSRIP Data Sources and Collection Plan

The evaluation will include multiple sources and forms of qualitative and quantitative data and research methods to comprehensively evaluate the DSRIP Demonstration component. These data include both primary and secondary data sources as described here.

DSRIP Primary Data Source

Primary data collection will be necessary to evaluate the DSRIP component of the Demonstration.

- **Social network analysis survey** - The social network analysis survey used in the previous Demonstration evaluation will be updated to reflect DY7-11 collaborators, new types of ties (learning collaborative participation, HIE membership), and other issues relevant to the renewal. Data will be collected at the organizational level using a computer-assisted telephone survey.

DSRIP Secondary Data Sources

This evaluation leverages administrative data collected by HHSC for reporting and payment purposes to assess the effects of DSRIP on access to and quality of care and Medicaid encounters and enrollment data.

- **RHP Plan update** - Performing providers will include their system description, including the population they serve through DSRIP and will list planned DY7 Core Activities, including which DY2-6 projects may correspond to DY7 Core Activities.

- **DSRIP reporting** - Performing providers are required to report their progress in categories A-C during specific reporting periods. Additionally, performing providers will respond qualitatively to Category D reporting

completed by the EQRO. Where feasible, DY2-6 Category 1-4 reporting will be utilized as well. These data will be used by the evaluation team to address various hypotheses.

- **DSRIP administrative data** - HHSC maintains monitoring and payment information for DSRIP performing providers to determine incentive valuations, payment amounts earned, and track performance over time.

- **Learning collaborative reporting** - Performing providers are required to attend and report on their DSRIP participation in at least one learning collaborative, stakeholder forum, or other stakeholder meetings each DY.

- Medicaid client-level data

    - **FFS Claims and MMC Encounter Data** - FFS claims and MMC encounter data have been processed by TMHP since January 1, 2004. The TMHP performs internal edits for data quality and completeness. The member-level claims/encounter data contain the CPT codes, ICD-10-CM codes, place of service codes, and other information necessary to calculate outcome measures. There is an approximate six-month time lag for claims and encounter data adjudication. Prior analyses with Texas data showed that, on average, over 96 percent of the claims and encounters are complete by that timeframe.

    - Member-level enrollment files **-** The enrollment file will be used to obtain information about the person's age, gender, race/ethnicity, county, the MCO in which the member is enrolled, and the number of months the member has been enrolled in the program.

    - Member-level pharmacy data -The member-level pharmacy data contain information about filled prescriptions, including the drug name, dose, date filled, number of days prescribed, and refill information.

DSRIP Proposed Analytic Methods

Qualitative and quantitative methods will be used to evaluate the DSRIP component of the Demonstration. Social network analysis, an inherently mixed method, will also be used. This section describes the proposed analytic methods to determine outcomes as specified through the DSRIP measures.

DSRIP Qualitative Analysis

Qualitative methods will be used to categorize, analyze, and synthesize data extracted from DSRIP reporting documents, open-ended question responses, and interview notes and/or transcripts. Both content analysis and thematic content analysis are proposed to answer evaluation questions related to DSRIP and the Demonstration overall.

Thematic Content Analysis

Thematic content analysis will be used primarily to evaluate responses to open-ended social network analysis survey items, DSRIP performing provider descriptions of Category D-related activities, and description of APM planning and/or implementation and perceived barriers/benefits to their development and implementation in Texas Medicaid. Thematic content analysis will be used to analyze and interpret documents for emerging themes among respondents. Through this method, documents are coded, and then codes are grouped together using inductive or deductive reasoning as themes among codes consistently emerge (Vaismoradi, Turunen, & Bondas, 2013).

DSRIP Mixed Methods Analysis

Social Network Analysis

Social network analysis is both a qualitative and quantitative analysis method in that a network diagram is used to illustrate relationships among network members. Measures including density, centrality, and multiplexity are calculated to quantitatively describe relationships within the network. Additionally, the social network analysis survey will collect responses to open-ended questions regarding attitudes toward collaboration. The social network analysis method will be used to measure change in collaboration among organizations participating in DSRIP within each RHP over time.

The proposed social network analysis aims to build upon a similar analysis conducted during the initial Demonstration timeframe (Texas Health and Human Services Commission, 2017). Collaboration will be measured by assessing connections between providers in each RHP; ties between providers will be measured for program and service delivery, sharing tangible resources, formal data sharing, learning collaborative participation, and HIE membership (Table 3).

The network survey will be structured such that each organization will answer a series of questions about their relationships with each of the organizations in their RHP (Provan & Milward, 1995; Provan & Milward, 2001). Measures used are provided in Table 4. In addition, open-ended questions will probe for qualitative information about the relationship, kinds of collaborative services, or nature of data sharing to assist in interpretation of the results.

Table 4. Social Network Analysis Measures

Measure	Sample Question	Source
Any Collaboration*	"Does your organization currently work with [x organization]?"	Provan & Milward, 1995
Joint Service Delivery	"Does your organization currently collaborate with [x organization] to deliver services?"	Foster-Fishman et al., 2001; Provan & Milward, 1995
Resource Sharing	"Does your organization currently share tangible resources with [x organization] for the purpose of increasing access to services?"	Provan, Nakama, Veazie, Teufel-Shone & Huddleston, 2003
Data Sharing	"Does your organization currently have a data sharing agreement with [x organization]?"	Johnsen, Morrissey, & Calloway, 1996
Learning Collaborative Participation	"Do members of your organization attend the same RHP learning collaborative as [x organization]?	Measure established in DY1-5
Health Information Exchange (HIE) Membership	"Does your organization belong to an HIE? If yes, which one(s)?	Measure established in DY1-5
Attitudes Toward Building Ties	"Given the opportunity, would your organization be willing to collaborate with [x organization] in the future?"	Measure established in DY1-5

Note. DY=Demonstration year, October 1-September 30.

DSRIP Quantitative Analysis

Quantitative methods will also be used to evaluate the DSRIP component of the Demonstration. Below is a description of the analytic strategies that will be used to examine the evaluation hypotheses.

Univariate and Bivariate Statistics

Descriptive statistics will examine results for selected measures for each year in the pre- and post-measurement timeframes. For example, bivariate analyses will be used to explore trends in beneficiaries' access to care, quality of care, etc. Three descriptive quantitative analysis methods will be used to examine health and health care outcomes: McNemar's chi-square, Mann-Whitney U Test, and Wilcoxon Signed Rank Test. These nonparametric tests are appropriate when data are categorical or continuous but do not meet the assumptions (e.g., normality) used by parametric tests. Parametric analyses (e.g., t-tests, etc.) may be used as appropriate.

Descriptive Trend Analysis

Descriptive trend analysis will be used if more robust methods such as interrupted time series (ITS) are not appropriate. Univariate or bivariate statistics will be calculated on the same population at two or more points in time to determine if a trend exists.

Difference-in-Difference (DID)

DSRIP will also be evaluated through a quasi-experimental design using client-level data extracted from a sample of clients interacting with DSRIP providers and a matched sample of clients interacting with similar non-DSRIP providers. This portion of the evaluation will focus on DSRIP providers that selected diabetes-related measure bundles during both the original and renewal Demonstration periods (N=54). These were the most commonly selected measure bundle in all DYs and offer the largest provider sample for analysis. It is currently unknown how many clients will have visits or filled prescriptions with these 54 DSRIP providers.

Sample Selection for DID

Given the large population served by Texas Medicaid, HHSC must establish inclusion criteria before identifying the initial sample of clients with a diabetes-related visit with, or prescription from, a relevant DSRIP provider (i.e. treatment group) or similar non-DSRIP providers (i.e. comparison group) during DY7. Before

identifying the initial sample of clients, HHSC will identify DSRIP providers and similar non-DSRIP providers across provider type, provider specialty, and taxonomy code. The sample of providers for the client comparison group will be equal to or larger than the number of DSRIP providers in the analysis to ensure an adequate sample of clients in the comparison group. If feasible, DSRIP collaborators (e.g., Federally Qualified Health Centers) will be excluded from the comparison sample to prevent contamination of the treatment effect.

After identifying DSRIP providers and similar non-DSRIP providers, HHSC will obtain client-level claims, encounter, and pharmacy data for clients with a diabetes-related visit or prescription from one of the two provider groups during DY7. Client-level data will be drawn from the Texas Medicaid and Healthcare Partnership (TMHP), the claims administrator and data warehouse for claims and encounter data associated with Texas Medicaid. Client-level variables may include provider IDs, dates of service, diagnosis codes, procedure codes, claim numbers, and other relevant fields. To extract client-level data, HHSC Center for Analytics and Decision Support (CADS) will query the TMHP universes filtering on provider identification numbers (e.g., National Provider Identifier (NPI) or Texas Provider Identifiers (TPIs)), diabetes-related diagnosis codes, and dates of service. A similar process will be performed for diabetes-related pharmacy claims. No sampling is performed at this stage; instead, the full population of clients associated with the provider samples who meet the diagnosis, prescription, and date range criteria will be included.

After obtaining Medicaid IDs for the treatment and comparison client samples, a mapping table will be used to query TMHP for all claims, encounters, and prescriptions associated with these clients for DY7 and 24 months before and after DY7 (October 1, 2015 through September 30, 2020). The external evaluator will use this information to identify the following clients:

- Treatment clients who 1) are continuously enrolled and residing in the same RHP 12 months before and after their index date;[5] 2) do not have any visits to a DSRIP provider in the 12 months prior to their index date; and, 3) had at least one visit to a DSRIP provider in the 12 months following their index date.
- Comparison clients who 1) are continuously enrolled and residing in the same RHP 12 months before and after their index date; 2) do not have any visits to a DSRIP provider in the 12 months prior to their index date; and, 3) do not

[5] The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

have any visits to a DSRIP provider in the 12 months following their index date.

Clients who do not meet the inclusion criteria above will be excluded from the treatment and comparison group samples. After excluding clients who do not meet the client inclusion criteria, the external evaluator will match clients in the comparison group to clients in the treatment group using propensity score matching based on client characteristics (sex, age, race, Elixhauser comorbidity index, and RHP residency location), using nearest-neighbor matching. The external evaluator will use a 12-month pre/post index date window when applying the client inclusion criteria to obtain sample sizes large enough for matching and analysis; applying client inclusion criteria for longer time frames would severely reduce the available sample sizes. Outcome measures, however, will be calculated using the full 24-month pre/post index date measurement period for matched clients in the treatment and comparison groups using the same methodology; this approach will allow for a more comprehensive estimate of the treatment effect resulting from DSRIP. If feasible, a DID design will be used for this purpose.

DID Model Specifications

DID mimics an experimental study by examining the average change in outcomes over time for the matched treatment and comparison groups. The DSRIP analyses utilize a DID model which relies on client-specific pre- and post-periods corresponding to each client's unique index date in the 24-month measurement period. Each client's pre-period corresponds to the 24 months prior to their index date, while their post-period corresponds to the 24 months after their index date. The regression equation for a simple DID model is:

$$Y_{ist} = \beta_0 + \beta_1 DSRIP_s + \beta_2 Post_t + \beta_3 (DSRIP_s * Post_t) + \varepsilon_{ist}$$

Where Y is the outcome measure for individual *i* in group *s* and time *t*, $DSRIP$ is a dummy variable for receiving care from a DSRIP provider, $Post$ is a dummy variable for the client-specific post period, $DSRIP * Post$ is an interaction term for receiving care from a DSRIP provider in the client-specific post period, and ε is an error term. β_3 gives the treatment effect of DSRIP. Additional covariates may be added to determine the effect of RHP, provider type, and other provider-level or client-level characteristics.

The DID approach will be applied to six client-level outcome measures within DSRIP: 1) Proportion of visits to usual provider of care, 2) Interval between

provider visits, 3) Testing HbA1c levels, 4) Diabetes medication management, 5) Diabetes-related ED visits, and 6) Overall cost of care, as determined by paid claims, encounters, and prescription drugs. Importantly, the traditional DID model is a linear probability model, however client-level outcomes associated with DSRIP may be dichotomous (e.g., testing HbA1c levels), count data with excess zeros (e.g., ED visits), or positively skewed (e.g., cost). These distinctions may require adjustments or corrections to the DID model. For example, because of known challenges involved in the application and interpretation of non-linear DID models--especially with regard to interaction terms (Athey and Imbens, 2006; Ai and Norton, 2003), linear models are often used to preserve interpretability of the treatment effect coefficient. Bootstrapping adjustments can be made to correct for heteroscedasticity and autocorrelation that arise from linear modeling under these circumstances (Bertrand et. al, 2004). However, other corrections or alternative models may be necessary.

Hierarchical Linear Models

Hierarchical linear models (HLM) or growth curve models may be used to evaluate DSRIP outcomes reported annually (Littell, Milliken, Stroup, Wolfinger, & Schanbenberger, 2006).

The HLM method accounts for the hierarchical nature of a dataset, in this case, provider systems operate within an RHP. The provider system is considered level 1 and the RHP is considered level 2 in the proposed model (Table 5).

Table 5. Hierarchical linear model framework for the Delivery System Reform Incentive Payment (DSRIP) program

Hierarchical Level		Potential Variables
Level 2	RHP	Demographic and poverty characteristics Poverty characteristics Health Professional Shortage Areas Percent population in Medicaid/Medicare Rural-Urban Continuum Code
Level 1	DSRIP performing provider system	Provider type Provider DSRIP minimum point threshold DSRIP valuation Percentage of MLIU in the provider system

Note. RHP=Regional Healthcare Partnership; DSRIP=Delivery System Reform Incentive Payment.

Given that DSRIP projects will operate with level funding through DY8, there may be sufficient years of data to evaluate if outcomes improved over baseline, in which

case growth curve modeling may be appropriate. In a growth curve model, the dependent variable would be Category C outcomes at each year; in a cross-sectional hierarchical linear model, the dependent variable might be change in Category C outcomes from baseline. The evaluation aims to examine performing provider and contextual factors associated with changes reported in outcome measures.

For selected Category C outcome measures, the basic HLM Level 1 model is specified as (a):

$$(a)\ Y_{ij} = \beta_{0j} + \beta_{1j} * X_{ij} + \varepsilon_{ij}$$

From the basic statistical model, Y_{ij} is the dependent variable, change in Category C outcome for the i^{th} provider at the j^{th} RHP, β_{0j} reflects the intercept of the dependent variable in group j (Level 2-RHP); β_{1j} estimates the slope for the relationship in group j (Level 2-RHP) between the Level 1 (Performing provider) predictor and the dependent variable; X_{ij} is a vector of Level 1 performing provider characteristics (e.g., core activities, years of DSRIP participation); and ε_{ij} refers to random errors of prediction for the Level 1 equation.

$$(b)\ \beta_{0j} = \gamma_{00} + \gamma_{01} * W_j + \upsilon_{0j} \text{ and } (c)\ \beta_{1j} = \gamma_{10} + \upsilon_{1j}$$

HLM models (b) and (c) specify how Level 2-RHP-level predictors influence model (a). γ_{00} reflects the overall intercept. This is the grand mean of the dependent variable (i.e., average change in outcome measure from baseline) across all provider outcomes when all predictors are equal to zero. W_j is the Level 2 predictor (Level 2-RHP), γ_{01} refers to the overall regression coefficient, or slope, between the dependent variable and the Level 2 predictor. υ_{0j} refers to the random error component for the deviation of the intercept of a group from the overall intercept, γ_{10} estimates the overall regression coefficient between the dependent variable and the Level 1 predictor, and υ_{1j} refers to the error component for the slope (meaning the deviation of the group slopes from the overall slope).

DSRIP Methodological Limitations

While DSRIP performing providers report the number of unique individuals served through their projects (DY2-6) and within their provider systems (DY7-10), these counts are unique only at the performing provider level and cannot be aggregated across providers to enumerate the entire DSRIP population. It is unknown how many clients may participate in DSRIP core activities implemented by multiple DSRIP performing providers. Additionally, DSRIP activities are intended to serve

MLIU individuals, but 1) services are not limited to this population, and 2) it is not possible to link Medicaid clients with utilization of specific DSRIP services. Additionally, the change in reporting from project-level Category 1-4 reporting to provider-level Category A-D reporting means there is a lack of continuity in outcomes reporting, resulting in instrumentation threats to internal validity.

The proposed HLM analysis allows the evaluation to account for the effects of the RHP on selected outcomes; however, there may be insufficient Category C outcome data for these analyses. Category C data are new as of DY7 and have yet to be reported. While there is compliance monitoring in place to ensure validity of the data, it is unknown how consistently the outcomes will be reported across providers.

A DID analysis is proposed using Medicaid claims and encounter data. While this is a robust method allowing for the comparison of client-level outcomes over time, it is unknown the degree to which the Medicaid clients served by DSRIP performing providers are actually exposed to DSRIP core activities. It is possible these clients may visit their provider for Medicaid services without being exposed to DSRIP core activities. The DID analysis also involves other challenges to sample identification. The originally proposed DID analysis identified clients in the treatment and comparison groups based on DSRIP providers and a randomly selected group of non-DSRIP providers. Numerous attempts to identify a similar comparison group at the provider-level were unsuccessful; substantial differences between DSRIP and non-DSRIP providers remained regardless of the sampling strategy (i.e., stratified random sampling, purposive sampling, and propensity score matching). As a result, identification of treatment and comparison groups was revised to utilize propensity score matching at the client-level. This version of the evaluation design plan reflects updated client-level matching techniques necessary for the DID analysis.

Other limitations include lack of data on the uninsured population and possible contamination of the treatment effect. For example, it is possible that non-DSRIP performing providers may implement similar, non-DSRIP-funded activities to improve care for their patients, thus diluting the treatment effect of DSRIP. It is also possible that some clients may receive care from both DSRIP and non-DSRIP providers, raising the possibility of individuals who are in both the treatment and comparison groups simultaneously. Finally, the reliance on administrative claims and encounters can be a limitation. These data have been designed and collected for billing purposes, but are used to determine changes in continuity and quality of

care. However, most of the selected measures are validated and widely used for this purpose.

UC Evaluation Methods

A quantitative approach will be used to evaluate two hypotheses specific to the UC component of the Demonstration. Sections following this overview provide more detail regarding the proposed measures, study population, data source, and proposed analytic methods.

The proposed evaluation question and hypotheses relate to UC as implemented from DY1-DY8. The UC program will undergo changes in DY9 and UC reimbursement will be for UC costs for charity care provided to uninsured individuals only. At the time of this draft negotiations are still ongoing. Should these changes to the UC program warrant specific evaluation questions or hypotheses, the evaluation design plan can be revised accordingly.

UC Proposed Measures

A measure has been selected or developed to operationalize each hypothesis. Table 6 provides an overview of all UC-specific evaluation questions and hypotheses aligned with its respective measure. Specific details regarding each of the proposed measures can be found in Appendix C: Detailed Tables.

Table 6. Uncompensated Care Evaluation Design Overview

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
Evaluation Question 2: Did the Demonstration impact unreimbursed costs associated with the provision of care to the MLIU population for UC providers?				
2.1 The percentage of UC costs reimbursed through UC payments for each type of UC (overall, Medicaid shortfall, uninsured shortfall) will decrease throughout DY1-DY8.	2.1.1 UC costs reimbursed (percentage)	• Providers reporting UC costs	• DSH/UC application	• Trend analysis
2.2 The UC cost growth rate will slow over time for UC providers participating in the Demonstration.	2.1.2 UC cost growth rate	• Providers reporting UC costs	• DSH/UC application	• Multiple linear regression or growth curve modeling

Note. MLIU=Medicaid and low-income uninsured; UC=Uncompensated Care; DY=Demonstration year, October 1-September 30; DSH=Disproportionate Share Hospital.

UC Study Population

The UC population consists of UC providers, including hospitals, clinics, and other providers who provide "medical assistance," as defined in section 1905(a) of the Social Security Act, to individuals who cannot pay for the services received. Analyses may be limited to hospitals who submit an annual DSH/UC Application that collects costs and payment data on services eligible for reimbursement through the UC Pool.

Providers included in the UC analyses must have a current Medicaid provider identification number and participate in regional learning collaborative activities. In DY7 there were 486 UC providers (Table 7). This number may vary slightly from year to year.

Table 7.Uncompensated Care Providers by Type in Demonstration Year 7

Provider Type	Estimated Count*
Hospital	360
Physician Group Practice	17
Ambulance Providers	107
Dental Providers	2

Note. *These are estimated numbers as of June 2018 to be finalized by September 2018. Ambulance and dental providers are estimates for DY6.

UC Data Sources and Collection Plan

The evaluation will include quantitative data and research methods to comprehensively evaluate the UC Demonstration component. The secondary data source is described below.

UC Secondary Data Source

- **DSH/UC Application** – UC providers complete this application to apply for reimbursement for costs incurred providing services to Medicaid and uninsured individuals that are not otherwise reimbursed. These applications are submitted to HHSC annually, but are paid based on a two-year data lag. The UC cost reimbursements are adjusted for inflation as an estimate of the UC costs for the year of payment.

UC Proposed Analytic Methods

Quantitative methods will be used to evaluate the UC component of the Demonstration. This section describes the proposed analytic methods to determine outcomes as specified through UC measures.

UC Quantitative Analysis

Quantitative methods will be used to evaluate the UC component of the Demonstration. Below is a description of the analytic strategies that will be used to examine the evaluation hypotheses.

Univariate and Bivariate Statistics

Descriptive statistics will examine results for selected measures for each year in the pre- and post-measurement timeframes. For example, bivariate analyses will be used to explore trends in beneficiaries' access to care, quality of care, etc. Three descriptive quantitative analysis methods will be used to examine health and health care outcomes: McNemar's chi-square, Mann-Whitney U Test, and Wilcoxon Signed Rank Test. These nonparametric tests are appropriate when data are categorical or continuous but do not meet the assumptions (e.g., normality) used by parametric tests. Parametric analyses (e.g., t-tests, etc.) may be used as appropriate.

Descriptive Trend Analysis

Descriptive trend analysis will be used if the recommended minimum measurement time points for ITS are not available (i.e., eight pre- and eight post-Demonstration measurement time points). Univariate or bivariate statistics will be calculated on the same population at two or more points in time to determine if a trend exists.

Regression Analysis

Regression analysis will be used to evaluate the UC component of the Demonstration. Multiple linear regression (MLR) will be used to test for trend over time in the annual UC growth rate, while controlling for UC provider type, and regional/county-level characteristics. The proposed MLR model is specified as:

$$UC\ growth\ rate_{ij} = \beta_0 + \beta_1(time) + \beta_2(hosptype_{ij}) + \beta_3(regionalchar_{ij}) + \varepsilon_{ij}$$

Where UC growth rate is defined as ((UC costs$_j$ – UC costs$_{j-1}$) / UC costs$_{j-1}$) for hospital *i* in year *j*. Time is a time trend variable, hosptype is the hospital type for

hospital *i* in year *j*, regionalchar is a vector of county-level or RHP-level characteristics such as rural-urban continuum code, RHP tier, or Rider 38 Status for hospital *i* in year *j*, and ε is an error term. Alternately, evaluators may also choose to model changes in UC costs through growth curve modeling, using time (level 1), hospital-level characteristics (level 2), and regional-level characteristics (level 3).

Where appropriate, research methods will incorporate results from sensitivity analyses—such as a comparison of nominal to constant dollar amounts, and all UC providers to UC hospitals only—to simplify statistical models and test for robustness/model fit.

UC Methodological Limitations

Major limitations affecting the UC evaluation include lack of a comparison group, lack of a pre-period, and a two-year data lag. Analysis of UC was limited in the evaluation of the initial approval period due to the two-year lag between reporting of UC costs and receiving UC payments. Given these challenges, the UC evaluation will include a trend analysis of the percentage of UC costs reimbursed rather than more robust methods such as DID or ITS, but will also include a regression analyses to examine the change in the UC growth rate over time.

MMC Evaluation Methods

A quantitative approach will be used to evaluate five hypotheses specific to the MMC component of the Demonstration. Sections following this overview provide more detail regarding the proposed measures, study populations, data sources/data collection methods, and proposed analytic methods.

MMC Proposed Measures

A measure, or series of measures, has been selected or developed to operationalize each hypothesis. Table 8 provides an overview of MMC-specific evaluation questions and hypotheses aligned with their respective measures. Specific details regarding each of the proposed measures can be found in Appendix C: Detailed Tables.

Table 8. Medicaid Managed Care Design Overview

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
Evaluation Question 3: Did the expansion of the MMC health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?				
3.1 Access to care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.	3.1.1 CMS percentage of eligibles who received preventative dental services	• CMDS	• FFS claims and MMC encounter data • Member-level enrollment files • Member-level pharmacy data	• Descriptive trend analysis • Interrupted time series analysis
	3.1.2 Adult access to preventive/ ambulatory health services	• NF • FFCC • MBCC		
	3.1.3 Children and adolescent access to primary care services	• AA • PCA		
	3.1.4 CMS screening for depression and follow-up plan	• NF • FFCC • AA • PCA • MBCC		
	3.1.5 Utilization of pharmacy benefits	• NF • FFCC • AA • PCA • MBCC		

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
3.2 Care coordination will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.	3.2.1 Rate of service coordination utilization	• NF • FFCC • MBCC	• FFS claims and MMC encounter data • Member-level enrollment files	• Interrupted time series analysis
	3.2.2 Rate of clients with SMI/SED receiving Targeted Case Management	• MBCC • AA • PCA		
3.3 Quality of care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.	3.3.1 Antidepressant medication management	• NF • FFCC	• FFS claims and MMC encounter data • Member-level enrollment files • Member-level pharmacy data	• Descriptive trend analysis • Interrupted time series analysis
	3.3.2 Use of first-line psychosocial care for children and adolescents on antipsychotics	• NF		
	3.3.3 Percent of Medicaid for Breast and Cervical Cancer clients receiving recommended treatment	• MBCC		
	3.3.4 Behavior modification	• NF	• NFQR Survey	• Descriptive trend analysis

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
3.4 Health and health care outcomes will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.	3.4.1 CMS Children who have dental decay or cavities	• CMDS	• FFS claims and MMC encounter data • Member-level enrollment files	• Interrupted time series
	3.4.2 Pressure Ulcers	• NF		
	3.4.3 Symptoms of depression	• NF	• NFQR Survey	• Descriptive trend analysis
	3.4.4 Prevention/Pediatric Quality Overall Composite 3.4.5 Rate of potentially preventable emergency department use 3.4.6 H2-510: Rate of ED visits for BH and SA	• NF • FFCC • AA • PCA • MBCC	• FFS claims and MMC encounter data • Member-level enrollment files	• Descriptive trend analysis • Interrupted time series analysis
3.5 Client satisfaction will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.	3.5.1 Client satisfaction - NF	• NF	• NFQR Survey	• Descriptive trend analysis
	3.5.2 Client satisfaction - CAHPS	• AA • PCA • MBCC	• CAHPS Health Plan Survey	

Note. MMC=Medicaid managed care; FFS=Fee-for-service; CMS=Centers for Medicare and Medicaid Services; CMDS=Children's Medicaid Dental Services; NF=Nursing Facility; FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; AA=Adoption Assistance; PCA=Permanency Care Assistance; SMI=Serious mental illness; SED=Severe emotional disturbance, NFQR=Nursing Facility Quality Review; ED=Emergency department; BH=Behavioral health; SA=Substance abuse; CAHPS=Consumer Assessment of Healthcare Providers and Systems.

MMC Study Populations

The study population collectively refers to the MMC clients enrolled in their respective MMC program in the post-implementation period (post-MMC population) and clients who would have been eligible for the MMC program had it been available to them in the pre-MMC period (pre-MMC population). Pre- and post-MMC populations will be identified by applying the Medicaid Population Eligibility Criteria to the pre- and post-MMC populations (Maximus, 2017). The specific pre-MMC and post-MMC periods will align to implementation date by MMC program or population in the analysis.

The MMC clients are the primary unit of analysis to examine the expansion of managed care as a health care delivery model. Medicaid populations were selected for this evaluation because: 1) they were carved in by DY4/FFY 2015 and additional years of data were needed to complete trend analyses conducted in the initial evaluation (i.e., nursing facility), 2) they are new MMC beneficiaries and provide a natural experiment to compare FFS to MMC health care delivery models (i.e., STAR Kids, MBCC, AA, PCA), 3) they demonstrate changes to MMC beneficiary programs (i.e., FFCC), or 4) they require continued evaluation based on CMS feedback on populations of interest (i.e., Children's Medicaid Dental Services).

The MMC study populations include:

- **Children's Medicaid Dental Services** - In March 2012, dental managed care replaced the FFS delivery model for primary and preventive dental care. The Children's Medicaid Dental Services (CMDS) are provided through MMC for most children and young adults through age 20.

- **Nursing Facility (NF)** - On March 1, 2015, HHSC began delivering nursing facility benefits to qualifying adults age 21 and older through STAR+PLUS.

- **STAR Kids** – On November 1, 2016, MMC was expanded to children and young adults (20 years and younger) with disabilities. Previously, MMC was voluntary for this population, but enrollment is now mandatory with STAR Kids implementation. A pre-post implementation evaluation is currently being conducted by Texas' EQRO[6]. Given this ongoing study, STAR Kids is

[6]External Quality Review Organization timeline includes five deliverables: 1) STAR Kids Managed Care Organization Site Visits, 2) Measures Feasibility - Survey, Screening and Assessment Instrument, Individual Service Plan, 3) Pre-/Post- Implementation survey measures, 4) Pre-/Post-Implementation

not currently included in the evaluation of the Demonstration extension, but if results of the EQRO's study suggest further evaluation of STAR Kids is necessary, this evaluation design plan may be revised.

- **Former Foster Care Children (FFCC)** - On September 1, 2017, FFCC clients ages 18-20, based on their disability status, may choose between STAR, STAR Kids, or STAR Health. FFCC clients ages 21 - 25, based on disability status, are mandated to enroll in STAR or STAR+PLUS, as STAR Health and STAR Kids are not options for this age group.

- **Adoption Assistance (AA) and Permanency Care Assistance (PCA)** - On September 1, 2017, Medicaid AA and PCA recipients transitioned from FFS to either STAR or STAR Kids MMC.

- **Medicaid Breast and Cervical Cancer (MBCC)** - On September 1, 2017, women in the FFS Breast and Cervical Cancer program transitioned to MMC. These clients are a specific sub-set of the STAR+PLUS population.

MMC study populations will be identified using data from member-level enrollment files, specifically Medicaid category and type program. Using these data fields, clients can be identified in both FFS (pre-period) and MMC (post-period) (Table 9).

Administration measures, and 5) Summary Report. Based on results from all deliverables (last deliverable due May 3, 2019), Texas Health and Human Services Center for Analytics and Decision Support may alter evaluation questions to include additional hypotheses/analyses.

Table 9. Overview of Medicaid Managed Care Populations

Population or Service	Medicaid Category	Medicaid Program Type	Medicaid Managed Care Program(s)	Average Monthly Enrollment, SFY 2017
Populations and services carved into MMC from FFS				
Children's Medicaid Dental Services	01, 02, 03, 04	01, 03, 07, 12, 13, 14, 15, 18, 19, 20, 21, 37, 40, 43, 44, 45, 47, 48, 51, 66, 67, 78, 79, 80, 81, 82, 87, 88	STAR STAR Kids STAR+PLUS	3,146,229
Nursing facility	01, 03, 04	12, 13, 14	STAR Kids STAR+PLUS	53,779
Adoption Assistance	02	15, 21	STAR STAR Kids	48,589
Permanency Care Assistance	02	78, 79, 80, 81	STAR STAR Kids	3,224
Medicaid for Breast and Cervical Cancer	N/A	67	STAR+PLUS	4,861
Population shifting from one MMC program to another				
Former Foster Care Children	02	09, 77, 82	STAR Health STAR STAR Kids STAR+PLUS	4,187

Note. Eligibility based on Appendix O: Medicaid Population Eligibility Criteria, EB 726 - EB Joint Interface Plan (JIP) - Update (Version 6.7). Average monthly enrollment provided by Health and Human Services Commission (HHSC) Forecasting. SFY=State fiscal year, September 1-August 31; MMC=Medicaid managed care; FFS=Fee-for-service.

The intention is to use the entire eligible population for the proposed MMC analyses. Therefore any changes pre- and post-expansion represent the population parameter. Parametric tests of hypotheses rely on sampling theory to produce estimates of likely error. If a researcher assumes a sample of a given size is selected from a population, knowledge of the systematic nature of sampling makes statistical testing, coefficient estimators, and standard errors meaningful. With a population, sampling theory is not relevant and statistical tests (e.g., t-tests) are not meaningful in the traditional sense because there is nothing to infer from a sample about the population. However, if there is a change and samples are necessary, the appropriate actions will be taken, including power calculations, to ensure traditional standards of scientific and academic rigor are met to ensure the validity of the findings.

MMC Data Sources and Collection Plan

The evaluation will include multiple sources and forms of qualitative and quantitative data and research methods to comprehensively evaluate the MMC Demonstration component. These data include both primary and secondary data sources, as outlined below.

MMC Secondary Data Sources

- **FFS Claims and MMC Encounter Data** - FFS claims and MMC encounter data have been processed by TMHP since January 1, 2004. The TMHP performs internal edits for data quality and completeness. The member-level claims/encounter data contain the CPT codes, ICD-10-CM codes, place of service codes, and other information necessary to calculate outcome measures. There is an approximate six-month time lag for claims and encounter data adjudication. Prior analyses with Texas data showed that, on average, over 96 percent of the claims and encounters are complete by that timeframe.

- **Member-Level Enrollment Files** - The enrollment file will be used to determine the pre-MMC and post-MMC populations, determine health care service delivery model (i.e., FFS or MMC), and enrollment gaps. The enrollment files contain information about the person's age, gender, race/ethnicity, county, the MCO in which the member is enrolled, and the number of months the member has been enrolled in the program.

- **Member-Level Pharmacy Data -**The member-level pharmacy data contain information about filled prescriptions, including the drug name, dose, date filled, number of days prescribed, and refill information.

MMC Proposed Analytic Methods

Quantitative methods will be used to evaluate the MMC component of the Demonstration. This section describes the proposed analytic methods to determine outcomes as specified through the proposed MMC measures. Where appropriate, research methods will incorporate results from sensitivity analysis to compare alternate subgroups (e.g., Medicaid clients continuously enrolled versus all Medicaid clients in a particular population), and other comparisons as necessary.

MMC Quantitative Analysis

Descriptive trend analysis and ITS will be the analytic strategies used to examine most of the evaluation questions. Although DID (or regression discontinuity design) is considered to be a more robust quasi-experimental design than trend analysis or interrupted time series, that method is not feasible for this evaluation because the MMC expansion to additional populations and services was statewide and adequate comparison groups do not exist. Below is a description of the analytic strategies that will be used to examine the evaluation hypotheses.

Univariate and Bivariate Statistics

Descriptive statistics will examine results for selected measures for each year in the pre- and post-measurement timeframes. For example, bivariate analyses will be used to explore trends in beneficiaries' access to care, quality of care, etc. Three descriptive quantitative analysis methods will be used to examine health and health care outcomes: McNemar's chi-square, Mann-Whitney U Test, and Wilcoxon Signed Rank Test. These nonparametric tests are appropriate when data are categorical or continuous but do not meet the assumptions (e.g., normality) used by parametric tests. Parametric analyses (e.g., t-tests, etc.) may be used as appropriate.

Descriptive Trend Analysis

Descriptive trend analysis will be used if the recommended minimum measurement time points for ITS are not available (i.e., eight pre- and eight post-Demonstration measurement time points). Univariate or bivariate statistics will be calculated on the same population at two or more points in time to determine if a trend exists.

Interrupted Time Series

The ITS analysis uses aggregate data collected over equally spaced intervals before and after a policy change. A key assumption of ITS is that data trends before the policy change can be extrapolated to predict trends had the policy change not occurred. If MMC has an impact on an outcome of interest, the post-expansion trend will have a statistically significant slope that is different from the pre-expansion trend. When properly executed, ITS is a valuable method to evaluate the success, failure, or unintended consequences of health care policy on outcomes (Lagarde, 2012). However, given the serial nature of ITS data, autocorrelation, nonstationarity, and seasonality need to be considered. Failing to assess and correct for these factors can lead to biased results (Wagner, Soumerai, Zhang, &

Ross-Degnan, 2002). A key strength of ITS methodology is that a control site is not required, providing an alternate method of measuring the effect of an intervention "when randomization or identification of a comparison group are impractical" (Grimshaw, et al., 2003). Identifying comparison groups is not feasible due to the unique nature and statewide inclusion of the new MMC populations. The ITS method allows the target population to serve as its own comparison group in the pre/post analysis.

For outcome measures using ITS, the basic segmented regression model with one change point or intervention examines the relationship between the outcome of interest (Y_t) over time, before and after the policy change (e.g., population shifted from FFS to MMC or changed MMC programs):

$$Yt = \beta_0 + \beta_1 time + \beta_2 MMC\ expansion + \beta_3 postslope + \varepsilon_t$$

From the basic statistical model, β_0 reflects the baseline level of the outcome at the beginning of the pre-Demonstration timeframe; β_1 estimates the trend before MMC expansion; β_2 estimates the immediate impact of MMC expansion; and β_3 reflects the change in trend after MMC expansion. To ease interpretation, ITS results are presented as: baseline level, trend before MMC expansion, level change after MMC expansion, and trend after MMC expansion.

Pre and Post Time Periods for Interrupted Time Series

The pre and post time periods for the ITS analysis vary by program. A two-year baseline, or pre period, will be used to establish a monthly trend for the outcome of interest during the two years prior to the population's carve-in to MMC or change in MMC program. The post period will continue for five years, ending on September 30 of the fifth year to align with DY/FFY, subject to data availability. Specific pre and post periods for each MMC population are listed in Table 10.

Table 10. Pre and Post Periods for Medicaid Managed Care Interrupted Time Series Analysis

MMC Population	Pre Period	Post Period
Children's Medicaid Dental Services	March 1, 2010-February 29, 2012	March 1, 2012 – September 30, 2020
Nursing Facility	March 1, 2013 – February 28, 2015	March 1, 2015 – September 30, 2020
Former Foster Care Children Adoption Assistance Permanency Care Assistance Medicaid for Breast and Cervical Cancer	September 1, 2015-August 31, 2017	September 1, 2017 – September 30, 2022

Note. MMC=Medicaid managed care. Pre period establishes baseline two years prior to MMC carve-in or shift in MMC program, post period starts with MMC carve-in or shift in MMC program.

MMC Methodological Limitations

Due to the statewide implementation of Texas' Demonstration, the MMC evaluation is limited by the lack of true comparison groups. All Medicaid clients in the state are subject to participation in the Demonstration. As a result, comparisons can only be made among beneficiaries; therefore while a pre/post evaluation design or comparison to baseline may suggest improvements in outcomes due to the Demonstration, associations do not imply causality.

While population-level data for the MMC evaluation is a strength of this evaluation, the reliance on administrative claims and encounters can be a limitation. These data have been designed and collected for billing purposes, but are used in the evaluation to determine changes in access to and quality of care. However, most of the selected measures are validated and widely used for this purpose. While administrative data might be able to identify key cases and statistical trends, they are usually limited in providing finer detailed health or health behavior information. Additionally, the use of population-level data precludes the use of significance testing since probability sampling and sampling error do not apply to measurements of difference at the population level. The effect size of measured differences represent true differences, though they may or may not correspond to meaningful changes at the program level.

Finally, data lags pose a challenge in measuring and reporting any change in a timely manner (Schoenberg, Heider, Rosenthal, Schwartz, & Kaye, 2015). Data lags specifically impact the MMC (6-9 months lag) component of the Demonstration.

Overall Demonstration Evaluation Methods

A mixed methods approach will be used to evaluate three hypotheses specific to the Overall Demonstration. Sections following this overview provide more detail regarding the proposed measures, study populations, data sources/data collection methods, and proposed analytic methods.

Overall Demonstration Proposed Measures

A measure, or a series of measures, has been selected or developed to operationalize each hypothesis. Table 11 provides an overview of Overall Demonstration-specific hypotheses aligned with their respective measures. Specific details regarding each of the proposed measures can be found in Appendix C: Detailed Tables.

Table 11.Overall Demonstration Evaluation Design Overview

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
Evaluation Question 4: Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?				
4.1 The Demonstration will result in the development and/or implementation of a variety of APMs in Texas Medicaid.	4.1.1 APMs (planned and/or implemented) 4.1.2 Perceived barriers to developing and/or implementing APMs 4.1.3 Perceived benefits to developing/ implementing APMs	• MCOs • DSRIP performing providers	• MCO APM reporting tool • APM survey	• Content analysis • Descriptive statistics, as applicable • Thematic content analysis

Evaluation Hypothesis	Measure(s)	Study Population	Data Source(s) or Data Collection Method(s)	Analytic Methods
Evaluation Question 5: Did the Demonstration transform the health care system for the MLIU population in Texas?				
5.1 The Demonstration will result in a reduction of potentially preventable ED use for the MLIU population.	5.1.1 Rate of potentially preventable emergency department use	• MLIU individuals	• Texas Emergency Department Data from THCIC	• Interrupted time series
5. 2 The Demonstration will result in overall cost savings as compared to the Medicaid program without the Demonstration, as shown in the budget neutrality calculation.	5.2.1 Demonstration cost growth rate	• MLIU individuals	• Demonstration Budget Neutrality Worksheet	• Descriptive trend analysis

Note. APM=Alternative payment model; MCO=Managed care organization; DSRIP=Delivery System Reform Incentive Payment; MLIU=Medicaid and low-income uninsured; ED=Emergency department; THCIC= Texas Health Care Information Collection.

Overall Demonstration Study Populations

Each hypothesis in this section has a unique study population described here.

- **DSRIP Performing Providers** – Providers who are eligible to receive DSRIP incentive payments must have a current Medicaid provider identification number. Performing providers include hospitals, CMHCs, LHDs, and physician practices. Performing providers are responsible for: 1) implementing Core Activities to achieve the Category C Measure Bundles and Measures; and 2) measuring, reporting, and improving performance on the Category C Measures and Measure Bundles.

- Managed Care Organizations (MCOs) – The health plans contracted with HHSC to administer Medicaid services through a network of contracted providers for the Medicaid clients enrolled in their plan.

- **Medicaid and Low-Income Uninsured (MLIU) Individuals**– The number of MLIU individuals served by the performing provider during the DY. The MLIU are a subset of the total patient population by provider, which are the total number of individuals served in a provider

Overall Demonstration Data Sources and Collection Plan

The evaluation will include multiple sources and forms of qualitative and quantitative data and research methods to comprehensively evaluate the Overall Demonstration. These data include both primary and secondary data sources as described here.

Overall Demonstration Primary Data Sources

- **Alternative Payment Model (APM) Survey** - The DSRIP performing providers and MCOs will be surveyed regarding their experience planning and implementing APMs. This survey will be developed by the external evaluator but should include questions to address Evaluation Question 4 and related hypotheses in Table 11. In lieu of a stand-alone survey, external evaluators and HHSC may agree to include questions related to these hypotheses on existing reporting tools, such as the MCO APM Reporting Tool, DSRIP Annual Reporting, and/or RHP plan updates.

Overall Demonstration Secondary Data Sources

- **Budget Neutrality Worksheet –** HHSC and CMS work together to determine the total cost of the Demonstration. "Without waiver" costs are projections based on what the services provided would cost without the Demonstration. The "with waiver" calculations are made for all years of the Demonstration, basing past years are on actual costs and projecting future years.

- **Managed Care Organization (MCO) Alternative Payment Model (APM) Reporting Tool** - Starting September 1, 2018, MCOs will be required to report on their APM activity, both implemented and planned. Information from this tool will be used to learn about the types of APMs implemented throughout the Medicaid program in Texas.

- **Texas Emergency Department Data** - The Texas Department of State Health Services (DSHS) Health Care Information Collection (THCIC) began collecting ED data from hospitals on January 1, 2015, and is available starting with ED visits in 2016. The Texas Emergency Department data set includes individual-level data for inpatient and outpatient visits involving the ED.

Overall Demonstration Proposed Analytic Methods

The qualitative and quantitative analytic methods proposed for the overall Demonstration evaluation are described below.

Overall Demonstration Qualitative Analysis

Content Analysis

Through content analysis, documents (i.e., MCO APM reporting tool) will be systematically examined to extract descriptive data that can be quantified (Vaismoradi, Turunen, & Bondas, 2013) in a structured dataset. This method will be used to identify the types of APMs MCOs have with MMC providers Once the documents have been reviewed and extracted data categorized, descriptive statistics specific to the type of APM, provider type participating in the APM, etc. will be calculated.

Thematic Content Analysis

Thematic content analysis will be used to evaluate responses to any open-ended questions related to APM planning and/or implementation and perceived barriers/benefits to their development and implementation in Texas Medicaid. These questions may be included on the APM survey or other reporting documents as described in the Overall Demonstration data sources sections. Thematic content analysis will be used to analyze and interpret responses for emerging themes among DSRIP performing providers and MCOs. Through this method, documents are coded, and then codes are grouped together using inductive or deductive reasoning as themes among codes consistently emerge (Vaismoradi, Turunen, & Bondas, 2013).

Overall Demonstration Quantitative Analysis

Quantitative methods will also be used to evaluate the overall Demonstration. Below is a description of the analytic strategies that will be used to examine the evaluation hypotheses.

Univariate and Bivariate Statistics

Descriptive statistics will examine results for selected measures for each year in the pre- and post-measurement timeframes. For example, bivariate analyses will be used to explore trends in beneficiaries' access to care, quality of care, etc. Three descriptive quantitative analysis methods will be used to examine health and health care outcomes: McNemar's chi-square, Mann-Whitney U Test, and Wilcoxon Signed Rank Test. These nonparametric tests are appropriate when data are categorical or continuous but do not meet the assumptions (e.g., normality) used by parametric tests. Parametric analyses (e.g., t-tests, etc.) may be used as appropriate.

Descriptive Trend Analysis

Descriptive trend analysis will be used if the recommended minimum measurement time points for ITS are not available (i.e., eight pre- and eight post-Demonstration measurement time points) or this method is inappropriate for the data available. Univariate or bivariate statistics will be calculated on the same population at two or more points in time to determine if a trend exists.

Interrupted Time Series

The ITS analysis uses aggregate data collected over equally spaced intervals before and after a policy change. A key assumption of ITS is that data trends before the policy change can be extrapolated to predict trends had the policy change not occurred. If the Demonstration has an impact on an outcome of interest, the post-expansion trend will have a statistically significant slope that is different from the pre-expansion trend. When properly executed, ITS is a valuable method to evaluate the success, failure, or unintended consequences of health care policy on outcomes (Lagarde, 2012). However, given the serial nature of ITS data, autocorrelation, nonstationarity, and seasonality need to be considered. Failing to assess and correct for these factors can lead to biased results (Wagner, Soumerai, Zhang, & Ross-Degnan, 2002). A key strength of ITS methodology is that a control site is not required, providing an alternate method of measuring the effect of an intervention "when randomization or identification of a comparison group are impractical" (Grimshaw, et al., 2003). Identifying comparison groups is not feasible due to the unique nature and statewide implementation of the Demonstration. The ITS method allows the target population to serve as its own comparison group in the pre/post analysis.

For outcome measures using ITS, the basic segmented regression model with one change point or intervention examines the relationship between the outcome of interest (Y_t) over time, before and after the policy change (e.g., specific DSRIP projects shifted to core activities):

$$Yt = \beta_0 + \beta_1 time + \beta_2 MMC\ expansion + \beta_3 postslope + \varepsilon_t$$

From the basic statistical model, β_0 reflects the baseline level of the outcome at the beginning of the baseline period before the Demonstration was renewed; β_1 estimates the trend before the Demonstration was renewed; β_2 estimates the immediate impact of the Demonstration renewal; and β_3 reflects the change in trend after the Demonstration was renewed. To ease interpretation, ITS results are presented as: baseline level, trend before Demonstration renewal, level change after Demonstration renewal, and trend after Demonstration renewal.

Pre and Post Time Periods for Interrupted Time Series

The pre and post time periods for the ITS analysis include a two-year baseline, or pre period, established during the two years prior to the Demonstration renewal.

The post period will continue for five years, depending on availability of the data (Table 10).

Overall Demonstration Methodological Limitations

There are several limitations to evaluating the overall Demonstration. First, given the statewide, multifaceted nature of the Demonstration, no valid comparison groups are available to compare outcomes under the conditions of the Demonstration to outcomes under baseline conditions. The proposed APM evaluation uses a newly-developed MCO APM Reporting Tool. While this tool underwent thorough review and vetting during its development, it has not yet been used so the quality and consistency of the self-reported MCO data is unknown at this time. Provider-level data gathered for the APM analysis will also be self-reported data.

Use of the Texas Emergency Department Data from THCIC is a strength of the Overall Demonstration evaluation since it contains individual-level data for Medicaid and uninsured individuals in Texas, but data are only available as of 2016. This allows for a pre/post comparison of ED outcomes before and after the Demonstration renewal (the focus of this evaluation), but does not allow for a comparison of outcomes earlier in the initial approval period or before the Demonstration began in FFY 2012.

Finally, the Budget Neutrality Worksheet includes actual Demonstration costs for years in which data are available ("with waiver'), but the "without waiver" costs are projections, as demonstrated by budget neutrality. While these simulated costs allow for a comparison of costs under Demonstration and non-Demonstration conditions, actual costs had the Demonstration not been implemented cannot be determined.

More broadly, the evaluation faces threats to internal validity from history and maturation. As noted, the Demonstration involves simultaneous implementation of multiple state efforts to address improvements in DSRIP/UC/MMC. These concurrent changes to the baseline conditions make it difficult to isolate the effect of one component, let alone determine which strategy is most successful. Maturation threats resulting from concurrent changes to economic, environmental (e.g., Hurricane Harvey), or demographic factors also present problems for causal inference.

Data Quality and Validation

The DSRIP reporting data is subject to compliance monitoring, the primary purpose of which is to validate data submitted by performing providers that serves as the basis of their DSRIP payments. As part of the approval of the DSRIP program, CMS required HHSC to contract with an independent assessor (also known as the compliance monitor) by the end of 2014, to conduct a transparent review of all RHPs established under DSRIP. The compliance monitor also performed additional reviews of the DSRIP projects to validate performance data reported by providers. With the extension of the waiver for the next several years, HHSC will continue to contract with a compliance monitor to validate provider performance data that serves as the basis for DSRIP payments. This validation includes a review of health outcomes and the population impact. Additionally, the compliance monitor may assist with other items as required by CMS during waiver negotiations. DSRIP performing providers are randomly selected for compliance monitoring and each has been selected at least once since the initiation of the DSRIP program.

The MMC encounter data have been processed by TMHP since January 1, 2004. TMHP performs internal edits for data quality and completeness. There is a six-month time lag for claims and encounter data. Prior analyses with Texas data showed that, on average, over 96 percent of the claims and encounters are complete by that time period.

Special Methodological Considerations

Given the Demonstration is a waiver renewal, Texas seeks to reduce evaluation reporting for MMC programs and populations now considered to be standard Medicaid policy that were rigorously evaluated and found to be successful (i.e., STAR and STAR+PLUS expansion to new SDAs). Additional results from the previous evaluation also found RHPs were successfully formed and DSRIP implemented (Texas Health and Human Services Commission, 2017). Therefore, this Evaluation Design Plan focuses on the CMS priority policy area of DSRIP (United States Government Accountability Office, 2018), continued evaluation of UC, and new MMC populations.

The Demonstration proposes to affect dynamic change throughout the health care delivery system for the MLIU population and providers in Texas. Systemic change does not occur quickly, and can rarely be measured immediately when it does happen (Rose, 2001). Additionally, modifications to Demonstration operations and

reporting present challenges to measuring changes in outcomes over time. Finally, data lags pose a challenge to measuring and reporting any change in a timely manner (Schoenberg, Heider, Rosenthal, Schwartz, & Kaye, 2015). Data lags specifically impact the UC (two-year lag) and the MMC (6-9 months lag) components of the Demonstration.

The evaluation of DSRIP involves several limitations, depending on the data source and analytic strategy. With regard to DSRIP provider reporting data, though DSRIP providers report the number of unique individuals served through their projects (DY2-6) and within their provider system (DY7-10), these counts are unique only at the performing provider level and cannot be aggregated across providers to enumerate the entire DSRIP population. It is unknown how many clients may participate in DSRIP activities implemented by multiple DSRIP performing providers. Additionally, DSRIP activities are intended to serve MLIU individuals, but 1) services are not limited to this population, and 2) it is not possible to link Medicaid clients with utilization of specific DSRIP services. Additionally, the change in reporting from project-level Category 1-4 reporting to provider-level Category A-D reporting means there is a lack of continuity in outcomes reporting, resulting in instrumentation threats to internal validity. While HLM is proposed to evaluate the DSRIP program, there may be insufficient Category C outcome data for these analyses.

Evaluating client-level DSRIP outcomes through encounter data also involves several drawbacks, including lack of data on the uninsured population and possible contamination of the treatment effect. Notably, the comparison group of non-DSRIP providers may have similar, non-DSRIP initiatives focused on the outcome of interest (e.g., diabetes control), which may dilute the treatment effect of DSRIP. It is also possible that some clients may receive care from both DSRIP and non-DSRIP providers, raising the possibility of individuals who are in both the treatment and comparison groups simultaneously.

Due to the statewide implementation of Texas' Demonstration, the MMC evaluation is limited by the lack of true comparison groups. All Medicaid clients in the state are subject to participation in the Demonstration. As a result, comparisons can only be made among beneficiaries; therefore while a pre/post evaluation design or comparison to baseline may suggest improvements in outcomes due to the Demonstration, associations do not imply causality.

The staggered expansion of DSRIP activities and MMC statewide, including geographic variations in implementation, present challenges for rigorous evaluation. Many components of the detailed evaluation design plan will need to be deferred until after additional DSRIP deliverables are available (Transition Plan STC 37 due October 1, 2019 and DSRIP protocols for DY9-10 due July 31, 2019). Additional amendments to STCs may require updates to the evaluation plan (STC 7(g)). Any changes will be reflected in STC Attachment S (Evaluation Design) tracking document (Appendix A: Document History Log).

While population-level data for the MMC evaluation is a strength of this evaluation, the reliance on administrative claims and encounters can be a limitation. These data have been designed and collected for billing purposes, but are used to determine changes in access to and quality of care. However, most of the selected measures are validated and widely used for this purpose. While administrative data might be able to identify key cases and statistical trends, they are usually limited in providing finer detailed health or health behavior information. Additionally, the use of population-level data precludes the use of significance testing since probability sampling and sampling error do not apply to measurements of difference at the population level. The effect size of measured differences represent true differences, though they may or may not correspond to meaningful changes at the program level.

Finally, history and maturation pose threats to the internal validity of the evaluation. Notably, the Demonstration involves simultaneous implementation of multiple state efforts to address improvements in DSRIP/UC/MMC. These concurrent changes to the baseline conditions make it difficult to isolate the effect of one component, let alone determine which strategy is most successful. Maturation threats resulting from concurrent changes to economic, environmental (e.g., Hurricane Harvey), or demographic factors also present problems for causal inference. However, the most serious confound in the evaluation is the COVID-19 pandemic, which coincides with the final three years of the Demonstration. The pandemic and ensuing economic recession significantly reordered priorities for clients and providers in the state, impacting enrollment, utilization, and health care delivery across the Medicaid system. HHSC anticipates the COVID-19 pandemic will have a direct or indirect impact on many of the measures used in this evaluation. At the time of writing, it is unknown how long the most severe effects of the pandemic will last. External evaluators will take care to adjust to the evaluation as necessary, and present pertinent findings within the appropriate context given the impact of the COVID-19 pandemic on the Demonstration.

Communication, Dissemination, and Reporting

The Interim and Summative Evaluation reports will be produced in alignment with the Attachment P of the STCs, *Preparing the Evaluation Report,* and the schedule of deliverables listed in the timeline (Table 12).

After the Interim Evaluation report is submitted, we will revisit the evaluation questions in the evaluation design plan to determine their relevance with respect to the Summative Evaluation. If revisions are necessary, we will work collaboratively with HHSC, CMS, and consider other stakeholder feedback to ensure the evaluation questions will provide meaningful information regarding the impact of the Demonstration.

Table 12. Schedule of Evaluation Deliverables

Deliverable	Date
STCs approved for the 1115(a) Waiver renewal	December 21, 2017
HHSC submits draft Evaluation Design Plan to CMS for comments and posts to the state's Demonstration website (no later than 120 calendar days after approval of demonstration extension)	April 19, 2018
HHSC received comments from CMS (no later than 60 business days of receipt of draft Evaluation Design Plan)	May 10, 2018
HHSC submits revised Evaluation Design (no later than 60 calendar days of receipt of CMS comments) and posts to the state's Demonstration website	July 9, 2018
HHSC procures an independent evaluator	By September 1,2019
HHSC submits draft Interim Evaluation Report to CMS for comment	September 30, 2021
HHSC receives comments from CMS (within 60 business days)	By December 29, 2021
HHSC submits final Interim Evaluation Report to CMS (within 60 calendar days of receipt of comments)	By March 28, 2022
HHSC submits draft Final Evaluation Report to CMS for comment	March 30, 2024
HHSC receives comments from CMS (within 60 business days)	By June 24, 2024
HHSC submits Final Evaluation Report to CMS (within 60 calendar days of receipt of comments)	By September 18, 2024

Note. STC=Special Terms and Conditions; HHSC=Health and Human Services Commission; CMS=Centers for Medicare and Medicaid Services.

State Presentations for the Centers for Medicare and Medicaid Services (CMS)

As specified in STC 71, if requested by CMS, Texas will participate in discussions with and/or present to CMS the Evaluation Design plan and/or evaluation findings.

Public Access

Texas shall post final versions of the Evaluation Design Plan, Interim Evaluation Report, and Summative Evaluation Report on the state's DSRIP website within 30 days of approval by CMS (STC 72).

Additional Publications and Presentations

Attachment O to the STCs, *Developing the Evaluation Design,* endorses dissemination of 1115(a) Demonstration evaluation findings on "what is or is not

working and why," Texas proposes a protocol for communicating evaluation publications and presentations incorporating direction from CMS STC 73. Texas HHSC CADS Evaluation will make every effort to provide CMS ten (10) business days to review and comment on manuscripts and presentations submitted to a journal, or conference for consideration of publication or acceptance for presentation, respectively. Although STC 73 also refers to 'contractors and any third party directly connected to the demonstration,' HHSC CADS can only impose this requirement for CMS review on CADS evaluators and evaluation contractors, not other parties involved with the Demonstration in other ways (i.e., DSRIP performing providers).

Additionally, all peer-reviewed and non-peer-reviewed publications and presentations will be listed as an appendix in the Interim and Summative Evaluation Reports.

Appendix A: Document History Log

Table A1. Document History Log

Status[1]	Document Revision[2]	Effective Date	Description[3]
Baseline	n/a	April 20,2018	Initial version of STC Attachment S: "Evaluation Design Plan "
Revision	2.1	July 9, 2018	Updated based on CMS feedback received May 10, 2018
Revision	3.1	March 11, 2020	Updated technical specifications for Measure 3.5.2
Revision	4.1	November 6, 2020	Added Appendix F: Supplemental Evaluation Design for the Texas COVID-19 Public Health Emergency 1115(a) Demonstration Amendment
Revision	5.1	January 8, 2021	Updated sampling strategy, analytic methods, and measures associated with Hypothesis 1.2 Updated select measure specifications or analytic methods the external evaluator deemed infeasible Added COVID-19 pandemic to the Special Methodological Considerations

Note. STC=Special Terms and Conditions; CMS=Centers for Medicare and Medicaid Services.

[1] Status should be represented as "Baseline" for initial issuances, "Revision" for changes to the Baseline version, and "Cancellation" for withdrawn versions.

[2] Revisions should be numbered according to the version of the issuance and sequential number of the revision - e.g., "1.2" refers to the first version of the document and the second revision.

[3] Brief description of the changes to the document made in the revision.

Appendix B: Independent Evaluator and Budget

The Special Terms and Conditions (STCs) state the Demonstration evaluation must be conducted by an independent evaluator. To meet this requirement, Health and Human Services Commission (HHSC) will identify and contract with an independent external evaluator.

External Independent Evaluator

Required Qualifications

HHSC will select an independent evaluator with the expertise, experience, and impartiality to conduct a scientifically rigorous program evaluation meeting all requirements specified in the STCs, including the skills needed to examine measures in Appendix C, and meet deadlines in table 5 (Schedule of Evaluation Deliverables). Required qualifications and experience include multi-disciplinary health services research skills and experience; an understanding of and experience with the Medicaid program; familiarity with Texas HHSC programs and populations; and experience conducting complex, multi-faced evaluations of large, multi-site health and/or social services programs.

Potential evaluation entities will be assessed on their relevant work experience, staff expertise, data management and analytic capacity, experience working with state agency program and research staff, proposed resource levels and availability of key staff, track record of related publications in peer-reviewed journals, and the overall quality of their proposal. Proposed deliverables must meet all standards of leading academic institutions and academic journal peer review. In the process of identifying, selecting, and contracting with an independent external evaluator, Texas will act appropriately to prevent a conflict of interest with the independent external evaluator, including the requirement to sign a declaration of "No Conflict of Interest."

HHSC will pursue a contract to secure independent evaluation services from a Texas university. The contracting process includes development of a project proposal and quote request specifying the Scope of Work, vendor qualifications, vendor requirements, timelines, milestones, and cost estimate template. The cost estimate template will include a breakdown of costs for staffing, fringe benefit, travel, equipment and supplies, data collection, other administrative, and indirect costs.

The project proposal and quote request is sent to the list of Texas universities allowing 30 calendar days for response. A team of reviewers at HHSC will be identified prior to the submission deadline of proposals. Each proposal submitted in response to the request will be reviewed by the HHSC team of reviewers. Respondents with the best proposal and value are identified by the team. HHSC will make a final decision for contract award based on the strength of the overall proposal and the abilities of the external entity to satisfy the requirements of the project proposal and quote request and conduct the independent evaluation in the timeframe required. The contracting process begins once a university is selected.

The timeframe for soliciting and contracting for an independent evaluator is 6-12 months from the date an Evaluation Design Plan is approved by the Centers for Medicare and Medicaid Services (CMS).

Evaluation Budget

As required by CMS in Attachment O of the STCs, Section F(2), the proposed budget shell includes: total estimated cost, estimated staff, administrative, and other costs for all aspects of the evaluation. The total budget for the external independent evaluator is estimated to be approximately $6 million for five years (September 1, 2019 through August 31, 2024)[7], but the final budget will not be available until the external evaluator is selected. The estimated budget amount will cover all evaluation expenses, including salary, fringe, administrative costs, other direct costs such as travel for data collection, conference calls, as well as indirect costs and those related to quantitative and qualitative data collection and analysis, and report development.

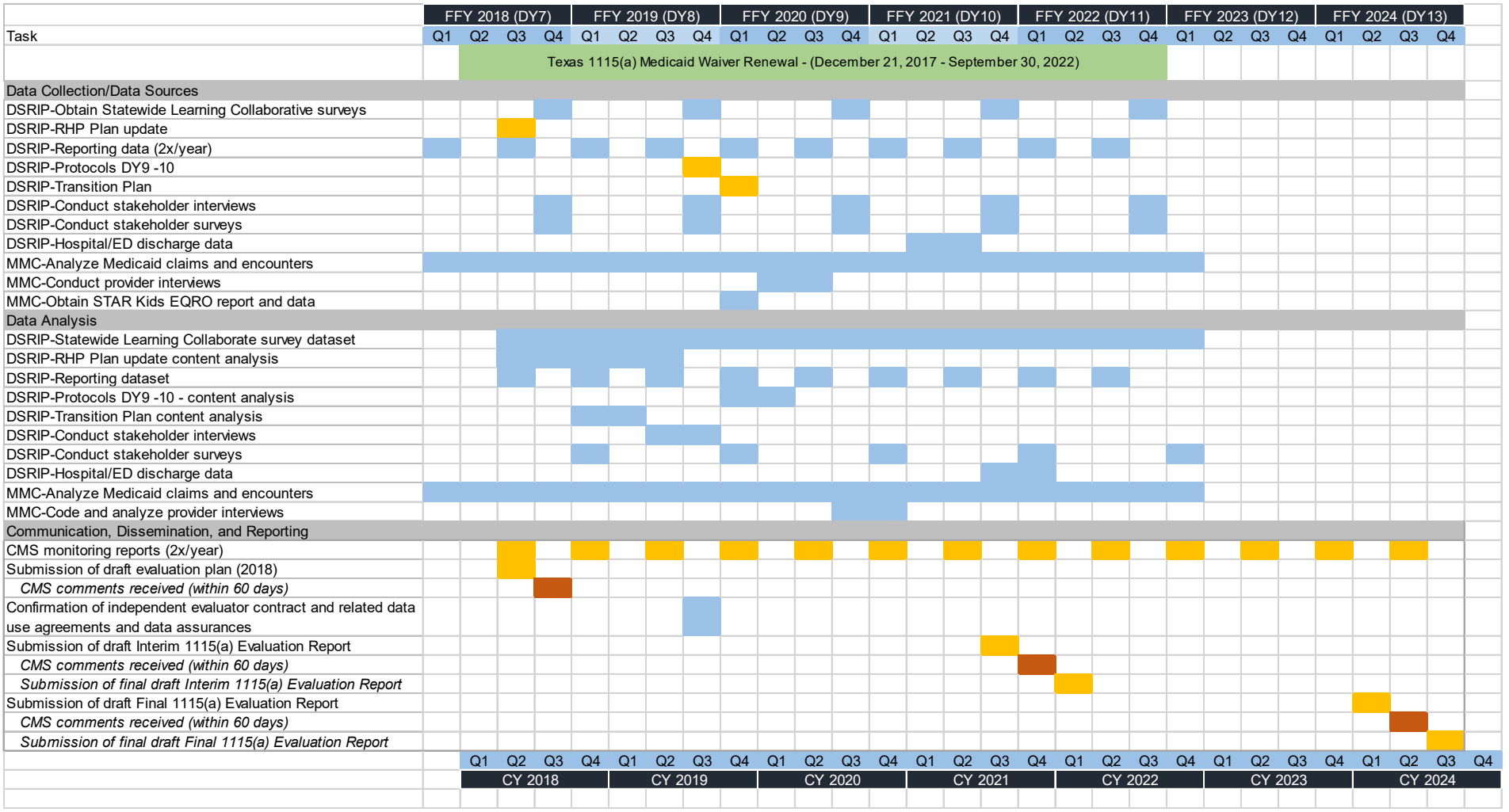
As part of the contracting process, potential contractors will populate the budget shell (Table B1).

[7] The external evaluator timeframe, September 1, 2019 through August 31, 2024, is based on the time needed for the Centers for Medicare and Medicaid Services (CMS) to approve the Evaluation Design Plan and to contract with an External Evaluator. The contract timeframe extends through CMS approval of the final Summative Evaluation Report, allowing time for External Evaluators to address any CMS comments/questions.

Table B1. Proposed Evaluation Budget

Category	Total Cost
Personnel	
Fringe	
Travel	
Indirect Costs	
Data Collection	
Equipment/Supplies	
Other Administrative Costs	
TOTAL EVALUATION COST	

Table B2. Estimated Evaluation Timeline and Major Milestones



Note. FFY=Federal fiscal year, October 1-September 30; DY=Demonstration year, October 1-September 30; Q1=October, November, and December; Q2=January, February, and March; Q3=April, May, and June; Q4=July, August, and September; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; ED=Emergency department; MMC=Medicaid managed care; STAR Kids=MMC program for disabled through 20 years; EQRO=External quality review organization; CMS=Centers for Medicare and Medicaid Services; CY=Calendar year.

Appendix C: Detailed Tables

Evaluation Question 1: *Did the Delivery System Reform Incentive Payment (DSRIP) program incentivize changes to transform the health care system for the Medicaid and low-income uninsured (MLIU) population in Texas?*

Hypothesis 1.1: DSRIP incentivized changes to the health care system that maintained or increased collaboration among providers.

Measure 1.1.1	Type of collaboration
Definition	Ties, or collaborative relationships between organizations will be classified as: any collaboration, joint service delivery, resource sharing, data sharing, DSRIP learning collaborative, or HIE participation.
Study Population	• DSRIP performing providers
Measure Steward or Source	N/A
Technical Specifications	Ties identified will be categorized into all applicable categories: • Joint service delivery - working with another organization to provide services to patients • Resource sharing - two organizations share tangible resources (i.e., office space) • Data sharing - two organizations have a formal data sharing agreement to share patient data • DSRIP learning collaborative - two organizations attend the same DSRIP learning collaborative • HIE membership • Any collaboration - working with another organization in any capacity
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting (sampling frame) • Social network analysis survey • Learning collaborative reporting, if necessary
Comparison Group(s)/ Subgroup(s)	• RHP subgroups • DSRIP performing provider status subgroups
Analytic Methods	• Social network analysis • Descriptive statistics, including trend analysis with DY2-5 data, if possible
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; HIE=Health information exchange; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30.

Measure 1.1.2	Number of ties
Definition	Count of ties, or collaborative relationships, between organizations
Study Population	• DSRIP performing providers
Measure Steward or Source	N/A
Technical Specifications	If an organization indicates it collaborates with another organization, this tie is counted. The collaboration does not necessarily need to be confirmed by the other organization. Unconfirmed (one-way, identified by one organization) and confirmed ties (ties identified by both organizations) are counted as one tie.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting (sampling frame) • Social network analysis survey
Comparison Group(s)/ Subgroup(s)	• RHP subgroups • DSRIP performing provider status subgroup
Analytic Methods	• Social network analysis • Descriptive statistics, including trend analysis with DY2-5 data, if possible
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30.

Measure 1.1.3	Strength of ties (multiplexity)
Definition	Indicated by the number of ties between two organizations. Organizations can have up to five types of ties between one another: joint service delivery, resource sharing, data sharing, DSRIP learning collaborative, and/or HIE membership. The greater number of types of ties between the pair, the stronger the tie.
Study Population	• DSRIP performing providers
Measure Steward or Source	N/A
Technical Specifications	The count of the types of ties shared by two organizations is the strength of the tie. For example, if two organizations share one type of tie, the strength of the tie is 1; if they share two types of ties, the strength of the tie is 2, etc.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting (sampling frame) • Social network analysis survey
Comparison Group(s)/ Subgroup(s)	• RHP subgroups • DSRIP performing provider status subgroup
Analytic Methods	• Social network analysis • Descriptive statistics, including trend analysis with DY2-5 data, if possible
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; HIE=Health information exchange; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30.

Measure 1.1.4	Density
Definition	The proportion of ties that exist among the ties that are possible. If all organizations in a network share ties (indicate they work together) the density of ties in the network is 100%.
Study Population	• DSRIP performing providers
Measure Steward or Source	N/A
Technical Specifications	Calculated as a percent: **Numerator:** Number of ties that exist among organizations (regardless of strength of the ties) **Denominator:** Total number of ties possible within the network among DSRIP performing providers **Density:** (numerator / denominator) * 100
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting (sampling frame) • Social network analysis survey
Comparison Group(s)/ Subgroup(s)	• RHP subgroups • DSRIP performing provider status subgroup
Analytic Methods	• Social network analysis • Descriptive statistics, including trend analysis with DY2-5 data, if possible
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30.

Measure 1.1.5	Centralization
Definition	The degree to which ties are concentrated, or centered on one or more organizations in the network.
Study Population	• DSRIP performing providers
Measure Steward or Source	N/A
Technical Specifications	Network centralization is calculated using degree centrality for each individual node in the network: **Numerator**: Sum of differences between each node's centrality and the centrality of the most central node **Denominator**: The maximum sum of differences between a perfectly central actor and all others; calculated as (n-1)*(n-2) in a network of n organizations **Centralization**: (numerator / denominator)
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting (sampling frame) • Social network analysis survey
Comparison Group(s)/ Subgroup(s)	• RHP subgroups • DSRIP performing provider status subgroups
Analytic Methods	• Social network analysis • Descriptive statistics, including trend analysis with DY2-5 data, if possible
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30.

Measure 1.1.6	Attitude toward collaboration
Definition	How positively or negatively an organization views collaboration with other organizations.
Study Population	• DSRIP performing providers
Measure Steward or Source	None
Technical Specifications	Organizations participating in the structured interview for the social network analysis will be asked questions indicating how they feel about collaborating with other RHP member and non-member organizations. Attitudes toward collaboration will be measured on a Likert-type scale (1-5). Organizations will also be given the opportunity to provide additional comments regarding collaboration (open-ended).
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting (sampling frame) • Social network analysis survey
Comparison Group(s)/ Subgroup(s)	• RHP subgroups • DSRIP performing providers status subgroups
Analytic Methods	• Descriptive statistics, including trend analysis with DY2-5 data, if possible • Thematic content analysis (open-ended responses)
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30.

Measure 1.1.7	Health information exchange membership
Definition	DSRIP performing providers who belong to HIE(s). DSRIP performing providers will be classified as HIE members or non-members, as well as the number of HIEs to which they belong.
Study Population	• DSRIP performing providers
Measure Steward or Source	None
Technical Specifications	DSRIP performing providers will be asked to report membership in HIE(s). They will be asked to report the name of the HIE(s) to which they belong.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Methods	• Descriptive statistics
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; HIE=Health information exchange; RHP=Regional Healthcare Partnership.

Measure 1.1.8	Use of health information exchange data for Delivery System Reform Incentive Payment reporting
Definition	DSRIP performing providers who use information from HIEs in their DSRIP reporting.
Study Population	• DSRIP performing providers
Measure Steward or Source	None
Technical Specifications	DSRIP performing providers will be asked to provide the source of information used in DSRIP reporting, for both numerators and denominators, where appropriate. Data sources may include, but are not limited to: electronic health records, claims data, HIE, etc. **Numerator:** Number of providers using HIE as a data source for at least one measure **Denominator:** Number of DSRIP performing providers submitting reporting for Category A-D **Use of HIE data (%):** (numerator / denominator) * 100
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Methods	• Descriptive statistics
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; HIE=Health information exchange; RHP=Regional Healthcare Partnership.

Hypothesis 1.2: DSRIP incentivized performing providers to improve continuity, quality, and cost of care for Medicaid clients with Diabetes.

Measure 1.2.1	Usual provider of care
Definition	Maximum value of the proportion of office visits to the same provider (same TPI) over all office visits
Study Population	• Medicaid clients with a diagnosis of diabetes
Measure Steward or Source	N/A

Technical Specifications	• Obtain FFS and MMC clients with a diagnosis of diabetes according to the HEDIS® Value Set: Diabetes during DY7
	• For each client, count the number of office visits using:
	  ○ CPT codes for new or established office/outpatient visit (99201-99215), new or established preventative care (99381-99397), or clinic visit/encounter, all inclusive (T1015); or
	  ○ Place codes for office, hospital outpatient, rural health clinic, federally qualified health center, or public health clinic
	• Calculate each provider's share of total office visits as the number of office visits to the provider divided by the total number of office visits over 24 months.
	• Designate the usual provider as the provider with the largest share of visits over 24 months

Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Clients treated by DSRIP providers matched to clients treated by non-DSRIP providers • Race/ethnicity • RHP subgroups

Analytic Methods	• DID between Medicaid clients seen by a DSRIP providers versus non-DSRIP providers
	  ○ Proposed pre-period: 24-months before client index date*
	  ○ Proposed post-period: 24-months after client index date

Benchmark	None

Note. TPI = Texas Provider Identifier; FFS = Fee-for-service; MMC=Medicaid managed care; HEDIS®=Healthcare Effectiveness Data and Information Set; DY=Demonstration year, October 1-September 30; CPT=Current Procedural Terminology; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DID = Difference-in-difference.*The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

Measure 1.2.2	Interval between provider visits
Definition	The longest interval between office visits to the same PCP during the measurement period
Study Population	• Medicaid clients with a diagnosis of diabetes
Measure Steward or Source	N/A

Technical Specifications	• Obtain FFS and MMC clients with a diagnosis of diabetes according to the HEDIS® Value Set: Diabetes during DY7
	• For each client, count the number of office visits using:
	  ○ CPT codes for new or established office/outpatient visit (99201-99215), new or established preventative care (99381-99397), or clinic visit/encounter, all inclusive (T1015); or
	  ○ Place codes for office, hospital outpatient, rural health clinic, federally qualified health center, or public health clinic
	• Calculate the longest interval between office visits to the same PCP during the measurement period.
	6-month interval: Number of clients in which the longest interval is 8 months or less (6 months with buffer) over a 24-month measurement period
	12-month interval: Number of clients in which the longest interval is 14 months or less (12 months with buffer) over a 24-month measurement period

Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Clients treated by DSRIP providers matched to clients treated by non-DSRIP providers • Race/ethnicity • RHP subgroups

Analytic Methods	• DID between Medicaid clients seen by a DSRIP providers versus non-DSRIP providers
	  ○ Proposed pre-period: 24-months before client index date*
	  ○ Proposed post-period: 24-months after client index date

Measure 1.2.2	Interval between provider visits
Benchmark	None

Note. PCP=Primary care provider; FFS = Fee-for-service; MMC=Medicaid managed care; HEDIS®=Healthcare Effectiveness Data and Information Set; DY=Demonstration year, October 1-September 30; CPT=Current Procedural Terminology; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DID = Difference-in-difference. *The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

Measure 1.2.3	Testing HbA1c levels
Definition	Individuals with HbA1c tests during the measurement period
Study Population	• Medicaid clients with a diagnosis of diabetes
Measure Steward or Source	N/A
Technical Specifications	• Obtain FFS and MMC clients with a diagnosis of diabetes according to the HEDIS® Value Set: Diabetes during DY7 • Find all dates for HbA1c test using CPT codes 83036, 83037, 83020 or 83021 **HbA1c testing**: Number of clients with at least two HbA1c tests within an interval of 14 months or less (12 months with buffer) over a 24-month measurement period
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Clients treated by DSRIP providers matched to clients treated by non-DSRIP providers • Race/ethnicity • RHP subgroups
Analytic Methods	• DID between Medicaid clients seen by a DSRIP providers versus non-DSRIP providers ○ Proposed pre-period: 24-months before client index date* ○ Proposed post-period: 24-months after client index date
Benchmark	None

Note. HbA1c= Glycosylated Hemoglobin, Type A1C; FFS = Fee-for-service; MMC=Medicaid managed care; HEDIS®=Healthcare Effectiveness Data and Information Set; DY=Demonstration year, October 1-September 30; CPT=Current Procedural Terminology; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DID = Difference-in-difference. *The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

Measure 1.2.4	Diabetes medication adherence
Definition	Overall proportion of days covered (PDC) for diabetes medications
Study Population	• Medicaid clients with a diagnosis of diabetes
Measure Steward or Source	PQA, as detailed in CMS' Quality Rating System*
Technical Specifications	• Obtain FFS and MMC clients with a diagnosis of diabetes according to the HEDIS® Value Set: Diabetes during DY7 • Identify pharmaceutical claims for clients diagnosed with diabetes consisting of non-insulin diabetes medications PDC is the number of "covered" days in the measurement period divided by the number of days in the measurement period. PDC will be calculated for PQA's "Diabetes All Class" therapeutic category. **Numerator:** Number of clients who met the 80% PDC threshold during the measurement year, for the "Diabetes All Class" therapeutic category **Denominator:** Number of clients (18 years or older on first day of measurement year) with at least two prescriptions filled **Annual rate:** (Numerator / denominator)*100
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level pharmacy data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Clients treated by DSRIP providers matched to clients treated by non-DSRIP providers • Race/ethnicity • RHP subgroups

Analytic Methods	• DID between Medicaid clients seen by a DSRIP providers versus non-DSRIP providers
	  ○ Proposed pre-period: 24-months before client index date**
	  ○ Proposed post-period: 24-months after client index date

Benchmark	None

Note. PDC=Proportion of days covered; PQA = Pharmacy Quality Alliance; CMS=Centers for Medicare and Medicaid Services; FFS = Fee-for-service; MMC=Medicaid managed care; HEDIS®=Healthcare Effectiveness Data and Information Set; DY=Demonstration year, October 1-September 30; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DID = Difference-in-difference. *https://www.cms.gov/files/document/2021-qrs-measure-technical-specifications.pdf **The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

Measure 1.2.5	Emergency department visits for diabetes
Definition	ED visits with a primary or secondary diagnosis of diabetes
Target Population(s)	• Medicaid clients with a diagnosis of diabetes
Measure Steward or Source	Based on DSRIP Measure Bundle Protocol, Measure A1-508 NYU Wagner: https://wagner.nyu.edu/faculty/billings/acs-algorithm
Technical Specifications	Clients with diabetes have a diagnosis according to the HEDIS® Value Set: Diabetes Number of ED visits with a primary or secondary diagnosis of diabetes per 1,000 clients during the measurement period
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Clients treated by DSRIP providers matched to clients treated by non-DSRIP providers • Race/ethnicity • RHP subgroups
Analytic Method(s)	• DID between Medicaid clients seen by a DSRIP providers versus non-DSRIP providers ○ Proposed pre-period: 24-months before client index date* ○ Proposed post-period: 24-months after client index date
Benchmark	None

Note. ED=Emergency Department; DSRIP=Delivery System Reform Incentive Payment; NYU=New York University; HEDIS®=Healthcare Effectiveness Data and Information Set; FFS=Fee-for-service; MMC=Medicaid Managed Care; RHP=Regional Healthcare Partnership; DID = Difference-in-difference.
*The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

Measure 1.2.6	Cost of Care
Definition	Cost of care for Medicaid clients with diabetes
Target Population(s)	• Medicaid clients with a diagnosis of diabetes
Measure Steward or Source	N/A
Technical Specifications	Clients with diabetes have a diagnosis according to the HEDIS® Value Set: Diabetes Cost of care based on all encounters data for each client with diabetes during the measurement period
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level pharmacy data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Clients treated by DSRIP providers matched to clients treated by non-DSRIP providers • Race/ethnicity • RHP subgroups

Analytic Method(s)	• DID between Medicaid clients seen by a DSRIP providers versus non-DSRIP providers
	  ○ Proposed pre-period: 24-months before client index date*
	  ○ Proposed post-period: 24-months after client index date

Benchmark	• None

Note. HEDIS®=Healthcare Effectiveness Data and Information Set; FFS=Fee-for-service; MMC=Medicaid Managed Care; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; DID = Difference-in-difference. *The client index date is the date of the client's first diabetes-related visit to a DSRIP or non-DSRIP provider in DY7.

Hypothesis 1.3: DSRIP incentivized performing providers to improve quality-related outcomes, specified as Category C population-based clinical outcome measures.

Measure 1.3.1	**Rate of emergency department visits for diabetes (A1-508*)**
Definition	The rate of ED utilization for preventable diabetes conditions or complications. This is a Category C measure in the measure bundle, A1: Improved Chronic Disease Management: Diabetes Care.
Target Population(s)	• MLIU sub-populations identified in DSRIP performing provider systems (adults with diabetes)
Measure Steward or Source	NYU Wagner: https://wagner.nyu.edu/faculty/billings/acs-algorithm
Technical Specifications	Following DSRIP Category C Measure Specifications, performing providers will report the numerator and denominator necessary to calculate a weighted and unweighted rate of ED visits for diabetes among the attributed target population in their provider system: **Numerator:** Total number of ED visits with a primary or secondary diagnosis of diabetes (E101, E131, E110, E130, E10641, E11641, E106, E116, E108, E118, E109, E119) **Denominator:** DSRIP attributed target population for the provider system **Rate:** (numerator / denominator) * 100 Note: Rate may be presented per 10,000 clients if prevalence is low
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting: Provider reported rate • RHP plan update: Provider and RHP characteristics for HLM model • DSRIP administrative data: Provider and RHP characteristics for HLM model
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Method(s)	• Descriptive trend analysis ○ Paired t-test or Wilcoxon signed-rank test • Hierarchical linear modeling or growth curve modeling, if feasible
Benchmark	• Baseline established CY17 • DY7 goal of 2.5% improvement over baseline • DY8 goal of 10% improvement over baseline

Note. ED=Emergency department; MLIU=Medicaid and low-income uninsured; NYU=New York University; DSRIP=Delivery System Reform Incentive Payment; RHP=Regional Healthcare Partnership; HLM=Hierarchical linear model; CY=Calendar year; DY=Demonstration year, October 1-September 30. *Selected Category C measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018).

Measure 1.3.2	Rate of emergency department visits for congestive heart failure, angina, and hypertension (A2-509*)
Definition	The rate of ED utilization for CHF, angina, and hypertension. This is a Category C measure in the measure bundle, A2: Improved Chronic Disease Management: Heart Disease.
Study Population	• MLIU sub-populations identified in DSRIP performing provider systems (adults with heart disease)
Measure Steward or Source	NYU Wagner: https://wagner.nyu.edu/faculty/billings/acs-algorithm
Technical Specifications	Following DSRIP Category C Measure Specifications, performing providers will report the numerator and denominator necessary to calculate a weighted and unweighted rate of ED visits for CHF, angina, and hypertension among the attributed target population in their provider system: **Numerator:** Total number of ED visits with a primary or secondary diagnosis of heart failure and pulmonary edema (I50, I110, J810), hypertension (I10, I119), or angina (I20, I240, I248, I249) **Denominator:** DSRIP attributed target population for the provider system **Rate:** (numerator / denominator) * 100 Note: Rate may be presented per 10,000 clients if prevalence is low
Exclusion Criteria	Numerator exclusions: • Heart failure/pulmonary edema and hypertension: Exclude cases with a surgical procedure starting with 02 • Angina: Exclude cases with a surgical procedure starting with 0 or 1
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting: Provider reported rate • RHP plan update: Provider and RHP characteristics for HLM model • DSRIP administrative data: Provider and RHP characteristics for HLM model
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Methods	• Descriptive trend analysis ○ Paired t-test or Wilcoxon signed-rank test • Hierarchical linear modeling or growth curve modeling, if feasible

Measure 1.3.2	Rate of emergency department visits for congestive heart failure, angina, and hypertension (A2-509*)
Benchmark	Improvement over self • Baseline established CY17 • DY7 goal of 2.5% improvement over baseline • DY8 goal of 10% improvement over baseline

Note. ED=Emergency department; CHF=Congestive heart failure; MLIU=Medicaid and low-income uninsured; DSRIP=Delivery System Reform Incentive Payment; NYU=New York University; RHP=Regional Healthcare Partnership; HLM=Hierarchical linear model; CY=Calendar year; DY=Demonstration year, October 1-September 30. *Selected Category C measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018).

Measure 1.3.3	Rates of emergency department visits for behavioral health and substance abuse (H2-510 / L1-387 / M1-387*)
Definition	The rates of ED utilization for BH and SA conditions (reported as two separate rates). This is a Category C measure in the measure bundle, H2: Behavioral health and appropriate utilization.
Study Population	• MLIU sub-populations identified in DSRIP performing provider systems (individuals with SMI)
Measure Steward or Source	HHSC-developed for DSRIP Measure Bundle Protocol DY7-10
Technical Specifications	Following DSRIP Category C Measure Specifications, performing providers will report the numerator and denominator necessary to calculate a weighted and unweighted rate of ED visits for each BH and SA conditions among the attributed target population in their provider system: **Rate 1 Numerator:** Total number of ED visits with a primary or secondary diagnosis of behavioral health conditions: • F20-F29 Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders • F30-F39 Mood [affective] disorders • F40-F48 Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders • F60-F69 Disorders of adult personality and behavior **Rate 2 Numerator:** Total number of ED visits with a primary or secondary diagnosis of substance abuse: • F10-F16, F18 - F19 Mental and behavioral disorders due to psychoactive substance use **Denominator (hospitals and physician practices):** DSRIP attributed target population for the provider system

Measure 1.3.3	Rates of emergency department visits for behavioral health and substance abuse (H2-510 / L1-387 / M1-387*)
	Denominator (LHDs, CMHCs): Either total number of ED visits for individuals 18 years or older during the measurement period OR DSRIP attributed target population for the provider system **Rate:** (numerator / denominator) * 100 Note: Rate may be presented per 10,000 clients if prevalence is low
Exclusion Criteria	Rate 2 numerator excludes nicotine
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting: Provider reported rate • RHP plan update: Provider and RHP characteristics for HLM model • DSRIP administrative data: Provider and RHP characteristics for HLM model
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Methods	• Descriptive trend analysis ○ Paired t-test or Wilcoxon signed-rank test • Hierarchical linear modeling or growth curve modeling, if feasible
Benchmark	• Baseline established CY17 • DY7 goal of 2.5% improvement over baseline • DY8 goal of 10% improvement over baseline

Note. ED=Emergency department; BH=Behavioral health; SA=Substance abuse; MLIU=Medicaid and low-income uninsured; DSRIP=Delivery System Reform Incentive Payment; SMI=Serious mental illness; HHSC=Health and Human Services Commission; DY=Demonstration year, October 1-September 30; LHD=Local health department; CMHC=Community mental health clinic; RHP=Regional Healthcare Partnership; HLM=Hierarchical linear modeling; CY=Calendar year. *Selected Category C measures from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018).

Measure 1.3.4	Prevention Quality Indicator 91: Adult acute composite indicator (C1-502*)
Definition	The PQI composite measure of acute conditions per 100,000 adult population. Includes admissions with a principal diagnosis of one of the following conditions: dehydration, bacterial pneumonia, or urinary tract infection. This is a Category C measure in the measure bundle, C1: Primary Care Prevention - Healthy Texans.
Study Population	• MLIU sub-populations identified in DSRIP performing provider systems (adults)
Measure Steward or Source	AHRQ: https://www.qualityindicators.ahrq.gov/Modules/PQI_TechSpec_ICD10_v70.aspx

Measure 1.3.4	Prevention Quality Indicator 91: Adult acute composite indicator (C1-502*)
Technical Specifications	This measure was developed by the AHRQ. Performing providers will report the numerator and denominator necessary to calculate a weighted and unweighted adult composite measure: **Numerator:** Number of discharges for clients 18 years and older in DSRIP attributed target population for the provider system, that meet the inclusion and exclusion rules for the numerator in any of the following PQIs: • PQI #10 Dehydration Admission Rate • PQI #11 Bacterial Pneumonia Admission Rate • PQI #12 Urinary Tract Infection Admission Rate Discharges are only counted once in the numerator, even if they qualify for more than one PQI listed above. **Denominator:** DSRIP attributed target population for the provider system (18 years and older) **Rate:** (numerator / denominator) * 100 Note: Rate may be presented per 10,000 clients if prevalence is low
Exclusion Criteria	Numerator excludes obstetric discharges, along with specific exclusion criteria listed in the PQI 10, 11, and 12 specifications
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting: Provider reported rate • RHP plan update: Provider and RHP characteristics for HLM model • DSRIP administrative data: Provider and RHP characteristics for HLM model
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Methods	• Descriptive trend analysis ○ Paired t-test or Wilcoxon signed-rank test • Hierarchical linear modeling or growth curve modeling, if feasible
Benchmark	• Baseline established CY17 • DY7 goal of 2.5% improvement over baseline • DY8 goal of 10% improvement over baseline

Note. PQI=Prevention Quality Indicator; MLIU=Medicaid and low-income uninsured; DSRIP=Delivery System Reform Incentive Payment; AHRQ=Agency for Healthcare Research and Quality; RHP=Regional Healthcare Partnership; HLM=Hierarchical linear model; CY=Calendar year; DY=Demonstration year, October 1-September 30. *Selected Category C measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018).

Measure 1.3.5	Pediatric Quality Indicator 91: Child acute composite indicator (D1-503*)
Definition	The PDI composite of acute conditions per 100,000 population, ages 3 months through 17 years. Includes admissions for gastroenteritis or urinary tract infection. This is a Category C measure in the measure bundle, D1: Pediatric Primary Care.
Study Population	• MLIU sub-populations identified in DSRIP performing provider systems (Children 3 months through 17 years)
Measure Steward or Source	AHRQ: https://www.qualityindicators.ahrq.gov/Modules/PDI_TechSpec_ICD10_v70.aspx
Technical Specifications	The PDI 91 composite measure was developed by AHRQ. Performing providers will report the numerator and denominator necessary to calculate a weighted and unweighted pediatric composite measure: **Numerator:** Number of discharges for clients 3 months through 17 years, that meet the inclusion and exclusion rules for the numerator in any of the following PDIs: • PDI 16 Gastroenteritis Admission Rate • PDI 18 Urinary Tract Infection Admission Rate Discharges are only counted once in the numerator, even if they qualify for more than one PDI listed above. **Denominator:** DSRIP attributed target population for the provider system (3 months through 17 years) **Rate:** (numerator / denominator) * 100 Note: Rate may be presented per 10,000 clients if prevalence is low
Exclusion Criteria	See measure source for specific inclusion and exclusion criteria.
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting: Provider reported rate • RHP plan update: Provider and RHP characteristics for HLM model • DSRIP administrative data: Provider and RHP characteristics for HLM model
Comparison Group(s)/ Subgroup(s)	• RHP subgroups
Analytic Methods	• Descriptive trend analysis ○ Paired t-test or Wilcoxon signed-rank test • Hierarchical linear modeling or growth curve modeling, if feasible

Measure 1.3.5	Pediatric Quality Indicator 91: Child acute composite indicator (D1-503*)
Benchmark	• Baseline established CY17 • DY7 goal of 2.5% improvement over baseline • DY8 goal of 10% improvement over baseline

Note. PDI=Pediatric Quality Indicator; MLIU=Medicaid and low-income uninsured; DSRIP=Delivery System Reform Incentive Payment; AHRQ=Agency for Healthcare Research and Quality; RHP=Regional Healthcare Partnership; HLM=Hierarchical linear model; CY=Calendar year; DY=Demonstration year, October 1-September 30. *Selected Category C measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018).

Hypothesis 1.4: DSRIP transformed the health care system, resulting in improvements in population health, as specified as DSRIP Category D outcomes.

Measure 1.4.1	Potentially preventable admissions (PPA)*
Definition	PPAs are facility admissions that may have resulted from the lack of adequate access to care or ambulatory care coordination. This measure is 1 of 4 in the Category D Hospital Statewide Reporting Measure Bundle specified in the Measure Bundle Protocol.
Study Population	• DSRIP performing providers
Measure Steward or Source	• 3M (licensed by the Texas EQRO)
Technical Specifications	Hospital admissions for any of the following ambulatory care sensitive conditions: congestive heart failure, diabetes, behavioral health/substance abuse, chronic obstructive pulmonary disease, adult asthma, pediatric asthma, angina and coronary artery disease, hypertension, cellulitis, respiratory infection, pulmonary edema and respiratory failure, and other. The EQRO will use 3M software** to calculate this ratio for each eligible DSRIP performing provider system. Following this proprietary protocol, APR-DRGs and Severity of Illness are assigned to each admission. If an admission is categorized as potentially preventable, it is assigned a relative weight based on resource utilization. PPA risk is then adjusted by CRG. **Ratio:** Actual PPA weight / Expected PPA weight
Exclusion Criteria	Specified in 3M technical specifications used by the EQRO
Data Source(s)	• Medicaid encounter data
Comparison Group(s)/ Subgroup(s)	• RHP and/or RHP tier
Analysis Methods	• Descriptive trend analysis of mean PPA ratio for DY7-DY11 ○ Paired t-test or Wilcoxon signed-rank test

Measure 1.4.1	Potentially preventable admissions (PPA)*
Benchmark	HHSC benchmark for STAR and STAR+PLUS programs Actual/Expected rate < 0.9

Note. PPA=Potentially preventable admission; DSRIP=Delivery System Reform Incentive Payment; EQRO=External quality review organization; APR-DRG=All Patient-Refined Diagnosis-Related Groups; CRG=Clinical Risk Group; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30; HHSC=Health and Human Services Commission. *Selected Category D measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018). **2016 Technical Notes available through the Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/resources/

Measure 1.4.2	Potentially preventable readmissions (PPR)*
Definition	PPRs occur when an individual returns to the hospital within the specified readmission time interval for a specific condition that is clinically related to the initial hospital admission. This measure is 1 of 4 in the Category D Hospital Statewide Reporting Measure Bundle specified in the Measure Bundle Protocol.
Study Population	• DSRIP performing providers
Measure Steward or Source	• 3M (licensed by the Texas EQRO)
Technical Specifications	Hospital readmissions for any of the following conditions within a specified timeframe may qualify as a PPR: Congestive heart failure, diabetes, behavioral health/substance abuse, chronic obstructive pulmonary disease, cerebrovascular accident, adult asthma, pediatric asthma, acute myocardial infarction, angina and coronary artery disease, hypertension, cellulitis, renal failure, Cesarean delivery, sepsis, and others The EQRO will use 3M software** to calculate this measure for each eligible DSRIP performing provider system. Following this proprietary protocol, APR-DRGs and Severity of Illness are assigned to each readmission. Clinically-related potentially preventable readmissions are assigned relative weight based on resource utilization. PPRs that are related to the same initial admission are considered to be part of the same "readmission chain." PPRs are then weighted according to the state norm. **Ratio:** Actual PPR weight / Expected PPR weight
Exclusion Criteria	Specified in 3M technical specifications used by the EQRO
Data Source(s)/ Data Collection Method(s)	• Medicaid encounter data
Comparison Group(s)/	• RHP and/or RHP tier

Measure 1.4.2	Potentially preventable readmissions (PPR)*
Subgroup(s)	
Analytic Methods	• Descriptive trend analysis for mean of PPR ratio for DY7-DY11 ○ Paired t-test or Wilcoxon signed-rank test
Benchmark	HHSC benchmark for STAR and STAR+PLUS programs Actual/Expected rate < 0.9

Note. PPR=Potentially preventable readmission; DSRIP=Delivery System Reform Incentive Payment; EQRO=External quality review organization; APR-DRG=All Patient-Refined Diagnosis-Related Groups; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30; HHSC=Health and Human Services Commission. *Selected Category D measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018). **2016 Technical Notes available through the Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/resources/

Measure 1.4.3	Potentially preventable complications (PPC)*
Definition	PPCs are in-hospital complications that are not present on admission, but result from treatment during the inpatient stay. This measure is 1 of 4 in the Category D Hospital Statewide Reporting Measure Bundle specified in the Measure Bundle Protocol.
Study Population	• DSRIP performing providers
Measure Steward or Source	• 3M (licensed by the Texas EQRO)
Technical Specifications	Complications that develop in the hospital, depending on risk assessment upon admission, due to the following conditions may qualify as PPCs: renal failure without dialysis; urinary tract infection; clostridium difficile colitis; encephalopathy; shock; pneumonia and other lung infections; acute pulmonary edema and respiratory failure without ventilation; stroke and intracranial hemorrhage; post hemorrhagic and other acute anemia with transfusion; venous thrombosis; ventricular fibrillation/cardiac arrest; major gastrointestinal complications without transfusion or significant bleeding; other complications of medical care; moderate infections; inflammation and other complications of devices, implants or grafts except vascular infection; post-operative hemorrhage and hematoma without hemorrhage control procedure or I&D procedure, septicemia and severe infections; acute pulmonary edema and respiratory failure with ventilation; post-operative infection and deep wound disruption without procedure; or infections due to central venous catheters The EQRO will use 3M software** to calculate this measure for each eligible DSRIP performing provider system. Following the proprietary protocol, APR-DRGs are assigned

Measure 1.4.3	Potentially preventable complications (PPC)*
	to each admission. Eligible admissions are then HCUP Relative PPC weights are assigned based on national resource utilization data. A state norm based on APR-DRGs and Severity of Illness is applied to each admission. **Ratio:** Actual PPC weight / Expected PPC weight
Exclusion Criteria	Specified in 3M technical specifications used by the EQRO
Data Source(s)/ Data Collection Method(s)	• Medicaid encounter data
Comparison Group(s)/ Subgroup(s)	• RHP and/or RHP tier
Analytic Methods	• Descriptive trend analysis of mean PPC ratio DY7-DY11 ○ Paired t-test or Wilcoxon signed-rank test
Benchmark	HHSC benchmark for STAR and STAR+PLUS programs Actual/Expected rate < 0.9

Note. PPC=Potentially preventable complication; DSRIP=Delivery System Reform Incentive Payment; EQRO=External quality review organization; APR-DRGs=All Patient-Refined Diagnosis-Related Groups; HCUP=Healthcare Cost and Utilization Project; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30; HHSC=Health and Human Services Commission. *Selected Category D measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018). **2016 Technical Notes available through the Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/resources/

Measure 1.4.4	Potentially preventable emergency department visits (PPV)*
Definition	PPVs occur when emergency treatment is provided for a condition that could have been treated or prevented by a physician or other health care provider in a nonemergency setting. This measure is 1 of 4 in the Category D Hospital Statewide Reporting Measure Bundle specified in the Measure Bundle Protocol.
Study Population	• DSRIP performing providers
Measure Steward or Source	• 3M (licensed by the Texas EQRO)
Technical Specifications	ED visits for the following conditions may be considered PPVs: skin and integumentary system; breast; musculoskeletal system; respiratory system; cardiovascular system; hematologic, lymphatic and endocrine; gastrointestinal; genitourinary system; male reproductive system; female reproductive system; neurologic system; ophthalmologic system; otolaryngologic system; radiologic procedures; rehabilitation; mental illness and substance

Measure 1.4.4	Potentially preventable emergency department visits (PPV)*
	abuse therapies; nuclear medicine; radiation oncology; or dental procedures The EQRO will use 3M software** to calculate this measure for each eligible DSRIP performing provider system. Following this proprietary protocol, ED visits are assigned to a primary EAPG to determine the potentially preventable status. Each ED visit is then assigned a relative weight based on national resource utilization. PPVs are then risk-adjusted using a state-level norm PPV weight or each CRG category. **Ratio:** Actual PPV weight / Expected PPV weight
Exclusion Criteria	Specified in 3M technical specifications used by the EQRO
Data Source(s)	• Medicaid encounter data
Comparison Group(s)/ Subgroup(s)	• RHP and/or RHP tier
Analytic Methods	• Descriptive trend analysis for mean of PPV ratio for DY7-DY11 ○ Paired t-test or Wilcoxon signed-rank test
Benchmark	Actual/Expected rate < 0.9 HHSC benchmark for STAR and STAR+PLUS programs

Note. PPV=Potentially preventable emergency department visit; DSRIP=Delivery System Reform Incentive Payment; EQRO=External quality review organization; ED=Emergency department; EAPG=Enhanced Ambulatory Patient Groups; CRG=Clinical Risk Group; RHP=Regional Healthcare Partnership; DY=Demonstration year, October 1-September 30; HHSC=Health and Human Services Commission. *Selected Category D measure from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018). **2016 Technical Notes available through the Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/resources/

Measure 1.4.5	Category D-related activities
Definition	Performing provider activities impacting population health, as indicated by Category D measures.
Study Population	• DSRIP performing providers
Measure Steward or Source	N/A
Technical Specifications	Category D outcomes (as calculated by the EQRO) will be sent to DSRIP performing providers who will answer qualitative questions about their specific outcomes and related activities.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSRIP reporting
Comparison Group(s)/ Subgroup(s)	• RHP subgroup
Analytic Methods	• Thematic content analysis • Descriptive statistics, if feasible
Benchmark	None

Note. DSRIP=Delivery System Reform Incentive Payment; EQRO=External quality review organization; RHP=Regional Healthcare Partnership.

Evaluation Question 2*: Did the Demonstration impact unreimbursed costs associated with the provision of care to the MLIU population for Uncompensated Care (UC) providers?*

Hypothesis 2.1: The percentage of UC costs reimbursed through UC payments for each type of UC (overall, Medicaid shortfall, uninsured shortfall) will decrease throughout Demonstration Year (DY) 1-8 of the Demonstration.

Measure 2.1.1	UC Costs Reimbursed (percentage)
Definition	The percentage of UC costs reimbursed through UC payments by type (Medicaid shortfall, uninsured shortfall, and provider and pharmacy costs)
Study Population	• Providers reporting UC costs
Measure Steward or Source	• N/A
Technical Specifications	For each UC provider, use the DSH/UC application to determine the annual UC costs and payments overall and by type (Medicaid shortfall, uninsured shortfall, and the provider and pharmacy costs). **Numerator:** UC payment received for a given year **Denominator:** UC costs for a given year **Percentage:** (numerator / denominator) * 100
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSH/UC application
Comparison Group(s)/ Subgroup(s)	• Provider type • RHP and/or RHP tier • RUCC classification
Analytic Methods	• Descriptive trend analysis for mean of UC percentage reimbursed for DY1-DY8* ○ Paired t-test or Wilcoxon signed-rank test
Benchmark	None

Note. UC=Uncompensated Care; DSH=Disproportionate share hospital; RHP=Regional Healthcare Partnership; RUCC=Rural-Urban Continuum Codes; DY=Demonstration year, October 1-September 30. *Negotiations are ongoing (as of July 2018) to revise the UC program. Upon establishment of new UC rules, it will be determined whether it is appropriate to continue this analysis for DY9-DY11.

Hypothesis 2.2: The UC cost growth rate will slow over time for hospitals participating in the Demonstration.

Measure 2.2.1	Uncompensated Care Cost Growth Rate
Definition	Year-over-year growth rate (%) for UC costs reported by hospitals on the DSH/UC reporting tool
Study Population	• Hospitals reporting UC costs
Measure Steward or Source	N/A
Technical Specifications	For each hospital, use the DSH/UC application to determine the annual UC costs, consisting of the Medicaid shortfall, uninsured shortfall, and the provider and pharmacy costs. **Numerator:** Year 2 UC costs reported - Year 1 UC costs reported **Denominator:** Year 1 UC costs reported **Rate:** (numerator / denominator) * 100
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• DSH/UC application
Comparison Group(s)/ Subgroup(s)	• Hospital type subgroups • RHP and/or RHP tier • RUCC classification subgroups
Analytic Methods	• Multiple linear regression or growth curve modeling testing for trend over time in annual UC growth rate while controlling for hospital characteristics (e.g., type, bed count, case mix, etc.), regional/county-level characteristics (e.g., RUCC code, RHP tier, Rider 38 status, etc.), and other relevant factors (e.g., inflation, economic shocks, etc.)
Benchmark	None

Note. UC=Uncompensated Care; DSH=Disproportionate share hospital; RHP=Regional Healthcare Partnership; RUCC=Rural-Urban Continuum Codes.

Evaluation Question 3: ***Did the expansion of the Medicaid managed care (MMC) health care delivery model to additional populations and services improve health care (including access to care, care coordination, quality of care, and health outcomes) for MMC clients?***

The pre and post periods for proposed interrupted time series (ITS) analyses are listed in Table by MMC population, unless otherwise specified in the detailed table for a specific measure.

Table C1. Pre and Post Periods for Medicaid Managed Care Interrupted Time Series Analysis

MMC Population	Pre Period	Post Period
Children's Medicaid Dental Services	March 1, 2010- February 29, 2012	March 1, 2012 – September 30, 2020
Nursing Facility	March 1, 2013 – February 28, 2015	March 1, 2015 – September 30, 2020
Former Foster Care Children	September 1, 2015- August 31, 2017	September 1, 2017 – September 30, 2022
Adoption Assistance		
Permanency Care Assistance		
Medicaid for Breast and Cervical Cancer		

Note. MMC=Medicaid managed care. Pre period establishes baseline two years prior to MMC carve-in or shift in MMC program, post period starts with MMC carve-in or shift in MMC program.

Hypothesis 3.1: Access to care will improve among clients whose Medicaid benefits shift from fee-for-service (FFS) to a MMC health care delivery model.

Measure 3.1.1	**Centers for Medicare and Medicaid Services Child Core Measure: Percentage of eligibles who received preventative dental services (PDENT-CH)**
Definition	The CMS PDENT-CH measures the percent of members aged 0 to 20 years who received at least one preventive dental service during the reporting period.
Study Population(s)	• CMDS
Measure Steward or Source	CMS
Technical Specifications	Claims and encounters will be used to determine the numerator and denominator to calculate the CMS-PDENT-CH measure by month or quarter. **Numerator:** Unduplicated number of clients receiving at least one preventive dental service by or under the supervision of a dentist as defined by HCPCS codes D1000 - D1999 (or equivalent CDT codes/CPT codes) **Denominator:** Total unduplicated number of clients ages 0 to 20 years who have been continuously enrolled in the Children's Medicaid Dental program. **Monthly or quarterly rate:** (Numerator / denominator)
Exclusion Criteria	Members not enrolled in a DMO. STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre-DMO (FFS) to post-DMO • SDA • Client demographics (age, sex, race/ethnicity)
Analytic Methods	• Interrupted time series analysis
Benchmark	None

Note. CMS=Centers for Medicare and Medicaid Services; PDENT-CH=Percent of clients receiving preventative dental services; CMDS=Children's Medicaid Dental Services; HCPCS=Healthcare Common Procedure Coding System Level II; CDT=Current Dental Terminology; CPT=Current Procedural Terminology; DMO=Dental maintenance organization; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.

Measure 3.1.2	Adult access to preventive/ambulatory health service
Definition	Adult access to preventive/ambulatory health services measures members who had an ambulatory or preventive care visit in the past year.
Study Population(s)	• FFCC • MBCC • NF
Measure Steward or Source	NCQA-like measure (HEDIS® AAP)
Technical Specifications	HEDIS®-like technical specifications will be used to calculate the measure for MBCC, FFCC, and NF clients, with minor modifications to better align with the Demonstration: • To be consistent with DY, FFY will be used as the measurement year, instead of calendar year, making September 30, the anchor date. • The definition of PCP was defined according to the PCP provider types and provider specialty codes outlined in the MAXIMUS *Medicaid Managed Care and CHIP Joint Interface Plan EB 724* (2017). • For consistency, the same HEDIS®-like technical specifications, including value sets, will be used throughout the measurement period (FFY 2015 - 2022) • Monthly or quarterly rate:(Number of clients with an ambulatory visit per number of eligible clients)
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis

Measure 3.1.2	Adult access to preventive/ambulatory health service

Benchmark	2016 State Rate* for HEDIS® AAP
	• STAR
	  ○ Overall 85.67
	  ○ 20-44 years 85.19
	  ○ 45-64 years 89.22
	• STAR+PLUS
	  ○ Overall 85.00
	  ○ 20-44 years 78.47
	  ○ 45-64 years 89.89
	  ○ 65+ years 90.03

Note. FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing Facility; NCQA=National Committee for Quality Assurance; HEDIS®= Healthcare Effectiveness Data and Information Set; AAP=Adult access to preventive/ambulatory health services; DY=Demonstration year, October 1-September 30; FFY=Federal fiscal year, October 1-September 30; PCP=Primary care provider; CHIP=Children's Health Insurance Plan; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area. *Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Measure 3.1.3	Children and adolescent access to primary care services
Definition	The percentage of members 12 months – 19 years of age who had a visit with a PCP during the measurement year
Study Population(s)	• AA • PCA
Measure Steward or Source	NCQA-like measure (HEDIS® CAP)
Technical Specifications	HEDIS®-like technical specifications will be used to calculate the measure for AA and PCA clients, with minor modifications to better align with the Demonstration: • To be consistent with DY, FFY will be used as the measurement year, instead of the calendar year, making September 30, the anchor date. • PCP defined according to the MAXIMUS *Medicaid Managed Care and CHIP Joint Interface Plan EB 724* (2017) • Continuous enrollment as defined by HEDIS® may be modified to better align with enrollment patterns for study populations • For consistency, the same HEDIS®-like technical specifications, including value sets, will be used throughout the measurement period. • Monthly or quarterly rate: (Number of clients with a PCP visit per number of eligible clients)

Measure 3.1.3	Children and adolescent access to primary care services
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis
Benchmark	2016 state rate* for HEDIS® CAP in STAR: ○ Overall 91.74 ○ 12-24 months 96.42 ○ 25 months – 6 years 89.18 ○ 7-11 years 93.24

Note. PCP=Primary care provider; AA=Adoption Assistance; PCA=Permanency Care Assistance; NCQA=National Committee for Quality Assurance; HEDIS®=Healthcare Effectiveness Data and Information Set; CAP=Children and adolescent access to primary care services; DY=Demonstration year, October 1-September 30; FFY=Federal fiscal year, October 1-September 30; CHIP=Children's Health Insurance Plan; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area. *Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Measure 3.1.4	Centers for Medicare and Medicaid Services Child Core Measure: Screening for depression and follow-up plan (CDF-CH/AD)
Definition	The CMS CDF-CH/AD measures the percentage of members aged 12 years and older screened for clinical depression on the date of the encounter using an age appropriate standardized depression screening tool and, if positive, having a follow-up plan documented on the date of the positive screening (CMS Core Measure).
Study Population(s)	• AA • FFCC • MBCC • NF • PCA
Measure Steward or Source	CMS*
Technical Specifications	Adapting the CMS measure specifications for 2017, claims and encounter data will be used to determine the numerator and denominator to calculate the CDF-CH/AD measure by month or quarter. Exclusion criteria will be applied to the extent possible using claims and encounter data.

Measure 3.1.4	Centers for Medicare and Medicaid Services Child Core Measure: Screening for depression and follow-up plan (CDF-CH/AD)
	Numerator: Clients screened for clinical depression using a standardized tool and having depression, and having a follow-up plan documented (G8431) on the same day as a positive or negative screen result (G8510). **Denominator:** Number of clients (12 – 64 years of age) with an outpatient visit for behavioral health. **Monthly or quarterly rate:** (Numerator / denominator)
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older. Denominator exclusion criteria: Active diagnosis of depression or bipolar disorder.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity)
Analytic Methods	• Interrupted time series analysis
Benchmark	Not available

Note. CDF-CH/AD=Screening for depression and follow-up plan for children and adults; CMS=Centers for Medicare and Medicaid Services; AA=Adoption Assistance; FFCC=Former Foster Care Youth; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing Facility; PCA=Permanency Care Assistance; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.*https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/MSSP-QM-Benchmarks-2016.pdf

Measure 3.1.5	Utilization of pharmacy benefits
Definition	Drug utilization measures of adherence will quantify the extent of medication use.
Study Population(s)	• AA • FFCC • MBCC • NF • PCA
Measure Steward or Source	PQA, as detailed in CMS' Quality Rating System*
Technical Specifications	Population-level measures of adherence (i.e., PDC) will be calculated. PDC is the number of "covered" days in the measurement period divided by the number of days in measurement period. PDC will be calculated for three therapeutic categories:

Measure 3.1.5	Utilization of pharmacy benefits
	• Renin Angiotensin System Antagonists • Diabetes All Class • Statins **Numerator:** Number of clients who met the 80% PDC threshold during the measurement year, for each therapeutic category separately **Denominator:** Number of clients (18 years or older on first day of measurement year) with at least two prescriptions filled, for each therapeutic category separately **Annual rate:** (Numerator / denominator)*100
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files • Member-level pharmacy data
Comparison Group(s)/ Subgroup(s)	• Pre-MMC policy change to post-MMC policy change • SDA • Client demographics (age, sex, race/ethnicity) • Salient drug classes
Analytic Methods	• Descriptive trend analysis
Benchmark	None

Note. AA=Adoption Assistance; FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing facility; PCA=Permanency Care Assistance; PQA = Pharmacy Quality Alliance; CMS=Centers for Medicare and Medicaid Services; PDC=Proportion of days covered; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.

*https://www.cms.gov/files/document/2021-qrs-measure-technical-specifications.pdf

Hypothesis 3.2: Care coordination will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Measure 3.2.1	Rate of service coordination utilization
Definition	Service coordination is an ongoing process to identify client needs, connect them with other providers to obtain necessary services, and follow-up to ensure needs are met.
Study Population(s)	• FFCC • MBCC • NF
Measure Steward or Source	N/A
Technical Specifications	**Numerator:** Paid and partially paid encounters of procedure codes for service coordination: T1017. These contacts must be documented in the client's record, but are not submitted as claims to Medicaid if they took place outside of the presence of the client or the client's parent or routine caregivers. **Denominator:** Number of clients within the reporting period **Monthly or quarterly rate:** (Numerator / denominator) per 1,000 member months
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis
Benchmark	None

Note. FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing Facility; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.

Measure 3.2.2	Rate of clients with SMI/SED receiving Targeted Case Management
Definition	This rate indicates the level of utilization of targeted case management among clients with SMI/SED during the measurement year.
Study Population(s)	• AA • FFCC • PCA
Measure Steward or Source	N/A
Technical Specifications	**Numerator:** Clients who met the HHSC SMI/SED criteria who received targeted case management services: T1017 during the measurement year **Denominator:** Clients diagnosed with HHSC-defined SMI/SED (Adults with "schizophrenia, major depression, bipolar disorder, or other severely disabling mental order," and "children and adolescents ages 3 through 17 years with a diagnosis of a mental illness or who exhibit a serious emotional disturbance.") **Monthly or quarterly rate:** (Numerator / denominator)
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis
Benchmark	None

Note. SMI=Serious mental illness, SED = Severe emotional disturbance; AA=Adoption Assistance; FFCC=Former Foster Care Children; PCA=Permanency Care Assistance; HHSC=Health and Human Services Commission; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.

Hypothesis 3.3: Quality of care will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Measure 3.3.1	Antidepressant Medication Management
Definition	The percentage of clients 18 years and older who were treated with antidepressant medication, had a diagnosis of major depression and who remained on antidepressant medication treatment.
Study Population(s)	• FFCC • NF
Measure Steward or Source	NCQA-like measure (HEDIS® AMM)
Technical Specifications	Using Medicaid claims and encounter data, two rates are reported: **Numerators:** 1. Effective Acute Phase Treatment – The percentage of clients who remained on an antidepressant medication for at least 84 days (12 weeks) (calculated annually). 2. Effective Continuous Phase Treatment. The percentage of clients who remained on an antidepressant medication at least 180 days (6 months) (calculated annually). **Denominator:** Clients 18 years and older meeting HEDIS-like inclusion criteria related to major depression, negative medication history, and continuous enrollment requirements. HEDIS®-like technical specifications will be used to calculate the measure, with some minor modifications to better align with the Demonstration: 1. Measurement years will align with the MMC transition date (March 1 for NF and September 1 for FFCC) 2. The intake period will be the same as the measurement year 3. Continuous enrollment as defined by HEDIS® may be modified to better align with enrollment patterns for target populations 4. For consistency, the same HEDIS®-like technical specifications, including value sets, will be used throughout the measurement period
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files

Measure 3.3.1	Antidepressant Medication Management
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity)
Analytic Methods	• Descriptive trend analysis
Benchmark	2016 state rates* for HEDIS® AMM (acute rate, continuous rate): • STAR 46.79, 29.59 • STAR Health 42.65, 30.88 • STAR Kids not available • STAR+PLUS 47.19, 33.33

Note. FFCC=Former Foster Care Children; NF=Nursing Facility; NCQA=National Committee on Quality Assurance; HEDIS®=Healthcare Effectiveness Data and Information System; AMM=Antidepressant Medication Management; MMC=Medicaid managed care; FFS=Fee-for-service; SDA=Service delivery area. *Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Measure 3.3.2	Use of first-line psychosocial care for children and adolescents on antipsychotics
Definition	The percentage of children and adolescents 1-17 years of age who had a new prescription for an antipsychotic medication and had documentation of psychosocial care as first-line treatment.
Study Population(s)	• AA • FFCC • PCA
Measure Steward or Source	NCQA-like measure (HEDIS® APP)
Technical Specifications	HEDIS®-like technical specifications will be used to calculate the measure annually, with some minor modifications to better align with the Demonstration: • Measurement years will align with the MMC transition date (September 1 for FFCC, AA and PCA) • The intake period will be the same as the measurement year • For consistency, the same HEDIS®-like technical specifications, including value sets, will be used throughout the measurement period
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files • Member-level pharmacy data

Measure 3.3.2	Use of first-line psychosocial care for children and adolescents on antipsychotics
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Descriptive trend analysis

Benchmark	• 2016 State Rate* for HEDIS® APP in STAR Health:
	  ○ Overall 89.85
	  ○ 1-5 years 83.33
	  ○ 6-11 years 91.27
	  ○ 12-17 years 89.49

Note. AA=Adoption Assistance; FFCC=Former Foster Care Children; PCA=Permanency Care Assistance; NCQA=National Committee for Quality Assurance; HEDIS®= Healthcare Effectiveness Data and Information Set; APP = Use of First-line Psychosocial Care for Children and Adolescents in Antipsychotics; MMC=Medicaid managed care; FFS=Fee-for-service; SDA=Service delivery area.
*Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Measure 3.3.3	Percent of Medicaid for Breast and Cervical Cancer clients receiving recommended treatment
Definition	Percentage of MBCC clients receiving recommended treatment according to patient subgroup. Percentage of female patients aged 18 years and older diagnosed with breast cancer who were prescribed tamoxifen or AI during the measurement period.
Study Population(s)	• MBCC
Measure Steward or Source	N/A
Technical Specifications	**Numerator:** Female clients diagnosed with breast cancer and prescribed tamoxifen or AI during the measurement year **Denominator:** Female clients diagnosed with breast cancer **Monthly or quarterly rate:** (Numerator / denominator) * 100
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter • Member-level enrollment files

Measure 3.3.3	Percent of Medicaid for Breast and Cervical Cancer clients receiving recommended treatment
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis
Benchmark	None

Note. MBCC=Medicaid for Breast and Cervical Cancer; ER=Estrogen receptor; PR=Progesterone receptor; AI=Aromatase inhibitor; ICD-10=International Classification of Diseases, 10th Revision, Clinical Modification; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.

Measure 3.3.4	Behavior Modification
Definition	Percentage of NF clients on psychotropic medication with behavior modifications included in their care plan
Study Population(s)	• NF
Measure Steward or Source	N/A
Technical Specifications	Nursing Facility Quality Review (NFQR)* Psychotropic Medication Measure: • Residents with an active prescription for a psychotropic medication, and whose care plan included behavior modification interventions to address specific behaviors for which the medications were prescribed
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• NFQR – A biannual survey conducted among nursing facility residents in Texas since 2002, but this question was added in 2015
Comparison Group(s)/ Subgroup(s)	• Client demographics (age, sex, race/ethnicity, length of stay)
Analytic Methods	• Descriptive trend analysis
Benchmark	None

Note. NF=Nursing Facility; NFQR=Nursing Facility Quality Review. *Synopsis and most recent report available here: https://hhs.texas.gov/reports/2017/06/nursing-facility-quality-review-nfqr-2015

Hypothesis 3.4: Health and health care outcomes will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Measure 3.4.1	Centers for Medicare and Medicaid Services Child Core Measure: Children who have dental decay or cavities
Definition	Percentage of children, age 0-20 years, who have had tooth decay or cavities during the measurement period (CMS Core Child Measure).
Study Population(s)	• CMDS
Measure Steward or Source	CMS
Technical Specifications	**Numerator:** CMDS clients who had a cavity or decayed teeth. **Denominator:** CMDS clients with face-to-face interaction, office visit, established office visit, or initial office visits **Monthly or quarterly rate:** (Numerator / denominator) * 100
Exclusion Criteria	Members not enrolled in a DMO. STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity)
Analytic Methods	• Interrupted time series analysis
Benchmark	CMS Performance Year 2016 Benchmark*: 1.65%, SD 3.24%

Note. CMS=Centers for Medicare and Medicaid Services; CMDS=Children's Medicaid Dental Services; DMO=Dental maintenance organization; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area; SD = Standard deviation.*Benchmarks for Measures Included in the Performance Year 2016 Quality and Resource Use Reports: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeedbackProgram/Downloads/PY2016-Prior-Year-Benchmarks.pdf

Measure 3.4.2	Pressure Ulcers
Definition	Rate of pressure ulcers
Study Population(s)	• NF
Measure Steward or Source	N/A
Technical Specifications	**Numerator:** Number of pressure ulcers among NF clients **Denominator:** NF member months **Monthly or quarterly rate:** Number of pressure ulcers per 1,000 member months
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Stage of ulcer • Client demographics (age, sex, race/ethnicity)
Analytic Methods	• Interrupted time series analysis
Benchmark	None

Note. NF=Nursing Facility; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area.

Measure 3.4.3	Symptoms of Depression
Definition	NF residents with improvement in depressive symptoms with treatment
Study Population(s)	• NF
Measure Steward or Source	N/A
Technical Specifications	NFQR* Depression Measures: • Percentage of clients diagnosed with depression who report an improvement in depressive symptoms with treatment
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• NFQR – A biannual survey conducted among nursing facility residents in Texas since 2002 (Depression measure added to NFQR Survey in 2010)

Comparison Group(s)/ Subgroup(s)	• Pre/post comparison
	  ○ Pre: 2010 – 2014
	  ○ Post: 2015-2019
	• Client demographics (age, sex, race/ethnicity, length of stay)

Analytic Methods	• Descriptive trend analysis
Benchmark	None

Note. NF=Nursing Facility; NFQR=Nursing Facility Quality Review. *Synopsis and most recent report available here: https://hhs.texas.gov/reports/2017/06/nursing-facility-quality-review-nfqr-2015

Measure 3.4.4	Prevention/Pediatric Quality Overall Composite (PQI#90; PDI#90)
Definition	**PQI#90**: The rate of discharges per 100,000 adult members, for one of the following ambulatory care sensitive conditions: diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes without complications, diabetes with lower-extremity amputation, chronic obstructive pulmonary disease, asthma, hypertension, heart failure, bacterial pneumonia, or urinary tract infection. **PDI#90**: The rate of discharges per 100,000 child members, for one of the following ambulatory care sensitive conditions: asthma, diabetes with short-term complications, gastroenteritis, or urinary tract infection.
Study Population(s)	• AA • FFCC • MBCC • NF • PCA
Measure Steward or Source	AHRQ, Quality Indicator-like measure
Technical Specifications	**Rate 1 Numerator (Adult, PQI#90):** Hospital discharges for adult clients for one of the following conditions: diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes without complications, diabetes with lower-extremity amputation, chronic obstructive pulmonary disease, asthma, hypertension, heart failure, bacterial pneumonia, or urinary tract infection (as measured through PQI#1, PQI#3 PQI#5, PQI#7, PQI#8, PQI#11, PQI#12, PQI#14, PQI#15, and PQI#16) **Rate 2 Numerator (Child, PDI#90):** Hospital discharges for child clients for one of the following conditions: asthma, diabetes with short-term complications, gastroenteritis, or urinary tract infection (as measured through PDI#14, PDI#15, PDI#16, PDI#18) • Clients that meet the inclusion and exclusion rules for a numerator more than once will only counted only once in the composite numerator **Denominator:** Members per specified population **Monthly or quarterly rate:** Number of discharges per 100,000 members

Measure 3.4.4	Prevention/Pediatric Quality Overall Composite (PQI#90; PDI#90)
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis

Benchmark	• 2016 Adult State Rate* per 100,000 member months (PQI#90):
	  ○ STAR 52.32
	  ○ STAR Health 110.29
	  ○ STAR Kids Not available until 2017
	  ○ STAR+PLUS 473.40
	  ○ FFS 272.99
	• 2016 Child State Rate* per 100,000 member months (PDI#90):
	  ○ STAR 11.31
	  ○ STAR Health 25.40
	  ○ STAR Kids Not available
	  ○ STAR+PLUS 36.09
	  ○ FFS 28.60

Note. PQI = Prevention Quality Indicator; PDI = Pediatric Quality Indicator; AA=Adoption Assistance; FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing facility; PCA=Permanency Care Assistance; AHRQ = Agency for Healthcare Research and Quality; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area. *Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Measure 3.4.5	Rate of potentially preventable emergency department use
Definition	An emergency treatment for a condition that did not require immediate medical care; required immediate medical care but care could have been provided in a primary care setting; or, required immediate medical care but the nature of the condition was potentially preventable or avoidable if timely and effective primary care had been provided
Study Population(s)	• AA • FFCC • MBCC • NF • PCA
Measure Steward or Source	NYU Wagner: https://wagner.nyu.edu/faculty/billings/nyued-articles
Technical Specifications	Using the NYU algorithm, potentially preventable ED use is defined as ED visits that are: • Non-emergent; • Emergent, but primary care treatable; or, • Emergent and ED care needed, but preventable/avoidable **Monthly or quarterly rate:** Number of potentially preventable ED visits per 1,000 member months
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Interrupted time series analysis

Measure 3.4.5	Rate of potentially preventable emergency department use
Benchmark	• 2016 State Rate* for PPV (cannot be used for direct comparison as state PPV rates use 3M® methodology): ○ STAR 9.59 ○ STAR Health 11.82 ○ STAR Kids 10.10 ○ STAR+PLUS 26.60 ○ FFS 9.16

Note. ED=Emergency department; AA=Adoption Assistance; FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing facility; PCA=Permanency Care Assistance; NYU = New York University; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area; PPV=Potentially preventable emergency department visit. *Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Measure 3.4.6	Rate of emergency department visits for behavioral health or substance abuse (H2-510*)
Definition	The rates of ED utilization for BH and SA conditions. This is a Category C measure in the measure bundle, H2: Behavioral health and appropriate utilization.
Study Population(s)	• AA • FFCC • MBCC • NF • PCA
Measure Steward or Source	HHSC-developed for DSRIP Measure Bundle Protocol DY7-10
Technical Specifications	**Rate 1 Numerator**: Total number of ED visits with a primary or secondary diagnosis of BH conditions: • F20-F29 Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders • F30-F39 Mood [affective] disorders • F40-F48 Anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders • F60-F69 Disorders of adult personality and behavior **Rate 2 Numerator:** Total number of ED visits with a primary or secondary diagnosis of SA: • F10-F16, F18 - F19 Mental and behavioral disorders due to psychoactive substance use **Denominator:** Number of clients in study population **Monthly or quarterly rate:** Number of ED visits for BH or SA per 1,000 member months
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.

Measure 3.4.6	Rate of emergency department visits for behavioral health or substance abuse (H2-510*)
Data Source(s)/ Data Collection Method(s)	• FFS claims and MMC encounter data • Member-level enrollment files
Comparison Group(s)/ Subgroup(s)	• Pre/post comparison • SDA • Client demographics (age, sex, race/ethnicity) • Stratification will include salient provider and service types
Analytic Methods	• Descriptive trend analysis • Interrupted time series analysis
Benchmark	Performance against self as defined in the HHSC Uniform Managed Care Manual.** According to this standard, any year-to-year change between -2.99% and 2.99% is considered consistent with the year before. Any change of +/-3.00% or greater indicates a change in the rate from the previous year.

Note. ED=Emergency department; BH=Behavioral health; SA=Substance abuse; AA=Adoption Assistance; FFCC=Former Foster Care Children; MBCC=Medicaid for Breast and Cervical Cancer; NF=Nursing facility; PCA=Permanency Care Assistance; HHSC=Health and Human Services Commission; DSRIP=Delivery System Reform Incentive Payment; DY=Demonstration year, October 1-September 30; FFS=Fee-for-service; MMC=Medicaid managed care; SDA=Service delivery area. *Selected Category C measures from the Measure Bundle Protocol (Texas Health and Human Services Commission, 2018). **https://hhs.texas.gov/sites/default/files/documents/laws-regulations/handbooks/umcm/6-2-14.pdf

Hypothesis 3.5: Client satisfaction will improve among clients whose Medicaid benefits shift from FFS to a MMC health care delivery model.

Measure 3.5.1	Client Satisfaction - NF
Definition	Self-reported client satisfaction with nursing facility
Study Population(s)	• NF
Measure Steward or Source	N/A
Technical Specifications	NFQR* Satisfaction Measures: • Level of satisfaction with experience in nursing facility • Level of satisfaction with health care services received • Participation in care plan meeting* • Concerns the facility did not address
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• NFQR – A biannual survey conducted among nursing facility residents in Texas since 2002

Comparison Group(s)/ Subgroup(s)	• Pre/post comparison
	  ○ Pre: 2009 – 2014
	  ○ Post: 2015 – 2019
	• Client demographics (age, sex, race/ethnicity, length of stay)

Analytic Methods	• Descriptive trend analysis
Benchmark	None

Note. * This item was added to the NFQR in 2015. NF=Nursing Facility; NFQR=Nursing Facility Quality Review. *Synopsis and most recent report available here: https://hhs.texas.gov/reports/2017/06/nursing-facility-quality-review-nfqr-2015

Measure 3.5.2	Client Satisfaction - CAHPS
Definition	Self-reported client satisfaction with their MMC health plan (caregivers will report on behalf of children 17 years and younger).
Study Population(s)	• AA • MBCC • PCA
Measure Steward or Source	AHRQ (for CAHPS Health Plan Survey – Adult, Child)
Technical Specifications	Following AHRQ technical specification for administration of the CAHPS Health Plan Survey*, Texas' EQRO will include a sample of each study population in scheduled survey administration to the STAR (child) and STAR+PLUS populations. Survey schedule: • 2019: STAR children (AA/PCA) • 2020: STAR+PLUS (MBCC) • 2021: STAR children (AA/PCA) • 2011: STAR+PLUS (MBCC) (if data is available for analysis for final report)
Exclusion Criteria	STAR+PLUS Medicare/Medicaid (dual eligible) members. Members 65 years and older.
Data Source(s)/ Data Collection Method(s)	• CAHPS Health Plan Survey, Child (AA, PCA) • CAHPS Health Plan Survey, Adult (MBCC)
Comparison Group(s)/ Subgroup(s)	• Client demographics (age, sex, race/ethnicity), if available
Analytic Methods	• Descriptive trend analysis
Benchmark	

Note. CAHPS=Consumer Assessment of Healthcare Providers and Systems; MMC=Medicaid managed care; AA=Adoption Assistance; MBCC=Medicaid for Breast and Cervical Cancer; PCA=Permanency Care Assistance; AHRQ=Agency for Healthcare Quality and Research; EQRO=External quality review organization. *CAHPS Health Plan Survey – Agency for Health Care Research and Quality: https://www.ahrq.gov/cahps/surveys-guidance/hp/index.html

Evaluation Question 4: *Did the Demonstration impact the development and implementation of quality-based payment systems in Texas Medicaid?*

Hypothesis 4.1: The Demonstration will result in the development and/or implementation of a variety of alternative payment models (APMs) in Texas Medicaid.

Measure 4.1.1	Alternative payment models
Definition	APMs planned or implemented by MCOs and providers. CMS defines APMs as a payment approach that gives added incentive payments to provide high-quality and cost-efficient care.*
Study Population(s)	• DSRIP performing providers • MCOs
Measure Steward or Source	N/A
Technical Specifications	Various APMs and/or other quality-based payment systems will be identified, categorized, and enumerated to the extent possible, based on characteristics including but not limited to: Type of APM, APM framework category, level of financial risk for plan and providers, STAR product, SDA, provider service type, estimated number of members impacted by APM, claims paid, incentives paid and disincentives applied.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• MMC APM reporting tool
Comparison Group(s)/ Subgroup(s)	Subgroups may include: • MCO size • SDA • RHP, if possible • Type of provider in APM
Analytic Methods	• Content analysis • Descriptive statistics, as applicable
Benchmark	None

Note. APM=Alternate payment model; MCO=Managed care organization; CMS=Centers for Medicare and Medicaid Services; DSRIP=Delivery System Reform Incentive Payment; SDA=Service delivery area; MMC=Medicaid managed care; RHP=Regional Healthcare Partnership.

*CMS: https://qpp.cms.gov/apms/overview

Measure 4.1.2	Perceived barriers to developing and/or implementing alternative payment models
Definition	MCO and DSRIP provider-identified challenges, or perceived barriers, experienced in developing and/or implementing APMs or other quality-based payment systems within the Texas MMC health care service delivery model.
Study Population(s)	• DSRIP performing providers • MCOs
Measure Steward or Source	N/A
Technical Specifications	Perceived barriers to the development and/or implementation of APMs and other quality-based payment systems will be identified and categorized or grouped by theme.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	Possible data sources include: • APM survey (to be developed by external evaluator) • DSRIP reporting (if used to obtain APM information in lieu of a separate survey) • Other documents, as available (e.g., MCO APM reporting tool could include additional questions in lieu of separate survey)
Comparison Group(s)/ Subgroup(s)	Subgroups may include: • MCO size • SDA • RHP • Provider type
Analytic Methods	• Thematic content analysis
Benchmark	None

Note. MCO=Managed care organization; DSRIP=Delivery System Reform Incentive Payment; APM=Alternate payment model; MMC=Medicaid managed care; SDA=Service delivery area; RHP=Regional Healthcare Partnership.

Measure 4.1.3	Perceived benefits to developing and/or implementing alternative payment models
Definition	MCO and DSRIP provider-identified benefits, or perceived positive aspects, of developing and/or implementing APMs within the Texas MMC health care service delivery model
Study Population(s)	• DSRIP performing providers • MCOs
Measure Steward or Source	N/A
Technical Specifications	Perceived benefits of the development and/or implementation of APMs and other quality-based payment systems will be identified and categorized or grouped by theme.
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	Possible data sources include: • APM survey (to be developed by external evaluator) • DSRIP reporting (if used to obtain APM information in lieu of a separate survey) • Other documents, as available (e.g., MCO APM reporting tool could include additional questions in lieu of separate survey)
Comparison Group(s)/ Subgroup(s)	Subgroups may include: • MCO size • SDA • RHP • Provider type
Analytic Methods	• Thematic content analysis
Benchmark	None

Note. MCO=Managed care organization; DSRIP=Delivery System Reform Incentive Payment; APM=Alternate payment model; MMC=Medicaid managed care; SDA=Service delivery area; RHP=Regional Healthcare Partnership.

Evaluation Question 5: *Did the Demonstration transform the health care system for the MLIU population in Texas?*

Hypothesis 5.1: The Demonstration will result in a reduction of potentially preventable ED use for the MLIU population.

Measure 5.1.1	Rate of potentially preventable emergency department use
Definition	An emergency treatment for a condition that did not require immediate medical care; required immediate medical care but care could have been provided in a primary care setting; or, required immediate medical care but the nature of the condition was potentially preventable or avoidable if timely and effective primary care had been provided

Measure 5.1.1	Rate of potentially preventable emergency department use
Study Population(s)	MLIU individuals
Measure Steward or Source	NYU Wagner: https://wagner.nyu.edu/faculty/billings/nyued-articles
Technical Specifications	Using the NYU algorithm, potentially preventable ED use is defined as ED visits that are: • Non-emergent; • Emergent, but primary care treatable; or, • Emergent and ED care needed, but preventable/avoidable **Monthly or quarterly rate:** Percentage of potentially preventable ED visits among total ED visits
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• THCIC - Emergency Department Research Data File

Comparison Group(s)/ Subgroup(s)	• Pre/post comparison (depending on data availability)
	  ○ Pre: 2016-2017 (pre-Demonstration renewal)
	  ○ Post: 2018-2022 (post-Demonstration renewal)
	• RHP and/or RHP tier
	• SDA
	• Payer type

Analytic Methods	• Interrupted time series
Benchmark	2016 State Rate* for count of PPVs (cannot be used for direct comparison as state PPV rates are based on Medicaid-only population and use 3M® methodology): STAR: At-risk ED visits 1,518,816; PPV Count 1,049,809 STAR Health: 20,907; 14,907 STAR Kids: 15,683; 10,698 STAR+PLUS: 317,732; 239,408 FFS: 222,203; 144,335

Note. ED=Emergency department; MLIU=Medicaid and Low-Income Individuals; NYU = New York University; THCIC=Texas Health Care Information Collection; RHP=Regional Healthcare Partnership; SDA=Service delivery area; PPV=Potentially preventable emergency department visit. *Texas Healthcare Learning Collaborative Portal: https://thlcportal.com/qoc/medical

Hypothesis 5.2: The Demonstration will result in overall cost savings compared to the Medicaid program without the Demonstration, as shown in the budget neutrality calculation.

Measure 5.2.1	Growth Rate of Demonstration Costs
Definition	The annual growth rate of the overall costs of the Demonstration as reported on the budget neutrality worksheet
Study Population(s)	MLIU individuals
Measure Steward or Source	N/A
Technical Specifications	Using total summary amounts reported in the Budget Neutrality Worksheet, annual growth rate of costs (actual or projected) will be compared over time: • Total WOW versus WW expenditures **Numerator:** (Annual waiver costs reported for DY_t) - (Annual waiver costs reported for DY_{t-1}) **Denominator:** Annual waiver costs reported for DY_t **Annual growth rate:** (Numerator / denominator) * 100
Exclusion Criteria	None
Data Source(s)/ Data Collection Method(s)	• HHSC Budget Neutrality Worksheet
Comparison Group(s)/ Subgroup(s)	• Overall costs WW versus costs WOW • Medicaid population
Analytic Methods	• Descriptive trend analysis comparing annual WOW growth rate to annual WW growth rate
Benchmark	WW costs are required to remain at or below WOW costs

Note. MLIU=Medicaid and Low-Income Individuals; WOW=Without waiver; WW=With waiver; DY=Demonstration Year, October 1-September 30; HHSC=Health and Human Services Commission.

Appendix D: List of Acronyms

Acronym	Full Name
AA	Adoption Assistance
AAP	Adult Access to Preventive/Ambulatory Health Services
AHRQ	Agency for Healthcare Research and Quality
AMM	Antidepressant Medication Management
APM	Alternate Payment Model
APP	Use of First-line Psychosocial Care for Children and Adolescents in Antipsychotics
APR-DRG	All Patient-Refined Diagnosis-Related Groups
BH	Behavioral Health
CADS	Center for Analytics and Decision Support
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CAP	Children and Adolescents' Access to Primary Care
CDF-CH/AD	Screening for Depression And Follow-Up Plan For Children And Adults
CDT	Current Dental Terminology
CHF	Congestive Heart Failure
CHIP	Children's Health Insurance Program
CMDS	Children's Medicaid Dental Services
CMHC	Community Mental Health Center
CMS	Centers for Medicare and Medicaid Services
CPT	Current Procedural Terminology

CRG	Clinical Risk Group
CY	Calendar Year
DID	Difference-in-difference
DMO	Dental Maintenance Organization
DSH	Disproportionate Share Hospital
DSHS	Texas Department of State Health Services
DSRIP	Delivery System Reform Incentive Payment
DY	Demonstration Year
EAPG	Enhanced Ambulatory Patient Groups
ED	Emergency Department
EQRO	External Quality Review Organization
ER	Estrogen Receptor
FFCC	Former Foster Care Children
FFS	Fee-for-Service
FFY	Federal Fiscal Year
HbA1c	Glycosylated Hemoglobin, Type A1C
HCPCS	Healthcare Common Procedure Coding System Level II
HCUP	Healthcare Cost and Utilization Project
HEDIS®	Healthcare Effectiveness Data and Information Set
HHSC	Texas Health and Human Services Commission
HIE	Health Information Exchange
HLM	Hierarchical Linear Modeling

ICD-10-CM	International Classification of Diseases, 10th Revision, Clinical Modification
ITS	Interrupted Time Series
LHD	Local Health Department
MBCC	Medicaid for Breast and Cervical Cancer
MCO	Managed Care Organization
MLIU	Medicaid and Low-Income Uninsured
MLR	Multiple Linear Regression
MMC	Medicaid Managed Care
NCQA	National Committee for Quality Assurance
NF	Nursing Facility
NFQR	Nursing Facility Quality Review
NPI	National Provider Identifier
NYU	New York University
PCA	Permanency Care Assistance
PCCM	Primary Care Case Management
PCP	Primary Care Provider
PDC	Proportion Days Covered
PDI	Pediatric Quality Indicators
PPA	Potentially Preventable Admission
PPC	Potentially Preventable Complication
PPR	Potentially Preventable Readmission
PPV	Potentially Preventable Emergency Department Visits

PQA	Pharmacy Quality Alliance
PQI	Prevention Quality Indicator
PR	Progesterone Receptor
Q1-Q4	Quarter 1 - Quarter 4
RHP	Regional Healthcare Partnership
RUCC	Rural-Urban Continuum Codes
SA	Substance Abuse
SD	Standard Deviation
SDA	Service Delivery Area
SED	Severe Emotional Disturbance
SMI	Serious Mental Illness
STC	Special Terms and Conditions
THCIC	Texas Health Care Information Collection
TMHP	Texas Medicaid and Healthcare Partnership
TPI	Texas Provider Identifier
UC	Uncompensated Care
UPL	Upper Payment Limit
WOW	Without Waiver
WW	With Waiver

Appendix E: References

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Appendix F. Supplemental Evaluation Design for the Texas COVID-19 Public Health Emergency 1115(a) Demonstration Amendment

Introduction

On March 13, 2020, the President of the United States issued a proclamation that the COVID-19 outbreak in the United States constituted a national emergency by the authorities vested in him by the Constitution and the laws of the United States, including sections 201 and 301 of the National Emergencies Act (50 U.S.C. 1601 et seq.), and consistent with section 1135 of the Social Security Act (Act) as amended (42 U.S.C. 1320b-5). The Secretary of Health and Human Services invoked his authority to waive or modify certain requirements of titles XVIII, XIX, and XXI of the Act to the extent necessary, as determined by the Centers for Medicare & Medicaid Services (CMS), due to the consequences of the COVID-19 pandemic. Waivers or modifications to titles XVIII, XIX, and XXI of the Act ensure that sufficient health care items and services are available to meet the needs of individuals enrolled in the respective programs and to ensure that health care providers that furnish such items and services in good faith, but are unable to comply with one or more of such requirements as a result of the COVID-19 pandemic, may be reimbursed for such items and services and exempted from sanctions for such noncompliance, absent any determination of fraud or abuse. The Secretary's authority took effect as of 6:00 PM Eastern Standard Time on March 15, 2020, with a retroactive effective date of March 1, 2020. The authority will end upon termination of the public health emergency (PHE), including any extensions.

In an effort to assist states with addressing the COVID-19 pandemic, CMS created an 1115(a) demonstration opportunity to waive or modify requirements of titles XIX of the Act. The 1115(a) demonstration opportunity allows states flexibility and assistance enrolling and covering Medicaid beneficiaries during the COVID-19 pandemic. CMS announced the new 1115(a) demonstration opportunity on March 22, 2020; all approved demonstrations have a retroactive effective date of March 1, 2020 and will expire no later than 60 days after the end of the PHE, including any extensions.

Texas submitted a request for an 1115(a) demonstration to CMS on July 10, 2020. The amendment proposed to extend the 30-day spell of illness (SOI) limitation[8] in Texas' state plan for an additional 30 days for inpatient hospital stays related to COVID-19 (i.e., a stay for which the COVID-19 diagnosis is listed anywhere on the claim). The amendment would allow certain Medicaid beneficiaries up to 60 days of coverage for COVID-19-related inpatient hospital stays. In addition, the amendment would allow certain Medicaid beneficiaries to exceed the $200,000 inpatient hospital benefit limitation[8] for COVID-19-related inpatient hospital stays. CMS determined that the 1115(a) demonstration is necessary to assist Texas in delivering the most effective care to its beneficiaries in light of the COVID-19 PHE, and approved the state's 1115(a) demonstration amendment on September 3, 2020.

CMS requires all states conduct an evaluation of approved 1115(a) demonstrations. Texas' evaluation of the COVID-19 1115(a) demonstration amendment must test whether and how the approved expenditure authority affected Texas' response to the PHE. Texas is also required to track demonstration expenditures and to evaluate the connection between the expenditures and the cost-effectiveness of Texas' response to the PHE. Texas must submit a final evaluation report to CMS no later than one year after the end of the 1115(a) demonstration authority.

CMS approved use of the Texas Health and Human Services Commission's (HHSC's) Center for Analytics and Decision Support (CADS) to conduct the evaluation of the 1115(a) demonstration SOI amendment on a call August 27, 2020 and in writing on September 24, 2020. CADS is an independent department within HHSC, separate from the Medicaid and CHIP Services department. CADS has no role or responsibility in administration or implementation of the 1115(a) demonstration amendment. CADS is staffed by masters and doctoral-level researchers with extensive backgrounds in health and social science research methods. This evaluation design outlines CADS' plan for conducting the evaluation of the 1115(a) demonstration amendment.

[8] The 30-day SOI limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service, STAR+PLUS, or STAR Health. The $200,000 inpatient hospital benefit limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service or STAR Health. In compliance with H.R. 6201, for the duration of the public health emergency, these limitations do not apply to clients who turned 21 on or after March 18, 2020. Under existing policy, these limitations do not apply to certain approved transplants and STAR+PLUS members with a severe and persistent mental illness. Not all clients subject to the state plan limitations are served under the Texas Healthcare Transformation and Quality Improvement Program 1115 demonstration. However, this evaluation includes all clients subject to the 30-day SOI limitation or $200,000 inpatient hospital benefit limitation.

Evaluation Questions and Hypotheses

To assess how the 1115(a) demonstration amendment affected the state's response to the PHE, Texas developed two evaluation questions and four corresponding hypotheses.

Evaluation Question 1. What challenges did the public health emergency pose to Medicaid policies regarding hospitalization limits?

> Hypothesis 1.1. Due to COVID-19-related complications, some Medicaid clients required hospital stays that exceeded the 30-day SOI limitation.
>
> Hypothesis 1.2. Due to COVID-19-related complications, some Medicaid clients required care that exceeded the $200,000 inpatient hospital benefit limitation.

Evaluation Question 2. How did the 1115(a) demonstration amendment help the state address challenges to hospitalization limits posed by the public health emergency?

> Hypothesis 2.1. The 1115(a) demonstration amendment allowed the state greater flexibility in providing services to Medicaid clients with a COVID-19 diagnosis.
>
> Hypothesis 2.2. The 1115(a) demonstration amendment reduced the financial burden on hospitals during the PHE by reimbursing hospital stays that exceeded the 30-day SOI or $200,000 inpatient hospital benefit limitations.

Methodology

The evaluation of the COVID-19 section 1115(a) demonstration amendment is guided by two evaluation questions and four hypotheses that examine how the amendment affected the state's response to the PHE. This section summarizes the evaluation design, study populations, data sources, analytic methods, and methodological limitations.

Evaluation Design

The evaluation will rely on a descriptive case study design, integrating both quantitative and qualitative data to provide a comprehensive understanding of how the demonstration amendment affected Texas' response to the PHE.

Evaluation Measures

Several measures have been identified to operationalize the above hypotheses. Table 13 presented on page 136 provides an overview of the proposed measures, study populations, data sources, and analytic methods by evaluation hypothesis. Specific details regarding each of the proposed measures can be found in the Detailed Tables section starting on page 139.

Study Populations

HHSC will draw on three study populations for this evaluation. The first study population includes Medicaid clients subject to the 30-day SOI or $200,000 inpatient hospital benefit limitations who had an inpatient hospital stay for COVID-19 during the PHE. In addition, the evaluation will identify Medicaid administrators (study population 2) and Managed Care Organization (MCO) staff (study population 3) to participate in semi-structured interviews based on their knowledge and familiarity with the administrative and financial aspects of Medicaid inpatient hospital stays. HHSC will identify between one and three representatives for each of the two interviewee groups (Medicaid administrators and MCO staff).

Data Sources

The evaluation will leverage both administrative and primary data sources to evaluate the 1115(a) demonstration amendment. Specifically, the evaluation will utilize fee-for-service (FFS) claims data, Medicaid managed care (MMC) encounter data, MCO administrative data, client enrollment files, and semi-structured interviews, as described below.

- **FFS claims and MMC encounter data.** FFS claims and MMC encounter data contain information on hospital stays, including the length of the stay, diagnosis codes, procedures, and costs. These data are processed and housed by Texas Medicaid and Health Partnership (TMHP), and finalized on an eight-month lag.
- **MCO administrative data.** MCO administrative data contain information on members who exceeded the 30-day SOI or $200,000 inpatient hospital

benefit limitations, such as Member ID, admission dates, cost, and additional relevant information. MCO administrative data may be used to supplement data held in TMHP.

- **Client enrollment files.** The enrollment files will be used to obtain information about the client's age, sex, race/ethnicity, and county of residence. Enrollment data will be accessed using an HHSC Structured Query Language database that is finalized on an eight-month lag.
- **Semi-structured interviews.** Select Medicaid administrators and MCO staff will be interviewed via phone or videoconferencing software. Each interview will last approximately 30-45 minutes and will include an interviewer and one or two transcribers. HHSC will conduct interviews as soon as logistically feasible after approval of the Supplemental Evaluation Design for the Texas COVID-19 PHE SOI 1115(a) Demonstration Amendment. Depending on the length of the PHE, HHSC may conduct a second round of interviews to assess any substantial changes in Texas' response to the PHE.

Analytic Methods

Hypotheses will be tested using quantitative and qualitative methods. This section describes the proposed analytic strategies for examining the measures presented in Table 13.

- **Descriptive statistics.** Descriptive statistics, such as estimates of central tendency and dispersion, will be used to describe COVID-19-related inpatient hospital stays during the PHE. Descriptive statistics will include summaries of the inpatient hospital stays, such as total days and cost, as well as summaries of clients impacted by the 1115(a) demonstration amendment.
- **Descriptive trend analysis.** Descriptive trend analysis will be used to explore changes in COVID-19-related inpatient hospital stays over the course of the PHE.
- **Thematic analysis.** Hypotheses that rely on semi-structured interviews will be examined using thematic analysis. This qualitative method involves the identification of patterns and themes within interview data, and is well-suited to analyzing the diverse and nuanced information collected from study participants.

Table 13. 1115(a) Demonstration Amendment Evaluation Measures

Evaluation Hypothesis	Measures	Study Population	Data Sources	Analytic Methods
Evaluation Question 1. What challenges did the public health emergency pose to Medicaid policies regarding hospitalization limits?				
1.1. Due to COVID-19-related complications, some Medicaid clients required hospital stays that exceeded the 30-day SOI limitation.	1.1.1. Number and proportion of clients with a COVID-19 diagnosis who exceeded the 30-day SOI limitation	Clients subject to the 30-day SOI limitation with a COVID-19 diagnosis on an inpatient claim/encounter	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)	Descriptive statistics; Descriptive trend analysis (subgroup analysis, where applicable)
1.2. Due to COVID-19-related complications, some Medicaid clients required care that exceeded the $200,000 inpatient hospital benefit limitation.	1.2.1. Number and proportion of clients with a COVID-19 diagnosis who exceeded the $200,000 inpatient hospital benefit limitation	Clients subject to the $200,000 inpatient hospital benefit limitation with a COVID-19 diagnosis on an inpatient claim/encounter	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)	Descriptive statistics; Descriptive trend analysis (subgroup analysis, where applicable)

Evaluation Hypothesis	Measures	Study Population	Data Sources	Analytic Methods
Evaluation Question 2. How did the 1115(a) demonstration amendment help the state address challenges to hospitalization limits posed by the public health emergency?				
2.1. The 1115(a) demonstration amendment allowed the state greater flexibility in providing services to Medicaid clients with a COVID-19 diagnosis.	2.1.1. SOI length for clients with a COVID-19 diagnosis 2.1.2. Cost of inpatient hospitalizations for clients with a COVID-19 diagnosis	Clients subject to the 30-day SOI or $200,000 inpatient hospital benefit limitation with a COVID-19 diagnosis on an inpatient claim/encounter	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)	Descriptive statistics; Descriptive trend analysis (subgroup analysis, where applicable)
	2.1.3. Impact of extending the 30-day SOI limitation on client care 2.1.4. Impact of waiving the $200,000 inpatient hospital benefit limitation on client care 2.1.5. HHSC and MCO process changes related to the 1115(a) demonstration amendment	Medicaid administrators; MCO staff	Interviews	Thematic analysis
2.2. The 1115(a) demonstration amendment reduced the financial burden on hospitals during the PHE by reimbursing hospital stays that exceeded the 30-day SOI or $200,000 inpatient hospital benefit limitations.	2.2.1 Impact of the 1115(a) demonstration amendment on the distribution of costs associated with Medicaid inpatient hospital stays	Medicaid administrators; MCO staff	Interviews	Thematic analysis

Note. The 30-day SOI limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service, STAR+PLUS, or STAR Health. The $200,000 inpatient hospital benefit limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service or STAR Health.

Anticipated Limitations

The goal of this evaluation is to determine how the 1115(a) demonstration amendment affected Texas' response to the PHE. Consistent with CMS guidance for COVID-19 PHE 1115(a) demonstration evaluations, analyses will be primarily descriptive and qualitative. Texas cannot test the causal impact of the 1115(a) demonstration amendment on the state's response to the PHE because the amendment was made retroactively effective at the beginning of the PHE. There is not an appropriate counterfactual condition available in which Texas was responding to the COVID-19 pandemic without COVID-19 hospitalization flexibilities in place.

Due to the reliance on interviews from a select number of Medicaid administrators and MCO staff, the evaluation may be susceptible to common threats to validity among qualitative methods, such as recall bias and social desirability bias. Texas will attempt to reduce these potential biases by using contextual reminders where appropriate and standardizing interview protocols. Despite these threats, this mode of data collection is strengthened by a high level of nuance and the ability to capture unique perspectives. Further, qualitative data will be supplemented with quantitative data on client hospitalizations. The combination of claims data and semi-structured interviews will provide broad insight into Texas' response to the PHE in light of the COVID-19 flexibilities granted under this amendment.

Evaluation Timeline

HHSC will follow the evaluation timeline shown in Table 14.

Table 14. 1115(a) Demonstration Amendment Evaluation Timeline

Date	Milestone/Deliverable
March 1, 2020	Effective date of Texas' COVID-19 PHE 1115(a) Demonstration Amendment
September 3, 2020	Texas' COVID-19 PHE 1115(a) Demonstration Amendment Approved
November 6, 2020	Texas' COVID-19 PHE 1115(a) Demonstration Amendment Evaluation Design Due
No later than 60 days after end of PHE	End date of Texas' COVID-19 PHE 1115(a) Demonstration Amendment
One year after expiration of demonstration	Final Report Due

Detailed Tables

Evaluation Question 1. ***What challenges did the public health emergency pose to Medicaid policies regarding hospitalization limits?***

Hypothesis 1.1. Due to COVID-19-related complications, some Medicaid clients required hospital stays that exceeded the 30-day SOI limitation.

Measure 1.1.1	Number and proportion of clients with a COVID-19 diagnosis who exceeded the 30-day SOI limitation
Definition	The unique count of FFS, STAR+PLUS, and STAR Health clients subject to the 30-day SOI limitation who were hospitalized with COVID-19 for more than 30 days (days do not need to be consecutive) during a single spell of illness
Study Population	FFS, STAR+PLUS, and STAR Health clients[1] subject to the 30-day SOI limitation with a COVID-19 diagnosis (U071 diagnosis code) in any position on an inpatient claim/encounter
Technical Specifications	**Spell of illness**: The number of days a client is eligible to receive coverage for inpatient hospital care. Days counted under a single spell of illness may accrue intermittently or consecutively. A new spell of illness does not start until the client has been out of an acute care facility for 60 consecutive days. Present as an unduplicated number of clients and as a proportion of all clients with a COVID-19 diagnosis: **Numerator:** Total number of unduplicated clients subject to the 30-day SOI limitation with a COVID-19 diagnosis whose hospitalization exceeded 30 days during a single SOI **Denominator:** Total number of unduplicated clients subject to the 30-day SOI limitation with a COVID-19 diagnosis **Rate:** (number / denominator) * 100
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)
Comparison Group(s)/Subgroup(s)	Client demographics (age, race/ethnicity, sex, region, etc.), where applicable
Analytic Methods	Descriptive statistics; Descriptive trend analysis (March 1, 2020 – no later than 60 days after the end of the PHE)

[1] The 30-day SOI limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service, STAR+PLUS, or STAR Health.

Note. COVID-19 = Coronavirus Disease 2019. SOI = Spell of illness. FFS = Fee-for-service. STAR+PLUS = Texas Medicaid Managed Care program for individuals age 21 and older with disabilities and individuals age 65 or older. STAR Health = Texas Medicaid Managed Care program for individuals under or transferring out of conservatorship or foster care. MMC = Medicaid Managed Care. MCO = Managed Care Organization. PHE = Public health emergency.

Hypothesis 1.2. Due to COVID-19-related complications, some Medicaid clients required care that exceeded the $200,000 inpatient hospital benefit limitation.

Measure 1.2.1	Number and proportion of Medicaid clients with a COVID-19 diagnosis who exceeded the $200,000 inpatient hospital benefit limitation
Definition	The unique count of FFS and STAR Health clients subject to the $200,000 inpatient hospital benefit limitation whose COVID-19 hospitalizations totaled more than $200,000 during a single spell of illness
Study Population	FFS and STAR Health clients[1] subject to the $200,000 inpatient hospital benefit limitation with a COVID-19 diagnosis (U071 diagnosis code) in any position on an inpatient claim/encounter
Technical Specifications	**Spell of illness**: The number of days a client is eligible to receive coverage for inpatient hospital care. Days counted under a single spell of illness may accrue intermittently or consecutively. A new spell of illness does not start until the client has been out of an acute care facility for 60 consecutive days. Present as an unduplicated number of clients and as a proportion of all clients with a COVID-19 diagnosis: **Numerator:** Total number of unduplicated clients subject to the $200,000 inpatient hospital benefit limitation with a COVID-19 diagnosis whose hospitalization totaled more than $200,000 **Denominator:** Total number of unduplicated clients subject to the $200,000 inpatient hospital benefit limitation with a COVID-19 diagnosis **Rate:** (number / denominator) * 100
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)
Comparison Group(s)/Subgroup(s)	Client demographics (age, race/ethnicity, sex, region, etc.), where applicable
Analytic Methods	Descriptive statistics; Descriptive trend analysis (March 1, 2020 – no later than 60 days after the end of the PHE)

[1] The $200,000 inpatient hospital benefit limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service or STAR Health.

Note. COVID-19 = Coronavirus Disease 2019. FFS = Fee-for-service. STAR Health = Texas Medicaid Managed Care program for individuals under or transferring out of conservatorship or foster care. MMC = Medicaid Managed Care. MCO = Managed Care Organization. PHE = Public health emergency.

Evaluation Question 2. ***How did the 1115(a) demonstration amendment help the state address challenges to hospitalization limits posed by the public health emergency?***

Hypothesis 2.1. The 1115(a) demonstration amendment allowed the state greater flexibility in providing services to Medicaid clients with a COVID-19 diagnosis.

Measure 2.1.1	SOI length for clients with a COVID-19 diagnosis
Definition	Number of days spent in the hospital with a COVID-19 diagnosis per client subject to the 30-day SOI limitation per spell of illness
Study Population	FFS, STAR+PLUS, and STAR Health clients[1] subject to the 30-day SOI limitation with a COVID-19 diagnosis (U071 diagnosis code) in any position on an inpatient claim/encounter
Technical Specifications	**Spell of illness**: The number of days a client is eligible to receive coverage for inpatient hospital care. Days counted under a single spell of illness may accrue intermittently or consecutively. A new spell of illness does not start until the client has been out of an acute care facility for 60 consecutive days. Present mean, median, standard deviation, minimum, and maximum number of days per SOI for groups with sufficient sample sizes
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)
Comparison Group(s)/Subgroup(s)	Client demographics (age, race/ethnicity, sex, region, etc.), where applicable Subgroup: Spells of illness that exceeded 30 days
Analytic Methods	Descriptive statistics; Descriptive trend analysis (March 1, 2020 – no later than 60 days after the end of the PHE)

[1] The 30-day SOI limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service, STAR+PLUS, or STAR Health.

Note. SOI = Spell of illness. COVID-19 = Coronavirus Disease 2019. FFS = Fee-for-service. STAR+PLUS = Texas Medicaid Managed Care program for individuals age 21 and older with disabilities and individuals age 65 or older. STAR Health = Texas Medicaid Managed Care program for individuals under or transferring out of conservatorship or foster care. MMC = Medicaid Managed Care. MCO = Managed Care Organization. PHE = Public health emergency.

Measure 2.1.2	Cost of inpatient hospitalizations for clients with a COVID-19 diagnosis
Definition	Cost of COVID-19-related inpatient hospitalizations per client subject to the $200,000 inpatient hospital benefit limitation per spell of illness
Study Population	FFS and STAR Health clients[1] subject to the $200,000 inpatient hospital benefit limitation with a COVID-19 diagnosis (U071 diagnosis code) in any position on an inpatient claim/encounter
Technical Specifications	**Spell of illness**: The number of days a client is eligible to receive coverage for inpatient hospital care. Days counted under a single spell of illness may accrue intermittently or consecutively. A new spell of illness does not start until the client has been out of an acute care facility for 60 consecutive days. Present mean, median, standard deviation, minimum, and maximum cost per SOI for groups with sufficient sample sizes
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	FFS Claims Data; MMC Encounter Data; Client Enrollment Files; MCO administrative data (if applicable)
Comparison Group(s)/Subgroup(s)	Client demographics (age, race/ethnicity, sex, region, etc.), where applicable Subgroup: Spells of illness that exceeded $200,000
Analytic Methods	Descriptive statistics; Descriptive trend analysis (March 1, 2020 – no later than 60 days after the end of the PHE)

[1] The $200,000 inpatient hospital benefit limitation described in the state plan only applies to clients 21 and older receiving services through fee-for-service or STAR Health.

Note. COVID-19 = Coronavirus Disease 2019. FFS = Fee-for-service. STAR Health = Texas Medicaid Managed Care program for individuals under or transferring out of conservatorship or foster care. MMC = Medicaid Managed Care. MCO = Managed Care Organization. PHE = Public health emergency.

Measure 2.1.3	Impact of extending the 30-day SOI limitation on client care
Definition	Semi-structured interviews will explore the impact of extending the 30-day SOI limitation on the care of Medicaid clients infected with COVID-19
Study Population	Medicaid administrators; MCO staff
Technical Specifications	N/A
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	Semi-structured interviews
Comparison Group(s)/Subgroup(s)	Interviewee group (Medicaid administrators; MCO staff), where applicable
Analytic Methods	Thematic Analysis

Note. SOI = Spell of illness. COVID-19 = Coronavirus Disease 2019. MCO = Managed Care Organization.

Measure 2.1.4	Impact of waiving the $200,000 inpatient hospital benefit limitation on client care
Definition	Semi-structured interviews will explore the impact of waiving the $200,000 inpatient hospital benefit limitation on the care of Medicaid clients infected with COVID-19
Study Population	Medicaid administrators; MCO staff
Technical Specifications	N/A
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	Semi-structured interviews
Comparison Group(s)/Subgroup(s)	Interviewee group (Medicaid administrators; MCO staff), where applicable
Analytic Methods	Thematic Analysis

Note. COVID-19 = Coronavirus Disease 2019. MCO = Managed Care Organization.

Measure 2.1.5	HHSC and MCO process changes related to the 1115(a) demonstration amendment
Definition	Semi-structured interviews will explore HHSC and MCO process changes related to the 1115(a) demonstration amendment
Study Population	Medicaid administrators; MCO staff
Technical Specifications	N/A
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	Semi-structured interviews
Comparison Group(s)/Subgroup(s)	Interviewee group (Medicaid administrators; MCO staff), where applicable
Analytic Methods	Thematic Analysis

Notes. MCO = Managed Care Organization.

Hypothesis 2.2. The 1115(a) demonstration amendment reduced the financial burden on hospitals during the PHE by reimbursing hospital stays that exceeded the 30-day SOI or $200,000 inpatient hospital benefit limitations.

Measure 2.2.1	Impact of the 1115(a) demonstration amendment on hospital financial burden
Definition	Semi-structured interviews will explore the impact of the 1115(a) demonstration amendment on the distribution of costs associated with Medicaid inpatient hospital stays
Study Population	Medicaid administrators; MCO staff
Technical Specifications	N/A
Exclusion Criteria	None
Data Source(s)/Data Collection Method(s)	Semi-structured interviews
Comparison Group(s)/Subgroup(s)	Interviewee group (Medicaid administrators; MCO staff), where applicable
Analytic Methods	Thematic Analysis

Notes. MCO = Managed Care Organization.