DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop S2-25-26
Baltimore, Maryland 21244-1850

State Demonstrations Group

March 17, 2025

Maureen Corcoran
Director
Ohio Department of Medicaid
50 W. Town Street, Suite 400
Columbus, OH 43215

Dear Director Corcoran:

The Centers for Medicare & Medicaid Services (CMS) completed its review of the Interim Evaluation Report, which is required by the Special Terms and Conditions (STCs), specifically STC #39 "Interim Evaluation Report" of Ohio's section 1115 demonstration, "Section 1115 Demonstration Waiver for Substance Use Disorder Treatment" (Project Number 11-W-00330/5), effective through June 30, 2025. This Interim Evaluation Report covers the period from October 2019 through September 2023, with baseline data from January 2017 through September 2019. CMS determined that the Evaluation Report, submitted on September 29, 2023 and revised on September 27, 2024, is in alignment with the CMS-approved Evaluation Design and the requirements set forth in the STCs, and therefore approves the state's Interim Evaluation Report.

The Interim Evaluation Report findings are overall positive, as most metrics are trending in the desired direction and qualitative evidence shows that the demonstration is making progress towards meeting its goals. Notably, interrupted time series analyses found that the demonstration was associated with a significant reduction in the utilization of emergency department and inpatient psychiatric hospital settings for opioid use disorder and other substance use disorder (SUD) diagnoses. While many other findings were not statistically significant when the transition period was compared to the pre-intervention period, most metrics were trending in the desired directions. For example, the rate of overdose deaths and opioid overdose deaths has declined steadily during the transition period.

Key informant interviews found that stakeholders generally supported the demonstration, while also providing insights into challenges in implementation. Some stakeholders noted that while provider capacity in urban settings was more than adequate, provider capacity at different levels of care in rural settings is often inadequate or contains gaps. Additionally, a lack of access to appropriate housing was continually listed as one of the most important barriers to successful recovery. However, the expansion of telehealth was consistently cited as a positive method for

expanding access to lower levels of care. CMS looks forward to receiving further findings in the Summative Evaluation Report.

In accordance with STC #43, the approved Interim Evaluation Report may now be posted to the state's Medicaid website within 30 days. CMS will also post the Interim Evaluation Report on Medicaid.gov.

We look forward to our continued partnership on the Ohio Section 1115 Demonstration Waiver for Substance Use Disorder Treatment. If you have any questions, please contact your CMS demonstration team.

Sincerely,

Danielle Daly -S

Digitally signed by Danielle Daly -S
Date: 2025.03.17 14:23:23 -04'00'

Danielle Daly
Director
Division of Demonstration Monitoring and Evaluation

cc: Christine Davidson, State Monitoring Lead, CMS Medicaid and CHIP Operations Group

Section 1115 Substance Use Disorder Demonstration Evaluation Interim Report

September 6, 2024

Governor Mike DeWine | Lt. Governor Jon Husted | Director Maureen Corcoran

medicaid.ohio.gov

Contributors

Leyla Tosun, PhD (Principal Investigator)
Dushka Crane, PhD (Co-Principal Investigator)
Zachary Weisbrodt, MBA (Project Manager)
Alyssa Antonini, PhD
Lareina La Flair, PhD
Chris Eisner, MPH
Robert Ashmead, PhD
Kelly Markowski, PhD

Acknowledgments

Rachel Mauk, PhD and Aimee Mack, MPH provided assistance with analyzing and interpreting Medicaid claims data. Tina Bickert, MA, MPAL, Townsand Price-Spratlen, PhD, Shawnita Sealy-Jefferson, PhD, MPH, Thomas Albani, PhD, and Audra Philipps collected and analyzed qualitative data for the SUD 1115 MidPoint Assessment.

Many people contributed to this report through key informant interviews and focus groups, including individuals with lived experience, SUD treatment providers, treatment and recovery advocates, managed care organizations, and state agency representatives.

Special thanks go to the staff of the Ohio Department of Medicaid including Lynne Lyon, Dan Arnold, Mary Haller, Kendallyn Markman, Diane Shinn, Peggy Smith as well as Doug Day of the Ohio Department of Mental Health and Addiction Services for answering questions and providing feedback.

About us

The Ohio Colleges of Medicine Government Resource Center's mission is to identify, research, and spread innovative practices to improve access to quality health care for all Ohioans through partnerships with health care, state, and academic leaders.

GRC's publications do not necessarily reflect the opinions of its clients and funders.

grc.osu.edu

List of Tables

List of Figures

A. Acronyms

ASAM	American Society of Addiction Medicine
AUD	Alcohol Use Disorder
BH	Behavioral Health
BHR	Behavioral Health Redesign
CMS	Centers for Medicare & Medicaid Services
GRC	Government Resource Center
IMD	Institutions for Mental Disease
IOP	Intensive Outpatient
ITS	Interrupted Time Series
LOC	Level of Care
MAT[1]	Medication Assisted Treatment (includes MOUD and medication for AUD)
MCP	Managed Care Plan
MM	Monitoring Metric
MOUD	Medication for Opioid Use Disorder
ODM	Ohio Department of Medicaid
OhioMHAS	Ohio Department of Mental Health and Addiction Services
OUD	Opioid Use Disorder
PDMP	Prescription Drug Monitoring Program

[1] As this is an outdated term, GRC has changed most references to MAT to "medication for SUD" or "MOUD" when referring specifically to medication for opioid use disorder. GRC has maintained use of MAT in some sections such as milestones, hypotheses, and drivers, and will revisit this terminology with ODM and CMS prior to the summative report.

PHP	Partial Hospitalization
SOR	State Opioid Response
SUD	Substance Use Disorder
RT	Residential Treatment

B. Executive Summary

Background

On September 24, 2019, the Ohio Department of Medicaid received approval for *Ohio's Substance Use Disorder (SUD) Section 1115 Demonstration Waiver* to address unprecedented increases in drug overdose deaths and substance use disorders (SUD) among Ohio Medicaid enrollees. Through the Demonstration, Ohio was able to pursue a series of programmatic changes over a period of five years (October 1, 2019 through September 30, 2024) to address the following milestones: (1) Access to critical LOCs for OUD and other SUDs; (2) Use of ASAM placement criteria; (3) Use of ASAM program standards for residential provider qualifications; (4) Provider capacity of SUD treatment including MAT; (5) Implementation of OUD comprehensive treatment and prevention strategies; and (6) Improved care coordination and transition between LOCs.

ODM worked with an independent evaluator to evaluate whether Ohio's Demonstration would achieve 6 goals that were established for the demonstration by CMS. The evaluation was designed to clarify the relationships between the key provisions of Ohio's demonstration and the CMS goals.

CMS Goals for SUD 1115 Demonstration

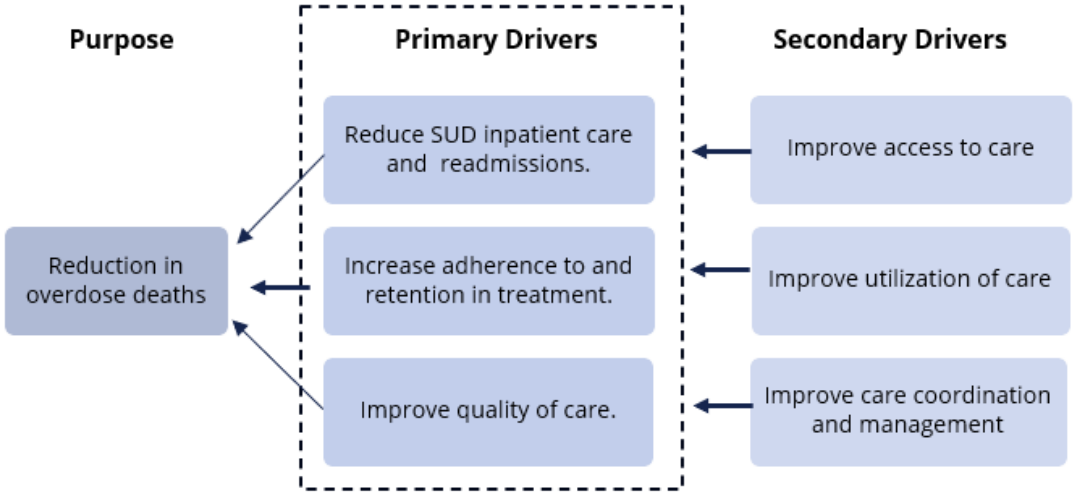
1. Increased rates of identification, initiation, and engagement in treatment.
2. Increased adherence to and retention in treatment for OUD and other SUDs.
3. Reductions in overdose deaths, particularly those due to opioids.
4. Reduced utilization of emergency departments (EDs) and inpatient (IP) hospital settings for OUD and other SUD treatment where the utilization is

preventable or medically inappropriate through improved access to other continuum of care services.

5. Fewer readmissions to the same or higher LOC where readmissions is preventable or medically inappropriate for OUD and other SUD.
6. Improved access to care for physical health conditions among members with OUD or other SUDs.

A driver diagram was developed to depict the hypothesized relationships between the desired outcomes of the demonstration and the factors that are expected to drive improvement (see Figure 1). Within the framework of the driver diagram, CMS Goal 3, reduction of overdose deaths, was viewed as the primary purpose of Ohio's demonstration, while other CMS goals were viewed as drivers of reduction in overdose death.

Figure 1: Primary Purpose and Drivers of Ohio's SUD 1115 Waiver



CMS Goals 1, 2, 4, 5, and 6 were subsumed in three categories of primary drivers. Primary Driver 1, reduction in hospital-based SUD service use and treatment readmissions, aligned with CMS Goals 4 and 5. Primary Driver 2, increased adherence to and retention in treatment, corresponded to CMS Goal 2. Primary Driver 3 combined CMS Goal 1, initiation and engagement in treatment, and CMS Goal 6, access to physical health care, under the umbrella of health care quality.

In this model three secondary drivers represented the immediate outcomes of specific programmatic changes in Ohio's implementation plan. Each secondary driver was expected to exert influence on all three primary drivers, and in turn, the primary drivers were expected to impact drug overdose deaths. Research questions and hypotheses were developed to assess these relationships.

Research Questions	Hypotheses
Q1 Does the demonstration increase access to SUD treatment services?	*H1.a* The demonstration will increase the ratio of SUD providers to members enrolled in Medicaid and qualified to deliver SUD services.
	H1.b The demonstration will increase the ratio of providers to members at each of the levels of care.
	H1.c The demonstration will increase the ratio of providers to members in geographic areas that are underserved at baseline.
Q2 Does the demonstration increase utilization of SUD treatment by enrollees with SUD?	*H2.a* The demonstration will reduce the time between initial diagnosis and treatment.
	H2.b The demonstration will increase the rate of MAT usage.
Q3 Does the demonstration improve coordination	*H3.a* The demonstration will increase the proportion of IP stays which have a timely follow- up visit with a corresponding primary diagnosis of SUD.

and management of care?	*H3.b* The demonstration will increase the proportion of RT visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.
	H3.c The demonstration will increase the proportion of ED visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.
	H3.d The demonstration will decrease high-risk prescribing practices (i.e., high dose, multiple prescribers and pharmacies, concurrent use of benzodiazepines).
Q4 Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?	*H4.a* The demonstration will decrease the rate of ED and IP visits within the Medicaid population for SUD.
	H4.b The demonstration will decrease the rate of readmissions to ED and IP settings.
Q5 Does the demonstration improve adherence to SUD treatment?	*H5.a* The demonstration will increase continuity of pharmaceutical care.
Q6 Do members receiving SUD services experience an improved quality of care?	*H6.a* The demonstration will increase the percentage of members with SUD who receive screening and care for co-morbid conditions.
	H6.b The demonstration will increase early engagement in SUD treatment.

Q7 Does the demonstration reduce rates of opioid-related overdose deaths?	*H7.a* The demonstration will decrease the rate of overdose deaths, including those due to opioids.
Q8 How do costs related to the demonstration waiver change throughout the pre- and post-demonstration periods?	*H8.a* The demonstration will decrease or have no effect on total costs. The demonstration will increase SUD-IMD, SUD-other, and Non-SUD costs, but decrease IP, non-ED outpatient, ED outpatient, pharmacy and long-term care costs.

This interim report describes the evaluation methods and preliminary results associated with the key components of Ohio's demonstration that have been implemented to date.

Methods

The evaluation uses a combination of quantitative and qualitative methods to assess the effects of the demonstration. Quantitative measures aligned with each of the hypotheses are constructed primarily from Medicaid claims and eligibility data and computed for each quarter stretching back to 2017 or 2018 depending on the measure. A three-period interrupted time series (ITS) approach is used to assess changes in the level and trend of the measures between a pre-intervention period, a transition period, and a post-intervention period..[2] The transition period is defined as beginning at Q4 2019, which is the earliest time point at which a waiver

[2] This diverges from the two-period ITS design that was originally proposed in the evaluation design. Evaluators proposed the new three-period design to CMS after determining that a number of planned waiver activities had been delayed due to the COVID-19 pandemic and after studying their implementation.

activity could have occurred. The post-intervention period is defined as beginning at Q4 2023, which is the quarter by which nearly all waiver activities had been implemented. A three-period design was selected as this is a robust method for evaluating health policy interventions that require some time to "ramp up" or reach their full extent. It is also appropriate in cases where there are multiple, staggered interventions for assessment. In this design, a comparison of the pre- and post-intervention periods will be the most robust assessment of the impact of the SUD waiver. This report includes data through Q3 2023 (pre-intervention period and transition period), and so the results of the analyses are a preliminary indication of how waiver activities are beginning to affect outcomes of interest but should not be interpreted as the ultimate assessment of the casual effect of the waiver.

Qualitative data collection and analysis complements the quantitative analysis, allowing for more in-depth examinations of the mechanisms that impact the waiver goals and a more comprehensive understanding of the lived experiences of individuals receiving treatment. The first of two qualitative data collections during the demonstration were conducted as a part of the Mid-Point Assessment (submitted to CMS in December 2022) consisting of semi-structured interviews with key informants such as representatives from state agencies, SUD treatment providers, treatment and recovery advocates, and representatives from managed care organization as well as focus groups with individuals actively receiving SUD treatment. A second data collection is planned for October-December 2024, which is about five years into (and nearing the end of) the demonstration period. This will include a second round of interviews with key stakeholders and individuals in treatment to understand how changes in processes and services unfolded during the demonstration from a variety of perspectives.

Limitations

A limitation of the study design is that the COVID-19 pandemic coincided with the planned start date for many of the waiver activities. As a result, many activities were delayed due to the PHE, resulting in the evaluation team's decision to switch to a three-period ITS design. While this change will allow us to make better comparisons between the pre-implementation and post-implementation periods, the reliability of interim findings is limited by the transition period occurring during the time period immediately following the start of the pandemic. Available data and

analyses also currently only reflect trends in the pre-implementation period and the transition period, so a true evaluation of the causal effect of the demonstration by comparing trends in the pre- and post-implementation periods will not be possible until the summative analysis. More reliable conclusions will be drawn in the summative report once time points in the post-implementation period become available.

Additionally, this study relies on several assumptions about data quality, unobserved variables, and specification of statistical models. Since the measures were constructed using administrative data, it is likely that individuals with an SUD diagnosis are underreported. It is also likely that unmeasured factors influence the measured outcomes, making it more difficult to attribute changes in trends to the demonstration waiver. Even in the absence of data quality issues or unmeasured factors, conclusions drawn from the ITS analyses are still only valid under assumptions of stable and linear trends. Therefore, the validity of results should be evaluated separately for each measure depending on the quality and stability of the data.

Preliminary Results and Conclusions

The preliminary findings of the evaluation indicate encouraging trends related to access to care, utilization, reducing hospital-based SUD service use and some treatment readmissions, in addition to a decline in overdose deaths. There is further work to be done in increasing adherence to and retention in treatment, improving coordination and management of care, and improving quality of care. A number of the interventions that are central to Ohio's demonstration have only recently concluded, so additional time will permit a comprehensive assessment of all outcomes associated with the demonstration.

1. Access to SUD treatment providers
    - The trend in the overall ratio of SUD providers to Medicaid members with an SUD diagnosis did not significantly change during the transition period, although it has been on a slight decline since late 2019. While the ratio has slightly declined, it is important to note that the number of SUD providers has increased since 2019. However,

there has been a greater percentage increase in the number of Medicaid members with an SUD diagnosis (total Medicaid enrollment grew throughout the transition period during the public health emergency), causing the ratio to decline slightly. A slight upward trend in the ratio may be starting in the last few quarters of the transition period, so it will be important to continue to observe this trend in the post-intervention period.

- ☐ There was a significantly improved trend in the ratio of SUD providers to members for ASAM level of care 3 in the transition period. The downward trend in SUD provider availability ratio for ASAM level 1 since late 2019 should be watched. Generally, the ratio for level 2 is trending upward in the transition period (with no significant change), although with substantial variation.
- ☐ In underserved areas, the ratio of SUD providers increased in 2021 – potentially related to the expansion of care via telehealth – but has subsequently been declining. There was no significant change associated with the transition period of the waiver.
- ☐ Access to MOUD providers increased throughout the pre-intervention period but leveled off (with no significant change detected) in the transition period.

2. Utilization of SUD treatment
    - ☐ MOUD utilization increased steadily since 2017, although it has begun to level off in 2023. There was no statistically significant causal effect of the waiver on the trend in the transition period.
    - ☐ MOUD utilization during residential treatment stays has steadily increased since 2018 with a few dips in the trend during the pandemic and in late 2021. There was no statistically significant causal effect of the waiver associated with the transition period.
    - ☐ Initiation of SUD treatment for new episodes has been declining steadily since Q1 2020, although there was no statistically significant causal effect of the waiver associated with the transition period.

3. Coordination and management of care

- Trends in timely follow-up care for RT stays or ED visits showed no statistically significant change in trend relative to the pre-intervention period, although descriptively the proportion of RT stays with timely follow-up care began to increase in the transition period. There was a statistically significant decrease in the trend for timely follow-up care for IP visits in the transition period, which had been increasing in 2017-2019 but has now leveled off on average (with substantial variation).
- Trends in high-risk utilization of opioids showed no statistically significant change in the transition period, although following steady declines in the pre-intervention periods, the trends for both measures leveled off in the transition period and show early signs of an uptick in rates in recent quarters.

4. Utilization of ED and IP

- ED and IP utilization for SUD decreased significantly in the transition period as did the 30-day ED readmission rate following an ED visit.
- Although there was no statistically significant effect associated with the waiver during the transition period, the 30-day IP readmission rate following an RT stay is trending downward.
- An area of attention for Ohio is in the 30-day ED readmission rate following an RT stay, which has been trending upward since 2018. There was no significant effect of the waiver during the transition period.

5. Adherence to SUD treatment

- Following a steady increase in continuity of pharmacotherapy for OUD in the pre-intervention period, there was an equally steady decrease in the transition period, with the beginning of the decline coinciding with the onset of the COVID-19 pandemic. Since Q2 2022 the trend has

turned upward again. There was no statistically significant effect of the waiver in the transition period.

6. Improved quality of care
    - The rate of access to preventive or ambulatory care increased on average until late 2021 but has been on the decline since that time. The rate of screening for HIV/HCV/HBV has exhibited a similar overall trend. Neither metric of quality of care was significantly impacted by the waiver during the transition period.
    - Early engagement in SUD treatment was on a slight upward trend during the pre-intervention period but has since been on the decline. There was a statistically significant decline in the trend associated with the transition period.

7. The primary purpose of Ohio's demonstration was to reduce the overdose death rate, including overdose deaths due to opioids.
    - While data are currently only available for the transition period and therefore no ITS analyses were conducted, the trends suggest that there was a steady decline in the rate of overdose deaths and opioid overdose deaths during 2020 - 2023.

8. A key consideration for this evaluation was on the impact on cost of care.
    - The interim findings suggest that there was a statistically significant increase in the trend of total costs per member-month (adjusted for age, sex, and race) associated with the transition period of the waiver. There were also statistically significant increases in the adjusted trends of ED, pharmacy, and long-term care costs associated with the transition period.
    - Although SUD-IMD, SUD-other, and non-SUD costs were expected to increase, for the former two, there were statistically significant decreases in the adjusted trends of these costs associated with the

transition period. There was a statistically significant increase in the trend of non-SUD costs.

- ☐ There was a statistically significant decrease in the adjusted trend of outpatient non-ED costs.
- ☐ There were no statistically significant changes in adjusted trends for total federal or inpatient costs.

C. General Background Information about the Demonstration

The goal of this SUD 1115 demonstration was to provide Ohio with flexibility and tools to address a growing SUD crisis within the state, including substance misuse, SUD, and opioid overdose deaths and other negative outcomes. During the years prior to the waiver, there were unprecedented increases in the number of individuals with SUD and, concurrently, the number of overdose deaths. By 2018, approximately 9% of the Medicaid non-dually eligible adult population (18-64) had a primary diagnosis of SUD[3], while drug overdose deaths among Ohioans had increased from 1,914 in 2012 to 4,854 in 2017.[4]

The Ohio Department of Medicaid pursued an SUD 1115 demonstration waiver to address these trends and enhance access to evidence-based treatment and prevention of SUD. Through the waiver, the state obtained the authority to provide high-quality, clinically appropriate treatment to members with an SUD diagnosis while they were short-term residents in residential and inpatient treatment settings that qualify as IMDs. The waiver supported efforts to increase access to care for individuals in community and home-based settings and improve access to a continuum of evidence-based SUD treatment at varied levels of intensity.

Ohio's Substance Use Disorder (SUD) Section 1115 Demonstration Waiver was approved by the Centers for Medicare and Medicaid Services (CMS) from October 1, 2019,

---

[3] Ohio Medicaid Administrative Data. Prevalence of primary or secondary SUD diagnosis among non-dual eligible adults 18-64 years of age.

[4] Ohio Department of Health, Bureau of Vital Statistics, 2020 Ohio Drug Overdose Report

through September 30, 2024. The period covered by this evaluation includes a baseline period prior to the start of the demonstration to assess the impact of waiver-related changes. The evaluation period begins on January 1, 2018,[5] and ends on September 30, 2024. In this interim report, results are generally reported through September 30, 2023. Further details about data availability, relevant changes to billing codes, and specific time periods of analysis by measure, are discussed in sections E.3 and E.6.1.4.

The demonstration was expected to impact services for all Medicaid enrollees of any age with a SUD. Ohioans who are not enrolled in Medicaid were also likely to benefit from Medicaid-focused interventions that enhanced the behavioral health system capacity to deliver evidence-based prevention and treatment.

C.1 History of the waiver's implementation

In the years prior to Ohio's SUD 1115 Waiver, the state implemented broad policy changes to modernize its Medicaid behavioral health benefit for individuals with mental health and substance use disorders. These changes, identified as Ohio Medicaid Behavioral Health Redesign (BHR), went into effect in January 2018 and set the stage for improvements in access to evidence based behavioral health treatment and continuity of care that were established under the SUD 1115 waiver. BHR enabled community behavioral health treatment providers to expand the array of services offered for mental health and SUD treatment, offer new evidence-based practices, and aligned SUD outpatient and residential treatment benefits with ASAM levels of care. For example, the redesigned benefit package included new evidence based BH services such as Assertive Community Treatment (ACT) for individuals with complex treatment needs and established a unique benefit package for opioid treatment programs. SUD treatment providers were required to assess and provide services using ASAM criteria with the goal of increasing utilization of community-based and non-hospital residential programs and limiting

[5] A handful of measures which were not expected to be impacted by the overhaul of Ohio's behavioral health system on January 1, 2018 (which included significant changes in Medicaid behavioral health benefits and billing codes) are calculated starting on January 1, 2017. For most other measures, January 1, 2018, was the earliest point that certain relevant Medicaid claims codes were used.

use of inpatient hospitalizations to situations in which there is a need for safety, stabilization, or acute detoxification (ASAM LOC 4). As of July 1, 2018, the Medicaid behavioral health benefit was integrated into Medicaid managed care. In 2022, 92% of individuals 18-64 with SUD were enrolled in a Medicaid managed care plan.

The SUD 1115 demonstration waiver gives Ohio the opportunity to continue progress with additional flexibility and tools to counter the state's elevated levels of SUD, including OUD. Through this demonstration, Ohio was able to complete a series of programmatic changes that aligned with the program milestones and goals that were established by CMS.

CMS Milestones:

1. Access to critical LOCs for OUD and other SUDs.
2. Use of ASAM placement criteria.
3. Use of ASAM program standards for residential provider qualifications.
4. Provider capacity of SUD treatment including MAT.
5. Implementation of OUD comprehensive treatment and prevention strategies.
6. Improved care coordination and transition between LOCs.

CMS Goals:

1. Increased rates of identification, initiation, and engagement in treatment.
2. Increased adherence to and retention in treatment for OUD and other SUDs.
3. Reductions in overdose deaths, particularly those due to opioids.
4. Reduced utilization of emergency departments (EDs) and inpatient (IP) hospital settings for OUD and other SUD treatment where the utilization is preventable or medically inappropriate through improved access to other continuum of care services.
5. Fewer readmissions to the same or higher LOC where readmissions is preventable or medically inappropriate for OUD and other SUD.
6. Improved access to care for physical health conditions among members with OUD or other SUDs.

Under the Demonstration, Ohio took steps to ensure providers utilized SUD-specific, multi-dimensional assessment tools so that patients received appropriate levels of care (LOC) that reflected evidence-based clinical treatment guidelines. The

Medicaid Behavioral Health Provider Manual, managed care provider agreement, and/or Ohio Administrative Code (OAC) were modified to establish provider responsibilities for screening, assessment, and treatment plan review.[6] ODM conducted reviews of provider and plan utilization management (UM) processes and used findings to improve UM and prior authorization approaches, including a standardized prior authorization form for all SUD residential and partial hospitalization services.

Ohio revised regulations, policies, and managed care contracts to align services with national standards and evidence-based practices. Service definitions, eligibility criteria, program requirements and provider qualifications in the Medicaid provider manual were updated to align with ASAM guidance. Residential program standards were updated to include more detail about the types of services, hours of clinical care, and credentials of staff in residential treatment settings. A single statewide vendor was selected to conduct an on-site review process of residential treatment providers to assure they met standards and to manage provider enrollment on an on-going basis. Residential treatment providers were also required to offer or facilitate patient access to MAT.

To address geographic variation in provider capacity, ODM evaluated the distribution and anticipated penetration rates among treatment providers and used the results to update MCP access standards for Behavioral Health State Plan services including all ASAM LOC and MAT. The new access standards require MCPs to ensure that all members have access to all Medicaid-covered BH services and monitor provider appointment access, time, and distance standards by ASAM LOC. MCPs must also monitor compliance with federal provider panel access standards set forth in 42 CFR 438.206.

Ohio continues to make system improvements to provide more coordinated and comprehensive treatment of Medicaid members with SUD. For example, MCPs must maintain provider directories that include an indication of whether each provider is accepting new members and submit quarterly reports to ODM that demonstrate provider panel adequacy. ODM and OhioMHAS also worked with

[6] This included, for example, an amendment to Ohio's managed care provider agreement on July 1, 2020, to include the use of ASAM criteria in approvals of inpatient SUD treatment admissions.

MCPs and providers to develop and implement care coordination models that are tailored to individuals' needs including a tiered care coordination strategy and data-driven attribution methodologies. Considerations for new models include using multiple attributes related to BH and SUD populations, data-driven attribution methodologies that can be replicated and updated regularly, multiple tiers of care coordination and re-evaluation of existing services with care coordination components, provider criteria that align with the care coordination needs of specific populations, and other benefit considerations. Additionally, as a part of the Next Generation Managed Care, Ohio has made enhancements to the overall managed care coordination model. The new four-tiered approach considers the individuals' involvement with other systems and providers to complement and support care coordination models at the practice level. When individuals are not connected to local or practice level care coordinators, the MCP provides a care coordinator when needed.

To improve care coordination and promote integration of behavioral and physical health care, funding was provided for 80 SUD providers to upgrade their electronic health record systems to enable utilization of Ohio's Health Information Exchanges (HIE). Other data-driven strategies to improve care coordination are still underway, such as enhancements to the state's PDMP that will allow providers to identify individuals that are at increased risk of negative outcomes, including individuals participating in drug court programs and those who have experienced a non-fatal drug overdose.

Additionally, in August 2022, the SUD Residential Treatment Notification of Admission Form was launched to facilitate communication between providers and MCPs and allow for early discharge planning and improved care coordination after discharge.

Finally, on July 1, 2022, the OhioRISE (Resilience through Integrated Systems and Excellence) program was launched. It is a specialized managed care program for youth enrolled in Medicaid with complex health and multisystem needs. A primary component of OhioRISE is comprehensive, community-driven care coordination across healthcare, BH care, SUD care, education, families, and other local entities to ensure individual care needs are met. OhioRISE covers children up to age 20, and therefore impacted a portion of the population of interest for Ohio's evaluation (Ohioans 18 years or older). Ohio has also identified individuals with SUD or mental

illness and co-occurring/chronic conditions as potential targets for other new care coordination models.

Ohio's Demonstration activities have also included data review and analysis related to individuals enrolled in Medicaid with an SUD diagnosis, and service utilization.

C.1.1 Status of waiver activities

Based on Ohio's approved implementation plan,[7] most waiver activities were originally scheduled to occur within the first 12 to 24 months of the demonstration start date (by October 2020 or October 2021, respectively). However, the implementation of several action items was delayed beyond their target completion dates, and many were implemented after October 2021 (some remain in progress). This included a delayed rollout of significant reforms to the Medicaid managed care system due in part to uncertainty related to the COVID-19 public health emergency. These delays motivated an adjustment to the evaluation design, from a two-period to a three-period interrupted time series model. Table 1 details the planned and actual implementation dates for waiver activities specified in Ohio's approved implementation plan.[7]

[7] Ohio's approved implementation plan

Table 1: Status of Ohio SUD 1115 Waiver Implementation Activities and Timeline

Action Item	Associated Milestone	Planned Date of Implementation	Actual Date of Implementation
Review plan policies for utilization review and prior authorization for compliance.	2	by October 2021	7/1/2021
Review plan delivery for program compliance (e.g., treatment plan, provider qualifications, etc.).	2	by October 2021	7/1/2021
Collect, review, and analyze utilization management information for CY2018.	2	by October 2021	7/1/2021
Based upon review and analysis, develop changes to the utilization management approach that reflect analysis and ensure compliance with ASAM and MHPAE.	2	by October 2021	7/1/2021
Develop necessary guidance to plans and providers regarding the new UM process.	2	by October 2021	7/1/2021
Update the State requirements to reflect residential requirements for the types of services, hours of clinical care and credentials of staff for each ASAM residential LOC.	3	by October 2021	7/1/2023
Require the plans to comply with updated ASAM residential requirements.	3	by October 2021	7/1/2018
Implement a standardized State on-site review process of residential provider qualifications against State requirements for ASAM, including the types of services,	3	by October 2021	7/1/2023

hours of clinical care and credentials of staff for each ASAM residential LOC.			
Implement a single statewide vendor to survey Ohio SUD residential providers to assure they meet certain standards and manage provider enrollment on an on-going basis.	3	by October 2021	7/1/2023
Require the plans to comply with state processes for credentialling SUD residential providers.	3	by October 2021	10/1/2022
Educate abstinence-based residential providers on benefits of MAT accessibility and begin cultural shift toward acceptance of MAT as a complementary treatment.	3	by October 2021	5/3/2023
Require SUD treatment providers to offer access and to facilitate patient access to MAT while in residential settings.	3	by October 2021	7/1/2023
Require the FFS delivery system and the plans to monitor access to MAT in residential settings including access to MAT counseling.	3	by October 2021	7/1/2023
Create a comprehensive access assessment baseline of all SUD providers and all SUD LOC, including MAT capacity.	4	by October 2020	9/1/2020
ODM will create access standards for SUD LOC.	4	by October 2020	2/1/2023
Add an indicator for providers accepting new patients to the plan quarterly network adequacy reports	4	by October 2021	08/01/2023
Require MCPs to update their SUD network development and management plan to specifically focus on SUD provider capacity by LOC, including MAT.	4	by April 2021	2/1/2023
Continue to onboard new EHR and pharmacy dispensing system vendors.	5	by October 2021	Ongoing

Explore the possibility of analysis to correlate long-term opioid use directly to clinician prescribing patterns in conjunction with the ODM (Action item for the Board of Pharmacy).	5	by October 2021	Ongoing
Implement enhanced information within the Ohio Automated Rx Reporting System (OARRS) including: OARRS flags for individuals who are participating in one of Ohio's drug court programs; non-fatal overdose, and naltrexone identification to identify individuals treated for SUD.	5	Over the duration of the waiver	Ongoing
Implement an enforcement plan to minimize the risk of inappropriate overprescribing consistent with prescribing guidelines.	5	Over the duration of the waiver	2011 – 2018
Support behavioral and physical health integration through care coordination and data exchange through increased use of Ohio's Health Information Exchanges (HIE) among inpatient and residential treatment providers.	5	None - additional activity not specified in waiver protocol	9/1/2021
Review data and conduct analysis of individuals with SUD.	6	by October 2021	Ongoing
Based upon data analysis, develop care coordination model(s) specific to identified populations.	6	by October 2021	Ongoing
Implement care coordination for identified populations.	6	by October 2021	Ongoing

The items in this table were pulled from Ohio's approved implementation plan, with one additional item added in and noted.

Several important action items related to Milestone 3 were delayed including the implementation of new residential treatment program requirements to assure access (e.g., hours of service) and quality (e.g., staff credentials). Of note, the proposed requirement for residential treatment providers to facilitate access to medication for SUD was delayed from its original target date of October 2021 to July 2023. Action items for Milestone 5 related to the use of EHR and pharmacy data systems to establish comprehensive treatment and prevention strategies are still underway. For example, enhancements to the state's PDMP that were planned to help providers identify individuals who have a heightened risk of overdose (e.g., individuals with a prior overdose) are targeted for completion by the end of the demonstration. Finally, there was short delay (< 1 year) in the implementation of several care coordination strategies associated with Milestone 6 that were expected to improve transitions between levels of care.

Many of these delays occurred in response to the COVID-19 pandemic, which we discuss in the next section.

C.2 Impact of COVID-19 on waiver implementation and SUD care

The COVID-19 PHE has impacted some facets of the SUD 1115 Waiver implementation and changed many aspects of SUD care for much of 2020, 2021, and into 2022. As described in the previous section, the diversion in resources required by the PHE delayed some demonstration activities by several months or longer. In addition, many behavioral health services were temporarily interrupted as providers implemented safety measures, purchased PPE, redesigned office workflows and office hours to enable social distancing and transitions to telehealth services were possible.

Another important factor affecting the demonstration was a temporary maintenance of effort (MOE) restriction under the Families First Coronavirus Response Act that limited ODM's ability to disenroll Medicaid recipients beginning in March 2020. This policy led to a substantial increase in Medicaid enrollment, including the population of non-dual Medicaid enrollees ages 19-64 with SUD who are the focus of this evaluation, between 2020 and 2022. As shown in Table 2 and Figure 2 below, Medicaid enrollment for non-dual adults ages 18-64 increased by

approximately 550,000 members (about 41%) from the first quarter of 2020 to the first quarter of 2023. There was also an increase in the number of non-dual adults ages 18-64 with an SUD diagnosis during the MOE, from 137,475 to 165,879 (21% increase), and those with an OUD diagnosis, from 72,139 to 82,664 (15% increase), between Q1 2020 and Q1 2023. MOE requirements were tied to the PHE, which ended on May 11, 2023. Ohio Medicaid indicated that it had resumed routine Medicaid eligibility operations in February 2023 and would redetermine the eligibility of its Medicaid members between February 2023 and April 2024..[8]

Much of the increase in SUD is related to factors other than Medicaid enrollment. Table 2 shows that there has been a consistent increase in enrollees with SUD and OUD since 2017, even during periods when Medicaid enrollment declined (2017-2020). These trends represent an increased burden on Ohio Medicaid and on the SUD treatment infrastructure over much of the duration of the demonstration period thus far.

Table 2: Ohio Medicaid Enrollment, Non-Duals Ages 18-64 (2017-2023)

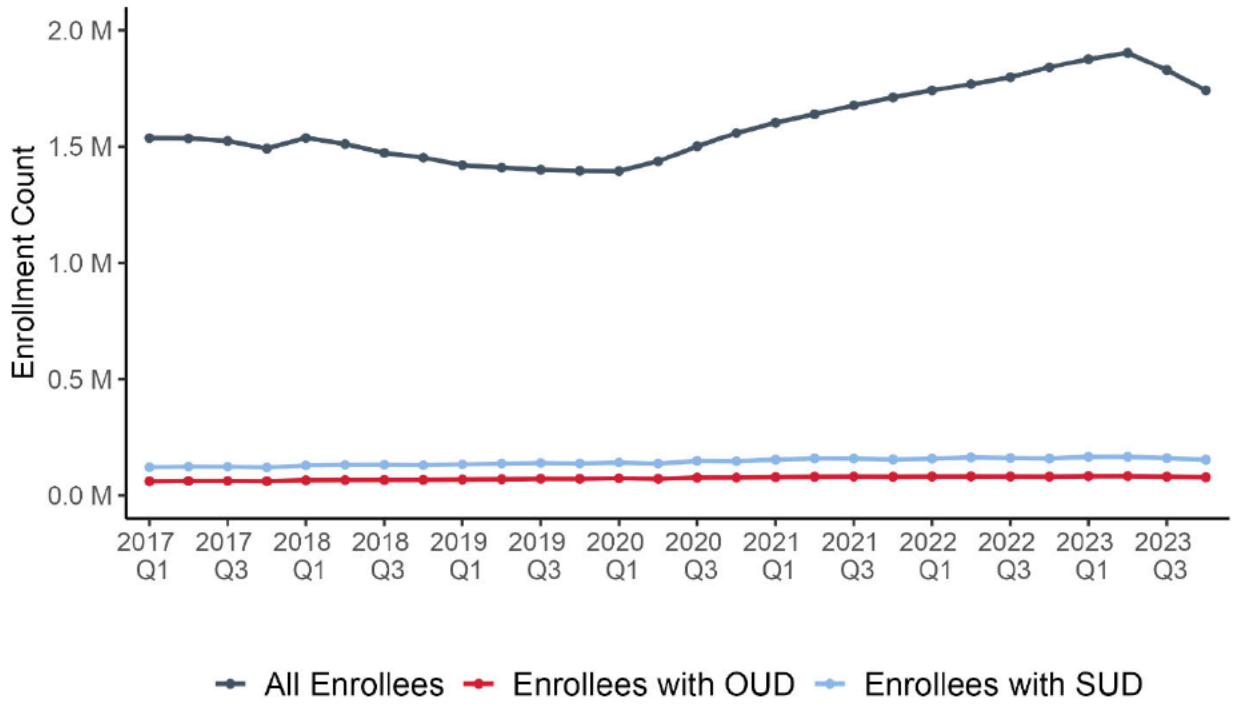
Quarter	All Enrollees	Enrollees with SUD	Enrollees with OUD
2017 Q1	1,536,292	121,173	61,034
2018 Q1	1,464,901	124,585	63,445
2019 Q1	1,350,768	129,396	66,565
2020 Q1	1,326,858	137,475	72,139
2021 Q1	1,534,627	150,504	76,936
2022 Q1	1,668,529	155,028	79,667

[8] From *Unwinding Update*, by Ohio Department of Medicaid. 2023, https://dam.assets.ohio.gov/image/upload/medicaid.ohio.gov/About%20Us/AdvisoryCommittee/2023/P.%20BEATTY%20-%20UNWINDING%20UPDATE.pdf.

2023 Q1	1,876,182	165,879	82,664

Source: Ohio Medicaid administrative data, accessed June 2024.

Figure 2: Ohio Medicaid Enrollment, Non-Duals Ages 18-64 (2017-2023)



Source: Ohio Medicaid administrative data, accessed June 2024.

C.2.1 Ohio's response in the public health emergency

While several demonstration action items were delayed and in-person services were temporarily interrupted during the COVID-19 pandemic, several policy changes were enacted to maintain access to behavioral health care during the PHE. On March 19, 2020, Governor DeWine issued an Executive Order requiring emergency enactment of administrative rules to expand telemedicine. The emergency rules implemented the following:

- Allowed asynchronous forms of communication, such as telephone and email.
- Removed the requirement for an initial face-to-face visit so that new patients could also be treated with telemedicine.
- Expanded the types of services that could be provided through telemedicine, such as peer support, SUD case management, crisis intervention, and assertive community treatment.
- Allowed practitioners to provide services remotely to individuals who were staying in a residential facility.
- Allowed individuals in residential facilities who needed to be in quarantine to receive counseling services remotely from their rooms.

At the same time, federal requirements for opioid treatment programs (OTPs) were relaxed to allow at-home delivery of methadone in some circumstances. As a result of this prompt state and federal response to the PHE, most services were only briefly interrupted during the pandemic.

C.2.2 Impact on the interim evaluation

The primary impact on the evaluation is that the delay in the implementation of some key waiver-related changes to policies and rules led the evaluation team to adjust our research design from a two-period to a three-period ITS model (see section E. Methodology for further discussion of the new methodology) and to carefully select cut points based off of actual implementation in order to ensure that we are evaluating the causal impact of waiver activities once they have occurred.

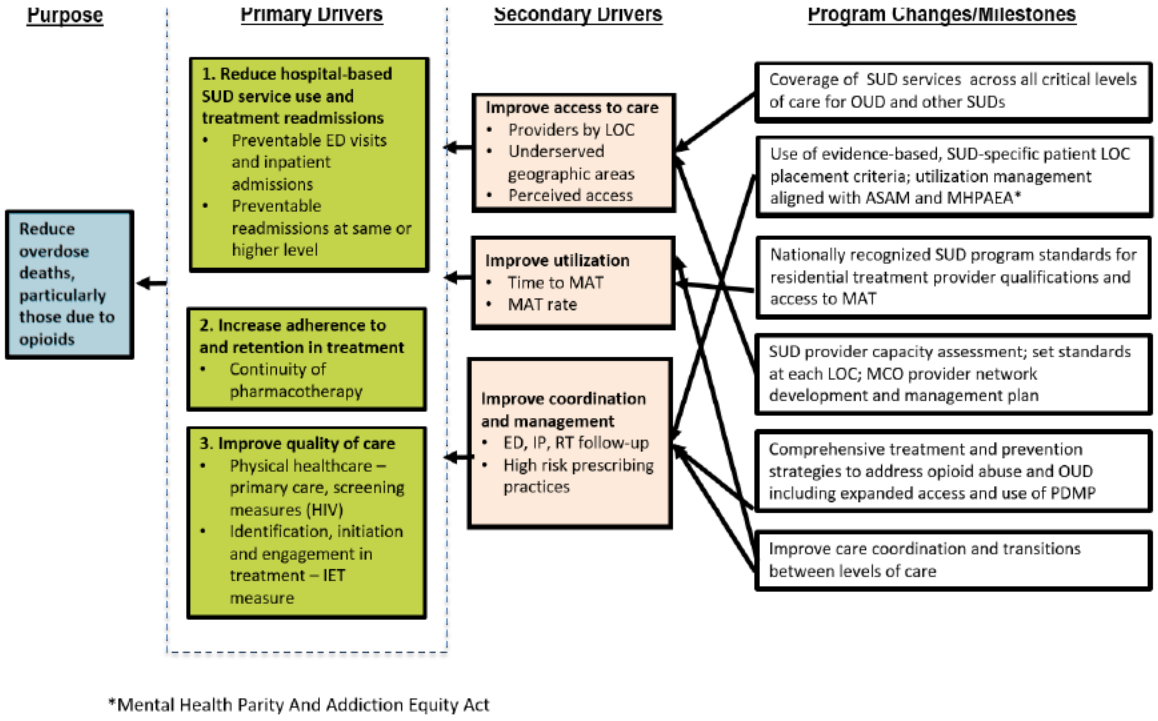
Additionally, from looking at trends in the constructed measures, it appears that several aspects of SUD care were affected by the pandemic. This includes ASAM levels of care 1 and 2 (H1B1); timely follow-up care for inpatient stays (H3A1), residential treatment visits (H3B1), and emergency department visits (H3C1); prescriptions from multiple providers (H3D1); 30-day ED admission rate following a residential treatment stay (H4B2); continuity of pharmacotherapy (H5A1); preventative or ambulatory care (H6A1); and HIV/HCV/HBV screenings (H6A2). All of these measures exhibited some degree of recovery to pre-pandemic trends in the time periods that followed the early onset of the pandemic. Other aspects of SUD care covered by the evaluation measures may have also been negatively impacted

by the pandemic but if they didn't exhibit the same kind of recovery pinpointing a decline as driven by the pandemic is more difficult - for example, a decline in early 2020 without a quick recovery may have been due to other factors. The three period ITS design allows for a transition period (period 2) during which recovery from these negative effects of the global pandemic on SUD care may occur. We then assess the change between the pre-intervention period (period 1) and the post-intervention period (period 3) to at least partially exclude the impact of the pandemic. To the extent to which the pandemic has more long-term impacts on SUD care, even a three-period design with an extended transition period cannot avoid picking up some of the effects of the COVID-19 pandemic.

D. Evaluation Goals, Questions, and Hypotheses

CMS established six goals for the SUD 1115 Waiver, as discussed in section C.1. Goal #3 – reduction of drug overdose deaths – was identified as the demonstration's chief purpose. To evaluate Ohio's SUD demonstration waiver, we developed the driver diagram shown in Figure 3 to visually represent the expected primary and secondary drivers that contribute to reducing overdose deaths either directly or indirectly. It also depicts the milestone-driven programmatic changes that will impact the secondary drivers. The demonstration's purpose and three primary drivers align with the six CMS-specified goals, and the three secondary drivers align with the six milestones defined by CMS.

Figure 3: Evaluation Driver Diagram



*Mental Health Parity And Addiction Equity Act

The logic of the driver diagram suggests that a reduction in drug overdose deaths (goal 3) will be achieved most directly by:

1. **Reducing the need for preventable hospital-based care** (goal 4) **and readmissions** (goal 5);
2. **Improving treatment adherence** (goal 2), including continuity of pharmacotherapy; and
3. **Improving the quality of care** through evidence-based treatment engagement (goal 1), and the integration of behavioral health and primary care (goal 6).

Three secondary drivers will indirectly influence drug overdose deaths through their impact on each of the primary drivers. These secondary drivers are:

1. **Improving access to care** by ensuring sufficient provider capacity at each level of care and particularly in underserved geographic areas; (milestone 1, milestone 4)

2. **Improving service utilization**, with a focus on the rate of medication assisted treatment (MAT) and time to MAT (milestone 3, milestone 6); and

3. **Improving care coordination and management**, including emergency department (ED), inpatient (IP), and residential treatment (RT) follow up, and reduction of high-risk prescribing practices (milestone 2, milestone 5, milestone 6)

Finally, the three secondary drivers represent the immediate outcomes of specific programmatic changes that Ohio implemented in response to the SUD 1115 Waiver. These programmatic changes, which were identified within the framework of CMS's six milestones, were hypothesized to impact the secondary drivers in the following ways:

1. Access to care will be improved through programmatic elements focused on **coverage for all critical levels of care** (LOC) (milestone 1), **developing provider networks** and certification of new provider types, and incorporating **access standards** in managed care contracts (milestone 4);

2. Service utilization will be improved through new **residential treatment (RT) program standards** that require access to MAT in RT settings (milestone 3), and **new care coordination approaches** to assure patients are engaged in appropriate LOCs (milestone 6); and

3. Care coordination and oversight will be achieved through use of **evidence-based patient placement criteria** and utilization management approach to assure that services meet the appropriate level of need (milestone 2), **expanded access and use of Ohio's prescription drug management program** (PDMP) to prevent high-risk prescribing (milestone 5), as well as **coordination of services to improve transitions between LOCs** (milestone 6).

The evaluation design was developed to follow the logic of this driver diagram. We identified eight research questions to assess the causal impact of programmatic

changes on secondary drivers, the indirect impact of the demonstration waiver on drug overdose deaths, the primary drivers of these deaths, and the costs associated with SUD care. Each research question and hypothesis aligns with and supports key objectives of Title XIX and XXI or the Social Security Act by supporting efficient and effective administration of Ohio's Medicaid and Children's Health Insurance Programs. The research questions and hypotheses are designed to assess whether Ohio's demonstration advances the quality of care for SUD by improving access to evidence-based treatment while maintaining budget neutrality.

We specify the research questions, their associated hypotheses, and the goals and milestones they were derived from in the next section.

D.1 Questions and Hypotheses

The following questions and hypotheses were examined and tested as part of the evaluation:

Q1 Does the demonstration increase access to SUD treatment services?
Derived from: Secondary Driver #1

H1.a The demonstration will increase the ratio of SUD providers to members enrolled in Medicaid and qualified to deliver SUD services.

H1.b The demonstration will increase the ratio of providers to members at each of the levels of care.

H1.c The demonstration will increase the ratio of providers to members in geographic areas that are underserved at baseline.

Q2 Does the demonstration increase utilization of SUD treatment by enrollees with SUD?
Derived from: Secondary Driver #2

H2.a The demonstration will reduce the time between initial diagnosis and treatment.

H2.b The demonstration will increase the rate of MAT usage.

Q3 Does the demonstration improve coordination and management of care?
Derived from: Secondary Driver #3

H3.a The demonstration will increase the proportion of IP stays which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3.b The demonstration will increase the proportion of RT visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3.c The demonstration will increase the proportion of ED visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3.d The demonstration will decrease high-risk prescribing practices (i.e., high dose, multiple prescribers and pharmacies, concurrent use of benzodiazepines).

Q4 Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?
Derived from: Primary Driver #1, Goal 4, Goal 5

H4.a The demonstration will decrease the rate of ED and IP visits within the Medicaid population for SUD.

H4.b The demonstration will decrease the rate of readmissions to ED and IP settings.

Q5 Does the demonstration improve adherence to SUD treatment?
Derived from: Primary Driver #2, Goal 2

H5.a The demonstration will increase continuity of pharmaceutical care.

Q6 Do members receiving SUD services experience an improved quality of care?
Derived from: Primary Driver #3, Goal 1, Goal 6

H6.a The demonstration will increase the percentage of members with SUD who receive screening and care for co-morbid conditions.

H6.b The demonstration will increase early engagement in SUD treatment.

Q7 Does the demonstration reduce rates of opioid-related overdose deaths?
Derived from: Goal 3

H7.a The demonstration will decrease the rate of overdose deaths, including those due to opioids.

Q8 How do costs related to the demonstration waiver change throughout the pre- and post- demonstration periods?

H8.a The demonstration will decrease or have no effect on total costs. The demonstration will increase SUD-IMD, SUD-other, and Non-SUD costs, but decrease IP, non-ED outpatient, ED outpatient, pharmacy and long-term care costs.

E. Methodology

E.1 Evaluation Design

This section describes the analytic methods strategy that was used for the evaluation, including both quantitative and qualitative methods. Summaries of the quantitative and qualitative methods are described below.

E.1.1 Quantitative Methods

Quantitative measures are derived from Ohio Medicaid administrative data (claims/encounters, eligibility, and provider information). The use of Medicaid administrative data allows measures to not only be tracked prospectively but also calculated historically to estimate trends. The primary causal analysis method for the evaluation is a three-period interrupted time series (ITS) regression model,[9]

[9] Zhang et al. *Design, analysis, power, and sample size calculation for three-phase interrupted time series analysis in evaluation of health policy interventions*. Journal of Evaluation in Clinical Practice. 2020. https://onlinelibrary.wiley.com/doi/full/10.1111/jep.13266.

which is a revision to the originally planned two-period ITS design that included only a pre-implementation and post-implementation phase. The ITS model compares pre- and post- intervention outcomes in a three-period interrupted time series, controlling for pre-intervention trends. The majority of the proposed evaluation outcomes are derived from Medicaid administrative data and are ideal candidates for a time series modelling approach because they can be calculated over repeated intervals and gathered retrospectively for a period prior to implementation of the demonstration interventions.

The three-period design is a segmented time series regression model with two change points, resulting in three periods: pre-implementation period (period 1), transition period (period 2), and post-implementation period (period 3). This design is a robust method for evaluating health policy interventions that require a longer period of time to reach their full extent ("ramp-up" or transition period) and for multi-component interventions that are introduced in stages or non-uniformly. Given the nature of the waiver activities being evaluated, as well as their staggered implementation, this three-period design allows for a more precise evaluation of the waiver demonstration as compared with the two-period design. It will also allow for comparison of pre- and post- pandemic trends (between periods 1 and 3), which will help to assess the impact of the waiver aside from the deleterious effects of the COVID-19 pandemic. Additionally, the three-period design will be strengthened by a potential extension to the waiver demonstration, as data collected during the extension period will be added to period 3 of the segmented design.

Quarters for each period are detailed in Table 6 in section E.6.1.4. The proposed period 2 start date of Q4 2019 is the beginning of Ohio's demonstration, which is the earliest time point at which a waiver activity could have occurred. The proposed period 3 start date of Q4 2023 is the quarter by which nearly all waiver activities had been implemented.[10]

In this report, only data for period 1 (pre-implementation) and period 2 (transition period) are available; a three-period analysis with data after Q3 2023 will not be

[10] A handful of waiver activities remain "Open" at the time of writing (7/2024). See Table 1 for the status of Ohio's waiver implementation activities and timeline.

possible until the summative report, as we currently only have reliable data through Q3 2023 due to a 6-month run out for the Medicaid claims. This report presents initial results for the change between period 1 and period 2 only. Therefore, the findings in this interim report should be interpreted as a preview of the effect of the waiver activities as they began to be implemented. The full effect will not be known until we add data in the post-implementation period (period 3), which will permit us to fully execute the three-period interrupted time series design and to assess the changes in outcomes in period 3 relative to period 1.

E.1.1.1 Comparison Population

After careful consideration, Ohio was not able to identify a feasible in-state or out-of-state comparison population to provide a counterfactual (that is, what might have happened had the waiver program not been implemented) for causal inference. Ohio's interventions are state- and system-wide, and therefore apply to all Medicaid members, making in-state comparisons within the Medicaid program infeasible. Also, there was no readily available source of service data from persons who are not enrolled in Medicaid in Ohio. Consequently, there are currently no opportunities to gather data from a comparison group of Ohio Medicaid enrollees not subject to interventions, or a comparison group of Ohioans who are not enrolled in Medicaid.

During the development of the evaluation design, several national data sources were considered to provide a state-level comparison group. However, because many states already have an 1115 SUD Waiver demonstration or have applied for a waiver to CMS, there were few remaining states to serve as candidates for a valid counterfactual comparison to Ohio. Analysis of summary measures for the states with similar characteristics to Ohio indicated that states without a waiver had a much lower opioid-involved overdose death rate, making them a poor counterfactual comparison to Ohio's experience with the opioid crisis.

An alternative approach that was considered was to compare Ohio's results to similar states that received the Section 1115 waiver to assess whether Ohio's approach to the waiver led to similar patterns of change as observed in other states. Ohio is currently participating in such a comparison strategy through its collaboration with Medicaid Outcomes Distributed Research Network (MODRN).

This analysis, led by researchers at Vanderbilt University, is currently underway and is expected to provide a means to directly compare outcomes in 12 states with Section 1115 SUD waivers. We expect results to be available to include in an upcoming report if a waiver extension is granted, but it is unlikely to be completed before the May 2025 deadline for the summative report for the current demonstration period.

Since Ohio had limited options for a valid comparison group, the evaluation utilizes statistical methods that account for the underlying counterfactual trends in outcomes, that is, what would have occurred in in the absence of the intervention, within a single population.[11] With the pre-intervention period effectively serving as a control, single-population ITS models can provide strong evidence of causal relationships for evaluation scenarios where a viable comparison group is unavailable. However, some limitations persist, and are discussed in detail in section F.

An unanticipated complication of the ITS method strategy at the time of the design was created was the COVID-19 pandemic which abruptly changed some healthcare patterns. The original two-period design included the COVID-19 pandemic in the post-implementation period, making it difficult to definitively attribute the observed changes to the demonstration rather than pandemic-related effects. However, the revised three-period ITS design allows for a transition period that covers the protracted implementation of waiver activities due to the pandemic, allowing us to assess the real-world effectiveness of the SUD 1115 waiver on health outcomes independently by comparing pre- and post-pandemic trends in periods 1 and 3. Refer to section C.2.2 for more details.

E.1.2 Qualitative Methods

The quantitative findings of the evaluation are complemented by qualitative data collection that allowed for a more in-depth examination of the larger context within

[11] Lopez Bernal J., Soumerai S., Gasparrini A., *A methodological framework for model selection in interrupted time series studies*, Journal of Clinical Epidemiology, Volume 103, 2018. https://www.sciencedirect.com/science/article/pii/S0895435617314117.

which waiver activities are implemented and affect those providing as well as those receiving SUD treatment. Discussion of qualitative findings represents common themes seen across qualitative data collection activities and indicates the experiences, understandings, and views shared at the time of data collection. The goal of qualitative data collection is not to provide or make claims about experiences or viewpoints of the general population. Instead, the goal of qualitative data collection, especially in the context of this evaluation, is to identify converging and diverging understandings related to waiver goals and implementation success both in relation to quantitative findings as well as across the different situated viewpoints involved in qualitative data collection.

The first of two qualitative data collections during the demonstration were conducted as a part of the Mid-Point Assessment (submitted to CMS in December 2022). First, twenty-three semi-structured interviews of 37 key informants were conducted on Zoom between October and December 2020, with 5 follow-up interviews in May 2022. This included interviews with representatives from state agencies, SUD treatment providers, treatment and recovery advocates, and representatives from managed care organizations. Second, between May and July 2021, ten focus groups were conducted on Zoom with individuals actively receiving SUD treatment. Focus groups included between 2 and 11 participants with a total of 79 participants and included treatment providers offering the full range of ASAM LOCs and recovery housing. Focus group participants were engaged in outpatient, intensive outpatient, and residential treatment programs.

This first data collection was targeted to occur in the 12-20 months after the demonstration start date, understanding that most of the demonstration activities would not have been fully implemented at that time. Therefore, the key stakeholders and focus group participants were able to identify many barriers to access and recovery within the behavioral health (BH) system that could be addressed over the course of the demonstration. Indeed, stakeholders provided valuable input regarding the state of SUD treatment access and care delivery in Ohio in the first years of the waiver. Key informant interviews with state agency representatives, treatment providers, MCP representatives, and recovery advocates, as well as focus groups with individuals with lived experience, provided a better understanding of waiver activities and progress, as well as the obstacles experienced by those delivering and receiving care across the state.

Additional detail on these qualitative interviews with key stakeholders and focus groups with individuals in treatment can be found in sections E.5.2 and E.6.2. A second data collection is planned for fall/winter 2024, which is about five years into (and nearing the end of) the demonstration. This will include a second round of interviews with key stakeholders and focus groups with individuals in treatment to understand how changes in processes and services unfolded during the demonstration from a variety of perspectives.

E.2 Target Population

While the impact of the demonstration was expected to be broad, the quantitative evaluation focuses on a more limited subset of the population. The target population is Ohioans ages 18 through 64 during a given measurement period excluding members who are dually enrolled in Medicaid and Medicare. Enrollees less than 18 years of age were excluded from the evaluation because adolescents differ substantially from adults in terms of the prevalence of SUD and aspects of treatment that are the focus of this evaluation. Members who are dually enrolled in Medicaid and Medicare were also excluded from the analyses because it is not possible to observe all of their health care in Medicaid claims and encounters. Additional inclusion criteria for specific construct measures such as a SUD/OUD diagnosis and/or continuous enrollment are described in Table 4 and in measure specifications in Appendix K.1.

There has not been substantial change in the racial-ethnic or sex makeup of the target population between the first quarter of 2017 and the first quarter of 2023. As shown in Table 3, as of Q1 2023 a sizable majority of the non-dual Ohio Medicaid population with SUD who are ages 18-64 are Non-Hispanic White (71.8%), and a slight majority (51.2%) are male. These demographic groups are both overrepresented in the Ohio Medicaid SUD population relative to their share of the Medicaid population more generally (in the same age range).[12] There has been a slight shift in the age profile of the Ohio Medicaid SUD population since 2017 – there has been a nearly 7 percentage point increase in the proportion of adults

[12] Ohio Medicaid Demographics Dashboard

who are ages 35-44, and a 3 and 5 percentage point decrease in the share of adults who are ages 18-24 and ages 25-34, respectively.

Table 3: Demographic Makeup of the Non-Dual Ohio Medicaid Population with SUD Ages 18-64 (2017-2023)

Variable	Subgroup	Percent Q1 2017	Percent Q1 2019	Percent Q1 2022	Percent Q1 2023
Race-Ethnicity	Asian, Non-Hispanic	0.3	0.3	0.3	0.4
Race-Ethnicity	Black, Non-Hispanic	20.8	19.8	19.4	19.9
Race-Ethnicity	Hispanic	1.8	2.2	2.6	2.7
Race-Ethnicity	Missing	6.9	4.6	4.8	4.6
Race-Ethnicity	Other, Non-Hispanic	0.5	0.6	0.7	0.7
Race-Ethnicity	White, Non-Hispanic	69.7	72.5	72.2	71.8
Sex	Female	48.1	49.4	48.8	48.8
Sex	Male	51.9	50.6	51.2	51.2
Age Group	18-24	12.1	10.3	9.3	9.1
Age Group	25-34	34.2	33.2	30.4	28.8
Age Group	35-44	24.4	26.5	30.2	31.2
Age Group	45-54	18.1	17.4	17.5	18.3
Age Group	55-64	11.2	12.6	12.6	12.6

Source: Ohio Medicaid administrative data, accessed June 2024.

E.3 Evaluation Period

The demonstration waiver period is October 2019 to September 2024. Evaluators used data starting in January 2018 or earlier in their measures and models to show outcome trends in the pre-demonstration period. January 2018 is significant because it marked the implementation of Ohio's behavioral health system redesign which included significant changes in Medicaid behavioral health benefits and billing codes. January 1, 2018, was the earliest that certain relevant Medicaid claims codes were used, and since many of the outcome measures are dependent on

Medicaid benefits structure, the start date for many of the measures is set at Q1 2018, though some start in Q1 2017 when appropriate (e.g., when the measure was not affected by the change in billing codes). Due to a 6-month run out for Medicaid claims, reliable claims data is currently only available through Q3 2023 (this aligns with the last quarter in the transition period of the ITS design). Therefore, time points in this report are restricted to only show through Q3 2023 or earlier. The latter truncation occurs in cases where the measure requires a longer measurement period that would extend beyond Q3 2023. The summative evaluation report will include data through Q3 2024, apart from measures that require a longer measurement period. Quarters for each period in the ITS design by measure are shown in Table 6.

E.4 Evaluation Measures

When available and appropriate, evaluation measures were derived from the SUD 1115 waiver Monitoring Metrics that were approved for Ohio by CMS. Several evaluation measures were calculated using definitions that were established by the MODRN,[13] a multi-state effort to develop standardized SUD measure specifications and that allow comparison across states. The SUD 1115 Waiver Evaluation Metrics are specified in the "Steward" column of Table 4. In all cases, the Evaluation measures have adjusted measurement periods (with the evaluation measures primarily quarterly, as opposed to the monitoring metrics which are monthly and yearly) and most have small deviations in content from the specifications laid out in Version 5 of the 1115 SUD Monitoring Metrics Technical Specifications. Many of the measures utilize a measurement period longer than three months and therefore the evaluation team adopted a strategy of computing some of the measures quarterly using a moving 6-month or 1-year window. For example, measure H3A1 uses a 6-month window for the measurement period. That means that the calculation of the measure for Q1 2019 uses data from January through June in 2019 while the measure for Q2 2019 uses data from April through

[13] Zivin K, Allen L, Barnes AJ, Junker S, Kim JY, Tang L, Kennedy S, Ahrens KA, Burns M, Clark S, Cole E, Crane D, Idala D, Lanier P, Mohamoud S, Jarlenski M, McDuffie MJ, Talbert J, Gordon AJ, Donohue JM. Design, Implementation, and Evolution of the Medicaid Outcomes Distributed Research Network (MODRN). Med Care. 2022 Sep 1;60(9):680-690. doi: 10.1097/MLR.0000000000001751. Epub 2022 Jul 15. PMID: 35838242; PMCID: PMC9378530.

September 2019. In that case, there are three months of data overlap with the previous quarter calculation. In the case of a year-long window (e.g., H6A1) that increases to 9 months of data overlap. The first quarter of the measurement window is always listed as the quarter attributed to the measure. There were also several cases where refinements to Evaluation measure specifications were made as measure construction began and the utility of each for the evaluation analyses was examined more closely. When substantial, these changes were discussed with and approved by Ohio Medicaid. Table 4 below summarizes the Evaluation measures, but detailed documentation for the construction of all measures can be found in Appendix K.1. Any deviations from the originally proposed measure specifications are noted in this appendix.

Table 4: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q1 Does the demonstration increase access to SUD treatment services?						
H1.a The demonstration will increase the ratio of SUD providers to members enrolled in Medicaid and qualified to deliver SUD services.						
Secondary Driver: *Improve access to care*	SUD provider availability ratio.[14] [quarterly]		The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period	Number of members with an SUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series
	SUD provider availability ratio – MOUD[14] [quarterly]		The number of providers who were enrolled in Medicaid and provided MOUD (buprenorphine, methadone, or naltrexone)	Number of members with an OUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series
H1.b The demonstration will increase the ratio of providers to members at each of the levels of care.						
Secondary Driver: *Improve access to care*	SUD provider availability ratio by level of care[14] [quarterly]		The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period by category (appropriate sublevels of 1, 2, and 3)	Number of members with an SUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series
H1.c The demonstration will increase the ratio of providers to members in geographic areas that are underserved at baseline.						
Secondary Driver: *Improve access to care*	SUD provider availability ratio within underserved areas[14] [quarterly]		The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period in select counties determined to be underserved based on the number, percentage, and ratio of provider to members	Number of members with an SUD diagnosis during the measurement period within selected counties	Medicaid administrative data and ODM Provider Address Database	Interrupted time series

[14] We also calculate this using billing providers rather than rendering providers as a supplemental measure. See Appendix K.2 for results.

Driver	Measure Description	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q2 Does the demonstration increase utilization of SUD treatment by enrollees with SUD?						
H2.a The demonstration will reduce the time between initial diagnosis and treatment.						
Secondary Drivers: *Improve utilization*	Initiation of SUD Treatment [rolling quarters, 1-year windows]	Based on MM15	The number of members who initiated treatment through an IP SUD admission, outpatient visit, intensive outpatient encounter or partial hospitalization, telehealth, or MAT within 14 days of diagnosis	Number of members with a new episode of SUD abuse or dependence	Medicaid administrative data	Interrupted time series
H2.b The demonstration will increase the MAT usage rate.						
Secondary Drivers: *Improve utilization*	MOUD usage [quarterly]	Based on MM12; MODRN metric.[15]	The number of members with an OUD diagnosis who have a claim for MOUD during the measurement period	Number of members with an OUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series
	RT stays with MOUD [quarterly]		The number of RT stays for members with a primary OUD diagnosis with MOUD administered or prescribed during the stay or 15 days before the start or after the end of the stay	Number of RT stays for members with a primary OUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series

[15] MODRN metric "Medications for opioid use disorder (OUD) measure"

Driver	Measure Description	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q3 Does the demonstration improve coordination and management of care?						
H3.a The demonstration will increase the proportion of IP visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.						
Secondary Driver: *Improve care coordination/ management*	IP follow-up [rolling quarters, 6-month windows]	Based on MM17	Number of IP visits for members who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days	Number of IP visits for members who have a primary SUD diagnosis	Medicaid administrative data	Interrupted time series
H3.b The demonstration will increase the proportion of RT visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.						
Secondary Driver: *Improve care coordination/ management*	RT follow-up [rolling quarters, 6-month windows]	Based on MM17	Number of RT visits for members who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days	Number of RT visits for members who have a primary SUD diagnosis	Medicaid administrative data	Interrupted time series
H3.c The demonstration will increase the proportion of ED visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.						
Secondary Driver: *Improve care coordination/ management*	ED follow-up [rolling quarters, 6-month windows]	Based on MM 17	Number of ED visits for members who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days	Number of ED visits for members who have a primary SUD diagnosis	Medicaid administrative data	Interrupted time series
H3.d The demonstration will decrease high-risk prescribing practices.						
Secondary Driver: *Improve care coordination and oversight*	Use of opioids from multiple providers in persons without cancer [rolling quarters, 1-year windows]	Based on MM 19; adjusted requirement	The number of members without cancer who received prescriptions for opioids from four and more prescribers or four or more pharmacies	Number of members without cancer during the measurement period	Medicaid administrative data	Interrupted time series
	Use of opioids at high dosage in persons without cancer [rolling quarters, 1-year windows]	Based on MM 18	The number of members without cancer who received members for opioids at high dosage, ≥ 90 morphine milligram equivalents	Number of members without cancer during the measurement period	Medicaid administrative data	Interrupted time series

Driver	Measure Description	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q4 Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?						
H4.a The demonstration will decrease the rate of ED and IP visits within the Medicaid population for SUD.						
Primary Driver: *Reduce hospital-based SUD service use and treatment readmissions*	Emergency department utilization for SUD.[16] [quarterly, with 11-month lookback window for defining SUD diagnosis]	Based on MM23	The number of ED visits for SUD during the measurement period	Number of members with SUD during the measurement period	Medicaid administrative data	Interrupted time series
	IP stays for SUD[16] [quarterly, with 11-month lookback window for defining SUD diagnosis]	Based on MM24	The number of IP discharges related to a SUD stay during the measurement period	Number of members with SUD during the measurement period	Medicaid administrative data	Interrupted time series
H4.b The demonstration will decrease the rate of readmissions to ED and IP settings.						
Primary Driver: *Reduce hospital-based SUD service use and treatment readmissions*	The 30-day IP admission rate for SUD following a RT stay among members with SUD [rolling quarters, 1-year windows]	Based on MM25; adjusted index locations	The count of IP admissions within 30-days of the index date: at least one acute admission for SUD within 30 days of the index discharge date	RT discharges among members with a SUD diagnosis	Medicaid administrative data	Interrupted time series
	The 30-day ED visit rate for SUD following a RT stay among members with SUD [rolling quarters, 1-year windows]	Based on MM25; adjusted index locations	The count of ED visits within 30-days of the index date: at least one acute visit for SUD within 30 days of the index discharge date	RT discharges among members with a SUD diagnosis	Medicaid administrative data	Interrupted time series
	The 30-day ED visit rate for SUD following an ED visit among members with SUD [rolling quarters, 1-year windows]	Based on MM23/25	The count of ED visits within 30-days of the index date: at least one acute visit for SUD within 30 days of the index discharge date	ED visits among members with a SUD diagnosis	Medicaid administrative data	Interrupted time series

[16] We also calculate this for the OUD subpopulation as a supplemental measure. See Appendix K.2 for results.

Driver	Measure Description	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q5 Does the demonstration improve adherence to SUD treatment?						
H5.a The demonstration will increase continuity of pharmaceutical care.						
Primary Driver: *Increased adherence to and retention in treatment*	Continuity of pharmacotherapy for opioid use disorder [rolling quarterly, 1-year windows]	Based on MM22; MODRN metric.[17]	Number of members who have at least 180 days of continuous pharmacotherapy with a medication prescribed for OUD without a gap of more than seven days	Number of members who had an OUD diagnosis and at least one claim for an OUD medication during the measurement period	Medicaid administrative data	Interrupted time series
Q6 Do members receiving SUD services experience an improved quality of care?						
H6.a The demonstration will increase the percentage of members with SUD who receive screening and care for co-morbid conditions.						
Primary Driver: *Improve quality of care*	Access to preventive/ ambulatory health services for adult Medicaid members with SUD [rolling quarters, 1-year windows]	Based on MM32	The number of members with SUD who had an ambulatory or preventive care visit during a 12-month period	Number of members with SUD during the measurement period	Medicaid administrative data	Interrupted time series
	Screening for HIV/HCV/HBV [rolling quarters, 1-year windows]	Based on MODRN metric.[18]	The number of members with SUD who were screened for HIV/HCV/HBV during a 12-month period	Number of members with SUD during the measurement period	Medicaid administrative data	Interrupted time series
H6.b The demonstration will increase early engagement in SUD treatment.						
Primary Driver: *Improve quality of*	Initiation and engagement of alcohol and other drug	Based on MM15	Number of members who initiated treatment and who had two or more	Number of members with a new episode of alcohol or	Medicaid administrative	Interrupted time series

[17] MODRN metric "Continuity of medications for OUD measure," which is based on the specification from the National Quality Forum (NQF).
[18] MODRN metric "Screening for HIV, HCV, HBV among Enrollees with an OUD diagnosis", with modified age criteria and includes enrollees with an SUD diagnosis.

care	abuse or dependence treatment [rolling quarters, 1-year windows]		additional SUD services or MAT within 34 days of the initiation visit	other drug abuse or dependence during the measurement period	data	
Driver	**Measure Description**	**Steward**	**Numerator**	**Denominator**	**Data Source**	**Analytic Approach**
Q7 Does the demonstration reduce rates of opioid-related overdose deaths?						
H7.a The demonstration will decrease the rate of overdose deaths, including those due to opioids.						
Purpose: *Reductions in over-dose deaths particularly those due to opioids*	Rate of overdose deaths [quarterly]	Based on MM27	Number of overdose deaths	Number of members /1000	Medicaid and ODH administrative data	Interrupted time series
	Rate of overdose deaths due to opioids [quarterly]	Based on MM27	Number of overdose deaths due to opioids	Number of members /1000	Medicaid and ODH administrative data	Interrupted time series

Driver	Measure Description	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q8 How do costs related to the demonstration waiver change throughout the pre- and post-demonstration periods?						
H8.a The demonstration will decrease or have no effect on total costs. The demonstration will increase SUD-IMD, SUD-other, and Non-SUD costs, but decrease IP, non-ED outpatient, ED outpatient, pharmacy and long-term care costs.						
	Total costs [quarterly]	Based on MM 28	Total costs from fee-for-service and encounter claims, including inpatient, outpatient, professional medical, pharmacy, dental, and long-term care for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member-level interrupted time series model
	Total federal costs [quarterly]	Based on MM 28	Total Medicaid costs * federal Medicaid percentage for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	SUD-IMD costs [quarterly]	Based on MM 29	IMD costs for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model

	SUD-other costs [quarterly]	Based on MM 28	Costs associated with claims with an SUD diagnosis and/or SUD-related code (procedure, revenue, POS, provider type) for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	Non-SUD costs [quarterly]		Costs associated with claims without an SUD diagnosis and without SUD-related code (procedure, revenue, POS, provider type) for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	Outpatient costs: non-ED [quarterly]		Costs associated with outpatient and professional medical and dental, non-ED claims for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	Outpatient costs: ED [quarterly]		Costs associated with ED claims that do not result in an inpatient admission for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	Inpatient costs [quarterly]		Costs associated with inpatient claims for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	Pharmacy costs [quarterly]		Costs associated with pharmacy claims for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model
	Long-term care costs [quarterly]		Costs associated with long-term care claims for the population of members with a SUD diagnosis	Total member-months for members with SUD	Medicaid administrative data	Member -level interrupted time series model

E.5 Data Sources

E.5.1 Quantitative Data

This section provides details on the data sources to be used in the evaluation. See Table 4 for how specific measures relate to these data sources. The primary data source for the evaluation is Medicaid administrative data as supplied to the Ohio Colleges of Medicine Government Resource Center (GRC) by the Ohio Department of Medicaid (ODM). Medical claims and encounter data for professional medical, outpatient facility, inpatient facility, and pharmacy are used to assess service utilization. Eligibility and enrollment records are used to determine eligibility and continuous enrollment criteria.

Cleaning of Medicaid administrative data primarily occurs through eligibility verification and claim adjudication processes. Eligibility verification occurs regularly at Ohio Medicaid to determine whether individuals are eligible for Medicaid benefits and the appropriate category of eligibility. The claims adjudication process validates submitted claims against Medicaid coverage policies. When multiple claims have been submitted by a provider for the same service(s), only the most recent version of the claim is retained for the evaluation. Due to the lag in submitting claims, the evaluation team will use claims on a six-month delay (e.g., claims for services rendered in January 2020 will be included in measures no sooner than July 2020). The evaluation team validated measure results through comparison to other Ohio SUD treatment data work, including but not limited to Ohio's SUD 1115 Monitoring project, the MODRN OUD project, and other SUD work conducted by GRC on behalf of the Ohio Department of Medicaid and Ohio Department of Mental Health and Addiction Services.

To answer evaluation question Q7 about the number and rate of overdose deaths, Vital Statistics death records from the Ohio Department of Health (ODH) were utilized for the related measures. These data were provided by ODM and had already been linked to Medicaid administrative data to determine the Medicaid identification number of the individuals.

E.5.2 Qualitative Stakeholder Feedback

E.5.2.1 Key informant interviews

Twenty-three semi-structured interviews of 37 key informants were conducted between October and December 2020, with 5 follow-up interviews in May 2022. Participants included representatives from state agencies (7 interviews of 14 people), SUD treatment providers (7 interviews of 7 people), treatment and recovery advocates (4 interviews of 5 people), and representatives from managed care organizations (5 interviews of 11 people, including 7 BH/medical/clinical directors and 4 administrative directors/staff). Participants were selected from among the SUD 1115 Waiver Stakeholder Advisory Committee members, state policy makers, and managed care plans. State agency representatives were selected to gather the perspectives from key actors responsible for policy development and implementation. Providers and treatment/recovery advocates were selected to ensure representation by geography, populations served, and services provided. Each of Ohio's five managed care plans were included. The characteristics of the key informants who participated in interviews are summarized below. Interviews were conducted over Zoom and were recorded with participant permission.[19] They were then professionally transcribed for qualitative analysis. Each interview lasted approximately one hour, and topics covered the implementation of the 1115 waiver, including access to care along the continuum, MAT, and the impact of the COVID-19 pandemic. Interview guides were tailored to the participants' role in SUD treatment to capture the unique experiences and perspectives of the diverse stakeholders we engaged. The key informant interview guides can be found in Appendix K.3.

E.5.2.2 Key Informant Interview Participants

- ☐ State agencies (7 interviews)
    - State mental health agency (4)
    - State Medicaid (3)

[19] One interview with a state agency was not recorded due to agency policy. Instead, verbatim notes were taken during the interviews.

- ☐ Treatment providers (6 interviews)
    - Southwest Ohio provider for women (1)
    - Northeast Ohio providers (2)
    - Northern Ohio adolescent provider (1)
    - Central Ohio MAT provider (1)
    - Statewide professional association for treatment providers (1)
- ☐ Treatment & Recovery advocates (4 interviews)
    - Statewide recovery housing representative (1)
    - Statewide SUD recovery advocate (1)
    - Statewide SUD treatment advocacy organization (2)
- ☐ Managed Care Plans (5 interviews)
    - Buckeye (1)
    - CareSource (1)
    - Molina (1)
    - Paramount (1)
    - United Health Care (1)

E.5.2.3 Focus groups with individuals with lived experience

Ten focus groups were conducted with individuals actively receiving SUD treatment. Focus groups included between 2 and 11 participants with a total of 79 participants and included treatment providers offering the full range of ASAM LOCs and recovery housing. Focus group participants were engaged in outpatient, intensive outpatient, and residential treatment programs. Table 5 provides characteristics about each focus group. Focus groups were conducted over Zoom between May and July 2021. Participants were recruited with the assistance of treatment and recovery housing providers. Some treatment providers were SUD 1115 Advisory Committee members and others were recommended by state and Advisory Committee partners as attempts were made to reach diverse populations and

regions of the state..[20] All participants were actively enrolled in Medicaid at the time of their focus group. Topics discussed included barriers and facilitators to entering or staying in treatment, MAT, court-involvement in treatment, and the impact of COVID-19 on treatment services. Focus groups lasted one hour, and each participant received a $75 Amazon gift card for their participation. The focus group interview guide is available in Appendix K.4.

Table 5: Focus Group Participants

Care Provided to Participants by Participating Facility	Treatment Demographic	Geographic Region of Facility	# of Participants in Focus Group
Residential treatment	Pregnant women and mothers with young children	Southeast Ohio	11
Residential treatment	Adult men and women	Southeast Ohio	11
Residential treatment	Pregnant women and mothers with young children	Southeast Ohio	5
Recovery housing	Women	Southwest Ohio	10
Outpatient treatment	Adult men and women	Southwest Ohio	6
Residential and IOP treatment	Adult men and women	Northeast Ohio	10
IOP treatment	Adult men and women	Northeast Ohio	2

[20] Attempts to recruit participants from Northwest Ohio through multiple treatment and recovery housing providers were unsuccessful due to scheduling conflicts and limited interest in participation.

Opioid Treatment Program and IOP treatment[21]	Adult men and women	Central Ohio	6
Residential, IOP, and recovery housing	Adult men and women	Central and Southwest Ohio	10
Residential, IOP, and recovery housing	Adult men and women	Central and Southwest Ohio	8

E.6 Analytic methods

E.6.1 Quantitative Measures

E.6.1.1 Summary-level ITS

Most analyses will be conducted with a summary-level interrupted time series, meaning that the unit of analysis is the summary measure (e.g., a ratio or percentage) at a given time rather than individual's outcome at a given time. Assume an outcome of interest Y across $t = 0, \ldots, m$ time periods. Let t represent the time elapsed and Y_t represent the outcome at time t. Let $T_I^{(1)}$ and $T_I^{(2)}$ represent the time points for the start of the transition period and post-intervention period, respectively. Additionally, let $W_t^{(1)}$ be an indicator variable that is equal to 0 prior to time $T_I^{(1)}$ and is equal to 1 at or after time $T_I^{(1)}$. Similarly, let $W_t^{(2)}$ be an indicator variable that is equal to 0 prior to time $T_I^{(2)}$ and is equal to 1 at or after time $T_I^{(2)}$. Then the three-phase ITS regression model is given by:

$$Y_t = \beta_0 + \beta_1 t + \Delta_1^{(1)} W_t^{(1)} + \Delta_2^{(1)} \left[t - T_I^{(1)}\right] W_t^{(1)} + \Delta_1^{(2)} W_t^{(2)} + \Delta_2^{(2)} \left[t - T_I^{(2)}\right] W_t^{(2)} + \varepsilon_t$$

where β_0 and $\beta_1$represent the pre-intervention intercept and slope, $\Delta_1^{(1)}$ and $\Delta_2^{(1)}$ represent the level (intercept) change and slope change during the transition period, and $\Delta_1^{(2)}$ and $\Delta_2^{(2)}$ represent the level change and slope change during the post-intervention period. The variable ε_t represents random gaussian error in the time series outcome at time t . The coefficients $\Delta_q^{(r)}$ for $q = 1,2$ and $r = 1,2$ are the causal parameters of interest in the model. Since we currently only have data

[21] This was a combined group for two facilities.

available in the pre-intervention and transition periods, the interim evaluation focuses on interpreting $\Delta_1^{(1)}$ and $\Delta_2^{(1)}$ only. For the summative evaluation, the analysis will include all four parameters.

One important consideration in time series models is autocorrelation, meaning the outcome at a point in time is correlated with its past values. Autocorrelation can violate the linear regression model's assumption that errors are independent over time. To account for autocorrelation in the data, the Newey-West estimator[22] was utilized for the calculation of standard errors.

For a few of the quarterly measures, the evaluation team observed seasonality in the data, where at certain times of the year an event (e.g. ED visits) is much more or less common. To account for these circumstances, three additional parameters and associated indicators were added to the models to adjust for the seasonality effect. Let Q_2, Q_3, Q_4 be indicators for the time periods of the 2nd, 3rd, and 4th quarters of the year. Then the following model adjusts for the seasonality in the data while still allowing us to estimate changes in the slope and intercept of the trend:

$$Y_t = \beta_0 + \beta_1 t + \Delta_1^{(1)} W_t^{(1)} + \Delta_2^{(1)}\left[t - T_I^{(1)}\right] W_t^{(1)} + \Delta_1^{(2)} W_t^{(2)} + \Delta_2^{(2)}\left[t - T_I^{(2)}\right] W_t^{(2)} + \lambda_2 Q_2 + \lambda_3 Q_3 + \lambda_4 Q_4 + \varepsilon_t$$

E.6.1.2 Member-level ITS

A member-level interrupted time series model was utilized for measures associated with Q8, concerning per-member quarterly cost data (capitation and claim cost). The units of analysis in the model are individuals rather than aggregate measures. This approach allows for the model to control for individual-level demographics (e.g., age, race, gender).

[22] Newey, W. K., & West, K. D. (1986). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix.

Let the outcome Y be the cost per member-month. Then Y_{it} is the cost per member-month for individual i at time t. The evaluation team explicitly modelled Y_{it} as a function of time, the intervention time period, and individual-level characteristics. All the cost categories considered had many values of zero in the data when considered at a per-quarter per-person level. To better account for the zeros, the evaluation team utilized a zero-inflated generalized linear model. Zero-inflated models have two parts: a zero-inflation model and a conditional model. First, the zero-inflation model estimates the probability an observation is a zero given a set of predictors using a logistic regression model. Next, the conditional model estimates the outcome, conditional on it being greater than zero. The evaluation team considered Poisson, negative binomial, and log linear regression models for the conditional model form. Ultimately, from considering how different model types fit the data, a log linear regression model was chosen.

The data contain multiple observations per member across the different quarters. As a result, the outcomes are correlated with one another. To account for this within-member dependence the evaluation team utilized random-effects at the member level in both the zero inflation and the conditional log linear regression parts of the model. Random effects models account for within-person dependence by assuming a person-level random effect that is constant over time. The evaluation team considered GEE (Generalized Estimating Equations) as an alternative but found no available software to compute zero-inflated GEE models.

Fixed-effects parameters for age, sex, and race-ethnicity were included in the models to control for changes in demographics over time. A separate model was fit for each cost outcome: total, total federal, SUD-other, non-SUD, outpatient non-ED, outpatient ED, IP, pharmacy, and long-term care costs.

The zero-inflation models have the form:

$$\begin{aligned}\text{logit}(P_{it}) = {} & {\beta_0}^z + X'\theta^z + {\beta_1}^z t + {\Delta_1}^{(1)z} W_t^{(1)} + {\Delta_2}^{(1)z}\left[t - \mathrm{T}_I^{(1)}\right] W_t^{(1)} \\ & + {\Delta_1}^{(2)z} W_t^{(2)} + {\Delta_2}^{(2)z}\left[t - \mathrm{T}_I^{(2)}\right] W_t^{(2)} + {\omega_i}^z\end{aligned}$$

and the conditional models have the form:

$$\log(Y_{it}) = \beta_0{}^c + X'\theta^c + \beta_1{}^c t + \Delta_1{}^{(1)c} W_t^{(1)} + \Delta_2{}^{(1)c}\left[t - \mathrm{T}_I^{(1)}\right] W_t^{(1)} + \Delta_1{}^{(2)c} W_t^{(2)} + \Delta_2{}^{(2)c}\left[t - \mathrm{T}_I^{(2)}\right] W_t^{(2)} + \omega_i{}^c + \varepsilon_{it}{}^c.$$

The superscripts "z" and "c" denote the zero-inflation and conditional model parameters to make it clear that these parameters are not shared between models. P_{it} represents the probability that the cost for individual i at time t is zero, $X'\theta^z$ and $X'\theta^c$ represent the demographic variables and coefficients for both models, $\omega_i{}^z$ and $\omega_i{}^c$ represent the random effects for the two parts of the model, and $\varepsilon_{it}{}^c$ represents the random gaussian error for the outcome for individual i at time t. As in the earlier ITS model, the β_1 parameters estimate the pre-intervention slope, the Δ_1 parameters estimate the intercept change at time T_I, and the Δ_2 parameters estimate the change in slope in the post-intervention period. Given the outcomes are on the logit and log scales respectively, the exponentiated coefficients will represent odds ratios in the case of the zero-inflation model and multiplicative ratios in the case of the conditional cost portion of the model.

The final dataset containing observations for each member and quarter contained almost 5 million rows of data for over 600,000 unique members. Given the high computational cost to fit the complex models, instead of using the entire dataset to fit the models, the evaluation team took a smaller random sample of 100,000 members and all their associated quarterly observations (approximately 1/6 of the full data) to fit the model. The team ran the models on both the full dataset and on the random subset and observed that the parameter estimates were very similar to each other in direction, magnitude, and statistical significance. Since the summative report will include several more time periods, the computational cost will be even larger due to the increased size of the cost dataset. To decrease computational cost, estimates reported in the summative report will also come from a random subsample of the overall dataset. Models were fit in R version 4.2.2[23] using the glmmTMB package.[24]

---

[23] R Core Team (2023). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

[24] Brooks ME, Kristensen K, van Benthem KJ, Magnusson A, Berg CW, Nielsen A, Skaug HJ, Maechler M, Bolker BM (2017). "glmmTMB Balances Speed and Flexibility Among Packages for Zero-inflated Generalized Linear Mixed Modeling." *The R Journal*, **9**(2), 378–400. doi:10.32614/RJ-2017-066.

In a few cases, the cost measure had a very high proportion of quarterly costs that were zero and the full model was not able to be fit due to convergence problems. In those cases, the evaluation team used a reduced parameterization for the conditional portion of the model which eliminated the demographic covariates and the random effects which leads to a model form in the conditional model of

$$\log(Y_{it}) = \beta_0{}^c + \beta_1{}^c t + \Delta_1{}^{(1)c} W_t^{(1)} + \Delta_2{}^{(1)c}\left[t - \mathrm{T}_I^{(1)}\right] W_t^{(1)} + \Delta_1{}^{(2)c} W_t^{(2)} + \Delta_2{}^{(2)c}\left[t - \mathrm{T}_I^{(2)}\right] W_t^{(2)} + \omega_i{}^c + \varepsilon_{it}{}^c.$$

Note that the demographic covariate and random effects parameters were still used for the zero-inflated portion of the model in this case.

E.6.1.3 Hypothesis Testing

As part of the model output, two-tailed hypothesis tests were performed on all model parameters. All p-values reported in the report are two-tailed and adjusted for multiple testing at a family-wise error rate of 0.05 using the Bonferroni method. Given the limited data in the post-intervention period and the plan to utilize additional data points for future analysis, the model parameter estimates, and associated p-value should be considered preliminary and subject to change after gathering additional data.

E.6.1.4 Time periods for ITS

Table 6 summarizes the time periods used for each measure in the analysis for the interim report and those that will be used for the full three-period analysis in the summative report. See section E.3 for more discussion of the justification for the starting data point for measures. Any deviations from the time periods proposed in the approved evaluation design are shown in Table 6 and discussed below.

Generally, seven quarters of data were available for the pre-intervention period and 16 quarters of data were available for the transition period. Four quarters of data are expected for most measures for the post-intervention period that will be presented in the summative report. While there is no precise number of quarters of data required for each period in the ITS analysis, fewer data points and higher

variability across observations lowers the quality of the model fit, which therefore weakens the explanatory power of the analysis. The reliability of estimates produced for each measure depends on the stability of each measure's trend, and it is noted in the results section which measures should be interpreted more cautiously.

Any measures for which there is a truncation of available data are flagged in Table 6 – this mainly occurred due to the measurement period used for the measure – and expectations for what updated data will be available for the summative report is noted. For 10 measures, only 1 quarter of post-intervention period data is currently expected to be available for the summative analysis. This limitation and potential avenues to obtain more data for the analysis are discussed in section F.

Table 6: Summary of measures with measurement periods and available data for ITS periods

Hypothesis	Measure	Available Data for Pre-Intervention Period (*Interim Report*)	Available Data for Transition Period (*Interim Report*)	Available Data for Post-Intervention Period (*Summative Report*)
H1.a1	SUD Provider Availability Ratio [quarterly]	Q3 2018* – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H1.a2	SUD Provider Availability Ratio – MOUD [quarterly]	Q1 2017 – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H1.b1	SUD Provider Availability Ratio by Level of Care [quarterly]	Q3 2018* – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H1.c1	SUD Provider Availability Ratio within Underserved Areas [quarterly]	Q3 2018* – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H2.a1	Initiation of SUD Treatment [rolling quarters, 1-year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H2.b1	MOUD Usage [quarterly]	Q1 2017 – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H2.b2	RT Treatment Stays with MOUD [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H3.a1	IP Follow-Up [rolling quarters, 6-month windows]	Q1 2017* – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q2 2024[a]
H3.b1	RT Follow-Up [rolling quarters, 6-month windows]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q2 2024[a]
H3.c1	ED Follow-Up [rolling	Q1 2017* – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q2 2024[a]

	quarters, 6-month windows]			
H3.d1	Use of Opioids from Multiple Providers in Persons Without Cancer [rolling quarters, 1-year window]	Q1 2017* – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H3.d2	Use of Opioids at High Dosage in Persons Without Cancer [rolling quarters, 1-year window]	Q1 2017* – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H4.a1	Emergency Department Visits for SUD.[25] [quarterly, with 11-month lookback window for defining SUD diagnosis]	Q1 2018* – Q3 2019	Q4 2019 – Q3 2023[†]	Q4 2023 – Q3 2024
H4.a2	IP Admissions for SUD[25] [quarterly, with 11-month lookback window for defining SUD diagnosis]	Q1 2018* – Q3 2019	Q4 2019 – Q3 2023	Q4 2023 – Q3 2024
H4.b1	The 30-day IP Admission Rate for SUD Following a RT Stay Among Members with SUD [rolling quarters, 1-year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H4.b2	The 30-day ED Visit Rate for SUD Following a RT Stay Among Members with SUD [rolling quarters, 1-year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]

[25] We also calculate this for the OUD subpopulation as a supplemental measure. See Appendix K.2 for results.

H4.b3	The 30-day ED Visit Rate for SUD Following an ED Visit Among Members with SUD [rolling quarters, 1-year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H5.a1	Continuity of Pharmacotherapy for Opioid Use Disorder [rolling quarters, 1-year windows]	Q1 2017 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H6.a1	Access to Preventive/ Ambulatory Health Services for Adult Medicaid Members with SUD [rolling quarters, 1 - year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H6.a2	Screening for HIV/HCV/HBV [rolling quarters, 1-year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H6.b1	Initiation and Engagement of Alcohol and Other Drug Abuse or Dependence Treatment [rolling quarters, 1-year windows]	Q1 2018 – Q3 2019	Q4 2019 – Q4 2022[†]	Q4 2023[a]
H7.a1	Rate of Overdose Deaths [quarterly]	None*	Q4 2019 – Q2 2023[†]	Q4 2023 – Q2 2024[a]
H7.a2	Rate of Overdose Deaths Due to Opioids [quarterly]	None*	Q4 2019 – Q2 2023[†]	Q4 2023 – Q2 2024[a]
H8.a1	Total Costs Per-Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a2	Total Federal Costs Per-Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024

H8.a3	SUD-IMD Costs Per- Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a4	SUD-other Costs Per- Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a5	Non-SUD Costs Per- Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a6	Outpatient non-ED Costs Per-Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a7	Outpatient ED Costs Per-Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a8	Inpatient Costs Per- Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a9	Pharmacy costs - ED Costs Per Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024
H8.a10	Long-term care costs - ED Costs Per- Member [quarterly]	Q1 2018 – Q3 2019	Q4 2019 – Q2 2023[†]	Q4 2023 – Q3 2024

* Quarters deviate from the originally proposed design. The reasons for the deviations are discussed in the text below.

[†] Truncated due to measurement period construction and currently available data. Full data through Q3 2023 will be available and reported in the summative report.

[a] Truncated due to measurement period construction and data expected to be available at time of summative report submission (May 31, 2025). Additional quarters of data will be added in subsequent deliverables.

As specified in Table 6 above, the starting point for measures H1A1, H1B, and H1C (SUD provider availability ratios) deviated from what was listed in the originally proposed design. As discussed in section C.1, BH Redesign, which involved broad policy changes to modernize Ohio Medicaid's behavioral health benefit, went into effect in January 2018 and resulted in a substantial change in billing and service codes for SUD and MH providers, as well as credentialing of new providers such as Licensed Independent Social Workers (LISWs). The combination of many new codes that providers could use to bill, in addition to an influx of newly credentialed providers beyond clinicians, resulted in an expansion of the number of providers delivering SUD services in 2018. This policy change is reflected in numerator counts for measures H1A1, H1B, and H1C, all of which count the number of providers delivering SUD services. Evaluators determined that including time points prior to Q3 2018 in the ITS models for these measures would bias the pre-trend slope, as the observed jump in rates in Q3 2018 is indicative of the BHR policy changes rather than an expansion in the number of SUD providers due to waiver-related changes. Measure H1A2 was not similarly affected by BHR because billing codes for MOUD were not substantially changed, and therefore the number of MOUD providers did not have a corresponding increase in reaction to BHR. Therefore, evaluators retained the earlier start point (Q1 2017) for H1A2 – SUD provider ratio for MOUD.

The start points for measure H3A1 (IP follow-up) and H3C1 (ED follow-up) were updated from the original proposal to now include data back to Q1 2017. The start point was originally set at Q1 2018 because evaluators were uncertain whether these were outcomes that would have been affected by the BHR overhaul. After evaluating the 2017 trends, it was determined that the data for this year was consistent with 2018, and that IP (H3A1) and ED (H3C1) follow-up would have been minimally impacted by the 2018 change in billing codes. Evaluators retained the originally proposed Q1 2018 start date for H3B1 (RT follow-up) because RT was billed differently in 2017 than in later years and therefore the data is not comparable.

The start points for H4A1 (ED visits for SUD) and H4A2 (IP admissions for SUD) were also updated from the originally proposed Q1 2017 date. In the interim analysis this start date was modified to Q1 2018 because the measure specifications (based off monitoring metrics 23 and 24, respectively) necessitate an 11-month look back window for the SUD diagnosis.

Finally, in the approved evaluation design the evaluators proposed a Q1 2018 start date for H7A1 (Rate of overdose deaths) and H7A2 (Rate of overdose deaths due to opioids). For the interim analysis, this was modified to Q4 2019 for both measures due to data quality concerns for 2018 and part of 2019 in the linked death certificates. Evaluators are in discussion with Ohio Medicaid to determine whether updated and reliable death data prior to Q4 2019 will be available for the summative report to be able to report pre-intervention period trends.

E.6.1.5 Descriptive Statistics

In addition to the formal models, for all measures the evaluation team created graphics and tables of the measures by quarters. In the case of measures associated with Hypothesis 1 concerning provider availability, the evaluation team computed alternative measure specifications that counted unique billing providers instead of rendering providers. Supplemental measures were also computed for measure H4A1 and H4a2 which utilized the OUD subpopulation instead of the SUD subpopulation. See Appendix K.2 for results for the supplemental measures.

The evaluation team had originally proposed additional descriptive analyses in the evaluation design concerning time and distance standards, state comparisons using the Medicaid Outcomes Distributed Research Network (MODRN) and calculating measures for specific subpopulations. Expectations for a multi-state comparison in future reports using MODRN data are discussed in the context of comparison populations in section E.1.1.1. At present, the evaluation team does not have a member with the necessary geospatial analysis skillset to conduct a time and distance standards analysis. After consulting with Ohio Medicaid, this was deemed a lower priority than exploring stratifications of key measures by race/ethnicity to explore any heterogeneity in demonstration effects and disparities in outcomes. In section G we present findings for the latter analysis for five key measures: MOUD usage (H2B1), residential treatment stays with MOUD (H2B2), continuity of pharmacotherapy (H5A), and overdose deaths (H7A1, H7A2).

E.6.2 Qualitative Stakeholder Feedback

Once professionally transcribed, all qualitative data from key informant interviews and focus groups were uploaded to ATLAS.ti for content analysis using a multiple coding approach in which passages of text could be categorized with one or more relevant code. For each data collection effort, we used a multi-stage approach to qualitative coding. First, the project team generated a coding frame through a combination of deductive and inductive methods. The team leveraged the subject matter and policy expertise of our 6-member coding team, which included a PhD social epidemiologist and a PhD urban sociologist, to identify prominent themes embedded in the extant literature on substance use disorder and SUD treatment. Next, two team members independently coded each transcript, with coders allowed to add codes to the frame as they reviewed the transcripts. The team met weekly for informal intercoder comparisons and discussions, followed by additional coding and refinement of the coding frame. This iterative process continued until all 34 transcripts were coded.

For the analysis of key informant interview data, the team developed more than 149 codes grouped into 27 overarching themes, including Best Practices, Medication Assisted Treatment, ASAM levels of care, Care Coordination, Quality of Care, COVID-19, Structural Factors, Cultural Competency, Stigma, Criminal Justice System, Geographic Differences, Technology, 12-Step Programs, Waiver Design & Implementation, Rules & Regulations, Data and Data Tracking, Market Factors, Collaboration, and Community. For the analysis of focus group data, we developed more than 173 codes grouped into 31 overarching themes. Many of these overlapped with the themes identified for analysis of key informant interviews, with the addition of themes such as Barriers to Accessing, Entering, or Staying in Treatment, Triggers to Leaving Treatment, Factors Facilitating Entering or Staying in Treatment, Experiences with Treatment Providers, Environmental Factors, Insurance, Family, Behavioral Health, Physical Well-Being, Peer Supports/Recovery, and the Addiction Cycle.

Once all transcripts were coded, the files were merged, codes were deduplicated, and areas of inconsistency were flagged. The analytics leads then met to discuss overlaps and divergences in coding and resolved any outstanding discrepancies. Finally, the team reviewed code densities, co-occurrences, and relationships

between topics, and generated reports in ATLAS.ti to assess patterns emerging in the data.

F. Methodological Limitations

F.1 Quantitative analysis

A limitation of the study design is variation in pre-implementation period and transition period trends in several measures due to the effects of the COVID-19 pandemic. Depending on the measurement construction, quarters of data that coincided with early-to-mid 2020 fall into period 1 or period 2 (or both periods) of the ITS design. As noted in section C.2.2, for several measures there are observable declines in rates during these quarters, some of which are followed by recoveries, and others which are not. Depending on the magnitude of the decline, this may have impacted the slope of the pre-implementation and/or transition period trend lines, which can then make it difficult to attribute changes in the trend of the measure directly to the waiver. Therefore, for measures that contain clear outliers around the time of the pandemic, results should be interpreted cautiously since these data points influence the trends. For the summative report, the evaluation team will explore exclusion of data points that can be systematically identified as outliers in the final statistical analyses, once the broader context of the long-term trend can be observed. The ultimate comparison of period 1 and period 3 trends for the evaluation of the effect of the waiver in the summative report will also help to mitigate the effect of the pandemic on the observed trends.

Another forthcoming limitation is the lack of available data for about 10 measures in the post-intervention period (period 3) that is expected for the summative analysis. This is driven by long measurement periods for certain measures that make it such that there will only be 1-3 quarters of data available for analysis when the evaluation summative report is submitted in May 2025. This will limit the conclusions that can be made about changes in the measures between periods 1 and 3, which is the most robust assessment of the causal effect of the demonstration. In response, evaluators will rely on change between periods 1 and 2 to preview the expected effect of the demonstration during the transition period. However, Ohio Medicaid is pending receipt of official notice from CMS of a

temporary extension of the waiver for October 2024 – June 2025. If this temporary extension is received, evaluators will be given the option to include this data in a delayed summative analysis for the first demonstration period, which will offer 3 additional quarters of data for the three-period ITS analysis. This additional data would allow for more robust conclusions about the post-intervention trend and the causal impact of the waiver to be drawn in the summative report for the first demonstration. If CMS ultimately approves Ohio's request for a second 1115 waiver demonstration period, data points from the second demonstration period may also be added to the third period of the segmented ITS design to explore the causal effect of the waiver over a period longer than the original five-year demonstration.

There are also some limitations inherent to a study that relies on administrative data to assess the state of SUD in a population. This type of data source is likely to undercount SUD prevalence in the Ohio Medicaid population because these statistics only capture individuals who have interacted with the healthcare system and received a diagnosis. Other studies have found evidence of this undercounting of OUD prevalence in the Medicaid population in Ohio.[26] The COVID-19 pandemic likely exacerbated this undercount, as the PHE hindered detection and diagnosis of SUD.

When assessing the causal impact of changes that occurred under the waiver, it's also important to consider that many of the outcome measures may be simultaneously influenced by social determinants of health, the nonmedical factors that influence health outcomes. This was a recurring theme of the feedback received in focus groups with Medicaid members, particularly in the context of accessing and remaining in treatment. While changes under the waiver are certainly one dimension that will influence outcomes, there are many other drivers – housing, financial security, employment, familial support – that are outside of the purview of the waiver but are often critical determinants of an individual's ability to receive care.

---

[26] Doogan NJ, Mack A, Wang J, Crane D, Jackson R, Applegate M, Villani J, Chandler R, Barocas JA. Opioid Use Disorder Among Ohio's Medicaid Population: Prevalence Estimates From 19 Counties Using a Multiplier Method. Am J Epidemiol. 2022 Nov 19;191(12):2098-2108. doi: 10.1093/aje/kwac154. PMID: 36004683; PMCID:PMC10144717.

Though ITS analyses can provide strong evidence of causal relationships, conclusions drawn from them rely on several assumptions. First, in the absence of a comparison group, we must rely on the pre-intervention trends being relatively stable and linear. There are several measures (those associated with hypothesis 3, hypothesis 4, and hypothesis 6 in particular) that do not exhibit linear pre-intervention trends, which means that assumption of the counterfactual trend after the waiver interventions began is somewhat uncertain. We note measures for which this is a concern and therefore caution interpretation of the model parameter indicating a change in the trend between the pre-intervention and transition periods. We must also assume that there are no other unmeasured factors that could be influencing the trends. This is a strong assumption, especially given the impacts of the COVID-19 pandemic, and a comparison group would have allowed us to account for those impacts in our analysis. This design limitation is partially mitigated by our transition to a three-period design.

F.2 Qualitative analysis

There are also some limitations inherent to the qualitative data presented in this report. Most centrally, the key informant interview and focus group participants were not randomly sampled from their target populations and, therefore, the qualitative findings discussed in this report are not generalizable to the broader population. Rather, they are indicative of the specific experiences and views of the participants, which may or may not be shared by the general population. For example, for key informant interviews, SUD treatment providers and recovery advocates were recruited from the SUD Stakeholder Advisory Committee, limiting feedback collected to potentially better-informed individuals who were closely engaged with waiver planning and implementation activities. While these providers may have more intimate knowledge of the state's waiver progress than other providers around the state, their experiences of SUD treatment in Ohio may not be the average experience. For focus groups, we attempted to recruit diverse participants from treatment centers around the state, but the final sample lacked representation from northeast Ohio and for some subpopulations, such as LGBTQ+, immigrant, returning citizen, non-English speaking, and Hispanic populations. Additionally, focus group recruitment strategies failed to engage individuals who left treatment early or had not yet started treatment, so the narratives we gathered are to some extent those of the "success stories." Therefore,

there may be additional barriers to entering or staying in treatment or challenges faced by individuals needing treatment which are not reported in our summaries of the lived experiences of individuals with SUD.

However, despite the fundamental limits to the generalizability of our stakeholder feedback, we report these stories due to the inherent importance of each person's experience and we attempt to triangulate any claims made with other sources of data. The geographic coverage across the state of both treatment providers interviewed and individuals in treatment in focus groups, as well as the breadth of roles of key informants interviewed, have provided us with a variety of unique perspectives and experiences to help shed light on what it is like to receive substance use disorder treatment in Ohio.

G. Results

This section contains interim results for each of the measures in Table 4, followed by a discussion of qualitative results that provide additional context and complementary insights, where applicable. For measures related to Hypotheses 1 through 7, the quarterly measures are plotted to visually see patterns and then model results are presented and discussed. The trend lines represented in the plots by solid-colored lines correspond to the parameters from the ITS models. Tables that include the numerators and denominators for each quarter are included in Appendix K.2.

Results for cost measures related to Hypothesis 8 are displayed slightly differently. First, the unadjusted costs per member month are shown graphically to get a sense of the trend pattern. These are referred to as "unadjusted" because the statistical models that were used to estimate effects of the demonstration were adjusted for demographics (age, sex, race-ethnicity) at the member level. Therefore, the model parameters might not correspond exactly to the patterns in the graphics. Afterwards, model results are presented for each cost measure and are discussed.

The model results for measures related to Hypothesis 8 differ from those related to Hypotheses 1 through 7 in that more complex member-level models were fit to data, and therefore they have a more complicated set of parameters and interpretations. In this section, only parameters related to the causal parameters of interest are shown in the tables, but full model results are included in Appendix

K.2. Note that the interpretation of the *exp(Estimate)* column in the model results tables will differ for the conditional and the zero-inflated parts of the model. For the conditional part of the model the numbers in the *exp(Estimate)* column can be interpreted as the estimated multiplicative change in the cost per member-month for the given variable. For the zero-inflated part of the model the numbers in the *exp(Estimate)* column can be interpreted as an estimated odds ratio for the cost being zero.

Q1: Does the demonstration increase access to SUD treatment services?

H1A: The demonstration will increase the ratio of SUD providers to members enrolled in Medicaid and qualified to deliver SUD services.

H1B: The demonstration will increase the ratio of providers to members at each of the levels of care.

H1C: The demonstration will increase the ratio of providers to members in geographic areas that are underserved at baseline.

Measure H1A1: SUD provider availability ratio

G.1.1.1.1 Quantitative Results

Measure Summary: H1A1	
Waiver goal	Increase
Overall trend (descriptive)	Decreasing
Causal effect of transition period	None

- Numerator: The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period
- Denominator: The number of Medicaid members with an SUD diagnosis during the measurement period

Measure H1A1 considers the ratio of providers delivering SUD services to members with an SUD diagnosis, with a higher ratio indicating more capacity. Figure 4 shows that prior to Q3 2018, the ratio was quite a bit lower than the ratio from Q3 2018 to Q3 2023. This was likely a result of policy changes implemented as part of the Ohio Behavioral Health Redesign in 2018, which required all rendering providers to be enrolled in Medicaid and identified on billing claims. As a result, in the analysis of the trend of the measure, we exclude those data points prior to Q3 2018 as they don't align with the rest of the pre-intervention trend.

The overall trend of the ratio appears to be slightly decreasing; in the pre-intervention period there had been a slight upward incline, followed by a gradual decline in the transition period. Based on the model results (Table 7), there was no statistically significant level change or change in the slope of the trend at the beginning of the transition period. Descriptively, the overall trend for SUD provider availability is not in the desired direction, although the observed decline is small.

While the ratio has slightly declined, it is important to note that the number of SUD providers has increased since 2019. However, there has been a greater percentage increase in the number of Medicaid members with an SUD diagnosis (total Medicaid enrollment grew throughout the transition period during the public health emergency), causing the ratio to decline slightly. A slight upward trend in the ratio may be starting in the last few quarters of the transition period, so it will be important to continue to observe this trend in the post-intervention period.

Figure 4: Measure H1A1: SUD provider availability ratio

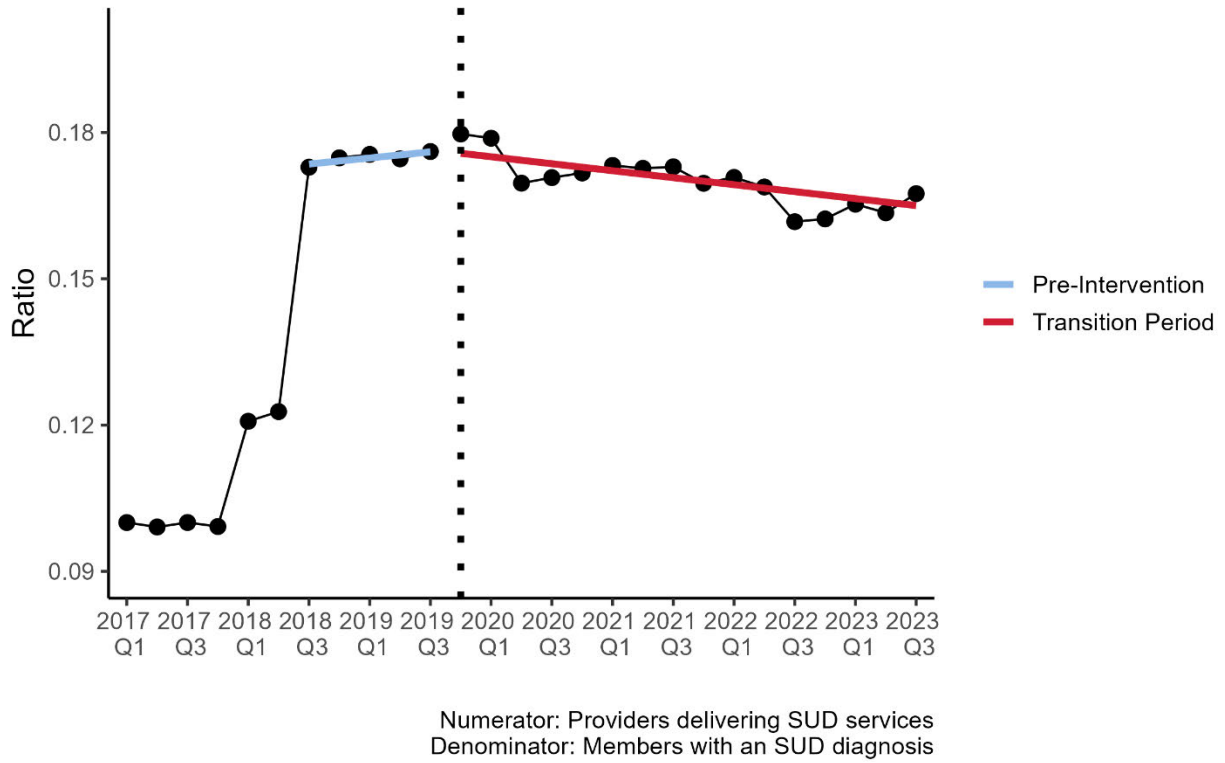


Table 7: H1A1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.16916	0.00070	241.00919	< 0.0001
Time	0.00062	0.00007	8.85797	< 0.0001
Intervention	-0.00089	0.00369	-0.24088	0.81237
Time Since Intervention x Intervention	-0.00134	0.00073	-1.85422	0.08017

G.1.1.1.2Qualitative Results

In interviews conducted between October and December 2020, providers and state agencies shared the general assessment that SUD provider availability in Ohio overall was insufficient. When discussing SUD provider capacity, these informants repeatedly highlighted concerns about chronic shortages within the behavioral health workforce. For example, one managed care plan explicitly raised a concern

about SUD providers not having enough staff to be able to meet the ASAM requirements for medical oversight. Factors identified as contributing to workforce shortages at all levels of care included low reimbursement rates for clinicians who provided SUD care to Medicaid members, as well as COVID-19 more broadly. Workforce shortages were noted as particularly acute in certain regions of the state (discussed further below in relation to Measures H1B1 and H1C1).

Like providers and state agencies, Medicaid members also described a lack of provider availability during focus groups that took place between May and July 2021. Individuals in recovery, for example, described a lack of availability for treatment, especially for AUD and other non-opiate drug dependencies. One focus group participant reported being turned down from three treatment centers because they were using crack cocaine, not opiates. Treatment providers acknowledged the difficulty faced by Medicaid members, noting how federal funding is tied to OUD treatment in particular. In addition, treatment providers as well as managed care plans acknowledged that specific obstacles exist for pregnant women seeking SUD treatment.

When discussing the behavioral health workforce shortage, state agency representatives and treatment providers discussed several strategies to help combat the shortage. For students preparing to enter behavioral health fields, these strategies include tuition assistance and licensing support. Retention bonuses and license renewal support were noted as other strategies to help retain and/or encourage the return of experienced professionals to behavioral health practices.

In future qualitative efforts, more specific questions will be asked related to the perception of provider availability throughout the transition period as well as if and how factors that influence provider availability have changed. This will provide another data point for understanding situated experiences of SUD treatment "supply" or availability versus "demand" or need.

Measure H1A2: SUD provider availability ratio – MOUD

G.1.1.1.3 Quantitative Results

Measure Summary: H1A2	
Waiver goal	Increase
Overall trend (descriptive)	Increasing
Causal effect of transition period	None

- Numerator: The number of providers who were enrolled in Medicaid and provided MOUD (buprenorphine, methadone, or naltrexone) during the measurement period
- Denominator: The number of members with an OUD diagnosis during the measurement period

Measure H1A2 is calculated as the ratio of MOUD providers to members with an OUD diagnosis. There was a steadily increasing trend in the pre-intervention period, followed by a flattening incline in the transition period (Figure 5). Based on the model results (Table 8), there was no statistically significant level change or change in the slope of the trend at the beginning of the transition period. However, descriptively, the overall trend in the SUD provider availability ratio for MOUD is in the desired direction.

Figure 5: Measure H1A2: SUD provider availability ratio - MOUD

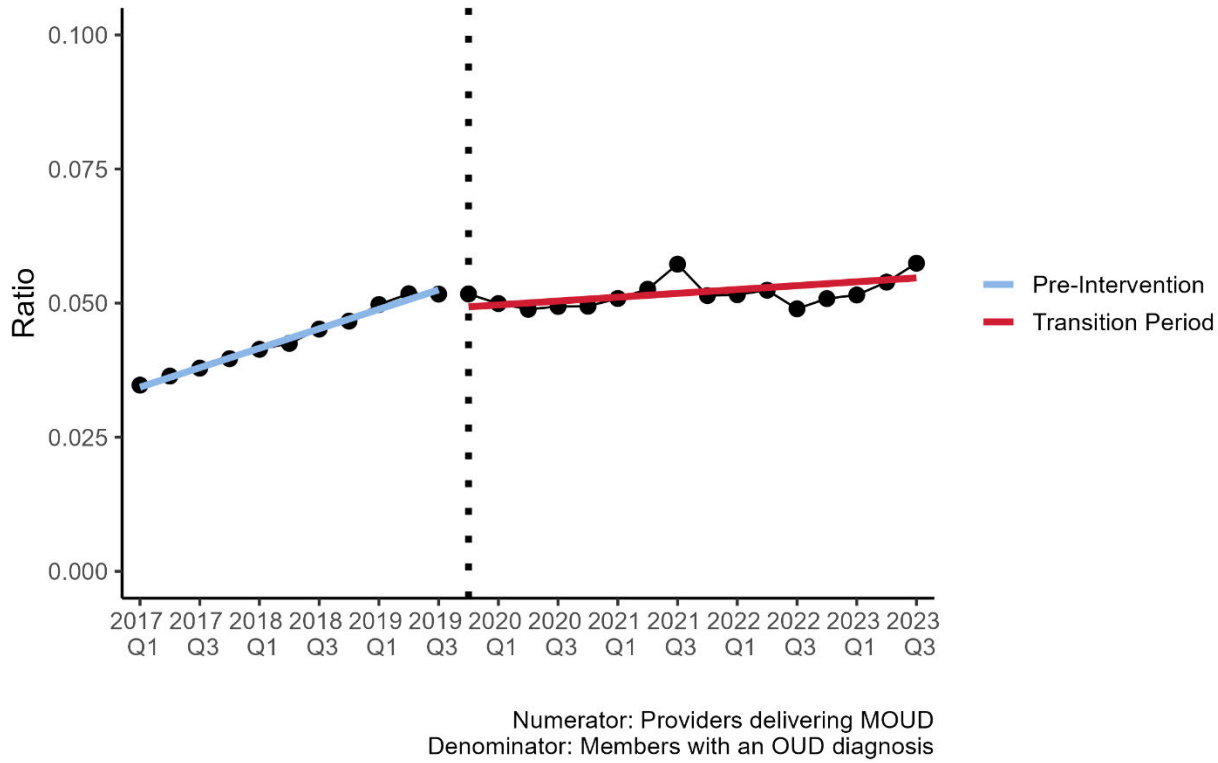


Table 8: H1A2 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.03253	0.00021	154.12678	<0.0001
Time	0.00181	0.00005	37.19280	<0.0001
Intervention	-0.00499	0.00355	-1.40588	0.17257
Time Since Intervention x Intervention	-0.00146	0.00072	-2.02894	0.05370

G.1.1.1.4Qualitative Results

In interviews conducted between October and December 2020, many stakeholders expressed similar concerns about the impact of workforce shortages on medication for SUD services and medication for SUD provider availability as they did for SUD

treatment more generally. However, different factors were identified as contributing to shortages in this specific context. For example, beyond difficulties recruiting and retaining clinicians and other staff, treatment providers discussed the significant and prohibitive ramp-up costs involved in starting a medication for SUD program in general, such as those associated with access to labs. The intersection of market forces with geography was also noted, as providers can only establish medication for SUD services if it is economically viable, which may not be the case in sparsely populated rural areas.

Related to MOUD specifically, treatment providers as well as managed care plans noted unique obstacles to providing this type of treatment, particularly in residential treatment facilities. Due to strict rules and regulations about storing controlled substances, including the need for a distributors' license, key informants noted that many residential treatment providers were not able to keep drugs such as buprenorphine on their premises. As a result, patients needed to be transported to off-site locations to receive their medication. In addition to posing logistical issues (especially for patients who received daily methadone treatments), multiple treatment providers expressed how this situation posed financial issues as well, as reimbursement only covered medication costs and not the time or resources involved in coordinating and providing transportation.

In their interviews, state agency representatives and managed care plans acknowledged that another challenge to providing medication for SUD broadly in residential facilities involved cultural and philosophical objections to treating SUD with medications. Some treatment providers and recovery advocates speculated that part of this resistance might be due to a desire to provide a medication-free environment to individuals who feel that the presence of medication for SUD poses a threat to their recovery (e.g., among those who used Suboxone or other MOUD-related medications as their drug of choice). In focus groups that took place between May and July 2021, some members described how provider resistance to medication for SUD might also be driven by stigmatizing beliefs. Both focus group participants and other key informants described how agonist MOUD, particularly methadone, was viewed more negatively than antagonist MOUD, such as naltrexone. This stigma may have fed into limited provider availability in some parts of the state. For example, provider resistance to medication for SUD was described as most prominent in Northeast Ohio, including the Cleveland-Akron area and was often discussed as being rooted in abstinence-only and 12-step philosophies.

Resistance to medication for SUD can have serious implications for individuals' treatment plans more generally, especially as they move through different levels of care. Two individuals in recovery described how taking methadone limited their ability to find treatment centers that would accept them as they transitioned from residential treatment to lower levels of care. One managed care plan described that many inpatient settings were not aware that their referrals to residential treatment facilities were not allowing continuation of medications, resulting in forced tapering in some treatment facilities. Another managed care plan described being forced, against their better judgement, to advise the detoxification of a patient in a residential treatment facility that did not allow medication for SUD to secure care for that patient as they moved through the care continuum. While it is unclear exactly how widespread the issue of forced tapering is in Ohio, many individuals in recovery described fears and anxieties around being weaned off medications that they felt "kept them alive."

In their interviews, some key informants expressed concerns about the potential ineffectiveness of the waiver if residential treatment providers continued to find loopholes to providing medication for SUD. One managed care plan described several of these; for example, some clinicians may claim that the patient "isn't clinically ready" for discussion about medication early in their stay, waiting to broach the subject with them as late as day 29 of a 30-day stay, while others may simply say that the patient has refused medication as a treatment option without meaningful discussion with the patient.

Despite some stakeholders' concerns about variable access to medication around the state (and limited access to methadone specifically in more rural areas), our data show that provider availability for MOUD generally and MOUD usage consistently expanded at the state-level (Table 32: (H1A2) SUD provider availability ratio – MOUD and Table 39: (H2B1) MOUD Usage). Still, many stakeholders described that pregnant women and mothers with young children often had some of the most trouble accessing this care because many prescribers were hesitant with these demographic groups, thus limiting available treatment options for them. Mothers seeking residential treatment or other critical levels of care faced additional challenges. These are discussed below in relation to Measures H1B1 and H1C1.

Measure H1B1: SUD provider availability ratio by level of care

G.1.1.1.5Quantitative Results

Measure Summary: H1B1 – ASAM Level 1	
Waiver goal	Increase
Overall trend (descriptive)	Decreasing but with substantial variation
Causal effect of transition period	None

Measure Summary: H1B1 – ASAM Level 2	
Waiver goal	Increase
Overall trend (descriptive)	Increasing but with substantial variation
Causal effect of transition period	None

Measure Summary: H1B1 – ASAM Level 3	
Waiver goal	Increase
Overall trend (descriptive)	Decreasing, except for a large increase in Q4 2022
Causal effect of transition period	Statistically significant increase in trend

- Numerator: The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period by category (appropriate sublevels of 1,2, and 3)
- Denominator: The number of members with a SUD diagnosis during the measurement period

Measure H1B1 is like H1A1 but looks specifically at the number of providers who delivered SUD services at ASAM levels of care 1,2, and 3. ASAM Level 1 generally consists of outpatient services, level 2 consists of intensive outpatient and partial hospitalization services, and level 3 consists of residential or inpatient services. Similarly to measure H1A1, the time periods prior to Q3 2018 are excluded from the analysis because of trends that do not align with the rest of the data (not shown in the figure).

For ASAM levels of care 1 and 2, there were no statistically significant level changes or changes in the slope of the trends at the beginning of the transition period (Figure 6, Table 9, Table 10). For ASAM Level 1, the trend was fairly flat in the pre-intervention period, then peaked in Q4 2019 and subsequently exhibited a steep decline in the transition period with another sharp decline following Q2 2022. The first decline observed coincides with the onset of the COVID-19 pandemic. Descriptively, the trend in SUD provider availability for ASAM Level 1 since the end of 2019 is not in the desired direction

For ASAM Level 2, the overall trend was slightly increasing in the pre-intervention period and had a peak at Q4 2019, followed by a sharp decline in early 2020, and then an upward trajectory throughout 2021-2023. The timing of the decline in the SUD provider availability ratio for Level 2 indicates that the COVID-19 pandemic likely influenced this sub-measure. However, it appears that on average there has been a recovery following the decline and Ohio is trending in the desired direction since 2021, although there is substantial variation in this measure.

For ASAM Level 3, there was no statistically significant level change, but there was a small statistically significant increase in the slope of the trend at the beginning of the transition period. The trend was generally declining until about Q4 2022, at which point there was a sharp jump, followed by another decline. This variation makes it difficult to determine whether the trend is generally moving in the desired direction.

For the three H1B measures, the ITS models don't fit the data very well due to the unstable trends in both the pre-intervention and transition periods. The non-linear pre-intervention trends make the determination of a counterfactual trend more uncertain. Therefore, we caution the interpretation of findings which may be influenced by the variability exhibited in both the pre-intervention and transition periods.

Figure 6: Measure H1B1: SUD provider availability ratio by level of care

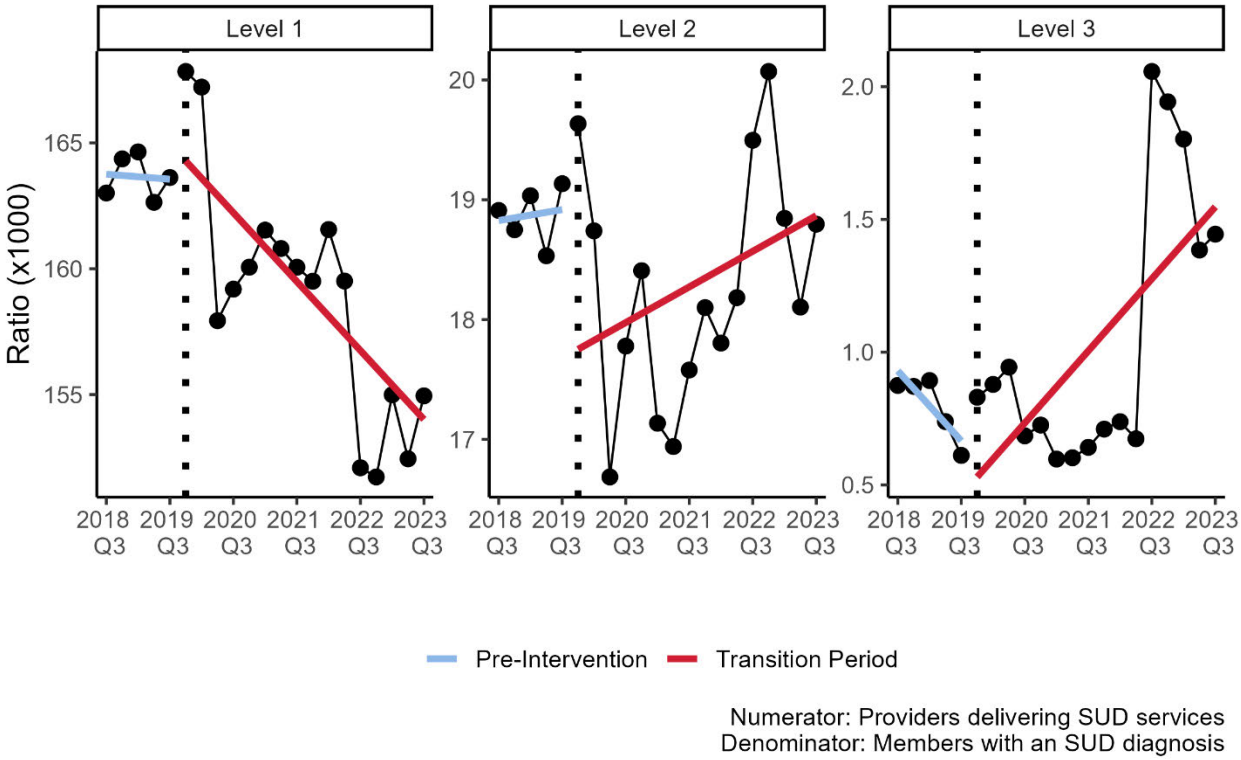


Table 9: H1B1 Interim ITS Model Results, Level 1

	Estimate	SE	t	p-value
Intercept	164.10214	1.06210	154.50698	<0.0001
Time	-0.04952	0.10673	-0.46391	0.64827
Intervention	0.77246	1.63488	0.47248	0.64226
Time Since Intervention x Intervention	-0.63504	0.22759	-2.79028	0.01209

Table 10: H1B1 Interim ITS Model Results, Level 2

	Estimate	SE	t	p-value
Intercept	18.66587	0.15346	121.63624	<0.0001
Time	0.02296	0.01749	1.31300	0.20568
Intervention	-1.18924	0.52194	-2.27851	0.03512

Time Since Intervention x Intervention	0.05142	0.06645	0.77387	0.44905

Table 11: H1B1 Interim ITS Model Results, Level 3

	Estimate	SE	t	p-value
Intercept	1.39155	0.08427	16.51245	<0.0001
Time	-0.06597	0.01037	-6.36018	0.00001
Intervention	-0.06978	0.29508	-0.23649	0.81573
Time Since Intervention x Intervention	0.13381	0.02297	5.82539	0.00002

Measure H1C1: SUD provider availability ratio within underserved areas

G.1.1.1.6Quantitative Results

Measure Summary: H1C1	
Waiver goal	Increase
Overall trend (descriptive)	Flat or increasing until Q4 2021, then decreasing
Causal effect of transition period	None

- Numerator: The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period in select counties determined to be underserved based on the number, percentage, and ratio of provider to members
- Denominator: The number of members with an SUD diagnosis during the measurement period within selected counties

Concentrating specifically on counties identified as underserved at the beginning of the demonstration, measure H1C1 considers the ratio of SUD providers in the county to the number of Medicaid members with SUD (see Appendix K.1 for details on which counties were defined to be underserved). Similar to measure H1A1, the time periods prior to Q3 2018 are excluded from the analysis because of trends that do not align with the rest of the data which are likely due to administrative changes related to Behavioral Health Redesign. Figure 7 shows that the trend in the ratio of SUD providers to members with an SUD diagnosis within selected

underserved counties was generally pretty flat until early 2021, then increased and peaked in Q4 2021, followed by a steady decline through 2022 and 2023. Based on the model results (Table 12), there was no statistically significant level change or change in the slope of the trend at the beginning of the transition period. Although the trend had generally been in the desired direction between 2018 and 2021, since 2022 the decline in the SUD provider availability ratio within underserved areas is counter to the desired trend.

Figure 7: Measure H1C1: SUD provider availability ratio within underserved areas

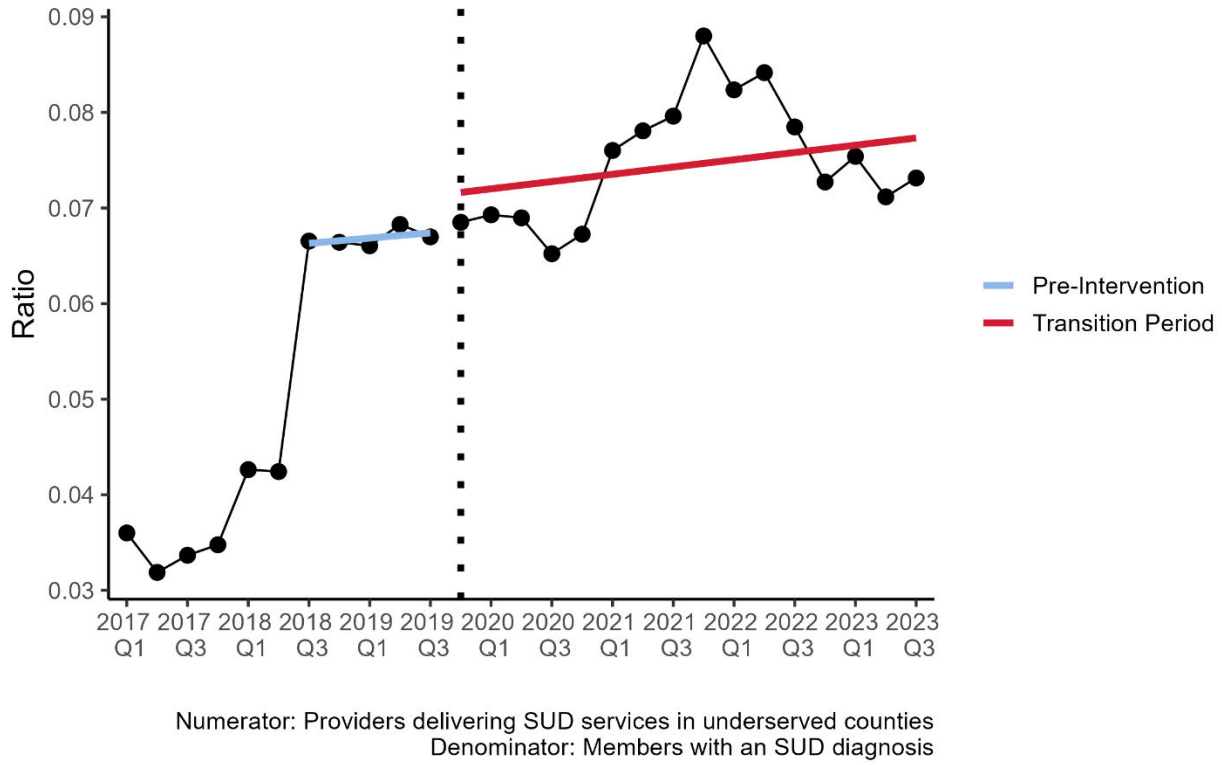


Table 12: H1C1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.06438	0.00072	89.97057	<0.0001
Time	0.00027	0.00008	3.58046	0.00214
Intervention	0.00395	0.01158	0.34129	0.73684
Time Since Intervention x Intervention	0.00011	0.00160	0.06575	0.94830

G.1.1.1.7Qualitative Results (H1B1 and H1C1)

In interviews conducted between October and December 2020, stakeholders largely described state-wide SUD provider capacity at critical levels of care as adequate, though they acknowledged that capacity for other levels, particularly those at the lowest levels of the ASAM continuum, varies by geography. However, in focus groups that took place between May and July 2021, Medicaid members in underserved areas, particularly in rural and Appalachian areas, frequently discussed difficulties in accessing most levels of care. For example, members seeking treatment in rural parts of the state recounted experiences where they were forced to wait sometimes weeks for a bed at a treatment center in contrast to those in urban centers who reported shorter wait times for care, sometimes including walk-in availability. Members living close to the West Virginia border described needing to travel to the state's urban centers, such as Columbus and Cincinnati, to get access to needed care.

In addition to the general behavioral health workforce obstacles described above in relation to Measure H1A1, state agency representatives, managed care plans, and treatment providers described several factors that contributed to the state of available care in rural areas, many of which reflected unfavorable market forces and the reality that providers must sustain a business model. For example, some stakeholders noted that in smaller population centers, there often was not sufficient demand for all levels of care. Even in areas where there might be, stakeholders noted that part of the reason practices and other settings struggled to recruit qualified providers in rural areas of the state was that they must compete with treatment centers in urban centers that could afford to pay higher salaries. At the same time, while costs of hiring staff continued to increase, reimbursement rates were not following suit, which exacerbated financial precarity for settings that already existed in these areas. One managed care plan described how reimbursement rates factored into the decision to provide certain services when they recounted a provider saying that they did not offer ASAM level 3.7 care because it did not reimburse well.

Some key informants indicated that quality recovery and other sober housing resources were scarce in rural and Appalachian areas. In areas like these as well as

other counties with higher unemployment and poverty rates, it was often not possible to levy taxes to fund these non-clinical and social support aspects of SUD treatment. Additionally, due in part to local funding limitations and local ordinances that prohibited more than two or three unrelated adults living together, the continuum of care available was truncated.

These realities can create tricky situations for Medicaid members. For example, treatment providers, recovery advocates, and individuals with lived experience emphasized the critical role recovery housing plays in both short- and long-term recovery for individuals engaged in outpatient, intensive outpatient, and partial hospitalization programs. One recovery advocate described how if someone leaves a residential facility but does not have a safe place to go to, they may return to a place that more supports a lifestyle of addiction than a lifestyle of recovery. While Medicaid does not cover housing costs, stakeholders consistently identified a lack of quality recovery housing as a leading barrier to SUD treatment and long-term recovery.

In the shorter-term, these realities can influence the level of care Medicaid members seek and receive at the beginning of a treatment journey. In some cases, this resulted in treatment at a different level of care than what was diagnosed. For example, a managed care plan representative described a case in a rural part of southeastern Ohio where the provider indicated that the member would have benefited from a residential level of care. However, because the closest residential facility was two hours away from the Medicaid member's home, the provider offered partial hospitalization instead.

Stakeholders noted that some demographic groups faced unique challenges to accessing appropriate levels of care. For example, mothers or pregnant women seeking residential treatment or other critical levels of care often needed to choose between either delaying treatment until they found a provider that offered childcare or residential beds for children or place their children in foster care or family care while they sought treatment. Further complicating this situation was that treatment providers, managed care plans, and Medicaid members didn't always agree on what the appropriate level of care is for a patient. For example, individuals in each group described disagreements around the appropriate length

of stay in residential or inpatient treatment or whether medically supervised detox was medically necessary.

One of the waiver's goals is to use evidence-based, SUD-specific patient placement criteria to improve the "fit" of the continuum of care for any prospective member seeking treatment into the level and quality of care that maximizes their likelihood of SUD treatment success. A community learning collaborative approach was being used to further ASAM familiarity, utility, and improved placement criteria and treatment outcomes. For example, a managed care plan representative described that they have their own ASAM training for staff and providers. They further expressed hope that the accrediting bodies would eventually provide structured training for providers and facilities, although they noted that they not yet seen that type of training in action yet. State agency representatives also described ASAM training as a top priority. One described their process of first establishing ASAM as the state's coverage framework for SUD services, followed by working with providers to determine which pieces of ASAM they needed to incorporate into state rules and regulation. They also noted a focus on making changes to the state's utilization management process. Sharing the view that a strong continuum of care nurtures a strong quality of care, stakeholders believed that improving the efficiencies of prior authorization timing and completion would strengthen the care continuum at multiple levels.

Q2: Does the demonstration increase utilization of SUD treatment by enrollees with SUD?

H2A: The demonstration will reduce the time between initial diagnosis and treatment.

H2B: The demonstration will increase the MAT usage rate.

Measure H2A1: Initiation of SUD treatment

G.1.1.1.8 Quantitative Results

Measure Summary: H2A1	
Waiver goal	Increase
Overall trend (descriptive)	Decreasing
Causal effect of transition period	None

- Numerator: The number of members who initiated treatment through an IP SUD admission, outpatient visit, intensive outpatient encounter or partial hospitalization, telehealth, or medication for SUD within 14 days of diagnosis
- Denominator: The number of Medicaid members with a new episode of SUD abuse or dependence

Measure H2A1 calculates the proportion of members with a new SUD episode in the measurement period who initiated treatment within 14 days of the diagnosis. Figure 8 shows that in the pre-intervention period this metric was, on average, trending downward. Subsequently in the transition period there was a steeper decline in the trend, with a drop off in the rate beginning in late 2021. There was no statistically significant causal effect of the waiver during the demonstration period. The trend for initiation of SUD treatment is not moving in the desired direction. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 8: Measure H2A1: Initiation of SUD Treatment

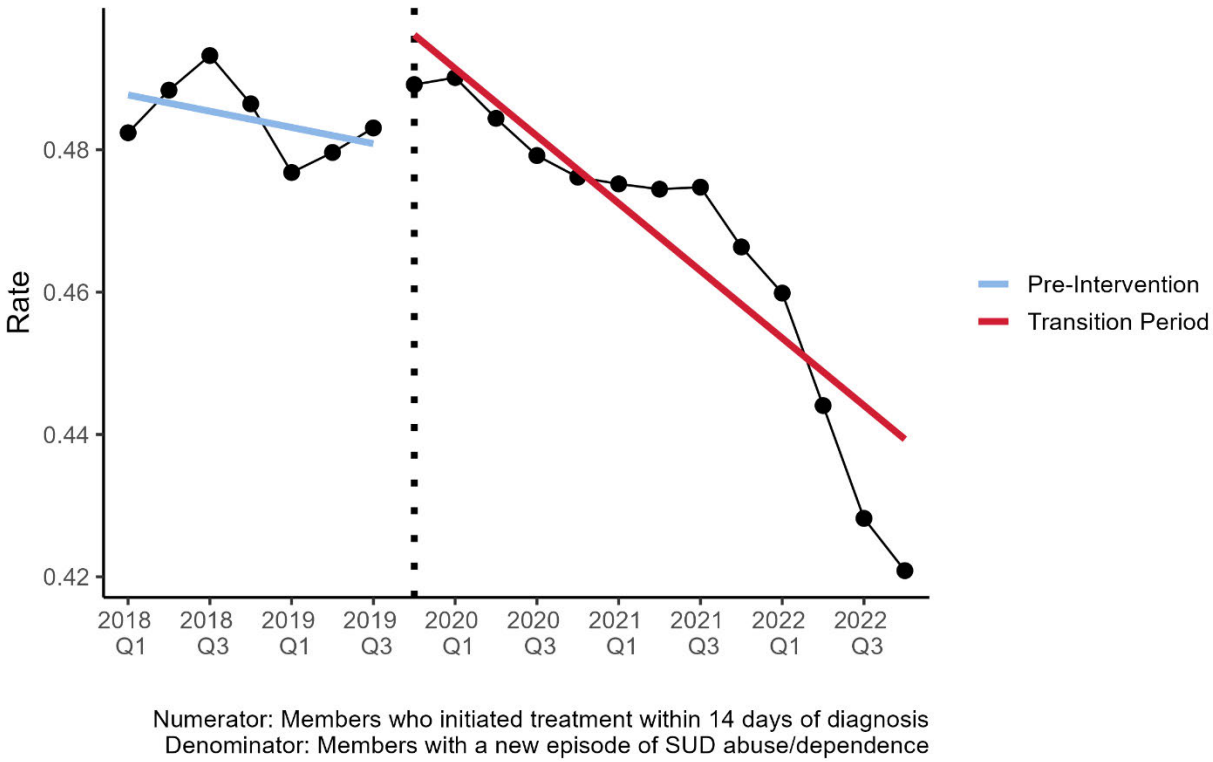


Table 13: H2A Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.48884	0.00301	162.52300	<0.0001
Time	-0.00114	0.00050	-2.25674	0.03837
Intervention	0.01642	0.01657	0.99089	0.33649
Time Since Intervention x Intervention	-0.00359	0.00568	-0.63273	0.53585

G.1.1.1.9Qualitative Results

In focus groups that took place between May and July 2021, many Medicaid members noted several factors that influenced their trajectory into treatment. In addition to the aforementioned structural factors influencing the provision of SUD services, members detailed personal factors as well. For example, many individuals actively receiving SUD treatment shared that personal and family hardships related

to active addiction were the motivation for seeking treatment. This suggests that individual-level factors also play a role in whether treatment is initiated after an SUD diagnosis. Members also credited peer support services, case management, and the availability of telehealth as facilitating access to and maintaining critical levels of care. Some Medicaid members noted that the push from court or child protective services (CPS) was helpful for their trajectory by facilitating treatment access. However, some treatment providers and managed care plans described the courts as creating barriers to care. For example, in an interview with a provider, court-ordered participation in naltrexone programs was specifically mentioned as a barrier because it limited treatment options for individuals who might have better outcomes with another type of care or medication. In future qualitative efforts, additional questions will be asked related to the barriers and facilitators to treatment during the transition period of the demonstration.

Measure H2B1: MOUD usage

G.1.1.1.10 Quantitative Results

Measure Summary: H2B1	
Waiver goal	Increase
Overall trend (descriptive)	Increasing
Causal effect of transition period	None

- Numerator: The number of members with an OUD diagnosis who have a claim for MOUD during the measurement period
- Denominator: The number of members with an OUD diagnosis during the measurement period

Figure 9 shows that the trend in the MOUD usage among members with an OUD diagnosis was steadily increasing across all time periods, although began to level off in 2023. Based on the model results in Table 14, there was no statistically significant level change or change in the slope of the trend at the beginning of the transition period. The trend in MOUD usage is moving in the desired direction even though there is no detectable significant causal effect of the demonstration during the transition period.

Figure 9: Measure H2B1: MOUD Usage

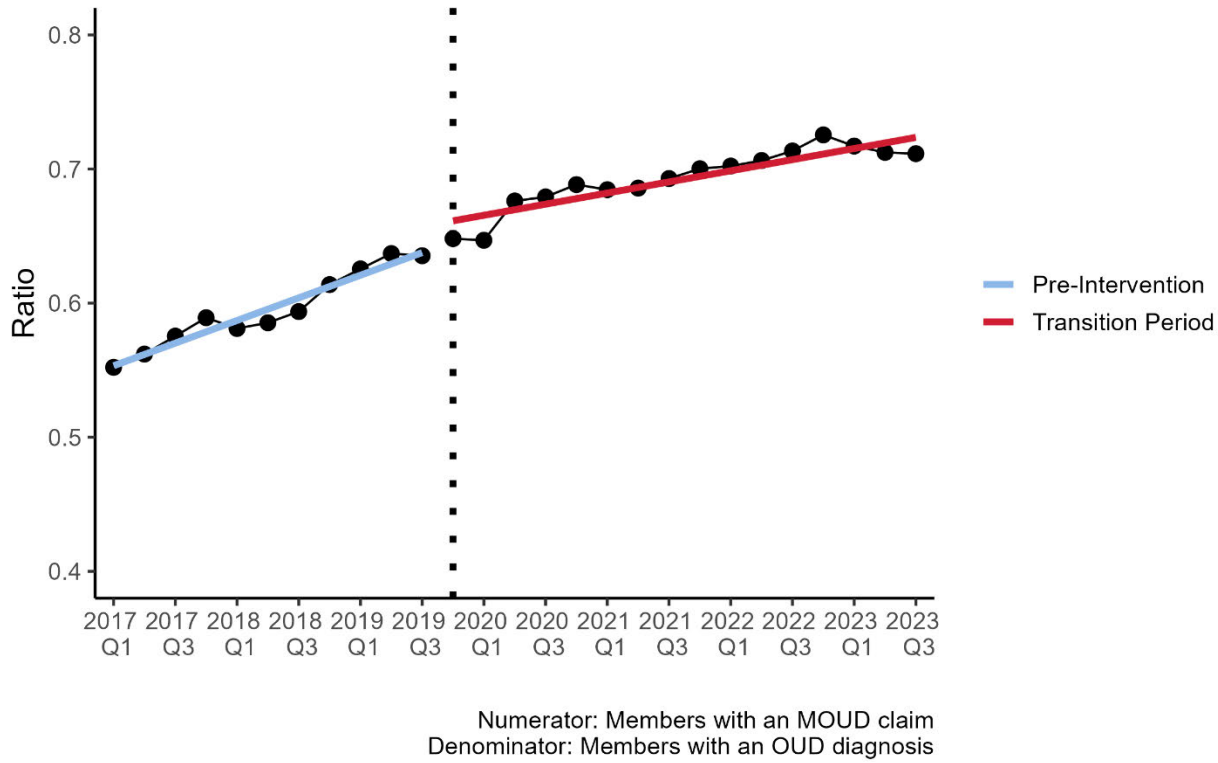


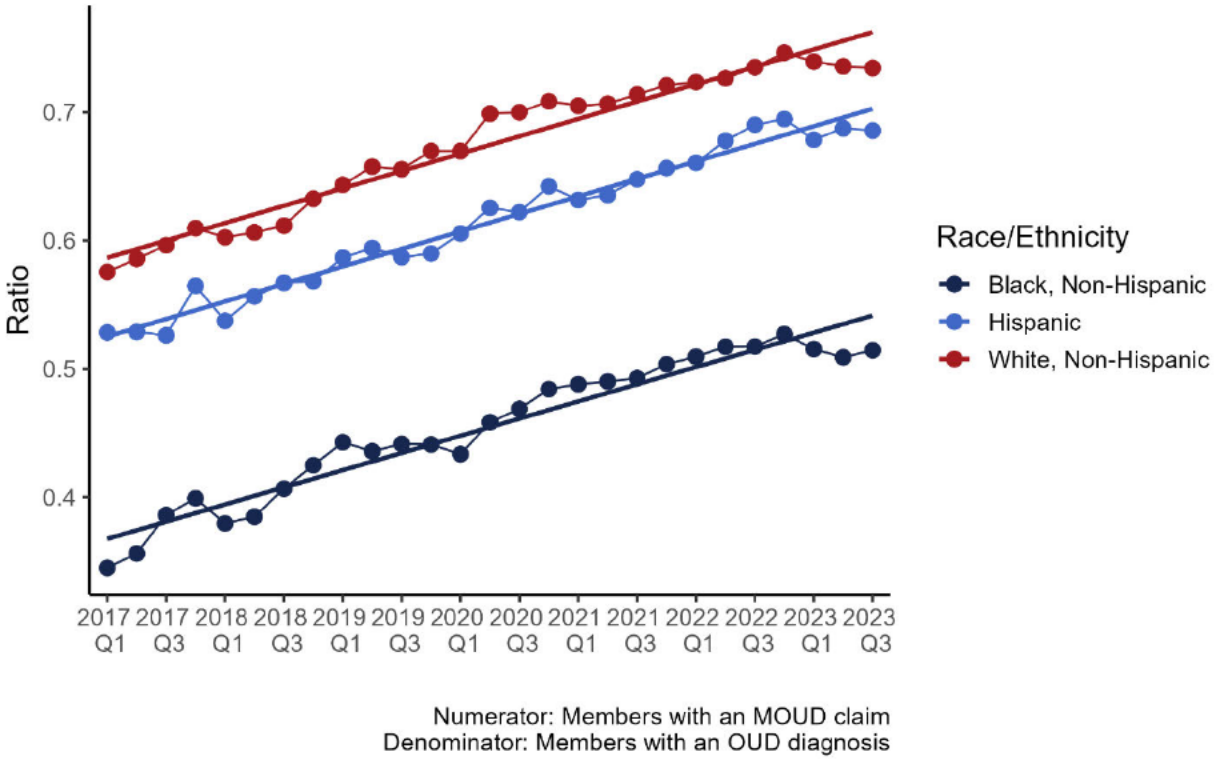
Table 14: H2B1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.54489	0.00384	141.79926	<0.0001
Time	0.00844	0.00048	17.67977	<0.0001
Intervention	0.01523	0.01138	1.33808	0.19341
Time Since Intervention x Intervention	-0.00429	0.00198	-2.16882	0.04023

As a supplementary analysis, we explored descriptive trends over time in MOUD usage by race/ethnicity. The trends are comparable across (1) non-Hispanic Black; (2) Hispanic; and (3) non-Hispanic White adult members for 2017-2023, with a steady increase in MOUD usage for all subpopulations. However, there are noticeable disparities by race/ethnicity, with non-Hispanic White members having about 0.5 times higher rates of MOUD usage than Non-Hispanic Black members

throughout this period. Rates of MOUD usage for Hispanic members are just below those for non-Hispanic White members.

Figure 10: Measure H2B1: MOUD Usage Stratified by Race/Ethnicity



Measure H2B2: RT stays with MOUD

G.1.1.1.11 Quantitative Results

Measure Summary: H2B2	
Waiver goal	Increase
Overall trend (descriptive)	Increasing
Causal effect of transition period	None

- Numerator: The number of RT stays for members with a primary OUD diagnosis with MOUD administered or prescribed during the stay or 15 days before the start or after the end of the stay
- Denominator: The number of RT stays for members with a primary OUD diagnosis during the measurement period

Figure 11 shows that there is a general upward trend in the proportion of RT stays with MOUD among members with a primary OUD diagnosis in both the pre-intervention and transition periods, although there were dips in the ratio in Q4 2018, Q3 2019, and Q4 2021. The model results in Table 15 indicate that there was no statistically significant level change or change in the slope of the trend at the beginning of the transition period. Overall, use of MOUD in residential treatment appears to be trending in desired direction. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 11: Measure H2B2: Residential Treatment Stays with MOUD

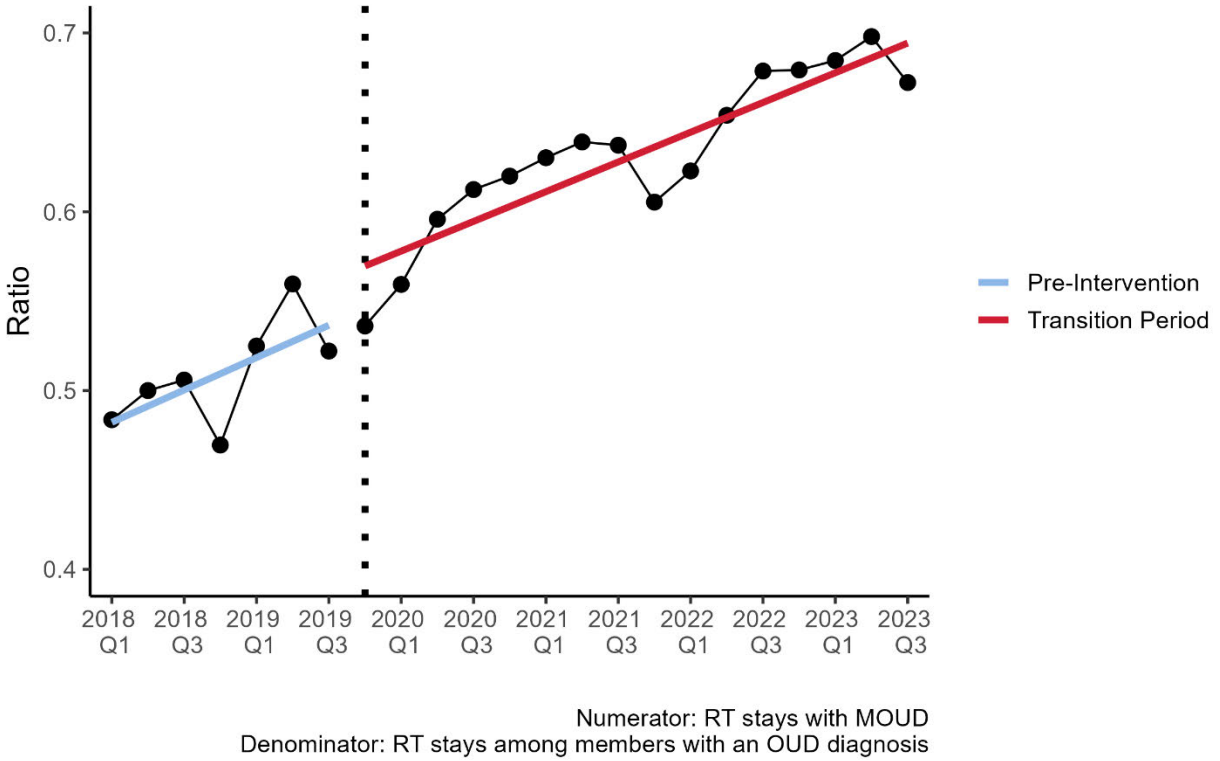
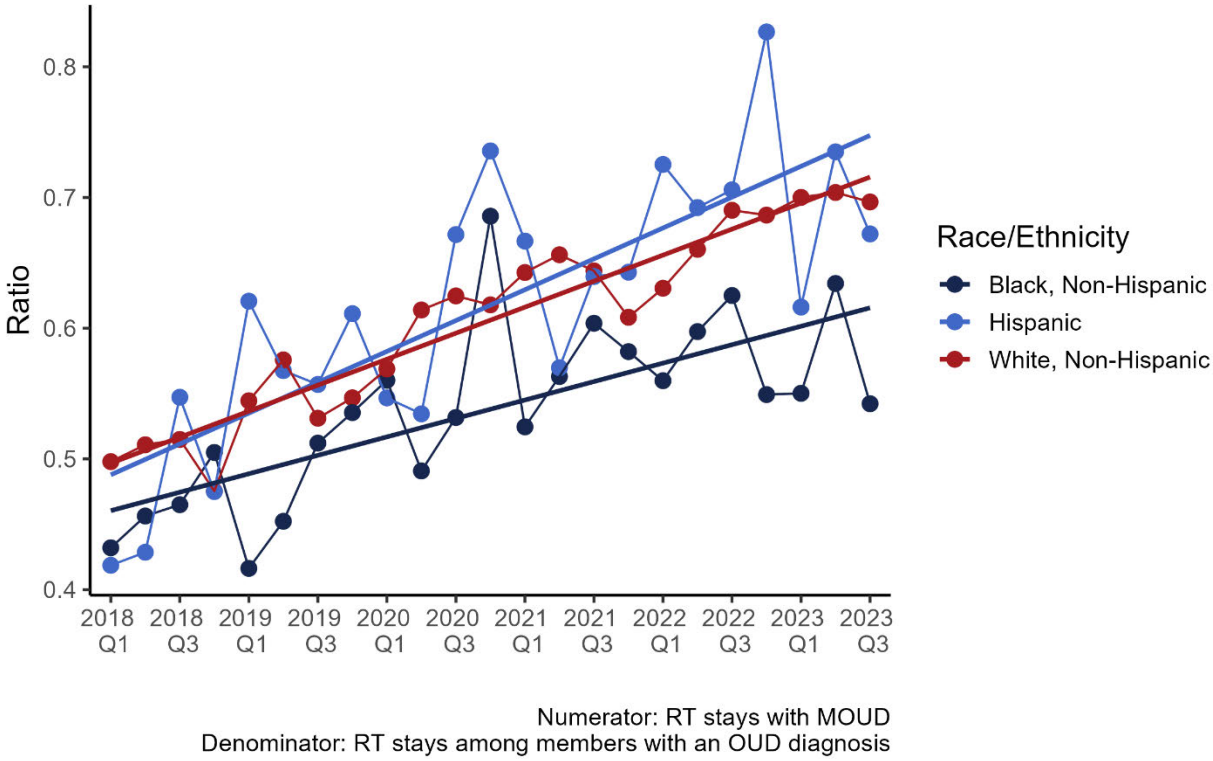


Table 15: H2B2 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.47319	0.00667	70.91165	<0.0001
Time	0.00905	0.00163	5.54160	0.00002
Intervention	0.02408	0.01977	1.21826	0.23730
Time Since Intervention x Intervention	-0.00074	0.00241	-0.30761	0.76156

As a supplementary analysis, we explored descriptive trends over time in residential treatment stays with MOUD by race/ethnicity. There is substantial variation in trends by race/ethnicity group due to small sample sizes, especially for Non-Hispanic Black and Hispanic members. For all three groups, there is an upward trend in the ratio of residential treatment stays with MOUD among members with an OUD diagnosis. However, the rate of increase is lowest for non-Hispanic Black Medicaid members. This has resulted in a growing disparity between rates for non-Hispanic Black members and non-Hispanic White or Hispanic members between early 2018 and late 2023. Rates of MOUD in residential treatment have always been lowest for non-Hispanic Black members.

Figure 12: Measure H2B2: Residential Treatment Stays with MOUD Stratified by Race/Ethnicity



G.1.1.1.12 Qualitative Results (H2B1 and H2B2)

As discussed above (especially in relation to H1A2), stakeholders described many barriers to receiving medication for SUD, especially for pregnant women, mothers with young children, individuals in rural areas, and individuals in parts of the state where an abstinence-only treatment philosophy is prominent. These findings represent insights gleaned during specific time points in the transition period (i.e., October and December 2020 and May through July 2021). In future qualitative efforts, more specific questions will be asked related to access to medication for SUD, including how access may have changed throughout the transition period, including where in the state, at which levels of care, and for whom.

Q3: Does the demonstration improve coordination and management of care?

H3A: The demonstration will increase the proportion of IP visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3B: The demonstration will increase the proportion of RT visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3C: The demonstration will increase the proportion of ED visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3D: The demonstration will decrease high-risk prescribing practices.

Measure H3A1: IP follow-up

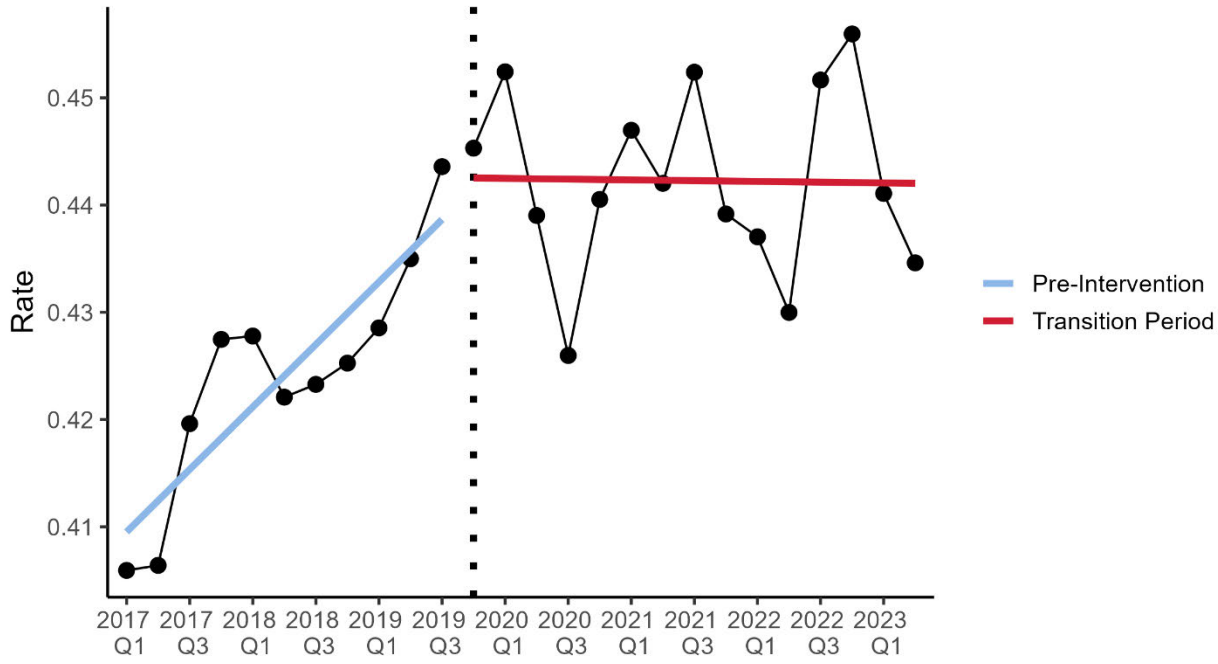
G.1.1.1.13 Quantitative Results

Measure Summary: H3A1 IP follow-up	
Waiver goal	Increase
Overall trend (descriptive)	Increasing until 2020, followed by substantial variation through 2023
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: The number of IP visits for members who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days
- Denominator: The number of IP visits for members who have a primary SUD diagnosis

The proportion of inpatient visits with a follow-up visit within 30 days among Medicaid members with a primary SUD diagnosis was generally on an upward trajectory during the pre-intervention period before falling precipitously in early 2020, coinciding with the onset of the COVID-19 pandemic (Figure 13). The transition period is marked with fluctuations. The negative, statistically significant slope parameter in the model results (Table 16) indicates that the trend decreased in the transition period and has on average been flat. Inferences drawn from these findings are limited by both the variability in the pre-intervention and transition period trends. The non-linear pre-intervention trend makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 13: Measure H3A1: Proportion of Inpatient stays with timely follow-up visit among members with SUD



Numerator: Follow-up visits within 30 days of the inpatient stay
Denominator: Inpatient stays within the first five months of the measurement period

Table 16: H3A1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.40661	0.00243	167.05654	<0.0001
Time	0.00291	0.00028	10.54000	<0.0001
Intervention	0.00096	0.00180	0.53022	0.60127
Time Since Intervention x Intervention	-0.00295	0.00033	-8.86941	<0.0001

Measure H3B1: RT follow-up

G.1.1.1.14 Quantitative Results

Measure Summary: H3B1	
Waiver goal	Increase
Overall trend (descriptive)	Variable until 2020, increasing through 2023
Causal effect of transition period	None

- Numerator: The number of RT visits for members who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days
- Denominator: The number of RT visits for members who have a primary SUD diagnosis

Figure 14 shows the proportion of follow-up visits among Medicaid members with a primary SUD diagnosis who had an RT stay generally declined during the pre-intervention period before climbing during the transition period. Following a decline from in the first half of 2018, there was a relatively large, statistically significant increase in the measure from Q3 2019 to Q4 2019, the start of the transition period. The observed dip in the measure between Q1 2020 and Q3 2020

coincided with the onset of the COVID-19 pandemic and ensuing disruptions to healthcare service delivery. The model results in Table 17 do not show a statistically significant effect of the demonstration on the trend during the transition period. However, the positive slope parameter and the increasing trend in the transition period suggest that this measure is generally progressing in the desired direction. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 14: Measure H3B1: Proportion of Residential Treatment stays with timely follow-up visit among members with SUD

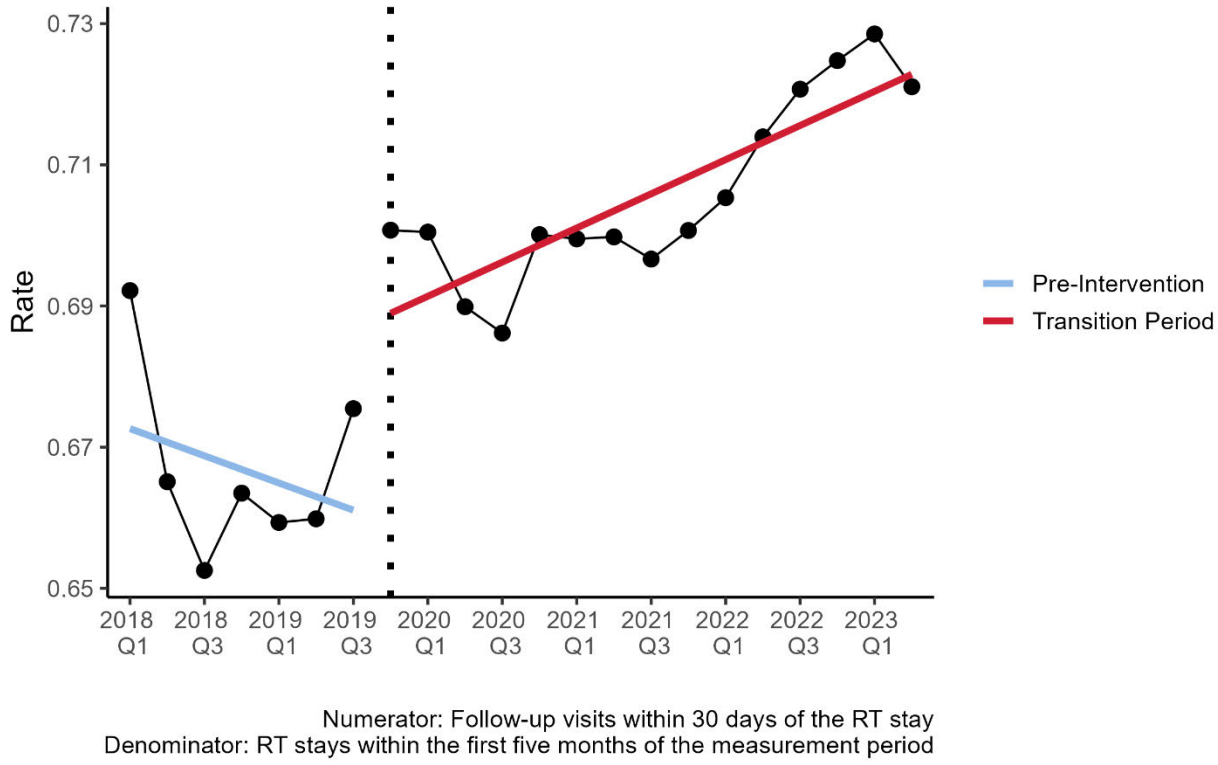


Table 17: H3B1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.68226	0.01228	55.56204	<0.0001
Time	-0.00193	0.00152	-1.26986	0.22031
Intervention	0.02981	0.00518	5.75276	0.00002

Time Since Intervention x Intervention	0.00434	0.00199	2.18030	0.04275

Measure H3C1: ED follow-up

G.1.1.1.15 Quantitative Results

Measure Summary: H3C1 ED follow-up	
Waiver goal	Increase
Overall trend (descriptive)	Increasing until 2020, followed by substantial variation through 2023
Causal effect of transition period	None

- Numerator: The number of ED visits for members who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days
- Denominator: The number of ED visits for members who have a primary SUD diagnosis

Figure 15 shows that the proportion of ED follow-up visits among Medicaid members with a primary SUD diagnosis is, despite a nonlinear trend, increasing on average in the pre-intervention period. Like a few other measures, there was a clear decline in the measure during the COVID-19 pandemic starting in Q1 2020, breaking the earlier pattern of the measure. Fluctuating recovery is observed during the transition period, although this measure was generally trending upward until Q3 2022. Since that time there has been a consistent downward trend through Q3 2023. While not statistically significant, the negative slope parameter (Table 18) indicates that the measure is trending downward, but data points in the post-implementation period are needed to better establish the pattern. Inferences drawn from these findings are limited by the variability in the transition period trend. There is also a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 15: Measure H3C1: Proportion of ED Visits with timely follow-up visit among members with SUD

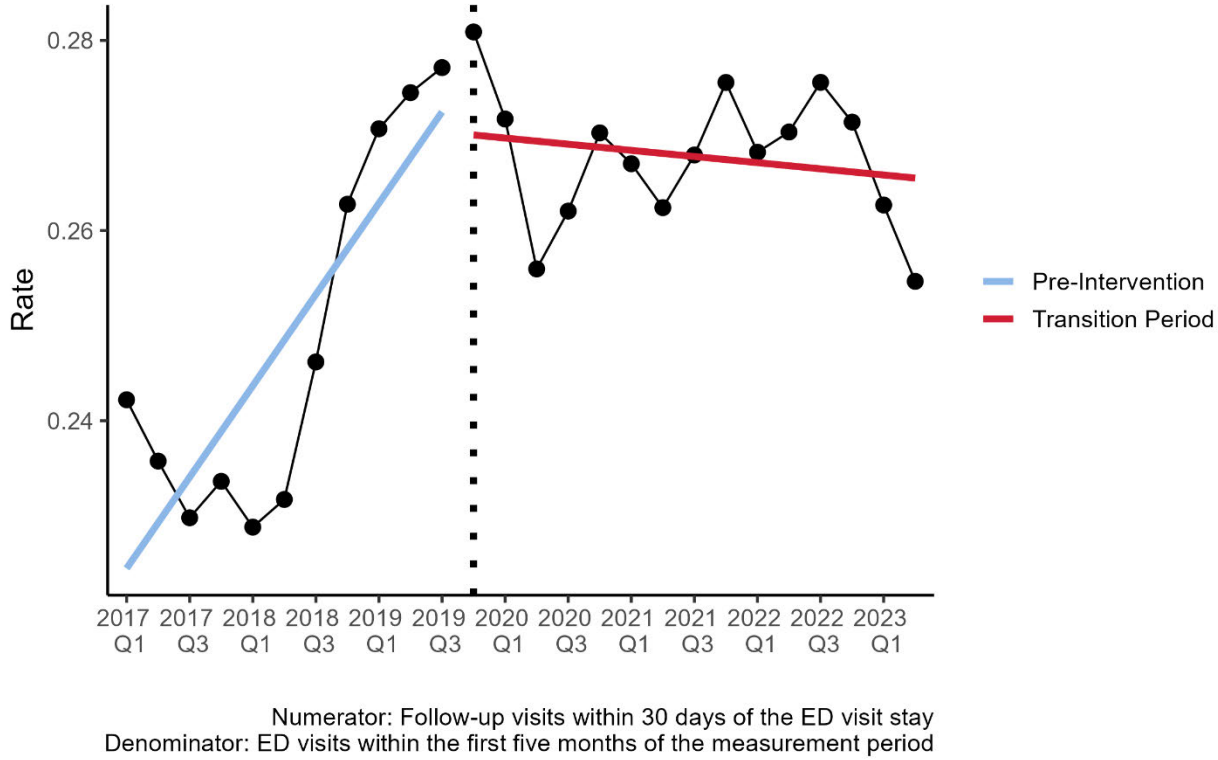


Table 18: H3C1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.21966	0.00652	33.70185	<0.0001
Time	0.00480	0.00110	4.34830	0.00026
Intervention	-0.00723	0.01001	-0.72205	0.47787
Time Since Intervention x Intervention	-0.00513	0.00175	-2.93518	0.00766

G.1.1.1.16 Qualitative Results (H3A1, H3B1, and H3C1)

In interviews conducted between October and December 2020, stakeholders largely discussed situations in which follow-up did not occur within the 30-day benchmark.

One major issue discussed that impeded timely follow-up related to documentation and notification. For example, stakeholders noted common processing delays between the time a Medicaid member entered a treatment facility and notification. In some instances, it took up to 30 days for a notification at all. This significantly challenged attempts to adhere to best practices designed to ensure Medicaid members received the appropriate level of care. This barrier was particularly impactful because stakeholders noted that there was usually only a small window of opportunity to ensure patients successfully progressed to the next level of care. Providers described another issue related to timely follow-up: intake assessments (e.g., psychosocial surveys and ASAM) were extensive and tended to span beyond the first visit. This disrupted the timing of notification and reasonable follow-up, delaying the onset of appropriate SUD treatment and care and negatively impacting patient experience.

In future qualitative efforts, more specific questions will be asked related to circumstances surrounding discrete visits and follow-up timing within members' treatment trajectories. Attention will be paid to barriers that impede timely follow-up as well as other factors that facilitate successful follow-up within the designated benchmark timeframe.

Measure H3D1: Use of opioids from multiple providers in persons without cancer

G.1.1.1.17 Quantitative Results

Measure Summary: H3D1	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing until early 2022, followed by an increase
Causal effect of transition period	None

- Numerator: The number of members without cancer who received prescriptions for opioids from four or more prescribers or four or more pharmacies during the measurement period
- Denominator: The number of members without cancer during the measurement period

Figure 16 shows that the trend in the proportion of Medicaid members without cancer who received prescriptions for opioids from four or more prescribers or four or more pharmacies was decreasing on average until Q1 2022, with large declines in early 2017 and mid-2019, the latter coinciding with the COVID-19 pandemic.[27] Following a stabilization through 2021, the direction of the trend changed in 2022, with a sharp increase observed throughout that year. The ITS model (Table 19) indicates that there was no statistically significant level change or change in the slope during the transition period. While historically the trend for prescription of opioids from multiple providers was moving in the desired direction, more recent data points indicate a potentially concerning change. Additional data in the post-intervention period will help to indicate whether the recent upward trend indicates a longer-term trajectory or is a temporary phenomenon. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

[27] Due to measure construction, Q3 and Q4 2019 use data from Q1/Q2 2020 and Q2/Q3 2020, respectively, which is why the effect of the pandemic is picked up in the trend visualized for mid-to-late 2019.

Figure 16: Measure H3D1: Use of opioids from multiple providers in persons without cancer

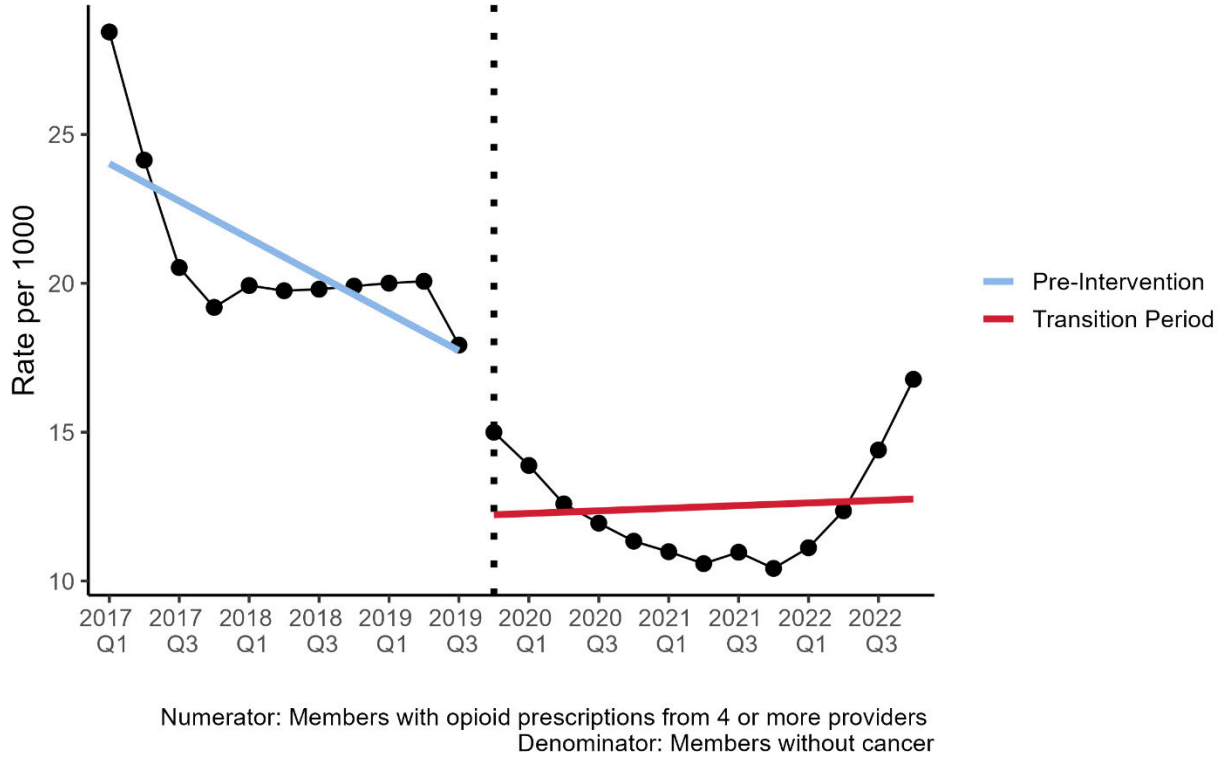


Table 19: H3D1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	24.65091	1.62018	15.21488	<0.0001
Time	-0.62849	0.16382	-3.83640	0.00103
Intervention	-4.88275	2.22038	-2.19906	0.03981
Time Since Intervention x Intervention	0.67246	0.49302	1.36395	0.18774

Measure H3D2: Use of opioids at high dosage in persons without cancer

G.1.1.1.18 Quantitative Results

Measure Summary: H3D2	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing
Causal effect of transition period	None

- Numerator: The number of members without cancer who received prescriptions for opioids at high dosage, ≥ 90 morphine milligram equivalents
- Denominator: The number of members without cancer during the measurement period

Figure 17 shows that the trend in the proportion of Medicaid members without cancer who received prescriptions for opioids at high dosage (≥ 90 morphine milligram equivalents) has consistently decreased from 2017.- Based on the model results (Table 20) there was no statistically significant level change or change in the slope of the trend in the transition period. Generally, this measure for prescription of opioids at high dosage has been trending in the desire direction. There was an uptick in the rate per 1000 in Q4 2022, but many more quarters of data are required to indicate whether this is the beginning of a change in the direction of the trend for this measure.

Figure 17: Measure H3D2: Use of opioids at high dosage in persons without cancer

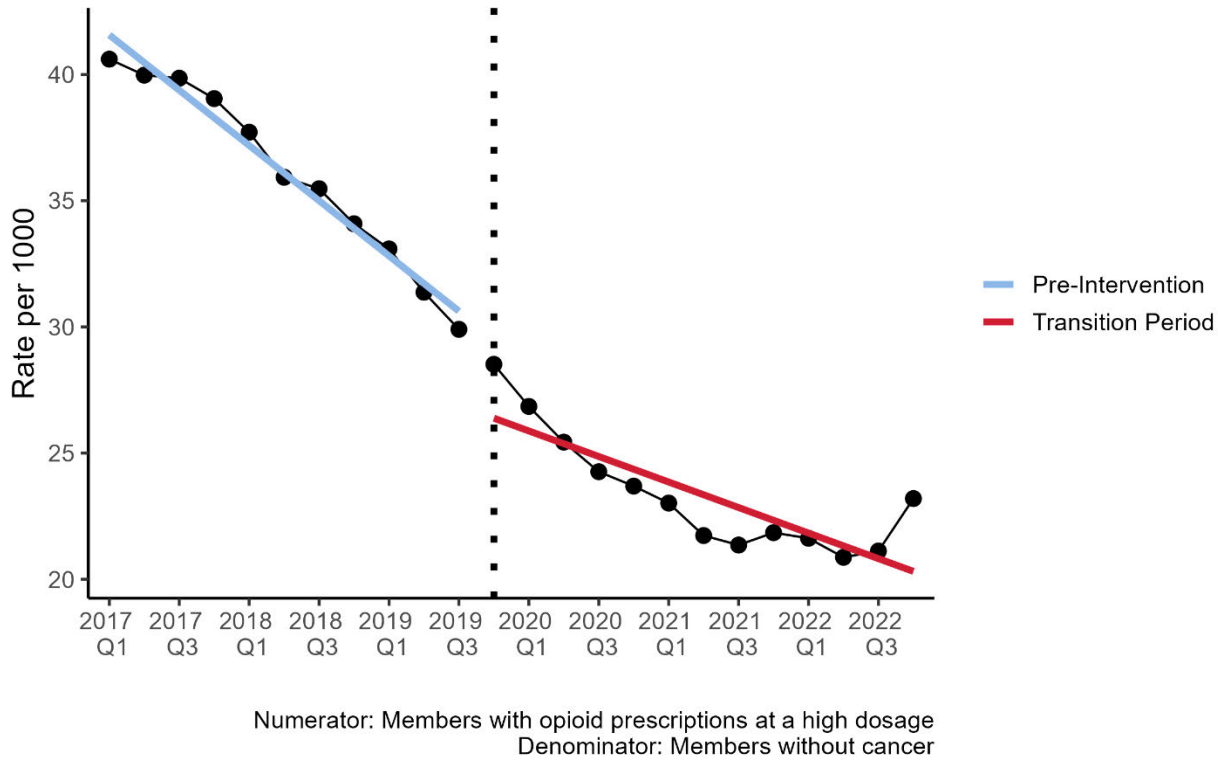


Table 20: H3D2 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	42.66103	0.37888	112.59866	<0.0001
Time	-1.09439	0.05809	-18.83929	0.00000
Intervention	-3.14551	1.54120	-2.04096	0.05467
Time Since Intervention x Intervention	0.58852	0.51693	1.13848	0.26838

G.1.1.1.19 Qualitative Results (H3D1 and H3D2)

In interviews conducted between October and December 2020, stakeholders discussed developments that may have contributed to changes in high-risk

prescribing. Specifically, the board of pharmacy's initiation of the prescription drug monitoring program, the Ohio Automated Rx Reporting System (OARRS), was framed as one of the most important achievements of the last decade in OUD treatment in Ohio. OARRS makes advanced data analytics possible, enabling the ability to track prescribing practices statewide and allowing insight into prescribing practices of individual clinicians. Emergency departments in particular can assess diagnosis and utilization data in real time and compare it with historical records. Additionally, state agency representatives described an expansion in the use of OARRS data to track overdose, such as overdose anomaly reports, as well as identify communities in which targeted outreach would be beneficial.

Moving forward, stakeholders expressed a desire for additional data collection and monitoring of MOUD providers. This was motivated by the goal of ensuring that outcomes meet expectations in outpatient treatment and that clinicians adhere to best practices to reduce relapse and overdose rates. In future qualitative efforts, more specific questions will be asked related to the utilization of OARRS as well as the role OARRS plays in facilitating communication and coordination between clinicians.

G.1.1.1.20 Additional Qualitative Insights Related to Coordination and Management of Care

As noted above, OARRS has the potential to strengthen coordination of care across clinicians and providers. In interviews conducted between October and December 2020, providers generally agreed that early engagement with individuals in treatment and working to link them with other services they may need was key to helping them maintain their recovery. However, despite there being general agreement among stakeholders on the importance of coordination—and even though some managed care plans felt they had a good working relationship with providers that allowed them to foster discussion and facilitate coordination—many acknowledged that several barriers impeded this goal.

First, all stakeholders acknowledged the need for rules and regulations and noted the positive impact they have on ensuring safety and consistency across organizations. However, one rule in particular was called out as prohibitive: 42 CFR Part 2 protections of patient records. Stakeholders expressed that it was difficult to

coordinate care when they were not allowed to acknowledge (without specific authorizations) that the patient was in fact receiving care. Some mentioned how other regulations made it especially difficult for residential treatment facilities to provide basic care (including use of OTC medications) and instead made the process more time-intensive and complicated for patients. One stakeholder noted that the ways in which SUD care coordination has been modeled differ administratively from the ways in which care coordination has been modeled for mental health care, complicating available approaches and strategies. There were also concerns raised by some of the stakeholders interviewed that some providers were still adhering to outdated rules about when to close a case.

Differential adherence to rules, and even misunderstanding about rules, was another barrier to care coordination that was discussed by stakeholders. For example, some stakeholders noted that clinicians believed that care coordination was only effective if the member had received care within the past 30 days or that an extensive assessment needed to be done before treatment could be rendered. Others described how widespread disagreement about the roles and involvement of care managers made it unclear who had the ultimate authority to decide an appropriate level of care.

One managed care plan representative described their efforts to use a wraparound model to coordinate across multiple systems to ensure that all the providers were working in sync and not duplicating services or efforts to meet the members' needs. One provider discussed hiring a care coordinator to address a perceived gap in patient coordination of care. However, other stakeholders mentioned that the inclusion of too many care managers could be detrimental, stunting efforts to coordinate care and possibly frustrating those in treatment.

Overall, state agencies expressed the importance of continued investment in efforts to build care coordination capacity, saying that care-coordination is "kind of the backbone of what we do." In future qualitative efforts, more specific questions will be asked about the coordination of care, including the benefits and challenges of working with designated coordinators who manage members' care.

Q4: Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?

H4A: The demonstration will decrease the rate of ED and IP visits within the Medicaid population for SUD.

H4B: The demonstration will decrease the rate of readmissions to ED and IP settings.

Measure H4A1: Emergency department utilization for SUD

G.1.1.1.21 Quantitative Results

Measure Summary: H4A1	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing with seasonal effects
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: The number of ED visits for SUD during the measurement period
- Denominator: The number of members with an SUD diagnosis enrolled in Medicaid during the measurement period

Following an increase on average in 2018 - 2019, overall, there has been a large decline in ED utilization among Medicaid members with an SUD diagnosis during 2020 – 2023. There is a seasonal pattern in this measure, with clear spikes at the third quarter of each year (Figure 18). To better account for seasonality, parameters were added to the models for each quarter. In Figure 18 the dashed colored lines represent the model with the seasonality and the solid-colored lines represent the model with the seasonality effect removed. Based on the model results in Table 21, the negative statistically significant slope parameter and the large observed decline in ED visits indicate that the trend in ED utilization is decreasing over time in the transition period. Additional data in the post-implementation period are needed to

better estimate the overall impact of the waiver on ED utilization. As a supplement, this measure was also calculated amongst the OUD subpopulation which showed similar patterns. Those additional results can be found in Appendix K.2.

Figure 18: Measure H4A1 Emergency department utilization for SUD among members with an SUD Diagnosis

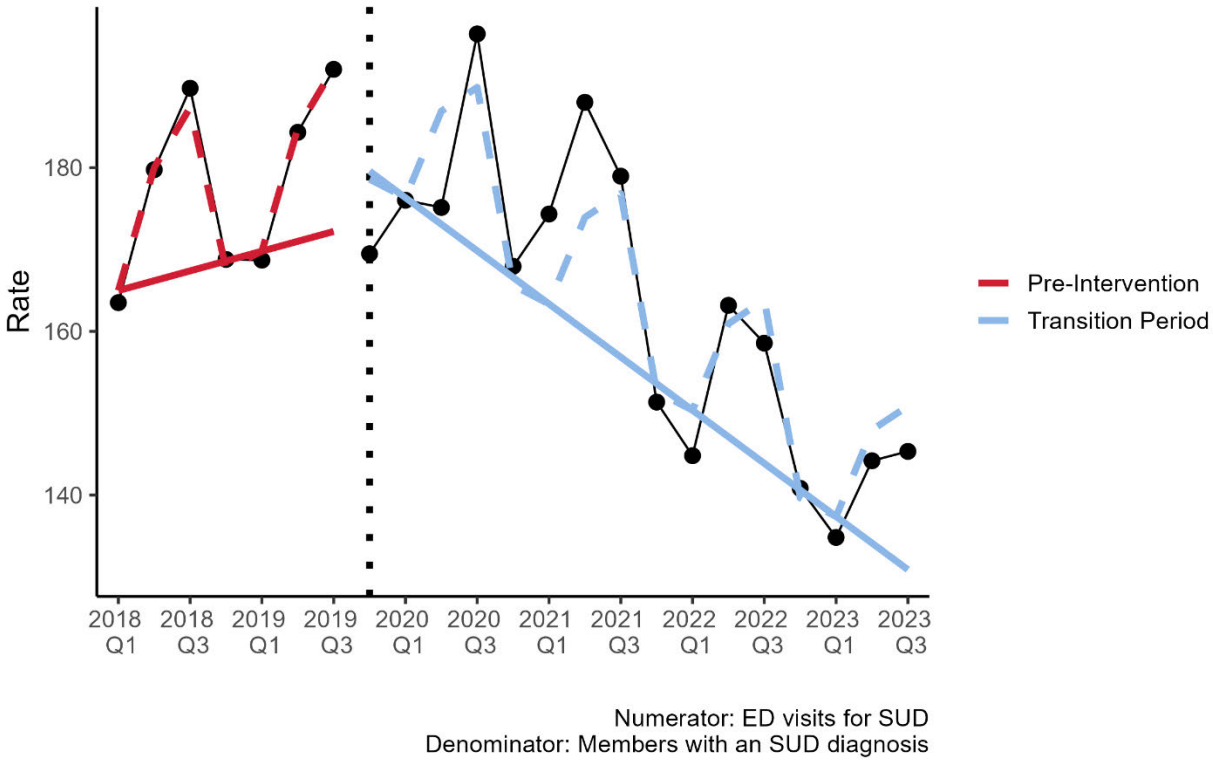


Table 21: H4A1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	158.97109	1.70969	92.98259	<0.0001
Time	1.20330	0.22021	5.46429	0.00004
Intervention	6.16736	3.61429	1.70638	0.10614
Time Since Intervention x Intervention	-4.44907	0.41269	-10.78057	<0.0001
Q2	13.82234	2.40929	5.73711	0.00002
Q3	19.97729	2.02423	9.86909	<0.0001
Q4	-0.97594	2.66618	-0.36604	0.71885

Measure H4A2: IP stays for SUD

G.1.1.1.22 Quantitative Results

Measure Summary: H4A2 Inpatient stays for SUD	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing with seasonal effects
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: The number of IP discharges related to an SUD stay during the measurement period
- Denominator: The number of members with an SUD diagnosis enrolled in Medicaid during the measurement period

Similarly to measure H4A1, the proportion of inpatient discharges related to an SUD diagnosis among Medicaid members with an SUD diagnosis also has an obvious seasonal trend, with peaks at the third quarter of each year (Figure 19). After accounting for seasonality, rates of inpatient discharges were relatively flat during 2018 - 2019 and began declining in 2020 – 2023. Based on the model results in Table 22, the transition period was associated with a statistically significant decline in the rate of inpatient discharges related to an SUD diagnosis among members with an SUD diagnosis. As a supplement, this measure was also calculated amongst the OUD subpopulation which showed similar patterns. Those additional results can be found in Appendix K.2.

Figure 19: Measure H4A2: Inpatient Discharges related to stay for SUD among members with an SUD Diagnosis

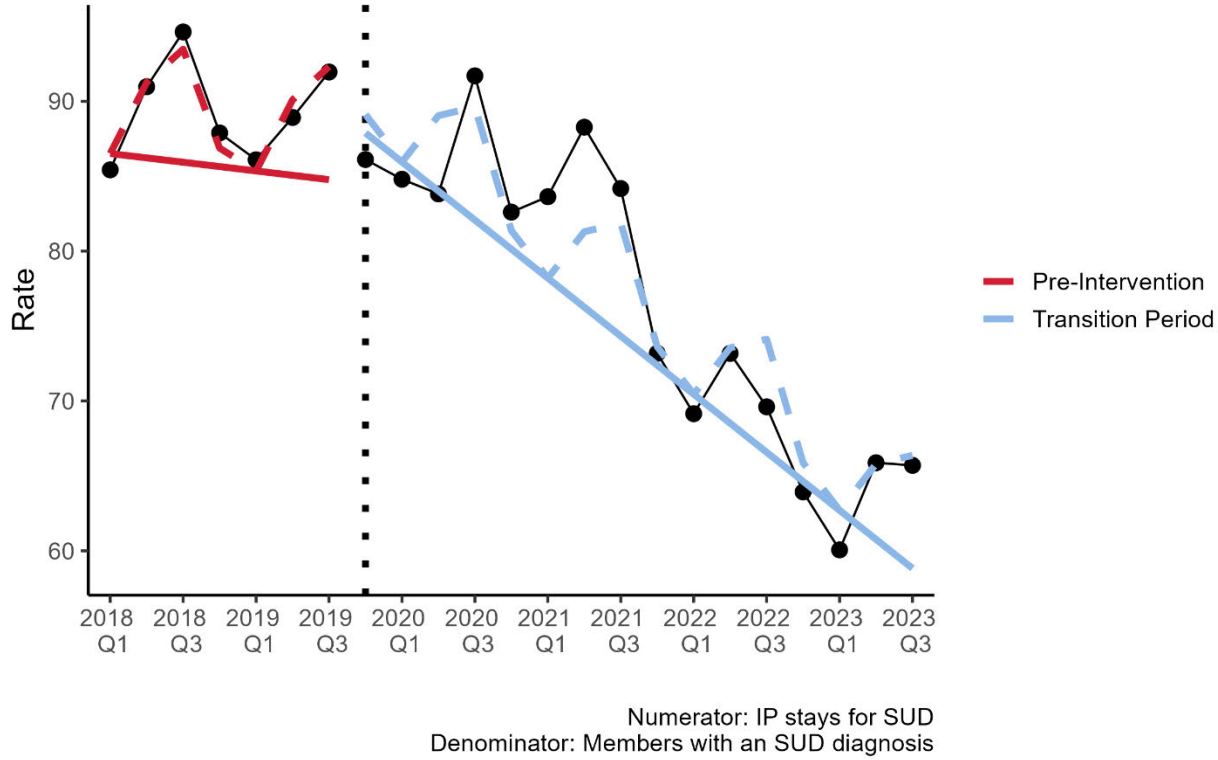


Table 22: H4A2 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	87.96418	1.07940	81.49381	<0.0001
Time	-0.29046	0.14334	-2.02634	0.05872
Intervention	3.40561	1.95155	1.74508	0.09902
Time Since Intervention x Intervention	-1.64682	0.25021	-6.58182	<0.0001
Q2	5.03249	1.04867	4.79894	0.00017
Q3	7.54436	0.98930	7.62592	<0.0001
Q4	1.23467	1.13681	1.08609	0.29260

Measure H4B1: The 30-day IP admission rate for SUD following an RT stay among members with SUD

G.1.1.1.23 Quantitative Results

Measure Summary: H4B1	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing with seasonal effects
Causal effect of transition period	None

- Numerator: The count of 30-day IP admissions: at least one acute admission for SUD within 30 days of the index discharge date
- Denominator: RT discharges among members with an SUD diagnosis
- Notes: Updated measure specs from all-cause admissions to SUD-related admissions

The trend in the proportion of inpatient admissions for SUD within 30 days of an RT discharge among all RT discharges for Medicaid members with an SUD diagnosis appears to have a seasonal pattern, with peaks occurring at the first quarter of each year (Table 52). Considering the seasonality, the trend generally follows a level pattern with a slight decline in the pre-intervention period followed by a further decline during the transition period. Based on the model results in Table 23, the demonstration was not associated with a statistically significant decline in inpatient admission rates following a residential treatment stay during the transition period. Additional data are needed in the post-intervention period to draw meaningful conclusions about the effect of the demonstration on this measure and to parse seasonal effects from those potentially attributable to the demonstration.

Figure 20: Measure H4B1: 30-Day IP Admission Rate for SUD following an RT stay among members with an SUD Diagnosis

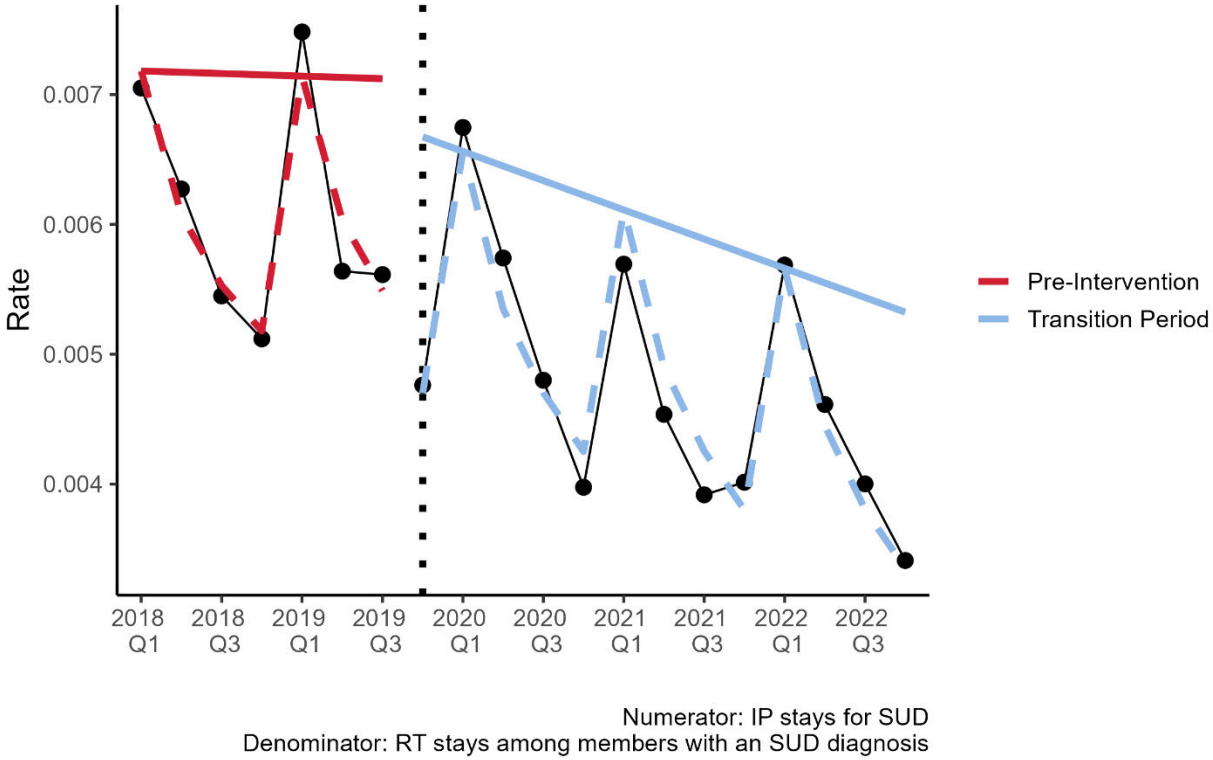


Table 23: H4B1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.00723	0.00011	66.38241	<0.0001
Time	-0.00001	0.00001	-0.75564	0.46334
Intervention	-0.00044	0.00020	-2.21202	0.04548
Time Since Intervention x Intervention	-0.00010	0.00003	-3.39790	0.00476
Q2	-0.00110	0.00015	-7.10831	0.00001
Q3	-0.00163	0.00009	-17.27988	<0.0001
Q4	-0.00197	0.00012	-16.25825	<0.0001

Measure H4B2: The 30-day ED visit rate for SUD following an RT stay among members with SUD

G.1.1.1.24 Quantitative Results

Measure Summary: H4B2	
Waiver goal	Decrease
Overall trend (descriptive)	Increasing other than a sharp drop in early 2020
Causal effect of transition period	None

- Numerator: The count of ED visits within 30-days of the index date: at least one acute visit for SUD within 30 days of the index discharge date
- Denominator: RT discharges among members with an SUD diagnosis
- Notes: Updated measure specification from all-cause admissions to SUD-related admissions

After peaking in early 2019, ED visits for SUD within 30 days of an RT discharge among Medicaid members with an SUD diagnosis began to fall in Q3 2019 and fell to a low in Q4 2019 (Figure 21). This is potentially a pandemic effect due to the construction of this measure, which uses a 1-year rolling measurement period. Rates climbed throughout 2020, stabilized in 2021 to mid-2022, and exhibited another increase in Q3 2022. Based on the model results in Table 24, there was no statistically significant level change or change in the slope during the transition period. Inferences drawn from these findings are limited by the variability in the transition period trend. There is also a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 21: Measure H4B2: 30-Day ED Admission Rate for SUD following an RT stay among members with an SUD Diagnosis

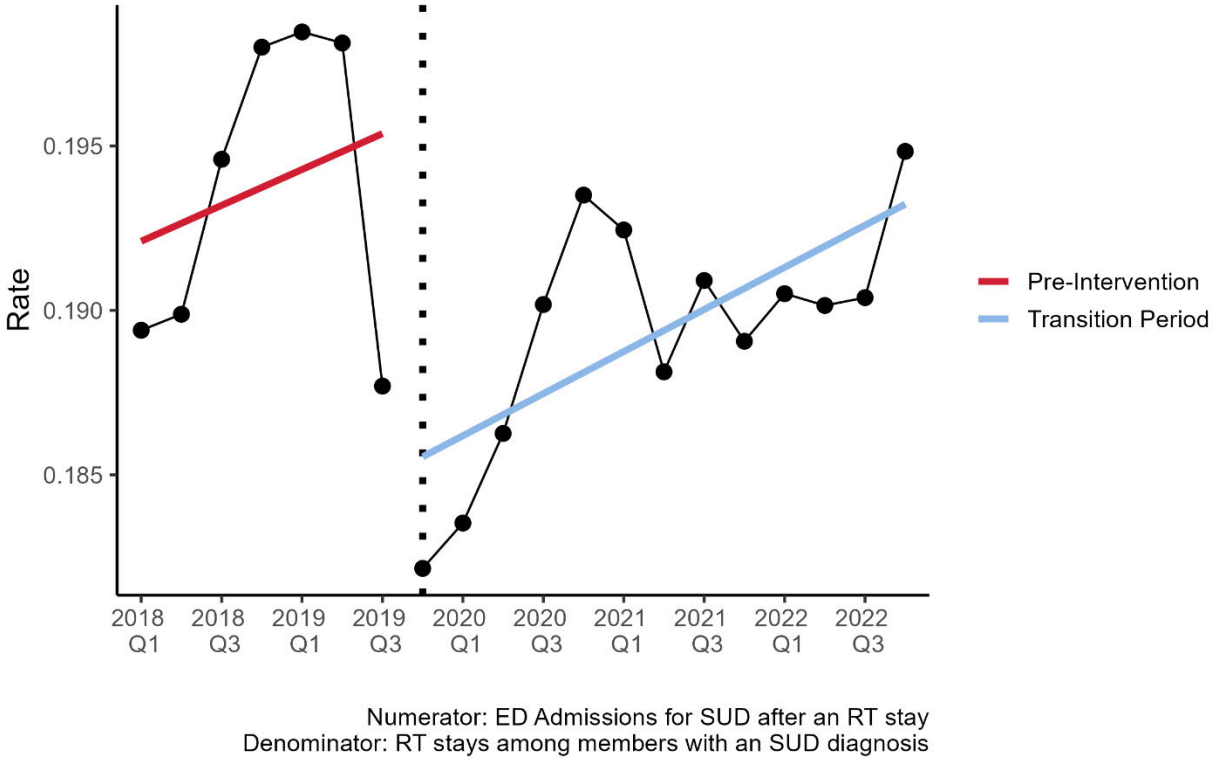


Table 24: H4B2 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.18937	0.00513	36.91147	<0.0001
Time	0.00055	0.00072	0.75748	0.45977
Intervention	-0.01037	0.00339	-3.05683	0.00753
Time Since Intervention x Intervention	0.00009	0.00096	0.09842	0.92282

Measure H4B3: The 30-day ED admission rate for SUD following an ED visit among members with SUD

G.1.1.1.25 Quantitative Results

Measure Summary: H4B3	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: The count of ED visits within 30-days of the index date: at least one acute visit for SUD within 30 days of the index discharge date
- Denominator: ED visits among members with an SUD diagnosis
- Notes: Updated measure specification from all-cause admissions to SUD-related admissions

Figure 22 shows that the trend in the proportion of 30-day ED readmissions among all ED visits for Medicaid members with an SUD diagnosis is relatively flat in 2018 and 2019 before beginning to decline in Q3 2019. This is followed by a steady decrease during the transition period, with a leveling off in Q4 2022. Based on the model results in Table 25, there was a statistically significant change in the slope of the trend in the transition period. More data will indicate whether the leveling off observed at the end of 2022 is a preview of the trend for 2023-2024 or if the consistent decline observed will continue.

Figure 22: Measure H4B3: 30-Day ED Admission Rate for SUD following an ED Admission for SUD among members with an SUD Diagnosis

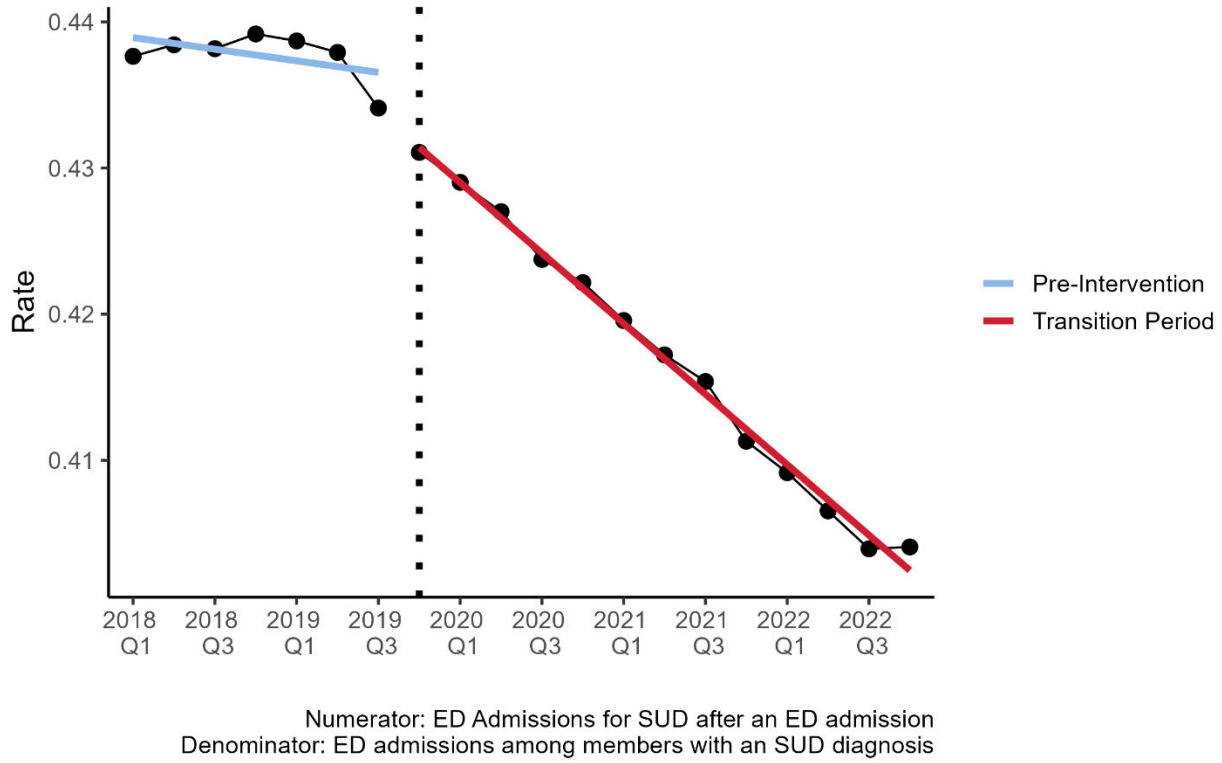


Table 25: H4B3 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.44091	0.00145	303.73327	<0.0001
Time	-0.00040	0.00023	-1.76612	0.09645
Intervention	-0.00473	0.00128	-3.70347	0.00193
Time Since Intervention x Intervention	-0.00201	0.00023	-8.58236	<0.0001

Q5: Does the demonstration improve adherence to SUD treatment?

H5A: The demonstration will increase continuity of pharmaceutical care.

Measure H5A1: Continuity of pharmacotherapy for opioid use disorder

G.1.1.1.26 Quantitative Results

Measure Summary: H5A1	
Waiver goal	Increase
Overall trend (descriptive)	Increasing until Q1 2020, then decreasing
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: The number of participants who have at least 180 days of continuous pharmacotherapy with a medication prescribed for OUD without a gap of more than seven days
- Denominator: The number of members who had an OUD diagnosis and at least one claim for an OUD medication during the measurement period

Measure H5A1 was calculated as the proportion of Medicaid members with an OUD diagnosis who have at least 180 days of continuous pharmacotherapy with a medication prescribed for OUD without a gap of more than seven days. In the pre-intervention period, there is an upward trend, but this is followed by a downward trend in the transition period and a low point in the rate at Q2 2022 (Figure 23). The timing of the decline, beginning around Q1 2020, indicates that the COVID-19 pandemic may have influenced continuity of pharmacotherapy for OUD. There appears to be a bit of a recovery in the latter half of 2022 with the trend starting to increase again. Based on model results in Table 26, there was a statistically significant change in the slope of the trend in the transition period.

Figure 23: Measure H5A1: Continuity of pharmacotherapy for OUD

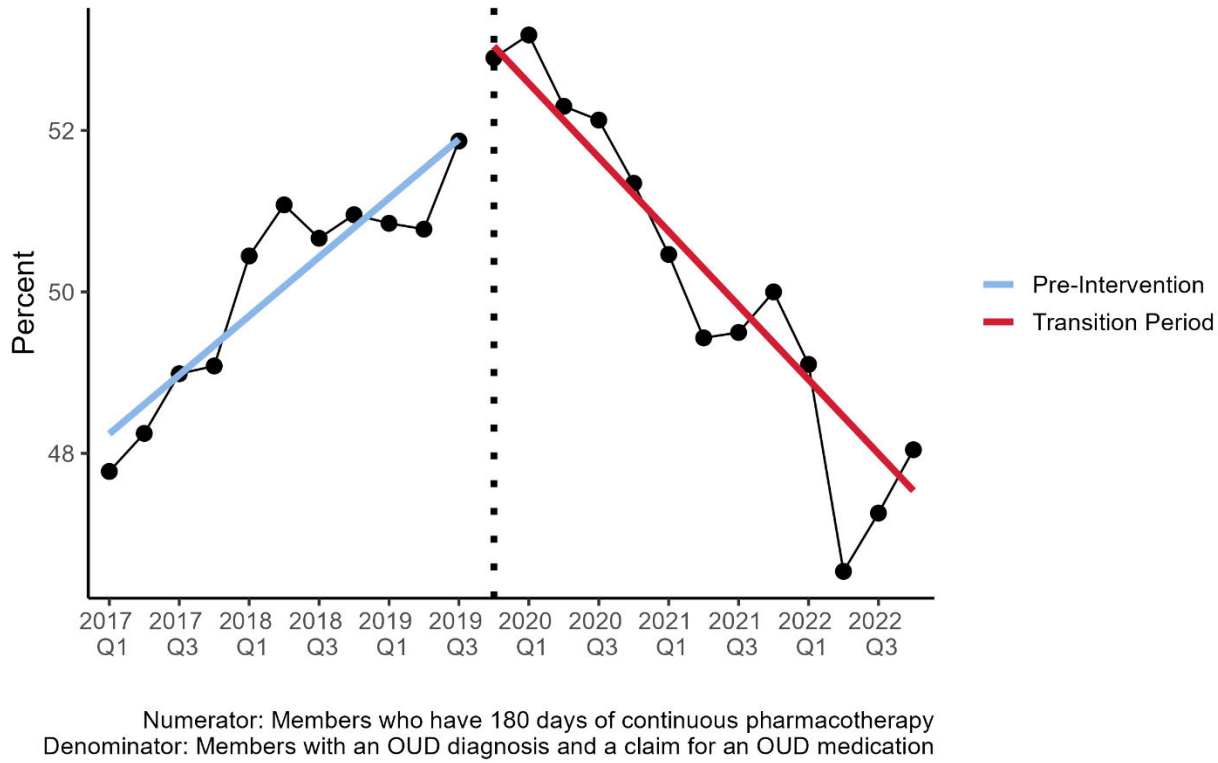


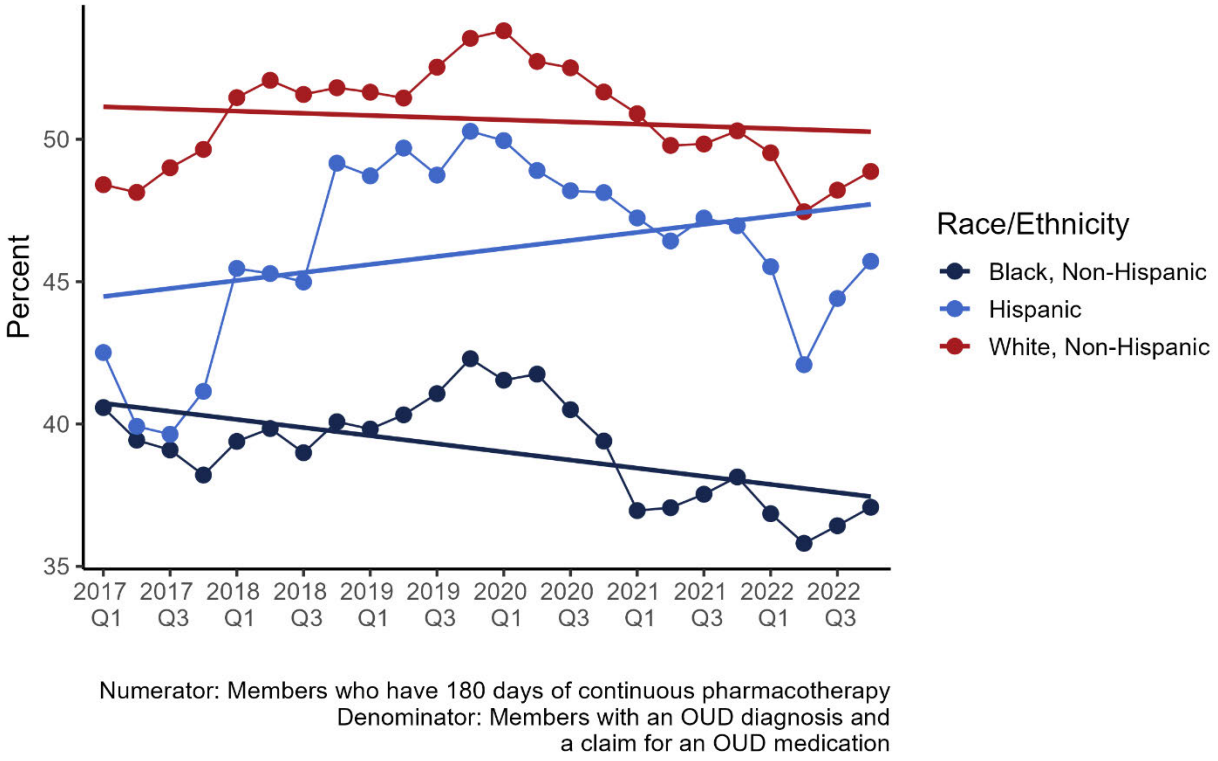
Table 26: H5A1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	47.87621	0.25957	184.44167	<0.0001
Time	0.36504	0.03965	9.20646	<0.0001
Intervention	0.78627	0.58242	1.35000	0.19139
Time Since Intervention x Intervention	-0.82391	0.09837	-8.37542	<0.0001

When examining trends in continuity of pharmacotherapy for OUD by race/ethnicity, there are clear differences by group. Since 2017 the percent of Hispanic Medicaid members with an OUD diagnosis and a claim for an OUD medication who had at least 180 days of continuous pharmacotherapy increased on average, albeit with some variation. In contrast, there has been a slight downward trend for non-Hispanic white Medicaid members, and a steeper decrease for non-Hispanic black Medicaid members. The absolute disparity in

continuity of pharmacotherapy over time is also noteworthy, with non-Hispanic black Medicaid members having rates about 10 percentage points lower than their non-Hispanic white Medicaid members over the six-year period studied.

Figure 24: Measure H5A1: Continuity of pharmacotherapy for OUD Stratified by Race



G.1.1.1.27 Qualitative Results

As discussed above (especially in Measure H1A2: Qualitative Results), stakeholders described many barriers to receiving MOUD, and one managed care plan specifically described a barrier to continuous pharmacotherapy: many inpatient settings were not aware that their referrals to residential treatment facilities were not allowing continuation of medications, resulting in forced tapering in some treatment facilities. This finding provides some insight into the continued use of MOUD as members continue their treatment trajectory by transitioning through levels of care. In future qualitative efforts, additional questions will be asked related to the barriers and facilitators to not only receiving Medicaid for SUD but maintaining access to it as well.

Q6: Do members receiving SUD services experience an improved quality of care?

H6A: The demonstration will increase the percentage of members with SUD who receive screening and care for co-morbid conditions.

H6B: The demonstration will increase early engagement in SUD treatment.

Measure H6A1: Access to preventive/ambulatory health services for adult Medicaid members with SUD

G.1.1.1.28 Quantitative Results

Measure Summary: H6A1	
Waiver goal	Increase
Overall trend (descriptive)	Generally increasing until late 2021, decreasing after
Causal effect of transition period	None

- Numerator: The number of members with SUD who had an ambulatory or preventive care visit during a 12-month period
- Denominator: The number of members with SUD during the measurement period
- Notes: Updated measure specification to change 12-month lookback period to a 12-month look-forward period to more closely align with associated monitoring metric (#32)

Measure H6A1 is calculated as the proportion of Medicaid members with an SUD diagnosis who had an ambulatory or preventive care visit during a 12-month period. Figure 25 shows that this proportion is increasing on average in the pre-

intervention period, though there was a dip during time periods associated with the COVID-19 pandemic (Q2-Q4 2019).[28] There is a subsequent recovery and the upward trend continued until late 2021, at which point the rate began to steadily decline. Based on the model results (Table 27), there was no statistically significant level change or change in the slope of the trend in the transition period. The more recent trend in 2022 is not in the desired direction. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

[28] Due to measurement construction (12-month look forward period), Q2-Q4 2019 include data through early to mid-2020, which is why these quarters may be picking up some effects of the impact of the pandemic.

Figure 25: Measure H6A1 Access to preventive/ambulatory health service among members with an SUD Diagnosis

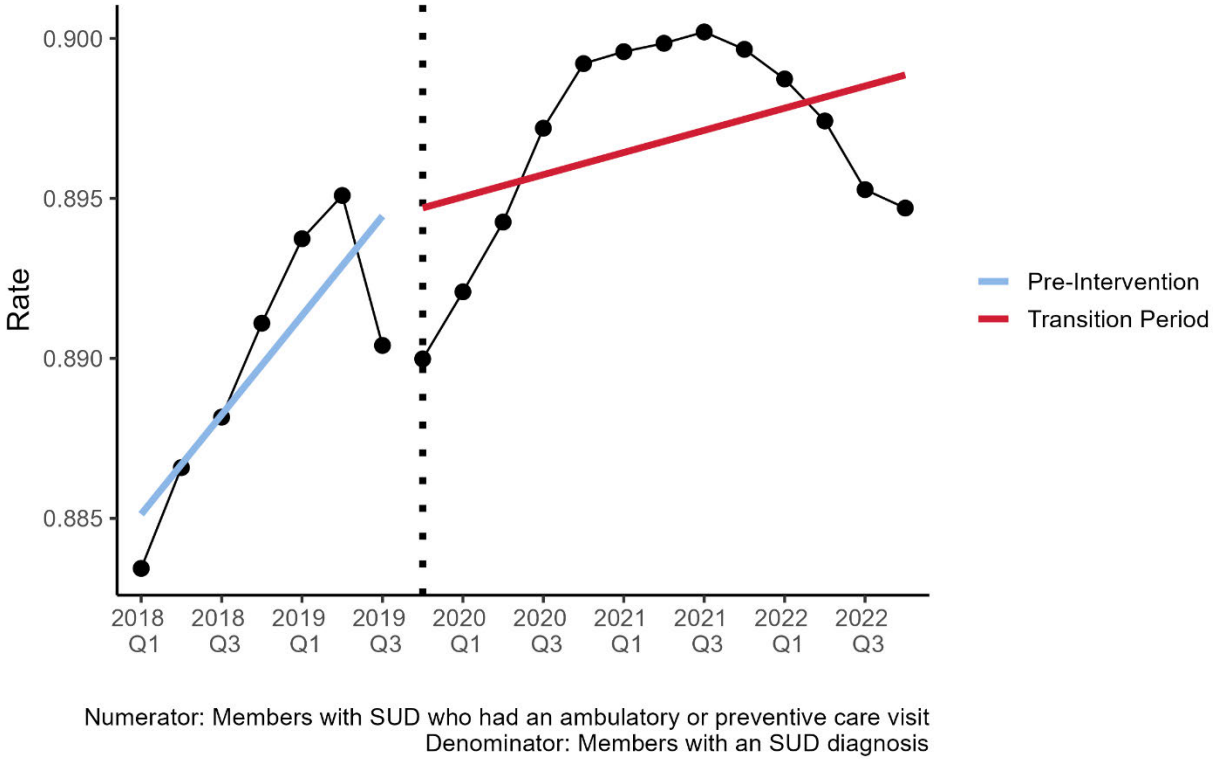


Table 27: H6A1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.87736	0.00200	439.71724	<0.0001
Time	0.00155	0.00031	4.94201	0.00015
Intervention	-0.00130	0.00446	-0.29118	0.77465
Time Since Intervention x Intervention	-0.00121	0.00117	-1.03294	0.31700

Measure H6A2: Screening for HIV/HCV/HBC

G.1.1.1.29 Quantitative Results

Measure Summary: H6A2	
Waiver goal	Increase
Overall trend (descriptive)	Increasing with some variation
Causal effect of transition period	None

- Numerator: The number of members with SUD who were screened for HIV/HCV/HBC during a 12-month period
- Denominator: The number of members with SUD during the measurement period
- Notes: Updated measure specification to change 12-month lookback period to a 12-month look-forward period to more closely align with associated MODRN metric

Measure H6A2 is calculated as the proportion of Medicaid members with an SUD diagnosis who were screened for HIV, HCV, or HBV during a 12-month period. Like measure H6A1, Figure 26 shows a steep drop in Q3 2019, likely related to the COVID-19 pandemic (the Q3 2019 statistic includes data from July 2019 until Jun 2020). Though the trend is a little unclear, in general the proportion increases over time in the pre-intervention period. In the transition period, a sharp recovery in the trend is observed through the end of 2020, and then the proportion is relatively flat or even slightly on the decline through the end of 2022. Based on the model results (Table 28), there was no statistically significant level change or change in the slope of the trend at the beginning of the transition period. The overall trend in this measure is a little difficult to discern due to the variability in the data prior to 2021. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 26: Measure H6A2 Screening for HIV/HBV/HCV

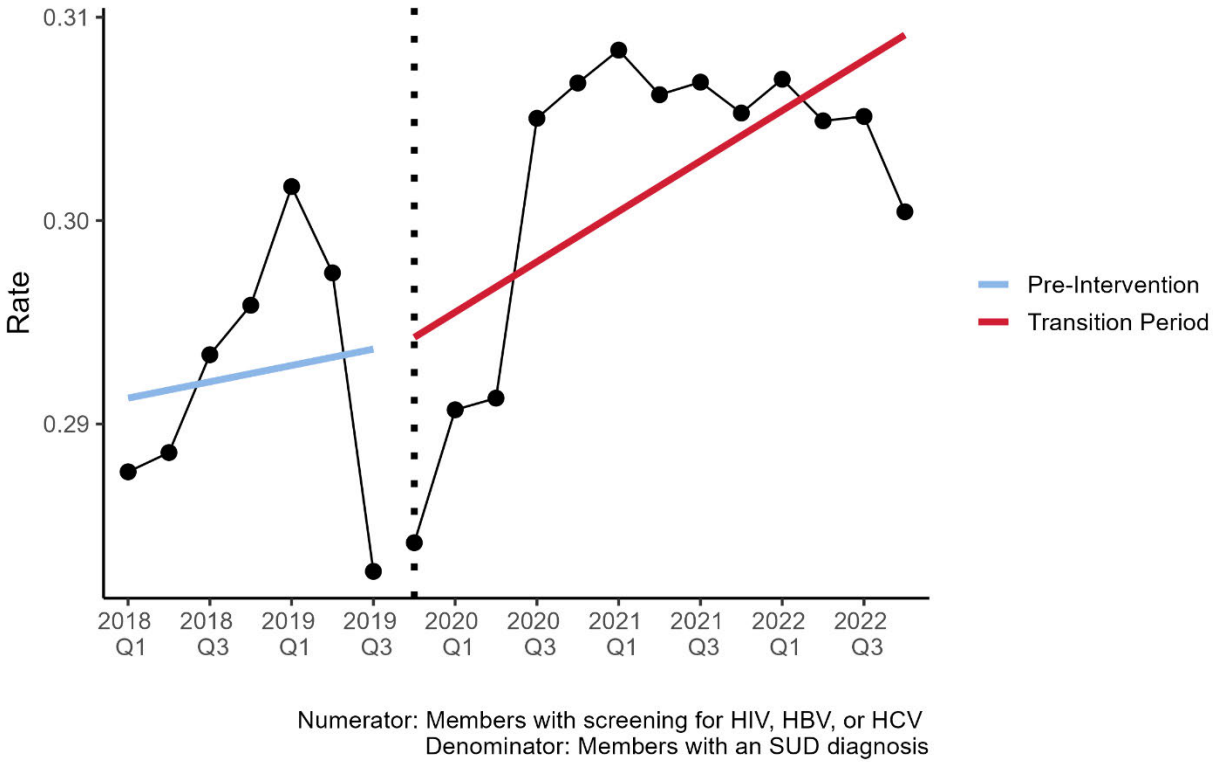


Table 28: H6A2 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.28926	0.00592	48.88383	<0.0001
Time	0.00040	0.00094	0.42785	0.67447
Intervention	0.00017	0.00601	0.02895	0.97726
Time Since Intervention x Intervention	0.00084	0.00172	0.48756	0.63247

Measure H6B1: Initiation and engagement of alcohol and other drug abuse or dependence treatment

G.1.1.1.30 Quantitative Results

Measure Summary: H6B1	
Waiver goal	Increase
Overall trend (descriptive)	Decreasing since early 2020, with some variation
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: The number of members who initiated treatment and who had two or more additional SUD services or MAT within 34 days of the initiation visit
- Denominator: The number of members with a new episode of SUD abuse or dependence

Measure H6B1 is related to measure H2A1 and considers the proportion of Medicaid members with a new episode of SUD abuse or dependence who not only initiate treatment within 14 days but also engage in treatment as measured by additional treatment visits within the 34 days following initiation of care. Figure 27 shows that the rate of early engagement was, with some variation, on an upward trend during the pre-intervention period. Following a peak in the rate in Q1 2020, there has been a steady decline which coincided with the onset of the COVID-19 pandemic. Rates temporarily improved in 2021 before beginning to fall again after Q2 2022. There was a very small but statistically significant decrease in the trend associated with the waiver during the transition period. Overall, the trend for this metric is not moving in the desired direction. Inferences drawn from these findings are limited by the variability in both the pre-intervention and the transition period trends. There is a non-linear pre-intervention trend, which makes the determination of a counterfactual trend more uncertain, so we caution the interpretation of the model findings.

Figure 27: Measure H6B1: Initiation and engagement of alcohol and other drug abuse or dependence treatment

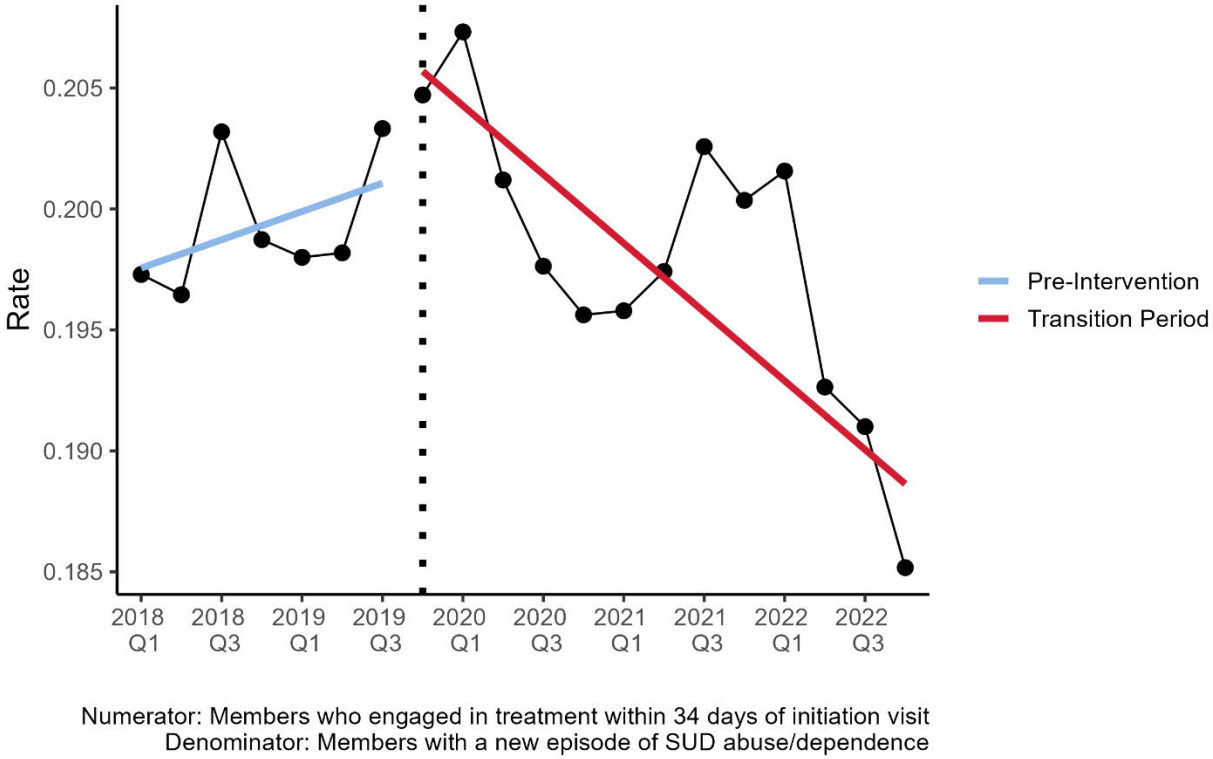


Table 29: H6B1 Interim ITS Model Results

	Estimate	SE	t	p-value
Intercept	0.19697	0.00084	235.77858	<0.0001
Time	0.00058	0.00022	2.60785	0.01903
Intervention	0.00404	0.00220	1.83369	0.08537
Time Since Intervention x Intervention	-0.00201	0.00040	-4.95634	0.00014

G.1.1.1.31 Qualitative Results (H6A1, H6A2, H6B1)

As discussed above, especially in Measure H2A1: Qualitative Results), individual-level factors (as well as other structural factors) played a role in whether individuals

initiated and continued to engage in SUD treatment overall. These factors included personal and family hardships, peer support services, influence from court or child protective services (CPS), case management, and telehealth availability as well as chronic behavioral health workforce shortages, other features of the market in different areas of the state, and processing delays due to the lag between visits as well as documentation and notification. Other factors uniquely influenced whether individuals were able to initiate and continue medication for SUD (see Measure H1A2: Qualitative Results), including a lack of transportation, trying to maintain employment while receiving treatment, cultural and philosophical objections to medications, being a mother or a pregnant women, and living in rural areas as well as other areas of the state where an abstinence-only treatment philosophy was prominent, such as Northeast Ohio.

Also discussed above (Additional Qualitative Insights Related to Coordination and Management of Care), there was some miscommunication and misunderstanding of rules and regulations surrounding coordination of care that impeded effective care coordination across the care continuum. Stakeholders also discussed barriers to coordination of care for co-occurring conditions or other physical health needs. For example, a Medicaid member might be able to find a residential treatment center, but there might not also be services for the treatment of mental health nearby. Telehealth has been one way in which some providers have attempted to fill in the gap. In future qualitative efforts, additional questions will be asked related to access to care for co-occurring and/or other physical health care needs, including the degree to which clinicians recommend and refer members to other preventive health screening services.

Q7: Does the demonstration reduce rates of opioid-related overdose deaths?

H7A: The demonstration will decrease the rate of overdose deaths, including those due to opioids.

Measure H7A1: Rate of overdose deaths

G.1.1.1.32 Quantitative Results

Measure Summary: H7A1 Rate of overdose deaths	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing
Causal effect of transition period	NA

- Numerator: The number of overdose deaths
- Denominator: The number of members/1000

Measure H7A2: Rate of overdose deaths due to opioids

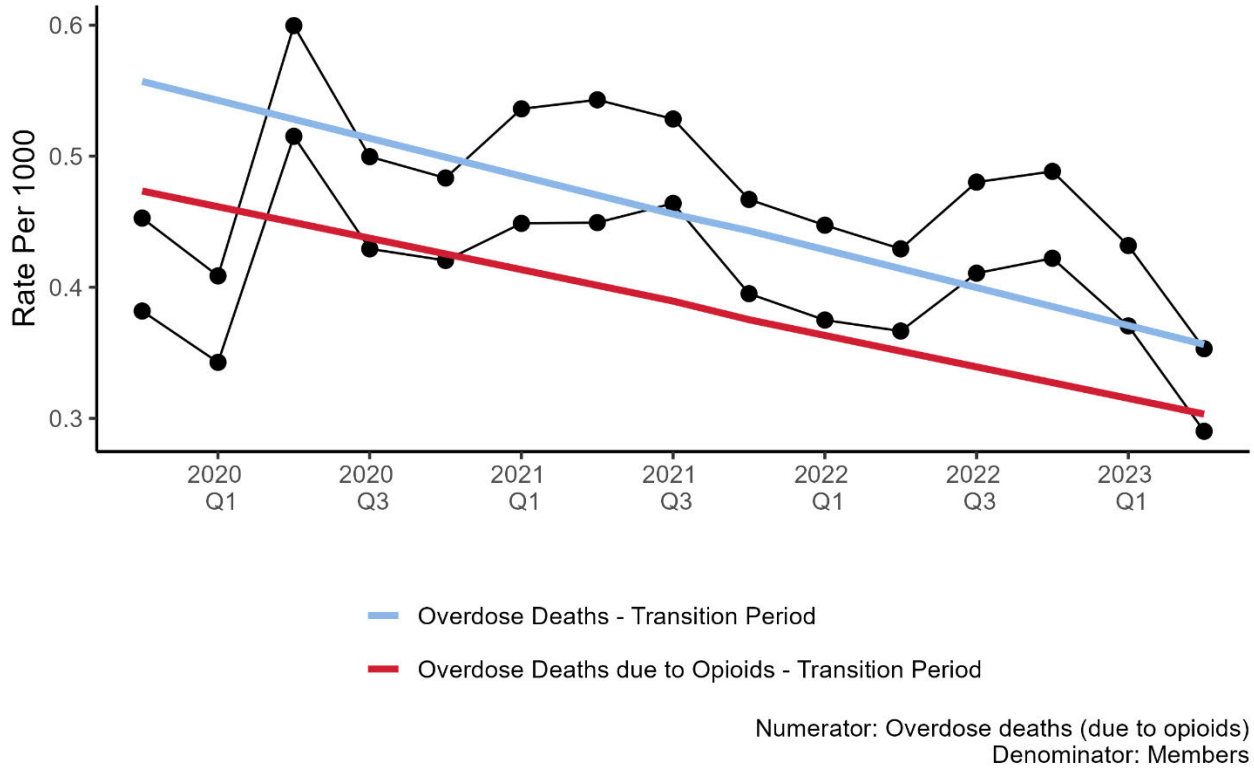
G.1.1.1.33 Quantitative Results

Measure Summary: H7A2 Rate of overdose deaths due to opioids	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing
Causal effect of transition period	NA

- Numerator: The number of overdose deaths due to opioids
- Denominator: The number of members/1000

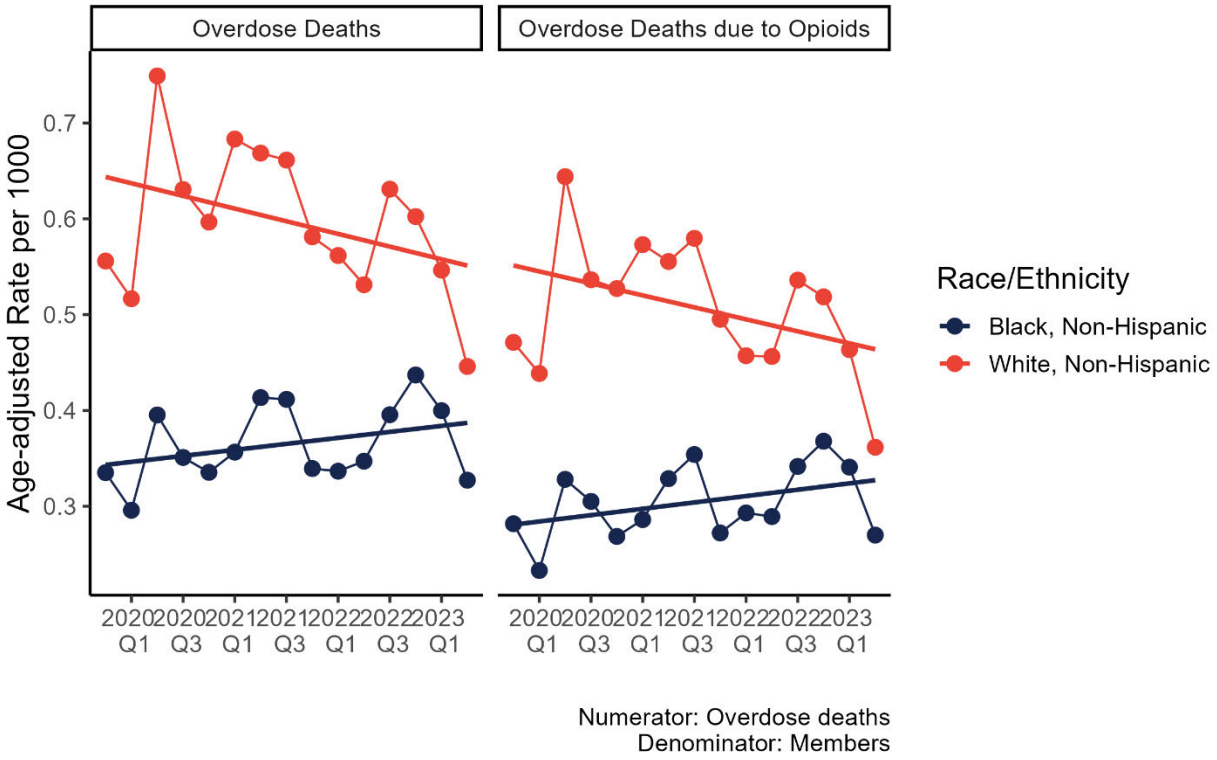
Figure 28 shows that after a peak in Q2 2020, the trend in the rates of overdose deaths and overdose deaths due to opioids per 1000 Medicaid members both appear to be steadily declining in the transition period. This trend is characterized by a few notable drops in rates, occurring in Q3 2020, after Q3 2021, and after Q4 2022. Note that mortality data on overdose deaths in 2023 are still considered provisional, though it is not expected to change meaningfully. Due to data quality limitations, reliable linked death certificates are not currently available prior to Q4 2019 as noted in Section E.6.1.4. Therefore, the only data currently available is for the transition period. This truncation of data prevents an ITS analysis comparing pre-intervention and transition period trends. Evaluators are in conversation with Ohio Medicaid to determine whether updated data will be available for quarters prior to Q4 2019 that could be included in the summative report.

Figure 28: Measures H7A1 and H7A2: Rate of overdose deaths



Additionally, age-adjusted rates were calculated for the overdose death rates by race and ethnicity (Figure 29), using the 2000 US standard population as the reference age distribution. Age adjustment to this population is commonly used for mortality data, and thus facilitates comparison to mortality rates for other populations. The stratified rates indicate that overdose death rates (overall and all-opioid) among Black non-Hispanic members are rising compared to their white non-Hispanic counterparts, indicating that the declining overall trend shown in Figure 29 is not the universal experience of all members. Results for Hispanic members were suppressed due to small sample sizes.

Figure 29: Measure H7A: Overdose Deaths Stratified by Race, Age-Adjusted



G.1.1.1.34 Qualitative Results (H7A1 and H7A2)

As discussed above in Qualitative Results (H3D1 and H3D2), the Ohio Automated Rx Reporting System (OARRS) makes advanced data analytics possible, enabling the ability to track prescribing practices statewide and allowing insight into prescribing practices of individual clinicians. OARRS may be used to track overdose, such as overdose anomaly reports, as well as identify communities in which targeted outreach would be beneficial. In future qualitative efforts, more specific questions will be asked related to the utilization of OARRS for tracking previous overdose incidence as well as the role OARRS plays in facilitating communication and coordination between clinicians toward the prevention of future overdose.

Q8: How do costs related to the demonstration waiver change throughout the pre- and post-demonstration periods?

Measures H8A1 – H8A10 consider the costs per member month in the subpopulation of members who had a claim with a primary or secondary diagnosis of SUD in the measurement quarter. Members without an SUD claim in the 11 months following their last SUD claim are dropped from the denominator. Costs include fee-for-service and encounter claims. Total costs include inpatient, outpatient, professional medical, pharmacy, dental, and long-term care costs.

Across all measures, "missing" race and Hispanic race were collapsed in the models adjusting for age, sex, and race due to very small sample sizes which prevented models from running to completion. Observed trends in plots do not always visually match the coefficient estimates represented in the zero-inflated model tables because the former do not adjust for the three demographic covariates of interest.

H8A: The demonstration will decrease or have no effect on total costs. The demonstration will increase SUD-IMD, SUD-other, and Non-SUD costs, but decrease IP, non-ED outpatient, ED outpatient, pharmacy and long-term care costs

---

Measure H8A1: Total costs

G.1.1.1.35 Quantitative Results

Measure Summary: H8A1 Total Costs	
Waiver goal	Decrease
Overall trend (descriptive)	Increasing in 2018 & 2019, then high variability in 2020-2021; steeper increase beginning at end of 2022
Causal effect of transition period	Statistically significant increase in trend

- Numerator: The total costs from fee-for-service and encounter claims, including inpatient, outpatient, professional medical, pharmacy, dental, and long-term care for the population of members with an SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A1 reports the total costs of care (inpatient, outpatient, professional medical, pharmacy, dental, and long-term care) for the subpopulation of Medicaid members with an SUD diagnosis. Figure 30 shows that the trend in the total costs per member month, unadjusted for age, sex, or race, was on average increasing during the evaluation period. The trend increased in 2018 and 2019, followed by a period of variability in 2020-2021, and then average total costs began to climb more steeply beginning in Q4 2022. The model results in Table 30 indicate that after adjusting for age, sex, and race, there is a statistically significant increase in the trend associated with the transition period of the waiver.

Figure 30: Measure H8A1 Average Total Cost per Member Month (unadjusted means)

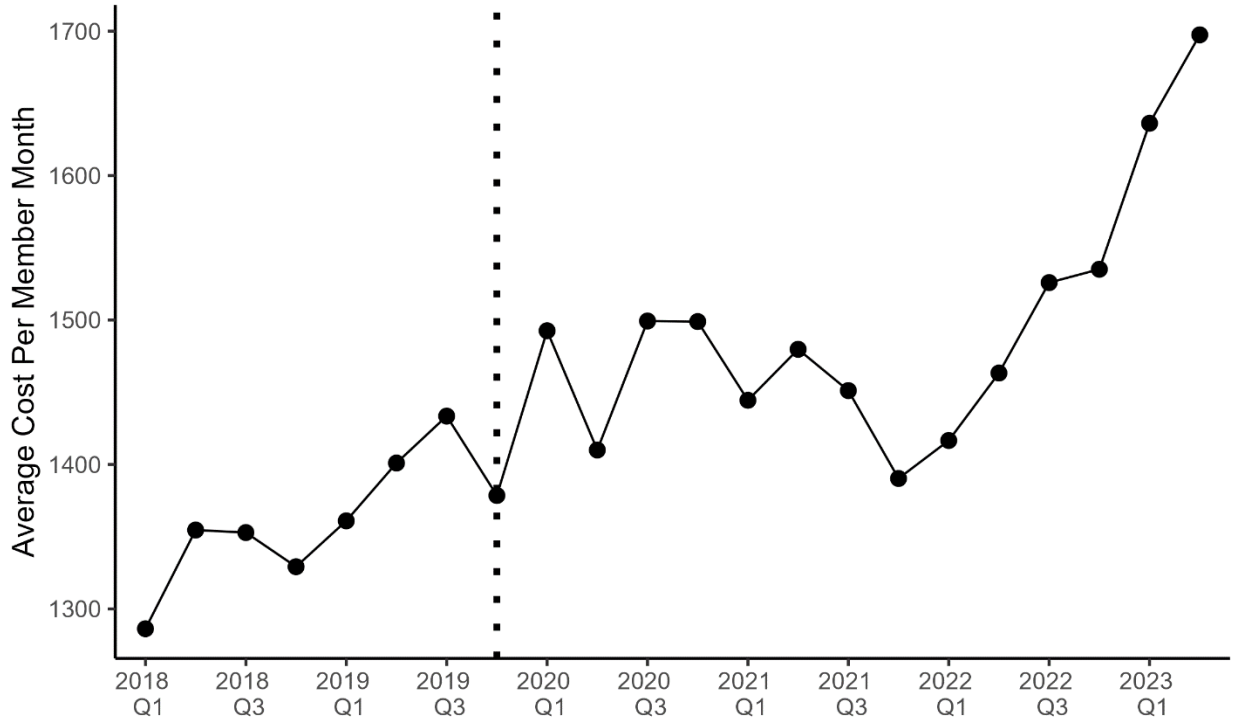


Table 30: H8A1 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	-0.00446	0.99555	0.00161	-2.76	0.00572
Cond	Intervention	0.03384	1.03441	0.00812	4.17	0.00003
Cond	Time Since Intervention x Intervention	0.00700	1.00703	0.00171	4.10	0.00004
ZI	Time	0.01610	1.01630	0.00360	4.49	<0.0001
ZI	Intervention	-0.02240	0.97790	0.01810	-1.24	0.21600
ZI	Time Since Intervention x Intervention	0.01680	1.01690	0.00380	4.43	<0.0001

Measure H8A2: Total federal costs

G.1.1.1.36 Quantitative Results

Measure Summary: H8A2 Total Federal Costs	
Waiver goal	Decrease
Overall trend (descriptive)	Increasing in 2018 & 2019, then variable in 2020-2021 but trending upward; steeper increase beginning at start of 2023
Causal effect of transition period	None

- Numerator: Total Medicaid costs * Federal Medicaid percentage, for the population of members with an SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A2 considers the total federal costs for the subpopulation of members with an SUD diagnosis. Figure 31 shows that the trend in federal costs per member month, unadjusted for age, sex, or race, was quite similar to the trend for total overall costs – generally it trended upward during the pre-intervention period,

followed by a slight dip at the start of the transition period. Average federal costs fluctuated in 2020 and 2021 but generally rose through 2022 before exhibiting a steeper increase in Q1 2023. The model results in Table 31indicate that after adjusting for age, sex, and race, there was no statistically significant change in the slope of the trend in the transition period, although there was statistically significant level change.

Figure 31: Measure H8A2 Average Total Federal Cost per Member Month (unadjusted means)

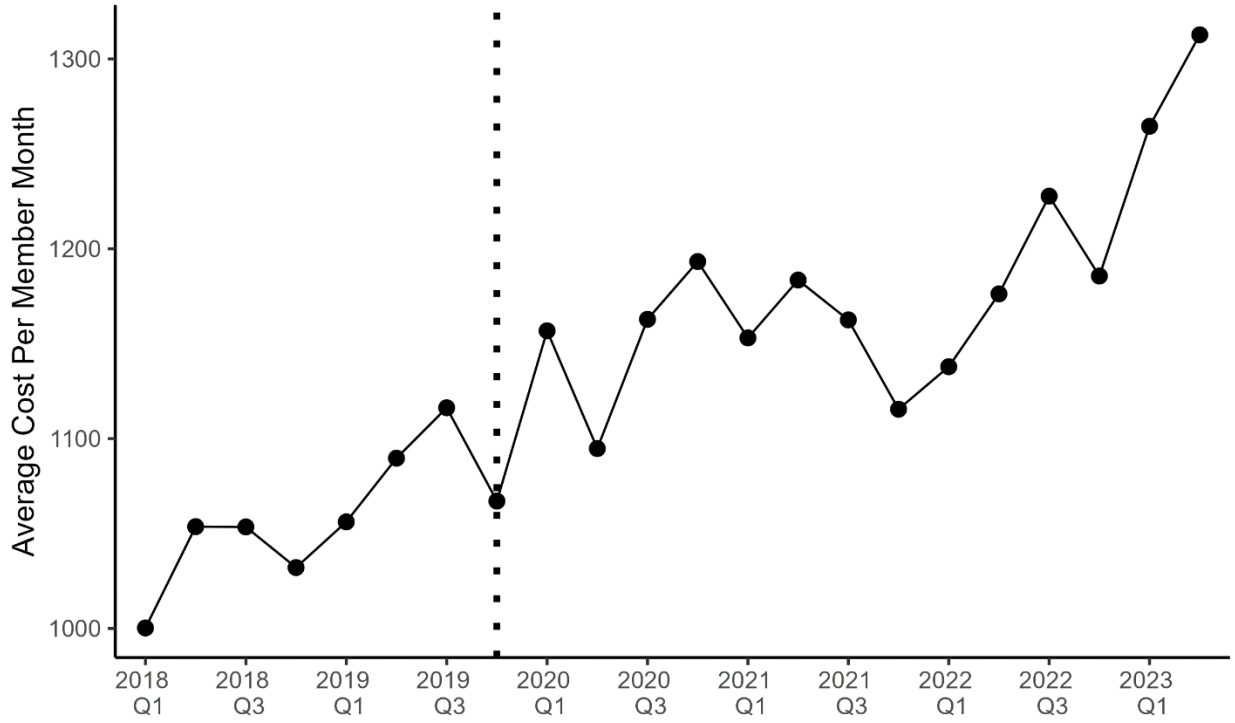


Table 31: H8A2 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	-0.00164	0.99836	0.00162	-1.02	0.30910
Cond	Intervention	0.04441	1.04541	0.00815	5.45	<0.0001

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time Since Intervention x Intervention	0.00228	1.00228	0.00171	1.33	0.18309
ZI	Time	0.02470	1.02500	0.00360	6.78	<0.0001
ZI	Intervention	-0.02010	0.98010	0.01830	-1.10	0.27140
ZI	Time Since Intervention x Intervention	0.00340	1.00350	0.00390	0.89	0.37150

Measure H8A3: SUD-IMD costs

G.1.1.1.37 Quantitative Results

Measure Summary: H8A3 SUD-IMD Costs	
Waiver goal	Increase
Overall trend (descriptive)	Increasing in 2018 & 2019; after drop in early 2020, relatively flat trend
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: IMD costs for the population of members with an SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A3 considers the IMD costs for the subpopulation of members with an SUD diagnosis. Figure 32 shows that the trend in the IMD-related costs per member month, unadjusted for age, sex, or race, climbed during the pre-intervention period before falling in Q1 and Q2 2020 (coinciding with the onset of the pandemic). IMD costs partially rebounded in Q3 2020 but were relatively flat throughout the transition period. The model results in Table 32 indicate that after adjusting for age, sex, and race, there is a statistically significant decrease in the trend associated with the transition period of the waiver. Expectations prior to the waiver implementation were that the demonstration period would increase SUD-IMD costs.

Figure 32: Measure H8A3 Average Total SUD-IMD Cost per Member Month (unadjusted means)

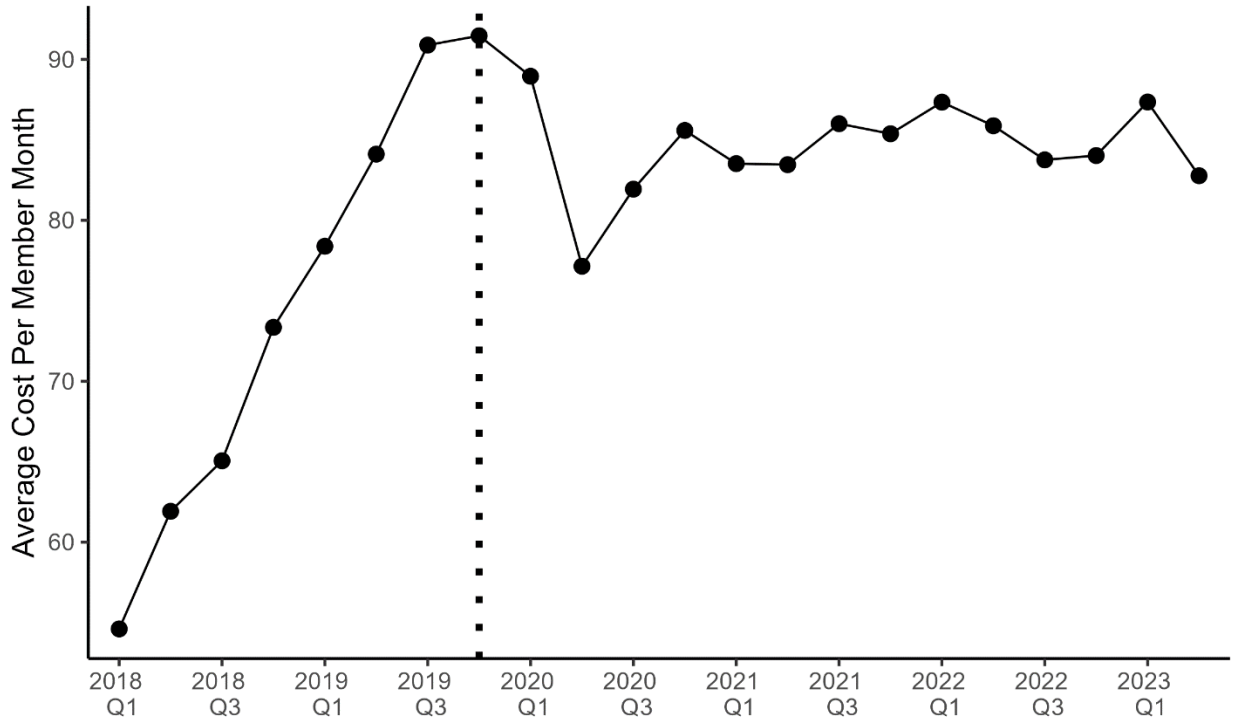


Table 32: H8A3 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	0.03332	1.03388	0.00522	6.39	<0.0001
Cond	Intervention	-0.01211	0.98796	0.02507	-0.48	0.62911
Cond	Time Since Intervention x Intervention	-0.04346	0.95747	0.00553	-7.86	<0.0001
ZI	Time	-0.05810	0.94360	0.00510	-11.48	<0.0001
ZI	Intervention	0.07300	1.07570	0.02480	2.95	0.00320
ZI	Time Since Intervention x Intervention	0.10170	1.10700	0.00530	19.11	<0.0001

Measure H8A4: SUD-other costs

G.1.1.1.38 Quantitative Results

Measure Summary: H8A4 SUD-Other Costs	
Waiver goal	Increase
Overall trend (descriptive)	Increasing until Q3 2022 (sharp decline)
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: Costs with SUD diagnosis and/or SUD-related code (procedure, revenue, POS, provider type) for the population of members with an SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A4 considers the SUD costs for the subpopulation of members with an SUD diagnosis. Figure 33 shows that the trend in the SUD-related costs per member month, unadjusted for age, sex, or race, was increasing during the pre-intervention period. This upward trend flattened slightly in the transition period in 2020 and 2021 before falling in Q3 2022. Recent quarters show fluctuation in these costs. The model results in Table 33 indicate that after adjusting for age, sex, and race, there is a statistically significant decrease in the trend associated with the transition period of the waiver. Expectations prior to the waiver implementation were that the demonstration period would increase SUD-related costs.

Figure 33: Measure H8A4 Average Total SUD Cost per Member Month (unadjusted means)

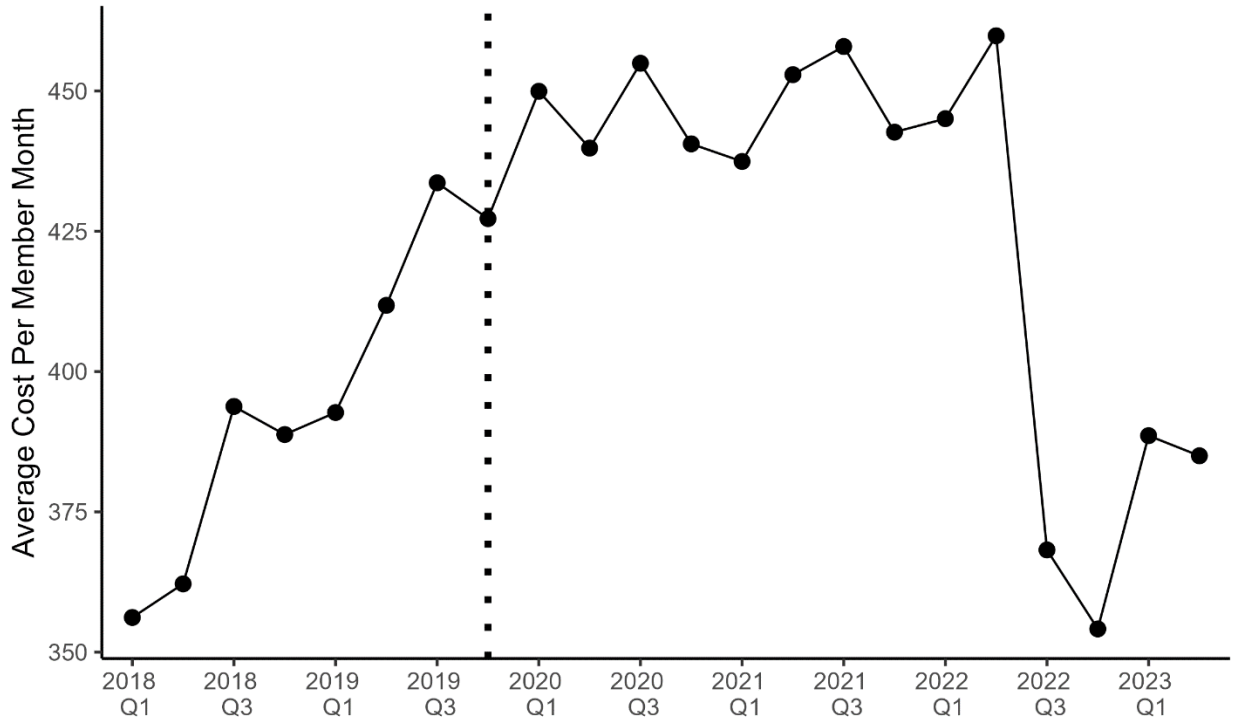


Table 33: H8A4 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	0.00536	1.00538	0.00212	2.53	0.01142
Cond	Intervention	0.07365	1.07643	0.01059	6.96	<0.0001
Cond	Time Since Intervention x Intervention	-0.01875	0.98143	0.00223	-8.41	<0.0001
ZI	Time	0.00720	1.00720	0.00260	2.73	0.00630
ZI	Intervention	-0.05820	0.94350	0.01320	-4.41	<0.0001
ZI	Time Since Intervention x Intervention	0.01910	1.01920	0.00280	6.88	<0.0001

Measure H8A5: Non-SUD costs

G.1.1.1.39 Quantitative Results

Measure Summary: H8A5 Non-SUD Costs	
Waiver goal	Increase
Overall trend (descriptive)	Generally flat on average until an increase in Q3 2022
Causal effect of transition period	Statistically significant increase in trend

- Numerator: Costs without SUD diagnosis and without SUD-related code (procedure, revenue, POS, provider type) for the population of members with an SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A5 considers the non-SUD costs for the subpopulation of members with an SUD diagnosis. Figure 34 shows that the trend in the non-SUD costs per member month, unadjusted for age, sex, or race, was variable during the pre-intervention and transition periods, although on average relatively flat. There was a notable increase in Q3 2022, followed by a continuing upward trend. The model results in Table 34 indicate that after adjusting for age, sex, and race, there is a statistically significant increase in the trend associated with the transition period of the waiver. Expectations prior to the waiver implementation were that the demonstration period would increase non-SUD costs.

Figure 34: Measure H8A5 Average Total Non-SUD Cost per Member Month (unadjusted means)

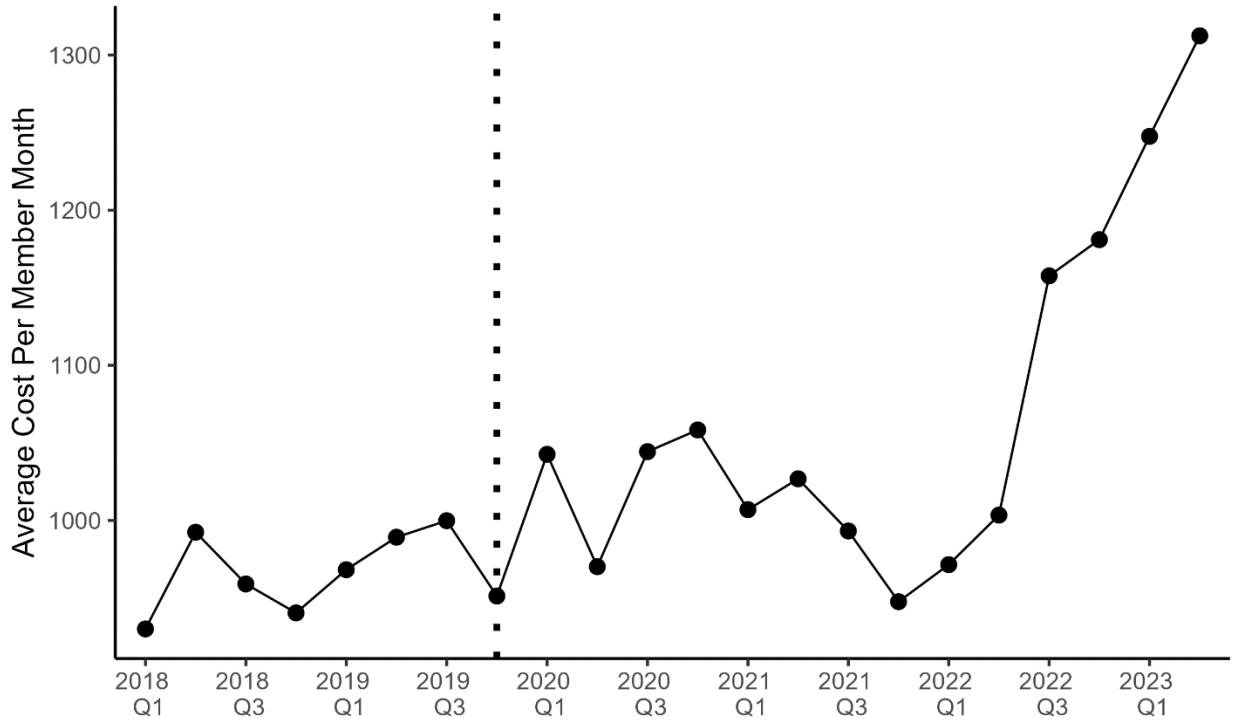


Table 34: H8A5 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	-0.00380	0.99620	0.00335	-1.14	0.25549
Cond	Intervention	-0.06673	0.93545	0.01687	-3.96	0.00008
Cond	Time Since Intervention x Intervention	0.02019	1.02039	0.00353	5.72	<0.0001
ZI	Time	0.00890	1.00900	0.00400	2.22	0.02610
ZI	Intervention	0.01380	1.01390	0.02010	0.69	0.49280
ZI	Time Since Intervention x Intervention	0.02140	1.02160	0.00420	5.06	<0.0001

Measure H8A6: Outpatient costs – non-ED

G.1.1.1.40 Quantitative Results

Measure Summary: H8A6 Outpatient costs – non-ED	
Waiver goal	Decrease
Overall trend (descriptive)	Increasing, but at a slower rate in 2020-2022 than in 2018-2019
Causal effect of transition period	Statistically significant decrease in trend

- Numerator: Costs associated with outpatient and professional medical and dental, non-ED claims for the population of members with a SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A6 considers the non-ED outpatient costs for the subpopulation of members with an SUD diagnosis. Figure 35 shows that the trend in the non-ED related outpatient costs per member month, unadjusted for age, sex, or race, was generally increasing throughout the demonstration period. However, the rate of increase of the unadjusted trend slowed down in the transition period as compared to the pre-intervention period. There was a spike more recently, between Q4 2022 and Q1 2023. The model results in Table 35 indicate that after adjusting for age, sex, and race, there is a statistically significant decrease in the trend associated with the transition period of the waiver.

Figure 35: Measure H8A6 Average Total Outpatient non-ED Cost per Member Month (unadjusted means)

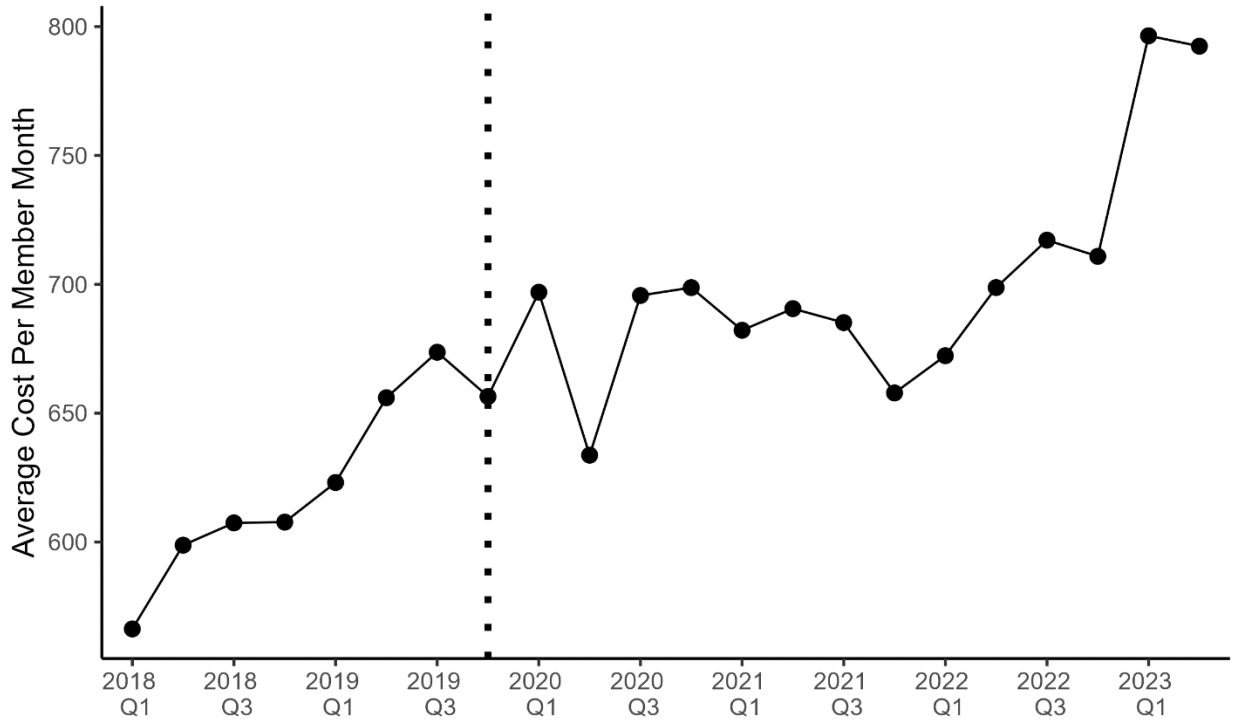


Table 35: H8A6 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	0.01000	1.01005	0.00147	6.79	<0.0001
Cond	Intervention	-0.02314	0.97713	0.00740	-3.13	0.00176
Cond	Time Since Intervention x Intervention	-0.00754	0.99249	0.00155	-4.85	<0.0001
ZI	Time	0.01010	1.01010	0.00320	3.19	0.00140
ZI	Intervention	-0.04660	0.95440	0.01600	-2.92	0.00350
ZI	Time Since Intervention x Intervention	0.02020	1.02040	0.00330	6.08	<0.0001

Measure H8A7: Outpatient costs –ED

G.1.1.1.41 Quantitative Results

Measure Summary: H8A7 Outpatient costs - ED	
Waiver goal	Decrease
Overall trend (descriptive)	Very variable, generally decreasing since early 2020
Causal effect of transition period	Statistically significant increase in the trend

- Numerator: Costs associated with ED claims that do not result in an inpatient admission for the population of members with a SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A7 considers the outpatient ED costs for the subpopulation of members with an SUD diagnosis. Figure 36 shows that the trend in the ED-related costs per member month, unadjusted for age, sex, or race, is quite variable. On average the unadjusted trend was fairly flat in 2018 and 2019, then was followed by a large spike in Q1 2020, coinciding with the beginning of the COVID-19 pandemic. On average the unadjusted trend decreased over 2020-2023, although in more recent quarters it appears that the trend is starting to turn upward. The model results in Table 36 indicate that after adjusting for age, sex, and race, there is a statistically significant increase in the trend associated with the transition period of the waiver.

Figure 36: Measure H8A7 Average Outpatient-ED Cost per Member Month (unadjusted means)

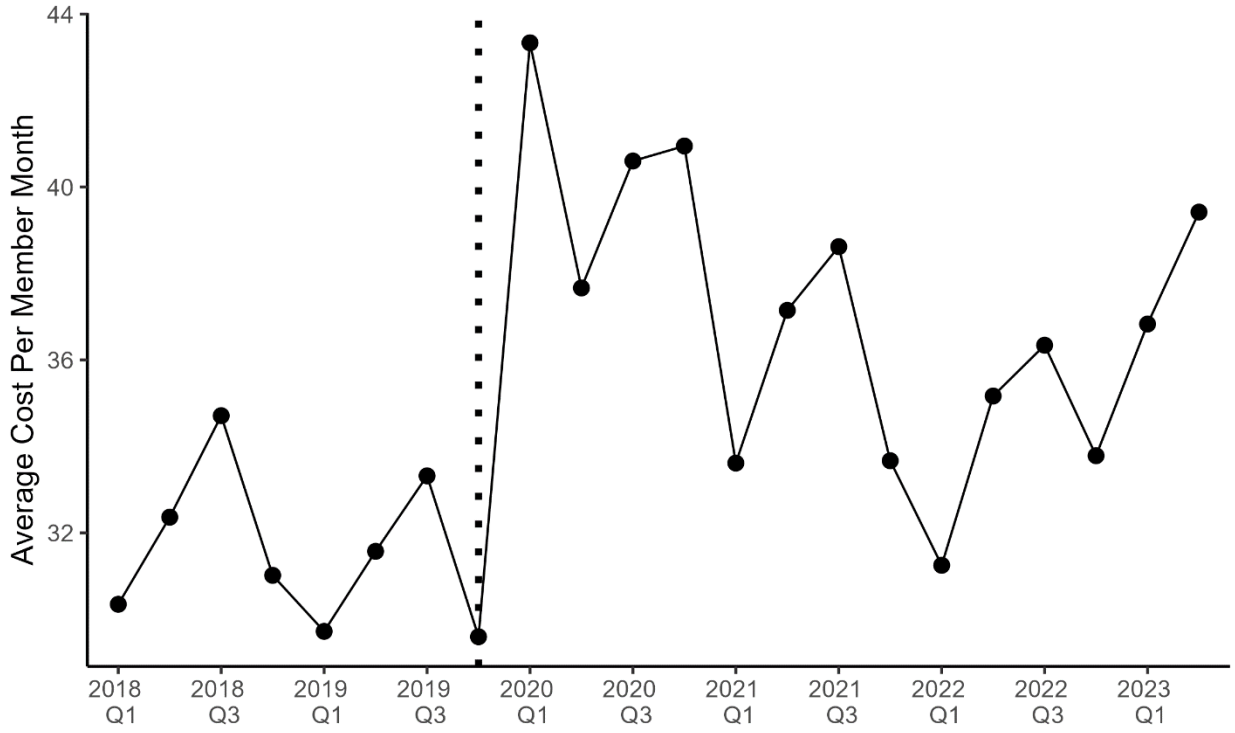


Table 36: H8A7 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	-0.00087	0.99913	0.00142	-0.61	0.53922
Cond	Intervention	0.20975	1.23337	0.00733	28.62	<0.0001
Cond	Time Since Intervention x Intervention	0.00774	1.00777	0.00151	5.14	<0.0001
ZI	Time	-0.00260	0.99740	0.00250	-1.02	0.30680
ZI	Intervention	0.15110	1.16310	0.01300	11.63	<0.0001
ZI	Time Since Intervention x Intervention	0.02380	1.02410	0.00270	8.82	<0.0001

Measure H8A8: Inpatient costs

G.1.1.1.42 Quantitative Results

Measure Summary: H8A8 Inpatient Costs	
Waiver goal	Decrease
Overall trend (descriptive)	Very variable, generally decreasing since early 2020
Causal effect of transition period	None

- Numerator: Costs associated with inpatient claims for the population of members with a SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A8 considers the inpatient costs for the subpopulation of members with an SUD diagnosis. Figure 37 shows that the trend in the inpatient costs per member month, unadjusted for age, sex, or race, was fairly variable overall. In the pre-intervention period, the unadjusted trend was relatively flat until there was a drop in Q4 2019 followed by an immediate spike in Q1 2020. In the transition period there has been substantial variation in inpatient costs, although on average the unadjusted trend was declining until more recent quarters in late 2022 and early 2023. The model results in Table 37 indicate that after adjusting for age, sex, and race, there was no statistically significant change in the trend associated with the transition period of the waiver. The model results do indicate a statistically significant increase in the odds of a member incurring zero inpatient costs in the transition period compared to the pre-intervention period.

Figure 37: Measure H8A8 Average Inpatient Cost per Member Month (unadjusted means)

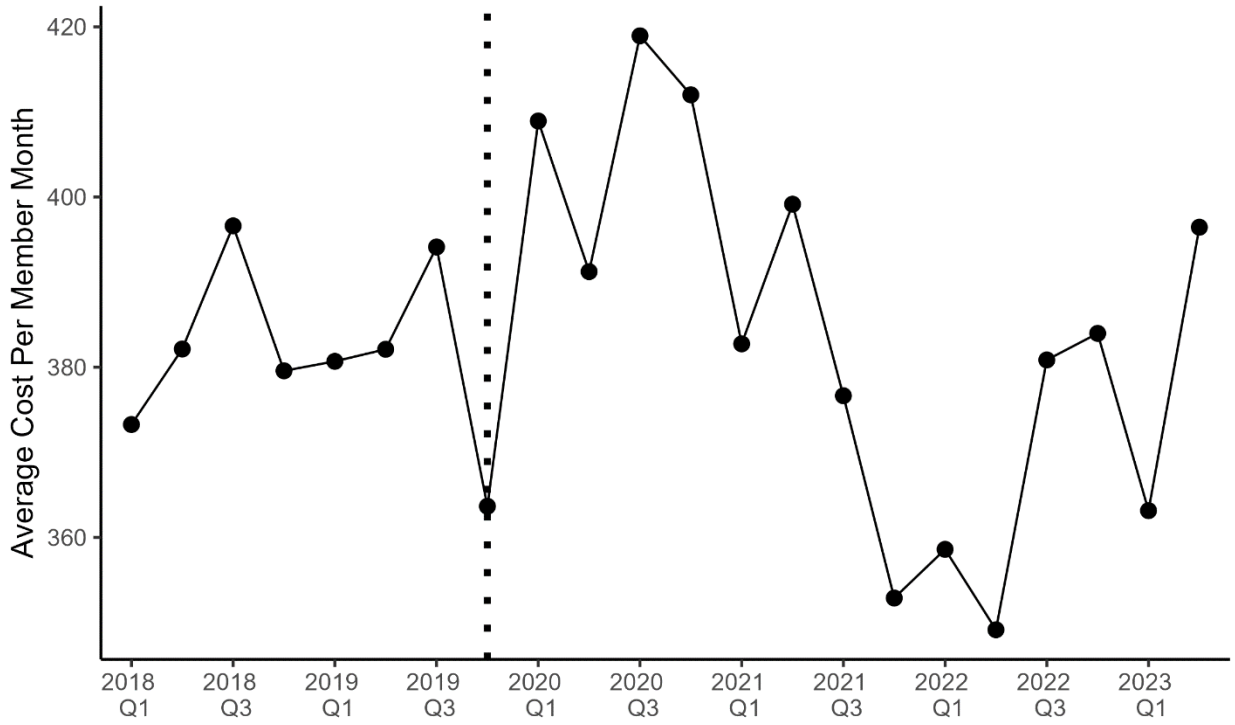


Table 37: H8A8 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	0.00815	1.00818	0.00270	3.02	0.00253
Cond	Intervention	0.05627	1.05788	0.01373	4.10	0.00004
Cond	Time Since Intervention x Intervention	0.00278	1.00279	0.00285	0.98	0.32914
ZI	Time	-0.00130	0.99870	0.00380	-0.34	0.73240
ZI	Intervention	0.02670	1.02700	0.01920	1.39	0.16400
ZI	Time Since Intervention x Intervention	0.02800	1.02840	0.00400	7.06	<0.0001

Measure H8A9: Pharmacy costs

G.1.1.1.43 Quantitative Results

Measure Summary: H8A9 Pharmacy Costs	
Waiver goal	Decrease
Overall trend (descriptive)	Slightly increasing until stronger upward trend beginning Q2 2022
Causal effect of transition period	Statistically significant increase in trend

- Numerator: Costs associated with pharmacy claims for the population of members with a SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A9 considers the pharmacy costs for the subpopulation of members with an SUD diagnosis. Figure 38 shows that the trend in pharmacy costs per member month, unadjusted for age, sex, or race, has been on average slightly increasing during the demonstration, although a steeper increase began in Q2 2022. The model results in Table 38 indicate that after adjusting for age, sex, and race, there is a statistically significant increase in the trend associated with the transition period of the waiver.

Figure 38: Measure H8A9 Average Pharmacy Cost per Member Month (unadjusted means)

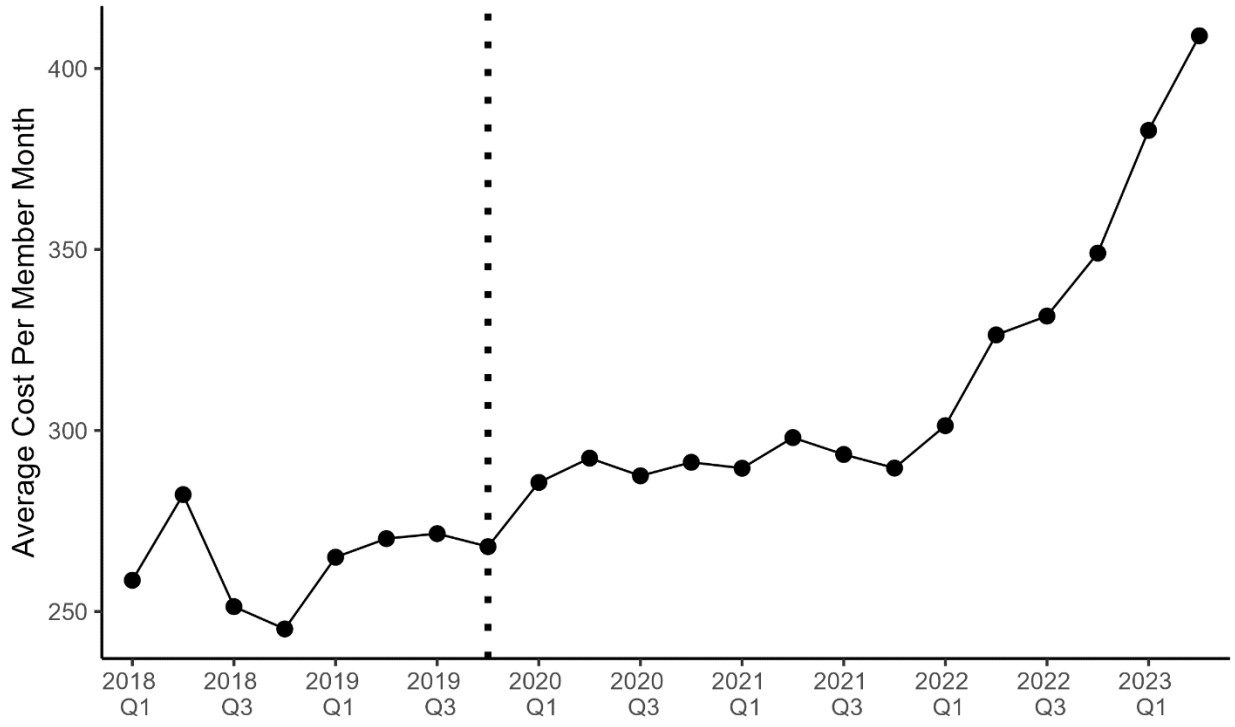


Table 38: H8A9 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	-0.04956	0.95164	0.00194	-25.49	<0.0001
Cond	Intervention	0.18201	1.19963	0.00969	18.79	<0.0001
Cond	Time Since Intervention x Intervention	0.08269	1.08620	0.00206	40.10	<0.0001
ZI	Time	0.00940	1.00950	0.00360	2.60	0.0092
ZI	Intervention	0.09140	1.09570	0.01810	5.04	<0.0001
ZI	Time Since Intervention x Intervention	0.00760	1.00760	0.00380	1.99	0.0471

Measure H8A10: Long-Term Care costs

G.1.1.1.44 Quantitative Results

Measure Summary: H8A10 Long-Term Care Costs	
Waiver goal	Decrease
Overall trend (descriptive)	Decreasing until mid-2020; flat/increasing since then
Causal effect of transition period	Statistically significant increase in trend

- Numerator: Costs associated with long-term care claims for the population of members with a SUD diagnosis
- Denominator: Total member-months for members with SUD

Measure H8A10 considers the long-term care costs for the subpopulation of members with an SUD diagnosis. Figure 39 shows that the trend in the long-term care costs per member month, unadjusted for age, sex, or race, was decreasing until mid-2020, followed by a relatively flat trend in late 2020 and 2021, and has begun to rise in 2022 and 2023. The model results in Table 39 indicate that after adjusting for age, sex, and race, there was a statistically significant increase in the trend associated with the transition period of the waiver. .[29]

[29] Due to the large quantity of observation with zero costs, we were unable to fit the full model due to model convergence issues. Instead, a reduced model which did not include the random effect, age, sex, and race covariates for in the conditional portion of the model was used for this measure. Those terms were still used in the zero-inflation portion of the model, although some collapsing of categories was necessary due to small sample sizes – "missing" race, Hispanic race, and "other non-Hispanic" race categories were collapsed, and the age categories for 19–24-year-olds and 25–34-year-olds were also collapsed.

Figure 39: Measure H8A10 Average Long-Term Care Cost per Member Month (unadjusted means)

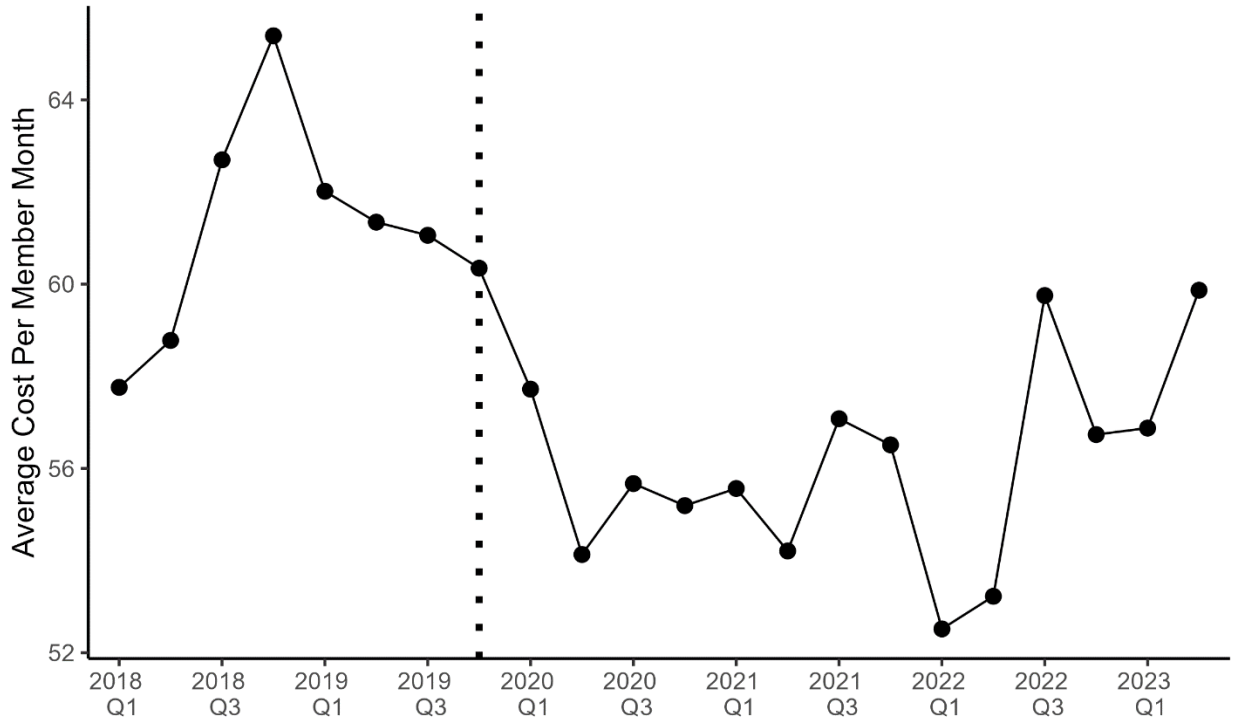


Table 39: H8A10 Interim Model Results

Model	Coefficient	Estimate	exp(Estimate)	SE	z	p-value
Cond	Time	-0.02325	0.97702	0.00821	-2.83	0.00464
Cond	Intervention	-0.02492	0.97539	0.04129	-0.60	0.54618
Cond	Time Since Intervention x Intervention	0.04978	1.05104	0.00882	5.64	<0.0001
ZI	Time	-0.04470	0.95630	0.01380	-3.24	0.00120
ZI	Intervention	0.19140	1.21090	0.06810	2.81	0.00500
ZI	Time Since Intervention x Intervention	-0.00520	0.99490	0.01460	-0.35	0.72410

H. Conclusions and Policy Implications

Ohio's SUD Section 1115 Demonstration Waiver is an innovative program designed to improve access and use of the full continuum of evidence-based treatment for SUD, including comprehensive treatment and prevention services, residential treatment, MAT, and improve coordination and transitions between LOCs. Key components of the program that have been implemented to date include creation of access standards for SUD in MCP contracts along with a focus on sufficient SUD provider capacity, requirements to increase MOUD utilization in residential treatment settings, and improvements to the credentialling process for SUD residential providers.

Many of these components have just recently concluded implementation; additional time will permit a comprehensive assessment of all outcomes associated with the demonstration. In what follows is a summary of interim findings associated with each of the evaluation hypotheses and their implications in relation to state policies and other state and federal other initiatives.

Q1. Did the demonstration increase access to SUD treatment services?

Several interventions were specifically designed to increase access to SUD providers, particularly in underserved areas of the state where the average provider-to-patient ratio in the pre-intervention period was approximately 60% lower than for the state as a whole. To address these gaps in SUD services, the state fielded a comprehensive provider availability assessment and implemented policies requiring that Medicaid managed care plans focus on sufficient SUD provider capacity and adopt access requirements for all ASAM Levels of Care.

The interim findings suggest that the ratio of all SUD providers to Medicaid members with SUD was on a very slight downward trend overall, with an increasing trend during the pre-intervention period followed by a gradual decline in the transition period and a slight increase again in 2023. There was no statistically significant effect of the waiver on the overall SUD provider ratio during the transition period. There was statistically significant evidence that access to ASAM level 3 providers improved during the transition period, although not for levels 1

and 2. The downward trend in the provider availability ratio for ASAM level 1 since late 2019 is of potential concern; this appears to be largely driven by the increase in the number of Medicaid members with an SUD diagnosis since 2018, which is outpacing a corresponding increase in the number of providers at this level of care (Table 34). Generally, the ratio of providers for level 2 is trending upward in the transition period, although with substantial variation.

The observed trend in access to all SUD providers may be attributed to several factors. The initial decline began in Q2 2020, so was likely influenced by the onset of the COVID-19 pandemic. Throughout the public health emergency, total enrollment in Medicaid steadily increased due to the suspension of eligibility redetermination. This is at least one driver of the number of Medicaid members with an SUD diagnosis significantly increasing during this time, rising from 136,694 members in Q2 2020 to 160,620 members at the end of the transition period in Q3 2023, a 17.5% increase. The number of SUD providers in the Medicaid program also rose between Q2 2020 and Q3 2023, from 23,185 providers to 26,887 providers, a 16% increase. However, since the increase in Medicaid members with an SUD diagnosis outpaced the increase in SUD providers in the Medicaid program, the SUD provider availability ratio declined slightly. Additionally, there were delays in several of the planned action items that were expected to improve provider availability. For example, several policy changes that would have created access standards in MCP contracts were not put in place until the Next Generation of MCP contracts were established in February 2023. The beginning of a slight increase in the trend is observed in 2023, so with additional time in the remaining waiver period, it is possible that the new access standards will improve access to SUD providers in the later demonstration quarters.

Interestingly, the pattern in underserved areas differed from the rest of the state. The trend was relatively flat until Q1 2021, then exhibited a steady increase throughout the rest of that year and has since been on the decline. There was no significant causal effect of the waiver in the transition period. The improvement in access to SUD providers in 2021 aligns with goals of the demonstration to improve access to care in underserved areas where the gaps in access are greatest. Improvement was notable following the PHE and may have been related to advances in telehealth that are a particularly effective means of overcoming workforce shortages and addressing transportation barriers in underserved areas. The subsequent decline in access since Q4 2021 may be partially related to a

decrease in the use of telehealth services as many providers resumed in-person services. With the remaining waiver periods it will be possible to observe whether these trends continue.

Access to MOUD providers steadily increased during the pre-intervention period, but the trend flattened during the transition period (although this change was not statistically significant). Many of the waiver provisions that were expected to improve access to MOUD, such as establishing regional access standards in the MCP contracts, were only implemented in early 2023. A slight upward trend is observed beginning at the end of 2022, so additional time will help indicate whether factors such as the new MCP contracts are having a positive effect on access to MOUD. The upward trend observed during the pre-intervention period was likely the result of other state and federal efforts directed at improving access to MOUD providers and utilization of MOUD in the lead up to the waiver. For example, resources were focused on increasing the number of providers eligible to prescribe MOUD, reducing stigma, eliminating or clarifying prior authorization requirements, and establishing treatment guidelines.

Qualitative findings indicated concerns about behavioral health workforce shortages which undoubtedly impact provider access. Several strategies to combat this challenge, such as tuition assistance, licensing support, and retention bonuses, are being discussed and explored by the state. Additionally, while the evaluation focused on trends in provider access in underserved areas of the state, it did not examine whether the absolute provider ratios observed were adequate, which is a concern that some key informants and Medicaid members expressed when discussing access in rural parts of the state. Finally, while concerns around resistance or obstacles to providing medication for SUD were described in various ways in interviews and focus groups conducted in 2020 and 2021, the quantitative metrics at the state level over the 2017-2023 period generally indicate that Ohio is progressing in the right direction when it comes to access and use of MOUD.

Q2: Does the demonstration increase utilization of SUD treatment by enrollees with SUD?

The demonstration included several interventions targeting utilization of SUD treatment including MOUD. These activities included the residential and withdrawal management of SUD services rule (OAC 5122-29-09), which was designed to ensure

that residential treatment services, including access to MOUD, are delivered in accordance with ASAM LOCs. Additional strategies to increase SUD treatment utilization included data and analysis review to identify the needs of individuals with SUD and development and implementation of care coordination models to meet those needs. Other enhancements to the overall managed care coordination model were embedded in the Next Generation Managed Care contracts.

The interim findings suggest that MOUD utilization increased steadily since 2017, although it has begun to level off in 2023. There was no statistically significant causal effect of the waiver on the trend in the transition period. Trends in MOUD usage are similar across race/ethnicity groups, although absolute disparities persist, with White, non-Hispanic adults having about 0.5 times higher rates of MOUD usage than Black, non-Hispanic adults. MOUD utilization during residential treatment has exhibited a fairly strong upward trend since 2018 with a few dips in early 2020 and late 2021. There was no statistically significant causal effect of the waiver associated with the transition period. Trends in MOUD use within residential treatment are increasing for all race/ethnicity groups examined, although the rate of increase is lowest for non-Hispanic Black Medicaid members with an OUD diagnosis.

Additional time is needed to assess whether these upward trends in MOUD utilization will continue, but initial data is promising. As described previously, many state and federal policies and programs were enacted to increase access and utilization of MOUD, but several action items aimed at improving MOUD utilization in residential treatment settings were delayed until July 2023, such as the new requirement around offering MOUD and monitoring utilization during RT stays. However, it is possible that, in preparation for these rule changes, providers began to make changes prior to the implementation of these waiver action items, which resulted in the observed upward trend even before Q3 2023.

The interim findings show that the rate of initiation of treatment for new SUD episodes was slightly declining on average during the pre-intervention period despite a peak in Q3 2018 and the beginning of an upward trend in 2019. However, this rate has steadily declined during the transition period, with the most rapid decline beginning after Q3 2021. There was no statistically significant causal effect of the waiver during the transition period. The initial decline in the transition period began around the time of the COVID-19 pandemic (Q1 2020) which undoubtedly

impacted utilization patterns, but it is unclear what is the driver of the faster rate of decline since late 2021.

Qualitative findings indicate that there are several personal and structural factors that influence utilization of SUD treatment, including lack of transportation, needing to maintain employment, childcare obstacles, personal or family hardships, peer support services, case management, and influences from court or child protective services. While these factors fall outside of the direct scope of the 1115 waiver, they are critical to understanding the dynamics involved in getting Medicaid members into and staying in SUD treatment.

Q3: Does the demonstration improve coordination and management of care?

Interventions aimed at improving care coordination and management included enhancements to the state's PDMP to identify persons at risk for drug overdose, increased data exchange among inpatient and RT providers, and overall improvements to the managed care coordination model in the Next Generation Managed Care contracts.

The findings suggest that there was an upward trend during the pre-intervention period in timely follow-up after IP and ED visits. However, the trend in timely follow-up care for an IP visit has on average been flat since early 2020 (although there was substantial variation). This represented a statistically significant decrease in the trend associated with the transition period. There was, on average, a slight trend downward in timely follow-up after ED visits in the transition period, with a sharper decline observed since the end of 2022, but this was not a statistically significant change.

The trend in timely residential treatment follow-up has been brighter – following a decline in the pre-intervention period, there was an immediate statistically significant increase in the rate at the first quarter of the transition period (Q4 2019), and an upward trend during the transition period following an initial decline in mid-2020 that was likely associated with the effects of the pandemic. However, there was no statistically significant causal effect of the waiver on the slope of the trend during the transition period, despite the immediate level change observed and the directional change of the trend.

Timely follow-up care has been viewed as a key strategy to engage individuals in ongoing SUD treatment in order to potentially improve outcomes and reduce the likelihood of readmission and overall cost of care. HEDIS quality measures for follow up after ED visits[30], and high-intensity care for substance use treatment[31] were established in recent years, paving the way for payor incentives and improvement efforts. Additional timepoints are needed to determine whether some of the waiver action items focused on coordination of care and transitions between levels of care that were established in 2022 under the new managed care plans such as care coordination entities (CCEs), the OhioRISE program, and care management entities (CMEs) will have an impact on timely follow-up care in the post-intervention period.

For measures of high-risk utilization of opioids, including prescriptions from multiple providers and high dosages >=90 MME, there was steady reduction throughout the pre-intervention period. In the transition period, rates of high-risk opioid use started to level off around the time of the COVID-19 pandemic and began trending upward in recent quarters. There has been a host of policy changes in recent years that may affect these outcomes, and the state medical board established guidance for safe prescribing, including limits on opioid prescriptions for acute and chronic pain.[32] Ohio's Automated Rx Reporting System (OARRS) provided easy access to vital data to help prescribers and pharmacies provide better care for their patients. Through the waiver, additional enhancements are planned, such as EHR and pharmacy dispensing system integration. These changes could allow more clinicians to identify and avoid high risk prescribing and

---

[30] *From Follow-Up After Emergency Department Visit for Substance Use,* by NCQA. https://www.ncqa.org/hedis/measures/follow-up-after-emergency-department-visit-for-substance-use/.

[31] From *Follow-Up After High-Intensity Care for Substance Use Disorder (FUI)*, by NCQA. https://www.ncqa.org/hedis/measures/follow-up-after-high-intensity-care-for-substance-use-disorder/.

[32] From *Opioid Prescribing Guidelines*, by Ohio Department of Medicaid. https://mha.ohio.gov/about-us/media-center/media-resources/opioid-prescribing-guidelines.

dispensing practices. Additional time in the post-intervention period will help to indicate whether the recent upward trends indicate a longer-term trajectory or are temporary phenomena.

Q4: Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?

Improvement in access, utilization, and coordination of care were expected to reduce use of ED and IP for SUD treatment. In particular, improvements in availability and quality of RT, including new RT standards, were expected to contribute to reductions in the costliest care. The interim findings generally support this hypothesis. The trend in ED and IP utilization for SUD decreased significantly in the transition period. The trend in the rate of 30-day readmission to ED following an ED visit also decreased significantly during the transition period. There was no statistically significant causal effect of the waiver during the transition period for the IP or ED 30-day admission rates following an RT stay, although the IP admission rate has been trending downward since 2020 which is an encouraging sign. On the other hand, the trend in the ED admission rate following an RT stay has been trending upward except for a sharp drop during the pandemic. While the trend in overall utilization of ED and IP settings for SUD care is moving in the right direction, Ohio will likely need to explore the dynamic leading to increasing ED admissions after a residential treatment stay.

Q5: Does the demonstration improve adherence to SUD treatment?

Although there are many dimensions to adherence to SUD care, the only evaluation metric associated with adherence pertains to medication for OUD. The interim findings show that continuity of pharmacotherapy for OUD was steadily increasing during the pre-intervention period and until Q1 2020 but has subsequently exhibited an equally steady decline through Q2 2022. More recently, there are signs of an upward trend returning. The beginning of the decline coincided with the onset of the pandemic, so it is possible that the PHE had an extended negative effect on the maintenance of MOUD, which only started to recover about two years later. There was no statistically significant effect of the waiver during the transition period. When examining trends by race/ethnicity, we find that non-Hispanic Black Medicaid members have the lowest rates of continuity of pharmacotherapy for OUD – consistently nearly 10 percentage points lower than for non-Hispanic White

Medicaid members – and a slightly more negative declining trend than for non-Hispanic White members between 2017 and late 2022.

Q6: Do members receiving SUD services experience an improved quality of care?

Access to preventive or ambulatory care and screening for HIV/HCV/HBC were both expected to increase as a result of improvements in access, utilization, and coordination of care. Access to preventive/ambulatory care was strongly trending upward in the pre-intervention period before dropping at the start of the transition period, which also coincided with the pandemic. During the transition period there has been, on average, an upward trend, although since late 2021 the rates have been declining. There was no statistically significant causal effect of the waiver during the transition period.

On average since 2018 screening rates for HIV/HCV/HBV have trended upward, although there was a noticeable decline during the pandemic and since early 2021 the trend has been flat and slightly declining at the end of 2022. There was no statistically significant causal effect of the waiver during the transition period.

The interim findings concerning early engagement with SUD treatment showed an upward trend during the pre-implementation period and a peak in Q1 2020, followed by a decline during the transition period. This decrease in the trend was a statistically significant change associated with the transition period. The rate temporarily improved in 2021 before falling again in 2022. While the initial decline likely indicates an impact of the pandemic, following a modest recovery in the rate, the second decline in 2022 may be unrelated.

Q7: Does the demonstration reduce rates of opioid-related overdose deaths?

The primary purpose of Ohio's demonstration was to reduce the overdose death rate, including overdose deaths due to opioids. Despite a peak in mid-2020 and a slight upward trend through 2021, on average the rate of overdose deaths overall and those due to opioids have declined throughout the transition period and even more substantially in early 2023. However, this promising trend does not appear to hold across all Medicaid members, as stratified rates indicate that overdose death rates for Black, non-Hispanic adults are rising compared to their White, non-

Hispanic counterparts. There is currently no reliable pre-intervention period death data available, so there was no ITS analysis for the rate of overdose deaths for the interim evaluation.

The spike in overdose deaths observed in Q2 2020 likely reflects the stress, anxiety, job loss, financial strain, and altered living arrangements that came with the pandemic, as described in our qualitative analysis and in other research.[33] They may also reflect interruptions in services during this timeframe. While the subsequent descriptive trends in these measures are very encouraging, further exploration into disparities by race/ethnicity and their drivers are a critical next step for Ohio.

Q8: How do costs related to the demonstration waiver change throughout the pre- and post-demonstration periods?

A key consideration for this evaluation was the impact on the cost of care. The demonstration provided Ohio with flexibility in the administration of services that could improve efficiency and quality without increasing the cost of care. The demonstration was expected to increase SUD-IMD, SUD-other, and non-SUD costs, but decrease more costly services including IP and ED costs. The overall impact was expected to be cost neutral or result in savings.

The interim findings supported two of these expectations – the transition period of the demonstration was associated with a statistically significant decrease in the trend of non-ED outpatient costs of care and an increase in the trend of non-SUD costs of care per member-month after adjusting for age, sex, and race. While the demonstration was expected to decrease total costs, there was a statistically significant increase in total overall costs and no significant change in the trend of total federal costs after adjusting for covariates. There was an expected increase in SUD-IMD and other SUD costs, but we found a statistically significant decrease in the trend of these costs associated with the transition period of the waiver. Areas of focus for Ohio include outpatient-ED, pharmacy, and long-term costs, all of which exhibited a statistically significant increase in trend associated with the transition

[33] From *Overdose Prevention*, by CDC. https://www.cdc.gov/overdose-prevention/?CDC_AAref_Val=https://www.cdc.gov/drugoverdose/pdf/sudors-covid-databrief-22.pdf.

period, although the trend for ED costs was highly variable. There was no significant change in the trend of inpatient costs, although the trend has generally been highly variable.

I. Interactions with Other State and Federal Initiatives

Other federal awards may have an impact on measures of service delivery, cost, and outcomes that are the focus of this evaluation. For example, the Provider Relief Fund, which was established through the 2020 CARES Act, provided funding directed at healthcare-related expenses and lost revenue attributable to COVID-19. This funding may have helped to minimize the impact of the pandemic on access to services. The American Rescue Plan Act of 2022 (ARPA) provided funding that is intended to strengthen the mental health and addiction services system, primarily directed toward prevention and early intervention, which may reduce the prevalence and minimize the long-term impact of substance use disorders. However, the impact of these efforts is unlikely to be fully realized during the timeframe of this evaluation.

Ohio's State Opioid Response/State Opioid and Stimulant Response (SOR/SOS) program was funded by SAMHSA, in 2018, 2020, and 2023. With a budget of $97.4 million in 2023, the program will support programs across Ohio that focus on implementation of evidence-based prevention, treatment, and recovery services, naloxone distribution, programs to expand access to MOUD, innovative telehealth strategies directed at rural and underserved areas, access to peer support, recovery housing, and employment, disparity reduction for minority populations disproportionately affected by SUD, and community collaborations to address complex social needs of underserved populations. Because this funding stream has been present throughout the pre-waiver, transition, and post waiver periods, it is not expected to have a substantial impact on the evaluation metrics.

J. Lessons Learned and Recommendations

Based on the interim evaluation findings, there are several key takeaways and lessons learned regarding the impact of the demonstration that can guide implementation and evaluation activities during the remaining waiver period.

1. The COVID-19 pandemic limited our ability to isolate the impact of the demonstration from the impact of the PHE. In addition, Ohio's response to the pandemic required the behavioral health system to divert resources and delay implementation of some of demonstration activities. As a result, several important provisions of the demonstration were not implemented until 2023, including the state requirement for residential treatment facilities to provide access to MAT, an on-site review process of residential provider qualifications aligned with State requirements for ASAM, and policies requiring that Medicaid managed care plans focus on sufficient SUD provider capacity. The impact of these delays combined with impact of the pandemic led to a revision of the evaluation design to include a three-period ITS model, which will help minimize these factors by specifying an extended transition period for the implementation of interventions and isolating the period when the impacts of the COVID-19 pandemic were most apparent. A waiver extension, if granted, will provide an opportunity to evaluate many crucial interventions that were substantially delayed.

2. The interim findings revealed descriptive evidence of a decline in the rate of overdose death and in the rate of opioid overdose death during the transition period. These findings are encouraging as this was identified as the demonstration's main purpose, although due to current data limitations, we are not able to assess whether the waiver causally impacted this trend.

   The decline in severity of COVID-19 infections in 2022 along with changes in deaths due to synthetic opioids (mainly fentanyl) may have been additional factors that contributed to a reduction in overdose deaths.[34] [35] Additional periods of observation will allow us to determine whether these trends persist in the post-pandemic period when the waiver activities are fully implemented. Nationwide, the overdose death rate climbed during the pandemic. Ohio fared

---

[34] From *U.S. Overdose Deaths Decrease in 2023, First Time Since 2018,* by CDC. 2024, https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2024/20240515.htm.

[35] From *Overdose deaths in Ohio dropped to 9-year-low, experts differ on why*, by Health Policy Institute of Ohio. 2024, https://www.healthpolicyohio.org/health-policy-news/2024/07/12/overdose-deaths-in-ohio-dropped-to-9-year-low-experts-differ-on-why.

better than other states, dropping from 5th to 7th place in opioid overdose deaths in 2021, and the overdose death rates continue to decline.[36] [37]This may suggest that Ohio's demonstration activities helped to minimize the impact of the pandemic and reduce overdose deaths.

3. There was evidence of significant improvement in the SUD provider availability ratio at the highest levels of care and a reduction of the use of ED and IP settings for treatment of SUD and in the ED 30-day readmission rate. While no statistically significant differences in trends were detected, there are descriptive signs of improvement in access to and the use of MOUD generally and in residential treatment. We also observed promising declines in the 30-day IP admission rates following an RT stay and in the use of opioids at high dosages. These findings indicate promising trends in many of the primary and secondary drivers that were key milestones established by CMS for this demonstration, even in cases where there are no detectable statistically significant effects of the waiver.

4. Areas of focus for Ohio include timely follow-up visits for inpatient stays, continuity of pharmacotherapy, and initiation and engagement of SUD treatment following a new episode, all of which exhibited statistically significant changes in trends that are moving in the opposite direction of the goals sets out in the waiver. There are also a few dimensions of care, such as 30-day ED readmission rates following an RT stay, and SUD provider availability ratios at the lowest level of care and in underserved areas, where recent trends are not moving in desired directions. Further investigation will help determine the main drivers of these trends. For example, while the SUD provider availability ratio increased following the pandemic and may have been influenced by the temporary expansion of telehealth access through policy changes implemented during the PHE, the more recent decline indicates a need to assess whether

[36] From *Ohio Preliminary Overdose Data Summary, Quarter 1, 2024*, by Ohio Department of Health. 2024, https://odh.ohio.gov/know-our-programs/violence-injury-prevention-program/media/ohio-preliminary-unintentional-drug-overdose-deaths-q1-2024.
[37] From *Provisional Drug Overdose Death Counts*, by CDC. https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm.

maintenance of telehealth care would help to ensure access in underserved parts of the state.

5. The findings suggest there was a statistically significant increase in the adjusted trend of total costs associated with the transition period of the waiver period. While expected to increase, adjusted trends in cost of care for SUD-IMD and other SUD care decreased in association with the waiver. Trends in non-SUD care and non-ED outpatient care both changed in the expected directions (increasing and decreasing, respectively). There were less optimistic findings pertaining to cost of outpatient-ED, long-term, and pharmacy care, with statistically significant increases in these trends associated with the transition period of the demonstration. However, the trend of ED costs was highly variable and especially so since the onset of the COVID-19 pandemic. Additional time points will help to indicate the longer-term trend.

Overall, the interim results highlight encouraging trends related to access to care, utilization, reducing hospital-based SUD service use, some treatment readmissions, overdose deaths, and in non-ED outpatient care. There is further work to be done in increasing adherence to and retention in treatment, improving coordination and management of care, and improving quality of care. The findings presented here represent the initial and preliminary impact of the waiver during the transition period, and amidst the massive disruption of the COVID-19 pandemic. The summative analysis will shed light on the impact of the demonstration period after all activities have been implemented and allowed time to come into effect, which will be the ultimate assessment of how the SUD 1115 waiver has changed SUD care and outcomes in Ohio.

K. Appendices

K.1 Evaluation Measure Specifications

H1A1: SUD provider availability ratio

- **Numerator**: The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period

- **Denominator**: The number of members ages 18-64 during the measurement period with a primary or secondary SUD diagnosis
- **Measurement period:** Quarter
- **Notes:**
    - We also calculate this measure using billing providers rather than rendering providers as a supplemental measure. See Appendix K.2 for results.

Construction Overview

Denominator

- For eligible adults ages 18-64 during the measurement period, count the number of persons who had a claim with a primary or secondary diagnosis of SUD during the measurement period

Numerator

- Identify providers enrolled in Medicaid who provided SUD services (including office-based MOUD) during the measurement period
- Count the number of distinct providers

H1A2: SUD provider availability ratio – MOUD

- **Numerator**: The number of providers who were enrolled in Medicaid and delivered MOUD (buprenorphine, methadone, or naltrexone) during the measurement period
- **Denominator**: The number of members ages 18-64 during the measurement period with a primary or secondary OUD diagnosis
- **Measurement period:** Quarter
- **Notes:**
    - In the approved evaluation design this measure was labeled as "SUD provider availability ratio - MAT" although the denominator was restricted to members with an OUD diagnosis and the numerator-compliant MAT is predominantly used for treating OUD. The evaluators decided to relabel this measure to clarify that it is capturing provider availability for MOUD, rather than MAT for SUD more broadly. Therefore, the measure label has been updated to "SUD provider availability ratio – MOUD" to more accurately reflect the measure content.

- We also calculate this measure using billing providers rather than rendering providers as a supplemental measure. See Appendix K.2 for results.

Construction Overview

Denominator

- For eligible adults ages 18-64 during the measurement period, count the number of members who had a claim with a primary or secondary diagnosis of OUD during the measurement period

Numerator

- Identify rendering providers enrolled in Medicaid who provided MOUD during the measurement period
- Count the number of distinct rendering providers

H1B1: SUD provider availability ratio by level of care

- **Numerator**: The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period by category and ASAM sublevels
- **Denominator**: The number of members ages 18-64 during the measurement period with a primary or secondary SUD diagnosis
- **Measurement period:** Quarter
- **Notes:**
  - We also calculate this measure using billing providers rather than rendering providers as a supplemental measure. See Appendix K.2 for results.

Construction Overview

Denominator

- For eligible members ages 18-64 during the measurement period, count the number of persons (quarter) who had a claim with a primary or secondary diagnosis of SUD during the measurement period

Numerator

- Identify rendering providers enrolled in Medicaid who provided SUD services (including office-based MOUD) during the measurement period
- Count the number of distinct rendering providers

- Report by ASAM Levels of Care (1-3)

H1C1: SUD provider availability ratio within underserved areas

- **Numerator**: The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period in select counties determined to be underserved based on the number, percentage, and ratio of provider to members
- **Denominator**: The number of members ages 18-64 during the measurement period with a primary or secondary SUD diagnosis within selected counties
- **Measurement period:** Quarter
- **Notes:**
    - We also calculate this measure using billing providers rather than rendering providers as a supplemental measure. See Appendix K.2 for results.

Construction Overview

The counties identified as underserved areas are those counties that have a combination of a large number and percentage of members with SUD and a small ratio of providers to members during 2018-2020. These three elements were combined to form an index by calculating and averaging z-scores to standardize the magnitude of differences across the three variables. Eleven counties were selected by looking at the bottom quartile and histogram of the index scores. Those counties were: Vinton, Meigs, Jackson, Hocking, Harrison, Brown, Noble, Morgan, Adams, Preble, and Perry. Figure 35 shows a map of the selected counties.

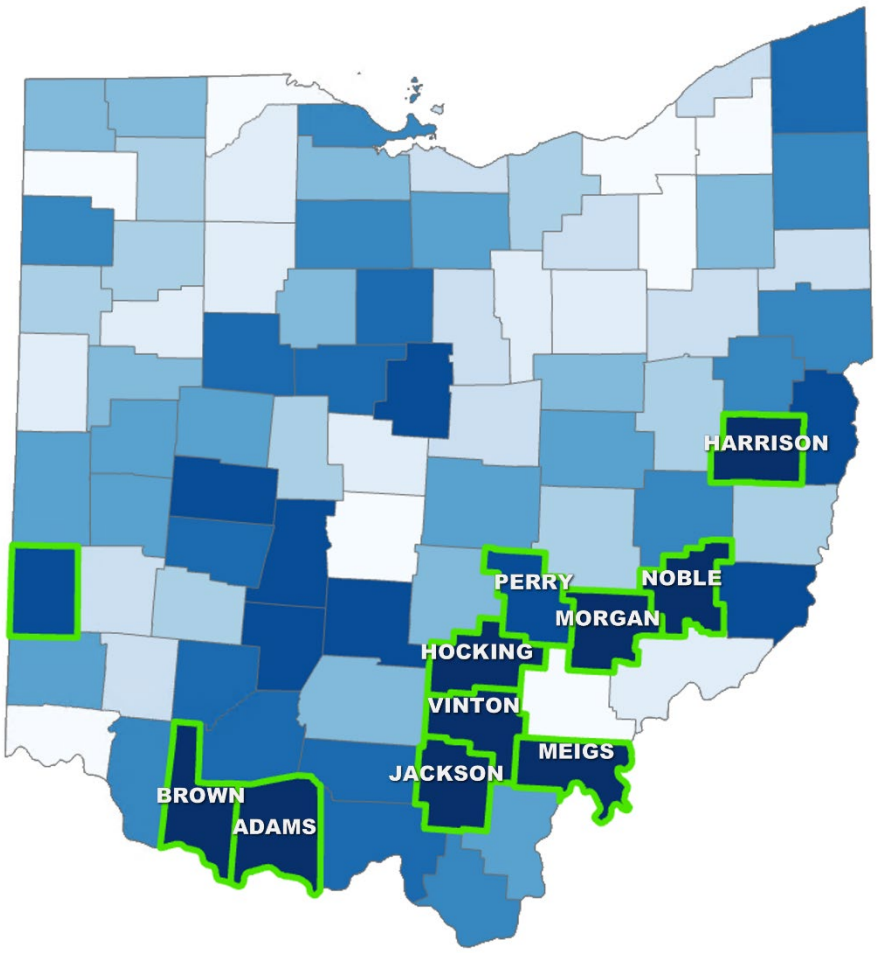
Denominator

- For eligible members ages 18-64 during the measurement period, count the number of persons who had a claim with a primary or secondary diagnosis of SUD during the measurement period whose address at the time was in the selected counties

Numerator

- Count the unique number of rendering providers enrolled in Medicaid who provided SUD services (including office-based MOUD) during the measurement period whose address was in the identified counties.

Figure 40: Selected counties identified as underserved related to measure H1c1



Note: Darker colors represent lower values of the index score computed to identify the counties

H2A1: Initiation of SUD treatment

- **Numerator**: The number of members ages 18-64 during the measurement period who initiated treatment through an IP SUD admission, outpatient visit, intensive outpatient encounter or partial hospitalization, telehealth, or MOUD within 14 days of diagnosis
- **Denominator**: The number of members ages 18-64 during the measurement period with a new episode of SUD abuse or dependence
- **Measurement period:** Rolling quarters, 1-year windows
- **Notes:**

- This measure is based off MM15 with an adjusted measurement period to allow the measure to be calculated quarterly with a one-year window.

Construction Overview

Denominator

- Identify members with a new episode of SUD abuse or dependence based on a negative diagnosis history and who are continuously enrolled.

Numerator

- Among the members identified in the denominator identify initiation events.

H2B1: MOUD usage

- **Numerator**: The number of members ages 18-64 during the measurement period with an OUD diagnosis who have a claim for MOUD during the measurement period
- **Denominator**: The number of members ages 18-64 during the measurement period with a primary or secondary OUD diagnosis
- **Measurement period:** Quarter
- **Notes:**
  - This measure is based off MM12 with an adjusted measurement period and MODRN metric "Medications for opioid use disorder (OUD) measure" with a modified age range (MODRN uses 12-64).
  - In the approved evaluation design this measure was labeled as "MAT usage," although the denominator was restricted to members with an OUD diagnosis. The evaluators decided to relabel this measure to clarify that it is capturing medication for OUD (MOUD) among the OUD subpopulation, rather than MAT for SUD more broadly. Therefore, the measure label has been updated to "MOUD usage" to more accurately reflect the measure content.

Construction Overview

Denominator

- For eligible members ages 18-64 during the measurement period, count the number of persons who had a claim with a primary or secondary diagnosis of OUD during the measurement period.

Numerator

- Amongst the population defined in the denominator, consider all Professional, Outpatient, Inpatient, and Pharmacy claims
- Count the number of persons with a claim for MOUD within any of the claim types

H2B2: RT stays with MOUD

- **Numerator**: The number of RT stays for members ages 18-64 with an OUD primary diagnosis with MOUD administered or prescribed during the stay or 15 days before the start or after the end of the stay
- **Denominator**: The number of RT stays for members ages 18-64 with an OUD primary diagnosis during the measurement period
- **Measurement period**: Quarter
- **Notes**:
    - In the approved evaluation design this measure was labeled as "RT stays with MAT" and included any RT stay with a SUD diagnosis. The evaluators decided to narrow the scope of the measure to focus on RT for OUD and the use of medication assisted treatment for OUD (MOUD), because it is not always medically appropriate to use MAT during residential treatment for a SUD stay. Therefore, the measure label has been updated to "RT stays with MOUD" to more accurately reflect the modified measure content.

<u>Construction</u>

Denominator

- For eligible members ages 18-64 during the measurement period, create RT stay spans from professional, inpatient and outpatient claims
    - RT claims are defined as those with appropriate procedure code and an OUD primary diagnosis code
    - Allow for a 2-day gap in billing to accommodate weekends
- Count the number of unique RT stay spans during the measurement period

Numerator

- For members identified in RT stay spans in the denominator, create MOUD spans, accounting for differences between date prescribed and dates administered, from professional, inpatient, outpatient, and RX claims
- Define an RT stay with MOUD based on 3 scenarios:
    - MOUD span starts up to 15 days before RT and does not end before RT starts
    - MOUD span starts during RT
    - MOUD span starts up to 15 days after RT
- Count the number of unique RT stay spans with MOUD during the measurement period

H3A1: IP follow-up

- **Numerator**: The number of IP visits with a primary SUD diagnosis among members ages 18-64 who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days
- **Denominator**: The number of IP visits with a primary SUD diagnosis among members ages 18-64
- **Measurement period**: Rolling quarters, six-month windows
- **Notes**:
    - This measure is based off MM17 with an adjusted measurement period.

Construction

Denominator

- For eligible members ages 18-64 during the measurement period, create inpatient stay spans by combining claims for the same member and provider that have a <= one-day gap between claims
    - For multiple stays within a 31-day period, include only the first eligible inpatient stay discharge
    - Keep stays where the patient is continuously enrolled from the discharge date through 30 days after the discharge date

- Remove stays for members that have a hospice claim in the measurement period
- Remove stays that ended within 30 days of the end of the measurement period
- Count the number of inpatient stays

Numerator

- Consider professional and outpatient claims, including denied claims
    - Find claims with a procedure code, revenue, code, or place of service code that qualifies as a follow-up visit and a primary SUD diagnosis
- Combine with the inpatient stays constructed in the denominator dataset
- Count the number of inpatient stays with a follow-up visit within the 30 days following the inpatient discharge date

H3B1: RT follow-up

- **Numerator**: The number of RT visits for members ages 18–64 who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days
- **Denominator**: The number of RT visits for members ages 18–64 who have a primary SUD diagnosis
- **Measurement period**: Rolling quarters, six-month windows
- **Notes**:
    - This measure is based off MM17 with an adjusted measurement period.

<u>Construction</u>

Denominator

- For eligible adults ages 18-64 during the measurement period, consider outpatient and professional claims, including denied claims
- Create RT stay spans by combining claims for the same member and provider, allowing for a 2-day gap in billing to accommodate weekends
    - For multiple stays within a 31-day period, include only the first eligible RT stay discharge

    - Keep stays where the patient is continuously enrolled from the discharge date through 30 days after the discharge date
- Remove stays for members that have a hospice claim in the measurement period
- Count the number of RT stays

Numerator

- Consider professional and outpatient claims, including denied claims
    - Find claims with a primary SUD diagnosis that qualify as a follow-up visit
- Combine with the RT stays constructed in the denominator dataset
- Count the number follow-up visits within the 30 days of the RT discharge date

H3C1: ED follow-up

- **Numerator**: The number of ED visits for members ages 18-64 who have a primary SUD diagnosis and who had a follow-up visit with a corresponding primary SUD diagnosis within 30 days
- **Denominator**: The number of ED visits for members ages 18 – 64 who have a primary SUD diagnosis
- **Measurement period**: Rolling quarters, six-month windows
- **Notes**:
    - This measure is based off MM17 with an adjusted measurement period.

Construction

Denominator

- For eligible adults ages 18-64 during the measurement period, consider professional and outpatient claims, including denied claims
- Identify claims with a procedure code or revenue code for an ED visit
    - For multiple ED visits within a 31-day period, include only the first eligible ED visit

    - Keep ED visits where the patient is continuously enrolled from the event date through 30 days after the ED visit
- Remove visits for members that have a hospice claim in the measurement period
- Count the number of ED visits

Numerator

- Consider professional and outpatient claims, including denied claims
    - Find claims with a primary SUD diagnosis that qualify as a follow-up visit
- Combine with ED visits constructed in the denominator dataset
- Count the number of follow-up visits within 30 days of the ED visit date

H3D1: Use of opioids from multiple providers in persons without cancer

- **Numerator**: The number of members ages 18-64 without cancer who received prescriptions for opioids from 4 or more prescribers and 4 or more pharmacies during the measurement period
- **Denominator**: The number of members ages 18-64 without cancer during the measurement period
- **Measurement period**: Rolling quarters, one-year windows
- **Notes**:
    - This measure is based off MM19 with an adjusted measurement period.
    - Due to the temporal specifications of this measure (opioid episode length > 90 days), we calculated this measure quarterly with a one year look forward period.
    - In the approved evaluation design, the numerator for the measure was incorrectly specified as including members who received prescriptions for opioids from 4 or more prescribers “or” 4 or more pharmacies. This has been corrected to “and” to better adhere with the corresponding monitoring metric (#19).

<u>Construction</u>

Denominator

- For eligible members ages 18-64 in the measurement period, identify individuals with 2 or more prescription claims for opioid medications (same or different opioids) on different dates of service and with a cumulative days' supply of at least 15 days during the measurement period.
- Among these members, identify individuals with an opioid episode of at least 90 days, with the episode start at least 90 days before the end of the measurement period
- Exclude individuals receiving hospice care, with a sickle cell diagnosis, or with a cancer diagnosis during the measurement period
- Count the number of distinct members

Numerator

- Among members identified in the denominator, identify individuals who received prescriptions for opioids from at least 4 unique prescribers AND at least 4 unique pharmacies during the evaluation period, which is from the beginning of an opioid episode (defined above) to the end of an episode or 180 days, whichever is shorter.
- Count the number of distinct members.

H3D2: Use of opioids at high dosage in persons without cancer

- **Numerator**: The number of members ages 18-64 without cancer who received prescriptions for opioids at high dosage (>= 90 morphine milligram equivalents) during the measurement period
- **Denominator**: The number of members ages 18-64 without cancer during the measurement period
- **Measurement period**: Rolling quarters, one-year windows
- **Notes**:
    - This measure is based off MM18 with an adjusted measurement period. The approved evaluation design indicated that the measure steward was MM20, which was incorrect.
    - Due to the temporal specifications of this measure (opioid episode length > 90 days), we calculated this measure quarterly with a one-year look forward period.

- The evaluation design specified the high dosage cutoff at 120 MME, but we updated this to 90 MME to better adhere to MM18 specifications.

Construction

Denominator

- This is identical to the H3D1 denominator. See description above.

Numerator

- Among members identified in the denominator, identify individuals who had an average daily dosage of >= 90 morphine milligram equivalents (MME) during an opioid episode of at least 90 days
- Count the number of distinct members

H4A1: ED utilization for SUD

- **Numerator**: The number of ED visits for SUD among members ages 18-64 during the measurement period
- **Denominator**: The number of members with SUD ages 18-64 during the measurement period
- **Measurement period**: Quarterly, with 11-month lookback window for defining SUD diagnosis
- **Notes**:
  - This measure is based off MM23 with an adjusted measurement period.
  - We also calculate this measure for the OUD subpopulation as a supplemental measure by including only eligible members who had a primary or secondary OUD diagnosis in the lookback window. See Appendix K.2 for results.

Construction

Denominator

- For eligible adults ages 18-64 during the measurement period, count the number of persons (quarter) who had a claim with a primary or secondary diagnosis of SUD during the measurement period or in the prior 11 months.

Numerator

- Amongst the population defined in the denominator, consider all Professional, Outpatient, and Outpatient Claims
- Count the number of persons with ED claims for SUD within any of the claim types during the measurement period

H4A2: IP stays for SUD

- **Numerator**: The number of IP discharges related to a SUD stay among members ages 18-64 during the measurement period
- **Denominator**: The number of members with SUD ages 18-64 during the measurement period
- **Measurement period**: Quarterly, with 11-month lookback window for defining SUD diagnosis
- **Notes**:
    - This measure is based off MM24 with an adjusted measurement period.
    - We also calculate this measure for the OUD subpopulation as a supplemental measure by including only eligible members who had a primary or secondary OUD diagnosis in the lookback window. See Appendix K.2 for results.

Construction

Denominator

- For eligible members ages 18-64 during the measurement period, count the number of persons (quarter) who had a claim with a primary or secondary diagnosis of SUD during the measurement period or in the prior 11 months.

Numerator

- Among the population identified in the denominator, find unique inpatient stay spans related to SUD
- Calculate the total number of IP events using the discharge dates

H4B1: 30-day IP admission rate for SUD following an RT stay among members with SUD

- **Numerator**: The count of inpatient admissions within 30 days of the index date: at least one acute admission for SUD within 30 days of the index discharge date
- **Denominator**: Residential treatment discharges among members with a primary SUD diagnosis
- **Measurement period**: Rolling quarters, 1-year windows
- **Notes**:
    - This measure is based off MM25 with an adjusted measurement period and index locations.

Construction

Denominator

- For eligible members ages 18-64 during the measurement period, consider inpatient, outpatient, and professional claims for the measurement period
- Create RT stay spans by combining claims for the same member and provider, allowing for a 2-day gap in billing to accommodate weekends, with only one RT stay within a 30 day period
- Count records that occur between the first day of the quarter and 11 months after the first day of the quarter.

Numerator

- For eligible members ages 18-64 during the measurement period, identify persons who had an inpatient claim with a primary diagnosis of SUD during the measurement period
- Create inpatient stay spans by combining claims for the same member and provider that have less than a one-day break between claims
- Combine with the inpatient stays with the RT stays identified in the denominator
- Count records that occur between the first day of the quarter and one year after the first day of the quarter

H4B2: 30-day ED visit rate for SUD following an RT stay among members with SUD

- **Numerator**: The count of ED visits within 30 days of the index date: at least one acute visit for SUD within 30 days of the index discharge date

- **Denominator**: Residential treatment discharges among members with a primary SUD diagnosis
- **Measurement period**: Rolling quarters, 1-year windows
- **Notes**:
    - This measure is based off MM25 with an adjusted measurement period and index locations.

Construction

Denominator

- For eligible members ages 18-64 during the measurement period, consider inpatient, outpatient, and professional claims for the measurement period
- Create RT stay spans by combining claims for the same member and provider, allowing for a 2-day gap in billing to accommodate weekends, with only one RT stay within a 30-day period
- Count records that occur between the first day of the quarter and 11 months after the first day of the quarter.

Numerator

- For eligible members ages 18-64 during the measurement period, consider professional and outpatient claims
- Identify claims with a procedure code or revenue code for an ED visit
- Combine the ED visits with the RT stays identified in the denominator
    - Consider only cases where the ED visit date either occurs on the day of the RT discharge or within the 29 days after
- Count records that occur between the first day of the quarter and one year after the first day of the quarter

H4B3: 30-day ED visit rate for SUD following an ED visit among members with SUD

- **Numerator**: The count of ED visits within 30 days of the index date: at least one acute visit for SUD within 30 days of the index discharge date
- **Denominator**: ED visits among members with an SUD diagnosis
- **Measurement period**: Rolling quarters, 1-year windows
- **Notes**:

    - This measure is based off MM23 and MM25 with an adjusted measurement period.

Construction

Denominator

- For eligible adults ages 18-64 during the measurement period, consider professional and outpatient claims
- Identify ED claims among members with a primary or secondary diagnosis of SUD within any of the claim types during the measurement period
- Consider only those were continuously enrolled for at least 30 days within the measurement period
- Count records that occur between the first day of the quarter and 11 months after the first day of the quarter

Numerator

- Use the ED visits dataset from the denominator
- Count records that have another ED visit occurring within 30 days of any given ED visit in the denominator

H5A1: Continuity of pharmacotherapy for opioid use disorder

- **Numerator**: Number of members ages 18-64 who had a diagnosis of OUD and who have at least 180 days of continuous pharmacotherapy with an OUD medication without a gap of more than seven days during the measurement period
- **Denominator**: Members ages 18-64 who had a diagnosis of OUD and at least one claim for an OUD medication during the measurement period
- **Measurement period**: Rolling quarters, one-year windows
- **Notes**:
    - This measure is based off MM22 with an adjusted measurement period, as well as MODRN metric "Continuity of medications for OUD measure," the latter being based on the specification from the National Quality Forum (NQF).

Construction

Denominator

- For eligible members ages 18-64 during the measurement period, identify members (quarter) who had a claim with a primary or secondary diagnosis of OUD during the measurement period.
- Identify first MOUD claim in the measurement period from pharmacy, professional, outpatient, and inpatient claims
    - Relevant claims are identified using appropriate procedure or revenue codes, including a state-specific definition of residential treatment. Diagnoses are identified using appropriate ICD-10 codes.
    - Exclude those who had < 180 data of continuous Medicaid enrollment following the first MOUD claim.
- Count the number of distinct members.

Numerator

- Among members identified in the denominator, identify those with at least 180 days of continuous MOUD
    - Allowing gaps up to 7 days and adjusting for surplus retainable medications.
- Count the number of distinct members.

H6A1: Access to preventive/ambulatory health services for adult Medicaid members with SUD

- **Numerator**: The number of members ages 20-64 with SUD who had an ambulatory or preventive care visit during a 12-month period during the measurement period
- **Denominator**: The number of members ages 20-64 with SUD during the measurement period
- **Measurement period**: Rolling quarters, one-year windows
- **Notes**:
    - This measure is based off MM32 with an adjusted measurement period and with a state-specific set of codes to identify claims for residential treatment.
    - This measure uses a different age criterion than most other measures, requiring that the members be age 20 or older by the end of the measurement period.

- Evaluators updated the measure specification to change 12-month lookback period to a 12-month look-forward period to more closely align with the associated monitoring metric (#32).

Construction

Denominator

- For eligible members ages 20-64 at the end of the measurement period, identify individuals with a primary or secondary SUD diagnosis during the measurement period. Exclude individuals receiving hospice care.
- Count the number of distinct members.

Numerator

- Among members identified in the denominator, identify individuals who have a claim for an ambulatory visit, preventive care visit, telephone visit, online assessment, or residential treatment stay, from paid and denied professional, inpatient, and outpatient claim. Also identify individuals with an ambulatory diagnosis from professional and outpatient diagnosis files.
  - Relevant claims are identified using appropriate procedure or revenue codes, including a state-specific definition of residential treatment. Diagnoses are identified using appropriate ICD-10 codes.
- Count the number of distinct members.

H6A2: Screening for HIV/HCV/HBV

- **Numerator**: The number of members ages 18-64 with SUD who were screened for HIV/HCV/HBV during a 12-month period during the measurement period
- **Denominator**: The number of members ages 18-64 with SUD during the measurement period
- **Measurement period**: Rolling quarters, one-year windows
- **Notes**:
  - This measure is based off MODRN metric, “Screening for HIV, HCV, HBV among Enrollees with an OUD diagnosis”, with an adjusted measurement period, modified age criteria, and includes members with an SUD diagnosis.

- Evaluators updated the measure specification to change 12-month lookback period to a 12-month look-forward period to more closely align with the associated MODRN metric.

Construction

Denominator

- For eligible members ages 18-64, identify individuals with a primary or secondary SUD diagnosis during the measurement period.
- Count the number of distinct members.

Numerator

- Among members identified in the denominator, identify individuals who have a claim for a HIV, HBV, or HCV screening from professional, outpatient, and inpatient paid claims during the measurement period. Relevant claims are identified using appropriate procedure codes.
- Count the number of distinct members.

H6B1: Initiation and engagement of alcohol and other drug abuse or dependence treatment

- **Numerator**: The number of members aged 18 – 64 who initiated treatment and who had two or more additional SUD services or MOUD within 34 days of the initiation visit
- **Denominator**: The number of members ages 18-64 with a new episode of alcohol or other drug abuse or dependence SUD during the measurement period
- **Measurement period**: Rolling quarters, one-year window
- **Notes**:
  - This measure is based off MM 15 with an adjusted measurement period.

Construction

Denominator

- This measure uses the same denominator as H2A1 *(*see H2A1 Initiation of SUD Treatment)

Numerator

- This measure uses the same numerator as H2A *(*see H2A1 Initiation of SUD Treatment) with the additional criterion:
    - Keep members ages 18 – 64 who had two or more additional SUD services or MOUD within 34 days of the initiation visit

H7A1: Rate of overdose deaths

- **Numerator**: Number of overdose deaths among members ages 18 – 64
- **Denominator**: The number of members ages 18 – 64 divided by 1000
- **Measurement period**: Quarter
- **Notes**:
    - This measure is based off MM 27 with an adjusted measurement period.

Construction

Denominator

- Count the number of eligible members ages 18 – 64 during the measurement period who had at least 30 days of continuous enrollment in the measurement period or the 30 days prior to the start of the measurement period.

Numerator

- Among those in the denominator, identify persons who died of a drug overdose and who were Medicaid eligible during the quarter of their death
    - Drug overdose deaths (unintentional, intentional, and undetermined) are identified with ICD-10 death codes in death certificate data
- Count the number of distinct members

H7A2: Rate of overdose deaths due to opioids

- **Numerator**: Number of overdose deaths among members ages 18 – 64 due to opioids
- **Denominator**: The number of members ages 18 – 64 divided by 1000
- **Measurement period**: Quarter
- **Notes**:

- This measure is based off MM 27 with an adjusted measurement period.

Construction

Denominator

- Count the number of eligible members ages 18 – 64 during the measurement period who had at least 30 days of continuous enrollment in the measurement period or the 30 days prior to the start of the measurement period.

Numerator

- Among those in the denominator, identify persons who died of an opioid overdose and who were Medicaid eligible during the quarter of their death
  - Drug overdose deaths (unintentional, intentional, and undetermined) are identified with ICD-10 death codes in death certificate data
- Count the number of distinct members

H8A1: Total costs

- **Numerator**: The total costs from fee-for-service and encounter claims, including inpatient, outpatient, professional medical, pharmacy, dental, and long-term care for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction

Denominator

- Identify eligible members ages 18 – 64 during the measurement period
- Combine eligible members with SUD claims and identify members who did not go more than 11 months without an SUD claim
- Count the number of total months each member that was identified above was eligible during the measurement period and calculate the total number of months for all members

Numerator

- Total the inpatient, outpatient ED, outpatient non-ED, pharmacy, long-term care, dental, and professional costs, as were defined in other cost measures

H8A2: Total federal costs

- **Numerator**: Total Medicaid costs * Federal Medicaid percentage, for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction

Denominator

- This measure uses the same denominator as H8A1 *(*see H8A1 Total Costs)

Numerator

- For each claim, multiply the cost associated with that claim by the federal reimbursement rate.
- Combine with eligible members from the denominator
- Total the federal costs for all inpatient, outpatient ED, outpatient non-ED, pharmacy, long-term care, dental, and professional claims

H8A3: SUD-IMD costs

- **Numerator**: Costs with SUD diagnosis and/or SUD-related code (procedure, revenue, POS, provider type) for the population of members with an SUD diagnosis who were treated in an IMD
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**: The measure specifications for MM 28 were followed for the construction of this measure

Construction

Denominator

- This measure uses the same denominator as H8A1 (see H8A1 Total Costs)

Numerator

- Total the cost of claims per member related to SUD treatment services provided in an IMD across outpatient, professional, inpatient, and pharmacy claims
- Create spans for RT stays and attribute the cost of the stay to the quarter when the RT stay ended.
- Create spans for inpatient stays and attribute the cost of the stay to the quarter when the inpatient stay ended

H8A4: SUD-other costs

- **Numerator**: Costs with SUD diagnosis and/or SUD-related code (procedure, revenue, POS, provider type) for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**: The measure specifications for MM 28 were followed for the construction of this measure

Construction

Denominator

- This measure uses the same denominator as H8A1 *(*see H8A1 Total Costs)

Numerator

- Total the cost of claims per member related to SUD treatment services across outpatient, professional, inpatient, and pharmacy claims
  - Create spans for RT stays and attribute the cost of the stay to the quarter when the RT stay ended.
  - Create spans for inpatient stays and attribute the cost of the stay to the quarter when the inpatient stay ended

H8A5: Non-SUD costs

- **Numerator**: Costs without SUD diagnosis and without SUD-related code (procedure, revenue, POS, provider type) for the population of members with a SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction

Denominator

- This measure uses the same denominator as H8A1 *(*see H8A1 Total Costs)

Numerator

- Subtract the total SUD costs from the total costs.

H8A6: Outpatient costs – non-ED

- **Numerator**: Costs associated with outpatient and professional medical and dental, non-ED claims for the population of members with a SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction

Denominator

- This measure uses the same denominator as H8A1 *(*see H8A1 Total Costs)

Numerator

- Among the members identified in the denominator, total all the costs associated with outpatient, professional, or dental non-ED claims
  - Create spans for RT stays and attribute the cost of the stay to the quarter when the RT stay ended.
  - Exclude claims identified in H8A7 as Outpatient ED claims

H8A7: Outpatient costs – ED

- **Numerator**: Costs associated with ED claims that do not result in an inpatient admission for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction
Denominator

- This measure uses the same denominator as H8A1 *(*see H8A1 Total Costs)

Numerator

- Among the members identified in the denominator, identify ED outpatient claims by appropriate revenue and procedure codes and calculate the total

H8A8: Inpatient costs

- **Numerator**: Costs associated with inpatient claims for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction
Denominator

- This measure uses the same denominator as H8A1 (see H8A1 Total Costs)

Numerator

- Among members identified in the denominator, calculate the total of costs associated with inpatient stays
  - Calculate inpatient stay spans
  - The inpatient discharge date determines the quarter for the entire stay

H8A9: Pharmacy costs

- **Numerator**: Costs associated with pharmacy claims for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction
Denominator

- This measure uses the same denominator as H8A1 (see H8A1 Total Costs)

Numerator

- Among members identified in the denominator total all the costs associated with pharmacy claims

H8A10: Long-term costs

- **Numerator**: Costs associated with long-term care claims for the population of members with an SUD diagnosis
- **Denominator**: Total member-months for members with SUD
- **Measurement period**: Quarter
- **Notes**:

Construction
Denominator

- This measure uses the same denominator as H8A1 (see H8A1 Total Costs)

Numerator

- Among members identified in the denominator total all the costs associated with long-term care

K.2 Evaluation Measure Tables

Table 40: (H1A1) SUD provider availability ratio

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	12119	121173	0.100
2017	Q2	12277	123879	0.099
2017	Q3	12358	123551	0.100
2017	Q4	11932	120282	0.099
2018	Q1	15526	128547	0.121
2018	Q2	16078	130969	0.123
2018	Q3	22726	131459	0.173
2018	Q4	22672	129705	0.175
2019	Q1	23383	133233	0.176
2019	Q2	23873	136731	0.175
2019	Q3	24489	139069	0.176
2019	Q4	24673	137305	0.180
2020	Q1	25238	141134	0.179
2020	Q2	23185	136694	0.170
2020	Q3	25431	148942	0.171
2020	Q4	25323	147487	0.172
2021	Q1	26681	154010	0.173
2021	Q2	27516	159380	0.173
2021	Q3	27499	158991	0.173
2021	Q4	26262	154861	0.170
2022	Q1	27069	158500	0.171
2022	Q2	27565	163280	0.169
2022	Q3	25995	160902	0.162
2022	Q4	25785	159038	0.162
2023	Q1	27413	165887	0.165
2023	Q2	27149	166093	0.163
2023	Q3	26887	160620	0.167

Table 41: (H1A1) SUD provider availability ratio (alternative specification: billing provider)

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	4885	121173	0.040

2017	Q2	5070	123879	0.041
2017	Q3	4878	123551	0.039
2017	Q4	4766	120282	0.040
2018	Q1	5001	128547	0.039
2018	Q2	5133	130969	0.039
2018	Q3	5487	131459	0.042
2018	Q4	5457	129705	0.042
2019	Q1	5566	133233	0.042
2019	Q2	5789	136731	0.042
2019	Q3	5803	139069	0.042
2019	Q4	5774	137305	0.042
2020	Q1	5890	141134	0.042
2020	Q2	5655	136694	0.041
2020	Q3	5920	148942	0.04
2020	Q4	6003	147487	0.041
2021	Q1	6265	154010	0.041
2021	Q2	6457	159380	0.041
2021	Q3	6740	158991	0.042
2021	Q4	6269	154861	0.040
2022	Q1	6434	158500	0.041
2022	Q2	6540	163280	0.040
2022	Q3	6491	160897	0.040
2022	Q4	6699	159035	0.042
2023	Q1	7213	165879	0.043
2023	Q2	7176	166089	0.043
2023	Q3	7290	160614	0.045

Table 42: (H1A2) SUD provider availability ratio – MOUD

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	2119	61034	0.035
2017	Q2	2268	62306	0.036
2017	Q3	2366	62445	0.038
2017	Q4	2432	61330	0.040
2018	Q1	2690	64983	0.041
2018	Q2	2807	66035	0.043
2018	Q3	3000	66416	0.045
2018	Q4	3118	66834	0.047
2019	Q1	3389	68130	0.050

2019	Q2	3615	69848	0.052
2019	Q3	3707	71716	0.052
2019	Q4	3696	71468	0.052
2020	Q1	3673	73569	0.050
2020	Q2	3491	71464	0.049
2020	Q3	3756	76052	0.049
2020	Q4	3778	76439	0.049
2021	Q1	3986	78348	0.051
2021	Q2	4202	79884	0.053
2021	Q3	4631	80864	0.057
2021	Q4	4111	79952	0.051
2022	Q1	4182	81083	0.052
2022	Q2	4269	81450	0.052
2022	Q3	3968	81069	0.049
2022	Q4	4090	80431	0.051
2023	Q1	4259	82667	0.052
2023	Q2	4464	82791	0.054
2023	Q3	4614	80322	0.057

Table 43: (H1A2) SUD provider availability ratio – MOUD (alternative specification: billing provider)

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	2005	61034	0.033
2017	Q2	2145	62306	0.034
2017	Q3	2204	62445	0.035
2017	Q4	2282	61330	0.037
2018	Q1	2413	64983	0.037
2018	Q2	2490	66035	0.038
2018	Q3	2601	66416	0.039
2018	Q4	2680	66834	0.040
2019	Q1	2843	68130	0.042
2019	Q2	2963	69848	0.042
2019	Q3	3015	71716	0.042
2019	Q4	3080	71468	0.043
2020	Q1	3159	73569	0.043
2020	Q2	3048	71464	0.043
2020	Q3	3207	76052	0.042

2020	Q4	3319	76439	0.043
2021	Q1	3458	78348	0.044
2021	Q2	3565	79884	0.045
2021	Q3	3867	80864	0.048
2021	Q4	3463	79952	0.043
2022	Q1	3583	81083	0.044
2022	Q2	3640	81450	0.045
2022	Q3	3782	81066	0.047
2022	Q4	3914	80428	0.049
2023	Q1	4072	82664	0.049
2023	Q2	4327	82788	0.052
2023	Q3	4459	80320	0.056

Table 44: (H1B1) SUD provider availability ratio by level of care

Year	Quarter	Level	Numerator	Denominator	Ratio
2018	Q3	Level 1	21429	131459	163.009
2018	Q4	Level 1	21319	129705	164.365
2019	Q1	Level 1	21936	133233	164.644
2019	Q2	Level 1	22238	136731	162.641
2019	Q3	Level 1	22755	139069	163.624
2019	Q4	Level 1	23045	137305	167.838
2020	Q1	Level 1	23600	141134	167.217
2020	Q2	Level 1	21589	136694	157.937
2020	Q3	Level 1	23710	148942	159.189
2020	Q4	Level 1	23607	147487	160.062
2021	Q1	Level 1	24878	154010	161.535
2021	Q2	Level 1	25629	159380	160.804
2021	Q3	Level 1	25448	158991	160.059
2021	Q4	Level 1	24701	154861	159.504
2022	Q1	Level 1	25607	158500	161.558
2022	Q2	Level 1	26045	163280	159.511
2022	Q3	Level 1	24471	160897	152.091
2022	Q4	Level 1	24130	159035	151.728
2023	Q1	Level 1	25710	165879	154.992
2023	Q2	Level 1	25320	166089	152.448
2023	Q3	Level 1	24887	160614	154.949
2018	Q3	Level 2	2486	131459	18.911
2018	Q4	Level 2	2432	129705	18.750

2019	Q1	Level 2	2536	133233	19.034
2019	Q2	Level 2	2534	136731	18.533
2019	Q3	Level 2	2661	139069	19.134
2019	Q4	Level 2	2696	137305	19.635
2020	Q1	Level 2	2645	141134	18.741
2020	Q2	Level 2	2281	136694	16.687
2020	Q3	Level 2	2648	148942	17.779
2020	Q4	Level 2	2715	147487	18.408
2021	Q1	Level 2	2639	154010	17.135
2021	Q2	Level 2	2700	159380	16.941
2021	Q3	Level 2	2795	158991	17.580
2021	Q4	Level 2	2803	154861	18.100
2022	Q1	Level 2	2822	158500	17.804
2022	Q2	Level 2	2969	163280	18.183
2022	Q3	Level 2	3137	160897	19.497
2022	Q4	Level 2	3192	159035	20.071
2023	Q1	Level 2	3126	165879	18.845
2023	Q2	Level 2	3007	166089	18.105
2023	Q3	Level 2	3019	160614	18.797
2018	Q3	Level 3	115	131459	0.875
2018	Q4	Level 3	113	129705	0.871
2019	Q1	Level 3	119	133233	0.893
2019	Q2	Level 3	101	136731	0.739
2019	Q3	Level 3	85	139069	0.611
2019	Q4	Level 3	114	137305	0.830
2020	Q1	Level 3	124	141134	0.879
2020	Q2	Level 3	129	136694	0.944
2020	Q3	Level 3	102	148942	0.685
2020	Q4	Level 3	107	147487	0.725
2021	Q1	Level 3	92	154010	0.597
2021	Q2	Level 3	96	159380	0.602
2021	Q3	Level 3	102	158991	0.642
2021	Q4	Level 3	110	154861	0.710
2022	Q1	Level 3	117	158500	0.738
2022	Q2	Level 3	110	163280	0.674
2022	Q3	Level 3	331	160897	2.057
2022	Q4	Level 3	309	159035	1.943
2023	Q1	Level 3	299	165879	1.803
2023	Q2	Level 3	230	166089	1.385
2023	Q3	Level 3	232	160614	1.444

Table 45: (H1B1) SUD provider availability ratio by level of care (alternative specification: billing provider)

Year	Quarter	Level	Numerator	Denominator	Ratio
2018	Q3	Level 1	2917	131459	22.189
2018	Q4	Level 1	2822	129705	21.757
2019	Q1	Level 1	2789	133233	20.933
2019	Q2	Level 1	2897	136731	21.188
2019	Q3	Level 1	2864	139069	20.594
2019	Q4	Level 1	2765	137305	20.138
2020	Q1	Level 1	2846	141134	20.165
2020	Q2	Level 1	2683	136694	19.628
2020	Q3	Level 1	2775	148942	18.631
2020	Q4	Level 1	2761	147487	18.720
2021	Q1	Level 1	2895	154010	18.797
2021	Q2	Level 1	2949	159380	18.503
2021	Q3	Level 1	2924	158991	18.391
2021	Q4	Level 1	2899	154861	18.720
2022	Q1	Level 1	2965	158500	18.707
2022	Q2	Level 1	2987	163280	18.294
2022	Q3	Level 1	2748	160897	17.079
2022	Q4	Level 1	2866	159035	18.021
2023	Q1	Level 1	3170	165879	19.110
2023	Q2	Level 1	2898	166089	17.448
2023	Q3	Level 1	2858	160614	17.794
2018	Q3	Level 2	458	131459	3.484
2018	Q4	Level 2	411	129705	3.169
2019	Q1	Level 2	373	133233	2.800
2019	Q2	Level 2	381	136731	2.786
2019	Q3	Level 2	386	139069	2.776
2019	Q4	Level 2	369	137305	2.687
2020	Q1	Level 2	342	141134	2.423
2020	Q2	Level 2	360	136694	2.634
2020	Q3	Level 2	379	148942	2.545
2020	Q4	Level 2	371	147487	2.515
2021	Q1	Level 2	395	154010	2.565
2021	Q2	Level 2	403	159380	2.529
2021	Q3	Level 2	387	158991	2.434

2021	Q4	Level 2	413	154861	2.667
2022	Q1	Level 2	449	158500	2.833
2022	Q2	Level 2	451	163280	2.762
2022	Q3	Level 2	464	160897	2.884
2022	Q4	Level 2	486	159035	3.056
2023	Q1	Level 2	603	165879	3.635
2023	Q2	Level 2	486	166089	2.926
2023	Q3	Level 2	512	160614	3.188
2018	Q3	Level 3	60	131459	0.456
2018	Q4	Level 3	54	129705	0.416
2019	Q1	Level 3	58	133233	0.435
2019	Q2	Level 3	63	136731	0.461
2019	Q3	Level 3	54	139069	0.388
2019	Q4	Level 3	62	137305	0.452
2020	Q1	Level 3	72	141134	0.510
2020	Q2	Level 3	66	136694	0.483
2020	Q3	Level 3	65	148942	0.436
2020	Q4	Level 3	73	147487	0.495
2021	Q1	Level 3	68	154010	0.442
2021	Q2	Level 3	76	159380	0.477
2021	Q3	Level 3	72	158991	0.453
2021	Q4	Level 3	73	154861	0.471
2022	Q1	Level 3	78	158500	0.492
2022	Q2	Level 3	81	163280	0.496
2022	Q3	Level 3	173	160897	1.075
2022	Q4	Level 3	173	159035	1.088
2023	Q1	Level 3	199	165879	1.200
2023	Q2	Level 3	171	166089	1.030
2023	Q3	Level 3	162	160614	1.009

Table 46: (H1C1) SUD provider availability ratio within underserved areas

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	129	3583	0.036
2017	Q2	119	3733	0.032
2017	Q3	127	3772	0.034
2017	Q4	127	3653	0.035
2018	Q1	168	3941	0.043
2018	Q2	170	4007	0.042

2018	Q3	277	4163	0.067
2018	Q4	283	4261	0.066
2019	Q1	292	4421	0.066
2019	Q2	299	4379	0.068
2019	Q3	299	4464	0.067
2019	Q4	296	4321	0.069
2020	Q1	305	4402	0.069
2020	Q2	293	4248	0.069
2020	Q3	306	4692	0.065
2020	Q4	311	4624	0.067
2021	Q1	356	4683	0.076
2021	Q2	371	4752	0.078
2021	Q3	371	4660	0.080
2021	Q4	399	4534	0.088
2022	Q1	388	4711	0.082
2022	Q2	407	4836	0.084
2022	Q3	373	4753	0.078
2022	Q4	341	4689	0.073
2023	Q1	355	4708	0.075
2023	Q2	331	4651	0.071
2023	Q3	326	4457	0.073

Table 47: (H1C1) SUD provider availability ratio within underserved areas (alternative specification: billing provider)

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	82	3583	0.023
2017	Q2	82	3733	0.022
2017	Q3	73	3772	0.019
2017	Q4	73	3653	0.020
2018	Q1	77	3941	0.020
2018	Q2	80	4007	0.020
2018	Q3	97	4163	0.023
2018	Q4	106	4261	0.025
2019	Q1	81	4421	0.018
2019	Q2	95	4379	0.022
2019	Q3	88	4464	0.020
2019	Q4	95	4321	0.022

2020	Q1	92	4402	0.021
2020	Q2	94	4248	0.022
2020	Q3	91	4692	0.019
2020	Q4	91	4624	0.020
2021	Q1	102	4683	0.022
2021	Q2	106	4752	0.022
2021	Q3	105	4660	0.023
2021	Q4	101	4534	0.022
2022	Q1	103	4711	0.022
2022	Q2	103	4836	0.021
2022	Q3	101	4753	0.021
2022	Q4	103	4689	0.022
2023	Q1	112	4708	0.024
2023	Q2	105	4651	0.023
2023	Q3	110	4457	0.025

Table 48: (H2A1) Initiation of SUD Treatment

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	56760	117663	0.482
2018	Q2	55081	112783	0.488
2018	Q3	55605	112734	0.493
2018	Q4	54016	111040	0.486
2019	Q1	54669	114656	0.477
2019	Q2	53883	112344	0.480
2019	Q3	53826	111424	0.483
2019	Q4	53181	108719	0.489
2020	Q1	55720	113680	0.49
2020	Q2	55547	114668	0.484
2020	Q3	58778	122661	0.479
2020	Q4	60611	127292	0.476
2021	Q1	63396	133408	0.475
2021	Q2	61565	129757	0.474
2021	Q3	61755	130079	0.475
2021	Q4	61181	131192	0.466
2022	Q1	62443	135786	0.460
2022	Q2	59081	133047	0.444
2022	Q3	57871	135146	0.428
2022	Q4	57041	135532	0.421

Table 49: (H2B1) MOUD Usage

Year	Quarter	Numerator	Denominator	Ratio
2017	Q1	33700	61034	0.552
2017	Q2	35017	62306	0.562
2017	Q3	35933	62445	0.575
2017	Q4	36133	61330	0.589
2018	Q1	37762	64983	0.581
2018	Q2	38656	66035	0.585
2018	Q3	39433	66416	0.594
2018	Q4	41025	66834	0.614
2019	Q1	42619	68130	0.626
2019	Q2	44492	69848	0.637
2019	Q3	45566	71716	0.635
2019	Q4	46319	71468	0.648
2020	Q1	47592	73569	0.647
2020	Q2	48324	71464	0.676
2020	Q3	51657	76052	0.679
2020	Q4	52622	76439	0.688
2021	Q1	53639	78348	0.685
2021	Q2	54784	79884	0.686
2021	Q3	56033	80864	0.693
2021	Q4	55986	79952	0.700
2022	Q1	56939	81083	0.702
2022	Q2	57534	81450	0.706
2022	Q3	57842	81069	0.713
2022	Q4	58350	80431	0.725
2023	Q1	59284	82667	0.717
2023	Q2	58983	82791	0.712
2023	Q3	57147	80322	0.711

Table 50: (H2B1) MOUD Usage Stratified by Race/Ethnicity

Year	Quarter	Race/Ethnicity	Numerator	Denominator	Ratio
2017	Q1	Black, Non-Hispanic	1676	4858	0.345

2017	Q2	Black, Non-Hispanic	1781	5000	0.356
2017	Q3	Black, Non-Hispanic	1868	4838	0.386
2017	Q4	Black, Non-Hispanic	1912	4790	0.399
2018	Q1	Black, Non-Hispanic	2010	5295	0.38
2018	Q2	Black, Non-Hispanic	2103	5464	0.385
2018	Q3	Black, Non-Hispanic	2143	5270	0.407
2018	Q4	Black, Non-Hispanic	2255	5306	0.425
2019	Q1	Black, Non-Hispanic	2322	5243	0.443
2019	Q2	Black, Non-Hispanic	2461	5647	0.436
2019	Q3	Black, Non-Hispanic	2566	5812	0.442
2019	Q4	Black, Non-Hispanic	2615	5928	0.441
2020	Q1	Black, Non-Hispanic	2738	6315	0.434
2020	Q2	Black, Non-Hispanic	2677	5839	0.458
2020	Q3	Black, Non-Hispanic	2825	6026	0.469
2020	Q4	Black, Non-Hispanic	2942	6075	0.484
2021	Q1	Black, Non-Hispanic	3093	6337	0.488
2021	Q2	Black, Non-Hispanic	3198	6523	0.49
2021	Q3	Black, Non-Hispanic	3261	6618	0.493
2021	Q4	Black, Non-Hispanic	3362	6675	0.504
2022	Q1	Black, Non-Hispanic	3417	6706	0.51
2022	Q2	Black, Non-Hispanic	3465	6698	0.517
2022	Q3	Black, Non-Hispanic	3550	6860	0.517
2022	Q4	Black, Non-Hispanic	3581	6793	0.527
2023	Q1	Black, Non-Hispanic	3683	7144	0.516
2023	Q2	Black, Non-Hispanic	3726	7320	0.509
2023	Q3	Black, Non-Hispanic	3665	7122	0.515
2017	Q1	Hispanic	557	1054	0.528
2017	Q2	Hispanic	578	1093	0.529
2017	Q3	Hispanic	582	1106	0.526
2017	Q4	Hispanic	615	1089	0.565
2018	Q1	Hispanic	702	1306	0.538
2018	Q2	Hispanic	728	1308	0.557
2018	Q3	Hispanic	753	1328	0.567
2018	Q4	Hispanic	737	1297	0.568
2019	Q1	Hispanic	805	1372	0.587
2019	Q2	Hispanic	836	1407	0.594
2019	Q3	Hispanic	863	1470	0.587
2019	Q4	Hispanic	876	1485	0.59
2020	Q1	Hispanic	924	1526	0.606
2020	Q2	Hispanic	932	1490	0.626
2020	Q3	Hispanic	993	1596	0.622

2020	Q4	Hispanic	1052	1638	0.642
2021	Q1	Hispanic	1087	1721	0.632
2021	Q2	Hispanic	1121	1764	0.635
2021	Q3	Hispanic	1175	1814	0.648
2021	Q4	Hispanic	1200	1828	0.656
2022	Q1	Hispanic	1238	1874	0.661
2022	Q2	Hispanic	1298	1915	0.678
2022	Q3	Hispanic	1328	1924	0.69
2022	Q4	Hispanic	1322	1903	0.695
2023	Q1	Hispanic	1370	2019	0.679
2023	Q2	Hispanic	1344	1955	0.687
2023	Q3	Hispanic	1309	1909	0.686
2017	Q1	White, Non-Hispanic	29005	50398	0.576
2017	Q2	White, Non-Hispanic	30152	51475	0.586
2017	Q3	White, Non-Hispanic	30832	51702	0.596
2017	Q4	White, Non-Hispanic	30965	50788	0.61
2018	Q1	White, Non-Hispanic	32750	54350	0.603
2018	Q2	White, Non-Hispanic	33540	55315	0.606
2018	Q3	White, Non-Hispanic	34264	56022	0.612
2018	Q4	White, Non-Hispanic	35775	56558	0.633
2019	Q1	White, Non-Hispanic	37183	57790	0.643
2019	Q2	White, Non-Hispanic	38854	59086	0.658
2019	Q3	White, Non-Hispanic	39762	60650	0.656
2019	Q4	White, Non-Hispanic	40412	60338	0.67
2020	Q1	White, Non-Hispanic	41484	61939	0.67
2020	Q2	White, Non-Hispanic	42199	60382	0.699
2020	Q3	White, Non-Hispanic	45118	64459	0.7
2020	Q4	White, Non-Hispanic	45851	64715	0.709
2021	Q1	White, Non-Hispanic	46665	66191	0.705
2021	Q2	White, Non-Hispanic	47624	67403	0.707
2021	Q3	White, Non-Hispanic	48740	68281	0.714
2021	Q4	White, Non-Hispanic	48564	67352	0.721
2022	Q1	White, Non-Hispanic	49353	68214	0.724
2022	Q2	White, Non-Hispanic	49822	68584	0.726
2022	Q3	White, Non-Hispanic	50013	68034	0.735
2022	Q4	White, Non-Hispanic	50470	67620	0.746
2023	Q1	White, Non-Hispanic	51176	69210	0.739
2023	Q2	White, Non-Hispanic	50873	69141	0.736
2023	Q3	White, Non-Hispanic	49265	67075	0.734

Table 51: (H2B2) Residential Treatment Stays with MOUD

Year	Quarter	Numerator	Denominator	Ratio
2018	Q1	1009	2086	0.484
2018	Q2	916	1832	0.500
2018	Q3	1330	2629	0.506
2018	Q4	1395	2971	0.470
2019	Q1	1486	2831	0.525
2019	Q2	1591	2843	0.560
2019	Q3	1654	3168	0.522
2019	Q4	1632	3044	0.536
2020	Q1	1653	2955	0.559
2020	Q2	1225	2056	0.596
2020	Q3	1607	2624	0.612
2020	Q4	1636	2639	0.620
2021	Q1	1590	2523	0.63
2021	Q2	1650	2582	0.639
2021	Q3	1811	2842	0.637
2021	Q4	1568	2590	0.605
2022	Q1	1658	2662	0.623
2022	Q2	1646	2517	0.654
2022	Q3	1711	2521	0.679
2022	Q4	1650	2429	0.679
2023	Q1	1847	2698	0.685
2023	Q2	1539	2205	0.698
2023	Q3	1401	2084	0.672

Table 52: (H2B2) Residential Treatment Stays with MOUD Stratified by Race/Ethnicity

Year	Quarter	Race/Ethnicity	Numerator	Denominator	Ratio
2018	Q1	Black, Non-Hispanic	54	125	0.432
2018	Q2	Black, Non-Hispanic	47	103	0.456
2018	Q3	Black, Non-Hispanic	73	157	0.465
2018	Q4	Black, Non-Hispanic	102	202	0.505
2019	Q1	Black, Non-Hispanic	82	197	0.416
2019	Q2	Black, Non-Hispanic	90	199	0.452
2019	Q3	Black, Non-Hispanic	127	248	0.512

2019	Q4	Black, Non-Hispanic	136	254	0.535
2020	Q1	Black, Non-Hispanic	121	216	0.56
2020	Q2	Black, Non-Hispanic	80	163	0.491
2020	Q3	Black, Non-Hispanic	109	205	0.532
2020	Q4	Black, Non-Hispanic	144	210	0.686
2021	Q1	Black, Non-Hispanic	107	204	0.525
2021	Q2	Black, Non-Hispanic	125	222	0.563
2021	Q3	Black, Non-Hispanic	128	212	0.604
2021	Q4	Black, Non-Hispanic	117	201	0.582
2022	Q1	Black, Non-Hispanic	131	234	0.56
2022	Q2	Black, Non-Hispanic	138	231	0.597
2022	Q3	Black, Non-Hispanic	145	232	0.625
2022	Q4	Black, Non-Hispanic	106	193	0.549
2023	Q1	Black, Non-Hispanic	137	249	0.55
2023	Q2	Black, Non-Hispanic	163	257	0.634
2023	Q3	Black, Non-Hispanic	122	225	0.542
2018	Q1	Hispanic	18	43	0.419
2018	Q2	Hispanic	15	35	0.429
2018	Q3	Hispanic	29	53	0.547
2018	Q4	Hispanic	19	40	0.475
2019	Q1	Hispanic	36	58	0.621
2019	Q2	Hispanic	42	74	0.568
2019	Q3	Hispanic	44	79	0.557
2019	Q4	Hispanic	44	72	0.611
2020	Q1	Hispanic	41	75	0.547
2020	Q2	Hispanic	31	58	0.534
2020	Q3	Hispanic	45	67	0.672
2020	Q4	Hispanic	64	87	0.736
2021	Q1	Hispanic	48	72	0.667
2021	Q2	Hispanic	49	86	0.57
2021	Q3	Hispanic	55	86	0.64
2021	Q4	Hispanic	54	84	0.643
2022	Q1	Hispanic	66	91	0.725
2022	Q2	Hispanic	54	78	0.692
2022	Q3	Hispanic	48	68	0.706
2022	Q4	Hispanic	62	75	0.827
2023	Q1	Hispanic	61	99	0.616
2023	Q2	Hispanic	61	83	0.735
2023	Q3	Hispanic	41	61	0.672
2018	Q1	White, Non-Hispanic	842	1691	0.498
2018	Q2	White, Non-Hispanic	778	1523	0.511

2018	Q3	White, Non-Hispanic	1087	2111	0.515
2018	Q4	White, Non-Hispanic	1130	2377	0.475
2019	Q1	White, Non-Hispanic	1236	2270	0.544
2019	Q2	White, Non-Hispanic	1292	2244	0.576
2019	Q3	White, Non-Hispanic	1289	2427	0.531
2019	Q4	White, Non-Hispanic	1281	2343	0.547
2020	Q1	White, Non-Hispanic	1326	2331	0.569
2020	Q2	White, Non-Hispanic	978	1593	0.614
2020	Q3	White, Non-Hispanic	1295	2073	0.625
2020	Q4	White, Non-Hispanic	1308	2117	0.618
2021	Q1	White, Non-Hispanic	1291	2009	0.643
2021	Q2	White, Non-Hispanic	1357	2068	0.656
2021	Q3	White, Non-Hispanic	1495	2322	0.644
2021	Q4	White, Non-Hispanic	1294	2127	0.608
2022	Q1	White, Non-Hispanic	1345	2133	0.631
2022	Q2	White, Non-Hispanic	1326	2008	0.66
2022	Q3	White, Non-Hispanic	1426	2066	0.69
2022	Q4	White, Non-Hispanic	1369	1994	0.687
2023	Q1	White, Non-Hispanic	1529	2184	0.700
2023	Q2	White, Non-Hispanic	1212	1722	0.704
2023	Q3	White, Non-Hispanic	1148	1648	0.697

Table 53: (H3A1) IP Follow-Up

Year	Quarter	Numerator	Denominator	Rate
2017	Q1	2134	5257	0.406
2017	Q2	2297	5652	0.406
2017	Q3	2409	5741	0.420
2017	Q4	2502	5853	0.427
2018	Q1	2568	6003	0.428
2018	Q2	2687	6366	0.422
2018	Q3	2720	6426	0.423
2018	Q4	2569	6041	0.425
2019	Q1	2384	5563	0.429
2019	Q2	2516	5784	0.435
2019	Q3	2504	5645	0.444
2019	Q4	2308	5183	0.445
2020	Q1	2149	4750	0.452
2020	Q2	2250	5125	0.439

2020	Q3	2342	5498	0.426
2020	Q4	2285	5187	0.441
2021	Q1	2478	5544	0.447
2021	Q2	2535	5735	0.442
2021	Q3	2323	5135	0.452
2021	Q4	1931	4397	0.439
2022	Q1	2013	4606	0.437
2022	Q2	2042	4749	0.430
2022	Q3	2032	4499	0.452
2022	Q4	1827	4007	0.456
2023	Q1	1819	4124	0.441
2023	Q2	1831	4213	0.435

Table 54: (H3B1) RT Follow-Up

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	2568	3710	0.692
2018	Q2	2997	4506	0.665
2018	Q3	3713	5690	0.653
2018	Q4	4109	6193	0.663
2019	Q1	4467	6775	0.659
2019	Q2	4844	7341	0.660
2019	Q3	5328	7888	0.675
2019	Q4	5559	7933	0.701
2020	Q1	5140	7338	0.700
2020	Q2	4316	6256	0.69
2020	Q3	4996	7281	0.686
2020	Q4	5129	7326	0.700
2021	Q1	5147	7358	0.700
2021	Q2	5676	8111	0.700
2021	Q3	5739	8238	0.697
2021	Q4	5600	7992	0.701
2022	Q1	6042	8566	0.705
2022	Q2	6522	9135	0.714
2022	Q3	6632	9202	0.721
2022	Q4	6770	9341	0.725
2023	Q1	6747	9261	0.729
2023	Q2	6566	9106	0.721

Table 55: (H3C1) ED Follow-Up

Year	Quarter	Numerator	Denominator	Rate
2017	Q1	2538	10479	0.242
2017	Q2	2659	11279	0.236
2017	Q3	2410	10488	0.230
2017	Q4	2203	9430	0.234
2018	Q1	2221	9707	0.229
2018	Q2	2496	10772	0.232
2018	Q3	2641	10728	0.246
2018	Q4	2547	9693	0.263
2019	Q1	2896	10698	0.271
2019	Q2	3377	12302	0.275
2019	Q3	3403	12279	0.277
2019	Q4	3103	11047	0.281
2020	Q1	2832	10422	0.272
2020	Q2	3007	11748	0.256
2020	Q3	3203	12223	0.262
2020	Q4	2996	11085	0.270
2021	Q1	3305	12377	0.267
2021	Q2	3553	13540	0.262
2021	Q3	3359	12536	0.268
2021	Q4	2855	10360	0.276
2022	Q1	2886	10759	0.268
2022	Q2	3120	11540	0.270
2022	Q3	3032	11002	0.276
2022	Q4	2764	10184	0.271
2023	Q1	2754	10484	0.263
2023	Q2	2789	10952	0.255

Table 56: (H3D1) Use of Opioids from Multiple Providers in Persons Without Cancer

Year	Quarter	Numerator	Denominator	Rate
2017	Q1	2502	87965	28.443
2017	Q2	1902	78800	24.137
2017	Q3	1483	72241	20.529
2017	Q4	1274	66385	19.191
2018	Q1	1276	64037	19.926
2018	Q2	1172	59340	19.751

2018	Q3	1127	56917	19.801
2018	Q4	1085	54511	19.904
2019	Q1	1058	52888	20.005
2019	Q2	996	49630	20.069
2019	Q3	877	48925	17.925
2019	Q4	729	48604	14.999
2020	Q1	682	49128	13.882
2020	Q2	605	48047	12.592
2020	Q3	577	48307	11.944
2020	Q4	537	47358	11.339
2021	Q1	513	46700	10.985
2021	Q2	468	44218	10.584
2021	Q3	475	43312	10.967
2021	Q4	439	42112	10.425
2022	Q1	471	42359	11.119
2022	Q2	524	42403	12.358
2022	Q3	596	41383	14.402
2022	Q4	674	40177	16.776

Table 57: (H3D2) Use of Opioids at High Dosage in Persons Without Cancer

Year	Quarter	Numerator	Denominator	Rate
2017	Q1	3572	87965	40.607
2017	Q2	3150	78800	39.975
2017	Q3	2879	72241	39.853
2017	Q4	2592	66385	39.045
2018	Q1	2415	64037	37.713
2018	Q2	2132	59340	35.929
2018	Q3	2019	56917	35.473
2018	Q4	1858	54511	34.085
2019	Q1	1750	52888	33.089
2019	Q2	1557	49630	31.372
2019	Q3	1463	48925	29.903
2019	Q4	1386	48604	28.516
2020	Q1	1319	49128	26.848
2020	Q2	1222	48047	25.433
2020	Q3	1172	48307	24.261
2020	Q4	1122	47358	23.692
2021	Q1	1075	46700	23.019

2021	Q2	961	44218	21.733
2021	Q3	925	43312	21.357
2021	Q4	920	42112	21.847
2022	Q1	916	42359	21.625
2022	Q2	885	42403	20.871
2022	Q3	874	41383	21.120
2022	Q4	932	40177	23.197

Table 58: (H4A1) Emergency Department Visits for SUD

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	40369	246889	163.511
2018	Q2	44288	246381	179.754
2018	Q3	46523	245239	189.705
2018	Q4	40893	242264	168.795
2019	Q1	40873	242275	168.705
2019	Q2	45273	245620	184.321
2019	Q3	47492	247335	192.015
2019	Q4	42048	248093	169.485
2020	Q1	44193	251062	176.024
2020	Q2	44432	253698	175.137
2020	Q3	51828	263964	196.345
2020	Q4	45091	268484	167.947
2021	Q1	47881	274646	174.337
2021	Q2	53433	284235	187.989
2021	Q3	52041	290797	178.960
2021	Q4	44121	291494	151.362
2022	Q1	42800	295552	144.814
2022	Q2	48574	297663	163.185
2022	Q3	47221	297801	158.566
2022	Q4	42027	298442	140.821
2023	Q1	40976	303912	134.829
2023	Q2	44033	305380	144.191
2023	Q3	42897	295149	145.340

Table 59: (H4A1) OUD: Emergency Department Visits for OUD (Supplementary Measure)

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	17322	108456	159.715
2018	Q2	18738	108166	173.234
2018	Q3	20280	108031	187.724
2018	Q4	18010	107093	168.172
2019	Q1	17868	106890	167.163
2019	Q2	19743	108371	182.180
2019	Q3	21455	109516	195.907
2019	Q4	18790	109666	171.338
2020	Q1	19398	110906	174.905
2020	Q2	18899	111948	168.819
2020	Q3	22379	115940	193.022
2020	Q4	19404	117608	164.989
2021	Q1	20492	119235	171.862
2021	Q2	22452	121567	184.688
2021	Q3	22608	123849	182.545
2021	Q4	18811	124150	151.518
2022	Q1	17481	125085	139.753
2022	Q2	18924	124575	151.908
2022	Q3	19214	124035	154.908
2022	Q4	16439	123320	133.304
2023	Q1	16104	124063	129.805
2023	Q2	17205	124038	138.707
2023	Q3	17150	120134	142.757

Table 60: (H4A2) IP Admissions for SUD

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	21090	246889	85.423
2018	Q2	22413	246381	90.969
2018	Q3	23206	245239	94.626
2018	Q4	21292	242264	87.888
2019	Q1	20859	242275	86.096
2019	Q2	21840	245620	88.918
2019	Q3	22743	247335	91.952
2019	Q4	21364	248093	86.113
2020	Q1	21289	251062	84.796

2020	Q2	21264	253698	83.816
2020	Q3	24205	263964	91.698
2020	Q4	22177	268484	82.601
2021	Q1	22969	274646	83.631
2021	Q2	25089	284235	88.269
2021	Q3	24478	290797	84.176
2021	Q4	21332	291494	73.182
2022	Q1	20437	295552	69.149
2022	Q2	21781	297663	73.173
2022	Q3	20729	297801	69.607
2022	Q4	19079	298442	63.929
2023	Q1	18253	303912	60.06
2023	Q2	20117	305380	65.875
2023	Q3	19392	295149	65.702

Table 61: (H4A2) OUD: IP Admissions for OUD (Supplementary Measure)

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	10192	108456	93.974
2018	Q2	10609	108166	98.081
2018	Q3	11305	108031	104.646
2018	Q4	10281	107093	96.001
2019	Q1	9813	106890	91.805
2019	Q2	10157	108371	93.724
2019	Q3	10762	109516	98.269
2019	Q4	10034	109666	91.496
2020	Q1	9927	110906	89.508
2020	Q2	9639	111948	86.102
2020	Q3	10857	115940	93.643
2020	Q4	10009	117608	85.105
2021	Q1	10176	119235	85.344
2021	Q2	10904	121567	89.695
2021	Q3	11097	123849	89.601
2021	Q4	9296	124150	74.877
2022	Q1	8655	125085	69.193
2022	Q2	9030	124575	72.486
2022	Q3	8962	124035	72.254
2022	Q4	7974	123320	64.661
2023	Q1	7624	124063	61.453

2023	Q2	8354	124038	67.35
2023	Q3	8233	120134	68.532

Table 62: (H4B1) The 30-day IP Admission Rate for SUD Following a RT Stay Among Members with SUD

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	73	10354	0.007
2018	Q2	77	12276	0.006
2018	Q3	76	13947	0.005
2018	Q4	79	15434	0.005
2019	Q1	124	16572	0.007
2019	Q2	99	17554	0.006
2019	Q3	96	17102	0.006
2019	Q4	80	16799	0.005
2020	Q1	113	16749	0.007
2020	Q2	93	16198	0.006
2020	Q3	82	17084	0.005
2020	Q4	71	17860	0.004
2021	Q1	104	18265	0.006
2021	Q2	85	18737	0.005
2021	Q3	76	19402	0.004
2021	Q4	80	19930	0.004
2022	Q1	116	20398	0.006
2022	Q2	96	20810	0.005
2022	Q3	82	20495	0.004
2022	Q4	70	20520	0.003

Table 63: (H4B2) The 30-day ED Visit Rate for SUD Following an RT Stay Among Members with SUD

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	1961	10354	0.189
2018	Q2	2331	12276	0.190
2018	Q3	2714	13947	0.195
2018	Q4	3056	15434	0.198

2019	Q1	3289	16572	0.198
2019	Q2	3478	17554	0.198
2019	Q3	3210	17102	0.188
2019	Q4	3060	16799	0.182
2020	Q1	3074	16749	0.184
2020	Q2	3017	16198	0.186
2020	Q3	3249	17084	0.190
2020	Q4	3456	17860	0.194
2021	Q1	3515	18265	0.192
2021	Q2	3525	18737	0.188
2021	Q3	3704	19402	0.191
2021	Q4	3768	19930	0.189
2022	Q1	3886	20398	0.191
2022	Q2	3957	20810	0.190
2022	Q3	3902	20495	0.19
2022	Q4	3998	20520	0.195

Table 64: (H4B3) The 30-day ED Visit Rate for SUD Following an ED Visit Among Members with SUD

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	175198	400320	0.438
2018	Q2	175398	400057	0.438
2018	Q3	175121	399669	0.438
2018	Q4	176339	401524	0.439
2019	Q1	179072	408192	0.439
2019	Q2	180220	411544	0.438
2019	Q3	168918	389118	0.434
2019	Q4	164947	382644	0.431
2020	Q1	164613	383695	0.429
2020	Q2	160530	375937	0.427
2020	Q3	168184	396897	0.424
2020	Q4	170639	404201	0.422
2021	Q1	172227	410489	0.42
2021	Q2	168516	403906	0.417
2021	Q3	164156	395185	0.415
2021	Q4	159478	387736	0.411
2022	Q1	158831	388191	0.409

2022	Q2	157797	388146	0.407
2022	Q3	154151	381613	0.404
2022	Q4	153382	379591	0.404

Table 65: (H5A1) Continuity of Pharmacotherapy for Opioid Use Disorder

Year	Quarter	Numerator	Denominator	Percent
2017	Q1	19962	41783	47.775
2017	Q2	20477	42442	48.247
2017	Q3	20791	42443	48.986
2017	Q4	21332	43462	49.082
2018	Q1	22328	44262	50.445
2018	Q2	23144	45311	51.078
2018	Q3	23294	45977	50.664
2018	Q4	24480	48041	50.956
2019	Q1	25250	49656	50.85
2019	Q2	25841	50891	50.777
2019	Q3	26588	51259	51.87
2019	Q4	28272	53445	52.899
2020	Q1	29829	56087	53.183
2020	Q2	30775	58844	52.299
2020	Q3	31695	60801	52.129
2020	Q4	31722	61781	51.346
2021	Q1	31918	63249	50.464
2021	Q2	31822	64377	49.431
2021	Q3	31976	64602	49.497
2021	Q4	32586	65172	50
2022	Q1	32370	65924	49.102
2022	Q2	30823	66233	46.537
2022	Q3	31612	66890	47.26
2022	Q4	32420	67480	48.044

Table 66: (H5A1) Continuity of Pharmacotherapy for Opioid Use Disorder Stratified by Race/Ethnicity

Year	Quarter	Race/Ethnicity	Numerator	Denominator	Ratio
2017	Q1	Black, Non-Hispanic	857	2112	40.578
2017	Q2	Black, Non-Hispanic	877	2224	39.433
2017	Q3	Black, Non-Hispanic	885	2264	39.09
2017	Q4	Black, Non-Hispanic	904	2366	38.208
2018	Q1	Black, Non-Hispanic	954	2422	39.389
2018	Q2	Black, Non-Hispanic	1000	2510	39.841
2018	Q3	Black, Non-Hispanic	1013	2598	38.992
2018	Q4	Black, Non-Hispanic	1101	2747	40.08
2019	Q1	Black, Non-Hispanic	1131	2840	39.824
2019	Q2	Black, Non-Hispanic	1198	2971	40.323
2019	Q3	Black, Non-Hispanic	1248	3039	41.066
2019	Q4	Black, Non-Hispanic	1339	3166	42.293
2020	Q1	Black, Non-Hispanic	1370	3298	41.54
2020	Q2	Black, Non-Hispanic	1410	3377	41.753
2020	Q3	Black, Non-Hispanic	1429	3528	40.504
2020	Q4	Black, Non-Hispanic	1463	3713	39.402
2021	Q1	Black, Non-Hispanic	1454	3934	36.96
2021	Q2	Black, Non-Hispanic	1491	4023	37.062
2021	Q3	Black, Non-Hispanic	1522	4055	37.534
2021	Q4	Black, Non-Hispanic	1573	4124	38.142
2022	Q1	Black, Non-Hispanic	1561	4236	36.851
2022	Q2	Black, Non-Hispanic	1538	4295	35.809
2022	Q3	Black, Non-Hispanic	1601	4395	36.428
2022	Q4	Black, Non-Hispanic	1664	4488	37.077
2017	Q1	Hispanic	298	701	42.511
2017	Q2	Hispanic	295	739	39.919
2017	Q3	Hispanic	308	777	39.64
2017	Q4	Hispanic	337	819	41.148
2018	Q1	Hispanic	381	838	45.465
2018	Q2	Hispanic	389	859	45.285
2018	Q3	Hispanic	386	858	44.988
2018	Q4	Hispanic	440	895	49.162
2019	Q1	Hispanic	455	934	48.715
2019	Q2	Hispanic	486	978	49.693

2019	Q3	Hispanic	485	995	48.744
2019	Q4	Hispanic	533	1060	50.283
2020	Q1	Hispanic	572	1145	49.956
2020	Q2	Hispanic	580	1186	48.904
2020	Q3	Hispanic	614	1274	48.195
2020	Q4	Hispanic	630	1309	48.128
2021	Q1	Hispanic	633	1340	47.239
2021	Q2	Hispanic	631	1359	46.431
2021	Q3	Hispanic	649	1374	47.234
2021	Q4	Hispanic	681	1450	46.965
2022	Q1	Hispanic	682	1498	45.527
2022	Q2	Hispanic	654	1554	42.085
2022	Q3	Hispanic	699	1574	44.409
2022	Q4	Hispanic	715	1564	45.716
2017	Q1	White, Non-Hispanic	17406	35957	48.408
2017	Q2	White, Non-Hispanic	17758	36891	48.136
2017	Q3	White, Non-Hispanic	18023	36780	49.002
2017	Q4	White, Non-Hispanic	18642	37549	49.647
2018	Q1	White, Non-Hispanic	19686	38251	51.465
2018	Q2	White, Non-Hispanic	20444	39260	52.073
2018	Q3	White, Non-Hispanic	20564	39871	51.576
2018	Q4	White, Non-Hispanic	21608	41704	51.813
2019	Q1	White, Non-Hispanic	22298	43167	51.655
2019	Q2	White, Non-Hispanic	22740	44197	51.451
2019	Q3	White, Non-Hispanic	23377	44498	52.535
2019	Q4	White, Non-Hispanic	24863	46432	53.547
2020	Q1	White, Non-Hispanic	26224	48731	53.814
2020	Q2	White, Non-Hispanic	27007	51213	52.735
2020	Q3	White, Non-Hispanic	27770	52883	52.512
2020	Q4	White, Non-Hispanic	27718	53654	51.661
2021	Q1	White, Non-Hispanic	27883	54781	50.899
2021	Q2	White, Non-Hispanic	27721	55680	49.786
2021	Q3	White, Non-Hispanic	27832	55848	49.835
2021	Q4	White, Non-Hispanic	28291	56247	50.298
2022	Q1	White, Non-Hispanic	28126	56792	49.525
2022	Q2	White, Non-Hispanic	27041	56980	47.457
2022	Q3	White, Non-Hispanic	27719	57491	48.214
2022	Q4	White, Non-Hispanic	28333	57974	48.872

Table 67: (H6A1) Access to Preventive/ Ambulatory Health Services for Adult Medicaid Members with SUD

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	191691	216983	0.883
2018	Q2	193560	218320	0.887
2018	Q3	195326	219921	0.888
2018	Q4	197974	222168	0.891
2019	Q1	199431	223142	0.894
2019	Q2	202512	226247	0.895
2019	Q3	208477	234137	0.89
2019	Q4	216001	242702	0.890
2020	Q1	220641	247333	0.892
2020	Q2	225340	251984	0.894
2020	Q3	235170	262117	0.897
2020	Q4	239655	266516	0.899
2021	Q1	241954	268961	0.900
2021	Q2	243330	270412	0.900
2021	Q3	244201	271273	0.900
2021	Q4	245861	273282	0.900
2022	Q1	247950	275888	0.899
2022	Q2	251593	280351	0.897
2022	Q3	245798	274550	0.895
2022	Q4	236945	264832	0.895

Table 68: (H6A2) Screening for HIV/HBV/HCV

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	73318	254889	0.288
2018	Q2	74497	258137	0.289
2018	Q3	75883	258628	0.293
2018	Q4	77320	261359	0.296
2019	Q1	78386	259838	0.302
2019	Q2	78641	264403	0.297
2019	Q3	74035	261838	0.283
2019	Q4	75116	264343	0.284
2020	Q1	76207	262153	0.291
2020	Q2	77813	267150	0.291

2020	Q3	84839	278132	0.305
2020	Q4	86754	282801	0.307
2021	Q1	87480	283672	0.308
2021	Q2	87768	286643	0.306
2021	Q3	88293	287778	0.307
2021	Q4	88384	289508	0.305
2022	Q1	88941	289753	0.307
2022	Q2	90048	295330	0.305
2022	Q3	89744	294122	0.305
2022	Q4	88675	295153	0.300

Table 69: (H6B1) Initiation and engagement of alcohol and other drug abuse or dependence treatment

Year	Quarter	Numerator	Denominator	Rate
2018	Q1	23214	117663	0.197
2018	Q2	22157	112783	0.196
2018	Q3	22906	112734	0.203
2018	Q4	22067	111040	0.199
2019	Q1	22702	114656	0.198
2019	Q2	22265	112344	0.198
2019	Q3	22655	111424	0.203
2019	Q4	22256	108719	0.205
2020	Q1	23568	113680	0.207
2020	Q2	23071	114668	0.201
2020	Q3	24242	122661	0.198
2020	Q4	24901	127292	0.196
2021	Q1	26120	133408	0.196
2021	Q2	25616	129757	0.197
2021	Q3	26351	130079	0.203
2021	Q4	26285	131192	0.200
2022	Q1	27370	135786	0.202
2022	Q2	25630	133047	0.193
2022	Q3	25813	135146	0.191
2022	Q4	25097	135532	0.185

Table 70: (H7A1) Rate of Overdose Deaths (per 1000 Members)

Year	Quarter	Numerator	Denominator	Rate
2019	Q4	632	1395804	0.453
2020	Q1	570	1394724	0.409
2020	Q2	845	1409245	0.600
2020	Q3	739	1479061	0.500
2020	Q4	753	1557846	0.483
2021	Q1	859	1602191	0.536
2021	Q2	881	1622431	0.543
2021	Q3	878	1661663	0.528
2021	Q4	799	1710899	0.467
2022	Q1	779	1741387	0.447
2022	Q2	753	1753957	0.429
2022	Q3	857	1784605	0.480
2022	Q4	899	1840702	0.488
2023	Q1	810	1875770	0.432
2023	Q2	667	1888862	0.353

Note that data concerning overdose deaths in 2023 is not yet final, though it is not expected to change meaningfully.

Table 71: (H7A1) Rate of Overdose Deaths (per 1000 Members) Stratified by Race

Year	Quarter	Race/Ethnicity	Numerator	Denominator	Rate
2019	Q4	Black, Non-Hispanic	111	381742	0.335
2020	Q1	Black, Non-Hispanic	101	381835	0.296
2020	Q2	Black, Non-Hispanic	142	387234	0.395
2020	Q3	Black, Non-Hispanic	130	406164	0.351
2020	Q4	Black, Non-Hispanic	134	425235	0.335
2021	Q1	Black, Non-Hispanic	136	437555	0.357
2021	Q2	Black, Non-Hispanic	161	443489	0.413
2021	Q3	Black, Non-Hispanic	165	453803	0.412
2021	Q4	Black, Non-Hispanic	141	465531	0.339
2022	Q1	Black, Non-Hispanic	147	473569	0.337
2022	Q2	Black, Non-Hispanic	143	477386	0.347
2022	Q3	Black, Non-Hispanic	168	484180	0.396
2022	Q4	Black, Non-Hispanic	193	497839	0.437
2023	Q1	Black, Non-Hispanic	174	507198	0.400
2023	Q2	Black, Non-Hispanic	142	512195	0.327

2019	Q4	White, Non-Hispanic	461	848120	0.556
2020	Q1	White, Non-Hispanic	428	846502	0.517
2020	Q2	White, Non-Hispanic	629	854101	0.749
2020	Q3	White, Non-Hispanic	550	894878	0.631
2020	Q4	White, Non-Hispanic	547	942562	0.597
2021	Q1	White, Non-Hispanic	641	968632	0.683
2021	Q2	White, Non-Hispanic	631	980431	0.669
2021	Q3	White, Non-Hispanic	636	1003433	0.661
2021	Q4	White, Non-Hispanic	582	1034133	0.581
2022	Q1	White, Non-Hispanic	569	1050826	0.562
2022	Q2	White, Non-Hispanic	538	1056277	0.531
2022	Q3	White, Non-Hispanic	642	1072807	0.631
2022	Q4	White, Non-Hispanic	631	1105781	0.602
2023	Q1	White, Non-Hispanic	576	1125468	0.546
2023	Q2	White, Non-Hispanic	472	1131039	0.446

Note that data concerning overdose deaths in 2023 is not yet final, though it is not expected to change meaningfully.

Table 72: (H7A2) Rate of Overdose Deaths Due to Opioids (per 1000 Members)

Year	Quarter	Numerator	Denominator	Rate
2019	Q4	533	1395804	0.382
2020	Q1	478	1394724	0.343
2020	Q2	726	1409245	0.515
2020	Q3	635	1479061	0.429
2020	Q4	655	1557846	0.420
2021	Q1	719	1602191	0.449
2021	Q2	729	1622431	0.449
2021	Q3	771	1661663	0.464
2021	Q4	676	1710899	0.395
2022	Q1	653	1741387	0.375
2022	Q2	643	1753957	0.367
2022	Q3	733	1784605	0.411
2022	Q4	777	1840702	0.422
2023	Q1	695	1875770	0.371
2023	Q2	548	1888862	0.290

Note that data concerning overdose deaths in 2023 is not yet final, though it is not expected to change meaningfully.

Table 73: (H7A2) Rate of Overdose Deaths Due to Opioids (per 1000 Members) Stratified by Race

Year	Quarter	Race/Ethnicity	Numerator	Denominator	Rate
2019	Q4	Black, Non-Hispanic	94	381742	0.282
2020	Q1	Black, Non-Hispanic	81	381835	0.233
2020	Q2	Black, Non-Hispanic	118	387234	0.328
2020	Q3	Black, Non-Hispanic	114	406164	0.305
2020	Q4	Black, Non-Hispanic	110	425235	0.269
2021	Q1	Black, Non-Hispanic	109	437555	0.286
2021	Q2	Black, Non-Hispanic	128	443489	0.329
2021	Q3	Black, Non-Hispanic	144	453803	0.354
2021	Q4	Black, Non-Hispanic	116	465531	0.272
2022	Q1	Black, Non-Hispanic	129	473569	0.293
2022	Q2	Black, Non-Hispanic	122	477386	0.289
2022	Q3	Black, Non-Hispanic	146	484180	0.342
2022	Q4	Black, Non-Hispanic	166	497839	0.368
2023	Q1	Black, Non-Hispanic	150	507198	0.341
2023	Q2	Black, Non-Hispanic	118	512195	0.270
2019	Q4	White, Non-Hispanic	393	848120	0.471
2020	Q1	White, Non-Hispanic	365	846502	0.439
2020	Q2	White, Non-Hispanic	543	854101	0.644
2020	Q3	White, Non-Hispanic	469	894878	0.536
2020	Q4	White, Non-Hispanic	484	942562	0.527
2021	Q1	White, Non-Hispanic	540	968632	0.573
2021	Q2	White, Non-Hispanic	528	980431	0.555
2021	Q3	White, Non-Hispanic	559	1003433	0.58
2021	Q4	White, Non-Hispanic	497	1034133	0.495
2022	Q1	White, Non-Hispanic	466	1050826	0.457
2022	Q2	White, Non-Hispanic	463	1056277	0.456
2022	Q3	White, Non-Hispanic	546	1072807	0.536
2022	Q4	White, Non-Hispanic	545	1105781	0.519
2023	Q1	White, Non-Hispanic	489	1125468	0.464
2023	Q2	White, Non-Hispanic	384	1131039	0.362

Note that data concerning overdose deaths in 2023 is not yet final, though it is not expected to change meaningfully.

K.2.1 H8 Cost Measure Full Model Parameter Estimates

Table 74: (H8A1) Total Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	5.87114	354.65278	0.01334	440.09	<0.0001
Cond	Time	-0.00446	0.99555	0.00161	-2.76	0.00572
Cond	Intervention	0.03384	1.03441	0.00812	4.17	0.00003
Cond	Time Since Intervention x Intervention	0.00700	1.00703	0.00171	4.10	0.00004
Cond	Male	-0.12821	0.87967	0.00813	-15.77	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	0.07711	1.08016	0.01769	4.36	0.00001
Cond	Some Other Race, Non-Hispanic	0.06680	1.06908	0.03472	1.92	0.05437
Cond	White, Non-Hispanic	0.10716	1.11311	0.00920	11.64	<0.0001
Cond	Age25-34	0.17426	1.19036	0.00985	17.69	<0.0001
Cond	Age35-44	0.25501	1.29048	0.01094	23.31	<0.0001
Cond	Age45-54	0.41888	1.52025	0.01193	35.12	<0.0001
Cond	Age55-64	0.59543	1.81382	0.01303	45.71	<0.0001
ZI	Intercept	-2.55740	0.07750	0.02630	-97.08	<0.0001
ZI	Time	0.01610	1.01630	0.00360	4.49	<0.0001
ZI	Intervention	-0.02240	0.97790	0.01810	-1.24	0.21600
ZI	Time Since Intervention x Intervention	0.01680	1.01690	0.00380	4.43	<0.0001
ZI	Male	1.01660	2.76390	0.01460	69.48	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	-0.03860	0.96210	0.03100	-1.24	0.21350
ZI	Some Other Race, Non-Hispanic	-0.17620	0.83850	0.06150	-2.86	0.00420
ZI	White, Non-Hispanic	-0.30590	0.73640	0.01610	-19.04	<0.0001
ZI	Age25-34	-0.13800	0.87110	0.01790	-7.72	<0.0001
ZI	Age35-44	-0.37260	0.68890	0.01990	-18.74	<0.0001
ZI	Age45-54	-0.83570	0.43360	0.02240	-37.31	<0.0001
ZI	Age55-64	-1.15330	0.31560	0.02500	-46.14	<0.0001

Table 75: (H8A2) Total Federal Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	5.51144	247.50839	0.01289	427.44	<0.0001
Cond	Time	-0.00164	0.99836	0.00162	-1.02	0.30910
Cond	Intervention	0.04441	1.04541	0.00815	5.45	<0.0001
Cond	Time Since Intervention x Intervention	0.00228	1.00228	0.00171	1.33	0.18309
Cond	Male	-0.04426	0.95670	0.00769	-5.75	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	0.10947	1.11569	0.01683	6.50	<0.0001
Cond	Some Other Race, Non-Hispanic	0.08077	1.08412	0.03297	2.45	0.01429
Cond	White, Non-Hispanic	0.15652	1.16944	0.00871	17.96	<0.0001
Cond	Age25-34	0.22151	1.24796	0.00953	23.23	<0.0001
Cond	Age35-44	0.33918	1.40379	0.01053	32.20	<0.0001
Cond	Age45-54	0.57470	1.77659	0.01148	50.05	<0.0001
Cond	Age55-64	0.78636	2.19540	0.01257	62.58	<0.0001
ZI	Intercept	-2.76170	0.06320	0.02830	-97.60	<0.0001
ZI	Time	0.02470	1.02500	0.00360	6.78	<0.0001
ZI	Intervention	-0.02010	0.98010	0.01830	-1.10	0.27140
ZI	Time Since Intervention x Intervention	0.00340	1.00350	0.00390	0.89	0.37150
ZI	Male	1.04780	2.85140	0.01630	64.26	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	-0.08760	0.91610	0.03430	-2.55	0.01070
ZI	Some Other Race, Non-Hispanic	-0.21060	0.81010	0.06830	-3.08	0.00200
ZI	White, Non-Hispanic	-0.27690	0.75810	0.01790	-15.44	<0.0001
ZI	Age25-34	-0.10710	0.89850	0.01920	-5.57	<0.0001
ZI	Age35-44	-0.29580	0.74390	0.02160	-13.70	<0.0001
ZI	Age45-54	-0.67210	0.51060	0.02430	-27.66	<0.0001
ZI	Age55-64	-0.85780	0.42410	0.02700	-31.81	<0.0001

Table 76: (H8A3) SUD-IMD Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	5.21786	184.53973	0.04146	125.86	<0.0001
Cond	Time	0.03332	1.03388	0.00522	6.39	<0.0001
Cond	Intervention	-0.01211	0.98796	0.02507	-0.48	0.62911
Cond	Time Since Intervention x Intervention	-0.04346	0.95747	0.00553	-7.86	<0.0001
Cond	Male	0.14545	1.15656	0.01891	7.69	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	0.18274	1.20050	0.04803	3.80	0.00014
Cond	Some Other Race, Non-Hispanic	0.01961	1.01980	0.08782	0.22	0.82335
Cond	White, Non-Hispanic	0.27558	1.31729	0.02517	10.95	<0.0001
Cond	Age25-34	0.22193	1.24849	0.02795	7.94	<0.0001
Cond	Age35-44	0.23714	1.26761	0.03002	7.90	<0.0001
Cond	Age45-54	0.23366	1.26322	0.03429	6.81	<0.0001
Cond	Age55-64	0.26806	1.30743	0.04173	6.42	<0.0001
ZI	Intercept	7.39200	1,623.00760	0.06180	119.63	<0.0001
ZI	Time	-0.05810	0.94360	0.00510	-11.48	<0.0001
ZI	Intervention	0.07300	1.07570	0.02480	2.95	0.00320
ZI	Time Since Intervention x Intervention	0.10170	1.10700	0.00530	19.11	<0.0001
ZI	Male	-0.45080	0.63710	0.03270	-13.77	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	-0.38400	0.68110	0.06900	-5.57	<0.0001
ZI	Some Other Race, Non-Hispanic	-0.68680	0.50320	0.12980	-5.29	<0.0001
ZI	White, Non-Hispanic	-0.83080	0.43570	0.03860	-21.54	<0.0001
ZI	Age25-34	-0.26830	0.76470	0.03200	-8.39	<0.0001
ZI	Age35-44	-0.05970	0.94210	0.03730	-1.60	0.10970
ZI	Age45-54	0.45520	1.57640	0.04380	10.40	<0.0001
ZI	Age55-64	0.87010	2.38710	0.05200	16.73	<0.0001

Table 77: (H8A4) SUD-Other Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	4.54981	94.61473	0.01796	253.36	<0.0001
Cond	Time	0.00536	1.00538	0.00212	2.53	0.01142
Cond	Intervention	0.07365	1.07643	0.01059	6.96	<0.0001
Cond	Time Since Intervention x Intervention	-0.01875	0.98143	0.00223	-8.41	<0.0001
Cond	Male	0.23873	1.26963	0.01016	23.51	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	0.31590	1.37149	0.02250	14.04	<0.0001
Cond	Some Other Race, Non-Hispanic	0.10389	1.10947	0.04465	2.33	0.01997
Cond	White, Non-Hispanic	0.34161	1.40721	0.01194	28.60	<0.0001
Cond	Age25-34	0.35151	1.42122	0.01314	26.75	<0.0001
Cond	Age35-44	0.37964	1.46175	0.01429	26.57	<0.0001
Cond	Age45-54	0.26155	1.29894	0.01568	16.68	<0.0001
Cond	Age55-64	0.17733	1.19402	0.01740	10.19	<0.0001
ZI	Intercept	1.33580	3.80290	0.02020	66.10	<0.0001
ZI	Time	0.00720	1.00720	0.00260	2.73	0.00630
ZI	Intervention	-0.05820	0.94350	0.01320	-4.41	<0.0001
ZI	Time Since Intervention x Intervention	0.01910	1.01920	0.00280	6.88	<0.0001
ZI	Male	-0.11320	0.89290	0.01150	-9.82	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	-0.47420	0.62240	0.02530	-18.72	<0.0001
ZI	Some Other Race, Non-Hispanic	-0.31350	0.73090	0.04990	-6.28	<0.0001
ZI	White, Non-Hispanic	-0.77320	0.46150	0.01320	-58.66	<0.0001
ZI	Age25-34	-0.48120	0.61800	0.01470	-32.73	<0.0001
ZI	Age35-44	-0.55020	0.57690	0.01620	-33.91	<0.0001
ZI	Age45-54	-0.31120	0.73260	0.01770	-17.61	<0.0001
ZI	Age55-64	-0.05340	0.94800	0.01930	-2.77	0.00550

Table 78: (H8A5) Non-SUD Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	5.54665	256.37617	0.02402	230.91	<0.0001
Cond	Time	-0.00380	0.99620	0.00335	-1.14	0.25549
Cond	Intervention	-0.06673	0.93545	0.01687	-3.96	0.00008
Cond	Time Since Intervention x Intervention	0.02019	1.02039	0.00353	5.72	<0.0001
Cond	Male	-0.46024	0.63113	0.01293	-35.60	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	-0.19031	0.82670	0.02939	-6.48	<0.0001
Cond	Some Other Race, Non-Hispanic	-0.03735	0.96334	0.05691	-0.66	0.51157
Cond	White, Non-Hispanic	-0.19971	0.81897	0.01473	-13.56	<0.0001
Cond	Age25-34	-0.01328	0.98681	0.01785	-0.74	0.45691
Cond	Age35-44	0.12259	1.13042	0.01920	6.38	<0.0001
Cond	Age45-54	0.54323	1.72156	0.02060	26.36	<0.0001
Cond	Age55-64	0.91199	2.48927	0.02206	41.34	<0.0001
ZI	Intercept	-2.60020	0.07430	0.02870	-90.51	<0.0001
ZI	Time	0.00890	1.00900	0.00400	2.22	0.02610
ZI	Intervention	0.01380	1.01390	0.02010	0.69	0.49280
ZI	Time Since Intervention x Intervention	0.02140	1.02160	0.00420	5.06	<0.0001
ZI	Male	1.23200	3.42790	0.01580	77.77	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	0.03330	1.03390	0.03300	1.01	0.31250
ZI	Some Other Race, Non-Hispanic	-0.19160	0.82560	0.06580	-2.91	0.00360
ZI	White, Non-Hispanic	-0.24350	0.78390	0.01720	-14.20	<0.0001
ZI	Age25-34	-0.11170	0.89430	0.01940	-5.77	<0.0001
ZI	Age35-44	-0.37780	0.68540	0.02140	-17.63	<0.0001
ZI	Age45-54	-0.94070	0.39040	0.02430	-38.76	<0.0001
ZI	Age55-64	-1.33960	0.26190	0.02720	-49.18	<0.0001

Table 79: (H8A6) Outpatient Costs - Non-ED

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	5.41367	224.45385	0.01166	464.41	<0.0001
Cond	Time	0.01000	1.01005	0.00147	6.79	<0.0001
Cond	Intervention	-0.02314	0.97713	0.00740	-3.13	0.00176
Cond	Time Since Intervention x Intervention	-0.00754	0.99249	0.00155	-4.85	<0.0001
Cond	Male	-0.12061	0.88638	0.00680	-17.74	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	0.08908	1.09317	0.01494	5.96	<0.0001
Cond	Some Other Race, Non-Hispanic	0.06835	1.07073	0.02863	2.39	0.01699
Cond	White, Non-Hispanic	0.10945	1.11566	0.00774	14.14	<0.0001
Cond	Age25-34	0.14943	1.16117	0.00863	17.31	<0.0001
Cond	Age35-44	0.17600	1.19244	0.00950	18.53	<0.0001
Cond	Age45-54	0.25591	1.29164	0.01030	24.83	<0.0001
Cond	Age55-64	0.33057	1.39177	0.01119	29.54	<0.0001
ZI	Intercept	-1.98290	0.13770	0.02240	-88.56	<0.0001
ZI	Time	0.01010	1.01010	0.00320	3.19	0.00140
ZI	Intervention	-0.04660	0.95440	0.01600	-2.92	0.00350
ZI	Time Since Intervention x Intervention	0.02020	1.02040	0.00330	6.08	<0.0001
ZI	Male	0.82330	2.27800	0.01200	68.57	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	-0.00050	0.99950	0.02590	-0.02	0.98350
ZI	Some Other Race, Non-Hispanic	-0.14270	0.86700	0.05060	-2.82	0.00480
ZI	White, Non-Hispanic	-0.22140	0.80140	0.01340	-16.55	<0.0001
ZI	Age25-34	-0.13200	0.87640	0.01560	-8.46	<0.0001
ZI	Age35-44	-0.28080	0.75520	0.01700	-16.47	<0.0001
ZI	Age45-54	-0.57340	0.56360	0.01880	-30.44	<0.0001
ZI	Age55-64	-0.80510	0.44710	0.02070	-38.85	<0.0001

Table 80: (H8A7) Outpatient Costs - ED

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	4.28828	72.84133	0.00413	1,037.65	<0.0001
Cond	Time	0.02833	1.02873	0.00045	62.62	<0.0001
Cond	Intervention	-0.13792	0.87117	0.00762	-18.09	<0.0001
Cond	Time Since Intervention x Intervention	-0.01649	0.98365	0.00341	-4.83	<0.0001
ZI	Intercept	0.70213	2.01804	0.07247	9.69	<0.0001
ZI	Time	0.02366	1.02395	0.00080	29.71	<0.0001
ZI	Intervention	0.09859	1.10361	0.01219	8.09	<0.0001
ZI	Time Since Intervention x Intervention	-0.03767	0.96303	0.00544	-6.92	<0.0001
ZI	Male	0.25165	1.28615	0.00927	27.13	<0.0001
ZI	Black, Non-Hispanic	-0.35555	0.70079	0.07186	-4.95	<0.0001
ZI	Hispanic	-0.18778	0.82880	0.07670	-2.45	0.01435
ZI	Missing Race-Ethnicity	0.12387	1.13187	0.07429	1.67	0.09542
ZI	Some Other Race, Non-Hispanic	-0.15006	0.86066	0.09068	-1.65	0.09796
ZI	White, Non-Hispanic	-0.00556	0.99446	0.07155	-0.08	0.93809
ZI	Age 25-34	0.12817	1.13675	0.01300	9.86	<0.0001
ZI	Age 35-44	0.17090	1.18637	0.01403	12.18	<0.0001
ZI	Age 45-54	0.23052	1.25925	0.01524	15.13	<0.0001
ZI	Age 55-64	0.37383	1.45329	0.01656	22.57	<0.0001

Table 81: (H8A8) Inpatient Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	7.49451	1,798.13541	0.06364	117.77	<0.0001
Cond	Time	0.01456	1.01467	0.00082	17.77	<0.0001
Cond	Intervention	-0.02773	0.97266	0.01341	-2.07	0.03868
Cond	Time Since Intervention x Intervention	-0.02194	0.97829	0.00609	-3.60	0.00032
Cond	Male	0.12947	1.13823	0.00799	16.20	<0.0001
Cond	Black, Non-Hispanic	0.02109	1.02131	0.06294	0.34	0.73760
Cond	Hispanic	-0.07136	0.93113	0.06685	-1.07	0.28575
Cond	Missing Race-Ethnicity	-0.03524	0.96537	0.06473	-0.54	0.58612

Cond	Some Other Race, Non-Hispanic	-0.11911	0.88771	0.07873	-1.51	0.13030
Cond	White, Non-Hispanic	-0.09481	0.90955	0.06267	-1.51	0.13033
Cond	Age 25-34	0.10021	1.10541	0.01207	8.30	<0.0001
Cond	Age 35-44	0.23950	1.27061	0.01297	18.47	<0.0001
Cond	Age 45-54	0.42995	1.53718	0.01350	31.84	<0.0001
Cond	Age 55-64	0.57725	1.78114	0.01381	41.80	<0.0001
ZI	Intercept	2.53832	12.65836	0.10132	25.05	<0.0001
ZI	Time	0.01307	1.01315	0.00117	11.15	<0.0001
ZI	Intervention	0.14412	1.15502	0.01858	7.75	<0.0001
ZI	Time Since Intervention x Intervention	-0.00122	0.99878	0.00841	-0.14	0.88505
ZI	Male	0.21179	1.23589	0.01293	16.39	<0.0001
ZI	Black, Non-Hispanic	-0.08864	0.91518	0.10030	-0.88	0.37687
ZI	Hispanic	-0.10946	0.89632	0.10698	-1.02	0.30624
ZI	Missing Race-Ethnicity	-0.11857	0.88819	0.10333	-1.15	0.25118
ZI	Some Other Race, Non-Hispanic	-0.04151	0.95934	0.12663	-0.33	0.74306
ZI	White, Non-Hispanic	0.02573	1.02606	0.09986	0.26	0.79669
ZI	Age 25-34	0.16566	1.18017	0.01879	8.82	<0.0001
ZI	Age 35-44	0.22448	1.25167	0.02025	11.08	<0.0001
ZI	Age 45-54	-0.08591	0.91767	0.02135	-4.02	0.00006
ZI	Age 55-64	-0.39387	0.67444	0.02232	-17.65	<0.0001

Table 82: (H8A9) Pharmacy Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	2.63916	14.00150	0.01919	137.55	<0.0001
Cond	Time	-0.04956	0.95164	0.00194	-25.49	<0.0001
Cond	Intervention	0.18201	1.19963	0.00969	18.79	<0.0001
Cond	Time Since Intervention x Intervention	0.08269	1.08620	0.00206	40.10	<0.0001
Cond	Male	-0.24168	0.78531	0.01264	-19.11	<0.0001
Cond	Missing/Hispanic Race-Ethnicity	0.48116	1.61795	0.02679	17.96	<0.0001
Cond	Some Other Race, Non-Hispanic	0.47264	1.60423	0.05089	9.29	<0.0001

Cond	White, Non-Hispanic	0.58070	1.78729	0.01436	40.45	<0.0001
Cond	Age25-34	0.50361	1.65468	0.01398	36.03	<0.0001
Cond	Age35-44	0.81813	2.26627	0.01570	52.12	<0.0001
Cond	Age45-54	1.22623	3.40837	0.01722	71.22	<0.0001
Cond	Age55-64	1.58636	4.88592	0.01911	83.03	<0.0001
ZI	Intercept	-1.34930	0.25940	0.02910	-46.41	<0.0001
ZI	Time	0.00940	1.00950	0.00360	2.60	0.0092
ZI	Intervention	0.09140	1.09570	0.01810	5.04	<0.0001
ZI	Time Since Intervention x Intervention	0.00760	1.00760	0.00380	1.99	0.0471
ZI	Male	1.41180	4.10350	0.01780	79.42	<0.0001
ZI	Missing/Hispanic Race-Ethnicity	-0.05850	0.94320	0.03670	-1.59	0.1108
ZI	Some Other Race, Non-Hispanic	-0.20690	0.81310	0.07180	-2.88	0.0040
ZI	White, Non-Hispanic	-0.45000	0.63770	0.01970	-22.88	<0.0001
ZI	Age25-34	-0.29350	0.74570	0.02020	-14.55	<0.0001
ZI	Age35-44	-0.65260	0.52070	0.02280	-28.60	<0.0001
ZI	Age45-54	-1.23450	0.29100	0.02570	-48.03	<0.0001
ZI	Age55-64	-1.56280	0.20960	0.02860	-54.72	<0.0001

Table 83: (H8A10) Long-Term Care Costs

Model	Variable	Estimate	exp(Estimate)	SE	z	p-value
Cond	Intercept	7.60980	2,017.87193	0.04099	185.66	<0.0001
Cond	Time	-0.02325	0.97702	0.00821	-2.83	0.00464
Cond	Intervention	-0.02492	0.97539	0.04129	-0.60	0.54618
Cond	Time Since Intervention x Intervention	0.04978	1.05104	0.00882	5.64	<0.0001
ZI	Intercept	12.80290	363,258.12210	0.15900	80.55	<0.0001
ZI	Time	-0.04470	0.95630	0.01380	-3.24	0.00120
ZI	Intervention	0.19140	1.21090	0.06810	2.81	0.00500
ZI	Time Since Intervention x Intervention	-0.00520	0.99490	0.01460	-0.35	0.72410
ZI	Male	-0.23780	0.78840	0.09560	-2.49	0.01290
ZI	Missing/Some Other Race	-0.14350	0.86630	0.17440	-0.82	0.41060

ZI	White, Non-Hispanic	0.02970	1.03010	0.10670	0.28	0.78080
ZI	Age35-44	-0.62200	0.53690	0.10790	-5.77	<0.0001
ZI	Age45-54	-1.50690	0.22160	0.11440	-13.17	<0.0001
ZI	Age55-64	-2.09260	0.12340	0.11880	-17.61	0.00000

K.3 **Key Informant Interviews**

K.3.1 ***Email Introduction***

E-mail Introduction draft:

Hello _____,
The Ohio Colleges of Medicine Government Resource Center (GRC) has been selected by the Ohio Department of Medicaid (ODM) to conduct components of the SUD 1115 Waiver Demonstration, including evaluation, metric monitoring, and the Interim Evaluation Report. The Interim Evaluation Report includes key informant interviews designed to gain a better understanding of the challenges and successes associated with implementation. You have been identified as a key informant due to your area of expertise.

Our discussion will focus on three key components of the Substance Use Disorder (SUD) 1115 Waiver which reflect the key goals and objectives for the waiver demonstration:

1. Access to care along the continuum
2. Access to Medication Assisted Treatments (MAT)
3. Impact of COVID-19 on the Waiver

Your participation is completely voluntary. In the next week I will be contacting you to schedule a one- hour interview to gather your perspective regarding waiver implementation. In the next week I will be contacting you to schedule a one hour interview to gather your perspective regarding waiver implementation. If you have questions about the interview process or believe someone else in your organization should be interviewed, please let me know.

We look forward to hearing your insights regarding the SUD 1115 Waiver.

K.3.2 ***Consent Language***

Hello, my name is _____ and today I am joined by _____. We are part of the GRC research team from the Substance Use Disorder (SUD) 1115 Waiver Demonstration Study. Thank you for speaking with us today. Before beginning, we thought it would be helpful to review the goals and process of this interview as well as answer any questions you have.

Part of SUD 1115 Waiver Interim Evaluation Report involves interviews with key stakeholders, like you, who have been involved in the planning and/or implementation of the waiver. The goals of these interviews are:

(1) To understand the factors that may hinder or facilitate implementation of the SUD 1115 Waiver, such as access to appropriate levels of care, national program standards and staff credentials, and care coordination;
(2) To gain insight into how organizations, including state agencies, treatment providers, advocacy groups, and managed care organizations are addressing access to Medication-Assisted Treatment (MAT)
(3) To understand how COVID-19 has impacted waiver implementation.

We understand it may be difficult to differentiate the impact of changes due to COVID vs. the waiver. We ask that you try to think about changes brought about by COVID and those implemented under the waiver demonstration separately, although we recognize differentiating the two may not be always be possible. We will discuss these issues throughout our conversation today.

Your participation in today's interview will help us gain valuable insight into the factors contributing to the success of the waiver implementation as well as the challenges. Our discussion will last about one hour. Your participation is voluntary. You do not have to answer any questions you do not want to answer. Know that we will keep everything you say confidential. Our discussion today will be recorded via the Zoom video conferencing application, which will also produce a verbatim transcript of our conversation. We will also be taking notes during our discussion. Please feel free to share your ideas, even if you feel like they are different from others in your field. There is no right or wrong answer. Remember that everything that is said during our discussion today is confidential and specifics of what is said will not be repeated. The information you share

will only be presented in summary form. If at any time you wish to discontinue participation, we can end our discussion.

Do you have any questions for us before we begin? Do we have your permission to begin the interview?

K.3.3 *Interview Guide for State Agency Leadership (ODM, OhioMHAS)*

1. We are trying to understand how SUD 1115 Waiver Demonstration implementation is going in Ohio right now, and we value your expertise and contributions. Can you tell us about your role in implementation of the SUD 1115 Waiver, and what you hope to achieve?
2. When the waiver implementation plan was being developed, what did you hope would be the most significant benefits?
    - ☐ For payers?
    - ☐ For providers?
    - ☐ For individuals seeking treatment?

Access to care along the continuum

The SUD 1115 Waiver aims to reduce overdose and overdose death through a series of policy and practice changes that improve access to high-quality treatment at all ASAM levels of care. We would like to spend some talking about the changes that you have seen or anticipate in access to care.

3. Within your organization, what changes have been or are being made to ensure access to or placement in the appropriate levels of care?
    - ☐ Policy/rule changes?
    - ☐ Data analysis/use of data?
    - ☐ Access standards for each level of care?
4. What, if any, changes has your organization made or planned to make to assure compliance with nationally recognized program standards and provider qualifications?
5. How will utilization management change within your organization under the waiver?
6. How do structural factors such as racism, sexism, classism, heteronormativity, and other “isms” impact access to SUD treatment?
7. What other factors lead to disparities in access to care right now?

- ☐ Substance (certain substances increase access to Tx?)
- ☐ Geography
- ☐ Disability
- ☐ Other

8. How do you think waiver implementation will impact non-clinical care services, such as peer-support, 12-step programs, and other mutual aid services?

Medication Assisted Treatment

Under the waiver, residential treatment programs will be required to offer MAT or facilitate access to MAT. We are interested in your thoughts regarding the potential impacts of this new requirement.

9. How will access to MAT in residential treatment settings change as a result of the waiver?
10. What challenges and benefits do you anticipate for residential treatment providers and patients?

Impact of COVID-19 on SUD treatment

COVID-19 has had a significant impact on access to and delivery of healthcare in Ohio and across the nation. We are interested in better understanding the impact of COVID-19 on delivery of SUD treatment in the state.

11. How has COVID impacted SUD treatment in Ohio?
    - ☐ For instance, changes in demand for services or changes in the levels of care needed?
    - ☐ Access to care or a greater impact on certain levels of care? MAT?
12. How has COVID impacted waiver planning and implementation?
    - ☐ Application of program standards?
    - ☐ Timeline changes?
    - ☐ Have you seen unexpected consequences, both beneficial and challenging?

Wrap Up

13. What are your primary concerns about the future of SUD 1115 waiver implementation within and outside the context of COVID-19?
14. What other important issues should we be considering or specific questions we should consider asking other key informants?
    - ☐ State leadership?
    - ☐ MCPs?
    - ☐ Residential or Community Treatment Providers?
    - ☐ Medicaid members?

K.3.4 *Interview Guide for Residential & Community Treatment Providers and for Treatment & Recovery Advocates*

1. We are trying to understand how SUD 1115 Waiver Demonstration implementation is going in Ohio right now, and we value your expertise and contributions. Can you tell us about your role in implementation of the SUD 1115 Waiver, and what you hope to achieve?

Access to care along the continuum

The SUD 1115 Waiver aims to reduce overdose and overdose death through a series of policy and practice changes that improve access to high-quality treatment at all ASAM levels of care. We would like to spend some talking about the changes that you have seen or anticipate in access to care.

2. How does your organization contribute to assessing individual treatment needs and assuring access to the appropriate levels of care?
3. What, if any, changes has your organization made or planned to make in assessing the level of care an individual should be receiving?
    - ☐ How are/will those changes ensure individuals are placed in the appropriate level of care?
    - ☐ What, if any, challenges are providers and members facing, or anticipating, as they implement these changes?
    - ☐ What, in any, improvements are providers and members seeing or anticipating?
4. How do structural factors such as racism, sexism, classism, heteronormativity, and other "isms" impact access to SUD treatment?
    - ☐ Can you talk about a specific client experience that highlights access inequity?
    - ☐ How might another client experience access (African American woman, Latin mom, transgendered person, etc.) to care?
5. What other factors lead to disparities in access to care right now?

- ☐ Substance (certain substances increase access to Tx?)
- ☐ Geography
- ☐ Disability
- ☐ Other

6. What is your organization's experience with coordination of care and how has it changed over time?
   - ☐ What among those changes have been most beneficial?
   - ☐ Have any of those changes been less helpful, perhaps even harmful?
   - ☐ How might the 1115 Waiver and its beneficial resources be most useful in improving care coordination?
   - ☐ What are the challenges associated with coordinating transition across levels of care?
   - ☐ How are physical healthcare needs and behavioral healthcare needs being coordinated differently?
7. How can coordination of care, starting at the point of entry into treatment, improve an individual's long-term recovery outcomes?
   - ☐ Reduce overdose?
   - ☐ Can you tell us about a specific example of a care coordination success?
8. How do you think waiver implementation will impact non-clinical care services, such as peer-support, 12-step programs, and other mutual aid services?

Medication Assisted Treatment

Under the waiver, residential treatment programs will be required to offer MAT or facilitate access to MAT. We are interested in your thoughts regarding the potential impacts of this new requirement.

9. What role does your organization play in delivery of or access to MAT?
   - ☐ How might your organizational role change with the 1115 SUD Waiver?
10. What are the challenges, if any, for providers who will be required to offer MAT under the Waiver?
    - ☐ What are the potential risks?

11. What benefits do you anticipate with the new requirement?

Impact of COVID-19 on SUD treatment

COVID-19 has had a significant impact on access to and delivery of healthcare in Ohio and across the nation. We are interested in better understanding the impact of COVID-19 on delivery of SUD treatment in the state.

1. In what ways has COVID impacted individuals experiencing SUD, including those in treatment or recovery, differently than other individuals?
    - ☐ Differences by treatment setting, i.e. residential vs. community, etc.?
    - ☐ How does this intersect with the disparities we discussed earlier?
2. How has COVID impacted SUD treatment in Ohio?
    - ☐ For instance, changes in demand for services or changes in the levels of care needed?
    - ☐ Access to care or a greater impact on certain levels of care?
    - ☐ Treatment/facility capacity (for residential)
    - ☐ MAT?
3. How has COVID impacted staffing within your organization/treatment community?
    - ☐ Staffing levels?
    - ☐ Morale

Wrap Up

4. What else would you like us to know about the state of SUD treatment services in Ohio right now?
5. Prior to COVID-19, we were planning to convene focus groups of individuals who had received treatment services in the prior six months to gather their perspectives about treatment services in their communities. Now, the risks associated with bringing groups of people together make focus groups an unlikely option for us. How would you recommend we reach out to this population to gain their insights and a better understanding of their experiences?
    - ☐ What should we be asking them?

K.3.5 *Interview Guide for Managed Care Plans*

1. We are trying to understand how SUD 1115 Waiver Demonstration implementation is going in Ohio right now, and we value your expertise and contributions. Can you tell us about your role in implementation of the SUD 1115 Waiver, and what you hope to achieve?

Access to care along the continuum

The SUD 1115 Waiver aims to reduce overdose and overdose death through a series of policy and practice changes that improve access to high-quality treatment at all ASAM levels of care. We would like to spend some talking about the changes that you have seen or anticipate in access to care.

2. Within your organization, what changes have been or are being made to ensure access to or placement in the appropriate levels of care?
    - ☐ Policy/rule changes?
    - ☐ Data analysis/use of data?
    - ☐ Access standards for each level of care?
3. What, if any, changes has your organization made or planned to make to assure compliance with nationally recognized program standards and provider qualifications?
4. How will utilization management change within your organization under the waiver?
5. How do structural factors such as racism, sexism, classism, heteronormativity, and other "isms" impact access to SUD treatment?
    - ☐ Can you talk about a specific client experience that highlights access inequity?
    - ☐ How might another client experience access (African American woman, Latin mom, transgendered person, etc.) to care?
6. What other factors lead to disparities in access to care right now?
    - ☐ Substance (certain substances increase access to Tx?)

- ☐ Geography
- ☐ Disability
- ☐ Other

7. What is your organization's role in coordination of care and how has it evolved over time?
    - ☐ What future changes do you anticipate?
    - ☐ What are the challenges associated with coordinating transition across levels of care?
    - ☐ How are physical healthcare needs and behavioral healthcare needs being coordinated differently?
8. What, if any, benefits have you seen with regard to changes in coordination of care?

Medication Assisted Treatment

Under the waiver, residential treatment programs will be required to offer MAT or facilitate access to MAT. We are interested in your thoughts regarding the potential impacts of this new requirement.

9. How will access to MAT in residential treatment settings change as a result of the waiver?
10. What challenges and benefits do you anticipate for residential treatment providers and patients?

Impact of COVID-19 on SUD treatment

COVID-19 has had a significant impact on access to and delivery of healthcare in Ohio and across the nation. We are interested in better understanding the impact of COVID-19 on delivery of SUD treatment in the state.

11. How has COVID impacted SUD treatment in Ohio?
    - ☐ For instance, changes in demand for services or changes in the levels of care needed?

- ☐ Access to care or a greater impact on certain levels of care?
- ☐ MAT?

12. How has COVID impacted application of program standards?
    - ☐ Have you seen unexpected consequences, both beneficial and challenging?

Wrap Up

13. What are your primary concerns about the future of SUD 1115 waiver implementation within and outside the context of COVID-19?
14. What else would you like us to know about the state of SUD treatment services in Ohio right now?

K.4 **Focus Groups with Members with Lived Experience**

K.4.1 ***Informed Consent***

Hello, my name is _____ and today I am joined by _____. We are part of a research team working on behalf of the Ohio Department of Medicaid to better understand the issues faced by those seeking drug and alcohol treatment. Thank you for speaking with us today. Before beginning, we thought it would be helpful to review the goals and process of this focus group as well as answer any questions you have.

We are part of a project looking at access to drug and alcohol treatment across the state. To better understand the issues faced by people trying to get into treatment, we are facilitating focus groups with people who are enrolled in Medicaid and have been in some type of substance use treatment and/or recovery services in the past 6 months. Our hope is that your stories can help improve access to care and recovery outcomes for other Ohioans enrolled in Medicaid. We hope that you will feel free to discuss your experience or the experiences of others close to you.

[Skip this section if all participants are in the same room] During our conversation today, we ask that you mute your microphone when you are not speaking. You can do this by clicking the microphone picture at the bottom of your screen or pressing *6 on your phone. We also ask that you change your Zoom display name to your first name. To change your Zoom name click on the "Participants" button at the top or bottom of the **Zoom** window. Next, hover **your** mouse over **your name** in the "Participants" list on the right side of the **Zoom** window. Click on "More" then click "Rename" and type in your first name. If you on a phone or unable to change your display name, please say your first name before speaking.

Our discussion will last about an hour and a half. Your participation is voluntary. You do not have to answer any questions you do not want to answer. Our discussion today will be recorded via the Zoom video conferencing application, which will also produce a word-for-word transcript of our conversation*. [this portion only for participants in the same*

room] Before speaking, please say your first name so the recording is correct. Everything said today is confidential. The information you share will only be presented in summary form, and none of your personal information will be shared with anyone. If at any time you wish to discontinue participation, we can end our discussion. We appreciate there are many pathways to recovery and we want to understand your experiences and observations on what helps and what may get in the way of recovery. We also appreciate that each person and each community is different, and our goal is to gather information about a variety of experiences. Again, what you share here is confidential and will not be attributed to any one person. Do you have any questions for us before we begin? Do we have your permission to begin recording?

K.4.2 ***Interview Guide***

1. To begin today, it would be helpful for us to understand what "treatment" means to you.
2. From your experience, how do people in your community typically get into treatment?
    - ☐ Recognizing there are many paths to recovery, what helped you find treatment services that met your needs? What helped you most in accessing those services? Were the services you needed different from what you thought you wanted?
    - ☐ What factors influence a person's decision to seek treatment?
    - ☐ Do you have an example of a person or community resource that has been successful in helping people seek treatment or get into treatment?
    - ☐ When people are focusing on the internal drivers (i.e. being ready, reaching bottom, being tired of the lifestyle): Was there a person or organization that helped you get from that point where you were ready for treatment to actually walking through the door?
3. What are the biggest barriers to treatment?
    - ☐ What problems in your community make it difficult to access treatment?
        - Wait list
        - Insurance

- Types of treatment available in your community
- Medication Assisted Treatment
- Telehealth

- ☐ How easy or difficult is it to find a treatment program that offers medication for treatment, such as methadone, buprenorphine, or suboxone?
- ☐ How might court involvement create barriers to treatment in your community?
  - Do you feel that others' experiences with the court system match your own?
- ☐ How has COVID-19 impacted access to treatment? Did you participate in telehealth services and how was that experience for you?
- ☐ *Are there other personal issues, such as childcare or work schedules, that can limit access to care for some people?*
  - *Housing*
  - *Physical healthcare needs*
- ☐ *What role does stigma play in getting a person into treatment?*

4. What makes people want to leave treatment?
   - ☐ Are there triggers in treatment or in the community that influence people's decisions about staying in treatment?
   - ☐ How do people in treatment experience stigma? Does that influence decisions about seeking or staying in care?
5. What keeps people in treatment?
   - ☐ Are there specific supportive services that make staying in treatment easier?
     - Housing
     - Access to healthy food
     - Healthcare access
     - Supported employment/vocational training
     - Childcare
6. How does the recovery community support treatment services?
   - ☐ What has your experience been with peer recovery services?

- ☐ Have you accessed recovery operated services (RCO), recovery communities, or recovery-oriented support services?
- ☐ If you were interested in recovery housing options, were they available or difficult to find?

7. If you had to pick one word/short phrase to describe your strength in recovery, what would it be?

Thank you all again for your time today and for sharing your experiences. We are truly grateful to you for sharing your stories. If you have any further questions, thoughts, or information you want to share with us after we end our conversation today, we welcome you to reach out via our project email account SUDwaiver@osumc.edu. You will get an email within the next few days with your digital gift card information. Thank you again, and we wish you all the best on your continued journey.

K.5 Attachment - Evaluation Design

Section 1115 Substance Use Disorder Demonstration Evaluation Design

October 23, 2020

Governor Mike DeWine | Lt. Governor Jon Husted | Director Maureen Corcoran

medicaid.ohio.gov

Table of Contents

1. General Background Information

Ohio's Substance Use Disorder (SUD) Section 1115 Demonstration Waiver, approved by the Centers for Medicare and Medicaid Services (CMS) on September 24, 2019, encompasses a five-year period, which began October 1, 2019, and will end September 30, 2024.

As described in the implementation plan, the number of individuals enrolled in Ohio Medicaid with an SUD diagnoses continues to grow. The largest increase (23%) occurred between 2014 and 2015, with Ohio's Medicaid eligibility expansion reflecting a large unmet treatment need among that newly eligible population. Since Medicaid expansion, the rate of SUD diagnoses has continued to increase by 8% in 2015-2016 and 4% in 2016-2017. As of 2018, approximately 9% of the non-dually eligible adult population (18-64) had a primary SUD diagnosis. Opioid overdose deaths have also increased in the state from 1,914 in 2012 to 4,293 in 2017.[1]

Recent behavioral health system changes in Ohio expanded access to evidence-based practices, increased provider capacity to render medication assisted treatment (MAT), strengthened efforts to integrate behavioral and physical health care and expanded services to individuals diagnosed with mental illness and SUDs. Beginning in 2011, Ohio mandated use of the prescription drug monitoring program (PDMP) to monitor dispensing of controlled prescription drugs for suspected abuse or diversion. Since 2012, Ohio implemented five sets of opiate prescribing guidelines to address the easiest sources of uncoordinated prescription medications, such as prescriptions obtained via hospital emergency departments. Since 2015, Ohio took important steps to extend access to the opiate overdose reversal drug, Naloxone, by permitting pharma- cists to dispense the drug without a prescription.

In January 2018, Ohio implemented broad policy changes to modernize Medicaid behavioral health benefits. This initiative, called Behavioral Health Redesign, revised Ohio's Medicaid behavioral health benefit to align with national coding and health care billing standards. Changes included:

- Adding coverage for primary care billing codes rendered by community behavioral health agencies;
- Expanding the service array for mental health and SUD treatment services;
- Requiring that SUD treatment services align with the American Society of Addiction Medicine (ASAM) levels of care;
- Establishing a unique benefit package for opiate treatment programs (OTP) offering MAT; and
- Adding new evidence-based behavioral health services for adults and youth with high intensity treatment needs.

Since January 1, 2019, working in partnership with the State's managed care plans (MCPs), Ohio eliminated prior authorization in most instances for MAT for opioid use disorder. Beginning January 1, 2020, the state began implementation of a unified preferred drug list that insured consis- tency in coverage across fee-for-service (FFS) and the MCPs.

The approved SUD 1115 demonstration waiver gives Ohio the opportunity to continue progress with additional flexibility and tools to counter the state's elevated levels of SUD, including opi-

[1] http://publicapps.odh.ohio.gov/EDW/DataBrowser/Browse/Mortality

oid use disorder (OUD). The waiver authorizes Ohio to implement programmatic changes that address the waiver milestones established by CMS, which will impact all Medicaid beneficiaries with a SUD.

Ohio Medicaid currently covers all the ASAM levels of care and administers treatment services based on the ASAM Patient Placement Criteria. Through this demonstration, Ohio will take additional steps to ensure providers utilize SUD-specific, multi-dimensional assessment tools, permitting patients to receive the appropriate level of care (LOC) that reflects evidence-based clinical treatment guidelines. The Medicaid Behavioral Health Provider Manual, managed care provider agreement, and/or Ohio Administrative Code (OAC) will be modified to establish provider responsibilities for screening, assessment and treatment plan review. ODM will conduct reviews of provider and plan utilization management (UM) processes, while using findings to improve UM and prior authorization approaches as the waiver demonstration evolves.

Ohio will also revise licensure requirements, policies, and managed care contracts. This will allow for services to be aligned with national standards and evidence-based practices. All ser- vice definitions, eligibility criteria, and program requirements and provider qualifications will be aligned with ASAM in the published Medicaid provider manual. Residential program standards will be updated to include more detail about particular types of services, hours of clinical care, and credentials of staff for residential treatment settings. Educational efforts and licensure standards will be revised to assure that all residential organizations offer MAT onsite or through coordination with offsite providers.

In order to improve access to each critical LOC, Ohio will assess availability of treatment providers focusing on geographic distribution and anticipated penetration rates. The results will be utilized to update MCP access standards for the Behavioral Health State Plan services including all ASAM LOC and MAT.

Ohio will improve the utilization and functionality of the existing prescription drug monitoring system. Planned improvements include: (1) expanding the state's health IT functionality to improve utilization; (2) enhance available information that can inform treatment and referral (e.g., identify individuals with prior history of non-fatal overdose); (3) conduct analyses to demonstrate the impact of clinician prescribing patterns on long-term opioid use; and (4) implement an enforcement plan to minimize inappropriate overprescribing. Finally, the state will seek to improve care coordination and transitions between LOCs gathering data to identify opportunities for improvement and support the development of a new care coordination model.

To determine the impact of this demonstration Ohio has arranged for an independent evaluation to be conducted throughout the waiver time period. The proposed evaluation described in this document includes quantitative and qualitative methods to measure the impact of key waiver provisions on Medicaid enrolled adults and youth with SUD.

The demonstration period is October 1, 2019, through September 30, 2024. An interim evaluation will be completed by September 30, 2023, and a draft summative evaluation report will be submitted to CMS within 18 months after the end of the demonstration. The evaluation period ends on March 30, 2026.

1.1 Evaluation Overview and Process

As described previously, Ohio's SUD Waiver demonstration was designed to address the six major goals and six milestones established by CMS. These include:

Milestones:

1. Access to critical LOCs for OUD and other SUDs.
2. Use of ASAM placement criteria.
3. Use of ASAM program standards for residential provider qualifications.
4. Provider capacity of SUD treatment including MAT.
5. Implementation of OUD comprehensive treatment and prevention strategies.
6. Improved care coordination and transition between LOCs.

Goals:

1. Increased rates of identification, initiation, and engagement in treatment.
2. Increased adherence to and retention in treatment for OUD and other SUDs.
3. Reductions in overdose deaths, particularly those due to opioids.
4. Reduced utilization of emergency departments (EDs) and inpatient (IP) hospital settings for OUD and other SUD treatment where the utilization is preventable or medically inappropriate through improved access to other continuum of care services.
5. Fewer readmissions to the same or higher LOC where readmissions is preventable or medically inappropriate for OUD and other SUD.
6. Improved access to care for physical health conditions among beneficiaries with OUD or other SUDs.

ODM worked with an independent evaluator to clarify the relationships between the key provisions of Ohio's demonstration and the desired outcomes that aligned with the six goals established by CMS. Within the framework of a driver diagram, goal 3, reduction of overdose deaths, was viewed as the primary purpose of Ohio's demonstration, while other goals were viewed as primary drivers of reduction in overdose death. Goals 1, 2, 4, 5, and 6 were subsumed in three categories of primary drivers. Primary Driver 1, reduction in hospital-based SUD service use and treatment readmissions, aligned with goals 4 and 5. Primary Driver 2, increased adherence to and retention in treatment, corresponds to goal 2. Primary Driver 3 combines goal 1, initiation and engagement in treatment, and goal 6, access to physical health care, under the umbrella of health care quality. A driver diagram was developed to depict the hypothesized relationships between the desired outcomes of the demonstration and the factors that are expected to drive improvement (see Figure 1). A description of the hypothesized relationship between provisions of the demonstration, primary and secondary drivers, and the purpose of the demonstration are described in Section 2.

Purpose:

1. Reductions in overdose deaths, particularly those due to opioids.

Primary Drivers:

1. Reduce hospital-based SUD service use and treatment readmissions.
2. Increase adherence to and retention in treatment.
3. Improve quality of care.

Secondary Drivers:

1. Improve access to care.
2. Improve utilization of care.
3. Improve coordination and management of care.

2. Evaluation Questions and Hypotheses

The following section of the evaluation reflects the CMS-issued guidance for the evaluation of SUD demonstration waivers.[2] It includes a driver diagram describing key features of Ohio's demonstration and associated demonstration milestones and drivers established by CMS. It also describes the evaluation questions and hypotheses that assess the strength of those associations.

2.1 Driver Diagram

The driver diagram displayed in Figure 1 serves as the basis for this evaluation proposal. The driver diagram depicts the expected relationships between the demonstration's chief purpose, which is to reduce drug overdose deaths, and key drivers that contribute to reducing overdose deaths either directly or indirectly. The demonstration's purpose and primary drivers align with the six goals established by CMS for the SUD 1115 Waiver. The logic of the driver diagram suggests that drug overdose deaths (goal 3) will be reduced by implementing interventions to:

1. Reduce the need for preventable hospital-based care (goal 4) and readmissions (goal 5),
2. Improve treatment adherence (goal 2), including continuity of pharmacotherapy, and
3. Improve the quality of care through evidence-based treatment engagement (goal 1), and the integration of behavioral health and primary care (goal 6).

The primary drivers are dependent on three secondary drivers in the model: (1) access to care; (2) service utilization; and (3) care coordination and oversight. These secondary drivers represent the immediate outcomes of specific programmatic changes that Ohio will implement in response to the SUD 1115 Waiver. As depicted in the model:

1. Access to care will be improved through programmatic elements focused on coverage for all critical levels of care (LOC) (milestone 1), developing provider networks and certification of new provider types, and incorporating access standards in managed care contracts (milestone 4);
2. Utilization will be improved through new residential treatment (RT) program standards that require access to MAT in RT settings (milestone 3), and new care coordination approaches to assure patients are engaged in appropriate LOCs (milestone 6); and
3. Care coordination and oversight will be achieved through use of evidence-based patient placement criteria and utilization management approach to assure that services meet the appropriate level of need (milestone 2), expanded access and use of Ohio's prescription drug management program (PDMP) to prevent high-risk prescribing (milestone 5), as well as coordination of services to improve transitions between LOCs (milestone 6).

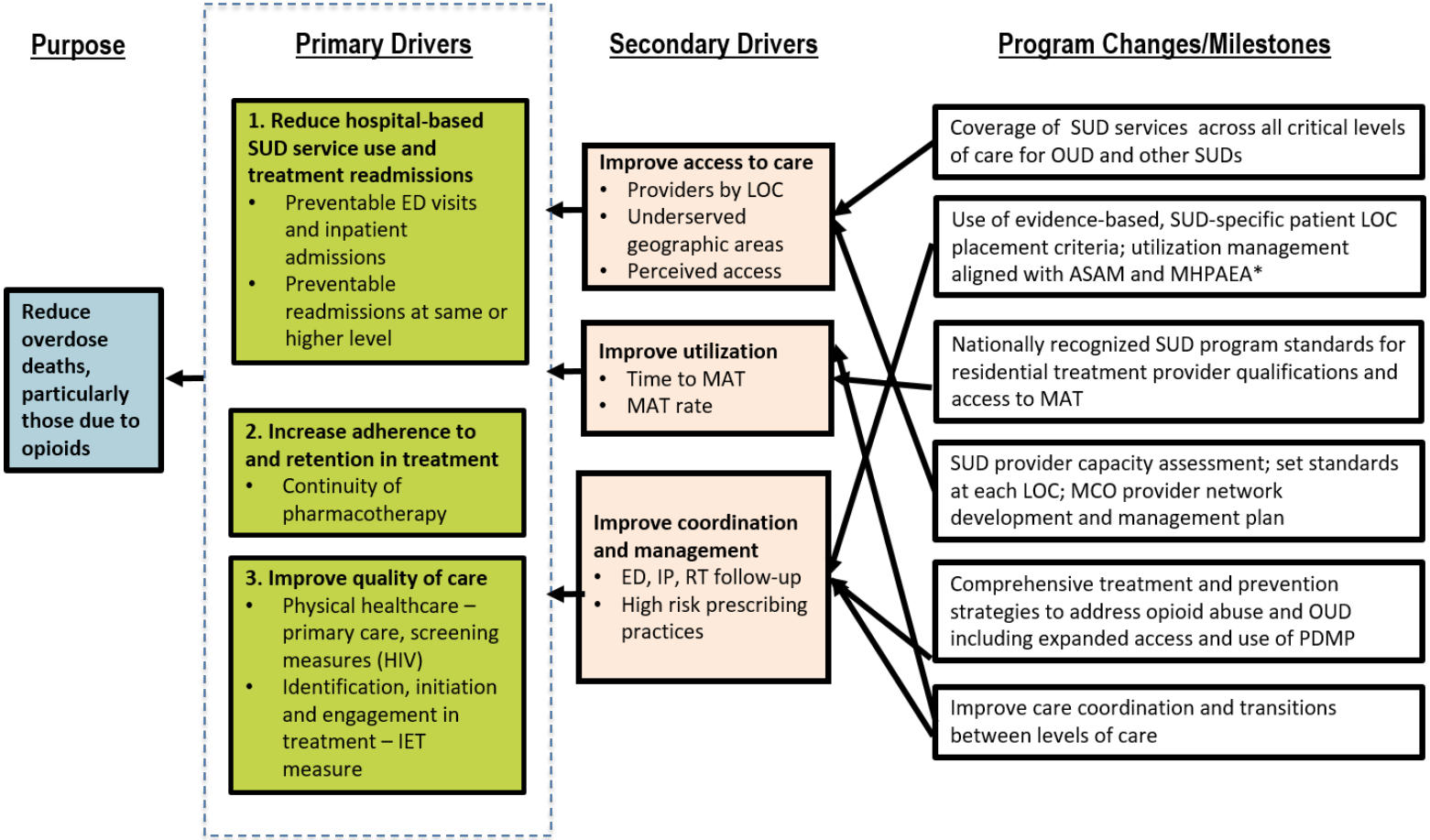
The proposed evaluation design follows the logic of this driver diagram. Each secondary driver is expected to exert influence on all three primary drivers, and all primary drivers are expected to impact drug overdose deaths. Thus, the primary drivers are grouped together with a dotted line. It is hypothesized that the planned programmatic changes will have a direct and immediate impact on secondary drivers. These hypotheses will be tested by assessing the causal impact of

[2]Centers for Medicare and Medicaid Services. Substance Use Disorder Section 1115 Demonstration Evaluation Design- Technical Assistance. March 6, 2019. Available at: https://www.medicaid.gov/medicaid/section-1115-demo/evaluation-reports/evaluation-designs-and-reports/index.html.

interventions on secondary drivers, including access to care, utilization patterns, and coordination and management.

The evaluation will also address the effects of the SUD demonstration waiver on drug overdose deaths and outcomes identified as primary drivers of drug overdose death, including hospital ED and inpatient admissions, readmissions, continuity of pharmacotherapy, physical health screening and utilization and treatment engagement.

Figure 1: Driver Diagram



*Mental Health Parity And Addiction Equity Act

2.2 Questions and Hypotheses

The following questions and hypotheses will be examined and tested as part of the evaluation:

Q1 Does the demonstration increase access to SUD treatment services?

H1.a The demonstration will increase the ratio of SUD providers to beneficiaries enrolled in Medicaid and qualified to deliver SUD services.

H1.b The demonstration will increase the ratio of providers to beneficiaries at each of the levels of care.

H1.c The demonstration will increase the ratio of providers to beneficiaries in geographic areas that are underserved at baseline.

Q2 Does the demonstration increase utilization of SUD treatment by enrollees with SUD?

H2.a The demonstration will reduce the time between initial diagnosis and treatment. *H2.b*

The demonstration will increase the rate of MAT usage.

Q3 Does the demonstration improve coordination and management of care?

H3.a The demonstration will increase the proportion of IP stays which have a timely follow- up visit with a corresponding primary diagnosis of SUD.

H3.b The demonstration will increase the proportion of RT visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3.c The demonstration will increase the proportion of ED visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.

H3.d The demonstration will decrease high-risk prescribing practices (i.e., high dose, multiple prescribers and pharmacies, concurrent use of benzodiazepines).

Q4 Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?

H4.a The demonstration will decrease the rate of ED and IP visits within the beneficiary population for SUD.

H4.b The demonstration will decrease the rate of readmissions to ED and IP settings.

Q5 Does the demonstration improve adherence to SUD treatment?

H5.a The demonstration will increase continuity of pharmaceutical care.

Q6 Do beneficiaries receiving SUD services experience an improved quality of care?

H6.a The demonstration will increase the percentage of beneficiaries with SUD who receive screening and care for co-morbid conditions.

H6.b The demonstration will increase early engagement in SUD treatment.

Q7 Does the demonstration reduce rates of opioid-related overdose deaths?

H7.a The demonstration will decrease the rate of overdose deaths, including those due to opioids.

Q8 How do costs related to the demonstration waiver change throughout the pre- and post-demonstration periods?

H8.a The demonstration will decrease or have no effect on total costs. The demonstration will increase SUD-IMD, SUD-other, and Non-SUD costs, but decrease IP, non-ED outpatient, ED outpatient, pharmacy and long-term care costs.

3. Methodology

3.1 Evaluation Methodology

This section describes the mixed methods strategy that will be used for the evaluation, including both quantitative and qualitative methods. Below are summaries of the quantitative and qualitative methods followed by Table 1 which lists specific measures, data sources, analytic approaches, and their relationship to specific evaluation questions and hypotheses. This is accompanied by a narrative description of the analytic approaches in Section 3.2 to provide additional detail. The target and comparison populations, evaluation period, data sources, and analytic methods are described in greater detail.

Quantitative Methods

A majority of measures will be quantitative and derived from Medicaid administrative data (claims/encounters, eligibility, and provider information). The use of Medicaid administrative data allows measures to not only be tracked prospectively but also calculated historically to measure trends. The primary causal analysis method of use is an interrupted time series (ITS). Medicaid administrative data are ideal for this method because measures can be constructed over repeated time periods and calculated historically, in many cases, allowing pre-intervention trends to be properly estimated. In addition, descriptive analysis such as demographic or geographic stratification of measures will add context to the results of the formal hypothesis tests where applicable. After careful consideration, Ohio has not been able to identify a feasible in-state or out-of-state comparison population to provide a counterfactual for causal inference. The topic of comparison populations is discussed in Section 3.3.

Qualitative Methods

Qualitative data will be gathered at two points during the demonstration from focus groups of people with a SUD insured by Medicaid. The goal of the focus groups is to gather consumer perspectives regarding the outcomes of Ohio's implementation strategy and better understand the lived experiences of individuals receiving treatment. The first set of focus groups will be conducted as part of the Midpoint Assessment required by CMS and scheduled between February and April 2021. While this timeframe begins 16 months after the demonstration start date, most of the demonstration interventions will not be fully implemented at that time. Therefore, the focus group participants may be able to identify barriers to access and recovery that could be addressed over the course of the demonstration. The second set of focus groups will take place near the end of the demonstration (approximately October through November 2024). The focus group questions will concentrate on perceptions regarding changes in access to care, coordination between LOCs, integration of primary care, and key factors that support recovery. Focus group participants will be engaged through RT facilities and/or community behavioral health providers. Facilities and providers will be asked to recruit consumers who received treatment in the previous six months. This target population is well suited since it is likely to include individuals who are subject to changes in services that are an important element of the demonstration. Individuals with recent experience in residential treatment facilities and community behavioral health are likely to understand the barriers to access at various LOCs within the behavioral health (BH) system.

A total of 10-15 focus groups will be conducted in a mix of residential and community behavior health provider settings located in both urban and rural areas, serving youth and adults. To

ensure focus groups reflect a diversity of perspectives, participant recruitment will focus on geographic, gender, age, racial, and ethnic diversity. Treatment facilities and other providers will be recruited from each of the three Ohio Medicaid Assessment Survey county types, metro, non-metro, and non-metro Appalachian to ensure geographic diversity. Treatment providers will be recruited with assistance from the Ohio SUD 1115 Stakeholder Advisory Committee, whose members were selected to represent diverse perspectives from recovery advocates, treatment providers, prescribers, and recovery housing. Focus group facilitators will work with participating treatment facilities and providers to recruit participants for gender, age, race, and ethnic diversity. Additional detail on the qualitative focus groups can be found in Section 3.7.

In addition to the qualitative information gathered as part of the focus group, the evaluation will seek to give a broad view of how Ohio's behavioral health treatment system changes during the demonstration period. This might include information on provider changes, such as adding or discontinuing the delivery of certain services, and different ways that consumers access services during the course of the demonstration. This information will help contextualize the quantitative results.

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q1 Does the demonstration increase access to SUD treatment services?						
H1.a The demonstration will increase the ratio of SUD providers to beneficiaries enrolled in Medicaid and qualified to deliver SUD services.						
Secondary Driver: *(Improve access to care)*	SUD provider availability ratio [quarterly]		The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period	Number of beneficiaries with an SUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series, descriptive statistics
	SUD provider availability ratio – MAT [quarterly]		The number of providers who were enrolled in Medicaid and provided MAT (buprenorphine, methadone, or naltrexone)	Number of beneficiaries with an OUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series, descriptive statistics
H1.b The demonstration will increase the ratio of providers to beneficiaries at each of the levels of care.						
Secondary Driver: *(Improve access to care)*	SUD provider availability ratio by level of care [quarterly]		The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period by category (appropriate sublevels of 1, 2, and 3)	Number of beneficiaries with an SUD diagnosis during the measurement period	Medicaid administrative data	Interrupted time series, descriptive statistics
H1.c The demonstration will increase the ratio of providers to beneficiaries in geographic areas that are underserved at baseline.						
Secondary Driver: *(Improve access to care)*	SUD provider availability ratio within underserved areas [quarterly]		The number of providers who were enrolled in Medicaid and delivered SUD services during the measurement period in select counties determined to be underserved based on the number, percentage, and ratio of provider to beneficiaries.	Number of beneficiaries with an SUD diagnosis during the measurement period within selected counties	Medicaid administrative data and ODM Provider Address Database	Interrupted time series, descriptive statistics
Q2 Does the demonstration increase utilization of SUD treatment by enrollees with SUD?						
H2.a The demonstration will reduce the time between initial diagnosis and treatment.						
Secondary Drivers: *(Improve utilization)*	Initiation of SUD Treatment [quarterly]	Based on MM** 15	Number of beneficiaries who initiated treatment through an IP SUD admission, outpatient visit, intensive outpatient encounter or partial hospitalization, telehealth, or MAT within 14 days of diagnosis	Number of beneficiaries with a new episode of SUD abuse or dependence	Medicaid administrative data	Interrupted time series

MM** Same Measure as Monitoring Metric

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
H2.b The demonstration will increase the MAT usage rate.						
Secondary Drivers: *(Improve utilization)*	MAT usage [quarterly]	Based on MM12**; MODRN	The number of beneficiaries who have a claim for MAT during the measurement period.	The number of beneficiaries with an OUD diagnosis during the measurement period.	Medicaid administrative data	Interrupted time series
	RT stays with MAT [quarterly]		The number of RT stays with MAT administered or prescribed during the stay or 15 days before the start or after the end of the stay	RT stays during the measurement period	Medicaid administrative data	Interrupted time series
Q3 Does the demonstration improve coordination and management of care?						
H3.a The demonstration will increase the proportion of IP visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.						
Secondary Driver: *(Improve care coordination/ management)*	IP follow-up [quar- terly]	Based on MM 17**; adjusted measurement period	Number of IP visits for beneficiaries who have a principal diagnosis of SUD abuse or dependence and who had a follow-up visit with a corresponding principal diagnosis for SUD within 30 days.	Number of IP visits for beneficiaries who have a principal diagnosis of SUD abuse or dependence.	Medicaid administrative data	Interrupted time series
H3.b The demonstration will increase the proportion of RT visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.						
Secondary Driver: *(Improve care coordination/ management)*	RT follow-up [quarterly]	Based on MM 17**; adjusted measurement period	Number of visits for beneficiaries who have a principal diagnosis of SUD abuse or dependence and who had a follow-up visit with a corresponding principal diagnosis for SUD within 30 days.	Number of RT visits for beneficiaries who have a principal diagnosis of SUD abuse or dependence.	Medicaid administrative data	Interrupted time series
H3.c The demonstration will increase the proportion of ED visits which have a timely follow-up visit with a corresponding primary diagnosis of SUD.						
Secondary Driver: *(Improve care coordination/ management)*	ED follow-up [quarterly]	MM 17**; adjusted measurement period	Number of ED visits for beneficiaries who have a principal diagnosis of SUD abuse or dependence and who had a follow-up visit with a corresponding principal diagnosis for SUD within 30 days.	Number of ED visits for beneficiaries who have a principal diagnosis of SUD abuse or dependence.	Medicaid administrative data	Interrupted time series

MM** Same Measure as Monitoring Metric

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
H3.d The demonstration will decrease high-risk prescribing practices.						
Secondary Driver: *(Improve care coordination and oversight)*	Use of opioids from multiple providers in persons without cancer [quarterly]	Based on MM 19**; adjusted requirement and measurement period	The number of beneficiaries without cancer who received prescriptions for opioids from four or more prescribers or four or more pharmacies	Beneficiaries without cancer/1000	Medicaid administrative data	Interrupted time series
	Use of opioids at high dosage in persons without cancer [quarterly]	Based on MM 20**; adjusted measurement period and no multiple provider requirement	The number of beneficiaries without cancer who received prescriptions for opioids at high dosage, ≥ 120 morphine milligram equivalents	Beneficiaries without cancer/1000	Medicaid administrative data	Interrupted time series
Q4 Does the demonstration reduce the utilization of ED and IP hospital settings for OUD and other SUD treatment?						
H4.a The demonstration will decrease the rate of ED and IP visits within the beneficiary population for SUD.						
Primary Driver: *(Reduce hospital-based SUD service use and treatment readmissions)*	Emergency department utilization for SUD [quarterly]	MM** 23	The number of ED visits for SUD during the measurement period	Beneficiaries with a SUD enrolled in Medicaid during the measurement period	Medicaid administrative data	Interrupted time series
	IP stays for SUD [quarterly]	MM** 24	The number of IP discharges re- lated to a SUD stay during the measurement period	Beneficiaries with a SUD enrolled in Medicaid during the measurement period	Medicaid administrative data	Interrupted time series

MM** Same Measure as Monitoring Metric

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
H4.b The demonstration will decrease the rate of readmissions to ED and IP settings.						
Primary Driver: *(Reduce hospital-based SUD service use and treatment readmissions)*	The 30-day all-cause IP admission rate following a RT stay among beneficiaries with SUD [quarterly]	MM** 25; adjusted index locations and measurement period	The count of 30-day IP admissions: at least one acute admission for any diagnosis within 30 days of the index discharge date	Index RT	Medicaid administrative data	Interrupted time series
	The 30-day all-cause ED visit rate following a RT stay among beneficiaries with SUD [quarterly]	MM** 25; adjusted index locations and measurement period	The count of ED visits within 30- days of the index date: at least one acute visit for any diagnosis within 30 days of the index discharge date	Index RT	Medicaid administrative data	Interrupted time series
	The 30-day all-cause visit rate to an ED following an ED visit among beneficiaries with SUD [quarterly]	Based on MM** 23/25; adjusted measurement period	The count of ED visits within 30- days of the index date: at least one acute visit for any diagnosis within 30 days of the index discharge date	Index ED Visits	Medicaid administrative data	Interrupted time series
Q5 Does the demonstration improve adherence to SUD treatment?						
H5.a The demonstration will increase continuity of pharmaceutical care.						
Primary Driver: *(Increased adherence to and retention in treatment)*	Continuity of pharmacotherapy for opioid use disorder [quarterly]	MM 22*, adjusted measurement period, MODRN	Number of participants who have at least 180 days of continuous pharmacotherapy with a medication prescribed for OUD without a gap of more than seven days	Individuals who had a diagnosis of OUD and at least one claim for an OUD medication	Medicaid administrative data	Interrupted time series

MM** Same Measure as Monitoring Metric

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q6 Do beneficiaries receiving SUD services experience an improved quality of care?						
H6.a The demonstration will increase the percentage of beneficiaries with SUD who receive screening and care for co-morbid conditions.						
Primary Driver: *(Improve quality of care)*	Access to preventive/ ambulatory health services for adult Medicaid beneficiaries with SUD [quarterly]	MM** 32; adjusted measurement period	Number of beneficiaries with SUD who had an ambulatory or preventive care visit during past 12 months	Number of beneficiaries with SUD during the measurement period.	Medicaid administrative data	Interrupted time series
	Screening for HIV/HCV/HBV [quarterly]	MODRN	Number of beneficiaries with SUD who were screened for HIV/HCV/HBV during past 12 months	Number of beneficiaries with SUD during the measurement period	Medicaid administrative data	Interrupted time series
H6.b The demonstration will increase early engagement in SUD treatment.						
Primary Driver *(Improve quality of care)*	Initiation and engagement of alcohol and other drug abuse or dependence treatment [quarterly]	MM** 15; adjusted measurement period	Number of beneficiaries who initiated treatment and who had two or more additional SUD services or MAT within 34 days of the initiation visit	Number of beneficiaries with a new episode of alcohol or other drug abuse or dependence	Medicaid administrative data	Interrupted time series
Q7 Does the demonstration reduce rates of opioid-related overdose deaths?						
H7.a The demonstration will decrease the rate of overdose deaths, including those due to opioids.						
Purpose: *(Reductions in overdose deaths particularly those due to opioids)*	Rate of overdose deaths [quarterly]	MM* 27	Number of overdose deaths	Number of beneficiaries/1000	Medicaid and ODH administrative data	Interrupted time series, descriptive statistics
	Rate of overdose deaths due to opioids [quarterly]	MM* 27	Number of overdose deaths due to opioids	Number of beneficiaries/1000	Medicaid and ODH administrative data	Interrupted time series, descriptive statistics

MM** Same Measure as Monitoring Metric

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
Q8 How do costs related to the demonstration waiver change throughout the pre- and post-demonstration periods?						
H8.a The demonstration will decrease or have no effect on total costs. The demonstration will increase SUD-IMD, SUD-other, and Non-SUD costs, but decrease IP, non-ED outpatient, ED outpatient, pharmacy and long-term care costs.						
	Total costs [quarterly]		Total costs from fee-for-service and encounter claims, including inpatient, outpatient, professional medical, pharmacy, dental, and long-term care	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	Total federal costs [quarterly]		Total Medicaid costs * federal Medicaid percentage	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	SUD-IMD costs [quarterly]		IMD costs	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	SUD-other costs [quarterly]		Costs with SUD diagnosis and/or SUD-related code (procedure, revenue, POS, provider type)	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	Non-SUD costs [quarterly]		Costs without SUD diagnosis and without SUD-related code (procedure, revenue, POS, provider type)	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	Outpatient costs -non ED [quarterly]		Costs associated with outpatient and professional medical and dental, non ED claims	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	Outpatient costs - ED [quarterly]		Costs associated with ED claims that do not result in an inpatient admission	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	Inpatient costs [quarterly]		Costs associated with inpatient claims	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model
	Pharmacy costs [quarterly]		Costs associated with pharmacy claims	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model

MM** Same Measure as Monitoring Metric

Table 1: Summary of Key Evaluation Questions, Hypotheses, Data Sources, and Analytic Approaches

Driver	Measure Description [period]	Steward	Numerator	Denominator	Data Source	Analytic Approach
	Long-term care costs [quarterly]		Costs associated with long-term care claims	Total member-months	Medicaid administrative data	Beneficiary-level interrupted time series model

MM** Same Measure as Monitoring Metric

3.2 Descriptions of Analytic Approaches by Hypothesis

Hypothesis H1.a states that the demonstration will increase the ratio of qualified SUD providers to beneficiaries. To test this hypothesis, the ratio of providers to beneficiaries will be calculated and tracked quarterly and an ITS model will be applied to test for statistically significant changes in the trajectory of the measures over time. Providers and their locations will be identified using the methodology described in Section 3.6.

The approach of standardizing the number of providers by the number of beneficiaries with an SUD or OUD diagnosis rather than the total number of beneficiaries was chosen because it better reflects the relative population need. Descriptive statistics also will be calculated to assess changes in the distribution of MAT providers by MAT type (buprenorphine, methadone, or naltrexone), and to better understand the geographic distribution of providers and beneficiaries by calculating the provider-beneficiary ratio within each county.

Hypothesis H1.b considers whether the demonstration will produce an increase in the ratio of providers to beneficiaries at each LOC. This hypothesis will be tested by applying an ITS model to examine changes in the ratio of providers to beneficiaries at each ASAM LOC and applying descriptive statistics to examine the geographic distribution of providers by county.

Hypothesis H1.c examines access to care in areas that are underserved. Access will be defined in terms of the ratio of providers and beneficiaries in a given county. Preliminary analyses suggest that there is wide variation in provider-to-beneficiary ratios across the state. Underserved counties will be defined as those counties that have a combination of a large number and percentage of beneficiaries with OUD and a small provider access ratio. Ratios of providers-to-beneficiaries will be tracked over time in these counties to assess improvement over time and indicate a re-
duction in access gaps. Additional descriptive statistics mapping provider locations will be used to add context to the analysis.

Hypothesis H2.a considers timely utilization of treatment after diagnosis. The impact of the demonstration on timely utilization will be tested using an ITS analysis with the outcome based on a modified version of monitoring metric 15 (initiation and engagement of alcohol and other drug abuse or dependence treatment). The measurement periods will be reduced to quarters instead of the annual measurement period specified in the monitoring metric.

Hypothesis H2.b expects that access to all ASAM levels of care and MAT will improve the MAT utilization rate over the course of the demonstration. This hypothesis will be tested using an ITS model applied to identify improvement over time in MAT usage rates among beneficiaries with OUD and beneficiaries in RT for OUD.

As part of the demonstration's goal of improving coordination and management of care, *Hypotheses H3.a*, *H3.b*, and *H3.c* consider the demonstration's effect on timely follow-up care after an IP or RT stay or ED visit. These hypotheses will be tested using ITS models with the outcome measures based on monitoring metric 17. *Hypothesis H3.d* relates to the demonstration's effect on high-risk prescribing practices. Two measures based on monitoring metrics 19 and 20
will be calculated quarterly and used as the outcomes in ITS models to test whether there are reductions in the proportion of beneficiaries who are prescribed opioids at high dosages (≥ 120 morphine milligram equivalent [MME]) and the proportion of beneficiaries with opioids from four or more prescribers or pharmacies in the past year.

Hypothesis H4.a assesses changes in ED and IP utilization for SUD by applying ITS models to monitoring metrics 23 and 24. Similarly, the analysis for *Hypothesis H4.b* considers the rate of readmission to an ED following an ED visit, and the rate of admission to ED and IP settings following a RT stay. Monitoring metric 23 will be used to capture ED readmissions and an adapted version of monitoring metric 25 will be used to capture ED visits and IP stays following RT. An
ITS model will be used to test for significant changes in the trajectories of these metrics over the course of the demonstration.

Adherence to treatment can support individuals in their pursuit of recovery and reduce risk of overdose. *Hypothesis H5.a* states that the demonstration will increase continuity of pharmaceutical care. The 180-day continuity of pharmacotherapy measure, based on monitoring metric 22, with an adjusted measurement period, will be used for this analysis.

Hypothesis H6.a assesses improvement in quality of care for beneficiaries receiving SUD ser- vices. The demonstration is expected to be associated with increases in the percentage of beneficiaries with SUD receiving primary care and screening for co-morbid conditions. ITS models will be used to assess changes in several measures over the course of the demonstration.
The first is the proportion of beneficiaries with SUD who had an ambulatory or preventive care visit in the past year. This measure is based on monitoring metric 32 with an adjusted measurement period. The other measures assess proportions of beneficiaries receiving HIV, HCV, and HBV screening during the past year. These measures will be calculated quarterly with a rolling
annual lookback period. *Hypothesis H6.b* assesses early engagement in SUD treatment. An ITS model will be used to test for changes over time in the proportion of beneficiaries who had two or more additional SUD services or MAT within 34 days of treatment initiation, based on monitoring metric 15.

Hypothesis H7.a addresses the fundamental goal of the demonstration to decrease the rate of drug overdose deaths, particularly those due to opioids. An ITS model will test for changes in drug overdoses and opioid overdoses over time as a result of the demonstration. In addition,
descriptive statistics will show the breakdown of opioid overdose deaths by type (e.g. fentanyl, heroin).

Evaluation question **Q8** considers changes in the cost of services that are due to program changes implemented in the demonstration. To estimate the effect of the demonstration on per-beneficiary cost, an interrupted time series model will be constructed for each outcome of interest. These models will be different from previous ITS analyses in that the modelled outcomes will be at the
beneficiary level instead of the summary level. See Section 3.7 for additional details on the mod- elling methodology.

In addition to the analytic approaches, descriptive comparisons may be conducted with a group of states that are implementing SUD 1115 Waiver demonstration projects and participating in
a distributed research network as described in Section 3.8. These comparisons may be used to evaluate unique elements of Ohio's implementation plan compared to those of other states.
Descriptive comparisons may also be conducted to compare the impact of the waiver on demo- graphic subpopulations of interest. See Section 3.8 for a full description.

3.3 Target and Comparison Populations

The demonstration will impact services for Medicaid enrollees of any age with a SUD. Adolescence is recognized as an important period of prevention and early intervention. However, adolescents

differ substantially in terms of the prevalence of SUD and aspects of treatment that are the focus of this evaluation. Therefore, the evaluation will focus on the target population of individuals ages 18 through 64 during a given measurement period. Adolescents, ages 12 through 17, will be considered as an additional population of interest for descriptive analysis for relevant measures given data availability. Beneficiaries who are dually enrolled in Medicaid and Medicare will be excluded from all analyses because it is not possible to observe all of their health care in Medicaid claims and encounters. Additional inclusion criteria for specific construct measures such as SUD/OUD diagnosis and/or continuous enrollment are described in Table 1.

In considering possible comparison populations, note that the interventions are state- and system- wide, and therefore apply to all Medicaid beneficiaries. Also, there is no readily available source of service data from persons who are not enrolled in Medicaid. Consequently, there are no opportunities to gather data from a comparison group of Ohio Medicaid enrollees not subject to interventions, or a comparison group of Ohioans who are not enrolled in Medicaid.

Several national data sources were considered to provide a state-level comparison group. How- ever, because many states already have an 1115 SUD Waiver demonstration, or have submitted an application for a waiver to CMS, there are few remaining states to serve as candidates for a valid counterfactual comparison to Ohio. Summary measures for the states with similar characteristics to Ohio indicate that states without a waiver have much lower opioid-involved overdose death rates (Table 2). Therefore, these states make a poor counterfactual comparison to Ohio's experience with the opioid crisis. Furthermore, these states (Connecticut, New York, and South Carolina) may choose to apply for an SUD 1115 waiver in the coming years.

Since Ohio has limited options for a valid comparison group, the evaluation will utilize statistical methods that compare the outcomes across time. These methods compare pre- and post- intervention outcomes in a time series controlling for pre-intervention trends. The majority of the proposed evaluation outcomes are derived from Medicaid administrative data and are ideal candidates for a time series modelling approach, because they can be calculated over repeated intervals and gathered retrospectively for a period prior to implementation of the demonstration interventions.

Table 2: Opioid-involved overdose deaths and prescriptions for selected states

1115 SUD Waiver States	Opioid-Involved Overdose Deaths/100,000 persons (2017)	Opioid Prescriptions/100 persons (2017)
West Virginia	49.6	81.3
Ohio	39.2	63.5
New Hampshire	34.0	52.8
Maryland	32.2	51.7
Massachusetts	28.2	40.1
Kentucky	27.9	86.8
Michigan	21.2	74.0
Wisconsin	16.9	52.6
Non-SUD Waiver States	**Opioid-Involved Overdose Deaths/100,000 persons (2017)**	**Opioid Prescriptions/100 persons (2017)**
Maine[3]	29.9	55.7
Connecticut	27.7	48
Missouri[4]	16.5	71.8
New York	16.1	37.8
South Carolina	15.5	79.3

3.4 Evaluation Period

The demonstration waiver period began October 2019, and will continue for 5 years. Based on the state's implementation plan[5], the majority of the actions related to the milestones will take place within the first 12-24 months of the waiver time period (October 2020-October 2021) with a few actions that already have taken place. Evaluators will use data starting with January 2018, or earlier to model the outcome trends in the pre-demonstration period. January 2018 is signif- icant because it marks the implementation of Ohio's behavioral health system redesign which included significant changes in Medicaid behavioral health benefits and billing codes.

January 1, 2018, was the earliest that certain relevant Medicaid claims codes were used. Since many of the outcome measures are dependent on Medicaid benefits structure, the start date for those measures will be set at Q1 2018. Those outcome measures unlikely to be affected by behavioral health system redesign will be measured starting in Q1 2017. As specified in Table 3, Q4 2021 will be treated as the start of the post-implementation period for ITS models because

[3]On November 26, 2019, MaineCare submitted a 1115 demonstration waiver application to CMS with the goal of improving the SUD service delivery system. If approved, this waiver would allow for additional federal funding for RT or IP SUD treatment for MaineCare-enrolled adults and would provide state flexibility to pilot four services focused on MaineCare-enrolled parents with SUD who are involved with or at-risk of involvement with Child Pro- tective Services.

[4]In August 2018, the state of Missouri requested authority to amend the demonstration to include a substance use treatment benefit. The amendment request was approved with an implementation date of February 1, 2019, to cover outpatient substance use services in the primary care home, including pharmacotherapy, for SUD treatment of Gateway enrollees. Sources: MACPAC Report – States with approved or pending 1115 SUD waivers (as of July 2019), NIDA report (opioid summaries by state, 2017) https://www.macpac.gov/subtopic/section-1115-waivers-for-substance-use-disorder-treatment/, https://www.drugabuse.gov/drugs-abuse/opioids/ opioid-summaries-by-state

[5]https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Waivers/1115/downloads/oh/oh-substance-use-disorder-treatment-pa.pdf

that is when the majority of actions related to the milestones will be completed. As a result, 15 quarters of data will be available in the models' pre-implementation period and 13 quarters will be available for the models' post-implementation period. See Figure 6 for a visual reference to important policy time points.

Table 3: Summary of ITS Measures and Time Periods

Hypothesis	Measure	Earliest Data Point	Start of Post-Implementation Period for ITS Model
H1.a	SUD provider availability ratio [quarterly]	Q1 2018	Q4 2021
H1.a	SUD provider availability ratio – MAT [quarterly]	Q1 2017	Q4 2021
H1.b	SUD provider availability ratio by Level of Care [quarterly]	Q1 2018	Q4 2021
H1.c	SUD provider availability ratio within Underserved Areas [quarterly]	Q1 2018	Q4 2021
H2.a	Initiation of SUD Treatment [quarterly]	Q1 2018	Q4 2021
H2.b	MAT Usage [quarterly]	Q1 2017	Q4 2021
H2.b	RT Treatment Stays with MAT [quarterly]	Q1 2018	Q4 2021
H3.a	IP Follow-Up [quarterly]	Q1 2018	Q4 2021
H3.b	RT Follow-Up [quarterly]	Q1 2018	Q4 2021
H3.c	ED Follow-Up [quarterly]	Q1 2018	Q4 2021
H3.d	Use of Opioids from Multiple Providers in Persons Without Cancer [quarterly]	Q1 2017	Q4 2021
H3.d	Use of Opioids at High Dosage in Persons Without Cancer [quarterly]	Q1 2017	Q4 2021
H4.a	Emergency Department Visits for SUD-Related Diagnoses and Specifically for OUD [quarterly]	Q1 2017	Q4 2021
H4.a	IP Admissions for SUD, and Specifically OUD [quarterly]	Q1 2017	Q4 2021
H4.b	The 30-day All-Cause IP Admission Rate Following a RT Stay Among Beneficiaries with SUD [quarterly]	Q1 2018	Q4 2021
H4.b	The 30-day All-Cause ED Admission Rate Following a RT Stay Among Beneficiaries with SUD [quarterly]	Q1 2018	Q4 2021
H4.b	30-day Readmission Rate to an ED Following ED Visit for an SUD-Related Diagnosis, and Specifically for OUD [quarterly]	Q1 2018	Q4 2021
H5.a	Continuity of Pharmacotherapy for Opioid Use Disorder [quarterly]	Q1 2017	Q4 2021
H6.a	Access to Preventive/ Ambulatory Health Services for Adult Medicaid Beneficiaries with SUD [quarterly]	Q1 2018	Q4 2021
H6.a	Screening for HIV/HCV/HBV [quarterly]	Q1 2018	Q4 2021

Table 3: Summary of ITS Measures and Time Periods

Hypothesis	Measure	Earliest Data Point	Start of Post-Implementation Period for ITS Model
H6.b	Initiation and Engagement of Alcohol and Other Drug Abuse or Dependence Treatment [quarterly]	Q1 2018	Q4 2021
H7.a	Rate of Overdose Deaths [quarterly]	Q1 2018	Q4 2021
H7.a	Rate of Overdose Deaths Due to Opioids [quarterly]	Q1 2018	Q4 2021
H8.a	Total Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Total Federal Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	SUD-IMD Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	SUD-other Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Non-SUD Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Outpatient non-ED Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Outpatient ED Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Inpatient Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Pharmacy costs - ED Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021
H8.a	Long-term care costs - ED Costs Per-Beneficiary [quarterly]	Q1 2018	Q4 2021

3.5 Data Sources

This section provides additional detail on the data sources to be used in the evaluation. See Table 1 for additional specificity on hypotheses, measures and their associated data sources.
The primary data source for the evaluation will be Medicaid administrative data as supplied to the Ohio Colleges of Medicine Government Resource Center (GRC) by the Ohio Department of Medicaid (ODM). Medical claims and encounter data for professional medical, outpatient facility, inpatient facility, and pharmacy will be used to assess service utilization. Eligibility and enrollment records will be used to determine eligibility and continuous enrollment criteria.
Provider records from Medicaid administrative data, programmatic data, and additional information from ODM's provider capacity scan will be used to assess provider capacity and access. This data will be used to construct a majority of the proposed measures.

All quantitative data in the evaluation will be drawn from Medicaid administrative data. Cleaning of Medicaid administrative data primarily occurs through eligibility verification and claim adjudication processes. Eligibility verification occurs regularly at Ohio Medicaid to determine whether individuals are eligible for Medicaid benefits and the appropriate category of eligibility. The claims adjudication process validates submitted claims against Medicaid coverage policies. When multiple claims have been submitted by a provider for the same service(s), only the most recent version of the claim is retained for the evaluation. Due to the lag in submitting claims,
the evaluation team will pull claims on a six-month delay (e.g., claims for services rendered in January 2020 will be analyzed in July 2020). The evaluation team will validate measure results through comparison to other Ohio SUD treatment data work, including but not limited to the

MODRN OUD project and other SUD work conducted by GRC on behalf of the Ohio Department of Medicaid and Ohio Department of Mental Health and Addiction Services.

In order to answer evaluation question **Q7** about the number of overdose deaths, Vital Statistics death records from the Ohio Department of Health (ODH) will be linked to Medicaid administrative data to determine Medicaid beneficiary status. The Vital Statistics–Medicaid record linkage methods will be based on prior established methods as approved by ODM.

To add context to the quantitative findings, 10-15 beneficiary focus groups will be conducted at two post-implementation time points with enrolled members who have received SUD treatment services. Residential treatment facilities and community behavior health providers will be asked to assist with recruitment of participants and host focus groups. Topics addressed may include perceptions regarding changes in access to care, coordination of transitions between levels of care, and integration of primary care. Questions will be aligned with topics from the Consumer Assessment of Healthcare Providers and Systems (CAHPS)[6] survey series where possible.

3.6 Identifying Providers

Medicaid claims include various provider identification numbers for billing, rendering (for medical), attending (for hospital outpatient and inpatient), and prescribing (for pharmacy) providers. Rendering providers can then be linked to a practice address file to determine the location. All three pieces of location information are often needed to get a full picture of all individual practitioners and practice locations. Billing providers will provide additional context, but as the primary identifier of providers for the ratio measures in Table 1, the rendering providers will be used. In addition, for MAT providers, the prescribing provider will be used for pharmacy claims and the rendering provider will be used for outpatient and professional claims.

ODM's administrative data on provider locations will be used to help geolocate providers for use in geographic-based measures. Evaluators also will consider using an alternative source of provider addresses such as the National Plan and Provider Enumeration System (NPPES) National Provider Identifier (NPI) Registry file. ODM researchers are developing a provider capacity scan that may be utilized to improve the accuracy of analyses that require provider location.
Such methods will be considered for the evaluation if they can be applied consistently across time and the impact of the interventions are not confounded by changes in methodology.

3.7 Analytic Methods

The following section describes the proposed analytic methods for evaluation of the hypotheses and evaluation questions. These include descriptive statistics, a summary-level Interrupted Time Series (ITS), a beneficiary-level ITS, and qualitative focus groups. Additional information regarding descriptive analysis that falls outside of the formal hypotheses yet adds to the general context of the evaluation is found in Section 3.8.

Descriptive Statistics

As appropriate, descriptive statistics for metrics will be shown along with more formal statistical models. Depending on the particular metric, this could include information on sample size,

[6] https://www.ahrq.gov/cahps/index.html

trends in the metric over time and/or maps of the metric by county. These analyses will be used to give additional context and information to the evaluation of research questions.

Summary-Level Interrupted Time Series (ITS)

The majority of analysis will be conducted with a summary-level interrupted time series, meaning that unit of analysis is the summary measure (e.g. a ratio or percentage) at a given time period rather than individual's outcome at the given time period. Assume an outcome of interest Y, across $t = 0, \ldots, m$ time periods. Let Y_t represent the outcome at time t, T represent the time elapsed, and W_t represent an indicator variable specifying whether or not time t is part of the post-intervention period. Then the standard ITS regression model is given by:

$$Y_t = \beta_0 + \beta_1 T + \Delta_1 W_t + \Delta_2 W_t T + \epsilon_t, \quad (1)$$

where β_0, β_1 represent the pre-intervention intercept and slope respectively, and Δ_1, Δ_2, the represent the change in the intercept and slope respectively during the post-intervention period. The variable ϵ_t represents random error in the time series at time t. The coefficients Δ_1 and Δ_2 are the causal parameters of the interest in the model.

There may be specific outcomes of interest to examine changes in three time periods rather than two. In this case, additional parameters for the change in intercept and slope in the third time period would also be estimated giving the model the following form:

$$Y_t = \beta_0 + \beta_1 T + \Delta_1 W_{1t} + \Delta_2 W_{1t} T + \Delta_3 W_{2t} + \Delta_4 W_{2t} T \epsilon_t, \quad (2)$$

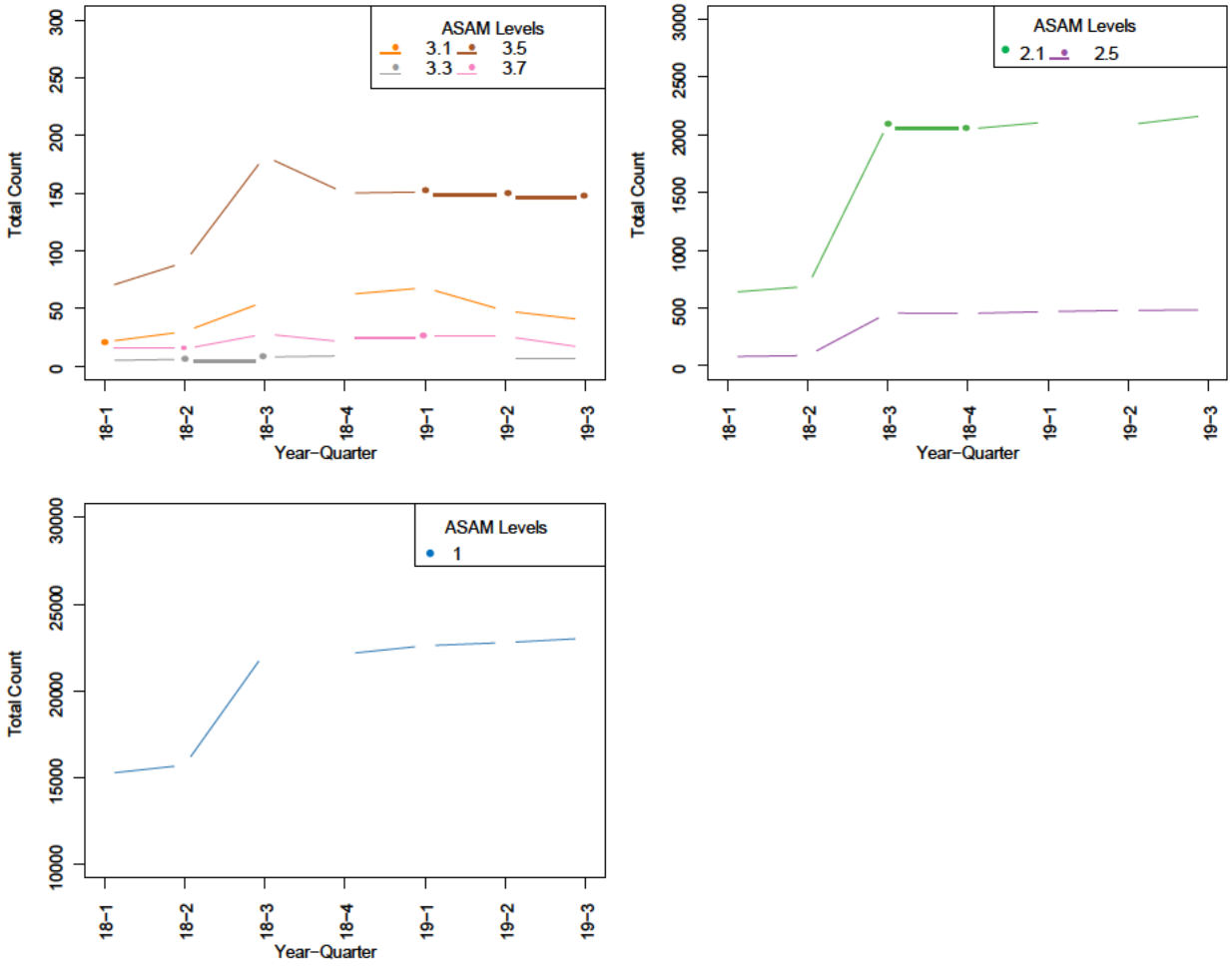
where W_{1t} and W_{2t} are indicators of the second and third time periods (post-intervention) respectively. The coefficients Δ_1 and Δ_2 represent the changes in the second time period relative to the first (pre-intervention) and Δ_3 and Δ_4 represent the changes in the third time period relative to the first.

One important consideration in time series models is autocorrelation, meaning the outcome at a point in time is correlated with its past values. Auto-correlation can violate the linear regression model's assumption that errors are independent over time. In order to account for auto- correlation, a correction to the standard errors such as the Newey-West estimator[7] is planned.

Figure 2 provides an example of the data that will be utilized in an interrupted time series model. It shows unique counts of rendering providers who were listed on at least one final paid inpatient, outpatient, or professional claim during the measurement period. For the time series model, the provider counts would be standardized by the number of OUD beneficiaries, and data would be extended into the future attempting to detect outcome shifts or changes in out- come slope.

[7]Newey, W. K., & West, K. D. (1986). A simple, positive semi-definite, heteroskedasticity and autocorrelation consis- tent covariance matrix.

Figure 2: Provider Totals by ASAM level by Service Quarter



Beneficiary-Level Interrupted Time Series (ITS)

As recommended in the CMS technical assistance, a beneficiary-level interrupted time series model will be used to model outcomes related to evaluation question **Q8**, concerning per-beneficiary quarterly cost data (capitation and claim cost). The unit of analysis in the model are individuals rather than aggregate measures. The beneficiary-level approach will allow for the model to control for individual-level demographics (e.g. age, race, gender) and potentially clinical characteristics (e.g. comorbidities, delivery system). Including these covariates should not only increase the predictiveness of the model itself, but also will help account for any changes in the underlying population over time that could affect costs.

Let Y be some outcome of interest. Then Y_{it}, the outcome for individual i at time t will be explicitly modelled. As advised in the CMS technical assistance, a few different modelling functional forms will be considered including log-transformed linear models and a zero-inflated (two- part) generalized linear models such as a zero-inflated Poisson or zero-inflated negative binomial. Zero-inflated models attempt to better capture zeros in the data by first modelling if the

outcome is zero or greater than zero. Then, conditional on the outcome being greater than zero, a secondary model is used to estimate the outcome. The two model parts can, but do not need to, utilize the same set of predictor variables. Because multiple observations per beneficiary will be used, the outcomes will be correlated with one another. In order to take into account this within-beneficiary dependence, a GEE (Generalized Estimating Equations) version, and a random effects model of the model forms will be considered. GEE models take into account within- person dependence through a parameterized and estimated working correlation matrix. Random effects models take into account within-person dependence by assuming a person-level random effect that is constant over time.

In addition to parameters for time, post-implementation time periods, and an interaction thereof, fixed-effects for age, gender, race, and possibly calendar month will be included to control for changes in demographics over time and seasonal effects. A separate model will be fit for each cost outcome: total, total federal, SUD-IMD, SUD-other, non-SUD, outpatient non-ED, outpatient ED, IP, pharmacy, and long-term care costs.

Hypothesis Testing

Formal statistical tests will be conducted on model parameters that represent the change in the metric over time in order to determine statistically significant changes in trends. For summary- level ITS models this includes the parameters that represent the change in the intercept and slope respectively from pre- to post-intervention time periods. For beneficiary-level ITS models, this includes parameters for indicators of the post-implementation time periods and those of interactions of the post-implementation time periods with time. Depending on the specific model, a t-test (linear model) or Wald test (generalized linear or GEE model) will be used to test for non- zero parameter values. Descriptive statistics or exploratory analysis will focus on estimation and uncertainty quantification (confidence intervals) rather than statistical significance. In interpreting results, additional context and descriptive analysis will be considered in order to give a full picture of the findings.

Qualitative Focus Groups

Qualitative methods of data collection, including semi-structured interviews and focus groups, will be a unique component of the evaluation given their ability to answer the “how” and “why” questions. Beneficiary focus groups will be conducted at each of two post-implementation time points. Ten to fifteen focus groups will be conducted, targeting seven or more participants per group, with enrolled members who have received SUD treatment ser vices. Residential treatment facilities and community behavior health providers will be asked to host focus groups and assist with recruitment of participants.

Prior to each focus group, participants will complete a brief questionnaire on subjects like age, gender, race/ethnicity, city of residence, occupation (if any), major health concerns, and house- hold composition. A member of the evaluation team will collect each questionnaire and label the seat location of each respondent (see Figure 3 below). During the focus group, the note taker will operate the audio-recorder and document SUD-associated major themes generated by the participants. The note taker will also highlight brief excerpts of compelling quotes and indicate the speaker by seat number and the time on the recording. For example, “Having Medicaid coverage…has changed my life.” Time: 34:14.[8] This procedure will enable evaluators to

[8]See page 43 of 2018 Ohio Medicaid Group VIII Assessment https://medicaid.ohio.gov/Portals/0/Resources/

Figure 3: Focus Group Seating Arrangement

more easily find and transcribe compelling quotes from the audio-recording and link the quote to de-identified characteristics of the speaker (e.g., "A 45-year-old daycare worker in Hocking County").

Both the note taker and the facilitator will document the "mood" or feel for how the discussion is proceeding, a respondent's reactions, and the potential need to pause or otherwise sustain a supportive environment for all respondents. Given the sensitivity of focus group topics, the evaluation team will be responsive to the respondent's reactions to establish and sustain a comfortable environment. For qualitative semi-structured interviews and focus groups, the evaluator will develop an informed consent process guided by federal regulations detailed in 45 CFR 46.116, approved by the Institutional Review Board of the Ohio State University, and reviewed by ODM.

Focus group recordings will be transcribed by a third party. Transcripts will be reviewed by focus group facilitators for quality assurance. Transcripts will then be loaded into computer-assisted qualitative data analysis software to aide in the management of transcripts, coding, and emergent themes. Grounded theory will underpin the analyses conducted of these interviews with regard to access to care, coordination of care, and medication assisted therapy. Codes pertaining to the hypotheses described in Table 1 will be developed prior to the qualitative interviews, and evaluators also will inductively develop codes based on the data during review as concepts emerge. Subsequent discussion of the codes by evaluators will determine the salient themes present in the findings.

3.8 Additional Descriptive Analysis Time and Distance Standards Analysis

Another marker of provider capacity is the time and distance that consumers need to travel from their residence to their provider. ODM requires Medicaid managed care plans to maintain certain minimum time and distance standards as part of their provider agreement.[9] Based on these standards and subject to availability, descriptive analysis will be completed in order to help describe changes in provider capacity. ODM's provider data along with beneficiaries ad- dress data from administrative records will be used in this analysis. This analysis will help pro- vide additional context to the evaluation results.

Reports/Annual/Group-VIII-Final-Report.pdf

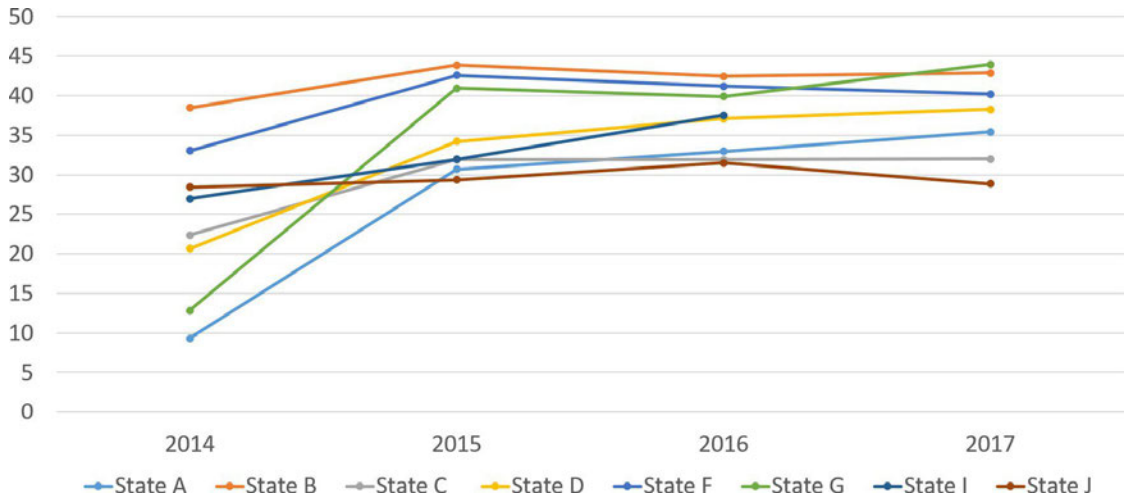
[9] https://medicaid.ohio.gov/Portals/0/Providers/ProviderTypes/Managed%20Care/Provider%20Agreements/01_2020_MMC_Final_Rates.pdf

MODRN State Comparisons

Ohio is part of a multi-state opioid-focused research network that provides an opportunity to contrast results of Ohio's SUD waiver to those of other states. The Medicaid Outcomes Distributive Research Network (MODRN), facilitated by AcademyHealth, is a collaborative effort to analyze data across multiple states to facilitate learning among Medicaid agencies. Academic institutions in 11 states (Delaware, Kentucky, Maryland, Michigan, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and Wisconsin) began working with their Medicaid state partners in 2014 to establish a set of common quality metrics for opioid use disorder treatment and outcomes. The majority of states in the MODRN collaborative have SUD waivers approved or pending, making them poor choices for a counterfactual comparison group. Instead, data from these other states will be used to describe how Ohio's outcomes change over the course
of the waiver in reference to other states. See Figure 4 for a MODRN data example. Possible MODRN measures that may be informative are:

- Measure 1: Initiation and Engagement in Treatment (annual percent);
- Measure 3 Annual Rate of MAT among Enrollees with OUD (rate per 1,000 member months);
- Measure 4: Continuity of Pharmacotherapy ≥ 180 days (annual percent);
- Measure 12: Opioid Fills at High Dose (rate per 1,000 enrollees without cancer);
- Measure 13: Multiple Opioid Prescribers or Providers (rate per 1,000 enrollees); and
- Measure 14: Concurrent Use of Benzodiazepines with MAT (annual percent).

Figure 4: Initiation in treatment rate per 1,000 enrollees with an OUD diagnosis, 2014-2017, MODRN collaborative



Subpopulations

Evaluators may conduct descriptive analyses to assess the impact of the demonstration on Ohio's priority subpopulations identified by gender, race, and age subgroups. ODM is working in collab- oration with other state agencies to address the needs of vulnerable populations who are in-
volved in multiple systems of care. Examples include adolescents, multi-system youth (MSY) and their families, enrollees involved in the criminal justice system, individuals with chronic physical

and/or mental health conditions, and women in the post-partum period who are at risk of morbidity and mortality. Ohio proposes to explore the waiver's impact on these subpopulations, given data availability, even though it is not a requirement of the demonstration evaluation.

4. Methodological Limitations

There are several major methodological limitations of the evaluation design that reduce the ability to draw causal arguments about the effect of the demonstration. Each is outlined below with discussion on how it will be addressed or considered in the evaluation.

First, there are minimal opportunities for a valid comparison group for the evaluation. While it would be ideal to draw comparison to a "control" population that was not subject to the policy changes within Ohio, it is not feasible due to the state-wide implementation of the demonstration and the lack of available non-Medicaid claims data. Data from other states exist through national surveys and summary data reports, but there are only a few states that are not participating the SUD waiver. Among these states, no candidates were found to be comparable to Ohio's opioid overdose rates. Further, it is not known whether these states will apply for the waiver in the future. Therefore, the interrupted time series (ITS) approach is the best option available for measures of Ohio administrative Medicaid data. Though it doesn't utilize an external comparison group, ITS remains a rigorous strategy to estimate the impact of a population-level health intervention that is implemented at a clearly-defined point in time.[10]

Another major methodological limitation is the impact of COVID-19 pandemic and resulting impact on services, behavioral health needs, and Medicaid enrollment. Emergency rules were enacted to temporarily extend the definition of telehealth to additional behavioral health ser- vices and communication modalities (e.g., telephone). Federal OTP requirements were relaxed to increase at-home administration of Methadone. There have been temporary interruptions in services as providers implemented safety measures. There also has been a reduction in demand due to fear of exposure and the closure of referral sources. Though the extent and length of this disruption is unknown, the primary and secondary drivers of overdose death will likely be affected. For example, access to care, treatment utilization, and coordination of care are likely to decrease temporarily, as consumers were concerned about seeking care and getting exposed, and providers had to develop telemedicine capacity. In the long run, this may have a negative impact on some of CMS's goals for the demonstration, including overdose and preventable hospitalizations.

It is also expected that there could be a surge of new Medicaid enrollees requiring SUD treatment due to increased stress related to this virus and the loss of employee sponsored health insurance coverage. As the emergency provisions expire and the virus eventually diminishes, the SUD treatment utilization and Medicaid coverage may return to levels observed before the pan- demic. Information about policy changes and their impact will be gathered from ODM and the stakeholder advisory committee over time to assess the length and depth of pandemic's impact on the behavioral health system and individuals with SUD. The evaluation findings will be interpreted in the larger context of the pandemic and its effects and as appropriate, methodology will be adjusted to better take into account the effects of the pandemic. For example, baseline and comparison time frames may be adjusted to isolate the impact of the demonstration from the impact of COVID.

Beyond COVID-19, Ohio has already implemented numerous program and policy changes to address the opioid crisis. It may be challenging to isolate the effects of previous program and policy changes from those of the demonstration, particularly if additional policy changes take

[10]Bernal, J. L., Cummins, S., & Gasparrini, A. (2017). Interrupted time series regression for the evaluation of public health interventions: a tutorial. International journal of epidemiology, 46(1), 348-355.

place concurrent to the demonstration. As a result, evaluation findings will be considered in the context of the larger policy and economic environment. Major policy changes outside of the waiver during the demonstration period that could affect the evaluation outcomes will be noted and discussed.

It is possible that characteristics of the population (e.g. the age distribution) will change over time either as a result of the demonstration itself, or because of outside factors such as loss of employee-sponsored insurance in an economic crisis. A change to the population characteristics also could affect the outcome measures. If there are meaningful changes to population characteristics over time, a propensity score weighting methodology will be utilized to adjust for changes in the population characteristics to better estimate the effect of the demonstration itself, rather than demographic changes.

In addition, identifying providers and locating their practice address from claims, billing, and other administrative data is challenging because services are provided both by sites and individuals. Several of the proposed evaluation measures dealing with access to care rely on counting and possibly geolocating providers. As a result, a consistent methodology for identifying and locating practices must be applied over time so that increases in access to care can be attributed to the intervention itself rather than changes in accuracy of the provider identification method- ology. As best possible, a consistent methodology will be used and any changes in the method- ology over time will be noted in the evaluation.

Lastly, because there are many hypotheses, measures, and models that will be formally tested as part of the evaluation, it is important to keep in mind issues of statistical significance and multiple comparisons when interpreting results. To minimize the risk of erroneous inference, only pre-specified hypotheses will be tested and stricter significance thresholds may be considered. Conclusions will not be based solely on a p-value threshold in keeping with statistical best practices.[11] Any descriptive statistics or exploratory analysis will focus on estimation and uncertainty quantification (confidence intervals) rather than hypothesis testing.

[11]Ronald L. Wasserstein & Nicole A. Lazar (2016) The ASA Statement on p-Values: Context, Process, and Purpose, The American Statistician, 70:2, 129-133, DOI: https://doi.org/10.1080/00031305.2016.1154108

5. Attachments

5.1 Independent Evaluator

The 1115 SUD demonstration will be evaluated by an independent party. The Ohio Colleges of Medicine Government Resource Center (GRC) will conduct the evaluation. This entity is separate from ODM and has extensive experience evaluating Medicaid programs, including Ohio's State Innovation Model grant, and a legislatively mandated evaluation of Ohio's Group VIII population in 2016. GRC partners with public universities in Ohio to leverage methodological and subject matter expertise.

GRC will maintain communication with ODM staff throughout the evaluation period to better understand policy and program implementation, and to obtain ODM's assistance with access to administrative data. GRC will make independent decisions about the evaluation itself, including methodology, analytical strategy, analysis of evaluation data, and presentation of results.

GRC agrees that no agency, employment, joint venture, or partnership has been or will be created between ODM and GRC. GRC further agrees that as an independent entity, it assumes all responsibility for any federal, state, municipal or other tax liabilities along with workers compensation, unemployment compensation, and insurance premiums that may accrue as a result of funds received pursuant to this work. GRC agrees that it is an independent entity for all purposes including, but not limited to, the application of the Fair Labor Standards Act, the Social Security Act, the Federal Unemployment Tax Act, the Federal Insurance Contribution Act, pro- visions of the Internal Revenue Code, Ohio tax law, Workers Compensation law, and Unemployment Insurance law.

THE OHIO STATE UNIVERSITY

Office of Research

Office of Sponsored Programs

Research Administration Building
1960 Kenny Road
Columbus, OH 43210

614-292-3815 Phone
614-292-5913 Fax
osp.osu.edu

February 7, 2020

I, Aimee Nielsen-Link, Director Health Sciences Office, Office of Sponsored Programs, warrant that: 1) I am an official authorized to bind the entity; and 2) to the best of my knowledge and belief, actual and potential organizational conflicts of interest have been identified, and disclosed to our institution's COI Administrator as of August 30, 2019.

I certify that The Ohio State University's Financial Conflicts of Interest policy complies with the requirements of the Department of Health and Human Services and 42 CFR Part 50 Subpart F. The full policy can be found at: http://orc.osu.edu/files/Policy-on-Faculty-Financial-Conflict-of- Interest.pdf

The Section 1115 Substance Use Disorder demonstration will be evaluated by an independent evaluator. The Ohio Colleges of Medicine Government Resource Center (GRC) will conduct the evaluation. This entity is separate from the Ohio Department of Medicaid (ODM) and has extensive experience evaluating Medicaid programs, including Ohio's State Innovation Model grant and a legislatively-mandated evaluation of Ohio's Medicaid expansion population in 2016. GRC partners with many public universities in Ohio to leverage methodological and subject matter expertise.

GRC will maintain communication with Ohio Department of Medicaid staff throughout the evaluation period in order to better understand policy and program implementation and to obtain ODM's assistance with access to administrative data, although GRC will make independent decisions about the evaluation itself, including methodology, analytical strategy, analysis of evaluation data, and presentation of results.

The Ohio State University agrees on behalf of GRC that no agency, employment, joint venture, or partnership has been or will be created between ODM and GRC. GRC further agrees that as an independent entity, it assumes all responsibility for any federal, state, municipal or other tax liabilities along with workers compensation, unemployment compensation and insurance premiums that may accrue as a result of funds received pursuant to this work. GRC agrees that it is an independent entity for all purposes including, but not limited to, the application of the Fair Labor Standards Act, the Social Security Act, the Federal Unemployment Tax Act, the Federal Insurance Contribution Act, provisions of the Internal Revenue Code, Ohio tax law, Workers Compensation law, and Unemployment Insurance law.

Aimee Nielsen-Link, Director, Health Sciences Office, Office of Sponsored Programs

5.2 Evaluation Budget

Table 4: Evaluation Budget for State Fiscal Years (SFY) 2020-2026

	SFY 2020	SFY 2021	SFY 2022	SFY 2023	SFY 2024	SFY 2025	SFY 2026
Estimated independent evaluator staff costs*	$159,816	$241,592	$224,212	$262,743	$310,100	$294,759	$228,525
Estimated other direct costs**	$50,000	$50,000	$50,000	$50,000	$125,747	$50,000	$50,000
Estimated administrative costs***	$20,982	$29,159	$27,421	$31,274	$43,585	$34,476	$27,853
Total Estimated Cost	$230,798	$320,751	$301,633	$344,017	$479,43	$379,235	$306,378

*Independent evaluator staffing costs

**Subcontractors will complete measurement development, qualitative data collection and cleaning, quantitative data cleaning, analyses, and report generation

***Facilities and Administrative costs

5.3 Timeline and Major Milestones

Figure 5: Evaluation Timeline and Major Milestones

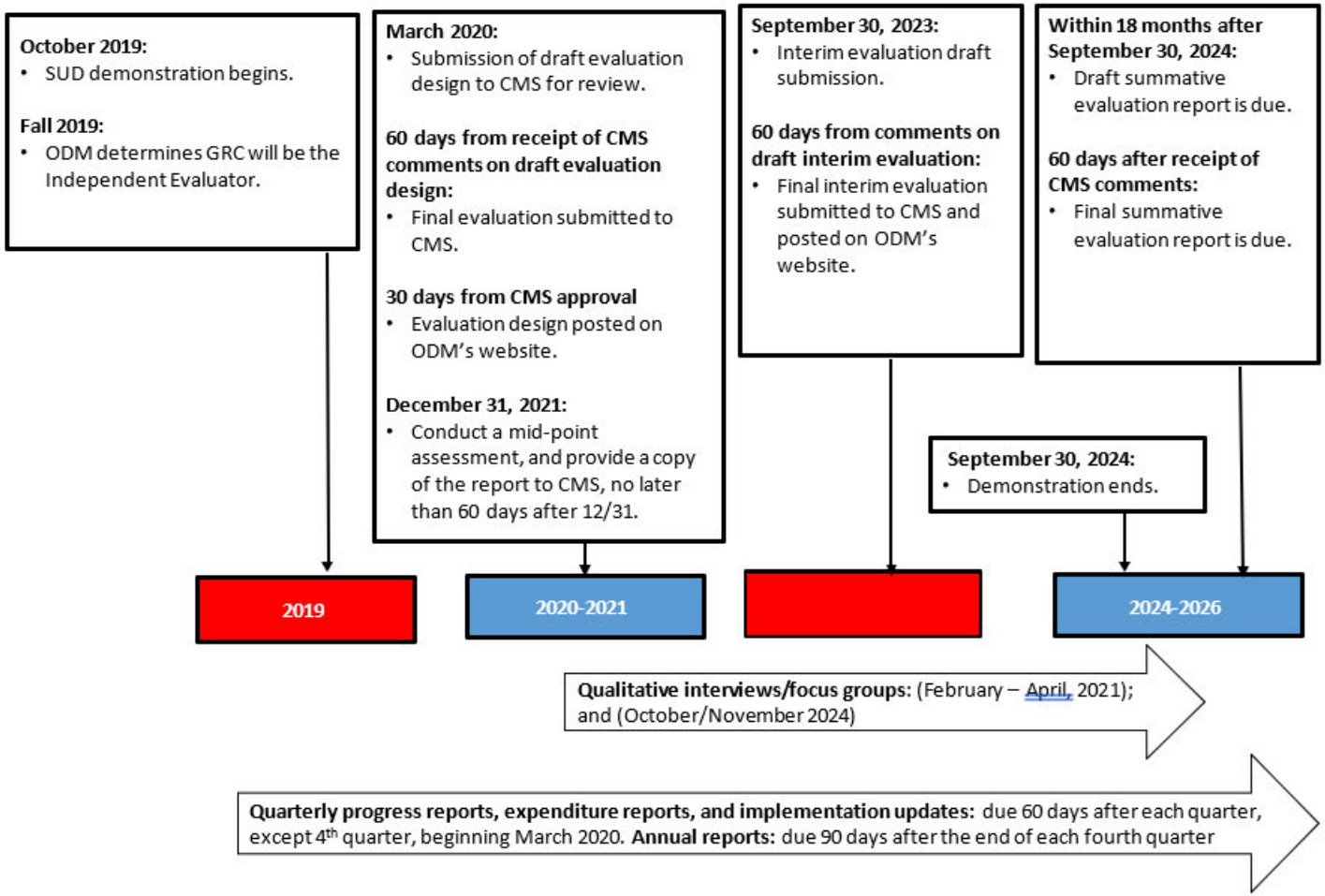
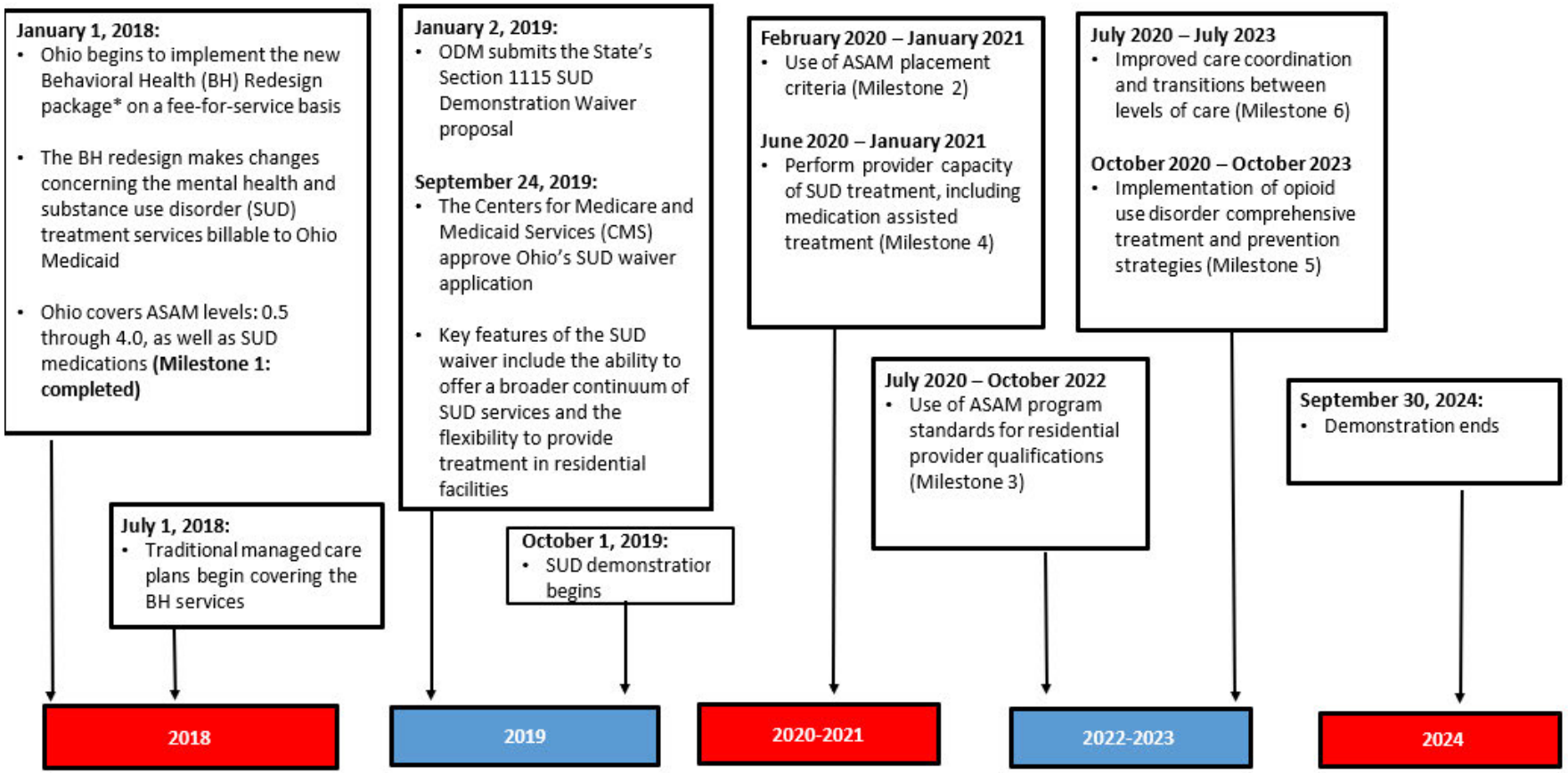


Figure 6: Timeline of Ohio Policy Changes



*The new BH benefit package was offered to outpatient hospitals beginning August 1, 2017

6. Appendix

6.1 Common Acronym List

Table 5: Common Acronym List

Acronym	Full Name
ASAM	American Society of Addiction Medicine
BH	Behavioral Health
BHCC	Behavioral Health Care Coordination
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CFR	Code of Federal Regulations
CMS	Centers for Medicare & Medicaid Services
COI	Conflict of Interest
ED	Emergency Department
GEE	Generalized Estimating Equations
GRC	Government Resource Center
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
IET	Initiation and Engagement of Alcohol and other Drug Dependence Treatment
IMD	Institutions for Mental Disease
IP	Inpatient
ITS	Interrupted Time Series
LOC	Level of Care
MACPAC	Medicaid and Children's Health Insurance Program Payment and Access Commission
MAT	Medication Assisted Treatment
MHPAEA	Mental Health Parity and Addiction Equity Act
MM	Monitoring Metric
MME	Morphine Milligram Equivalent
MODRN	Medicaid Outcomes Distributive Research Network
MSY	Multi-System Youth
NPI	National Provider Identifier
NPPES	National Plan & Provider Enumeration System
ODM	Ohio Department of Medicaid
OUD	Opioid Use Disorder
PDMP	Prescription Drug Monitoring Program
RT	Residential Treatment
SFY	State Fiscal Year
SUD	Substance Use Disorder
UM	Utilization Management