

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



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## State Demonstrations Group

June 23, 2026

Adela Flores-Brennan  
Medicaid Director  
Colorado Department of Health Care Policy and Financing  
303 E. 17<sup>th</sup> Avenue, Suite 100  
Denver, CO 80203

Dear Director Flores-Brennan:

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 #41 “Interim Evaluation Report” of the Colorado section 1115 demonstration, “Colorado Adult Prenatal Coverage in Child Health Plan Plus (CHP+)” (Project No: 21-W-00014/8), effective through July 31, 2025. This Interim Evaluation Report covers the period from December 2020 through July 2023. CMS determined that the Evaluation Report, submitted on July 30, 2024 and revised on June 2, 2025, 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 uses a mixed-methods approach, including descriptive statistics, statistical tests, desk reviews, and facilitated interviews, with results showing a mix of outcomes associated with the demonstration. Positive results included improved continuity of enrollment between the demonstration year (DY) 20 baseline period (August 1, 2019–July 31, 2020) and DY 23 (August 1, 2022–July 31, 2023). Pregnant members experienced longer enrollment durations, and the proportion of members continuously enrolled in CHP+ during the nine months prior to delivery increased by 48.7%. Access to care also improved, as evidenced by a 1.09-mile reduction in the average driving distance to prenatal care services between the baseline period and DY 23, as well as positive beneficiary feedback regarding maternity care experiences. The percentage of women who follow American College of Obstetricians and Gynecologists (ACOG) guidelines increased by 27.5% compared with the baseline period; however, this increase was not statistically significant. Similarly, the rate of live births weighing less than 2,500 grams decreased by 0.9% from the baseline period to DY 23, although this change was also not statistically significant. The state reported that the early period of the COVID-19 public health emergency (PHE) produced atypical results, including both positive trends (such as fewer emergency department visits) and negative trends (such as reduced access to and follow-up care services). Because the evaluation period overlapped with the COVID-19 PHE, many findings

were likely influenced by the pandemic and related policy changes, making it difficult to isolate the effects of the demonstration. The state indicated that in the summative evaluation, it plans to assess the pace at which utilization and access measures improve during the PHE unwinding period. We look forward to further evaluation of the demonstration.

In accordance with STC #45, 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.

States are responsible for following all applicable federal law and regulations when they claim and use federal Medicaid and CHIP funds and must fully comply with all applicable Medicaid and CHIP statutes and regulations under a section 1115 demonstration, except where specific provisions have been expressly waived or identified as not applicable for that demonstration. This obligation includes all requirements in Title XIX and Title XXI of the Social Security Act and implementing regulations governing provider screening and enrollment activities, pre- and post-payment review claiming, payment methodologies and rate-setting, utilization controls, and program integrity including processes to identify, investigate, and refer suspected fraud, and methods to receive complaints and identify questionable practices. States must maintain effective systems and safeguards to prevent, detect, and address any fraud, waste, or abuse (FWA) in the delivery of and payment for Medicaid and CHIP services, including referrals to law enforcement when appropriate.

States should have heightened monitoring and oversight mechanisms in place featuring robust internal controls to identify and remediate all vulnerabilities (including, but not limited to, FWA and beneficiary access issues) inherent in service areas approved as part of a demonstration. At any time, CMS may request that the state provide a plan detailing the state's systems and safeguards to prevent, detect, and address any FWA relative to this demonstration. Failure to meet program integrity obligations under federal statutes and regulations or under the terms and conditions of this demonstration approval may result in compliance actions or other enforcement measures that could include requirements to develop and implement corrective action plans, withholdings, deferrals, disallowances, and termination of demonstration authority.

We look forward to our continued partnership on the Colorado Adult Prenatal Coverage in CHP+ section 1115 demonstration. If you have any questions, please contact your CMS demonstration team.

Sincerely,

Danielle Daly  
Director  
Division of Demonstration Monitoring and Evaluation

cc: Keri Rosenbloom, State Monitoring Lead, CMS Medicaid and CHIP Operations Group

# Interim Evaluation

## Colorado's Adult Prenatal Coverage in Child Health Plan Plus (CHP+) Section 1115 Demonstration

Prepared for  
Colorado Department of Health Care Policy &  
Financing

June 6, 2025

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## Listing of Exhibits

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1	Section A	Summary of Measures Examined by Demonstration Goal
2	Section B	Total Combination CHIP Enrollment and Spending: FFY 2020 and FFY 2023
3	Section B	CHP+ Number of Women Enrolled in Prenatal Demonstration
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8	Section C	Logic Models Developed in Demonstration Evaluation Design Plan
9	Section C	Mapping Hypotheses and Research Questions to Demonstration Goals
10	Section F	Summary of Findings for Measures Mapped to Research Questions #1
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18	Section F	Results for Interim Evaluation Measures #7: Proportion of PPC (Timeliness) Women Using the Emergency Department
19	Section F	Results for Interim Evaluation Measure #8: Prenatal Postpartum Care (PPC): Timeliness of Prenatal Care
20	Section F	Summary of Findings for Measures Mapped to Research Questions #3 and #4
21	Section F	Results for Interim Evaluation Measure #9: At Risk of Poor Maternal and/or Infant Health Outcome
22	Section F	Results for Interim Evaluation Measure #10: Percentage of Women Who Follow ACOG Guidelines
23	Section F	Results for Interim Evaluation Measure #11: Proportion of At-Risk Deliveries
24	Section F	Results for Interim Evaluation Measure #12: Prenatal Postpartum Care (PPC): Postpartum Care
25	Section F	Results for Interim Evaluation Measure #13: Proportion of PPC (Postpartum) Women Using the Emergency Department
26	Section F	Results for Interim Evaluation Measure #14: Live Births Weighing Less Than 2,500 Grams (LBW-CH)
27	Section F	Results for Interim Evaluation Measure #15: Well-Child Visits in the First 15 Months of Life (6 or more visits)
28	Section G	Summary of Measures Examined by Demonstration Goal

## SECTION A: Executive Summary

Colorado has had a long-standing Section 1115(a) waiver demonstration, originally approved in 2002, to allow Colorado to continue to provide coverage to uninsured pregnant women with family income using Modified Adjusted Gross Income (MAGI) equivalent above 141 and through 195 percent of the federal poverty level (FPL). This Interim Evaluation covers the demonstration extension period from December 18, 2020 through July 31, 2025. The Department of Health Care Policy & Financing (HCPF) has responsibility for the administration and oversight of Colorado's Children's Health Insurance Program (CHIP) as well as the Adult Prenatal Coverage in Child Health Plan Plus (CHP+) program under the demonstration and state plan authorities.

Colorado's goals in operating the demonstration are to improve the health status of low-income Coloradoans by enabling a:

1. Decrease in the uninsured rate for pregnant women;
2. Increase in prenatal and postpartum care for pregnant women enrolled in the demonstration; and
3. Increase in the number of healthy babies born to pregnant women enrolled in the demonstration.

### Population Impacted by the Demonstration

From federal fiscal year (FFY) 2020 to 2023, CHP+ enrollment increased from 1.6% to 5.0% of total combined CHIP program enrollment, and 6.7% to 13.1% of the total expenditures for Colorado's total combined CHIP program. Since FFY 2020, monthly enrollment of pregnant women and births has trended upward, with the highest monthly enrollment of pregnant women occurring in May 2023 (3086 pregnant women) and the highest number of births in August 2022 (310 births). Enrollees are entitled to receive all mandatory and optional state plan services approved under the Medicaid state plan. Services are provided through a combination of fee-for-service (FFS) and managed care delivery systems that vary geographically. The majority of the services are provided through FFS, although the proportion of payments to managed care plans has increased over time. Of those members enrolled in the demonstration from demonstration year (DY)18 to DY23, the most predominant race/ethnicity reported was Multiple (39.4%) followed by White/Caucasian (27.2%) and Hispanic/Latino (18.1%). Between DY18 and DY23, approximately 60 percent of the women enrolled are between the ages of 21 and 30.

### Evaluation Questions and Hypotheses

Burns & Associates, a Division of Health Management Associates (HMA-Burns) is serving as the Independent Evaluator for this demonstration. HMA-Burns constructed logic models delineating short-term and long-term outcomes associated with the three principal policy objectives of the demonstration.

- Maintain Continuity of Enrollment
- Maintain Access to Care, and
- Maintain or Improve Health Outcomes

HMA-Burns converted the logic models into a series of hypotheses and research questions. For each research question, measures were assigned as well as a targeted methodology. At least one research question and one hypothesis is mapped to each of the three demonstration goals.

## Methodology

HMA-Burns developed an Evaluation Design Plan for this demonstration which was approved by CMS on March 7, 2023. The full Evaluation Design Plan, which appears in [Appendix A](#), is a mixed-methods approach, drawing from a range of data sources, measures, and analytics to best produce relevant and actionable study findings. It defines the most appropriate study population and sub-populations and describes the analytic methods included in the evaluation design including: (1) descriptive statistics; (2) statistical tests; (3) desk reviews; and (4) facilitated interviews.

## Target Population

The target population is any Colorado CHP+ beneficiary enrolled in the demonstration in the study period. HMA-Burns created flags to identify sub-populations within the demonstration population which include the following:

- MCO or RAE enrolled with
- Member race and ethnicity
- Pregnancy status
- Birthweight of newborn
- Member age (for specified age groups)
- Member home location (e.g., city/county/region)
- New member enrollment due to COVID

## Evaluation Period

Metrics for the demonstration population and sub-populations are computed for a pre- and post-demonstration period. The pre-demonstration period is defined as August 1, 2017 through December 17, 2020. The current demonstration period is defined as enrollment or dates of service from December 18, 2020 through July 31, 2025. To simplify the analytic plan, HMA-Burns is counting the first seven months of 2020 as part of the pre-demonstration period, and from August 1, 2020 through December 21, 2020 as part of the current demonstration period.

For the Interim Evaluation, HMA-Burns is defining the pre-demonstration period as dates of service on or after August 1, 2017 through July 31, 2020. The demonstration period is defined as dates of service August 1, 2020 through July 31, 2023. For monthly and quarterly measures, HMA-Burns included dates of service on or after: January 1, 2017 through July 31, 2017 in the pre-demonstration period; and August 1, 2023 through December 31, 2023 in the demonstration period.

## Data Sources

The primary data source used to compute measures in this evaluation is service utilization reported on encounters, member enrollment, and provider enrollment files from the data warehouse Business Intelligence Data Management (BIDM). Other data sources include secondary data published by other sources and qualitative feedback collected from facilitated interviews.

## Results

In Section F of this report, each of the 3 demonstration goals serves as a heading. Measures are reported for each goal as they relate to the research questions posed in the Evaluation Design Plan. At the start of each subsection, there is a summary table that lists each measure reviewed that was mapped to a research question under the demonstration goal. The table shows the desired outcome for each measure, if the desired outcome is being met in the demonstration period thus far when compared to the baseline period, the statistical test and if the results were found to be statistically significant (when testing for significance was conducted) in comparison to the baseline period. The test used for statistical significance is also shown, where applicable.

After the summary table, each of the individual measures examined appears on its own one-page dashboard report. Information about the research question posed, the measure and measure

steward, and the data source used to analyze the measure are provided. If available, results are presented from the earliest pre-demonstration period through the most recent demonstration year and include trend over time and statistical tests. Detailed data for each measure appears in [Appendix C](#). Results of each statistical test appears in [Appendix D](#).

A summary of the results of all 15 measures, by demonstration goal, appears in Exhibit 1 at the end of this section. Among the 15 measures, there were eight measures where the desired outcome was met. Statistical tests were run for 11 of the 15 measures. Among these 11 measures, there are three measures which have a statistically significant trend in the intended direction, five measures which have a statistically significant trend in wrong direction, and three measures where the trend was found not to be statistically significant.

### Assessment of the Effectiveness of the Demonstration

Colorado did not meet all the desired outcomes outright but still saw many positive impacts for the CHP+ population due to the demonstration, despite the entire demonstration period occurring during the PHE. Noteworthy positive impacts between DY20 and DY23 follow by logic model aim.

#### *Logic Model 1: Maintain Continuity of Enrollment.*

- Proportion of enrollees continuously enrolled in CHP+ has increased over the current demonstration period
- Enrollment duration during pregnancy increased with the majority of members continuously enrolled for 12 months

#### *Logic Model 2: Maintain Access to Care.*

- Average driving distance to prenatal care services decreased
- Beneficiary perspectives on lived experiences of maternity care

#### *Logic Model 3: Maintain or Improve Health Outcomes.*

- The proportion of at-risk deliveries declined
- The percentage of PPC women following ACOG guidelines increased
- The proportion of PPC postpartum care women increased
- The rate of live births weighing less than 2,500 grams declined

The PHE likely had a confounding effect in enabling Colorado to fully meet these aims during the demonstration period. While some measures were found to be steady between the pre-demonstration period and initial years of the demonstration, other measures had results that trended in the opposite direction from what was desired. Areas in which the evaluators will focus on assessing improvement in the remainder of this demonstration period include the following:

- Prenatal care paid by type of insurance
- Beneficiary perspectives on lived experiences of maternity care
- Utilization of prenatal care services
- Proportion of PPC prenatal and postpartum women using the emergency department
- PPC Timeliness of Prenatal Care
- Percentage of women determined to be at risk of poor maternal and/or infant health outcome
- Well child visits during the first 15 months of life

## Assessment of Opportunities for Improvement

Colorado has seen progress towards its goals related to maintaining continuity of eligibility, access to care and maintaining or improving health outcomes for CHP+ enrollees. Within each of the goals, there are some measures where progress has yet to be seen in a meaningful way during the current demonstration period. The HMA-Burns evaluation team has identified opportunities for the HCPF to consider for continued improvement during the remainder of this demonstration period which focus on:

1. **Encourage member involvement.** The HCPF is encouraged to expand the Maternity Advisory Committee to allow for feedback to be gathered from non-English speaking beneficiaries. Further, HMA-Burns recommends that HCPF conduct the Mini Focus Group session on an annual basis to continue to gather focused feedback relevant to its CHP+ demonstration.
2. **Incentivize prenatal and postpartum engagement.** To address the trends observed in this evaluation with respect to prenatal care and use of the emergency department settings, HMA-Burns recommends that the HCPF continue to incorporate prenatal engagement and consider adding postpartum follow-up care as key performance indicators as it plans for the implementation of the third phase of the Accountable Care Collaborative<sup>1</sup>.
3. **Reduce barriers to prenatal and postpartum care.** Based on member feedback and trends observed with respect to prenatal care and care settings during postpartum care, HMA-Burns recommends that HCPF consider expanding the use of Nurse Family Partnerships and home visiting to improve opportunities to access postpartum care services; and consider expanding provider types providing prenatal care services to improve opportunities to access prenatal care services and address perceived stigmas.
4. **Address data quality challenges.** While there have been improvements in the format and availability of data since the Summative Evaluation covering the extension period August 1, 2015 through July 31, 2020, HMA-Burns recommends that HCPF continue to address data quality challenges affecting claims and encounter data.

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<sup>1</sup> [Preparing for Accountable Care Collaborative Phase III | Colorado Department of Health Care Policy & Financing](#)

**Exhibit 1  
Summary of Measures Examined by Demonstration Goal**

Waiver Goals		Total Measures	Measures with Results Trending in the Intended Direction	Measures with Results Trending in the Wrong Direction	Total Measures Where Tests Were Run for Statistical Significance	Of these, the Total Where Trend in Intended Direction and Statistically Significant	Of these, the Total Where Trends in Wrong Direction and Statistically Significant	Of these, the Total Where There Was No Statistically Significant Change
<b>MEASURES FOR GOALS #1 - #3</b>		<b>15</b>	<b>8</b>	<b>7</b>	<b>11</b>	<b>3</b>	<b>5</b>	<b>3</b>
1	Decrease in the uninsurance rate for pregnant women.	3	2	1	1	1	0	0
2	Increase in prenatal and postpartum care for pregnant women enrolled in the demonstration	5	2	3	3	0	3	0
3	Increase in the number of healthy babies born to pregnant women enrolled in the demonstration.	7	4	3	7	2	2	3

## SECTION B: General Background Information

### Description of the Demonstration's Policy Goals<sup>2</sup>

Colorado's goals in operating the demonstration are to improve the health status of low-income Coloradans by enabling a:

1. Decrease in the uninsurance rate for pregnant women;
2. Increase in prenatal and postpartum care for pregnant women enrolled in the demonstration; and
3. Increase in the number of healthy babies born to pregnant women enrolled in the demonstration.

### Demonstration Name, Approval Date, and Time Period of Data Analyzed in the Assessment

Name: Colorado Adult Prenatal Coverage in Child Health Plus (CHP+)

Project Number: 21-W-00014/8

Approval Date: December 21, 2020

Time Period Covered by Evaluation: The demonstration covers the period from December 18, 2020 through July 31, 2025. This assessment covers the period with dates of service from December 18, 2020 through July 31, 2025.

### Brief Description and History of Implementation<sup>3</sup>

The Colorado Adult Prenatal Coverage in the CHP+ demonstration was initially approved on September 27, 2002 to provide coverage to uninsured pregnant women with family income above the CHP+ state plan level, from 133 to 185 percent of the FPL. At the time of initial approval, states only had the option to cover pregnant women above the CHP+ state plan level under title XXI, i.e., the Children's Health Insurance Program (CHIP) through a section 1115 demonstration.

The Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA) added section 2112 to the Act which created the option for states to cover pregnant women in the CHIP state plan, but only if the state covered pregnant women in CHP+ up to at least 185 percent of the FPL. Consistent with CHIPRA, Colorado extended coverage in the CHIP state plan to pregnant women with family income up to 250 percent of the FPL but had to amend its CHP+ state plan to move pregnant women from 133 to 185 percent of the FPL from coverage under the CHIP section 1115 demonstration to the CHP+ state plan (effective January 1, 2013).

To support Colorado with continuing its pre-CHIPRA coverage of pregnant women from 133 to 185 percent of the FPL, the Centers for Medicare and Medicaid Services (CMS) grandfathered title XXI coverage for this population of uninsured pregnant women (at the MAGI-equivalent eligibility level of above 141 percent through 195 percent of the FPL) with the July 30, 2012 extension of the demonstration. Grandfathering title XXI coverage for these pregnant women is consistent with

<sup>2</sup> Colorado Adult Prenatal Coverage in Child Health Plan Plus (CHP+) Section 1115(a) Demonstration Special Terms and Conditions, accessed at <https://www.CHP+.gov/CHP+-CHIP-Program-Information/By-Topics/Waivers/1115/downloads/co/co-adult-prenatal-coverage-ca.pdf>

<sup>3</sup> Ibid, page 4 of 31

section 2112(f) of the Act (enacted by CHIPRA) that authorizes the continuation of other state options for providing medical assistance to pregnant women, including pregnancy-related services through the application of any waiver authority (as in effect on June 1, 2008).

Colorado continues to operate the Adult Prenatal Coverage in CHP+ demonstration within the program authorities and implementation parameters in existence on June 1, 2008. In accordance with section 2112(f) of the Act, CMS approved a five-year extension of Colorado's grandfathered title XXI coverage in September 2015 (through July 31, 2020; temporarily extended through December 31, 2020) and is approving another five-year extension through July 31, 2025 with these STCs and associated expenditure and non-applicable authorities. The program authorities granted with this approval are solely limited to, and contingent upon, Colorado's continued implementation of its pre-CHIPRA coverage of pregnant women from 133 to 185 percent of the FPL (at the MAGI-equivalent of 141-195% of the FPL) in accordance with section 2112(f) of the Act.

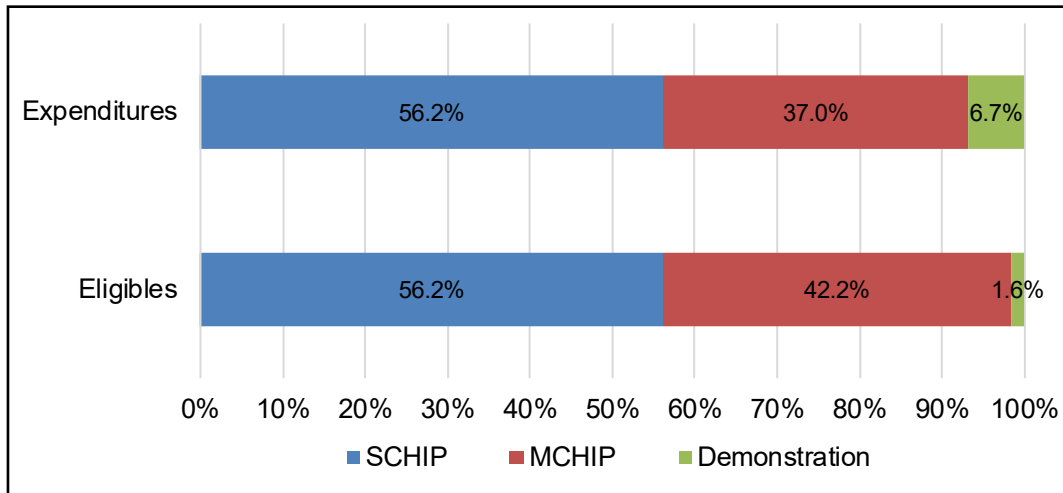
This demonstration furthers the objectives of title XXI by improving access to high-quality prenatal, delivery, and postpartum care services to low-income pregnant women that is producing positive health outcomes for beneficiaries. For example, the state's summative evaluation report for the 2015 to 2020 demonstration period shows that the state realized:

- Statistically significant improvement in the rate of prenatal care visits compared to the pre-waiver period. The rate for the pre-waiver year used as the baseline was 76.2 percent of eligible enrollees. During the five demonstration years, the rate varied from 76.8 percent to 81.0 percent.
- For the postpartum care measure, all five demonstration years showed statistically significant improvement in the rate of postpartum visits compared to the pre-waiver period (rate of 31.3%). The postpartum visit rate during the five demonstration years varied from 47.2 percent to 51.7 percent of eligible enrollees.
- For the healthy birthweight measure, the pre-waiver year result was 94.4 percent of all babies born to demonstration eligibles had a healthy birthweight. During the demonstration years, this rate varied from 92.4 percent to 93.9 percent. The lowest rate of 92.4 percent occurred in demonstration year five and the change was determined to be statistically significant. That said, Colorado's birthweight rate for all years is in line with what has been reported to CMS in state Medicaid agency submissions on this measure as it is one of the CMS Child Core Measures.

## Population Groups Impacted by the Demonstration

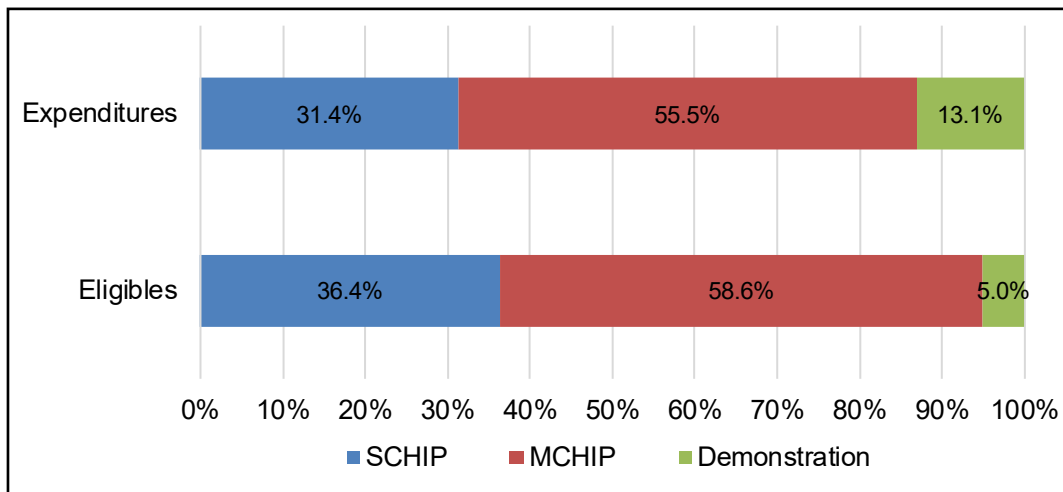
The Department of Health Care Policy & Financing (HCPF) has responsibility for the administration and oversight of Colorado's CHIP as well as the CHP+ program under the waiver and state plan authorities. As seen in Exhibit 2, from federal fiscal year (FFY) 2020 to 2023, CHP+ enrollment increased from 1.6% to 5.0% of total combined CHIP program enrollment, and 6.7% to 13.1% of the total expenditures for Colorado's total combined CHIP program.

**Exhibit 2**  
**Total Combination CHIP Enrollment and Spending: FFY 2020**



Source: CHP+ Demonstration Extension Application and FFY 2020 Allotment Neutrality Report

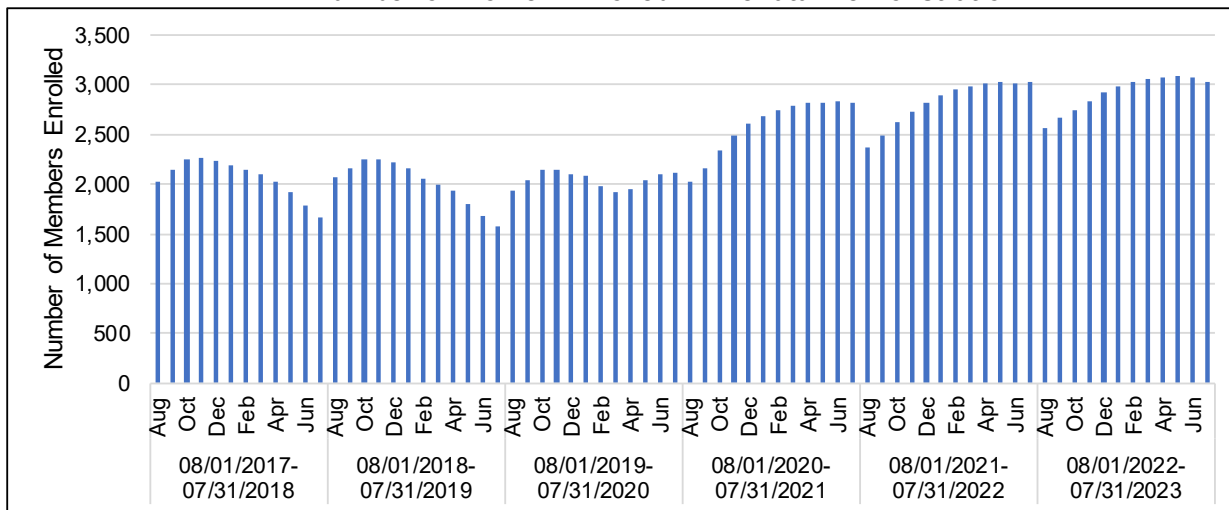
**Total Combination CHIP Enrollment and Spending: FFY 2023**



Source: CHP+ Demonstration Extension Application and FFY 2023 Allotment Neutrality Report

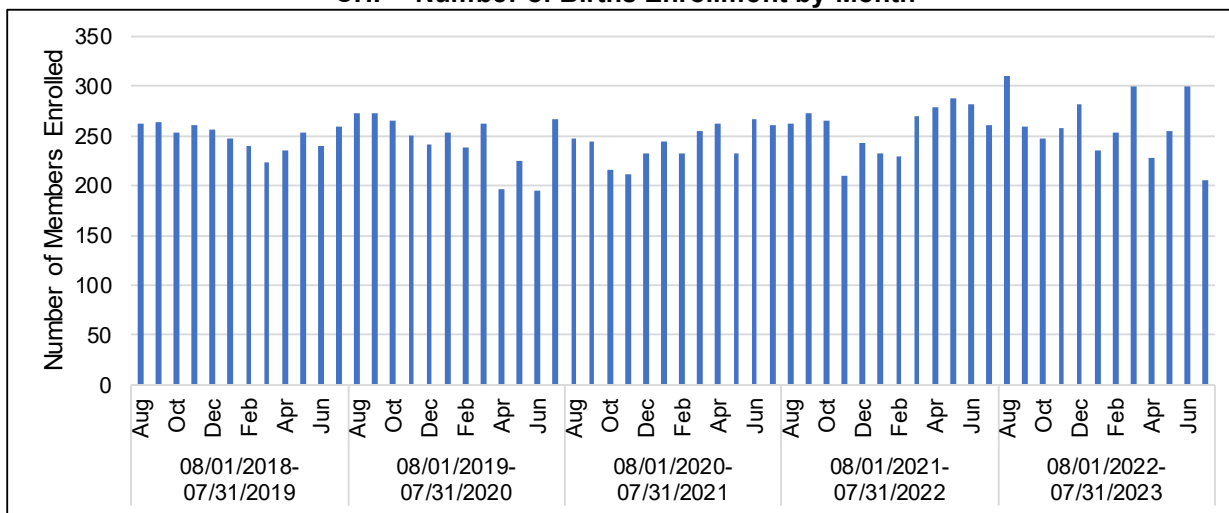
Since 2020, monthly enrollment of pregnant women and births has trended upward as found in Exhibits 3 and 4, with the highest monthly enrollment of pregnant women occurring in May 2023 (3086 pregnant women) and the highest number of births in August 2022 (310 births).

**Exhibit 3**  
**CHP+ Number of Women Enrolled in Prenatal Demonstration**



Source: CO CHP+ Enrollment Data

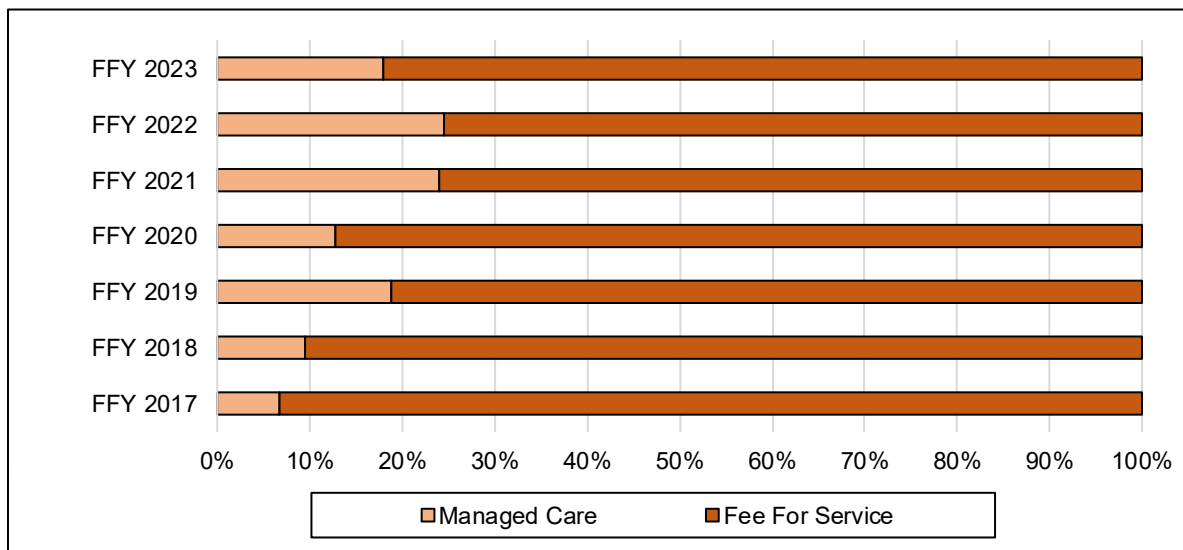
**Exhibit 4**  
**CHP+ Number of Births Enrollment by Month**



Source: CO CHP+ Enrollment Data

CHP+ enrollees are entitled to receive all mandatory and optional state plan services approved under the Medicaid state plan. Services are provided through a combination of fee-for-service (FFS) and managed care delivery systems that vary geographically. During this same time, the majority of Colorado’s CHP+ demonstration expenditures were for care provided through the FFS delivery system, although the proportion of payments to managed care plans has increased over time (refer to Exhibit 5).

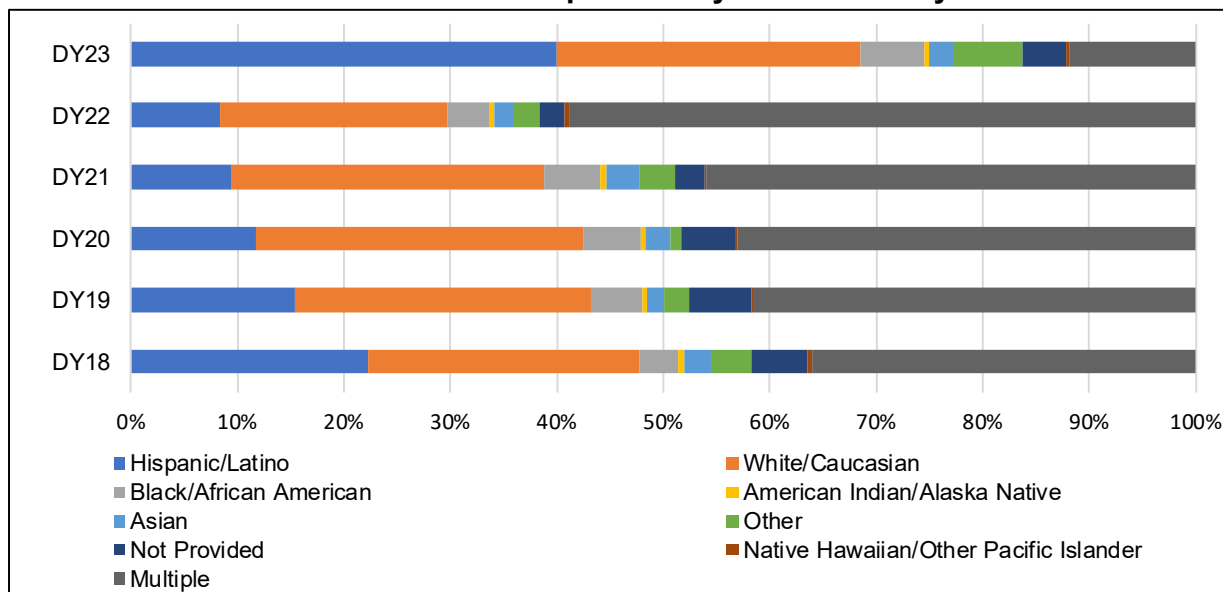
### Exhibit 5 Expenditures in CHP Plus Demonstration by Delivery System



Source: CHP+ Allotment Neutrality Report

Of those members enrolled in the demonstration from DY18 to DY23 (refer to Exhibit 6), the most predominant race/ethnicity reported was Multiple (39.4%) followed by White/Caucasian (27.2%) and Hispanic/Latino (18.1%).

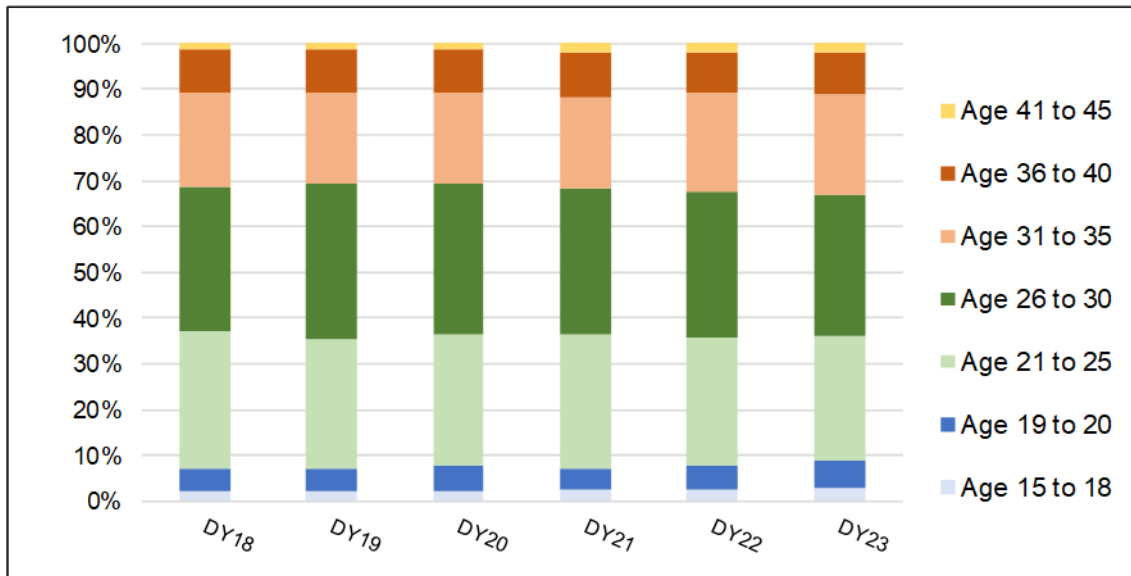
### Exhibit 6 Demonstration Population by Race/Ethnicity



Source: CO CHP+ Client Data

Exhibit 7 distributes enrollment in the demonstration by the age of the members. Between DY18 and DY23, approximately 60 percent of the women enrolled are between the ages of 21 and 30 (green portions of exhibit).

**Exhibit 7**  
**Demonstration Population by Age Group**



Source: CO CHP+ Client Data

## SECTION C: Evaluation Questions and Hypotheses

### Defining Relationships: Aims, Primary Drivers and Secondary Drivers

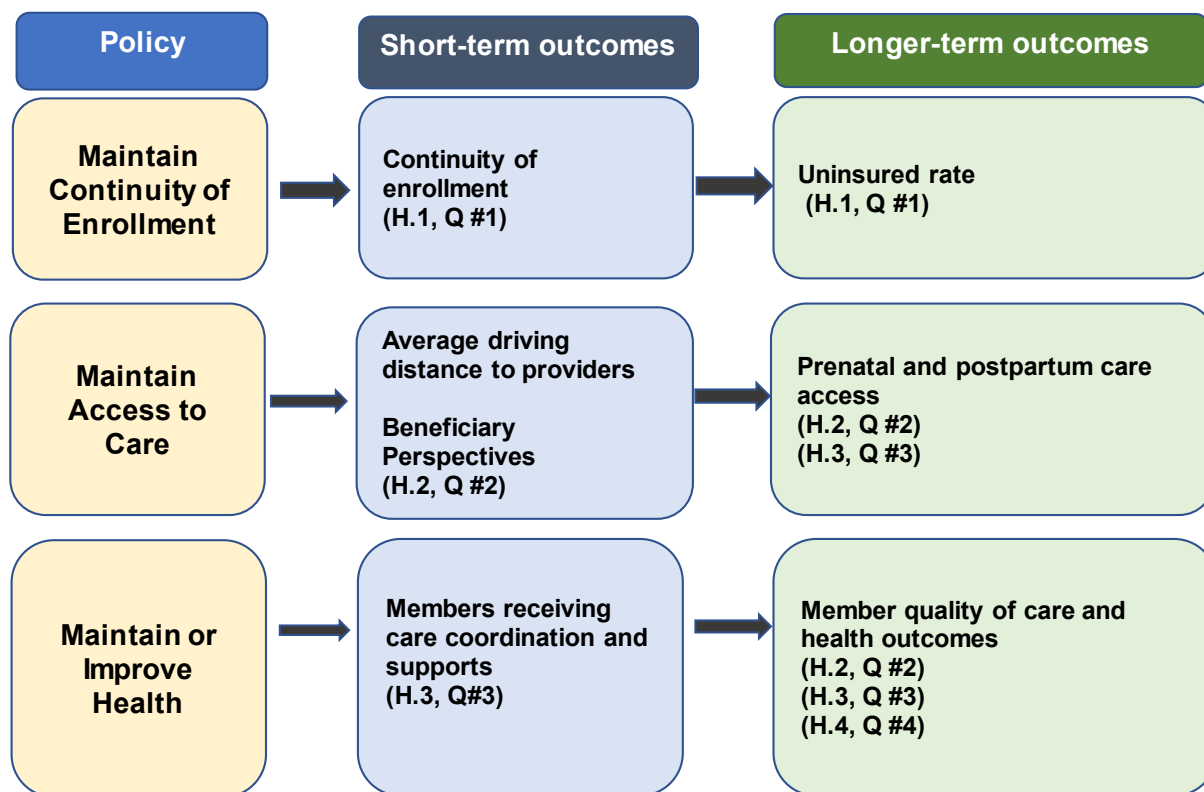
Burns & Associates, a Division of Health Management Associates (HMA-Burns) is serving as the Independent Evaluator for this demonstration. HMA-Burns constructed logic models delineating short-term and long-term outcomes associated with the three principal policy objectives of the demonstration.

- Maintain Continuity of Enrollment
- Maintain Access to Care, and
- Maintain or Improve Health Outcomes

The determination of whether an outcome is short-term or long-term is dependent on the measure specifications and the data needed to adequately assess trends with the waiver policy. For example, because national outcome measures tend to have annual measurement periods, they are considered in this evaluation to be longer-term indicators of policy outcomes. Each logic model is tied to specific hypotheses and research questions that were outlined in the Evaluation Design Plan.

Exhibit 8 summarizes the three logic models as shown in the Evaluation Design Plan.

**Exhibit 8**  
**Logic Models Developed in Demonstration Evaluation Design Plan**



### Hypotheses and Research Questions

HMA-Burns converted the logic models shown into a series of hypotheses and research questions. For each research question, measures were assigned as well as a targeted methodology. Exhibit 9

lists the hypotheses, the research questions, and the demonstration goals that each hypothesis is mapped to.

**Exhibit 9**  
**Mapping Hypotheses and Research Questions to Demonstration Goals**

Hypothesis	Research Questions	Demonstration Goal(s)
#1: Trends in continuity of enrollment in the demonstration continue (or do not worsen) for pregnant women in the current waiver period.	Does the waiver improve or maintain the uninsured rate of pregnant women in Colorado during the demonstration period?	1
#2: Trends observed in access to health care for pregnant women continues (or do not worsen) in the current waiver period.	Do CHP+ members achieve similar (or improved) access and health outcomes in the current waiver period?	2
#3: Trends observed in the health of the mother continues (or do not worsen) in the current waiver period.	Do CHP+ members achieve similar (or improved) pregnancy and postpartum outcomes in the current waiver period?	3
#4: Trends observed in the number of healthy babies (i.e., over 2500 grams) continues (or do not worsen) in the current waiver period.	Does the proportion of members receiving care coordination and supports continue (or not worsen) in the current waiver period?	3

## SECTION D: Methodology Used in Assessment

### Evaluation Design

The evaluation is conducted on CHP+ beneficiaries during the pre- and post-demonstration period. The approved Evaluation Design Plan is a mixed-methods approach, drawing from a range of data sources, measures, and analytics to best produce relevant and actionable study findings. The approved Evaluation Design Plan reflects a range of data sources, measures and perspectives. It defines the most appropriate study population and sub-populations and describes the analytic methods included in the evaluation design. The Evaluation Design Plan approved by CMS on March 7, 2023 appears in [Appendix A](#).

The four analytic methods used by the evaluators include:

1. descriptive statistics
2. statistical tests
3. desk reviews, and
4. facilitated interviews.

### Target and Comparison Population

The target population is any Colorado CHP+ beneficiary enrolled in the demonstration in the study period. HMA-Burns created flags to identify sub-populations within the demonstration population which include the following:

- MCO or RAE enrolled with
- Member race and ethnicity
- Pregnancy status
- Birthweight of newborn
- Member age (for specified age groups)
- Member home location (e.g., city/county/region)
- New member enrollment due to COVID

### Evaluation Period

Metrics for the demonstration population and sub-populations are computed for a pre- and post-demonstration period. The pre-demonstration period is defined as enrollment or dates of service from August 1, 2017 through December 17, 2020. The current demonstration period is defined as enrollment or dates of service from December 18, 2020 through July 31, 2025.

To simplify the analytic plan, HMA-Burns is counting the first seven months of 2020 as part of the pre-demonstration period, and from August 1, 2020 through December 21, 2020 as part of the current demonstration period. Although CMS approved Colorado's 1115 demonstration effective on December 21, 2020, demonstration related activities were moving forward in anticipation of approval of the extension.

For the Interim Evaluation, HMA-Burns is defining the pre-demonstration period is defined as dates of service on or after August 1, 2017 through July 31, 2020. The demonstration period is defined as dates of service August 1, 2020 through July 31, 2023. For monthly and quarterly measures, HMA-Burns included dates of service on or after: January 1, 2017 through July 31, 2017 in the pre-demonstration period; and August 1, 2023 through December 31, 2023 in the demonstration period.

For the purposes of this evaluation, the time periods included in the Interim Evaluation are presented on a demonstration year basis. HMA-Burns used DY20 to DY23 to assess trends during the current demonstration period, while also showing trends from the pre-demonstration (pre-demo) period in DY18 to DY23 for measures where possible for comparison purposes.

Year	Evaluation Period	Time Period
DY18	Pre-Demo	August 1, 2017 – July 31, 2018
DY19	Pre-Demo	August 1, 2018 – July 31, 2019
DY20	Pre-Demo	August 1, 2019 – July 31, 2020
DY21	Demonstration	August 1, 2020 – July 31, 2021
DY22	Demonstration	August 1, 2021 – July 31, 2022
DY23	Demonstration	August 1, 2022 – July 31, 2023

### Evaluation Measures

HMA-Burns is reporting on fifteen measures, each of which has been mapped to a demonstration goal. The measures that have been analyzed in this Interim Evaluation utilize several measure stewards, including the National Committee on Quality Assurance’s (NCQA’s) HEDIS<sup>4</sup>, the Centers for Disease Control (CDC) and the Colorado Pregnancy Risk Assessment Monitoring System (PRAMS). The HMA-Burns team has also defined measures that are specific to Colorado’s demonstration goals.

In Section F of the report, each measure is shown on a separate one-page summary of findings report. The measures are organized by demonstration goal. As an introduction to each goal, a summary exhibit is provided which lists out each measure, the desired outcome, if the outcome was met or not, the test applied for statistical significance and the result if statistically significant.

### Data Sources

HMA-Burns proposed to use a number of data sources, including primary and secondary data, to conduct the evaluation in the approved Evaluation Design Plan. Most of these sources are included in this Interim Evaluation, but all sources will be reported in the Summative Evaluation. The data sources used in conducting the Interim Evaluation include the following:

- Member Enrollment and Eligibility data from the state’s data warehouse Business Intelligence Data Management (BIDM).
- Claims and encounter data for inpatient, outpatient and professional claim types from the state’s data warehouse, BIDM, with dates of service from August 1, 2017 through July 31, 2023.
- Vital Statistics data with birthweight information from August 1, 2017 through July 31, 2023 from HCPF.
- Secondary data published from other sources including Colorado Pregnancy Risk Assessment Monitoring System (PRAMS)<sup>5</sup> and HCPF HEDIS<sup>®</sup> Child Health Plan Plus reports<sup>6</sup>.

<sup>4</sup> The Healthcare Effectiveness Data and Information Set (HEDIS) is a registered trademark of the National Committee for Quality Assurance.

<sup>5</sup> [Pregnancy Risk Assessment Monitoring System \(PRAMS\) | Department of Public Health & Environment \(colorado.gov\)](#)

<sup>6</sup> [HEDIS Reports | Colorado Department of Health Care Policy & Financing](#)

- Qualitative feedback on beneficiary perspectives on lived experiences of maternity care data was collected by HCPF staff during the April 25, 2023 meeting of the Maternity Advisory Council (MAC) Mini Focus Group.

For each measure where results are reported in Section F, the data source is BIDM unless specifically noted. The data was validated by the HMA-Burns team upon intake and trended against information received in prior periods across multiple dimensions. The HMA-Burns team has built a comprehensive database that incorporates utilization and enrollment data going back to CY 2017 up to the present.

Although managed care encounters and fee-for-service claims are the primary source for computing measures, other measures use a combination of encounters, member enrollment, and provider enrollment files. An example of this is the HMA-Burns measure to track the average distance travelled by adult Medicaid members for prenatal services. HMA-Burns joined data on encounters with the Medicaid member enrollment and provider enrollment files to map the physical location where providers render services and the home address of individual Medicaid beneficiaries. Driving distance was computed for each trip using external software.

Other secondary sources were used for selected measures. Examples include information from: Colorado (PRAMS) to collect insurance status; Vital Statistics to collect birth weight; and HCPF annual HEDIS® reports for CHP+.

Qualitative feedback on beneficiary perspectives on lived experiences of maternity care data was collected by HCPF staff during the April 25, 2023 meeting of the MAC Mini Focus Group. The MAC was created as part of the department's enactment of the Maternity Bundle rule, and is composed mainly of Black, Indigenous and People of Color (BIPOC) with lived experience in Medicaid maternity care to inform existing and emerging policy. The council has selected members (15 to 20), including Medicaid and CHP+, and meets online in the evenings on the last Tuesday of the month. In the Mini Focus Group, HCPF staff used a facilitated interview designed to gather Medicaid and CHP+ member lived experience and challenges faced during pregnancy and postpartum periods. The interview questions are found in [Appendix B](#).

## Analytic Methods

### Descriptive Statistics

For utilization-focused measures, HMA-Burns computed a rate expressed as utilization on a per 1,000-member basis. The numerator and denominator values are provided to show how the rate was computed. In this Interim Evaluation, results for annual measures are shown for the six years DY18 through DY23 where BIDM data is used as the source. The baseline period is defined as DY20 and the comparison year for the demonstration period is defined as DY23. The rate of change between the baseline (DY20) and the most recent demonstration period (DY23) is shown, as well as the earliest pre-demonstration period (DY18) to the most recent demonstration period (DY23).

### Statistical Tests

Among the 15 measures examined, tests of significance were run on 11 measures. The chi-square test was applied to assess statistical significance between the baseline year (DY20) and the demonstration year (DY23), as well as the earliest pre-demonstration year (DY18) to the most recent demonstration period (DY23). For the Summative Evaluation, interrupted time series will be used to assess significance on all measures where chi-square was applied in the Interim Evaluation.

### Desk Reviews

For this Interim Evaluation, desk reviews were completed of HCPF programmatic and policy changes occurring during the demonstration period, as well as the proposed questions to be used by the HCPF staff in conducting the MAC Mini Focus Group. The final interview questions used by HCPF staff during the April 25, 2023 meeting of the MAC Mini Focus Group are found in [Appendix B](#).

### Facilitated Interviews

Over the course of conducting the Interim Evaluation, HMA-Burns met with HCPF staff to provide input on the questions for the MAC Mini Focus Group. The final interview questions used by HCPF staff during the April 25, 2023 meeting of the MAC Mini Focus Group are found in [Appendix B](#). After the focus group meeting, HMA-Burns met with HCPF staff to debrief and gather HCPF staff observations from the focus group meeting.

## SECTION E: Methodological Limitations

### Limitations

The HMA-Burns assessment team identified limitations when computing measures and interpreting results as described in the Evaluation Design Plan. Although the limitations did not impact the computations of results for the time periods reported in this Interim Evaluation, there are limitations on how best to interpret the results that are being reported.

The HMA-Burns team did identify the following items that pose limitations in this evaluation:

*Public health emergency.* The obvious limitation in this evaluation is the impact on service utilization and provider supply during the public health emergency period. The current demonstration began just four months after the start of the PHE. Colorado, like most states, saw atypical results during the early period of the PHE both positively (e.g., lower emergency department visits) and negatively (e.g., lower rates on measures related to access to services or follow-up services). For the Summative Evaluation, the HMA-Burns team will assess trends not only between the pre-demonstration and current demonstration periods, but also the pace at which utilization and access measures improve as the PHE winds down. In addition, HMA-Burns will account for the COVID-19 pandemic timeframe as CY 2020 and plans to define the baseline pre-waiver period as August 1, 2017 to August 31, 2019, and the post-waiver period as June 1, 2023 to July 31, 2025. This methodology will allow for an equal time period of 25 months of data to be used in interrupted time series models, without including CY 2020 in statistical modeling.

*Exogenous factors that may impact results.* The fact that the 1115 demonstration components have been in place for many years during what would be considered the pre-demonstration period for evaluation purposes makes identifying any changes in outcomes directly attributable to the current demonstration implementation difficult. Further, observed changes in outcome measures in the current demonstration period are difficult, if not impossible, to attribute to one specific demonstration component given the interrelationship of the components themselves and the longstanding nature of the demonstration.

Many of the outcome measures are multi-dimensional and influenced by social determinants of health. While changes in the demonstration period related to access to care may be one dimension of various outcomes of interest and may contribute to improvements, it may be difficult to achieve statistically significant findings in the absence of data on other contributing dimensions such as social determinants of health (e.g., housing and employment).

*Data limitations in BIDM.* There are some limitations in the data as provided by HCPF from the BIDM data warehouse.

- Attribution of MCO Assignment for Members: HMA-Burns had to use the MCO assignment information in claims and encounters to create MCO enrollment spans as they were not available in the member eligibility files provided through BIDM.
- Counts of well-child exams for the CHP+ population underreported: HMA-Burns initially did not receive diagnosis code information on any of the professional claims transmitted from BIDM. Subsequently, the diagnosis code information was provided in a separate file which HMA-Burns used to append professional claims used in the study. Even with the additional data, the claims and encounter data appeared to be incomplete and would have resulted in computing inaccurate results. To control for the data challenges, HMA-Burns used HCPF

HEDIS® results to report results for Metric 15, Well-Child Visits in the First 15 Months of Life (6 or more visits).

*Small sample size.* Since Colorado's CHP+ population is small, some sub-populations may not be meaningful for reporting and there will be a concern about insufficient statistical power to detect a difference. For example, HMA-Burns was unable to report at the MCO or regional level due to insufficient sample size.

*Beneficiary Feedback.* Use of Colorado's Maternity Advisory Council to obtain beneficiary perspectives on lived experiences of maternity care offers a unique opportunity to collect qualitative information. However, the council is not specific to the demonstration population and will also include Medicaid beneficiary input. Therefore, it is not possible to attribute qualitative observations solely to the demonstration population.

*Vital Statistics Data.* Birthweight was not available on claims/encounters from BIDM. Therefore, HMA-Burns used Vital Statistics supplied by HCPF as the source for birthweight, which has inherent limitations as matching birth record data to Medicaid enrollees does not always result in a match and may lead to under-reporting of birthweights less than 2,500 grams as used in Metric 14, Live Births Weighing Less Than 2,500 Grams (LBW-CH).

*Colorado PRAMS Data.* The use of Colorado PRAMS data as the source for insurance status was proposed because it is obtained using a standard survey instrument collecting data from pregnant women and includes CHP+ breakouts as well as commercial insurance and Medicaid breakouts. While it provides broad context, there is no ability to link the survey results to demonstration enrollees. In addition, there is a lag in the availability of data and only survey results through CY 2021 were available to prepare the Interim Evaluation. While outside of the time periods included in the evaluation design, HMA-Burns included data from CY 2016 through CY 2021 in the analysis to compute trends over time.

*Modifications to Statistical Analysis.* HMA-Burns assessed each metric output against the level of statistical testing proposed in the approved Evaluation Design Plan. In some instances, the level of statistical rigor enhanced in the Interim Evaluation. Measures where HMA-Burns was able to change the statistical analysis performed from descriptive statistics to chi-square: Metric 1 Proportion of enrollees continuously enrolled in CHP+; and Metric 9 Percentage of women determined to be at risk of poor maternal and/or infant health outcome.

For other measures, such as Metric 2 Enrollment duration during pregnancy, Metric 3 Prenatal care by type of insurance, and Metric 4 Average driving distance to prenatal care services, HMA-Burns was not able to increase the level of statistical rigor due to insufficient observations. As part of the Summative Evaluation, HMA-Burns will again assess each metric output against the level of statistical rigor proposed in the approved Evaluation Design Plan.

## **SECTION F: Results**

The findings from HMA-Burns' assessment of each of Colorado's demonstration goals is shown in Section F. Each demonstration goal serves as a heading. Measures are reported for each goal as they relate to the research questions posed in the Evaluation Design Plan.

At the start of each subsection, there is a summary table that lists each measure reviewed that was mapped to a research question under the demonstration goal. The table shows the desired outcome for each measure, if the desired outcome is being met in the demonstration period thus far when compared to the baseline period, the test for statistical significance as applicable and if the results were found to be statistically significant (when testing for significance was conducted) in comparison to the baseline period. If the result is statistically significant, then it appears in the last column of the summary table.

After the summary table, each of the individual measures examined appears on its own one-page dashboard report. Information about the research question posed, the measure and measure steward, and the data source used to analyze the measure are provided. If available, results are presented from the earliest pre-demonstration period through the most recent demonstration year and include trend over time and statistical tests as applicable. Detailed data for each measure appears in [Appendix C](#). Results of each statistical test appears in [Appendix D](#).

## Demonstration Goal #1: Decrease the uninsurance rate for pregnant women

### Summary of Measures

Three measures were examined to assess Demonstration Goal #1, the uninsurance rate for pregnant women. The desired outcome was met in two out of three measures for this demonstration goal (refer to Exhibit 10). A test of statistical significance was conducted on one of the three measures and the outcome was found to be statistically significant. More detailed information can be found on each of the measures on the pages that follow.

**Exhibit 10**  
**Summary of Findings for Measures Mapped to Research Questions #1**

#	Measure Examined	Desired Outcome	Outcome Met?	Statistical Test	Statistically Significant?	Probability
<b>Research Question #1: Does the waiver improve or maintain the uninsured rate of pregnant women in Colorado during the demonstration period?</b>						
1	Proportion of enrollees continuously enrolled in CHP+	Steady or Increase	Yes	Chi-Square	Yes	<.0001
2	Enrollment duration during pregnancy	Steady or Increase	Yes	Descriptive	N/A	
3	Prenatal care paid by type of insurance	Steady or Decrease	No	Descriptive	N/A	

### Individual Measure Results

Exhibits 11 through 13 appear in the remainder of this section and show the results of each of the measures examined related to Demonstration Goal #1. For this measure, the delivery claim was used as the index month for the 9-month lookback period. Results for enrollees whose 9-month lookback period crossed into a prior demonstration period are included in the demonstration year of the delivery. The proportion of Coloradans continuously enrolled in CHP+ for the 9 months prior to the delivery month increased by 48.7% when comparing the baseline period (DY20) to DY23 (refer to Exhibit 11). While there was a drop in DY20 when comparing to DY19, enrollment steadily increased over the demonstration period when beginning in DY21 (16.3%) and continued in DY22 (37.9%). This is likely influenced by the suspension of eligibility processes during the PHE. The results are statistically significant.

The proportion of Coloradans enrolled in CHP+ for 12 months during pregnancy increased by 105.9% when comparing the baseline period (DY20) to DY23 (refer to Exhibit 12). For this measure, members identified as being pregnant at any point in the demonstration year are included in the numerator and may include pregnancy and postpartum periods. The proportion of Coloradans enrolled in CHP+ for all other enrollment durations less than 12 months decreased when comparing the baseline period (DY20) to DY23. As with Metric #1, maintenance of effort during the pandemic and suspension of eligibility redeterminations likely influenced the results observed beginning in DY21 and continuing through DY23.

As found in Exhibit 13, the proportion of Coloradans that report paying for prenatal care with some type of insurance has remained steady from CY 2016 through CY 2021 (the most recent year available for Colorado PRAMS data). There has been a 9.5% increase (0.2% percentage points) in the percentage of Coloradans reporting that they had no insurance for their prenatal care over

baseline (CY 2020). Note that survey respondents may choose more than one type of insurance so PRAMS prevalence percentages will add up to more than 1.0.

**Exhibit 11**  
**Results for Interim Evaluation Measure #1**  
**Proportion of enrollees continuously enrolled in CHP+**

**Hypothesis:**

Trends in continuity of enrollment in the demonstration continue (or does not worsen) for pregnant women in the current waiver period.

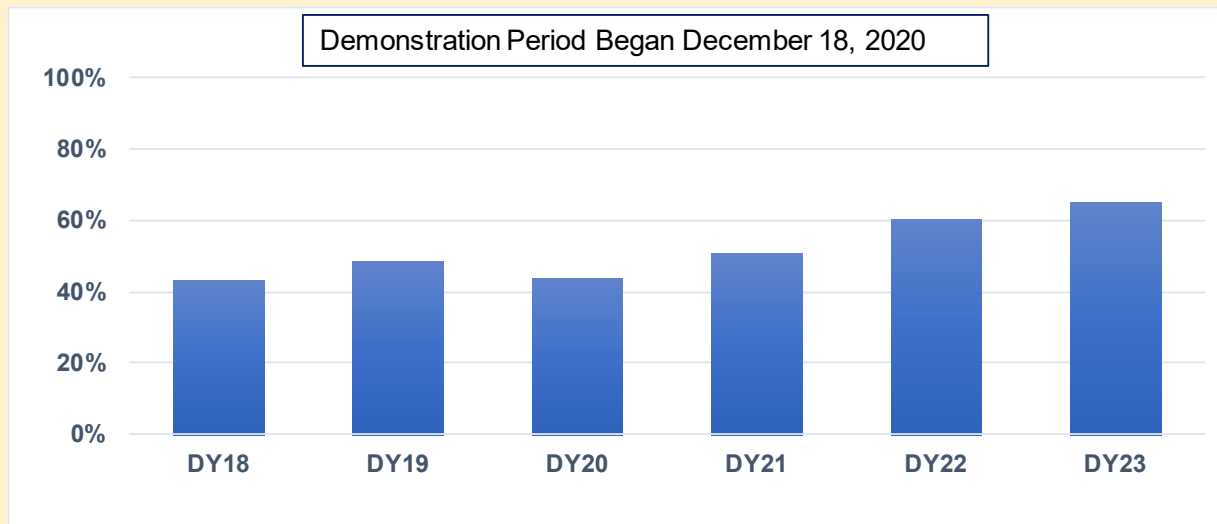
**Measure Used to Test Hypothesis:**

Proportion of enrollees continuously enrolled in CHP+ for the 9 months prior to delivery in the measurement period

**Measure Steward:** HMA-Burns

**Data Source:** Eligibility data from HCPF

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Percent</u>
DY18	1,273	2,929	43.5%
DY19	1,410	2,911	48.4%
DY20	1,258	2,875	43.8%
DY21	1,462	2,872	50.9%
DY22	1,841	3,052	60.3%
DY23	2,021	3,106	65.1%
Change Pre-Demo (DY18) to Demonstration Period (DY23):			49.7%
Change Baseline (DY20) to Demonstration Period (DY23):			48.7%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Increase	Increase
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	<.0001	<.0001
<b>Finding:</b>	Significant	Significant

**Exhibit 12**  
**Results for Interim Evaluation Measure #2**  
**Enrollment Duration During Pregnancy**

**Hypothesis:**

Trends in continuity of enrollment in the demonstration continue (or does not worsen) for pregnant women in the current waiver period.

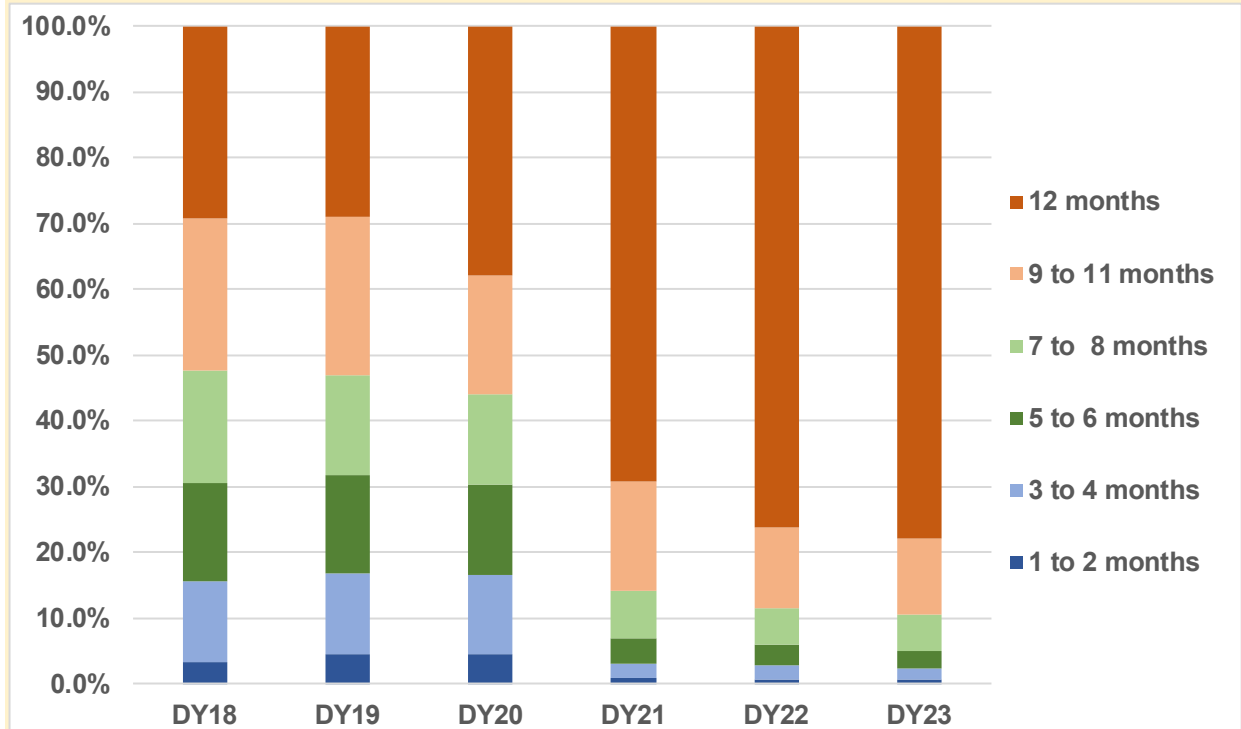
**Measure Used to Test Hypothesis:**

Enrollment duration during pregnancy in CHP+

**Measure Steward:** HMA-Burns

**Data Source:** Eligibility data from HCPF

**Results for the Entire Population in the Demonstration**



**Study Period**

	Enrollment Duration of CHP Plus Members					
	1 to 2 months	3 to 4 months	5 to 6 months	7 to 8 months	9 to 11 months	12 months
DY18	3.5%	12.2%	14.9%	17.0%	23.1%	29.3%
DY19	4.5%	12.4%	14.9%	15.2%	24.2%	28.9%
DY20	4.5%	12.2%	13.6%	13.9%	18.0%	37.8%
DY21	0.9%	2.3%	3.9%	7.2%	16.5%	69.3%
DY22	0.8%	2.0%	3.2%	5.7%	12.2%	76.1%
DY23	0.8%	1.6%	2.5%	5.6%	11.6%	77.9%
Change Baseline (DY18) to Demonstration Period (DY23) for 12 Months:						166.3%
Change Baseline (DY20) to Demonstration Period (DY23) for 12 Months:						105.9%

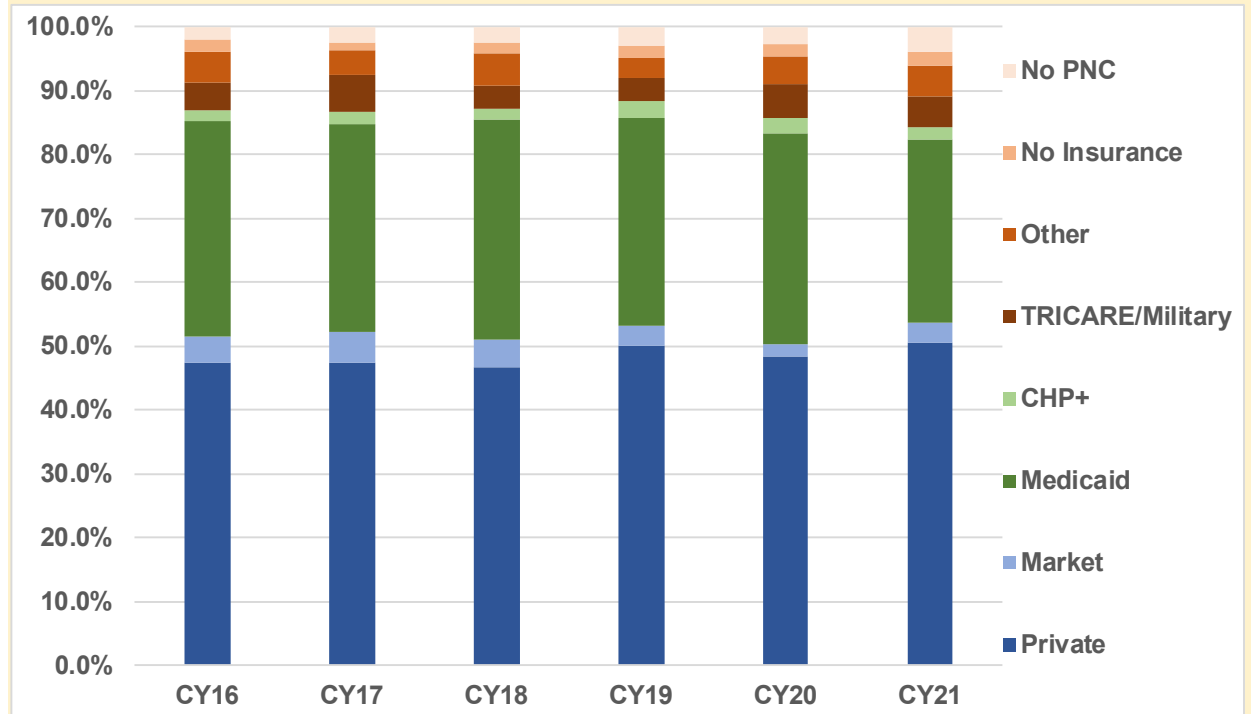
	DY18 to DY23	DY20 to DY23
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Increase	Increase

**Exhibit 13**  
**Results for Interim Evaluation Measure #3**  
**Prenatal care paid by type of insurance**

**Hypothesis:**  
 Trends in continuity of enrollment in the demonstration continue (or does not worsen) for pregnant women in the current waiver period.

**Measure Used to Test Hypothesis:**  
 Prenatal care paid by type of insurance  
**Measure Steward:** Colorado Pregnancy Risk Assessment Monitoring System (PRAMS)  
**Data Source:** Colorado PRAMS

**Results for the Colorado PRAMS Prenatal Care Reported Type of Insurance**



Study Period	Colorado PRAMS Prenatal Care Reported Type of Insurance							
	Private	Market	Medicaid	CHP+	TRICARE /Military	Other	No Insurance	No PNC
CY16	47.5%	4.1%	33.7%	1.7%	4.1%	5.0%	1.9%	2.0%
CY17	47.4%	4.8%	32.6%	2.0%	5.7%	4.0%	1.0%	2.6%
CY18	46.6%	4.3%	34.6%	1.8%	3.4%	5.0%	1.9%	2.3%
CY19	50.1%	3.1%	32.4%	2.7%	3.5%	3.3%	1.9%	2.9%
CY20	48.3%	2.1%	32.9%	2.5%	5.3%	4.1%	2.0%	2.7%
CY21	50.6%	3.1%	28.6%	2.0%	4.8%	4.9%	2.2%	3.9%
Change Pre-Demo (CY 2016) to Demonstration Period (CY 2021):							15.4%	
Change Baseline (CY 2020) to Demonstration Period (CY 2021):							9.5%	

Uninsured Rate	CY16 to CY21	CY20 to CY21
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Increase	Increase

## Demonstration Goal #2: Increase prenatal and postpartum care for pregnant women enrolled in the demonstration

### Summary of Measures

Five measures were examined to assess Demonstration Goal #2, increase prenatal and postpartum care for pregnant women enrolled in the demonstration. For this demonstration goal, the desired outcome was met in two out of the five measures (refer to Exhibit 14). A test of statistical significance was conducted on three of the five measures and although the measures were not trending in the desired direction, the outcomes were found to be statistically significant in each instance. More detailed information can be found on each of the measures on the pages that follow.

**Exhibit 14**  
**Summary of Findings for Measures Mapped to Research Question #2**

#	Measure Examined	Desired Outcome	Outcome Met?	Statistical Test	Statistically Significant?	Probability
<b>Research Question #2: Do CHP+ members achieve similar (or improved) access and health outcomes in the current waiver period?</b>						
4	Average driving distance to prenatal care services	Steady or Decrease	Yes	Descriptive	N/A	
5	Beneficiary perspectives on lived experiences of maternity care	Steady or Improved	Yes	Descriptive	N/A	
6	Utilization of prenatal care services per 1000	Steady or Increase	No	Chi-Square	Yes	<.0001
7	Proportion of PPC women using the emergency department	Steady or Decrease	No	Chi-Square	Yes	<.0001
8	Prenatal Postpartum Care (PPC): Timeliness of Prenatal Care	Steady or Increase	No	Chi-Square	Yes	<.0001

### Individual Measure Results

Exhibits 15 through 19 appear in the remainder of this section to show the results of each of the measures examined related to Demonstration Goal #2. As shown in Exhibit 15, average driving distance to prenatal care services was computed by using the members in the numerator of the PPC Timeliness measure (Evaluation Measure #8) for each calendar year. Providers were identified from claims and encounters using PPC Timeliness numerator specifications. For each Medicaid beneficiary, only a single unique beneficiary-to-provider visit was counted (i.e., repeat visits to the same provider by a beneficiary were excluded). For each visit, the turn-by-turn driving distance was determined using mapping software. The sum of all driving distance miles divided by the sum of all unique beneficiary-to-provider visits yields the average distance across all beneficiaries for each calendar year. As desired, the average distance decreased 1.09 miles from baseline (DY20) to DY23.

Beneficiary perspectives on lived experiences of maternity care was collected by HCPF staff during the April 25, 2023 meeting of the MAC Mini Focus Group and is summarized in Exhibit 16. Perspectives were gathered on opinions regarding CHP, getting to the pediatrician, barriers to prenatal and postpartum care, finding an OB/GYN and being offered classes while pregnant, and post-partum appointments and supports including mental health services. A total of four compliments were communicated in the areas of: getting to the pediatrician, barriers to prenatal and postpartum care, finding an OB/GYN and being offered classes while pregnant. Six critiques were presented in

the areas of: opinions regarding CHP, barriers to prenatal and postpartum care, post-partum appointments and supports including mental health services. Overall, participants provided three recommendations for post-partum appointments and supports including mental health services.

Utilization of prenatal care services per 1000 CHP+ Enrollees declined by 9.2% when comparing the baseline period (DY20) to DY23 (refer to Exhibit 17). The decrease in utilization of prenatal services per 1000 CHP+ Enrollees compared to the baseline period in was 14.5% in CY 2021, followed by 13.2% in CY 2022. While the results are not trending in intended direction and likely influenced by the PHE disruptions in utilization patterns, the outcome is statistically significant.

As shown in Exhibit 18, the proportion of PPC timeliness of care women using the emergency department increased 41.4% when comparing the baseline period (DY20) to DY23 for CHP Plus members. While there was a decrease of 0.6% in the proportion of timeliness of care women using emergency department services in DY21 over baseline, there were subsequent increases in DY22 and DY23. While the results are not trending in the desired direction and likely influenced by the PHE disruptions in utilization patterns, the outcome is statistically significant.

The proportion of PPC timeliness of prenatal care women decreased 7.7% when comparing the baseline period (DY20) to DY23 for CHP Plus members (refer to Exhibit 19). The decrease continued in DY21 and DY22 and stabilized in DY23. While the results are not trending in the desired direction and likely influenced by the PHE disruptions in utilization patterns, the outcome is statistically significant.

**Exhibit 15**  
**Results for Interim Evaluation Measure #4**  
**Average Driving Distance to Prenatal Care Services**

**Hypothesis:**

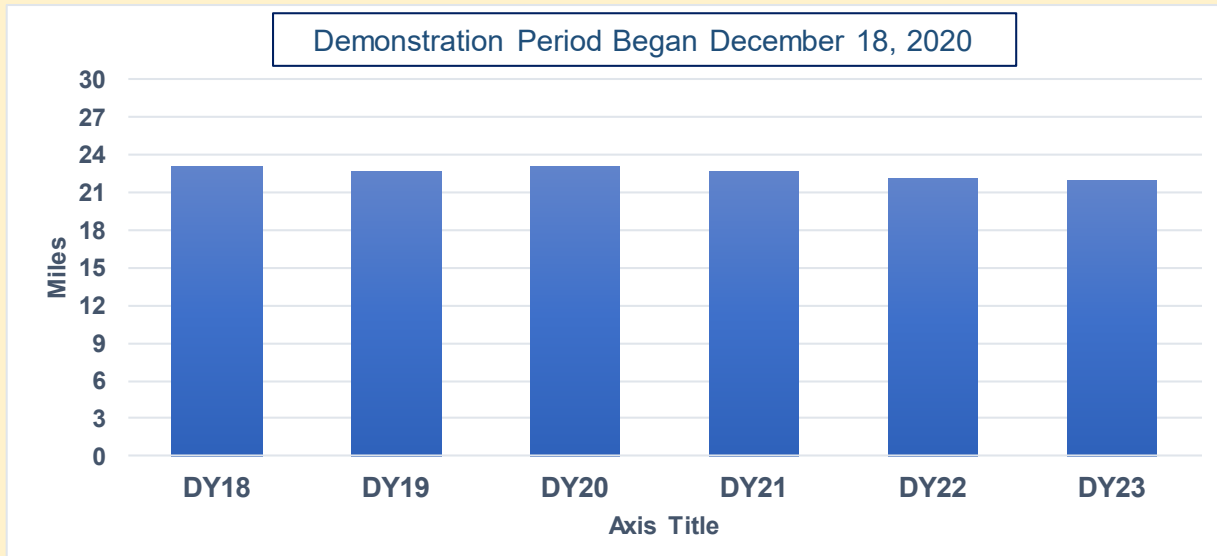
Trends observed in access to health care for pregnant women continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**

Average Driving Distance to Prenatal Care Services

**Measure Steward:** HMA-Burns

**Results for the DSHP Population in the Demonstration**



**Study Period    Avg Distance    Number of Trips in Study**

DY18	23.04	4,228
DY19	22.60	4,435
DY20	23.03	4,214
DY21	22.68	4,848
DY22	22.11	5,734
DY23	21.94	6,097

Change Pre-Demo (DY18) to Demonstration Period (DY23):

Decrease of 1.10 miles

Change Baseline (DY20) to Demonstration Period (DY23):

Decrease of 1.09 miles

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Decrease	Decrease

**Exhibit 16**  
**Results for Interim Evaluation Measure #5**  
**Beneficiary perspectives on lived experiences of maternity care**

<b>Number</b>	<b>Description</b>	<b>Type</b>
<b>Opinions regarding CHP</b>		
1	When asked about CHP Plus, participants expressed confusion about the differences between Medicaid and CHP, and when losing Medicaid, why their children ended up with CHIP but they were uninsured.	Critique
2	There were several comments about long wait times and that they did not like the CHP program.	Critique
<b>Getting to the pediatrician</b>		
3	While the meeting participants expressed that they have access to pediatricians, there are challenges with scheduling. Positive feedback regarding access to pediatricians at their local community health center was expressed in the meeting.	Compliment
<b>Barriers to pre-natal and post-partum care</b>		
4	A few participants expressed concerns with their doctor not taking patient concerns seriously and felt there was a lack of acknowledgment or validation by their provider.	Critique
5	Scheduling appointments for kids visits at the same time made it much easier to attend prenatal and postpartum care appointments.	Compliment
<b>Finding your OB/GYN while pregnant</b>		
6	Participants referenced finding their OB/GYN through a variety of sources including: local hospital, primary care provider, closest location, primary care clinic, and low-cost alternatives pregnancy center.	Compliment
<b>Being offered classes while pregnant</b>		
7	Most participants learned about classes from their hospital, with a few receiving information from other sources (e.g., WIC, Motherwise, Caring Pregnancy Center online classes).	Compliment
<b>Post-partum appointments and supports</b>		
8	There were positive comments from participants regarding Nurse Family Partnerships (NFP) and would like to see the program expand beyond the first baby.	Recommendation
9	Overall, participants expressed challenges with getting to the post-partum visit due to exhaustion, feeling overwhelmed, transportation and child care challenges.	Critique
10	Suggestions provided by meeting participants included more use of telehealth and other home visiting programs to reduce barrier to post-partum care.	Recommendation
11	There were concerns expressed by new parents with how they are perceived/treated by health care professionals (e.g., baby born early, in NICU, mild not coming in). In general, those expressing this concern felt they were not supported by the provider.	Critique
<b>Mental health services post-partum</b>		
12	Lack of engagement in substance use disorder treatment post-partum due to fears that CPS would become involved and their babies would be taken away from them.	Critique
13	Recommend using more telehealth to check on the well-being of post-partum individuals and address post-partum depression.	Recommendation

**Exhibit 17**

**Results for Interim Evaluation Measure #6**

**Utilization of prenatal care services per 1000 CHP Plus Enrollees**

**Hypothesis:**

Trends observed in access to health care for pregnant women continues (or does not worsen) in the current waiver period.

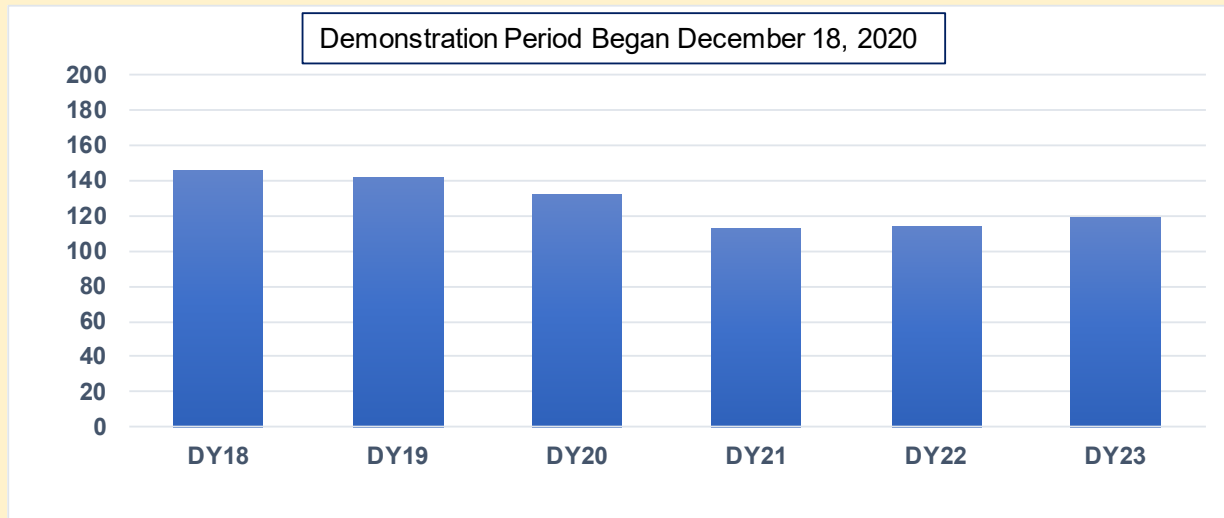
**Measure Used to Test Hypothesis:**

Utilization of prenatal care services per 1000 CHP Plus Enrollees

**Measure Steward:**

HMA-Burns

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>	
DY18	3,589	24,580	146.0	
DY19	3,422	24,245	141.1	
DY20	3,270	24,805	131.8	
DY21	3,502	31,063	112.7	
DY22	3,860	33,749	114.4	
DY23	4,148	34,660	119.7	
Change Pre-Demo (DY18) to Demonstration Period (DY23):				-18.0%
Change Baseline (DY20) to Demonstration Period (DY23):				-9.2%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Decrease	Decrease
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	<.0001	<.0001
<b>Finding:</b>	Significant	Significant

**Exhibit 18**

**Results for Interim Evaluation Measures #7**

**Proportion of PPC (Timeliness) Women Using the Emergency Department**

**Hypothesis:**

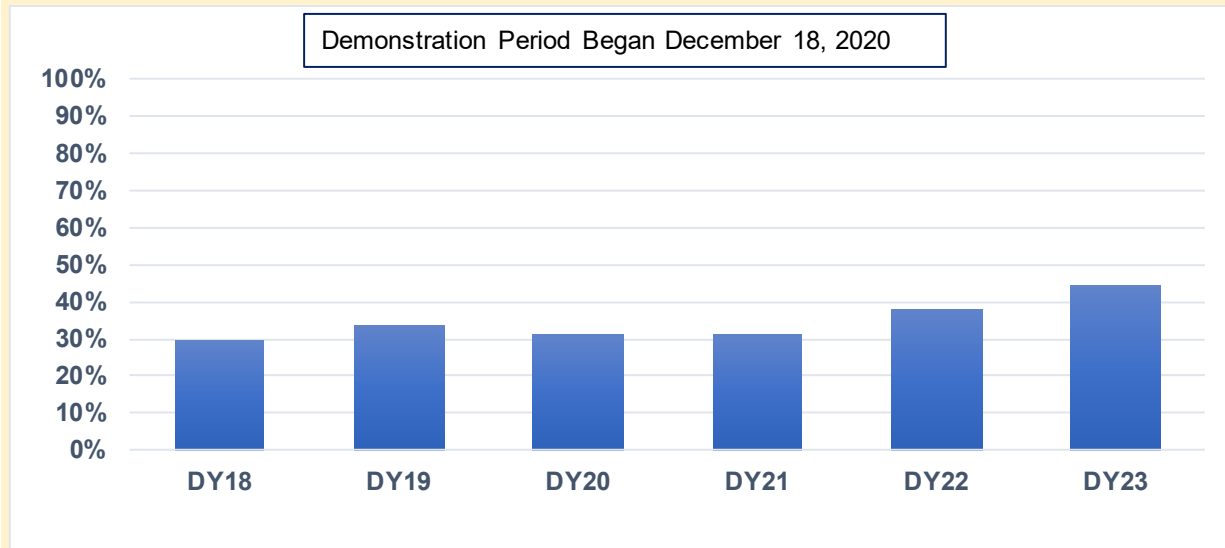
Trends observed in access to health care for pregnant women continues (or does not worsen) in the current waiver period.

**Measures Used to Test Hypothesis:**

Proportion of PPC Timeliness of Care Women Using the Emergency Department

**Measure Steward:** HMA-Burns

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>
DY18	368	1,239	29.7%
DY19	403	1,192	33.8%
DY20	353	1,130	31.2%
DY21	385	1,240	31.0%
DY22	491	1,293	38.0%
DY23	563	1,275	44.2%
Change Pre-Demo (DY18) to Demonstration Period (DY23):			48.7%
Change Baseline (DY20) to Demonstration Period (DY23):			41.4%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Increase	Increase
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	<.0001	<.0001
<b>Finding:</b>	Significant	Significant

**Exhibit 19**  
**Results for Interim Evaluation Measure #8**  
**Timeliness of Prenatal Care**

**Hypothesis:**

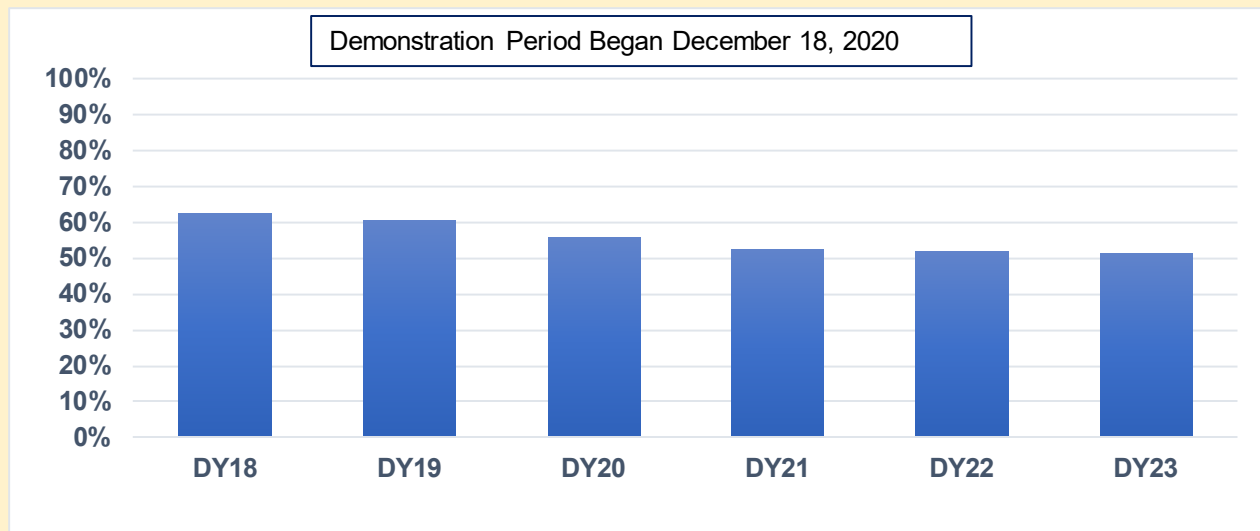
Trends observed in access to health care for pregnant women continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**

Prenatal Postpartum Care (PPC): Timeliness of Prenatal Care  
 The percentage of deliveries in which women have a prenatal care visit in the first trimester, on or before the enrollment start date, or within 42 days of enrollment

**Measure Steward:** National Committee for Quality Assurance

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>
DY18	1,239	1,981	62.5%
DY19	1,192	1,966	60.6%
DY20	1,130	2,018	56.0%
DY21	1,240	2,378	52.1%
DY22	1,293	2,502	51.7%
DY23	1,275	2,468	51.7%
Change Pre-Demo (DY18) to Demonstration Period (DY23):			-17.4%
Change Baseline (DY20) to Demonstration Period (DY23):			-7.7%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Decrease	Decrease
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	<.0001	0.0038
<b>Finding:</b>	Significant	Significant

## Demonstration Goal #3: Increase the number of healthy babies born to pregnant women enrolled in the demonstration

### Summary of Measures

Seven measures were examined to assess Demonstration Goal #3, increase the number of healthy babies born to pregnant women enrolled in the demonstration. For this demonstration goal, the desired outcome was met in four out of seven measures (refer to Exhibit 20). A test of statistical significance was conducted on all seven measures and the outcomes were found to be statistically significant for four of the six measures. More detailed information can be found on each of the measures on the pages that follow.

**Exhibit 20**  
**Summary of Findings for Measures Mapped to Research Questions #3 and #4**

#	Measure Examined	Desired Outcome	Outcome Met?	Statistical Test	Statistically Significant?	Probability
<b>Research Question #3: Do CHP+ members achieve similar (or improved) pregnancy outcomes in the current waiver period?</b>						
9	Percentage of women determined to be at risk of poor maternal and/or infant health outcome	Steady or Decrease	No	Chi-Square	Yes	0.0068
10	Percentage of women who follow ACOG guidelines overall and by subpopulation of interest	Steady or Increase	Yes	Chi-Square	No	
11	Proportion of at-risk deliveries	Steady or Decrease	Yes	Chi-Square	Yes	0.0082
12	Prenatal Postpartum Care (PPC): Postpartum Care	Steady or Increase	Yes	Chi-Square	Yes	<.0001
13	Proportion of PPC women using the emergency department	Steady or Decrease	No	Chi-Square	Yes	<.0001
<b>Research Question #4: Do CHP+ members achieve similar (or improved) birth outcomes in the current waiver period?</b>						
14	Live Births Weighing Less Than 2,500 Grams (LBW-CH)	Steady or Decrease	Yes	Chi-Square	No	
15	Well-Child Visits in the First 15 Months of Life (W15)	Steady or Increase	No	Chi-Square	No	

### Individual Measure Results

Exhibits 21 through 27 appear in the remainder of this section to show the results of each of the measures examined related to Demonstration Goal #3.

As shown in Exhibit 21, the percentage of women determined to be at risk of poor maternal and/or infant health outcome (defined as having diagnosis code O09 on any claim during the prenatal period) increased 14.2% when comparing the baseline period (DY20) to DY23 for CHP Plus members. The results are not trending in the desired direction and while the outcome is statistically significant, it is likely that the PHE disruptions in utilization patterns may have influenced the results.

Individuals included in the numerator of PPC Timeliness of Prenatal Care (Measure #8) served as the basis for computing the percentage of women who follow ACOG guidelines (Measure #10). A frequency distribution of the number of visits during the first trimester was created for those women who met the PPC Timeliness of Prenatal Care inclusion criteria. As shown in Exhibit 22, the percentage of women who had four or more visits during the first trimester increased when comparing baseline (DY20) to DY23 by 27.5% for the CHP+ population. The results are trending in the desired direction but the desired outcome is not significant.

The proportion of at-risk deliveries (refer to Exhibit 23) decreased 6.9% when comparing the baseline period (DY20) to DY23 for CHP Plus members. At risk deliveries were defined by claims or encounters that carried the ICD-10-CM diagnosis Code O60-O77 as the primary diagnosis on the delivery claim. The results are trending in the desired direction and the outcome is statistically significant.

The proportion of PPC postpartum care women (refer to Exhibit 24) increased 22.8% when comparing the baseline period (DY20) to DY23 for CHP+ members. The results are trending in the desired direction and the outcome is statistically significant.

The proportion of PPC postpartum care women using the emergency department (refer to Exhibit 25) increased 45.2% when comparing the baseline period (DY20) to DY23 for CHP+ members. The measure is not trending in the desired direction and is likely impacted by disruptions to utilization patterns occurring during the PHE. While the numerator is relatively small, the outcome is statistically significant.

The number of live births weighing less than 2,500 grams (refer to Exhibit 26) declined by 0.9% when comparing the baseline period (DY20) to DY23 for CHP+ members. While the results are trending in the desired direction, the outcome is not statistically significant. For comparison purposes, Medicaid and CHP Plus combined are presented, with CHP+ members experiencing slightly lower rates of birthweights less than 2,500 grams than Medicaid and CHP+ combined over the study period.

As shown in Exhibit 27, the number of Well-Child Visits in the First 15 Months of Life (six or more visits) declined by 5.8% from the baseline period of measurement year (MY) 20 to MY22 for CHP+ members. The results are not trending in the desired direction and are likely impacted by disruptions to utilization patterns that occurred during the PHE. The outcome was found to not be statistically significant. For this measure, HMA-Burns used audited HEDIS® data to report on Well-Child Visits in the First 15 Months of Life (6 or more visits) for the CHP+ population.

**Exhibit 21**  
**Results for Interim Evaluation Measure #9**  
**At Risk of Poor Maternal and/or Infant Health Outcome**

**Hypothesis:**

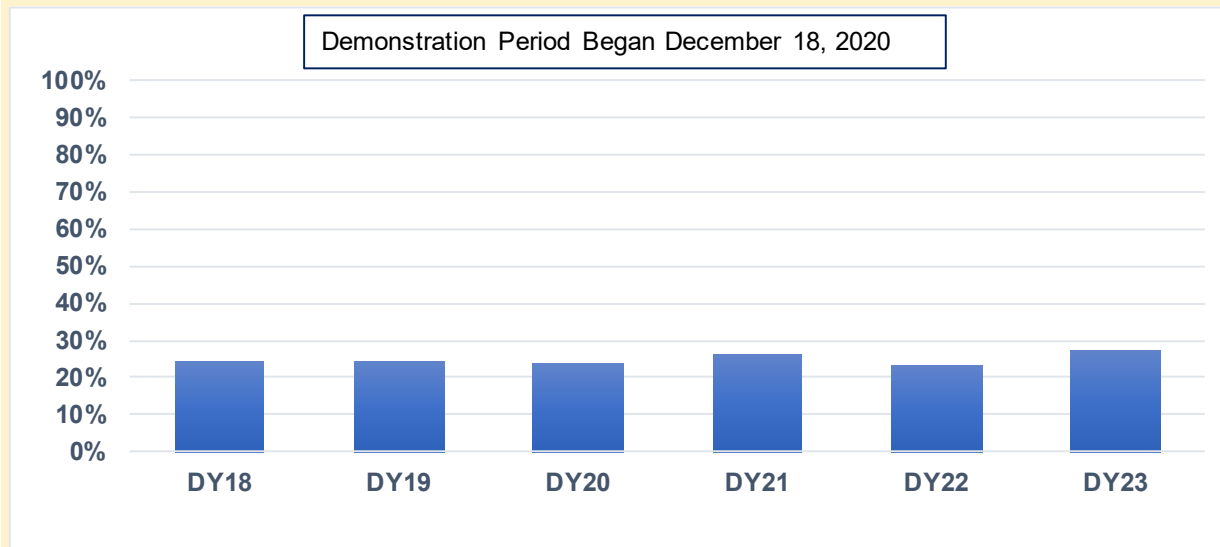
Trends observed in the health of the mother continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**

Percentage of women determined to be at risk of poor maternal and/or infant health outcome (defined as having diagnosis code O09 on any claim during the prenatal period)

**Measure Steward:** HMA-Burns

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>
DY18	525	2,161	24.3%
DY19	522	2,168	24.1%
DY20	527	2,216	23.8%
DY21	677	2,577	26.3%
DY22	626	2,729	22.9%
DY23	738	2,717	27.2%
Change Pre-Demo (DY18) to Demonstration Period (DY23):			11.8%
Change Baseline (DY20) to Demonstration Period (DY23):			14.2%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Increase	Increase
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	0.0231	0.0068
<b>Finding:</b>	Significant	Significant

**Exhibit 22**  
**Results for Interim Evaluation Measure #10**  
**Percentage of Women Who Follow ACOG Guidelines**

**Hypothesis:**

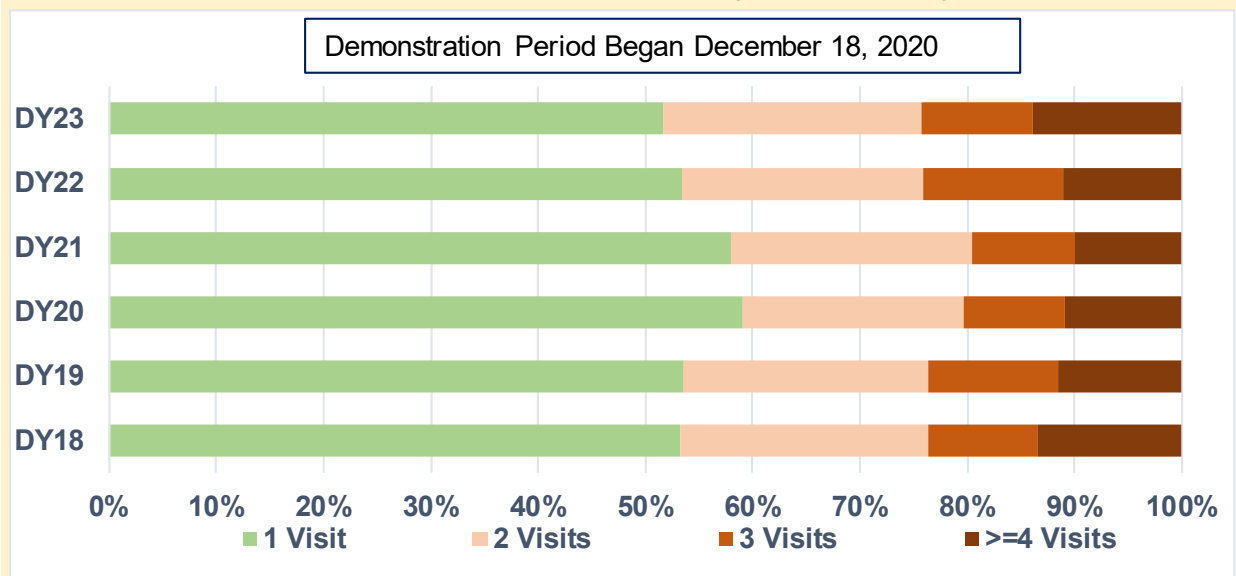
Trends observed in the health of the mother continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**

Percentage of women who follow ACOG guidelines overall and by subpopulation of interest - visits for the first trimester (0 to 28 weeks)

**Measure Steward:** HMA-Burns

**Results for the Demonstration for First Trimester (0 to 28 weeks)**



<u>Study Period</u>	<u>1 Visit</u>	<u>2 Visits</u>	<u>3 Visits</u>	<u>&gt;=4 Visits</u>
DY18	53%	23%	10%	13%
DY19	54%	23%	12%	12%
DY20	59%	21%	10%	11%
DY21	58%	23%	10%	10%
DY22	53%	23%	13%	11%
DY23	52%	24%	10%	14%
Change Pre-Demo (DY18) to Demonstration Period (DY23):				2.9%
Change Baseline (DY20) to Demonstration Period (DY23):				27.5%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Increase	Increase
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	0.8151	0.0768
<b>Finding:</b>	Not Significant	Not Significant

**Exhibit 23**  
**Results for Interim Evaluation Measure #11**  
**Proportion of At-Risk Deliveries**

**Hypothesis:**

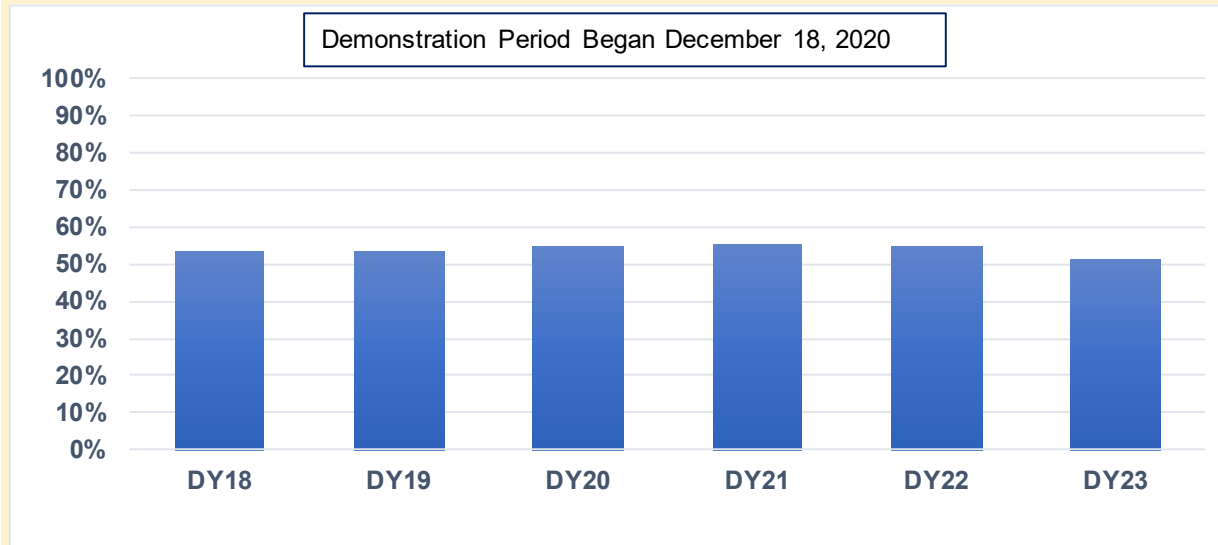
Trends observed in the health of the mother continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**

Proportion of At-Risk Deliveries (defined as having diagnosis code O60-O77 as the primary diagnosis on the delivery claim)

**Measure Steward:** HMA-Burns

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>	
DY18	1,154	2,161	53.4%	
DY19	1,155	2,168	53.3%	
DY20	1,219	2,216	55.0%	
DY21	1,431	2,577	55.5%	
DY22	1,493	2,729	54.7%	
DY23	1,392	2,717	51.2%	
Change Pre-Demo (DY18) to Demonstration Period (DY23):				-4.1%
Change Baseline (DY20) to Demonstration Period (DY23):				-6.9%

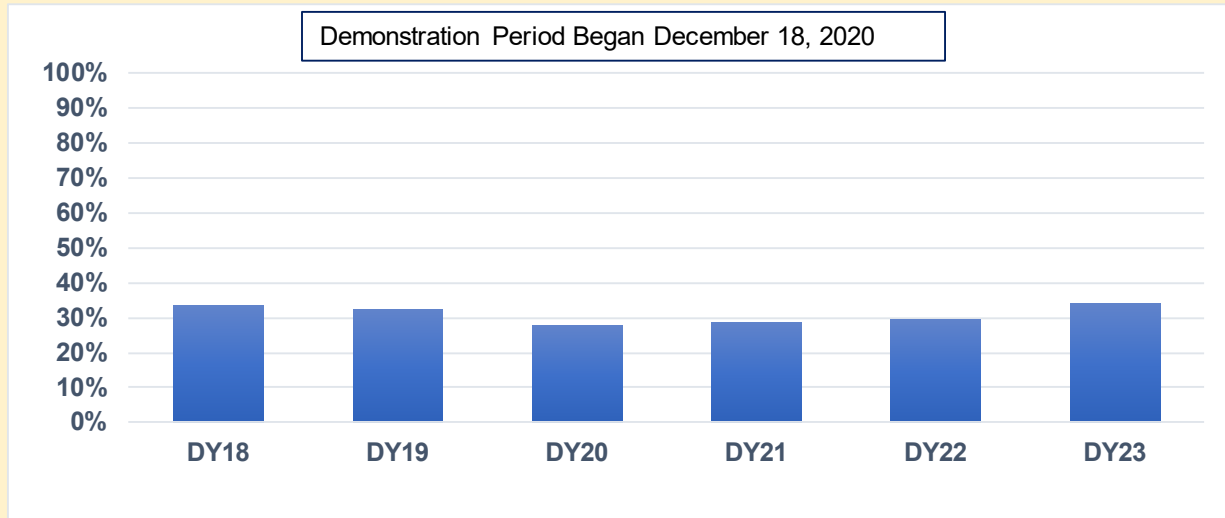
	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Decrease	Decrease
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	0.1321	0.0082
<b>Finding:</b>	Not Significant	Significant

**Exhibit 24**  
**Results for Interim Evaluation Measure #12**  
**Postpartum Care**

**Hypothesis:**  
 Trends observed in the health of the mother continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**  
 Prenatal Postpartum Care (PPC): Postpartum Care  
 The percentage of deliveries in which women had a postpartum visit on or between 7 and 84 days after delivery  
**Measure Steward:** National Committee for Quality Assurance

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>
DY18	667	1,990	33.5%
DY19	633	1,976	32.0%
DY20	565	2,029	27.8%
DY21	683	2,386	28.6%
DY22	744	2,512	29.6%
DY23	845	2,471	34.2%
Change Pre-Demo (DY18) to Demonstration Period (DY23):			2.0%
Change Baseline (DY20) to Demonstration Period (DY23):			22.8%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Increase	Increase
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	0.6338	<.0001
<b>Finding:</b>	Not Significant	Significant

**Exhibit 25**

**Results for Interim Evaluation Measures #13**

**Proportion of PPC (Postpartum) Women Using the Emergency Department**

**Hypothesis:**

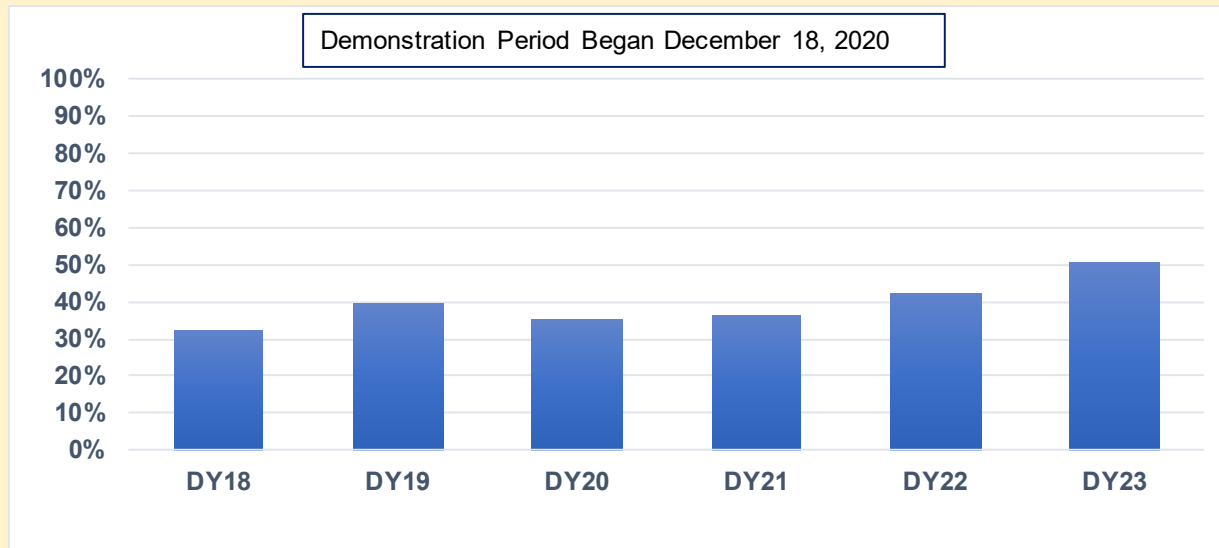
Trends observed in the health of the mother continues (or does not worsen) in the current waiver period.

**Measures Used to Test Hypothesis:**

Proportion of PPC Postpartum Care Women Using the Emergency Department

**Measure Steward:** HMA-Burns

**Results for the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>
DY18	213	667	31.9%
DY19	251	633	39.7%
DY20	198	565	35.0%
DY21	247	683	36.2%
DY22	313	744	42.1%
DY23	430	845	50.9%
Change Pre-Demo (DY18) to Demonstration Period (DY23):			59.4%
Change Baseline (DY20) to Demonstration Period (DY23):			45.2%

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Increase	Increase
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	<.0001	<.0001
<b>Finding:</b>	Significant	Significant

**Exhibit 26**  
**Results for Interim Evaluation Measure #14**  
**Live Births Weighing Less Than 2,500 Grams (LBW-CH)**

**Hypothesis:**

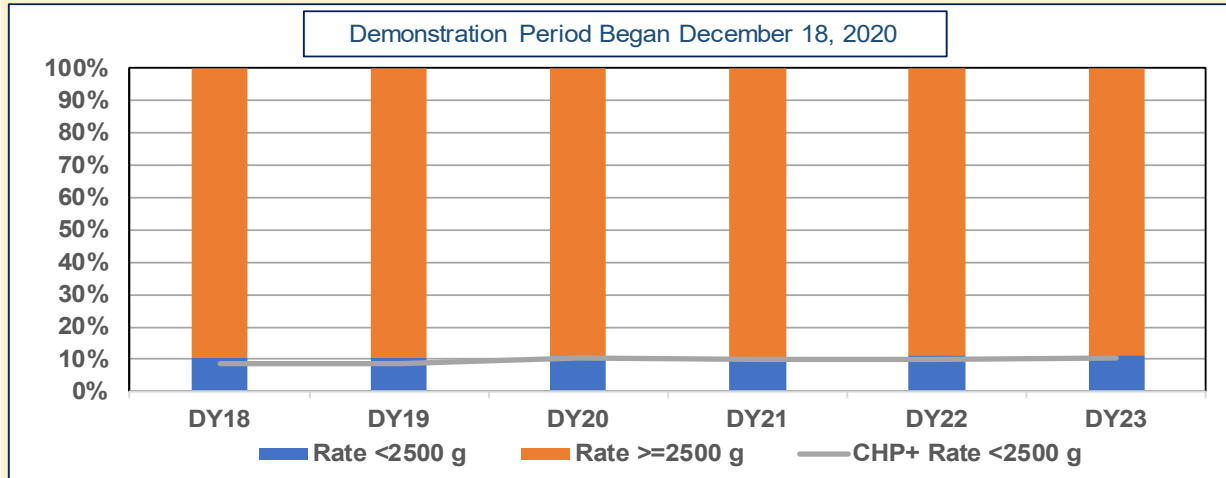
Trends observed in the number of healthy babies (over 2500 grams) continues (or does not worsen) in the current waiver period.

**Measure Used to Test Hypothesis:**

Live Births Weighing Less Than 2,500 Grams (LBW-CH)

**Measure Steward:** Centers for Disease Control

**Results for the Medicaid and CHP Plus Population**



**Medicaid and CHP Plus Combined**

<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate &lt;2500 g</u>	<u>Rate &gt;=2500 g</u>
DY18	2,586	24,412	10.6%	89.4%
DY19	2,493	23,743	10.5%	89.5%
DY20	2,468	22,632	10.9%	89.1%
DY21	2,388	22,581	10.6%	89.4%
DY22	2,527	22,439	11.3%	88.7%
DY23	2,477	21,957	11.3%	88.7%

Change Pre-Demo (DY18) to Demonstration Period (DY23): 6.5%

Change Baseline (DY20) to Demonstration Period (DY23): 3.5%

**CHP Plus Only**

<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate &lt;2500 g</u>	<u>Rate &gt;=2500 g</u>
DY18	209	2,430	8.6%	91.4%
DY19	219	2,472	8.9%	91.1%
DY20	250	2,401	10.4%	89.6%
DY21	241	2,423	9.9%	90.1%
DY22	249	2,534	9.8%	90.2%
DY23	248	2,404	10.3%	89.7%

Change Pre-Demo (DY18) to Demonstration Period (DY23): 19.9%

Change Baseline (DY20) to Demonstration Period (DY23): -0.9%

**CHP Plus Only**

	<b>DY18 to DY23</b>	<b>DY20 to DY23</b>
<b>Desired Outcome:</b>	Steady or Decrease	Steady or Decrease
<b>Actual Outcome:</b>	Increase	Decrease
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	0.0415	0.9129
<b>Finding:</b>	Significant	Not Significant

**Exhibit 27**

**Results for Interim Evaluation Measure #15**

**Well-Child Visits in the First 15 Months of Life (6 or more visits)**

**Hypothesis:**

Trends observed in the number of healthy babies (over 2500 grams) continues (or does not worsen) in the current waiver period.

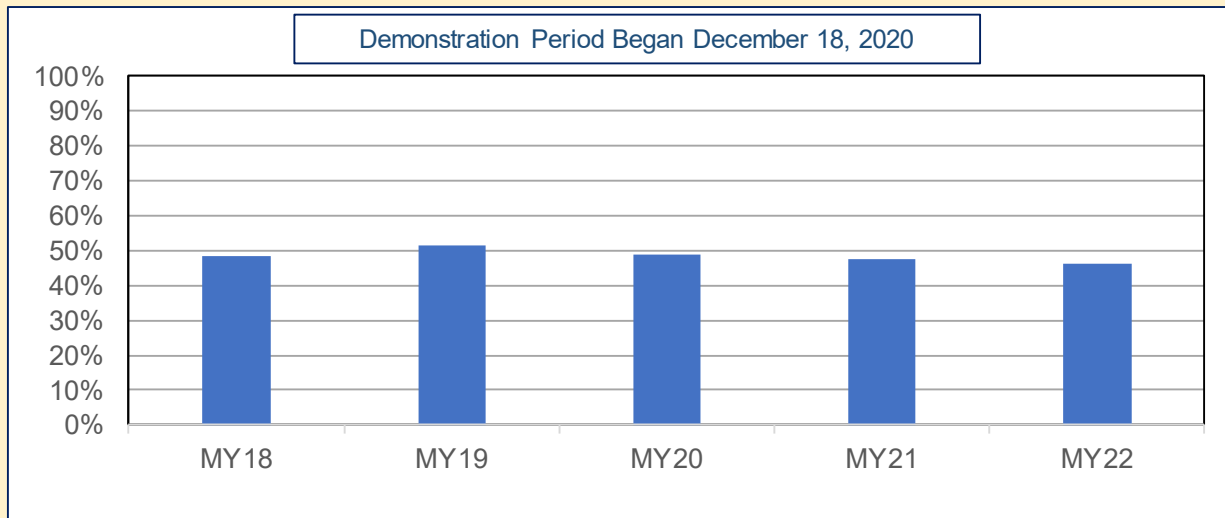
**Measure Used to Test Hypothesis:**

Well-Child Visits in the First 15 Months of Life (6 or more visits)

**Measure Steward:** National Committee for Quality Assurance

**Data Source:** HCPF HEDIS Aggregate Reports for Child Health Plans Plus -  
 Measurement Year (MY) 2018- 2022

**Results for the DSHP Population in the Demonstration**



<u>Study Period</u>	<u>Numerator</u>	<u>Denominator</u>	<u>Rate</u>
MY18	210	435	48.3%
MY19	198	386	51.3%
MY20	334	683	48.9%
MY21	318	668	47.6%
MY22	257	558	46.1%
Change Pre-Demo (MY18) to Demonstration Period (MY22):			-4.6%
Change Baseline (MY20) to Demonstration Period (MY22):			-5.8%

	<b>MY18 to MY22</b>	<b>MY20 to MY22</b>
<b>Desired Outcome:</b>	Steady or Increase	Steady or Increase
<b>Actual Outcome:</b>	Decrease	Decrease
<b>Statistical Review:</b>	Chi-Square	Chi-Square
<b>Probability:</b>	0.4871	0.3182
<b>Finding:</b>	Not Significant	Not Significant

## SECTION G: Conclusions

### Assessment of the Effectiveness of the Demonstration

When considering the logic models shown in the Evaluation Design Plan, Colorado did not meet all the desired outcomes outright but still saw many positive impacts for the CHP+ population due to the demonstration, despite the entire demonstration period occurring during the PHE. Noteworthy positive impacts between DY20 and DY23 follow by logic model aim.

#### *Logic Model 1: Maintain Continuity of Enrollment.*

- Proportion of enrollees continuously enrolled in CHP+ has increased over the current demonstration period
- Enrollment duration during pregnancy increased with the majority of members continuously enrolled for 12 months

#### *Logic Model 2: Maintain Access to Care.*

- Average driving distance to prenatal care services decreased
- Beneficiary perspectives on lived experiences of maternity care

#### *Logic Model 3: Maintain or Improve Health Outcomes.*

- The proportion of at-risk deliveries declined
- The percentage of PPC women following ACOG guidelines increased
- The proportion of PPC postpartum care women increased
- The rate of live births weighing less than 2,500 grams declined

The PHE likely had a confounding effect in enabling Colorado to fully meet these aims during the demonstration period. While some measures were found to be steady between the pre-demonstration period and initial years of the demonstration, other measures had results that trended in the opposite direction from what was desired. Areas in which the evaluators will focus on assessing improvement in the remainder of this demonstration period include the following:

- Prenatal care paid by type of insurance
- Beneficiary perspectives on lived experiences of maternity care
- Utilization of prenatal care services
- Proportion of PPC prenatal and postpartum women using the emergency department
- PPC Timeliness of Prenatal Care
- Percentage of women determined to be at risk of poor maternal and/or infant health outcome
- Well child visits during the first 15 months of life

When considering each of the demonstration goals, Colorado did see some success in each goal, albeit perhaps not as much as desired. Exhibit 28, which appears on the next page, summarizes all the measures that were reviewed. Among the 15 measures, there were eight measures where the desired outcome was met. Statistical tests were run for 11 of the 15 measures. Among these 11 measures, there are three measures which have a statistically significant trend in the intended direction, five measures which have a statistically significant trend in wrong direction, and three measures where the trend was found not to be statistically significant.

**Exhibit 28  
Summary of Measures Examined by Demonstration Goal**

Waiver Goals		Total Measures	Measures with Results Trending in the Intended Direction	Measures with Results Trending in the Wrong Direction	Total Measures Where Tests Were Run for Statistical Significance	Of these, the Total Where Trend in Intended Direction and Statistically Significant	Of these, the Total Where Trends in Wrong Direction and Statistically Significant	Of these, the Total Where There Was No Statistically Significant Change
<b>MEASURES FOR GOALS #1 - #3</b>		<b>15</b>	<b>8</b>	<b>7</b>	<b>11</b>	<b>3</b>	<b>5</b>	<b>3</b>
1	Decrease in the uninsurance rate for pregnant women.	3	2	1	1	1	0	0
2	Increase in prenatal and postpartum care for pregnant women enrolled in the demonstration	5	2	3	3	0	3	0
3	Increase in the number of healthy babies born to pregnant women enrolled in the demonstration.	7	4	3	7	2	2	3

## Assessment of Opportunities for Improvement

Beginning in the prior demonstration period and continuing through the current demonstration period, Colorado has seen progress towards its goals related to maintaining continuity of eligibility, access to care and maintaining or improving health outcomes for CHP+ enrollees. Within each of the goals, there are some measures where progress has yet to be seen in a meaningful way during the current demonstration period, likely the result of severe disruptions to utilization patterns occurring during the PHE. The HMA-Burns evaluation team has identified opportunities for the HCPF to consider for continued improvement during the remainder of this demonstration period which include the following:

1. **Encourage member involvement.** The Maternity Advisory Committee<sup>7</sup> is a unique opportunity for HCPF to gather and leverage lived experience including challenges faced during pregnancy and postpartum experiences that are to be used to inform existing and emerging policy. While the MAC is relatively new, having been created as part of the enactment of the Maternity Bundle Rule in November 2020, the HCPF is encouraged to expand the MAC to allow for feedback to be gathered from non-English speaking beneficiaries. Further, HMA-Burns recommends that HCPF conduct the Mini Focus Group session on an annual basis to continue to gather focused feedback relevant to its CHP+ demonstration.
2. **Incentivize prenatal and postpartum engagement.** While the PHE likely had a confounding effect in enabling Colorado to fully meet the aims during the demonstration period, measures related to prenatal care, and utilization of emergency department settings indicate that there is more work to be done to incentivize prenatal and postpartum engagement. Through its current Accountable Care Collaborative (ACC)<sup>8</sup> and Key Performance Indicators (KPI)<sup>9</sup>, the HCPF has designed a person-centered approach to care by connecting members to medical and community resources, thus minimizing the barriers to access. The KPI measures are designed to assess the functioning of the overall system and the individual Regional Accountable Entities (RAEs), and support the Incentive Payment component of the ACC. During the demonstration period, prenatal engagement has been included as a KPI through the entirety of the current demonstration period, with postpartum follow-up care included DY22. To address the trends observed in this evaluation with respect to prenatal care and use of the emergency department settings, HMA-Burns recommends that the HCPF continue to incorporate prenatal engagement and consider adding postpartum follow-up care as key performance indicators as it plans for the implementation of the third phase of the Accountable Care Collaborative<sup>10</sup>.
3. **Reduce barriers to prenatal and postpartum care.** The MAC Mini Focus Group held in April 2023 provided a unique opportunity to inform policies and initiatives designed to improve access to prenatal and postpartum care services. Specifically, participants mentioned telehealth and home visiting programs help reduce barriers to post-partum care. With respect to prenatal care, barriers appeared to be more related to interactions with the prenatal care provider and not feeling validated or acknowledged. Given the trends observed with respect to prenatal care and care settings during postpartum care, HMA-Burns

<sup>7</sup> [Maternity Advisory Committee | Colorado Department of Health Care Policy & Financing](#)

<sup>8</sup> [Accountable Care Collaborative Phase II | Colorado Department of Health Care Policy & Financing](#)

<sup>9</sup> [Accountable Care Collaborative Phase II - Provider and Stakeholder Resource Center | Colorado Department of Health Care Policy & Financing](#)

<sup>10</sup> [Preparing for Accountable Care Collaborative Phase III | Colorado Department of Health Care Policy & Financing](#)

recommends that HCPF consider expanding the use of Nurse Family Partnerships and home visiting to improve opportunities to access postpartum care services; and consider expanding provider types providing prenatal care services to improve opportunities to access prenatal care services and address perceived stigmas.

4. **Address data quality challenges.** While there have been improvements in the format and availability of data since the Summative Evaluation covering the extension period August 1, 2015 through July 31, 2020, HMA-Burns recommends that HCPF continue to address data quality challenges affecting claims and encounter data.

## SECTION H: Interpretations, Policy Implications, and Interactions with Other State Initiatives

### Policy Implications

This demonstration furthers the objectives of title XXI by improving access to high-quality prenatal, delivery, and post-partum care services to low-income pregnant women and is producing positive health outcomes for beneficiaries. Understandably, the PHE required states to amend existing policies and procedures in order to ensure that services were continually rendered when needed to CHP+ beneficiaries. As the PHE unwinds, and its resulting policies are re-evaluated, it will be important for the HCPF to monitor the effects of PHE-related policy decisions on access to care for its CHP+ enrollees. To that end, a concerted effort has been adopted by the HCPF to further improve continuity of enrollment, access and the health outcomes of pregnant women and their babies in both the Medicaid program and the CHP+ demonstration population.

### Interactions with Other State Initiatives

During the current demonstration period, HCPF did undertake specific initiatives to further the goals and policy aims of the demonstration as follows:

1. **Maintain Continuity of Enrollment.** In accordance with House Bill (HB) 22-1289<sup>11</sup>, effective July 1, 2022, Colorado enacted HB 22-1289, known as Health Benefits for Children and Pregnant Persons or the Cover All Coloradans bill, which expands health coverage to children and pregnant persons regardless of immigration status. The legislation was designed to improve health equity for pregnant persons and children in Colorado by making coverage more affordable, more broadly available, and investing in perinatal and postpartum care. The legislation also makes improvements to existing Health First Colorado (Colorado's Medicaid program) and Child Health Plan Plus (CHP+) benefits for children and pregnant persons. Specific provisions related to maintaining continuity of enrollment that went into effect includes postpartum coverage expansion from 60 days to a full 12 months, and the elimination of the CHP+ enrollment fee for families.
2. **Maintain Access.** A key component of HB 22-1289 requires HCPF to work with stakeholders and community members to develop outreach and education strategies to help enroll children and pregnant persons regardless of their immigration status. Listening sessions scheduled for early 2024, with coverage scheduled to begin January 1, 2025.<sup>12</sup> Additional activities underway that support maintaining or improving access for Medicaid and CHP+ enrollees includes the following:
  - **Encourage member involvement.** Beginning in January 2024, HCPF is launching a Spanish speaking MAC.
  - **Reduce barriers to prenatal and postpartum care.** Between Spring and Summer 2024, HCPF will be launching additional reproductive and maternal health programs and resources including adding certified professional midwives and direct entry midwives (Spring 2024), doula services (Summer 2024), and certified midwives (Summer 2024) as providers.<sup>13</sup>

<sup>11</sup> [Cover All Coloradans: Health Benefits for Children and Pregnant Persons | Colorado Department of Health Care Policy & Financing](#)

<sup>12</sup> Ibid

<sup>13</sup> [Reproductive and Maternal Health Programs and Resources | Colorado Department of Health Care Policy & Financing](#)

- 3. Maintain or Improve Outcomes.** Part of HB 22-1289 included the development of Health Services Initiatives (HSI) using Children's Health Insurance Program (CHIP) funding to improve the health outcomes of children and/or pregnant and postpartum people. In accordance with HB 22-1289, HCPF solicited feedback on the process and the eventual projects to be funded.<sup>14</sup>

In addition, HCPF has begun the process to roll out Phase III of its ACC. Specifically, HCPF has included as one of its Phase III Strategic Objectives to "...Reduce maternal disparity gaps for pregnant members in the lowest performing populations by 50% to the highest performing population." Proposed incentive payment measures include: "...Timeliness of prenatal care; postpartum care; and contraceptive care for postpartum women."<sup>15</sup>

## State of Colorado Interpretations from the Evaluation Findings

The HCPF largely agrees with the findings of the report. We agree that the public health emergency posed significant challenges for our members and provider community, primarily resulting in depressed utilization of prenatal care services and increased use of emergency department settings for prenatal and postpartum persons.

Over the current demonstration period, HCPF has worked to identify gaps and opportunities related to member engagement and enrollment. There are multiple opportunities and methods for members to participate and provide feedback including the Maternity Advisory Committee mentioned in this report, including the addition of the Spanish speaking committee in 2024.

Colorado's Cover All Coloradans legislation (HB 22-1289) was passed during the PHE and is designed to improve health equity for pregnant persons and children in Colorado by making coverage more affordable, more broadly available, and investing in perinatal and postpartum care. HCPF continues to be engaged in implementation activities related to HB 22-1289 through the remainder of DY 23 and into DY 24.

HCPF continually reviews its programs and policies and is currently launching additional reproductive and maternal health programs and resources that will reduce barriers to prenatal and postpartum care including certified professional midwives and direct entry midwives, doula services, and certified midwives Summer 2024.

Created in 2011, the commitment to accountable care through the Accountable Care Collaborative is now beginning its third phase. The ACC continues to provide a person-centered approach to care by connecting members to medical and community resources, thus minimizing the barriers to access. Key Performance Indicators related to prenatal and postpartum care with an incentive payment tied to HCPF's contracted entities who certain goals will be component of the ACC Phase III.

HCPF has made improvements to its data quality by establishing a Managed Care Encounter Reporting Team as the final phase of the Department's Strategic Project Initiative to deliver timely and accurate BH, MCP, and CHP+ encounters and billing compliance. The Managed Care Encounter Reporting Team will address the needs of the Department's encounter reporting stakeholders. This final phase of the project will seek to align reporting stakeholders to support consistent and compliant reporting, which should have the added benefit of reducing the costs of system and operational change across the enterprise. Improved timeliness and accuracy of

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<sup>14</sup> [Health Services Initiatives \(HSI\) | Colorado Department of Health Care Policy & Financing](#)

<sup>15</sup> [Accountable Care Collaborative Phase III Concept Paper \(colorado.gov\)](#), page 16.

encounter data will improve the data analysis and rate setting processes across multiple offices in the Department.

Our hope is that these efforts will continue to maintain continuity of enrollment, maintain access to services and maintain or improve outcomes for CHP+ members enrolled in this demonstration.

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## SECTION I: Lessons Learned and Recommendations

### Lessons Learned

As it worked to implement many new initiatives in the initial years of its demonstration while navigating the public health emergency, Colorado's HCPF learned some lessons to be mindful of moving forward.

1. Data systems can pose challenges to the effective implementation of program initiatives when working with multiple stakeholder/partner systems. Gaining a thorough understanding of the respective systems, file formats, and the ability to gather and integrate data to support initiatives is important when standing up new programs as well as an appreciation for the time commitment involved.
2. Invest in a consistent resource early on to complete the required monitoring activities and to conduct the independent evaluation required by the special terms and conditions.

### Recommendations

Colorado's HCPF offers the following recommendations to other states from what was learned from the evaluation of our own demonstration.

1. Colorado recommends to other states to convene stakeholders/partners involved in the demonstration such as managed care organizations, members and providers on a regular basis to communicate facets and goals of the demonstration and related initiatives. Communication should be bidirectional so that all parties have a common understanding, in particular to understand what is happening on the ground, particularly at the introduction of a new service, expansion of an existing service, or fundamental change in billing or reimbursement of existing services. In addition to providing a forum for multiple viewpoints to successfully implement demonstration activities, these meetings foster collaboration between stakeholders and offer the state the ability to share its vision with all parties.
2. The coordination and communication among entities that deliver supports to vulnerable populations is essential to ensure that each beneficiary receives the supports that they need. This coordination includes written protocols on the scope of each entity's area of responsibility, the procedures that will be followed by each entity, and the protocols for the seamless transfer of information about beneficiaries, when applicable.

## **APPENDIX A: Approved Evaluation Design Plan**

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



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## State Demonstrations Group

March 7, 2023

Adela Flores-Brennan  
Medicaid Director  
Colorado Department of Health Care Policy and Financing  
1570 Grant Street  
Denver, CO 80203

Dear Ms. Flores-Brennan:

The Centers for Medicare & Medicaid Services (CMS) completed its review of the Evaluation Design, which is required by the Special Terms and Conditions (STCs), specifically, STC #37, of Colorado's section 1115 demonstration, "Colorado Adult Prenatal Coverage in CHP+" (Project No: 21-W-00014/8), effective through July 31, 2025. CMS has determined that the Evaluation Design, dated July 8, 2022, meets the requirements set forth in the STCs and our evaluation design guidance, and therefore, approves the state's Evaluation Design.

CMS has added the approved Evaluation Design to the demonstration's STCs as Attachment C. A copy of the STCs, which includes the new attachment, is enclosed with this letter. In accordance with 42 CFR 431.424, the approved Evaluation Design may now be posted to the state's Medicaid website within thirty days. CMS will also post the approved Evaluation Design as a standalone document, separate from the STCs, on Medicaid.gov.

Please note that an Interim Evaluation Report, consistent with the approved Evaluation Design, is due to CMS one year prior to the expiration of the demonstration, or at the time of the extension application, if the state chooses to extend the demonstration. Likewise, a Summative Evaluation Report, consistent with this approved Evaluation Design, is due to CMS within 18 months of the end of the demonstration period. In accordance with 42 CFR 431.428 and the STCs, we look forward to receiving updates on evaluation activities in the annual monitoring reports.

We appreciate our continued partnership with Colorado on the Colorado Adult Prenatal Coverage in CHP+ section 1115 demonstration. If you have any questions, please contact your CMS demonstration team.

Sincerely,

**Danielle**  
**Daly -S**

Digitally signed by  
Danielle Daly -S  
Date: 2023.03.07  
13:30:05 -05'00'

Danielle Daly

Director

Division of Demonstration Monitoring and Evaluation

**EVALUATION DESIGN PLAN FOR  
COLORADO'S ADULT PRENATAL COVERAGE IN  
CHILD HEALTH PLAN PLUS (CHP+) SECTION 1115  
DEMONSTRATION WAIVER**



**FINAL DRAFT  
JULY 8, 2022**

**HEALTH MANAGEMENT ASSOCIATES**

EVALUATION TEAM MEMBERS:

MARK PODRAZIK, PRINCIPAL INVESTIGATOR

AKHILESH PASUPULATI

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### Abbreviations List

Abbreviation	Meaning	Abbreviation	Meaning
ACA	Affordable Care Act	FI	Facilitated Interviews
HMA-Burns	Burns & Associates, a Division of Health Management Associates	FPL	Federal Poverty Level
BIDM	Business Intelligence Data Management	HCPCS	Healthcare Common Procedure Coding System
CDC	Centers for Disease Control and Prevention	HCPF	Department of Health Care Policy & Financing
CHIP	Children's Health Insurance Program	IBM	IBM Corporation (formerly Truven Health Analytics)
CHIPRA	Children's Health Insurance Program Reauthorization Act of 2009	ITS	Single Segment Interrupted Time Series
CHP+	Child Health Plus	LBW	Low Birth Weight
CMS	Centers for Medicare and Medicaid Services	MAGI	Modified Adjusted Gross Income
CoHID	Colorado Health Information Dataset	MCO	Managed Care Organization
CPT	Current Procedural Terminology	MMIS	Medicaid Management Information System
CY	Calendar Year	NCQA	National Committee for Quality Assurance
DOS	Date of Service	OR	Onsite Reviews
DR	Desk Review	PCP	Primary Care Provider
DS	Descriptive Statistics	PRAMS	Pregnancy Risk Assessment and Monitoring System
DXC	DXC Technologies (now Gainwell)	RAE	Regional Accountable Entity
E&M	Evaluation & Management	RCT	Randomized Control Trials
ED	Emergency Department	SFY	State Fiscal Year
EDW	Enterprise Data Warehouse	STC	Special Terms and Conditions
FFS	Fee-For-Service	SUD	Substance Use Disorder
FG	Focus Groups	TJC	The Joint Commission

**FINAL DRAFT**  
**Evaluation Design Plan for Colorado's CHP+ 1115 Demonstration Waiver**

## SECTION I: GENERAL BACKGROUND INFORMATION

### I.A Waiver Demonstration Information<sup>1</sup>

Colorado has had a long-standing Section 1115(a) demonstration which was originally approved in 2002 and most recently extended from December 18, 2020 through July 31, 2025. The demonstration waiver was selected as a mechanism to allow Colorado to continue to provide coverage to uninsured pregnant women with family income using Modified Adjusted Gross Income (MAGI) equivalent between 141 and 195 percent of the federal poverty level (FPL). Colorado continues to use the Child Health Plus (CHP+) 1115 Demonstration to improve the health status of low-income pregnant women and their newborns by using the goals as described in Section I.B to guide the administration and implementation of the demonstration.

Name: Colorado Adult Prenatal Coverage in Child Health Plus (CHP+)

Project Number: 21-W-00014/8

Approval Date: December 21, 2020

Time Period Covered by Evaluation: December 18, 2020 through July 31, 2025

### I.B Waiver Demonstration Goals<sup>2</sup>

Colorado's goals in operating the demonstration are to improve the health status of low-income Coloradoans by enabling a:

1. Decrease in the uninsurance rate for pregnant women;
2. Increase in prenatal and postpartum care for pregnant women enrolled in the demonstration; and
3. Increase in the number of healthy babies born to pregnant women enrolled in the demonstration.

### I.C Brief Description and History of Implementation<sup>3</sup>

The Colorado Adult Prenatal Coverage in the CHP+ demonstration was initially approved on September 27, 2002 to provide coverage to uninsured pregnant women with family income above the CHP+ state plan level, from 133 to 185 percent of the FPL. At the time of initial approval, states only had the option to cover pregnant women above the CHP+ state plan level under title XXI, i.e., the Children's Health Insurance Program (CHIP) through a section 1115 demonstration.

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<sup>1</sup> Colorado Adult Prenatal Coverage in Child Health Plan Plus (CHP+) Section 1115(a) Demonstration Special Terms and Conditions, accessed at <https://www.CHP+.gov/CHP+-CHIP-Program-Information/By-Topics/Waivers/1115/downloads/co/co-adult-prenatal-coverage-ca.pdf>

<sup>2</sup> Ibid, page 5 of 31

<sup>3</sup> Ibid, page 4 of 31

## FINAL DRAFT

### Evaluation Design Plan for Colorado's CHP+ 1115 Demonstration Waiver

The Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA) added section 2112 to the Act which created the option for states to cover pregnant women in the CHIP state plan, but only if the state covered pregnant women in CHP+ up to at least 185 percent of the FPL. Consistent with CHIPRA, Colorado extended coverage in the CHIP state plan to pregnant women with family income up to 250 percent of the FPL but had to amend its CHP+ state plan to move pregnant women from 133 to 185 percent of the FPL from coverage under the CHIP section 1115 demonstration to the CHP+ state plan (effective January 1, 2013).

To support Colorado with continuing its pre-CHIPRA coverage of pregnant women from 133 to 185 percent of the FPL, the Centers for Medicare and Medicaid Services (CMS) grandfathered title XXI coverage for this population of uninsured pregnant women (at the MAGI-equivalent eligibility level of above 141 percent through 195 percent of the FPL) with the July 30, 2012 extension of the demonstration. Grandfathering title XXI coverage for these pregnant women is consistent with section 2112(f) of the Act (enacted by CHIPRA) that authorizes the continuation of other state options for providing medical assistance to pregnant women, including *pregnancy-related services through the application of any waiver authority (as in effect on June 1, 2008)*.

Colorado continues to operate the Adult Prenatal Coverage in CHP+ demonstration within the program authorities and implementation parameters in existence on June 1, 2008. In accordance with section 2112(f) of the Act, CMS approved a five-year extension of Colorado's grandfathered title XXI coverage in September 2015 (through July 31, 2020; temporarily extended through December 31, 2020) and is approving another five-year extension through July 31, 2025 with these STCs and associated expenditure and non-applicable authorities. The program authorities granted with this approval are solely limited to, and contingent upon, Colorado's continued implementation of its pre-CHIPRA coverage of pregnant women from 133 to 185 percent of the FPL (at the MAGI-equivalent of 141-195% of the FPL) in accordance with section 2112(f) of the Act.

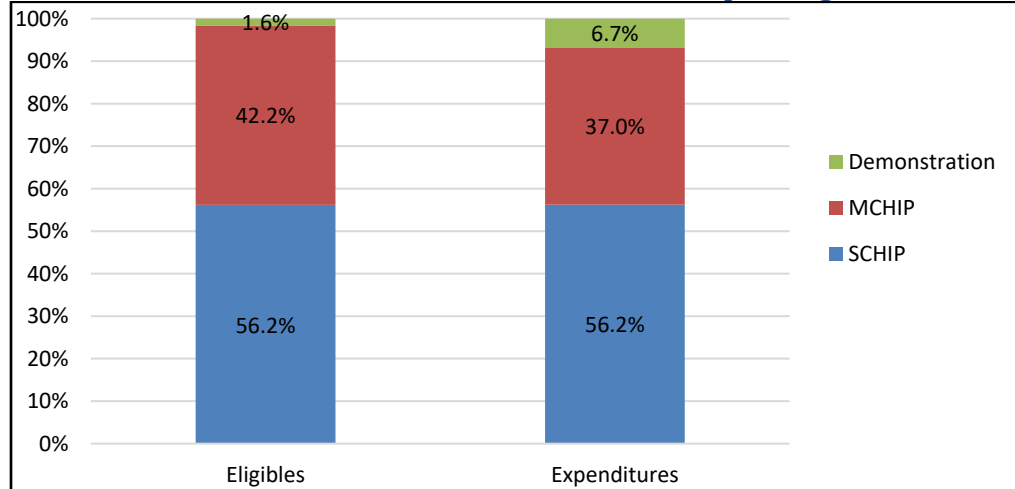
This demonstration furthers the objectives of title XXI by improving access to high-quality prenatal, delivery, and postpartum care services to low-income pregnant women that is producing positive health outcomes for beneficiaries. For example, the state's interim evaluation report for the 2015 – 2020 demonstration period shows that the state realized an 8.6 percent increase in the proportion of eligible beneficiaries accessing postpartum care from the state's baseline to demonstration year one. After the first demonstration year, this proportion remained relatively stable across the remaining demonstration years. Another positive outcome is the proportion of beneficiaries who gave birth to a low birth weight (LBW) baby decreased each year of the demonstration.

## I.D Population Groups Impacted

### Overview of Colorado's CHP+ Program

The Department of Health Care Policy & Financing (HCPF) has responsibility for the administration and oversight of Colorado's CHIP as well as the CHP+ program under the waiver and state plan authorities. As seen in Exhibit I.1, during federal fiscal year (FFY) 2020, CHP+ comprised 1.6% of the total enrollment of 135,265 and 6.7% of the total of \$330 million in expenditures for Colorado's total combined CHIP program.

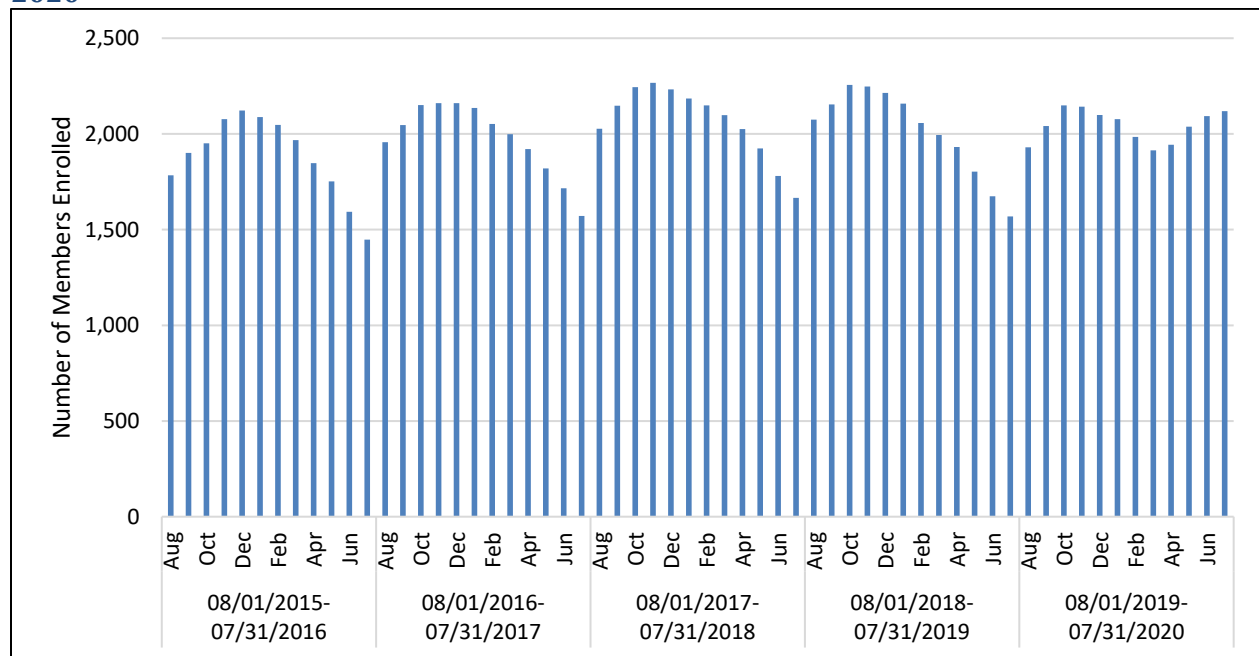
**Exhibit I.1. Total Combination CHIP Enrollment and Spending: FFY 2020**



Source: CHP+ Demonstration Extension Application and FFY 2020 Allotment Neutrality Report

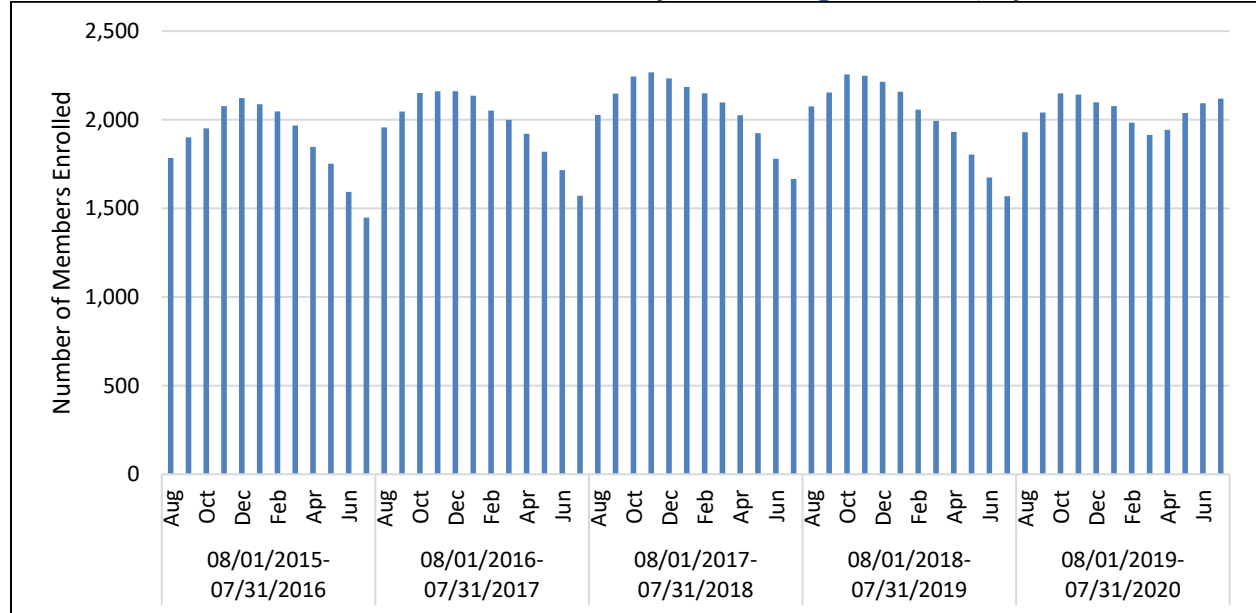
In the most recent demonstration year, there were 2,938 unduplicated pregnant women enrolled. Since 2015, monthly enrollment of pregnant women and births has trended upward as found in Exhibits I.2 and I.3.

**Exhibit I.2. CHP+ Number of Women Enrolled in Prenatal Demonstration, August 2015 – July 2020**



Source: CHP+ Client Data

**Exhibit I.3. CHP+ Number of Births Enrollment by Month, August 2015 – July 2020**

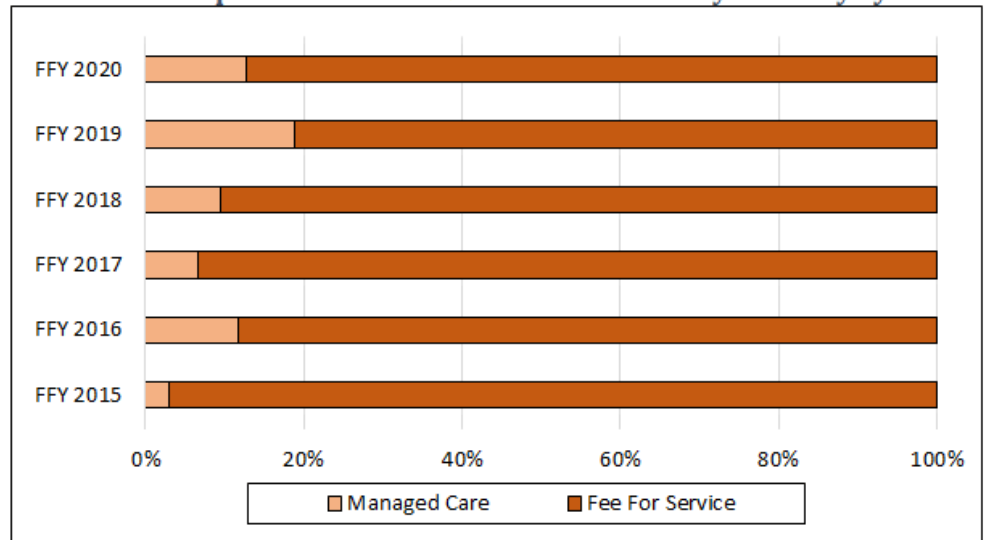


Source: CHP+ Client Data

CHP+ enrollees are entitled to receive all mandatory and optional state plan services approved under the Medicaid state plan. Services are provided through a combination of fee-for-service (FFS) and managed care delivery systems that vary geographically.

During this same time, the majority of Colorado’s CHP+ demonstration expenditures were for care provided through the FFS delivery system, although the proportion of payments to managed care plans is increasing over time (refer to Exhibit I.4).

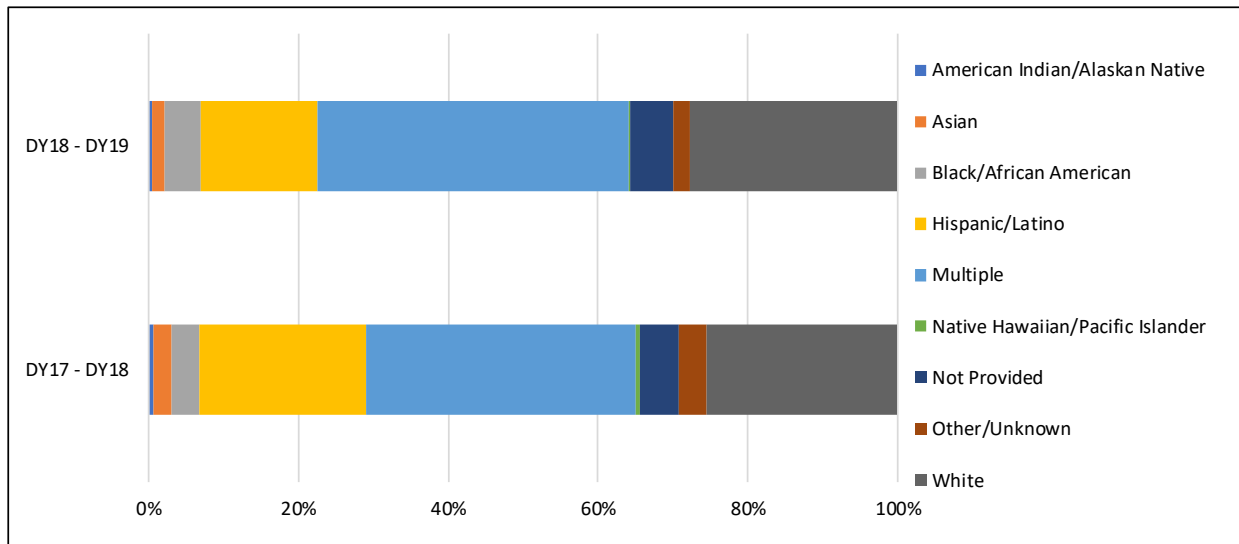
**Exhibit I.4. Expenditures in CHP+ Demonstration by Delivery System**



Source: CO CHP+ Allotment Neutrality Report

Of those members enrolled in the demonstration from 2018 to 2019, the most predominant race/ethnicity reported was multiple (41.6% of the total), followed by White (27.7%), Hispanic/Latino (15.5%), Black/African American (4.8%), Asian (1.7%), American Indian/Alaskan Native (0.4%) and Native Hawaiian/Pacific Islander (0.2%), and other/unknown or not provided (8.1%) (refer to Exhibit I.5 on the following page).

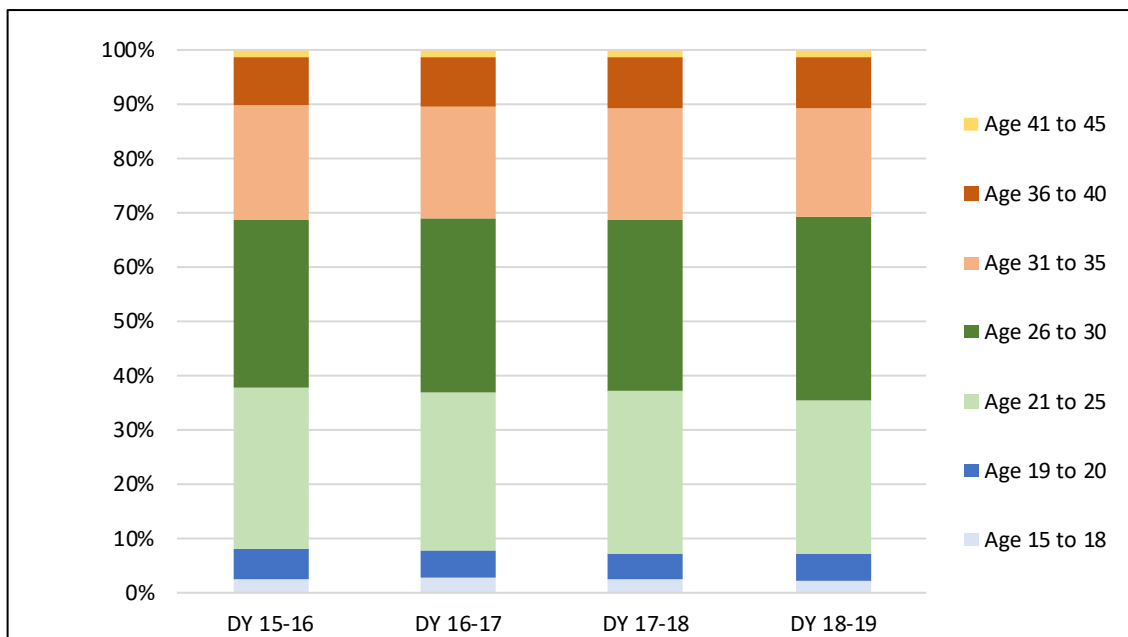
Exhibit I.5. Demonstration Population by Race/Ethnicity



Source: CO CHP+ Client Data

Exhibit I.6 distributes enrollment in the demonstration by the age of the members. Just over 60 percent of the women enrolled are between the ages of 21 and 30 (green portions of exhibit).

Exhibit I.6. Demonstration Population by Age Group



Source: CO CHP+ Client Data

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**Evaluation Design Plan for Colorado’s CHP+ 1115 Demonstration Waiver**

## SECTION II: EVALUATION QUESTIONS AND HYPOTHESES

### II.A Defining Relationships: Waiver Policy, Short-term and Longer-term Outcomes

As part of the examination of the relationships between demonstration goals and the maturity of evaluating a long-term demonstration, the evaluation team at Burns & Associates, a Division of Health Management Associates (HMA-Burns) constructed logic models delineating short-term and longer-term outcomes associated with the three principle policy objectives of the demonstration.

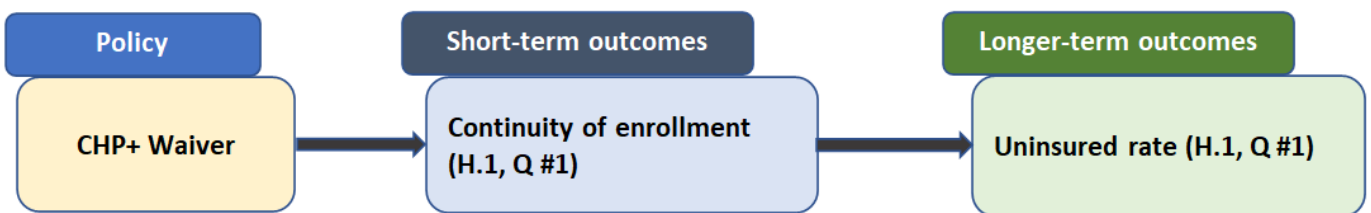
1. Maintain Continuity of Enrollment,
2. Maintain Access to Care, and
3. Maintain or Improve Health Outcomes

The determination of whether an outcome is short-term or longer-term is dependent on the measure specifications, including measurement period, and the data needed to adequately assess trends with the waiver policy. For example, because national outcome measures tend to have annual measurement periods, they are considered in this evaluation to be longer-term indicators of policy outcomes. Each of the three principle policy objectives are described in detail below and include logic models to illustrate both short-term and longer-term outcomes. Each logic model also provides a reference to specific hypotheses and research questions that will be described in Section II.B.

#### Maintain Continuity of Enrollment

HMA-Burns chose Maintain Continuity of Enrollment as the first policy objective as it is responsive to Waiver Goal #1, decreasing the rate of pregnant women who do not have insurance. Exhibit II.1 illustrates the baseline assumption that continuing the demonstration will not have an adverse impact on trends in the continuity of CHP+ enrollment in the short term. On a longer-term basis, the assumption is that trends in prenatal care paid by some type of insurance will not worsen over the course of the demonstration. Both process and outcome measures are proposed to assess impact.

#### **Exhibit II.1. Logic Model 1: Maintain Continuity of Enrollment**



#### Maintain Access to Care

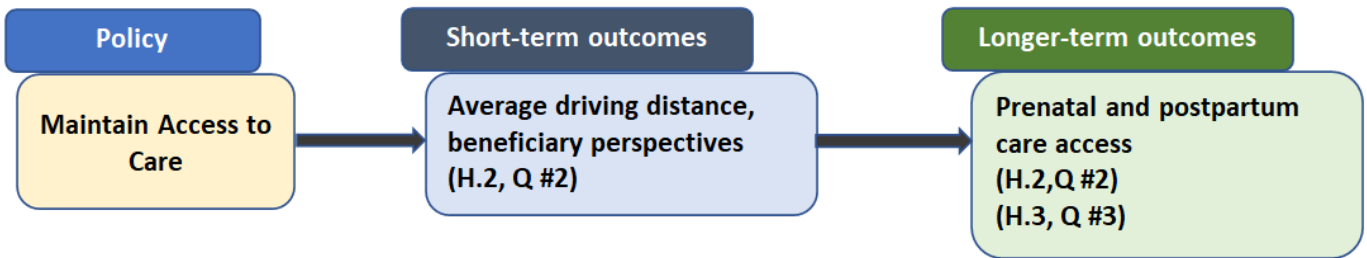
Maintain Access to Care is the second policy objective and it is based on Waiver Goal #2, increase in prenatal and postpartum care during the demonstration. Exhibit II.2 on the following page illustrates the assumption that trends in access to care sustain or do not worsen. HMA-Burns is proposing to use outcome measures to assess trends in access to care. In the short term, trends in average driving

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**Evaluation Design Plan for Colorado’s CHP+ 1115 Demonstration Waiver**

distance to prenatal care services and beneficiary perspectives on lived experiences of maternity care will be assessed. To evaluate access to care on a longer-term basis, HMA-Burns is proposing to use established outcome measures of access and utilization.

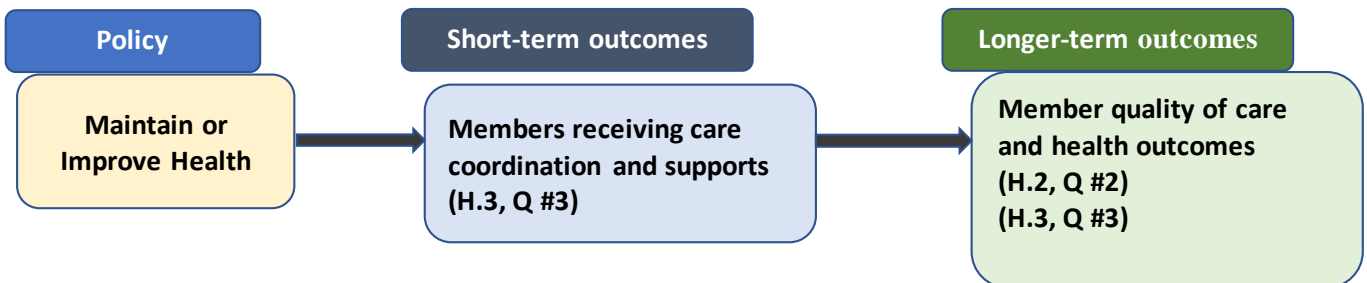
**Exhibit II.2. Logic Model 2: Maintain or Improve Access**



Maintain or Improve Health Outcomes

The third policy objective is Maintain or Improve Health Outcomes and it encompasses Waiver Goal #3, increase in the number of healthy babies born to pregnant women enrolled in the demonstration. Exhibit II.3 illustrates the assumption that CHP+ beneficiaries enrolled in the demonstration will maintain or improve health outcomes. In the short term, a process measure will measure access to care coordination and supports. On a longer-term basis, national health outcome metrics and HMA-Burns customized process measures focusing on care coordination will complete the assessment of the third principle policy objective.

**Exhibit II.3. Logic Model 3: Maintain or Improve Health Outcomes**



HMA-Burns found that there are existing, nationally-recognized outcome measures associated with principle policy objectives two and three. The specifications and data sources for many of these were already described as part of Colorado CHP+’s Quality Strategy. In addition to using nationally recognized outcome measures, HMA-Burns will fill gaps with custom measures developed by us where needed.

A more detailed description of the data, measures, and analyses to be used are described in Section III of the Evaluation Design document.

**II.B Hypotheses and Research Questions**

The three principle policy areas depicted in the logic models in Section II.A were converted into four hypotheses (H) and four research questions (Q). Each research question has assigned measures and a targeted analytic methodology which is described in detail in Section III. Methodology. Exhibit II.4

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provides a high-level overview of each hypothesis and the associated research question. In most cases, the research question assesses impact on both a short- and longer-term basis, except for Q #4 which has measures that only assess longer-term impact.

#### Exhibit II.4. Hypotheses and Research Questions

Hypothesis	Research Question	Outcomes	
		Short-term	Longer-term
<b>H.1: Trends in continuity of enrollment in the demonstration sustains (or do not worsen) for pregnant women in the current waiver period.</b>			
	Q #1: <i>Does the waiver improve or maintain the uninsured rate of pregnant women in Colorado during the demonstration period?</i>	X	X
<b>H.2: Trends observed in access to health care for pregnant women sustains (or does not worsen) in the current waiver period.</b>			
	Q #2: <i>Do CHP+ members achieve similar (or improved) access and health outcomes in the current waiver period?</i>	X	X
<b>H.3: Trends observed in the health of the mother sustains (or does not worsen) in the current waiver period.</b>			
	Q #3: <i>Do CHP+ members achieve similar (or improved) pregnancy and postpartum outcomes in the current waiver period?</i>	X	X
<b>H.4: Trends observed in the number of healthy babies (i.e., over 2500 grams) sustains (or does not worsen) in the current waiver period.</b>			
	Q #4: <i>Do CHP+ members achieve similar (or improved) birth outcomes in the current waiver period?</i>		X

#### II.C Alignment with Demonstration Goals

Building upon the matrix shown in Section II.B, each hypothesis was cross-referenced to demonstration goals. This was to ensure that the evaluation hypotheses and research questions are responsive to the CMS guidance in the approved waiver STCs. As demonstrated in Exhibit II.5 on the next page, each hypothesis addresses at least one demonstration goal and, in one case crosses two goals.

**Exhibit II.5. Alignment of Hypotheses with Demonstration Goals**

		Hypotheses			
		H.1	H.2	H.3	H.4
		Continuity of Enrollment	Access to Health Care	Outcomes for Mother	Outcomes for Baby
<b>Waiver Goals</b>					
G.1	Decrease the uninsurance rate for pregnant women	X			
G.2	Increase prenatal and postpartum care for pregnant women enrolled in the demonstration		X		
G.3	Increase the number of healthy babies born to pregnant women enrolled in the demonstration			X	X

**II.D How Hypotheses and Research Questions Promote Objectives of Titles XIX and XXI**

The Evaluation Design Plan hypotheses were also cross referenced with the objectives of the CHP+ program<sup>4</sup> to ensure that the plan promotes the objectives of Titles XIX and XXI of the Social Security Act as required in Attachment A of the approved waiver STCs. Each hypothesis supports the principle objective to improve access to services that promote positive health outcomes. In the case of CHP+, the demonstration provides access to health care services for pregnant women and their newborns who otherwise would not qualify for these services.

<sup>4</sup>Accessed at: <https://www.medicaid.gov/medicaid/section-1115-demonstrations/about-section-1115-demonstrations/index.html>

## SECTION III: METHODOLOGY

### III.A Evaluation Design

The evaluation design is a mixed-methods approach, drawing from a range of data sources, measures and analytics to best produce relevant and actionable study findings. HMA-Burns tailored the approach for each of the research questions described in Section II, Evaluation Questions and Hypotheses. The evaluation plan reflects a range of data sources, measures and perspectives. It also defines the most appropriate study population and sub-populations, as well as describes the analytic methods included in the evaluation design.

The analytic methods proposed for use across the four hypotheses and four research questions include the following:

1. Descriptive statistics (DS),
2. Statistical tests (ST),
3. Desk reviews (DR), and
4. Facilitated interviews (FI).

Exhibit III.1 below presents a chart displaying which method(s) are used for each hypothesis. It also includes a brief description of the indicated methods as well as the sources of data on which they rely.

#### Exhibit III.1. Summary of Four Analytic Methods by Hypothesis

	Hypothesis Description	Method				Analytic Method Examples
		DS	ST	DR	FI	
1	Trends in continuity of enrollment in the demonstration sustains (or does not worsen) for pregnant women in the current waiver period.	X		X		<b>DS:</b> trends in frequencies and percentages of enrollment duration and insurance status stratified by subpopulations of interest. <u>Data sources:</u> enrollment and CO PRAMS data.
2	Trends observed in access to health care for pregnant women sustains (or does not worsen) in the current waiver period.	X	X	X	X	<b>DS:</b> trends in frequencies and percentages. <b>ST:</b> chi square or t-tests of significance; ITS. <b>DR/FI:</b> Prenatal Care focus study (2 rounds). <u>Data sources:</u> claims data and enrollment data, beneficiary interviews.
3	Trends observed in the health of the mother sustains (or does not worsen) in the current waiver period.	X	X	X	X	<b>DS:</b> trends in frequencies and percentages. <b>ST:</b> chi square or t-tests of significance; interrupted time series. <b>DR/FI:</b> Prenatal Care focus study (2 rounds). <u>Data sources:</u> claims and enrollment data, reports submitted by MCOs/RAEs validated by HMA-Burns.
4	Trends observed in the number of healthy babies (over 2500 grams) sustains (or does not worsen) in the current waiver period.	X	X	X		<b>DS:</b> trends in frequencies and percentages. <b>ST:</b> chi square or t-tests of significance; interrupted time series. <u>Data sources:</u> claims and enrollment data, state vital records, and CoHID.

DS = Descriptive Statistics; ST = Statistical Tests; DR = Desk Reviews; FI = Facilitated Interviews

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As described in Section II.A, the majority of the hypotheses and associated research questions focus on whether the 1115 Demonstration made an impact on key CHP+ waiver goals (i.e., short-term and longer-term outcomes). In order to facilitate evaluation on whether a statistically significant difference between the pre-waiver and current waiver period can be detected, the data, measures and methods for these research questions will be tested using healthcare claims, member enrollment data, managed care organization (MCO) or regional accountable entity (RAE) report submissions, and provider enrollment data. The proposed metrics blend nationally-recognized measure specifications with custom metrics developed by HMA-Burns (where national metrics are unavailable). Analytic methods include interrupted time series (ITS) and descriptive statistics using chi-square tests or t-tests as applicable.

The focus shifts to assessing member perception of access to insurance, and quality. Given that these require information beyond what is available in claims or other public data sets, this section draws upon a set of mixed methods to evaluate progress. Where possible, measures will be incorporated into a reporting dashboard that tracks results from the pre-waiver period and the waiver-to-date period. Wherever possible, data will be tracked and reported on a quarterly basis.

## III.B Target and Comparison Populations

### Target Population

The target population is any Colorado CHP+ beneficiary enrolled in the demonstration in the study period. HMA-Burns will use Section III in the approved waiver STCs as the basis for identification of beneficiaries enrolled in the demonstration. HMA-Burns will create flags to identify CHP+ members and providers that will be part of the analytics. Flags will be assigned to attribute individuals to each sub-population group which includes, but is not limited to:

- MCO or RAE enrolled with
- Member race and ethnicity
- New member enrollment due to COVID
- Birthweight of newborn
- Member age (for specified age groups)
- Member home location (e.g., city/county/region)
- Substance Use Disorder

There will also be flags assigned to providers. The provider type and specialty will be tracked. HMA-Burns will use these indicators and create other flags that may require the joining of existing variables to assign providers by:

- Regional location
- Level of care
- Newly-enrolled and long-standing enrolled providers

The matrices included in Section III.G identify the target population and stratification proposed for each hypothesis and research question.

### Comparison Groups

Two ideal comparison groups described in the CMS technical advisory guidance on selection of comparison groups include another state CHIP population and/or prospectively collected information

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### Evaluation Design Plan for Colorado's CHP+ 1115 Demonstration Waiver

prior to the start of the intervention.<sup>5</sup> Specifically, a CHP+ population with similar demographics but in another state without those waiver flexibilities described in Colorado would be an ideal comparator. However, identifying whether such a state exists or the ability to obtain data from another state given the sensitivity of privacy concerns as it relates to data sharing is not feasible; therefore, it is outside the scope of this evaluation.

The other example of a control group described in the design guide is to collect prospective data. To our knowledge, there is no known prospective data collection on which to build baselines. Given the lack of an available and appropriate comparison group, HMA-Burns will use an analytic method which creates a pre-waiver and current waiver (intervention) group upon which to compare outcomes. See Section III.F for more details on the analytic methods.

Available results from CMS's Core Set of Health Care Quality Measures for Children in Medicaid and CHIP and the Initial Core Set of Health Care Quality Measures for Medicaid-Eligible Adults will be used as a benchmark comparator for those nationally-recognized metrics included in the evaluation design. Results of these measures are reported at a statewide level by CHIP program, as well as national values. In this case, comparator states will be identified and included, along with national values, within the Summative Evaluation. Comparator states will be chosen in consultation with the State, CMS and other stakeholders. For non-Core measures that align with Colorado Medicaid goals and initiatives for pregnant women, HMA-Burns will compute a benchmark using Colorado Medicaid as the comparator population. For average driving distance, HMA-Burns will use Colorado Medicaid and CHIP managed care organization, and Accountable Care Collaborative RAE distance standards to benchmark access.

### III.C Evaluation Period

A pre-waiver and current waiver period will be defined as three calendar years before and five calendar years after waiver implementation. The pre-waiver period is defined as enrollment or dates of service from August 1, 2017 through December 17, 2020. The current waiver period is defined as enrollment or dates of service from December 18, 2020 through July 31, 2025. In support of the analytic methods described in Section III.F, the calendar year data will be further defined into both monthly and quarterly segments such that both the pre-periods will include 12 quarters or 36 months from the pre-waiver period, and 20 quarters or 60 months from the current waiver period.

To simplify the analytic plan, HMA-Burns is making an assumption about the first six months of 2020 prior to the current waiver being approved. For annual measures in which a national steward has defined measure specifications, HMA-Burns will consider August 1, 2019 to July 31, 2020 in the period prior to the current approved demonstration that became effective December 18, 2020. Although CMS approved Colorado's 1115 waiver in December 2020, waiver-related activities were moving forward in anticipation of approval of the extension throughout 2020. For ease of conducting and describing the analysis, the evaluation period will be defined as follows:

- For monthly and quarterly metrics, the six months in the 2020 calendar year prior to December 18, 2020 approval will be defined as the current waiver period (not the pre-waiver period).

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<sup>5</sup> Comparison Group Evaluation Design. <https://www.medicaid.gov/medicaid/section-1115-demo/downloads/evaluation-reports/comparison-grp-eval-dsgn.pdf>.

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- For annual metrics, August 1, 2020 through July 31, 2025 will be considered the demonstration period.

It should be noted that, while this is the expected current evaluation period, modifications may be warranted to better reflect differences in the time period upon which one would expect to see a change in outcomes resulting from waiver activities. At this time, there was little data or similar studies available on which to base specific alternatives to the proposed current evaluation period. HMA-Burns, therefore, will examine time series data in order to identify whether the current evaluation period should be delayed. For example, if review of the data shows a distinctive change in the first and second quarter of 2021, then the current period would be adjusted such that the third and fourth quarter data would not be considered in the interrupted time series analysis described in Section III.F.

**III.D Evaluation Measures**

The measures included in the Evaluation Design Plan directly relate to the three principle policy objectives and short-term and longer-term outcomes described in Section II.

The measures fall into two primary domains: quality and access. Exhibit III.2 summarizes the list of measures included in the evaluation plan. A comprehensive summary of measures, which includes measure stewards as well as a description of numerators and denominators, can be found in the detailed matrices in Section III.G. Where possible, measure results will be stratified by race, ethnicity and region.

**III.E Data Sources**

As described in Section III.A, Evaluation Design, HMA-Burns will use existing secondary data sources as well as collect primary data. The evaluation design relies most heavily on the use of Colorado CHP+ administrative data, i.e., enrollment, claims and encounter data.

Supplemental administrative data, such as survey data, will also be incorporated. Primary data will be limited and will include data created by desk review and facilitated interview instruments. A brief description of these data and their strengths and weaknesses follow.

**Colorado CHP+ Administrative Data**

Claims and encounters with dates of service (DOS) from August 1, 2017 and ongoing will be collected from the Colorado Medicaid Management Information System (MMIS) Data Warehouse (EDW), facilitated by HCPF’s MMIS vendor, Gainwell (formerly DXC) Technologies and IBM Corporation (formerly Truven Health Analytics) Business Intelligence Data Management (BIDM). A data request specific to the 1115 Evaluation Design Plan will be given to HCPF and the data will be delivered to the evaluators in an agreed-upon format. The initial EDW data set will include historical data up to the point of the delivery date. Subsequent data will be sent to HMA-Burns on a periodic basis. The last query of

**Exhibit III.2. Evaluation Measures by Domain**

<b>Quality</b>
<ul style="list-style-type: none"><li>• Timeliness of Prenatal Care (PPC)</li><li>• Postpartum Care (PPC)</li><li>• Utilization of emergency department among PPC population</li><li>• At risk of poor maternal and/or infant health outcome</li><li>• Percentage of women who follow ACOG guidelines</li><li>• Proportion of at-risk deliveries</li><li>• Live births weighing less than 2,500 grams</li><li>• Well-child visits in the first 15 months of life</li></ul>
<b>Access</b>
<ul style="list-style-type: none"><li>• Utilization of prenatal care services per 1000 members</li><li>• Average driving distance to prenatal care services</li><li>• Proportion of enrollees continuously enrolled in CHP+</li><li>• Enrollment duration during pregnancy</li><li>• Prenatal care paid by type of insurance</li><li>• Proportion of PPC women, prenatal, using emergency department</li><li>• Proportion of PPC women, postpartum, using emergency department</li><li>• Beneficiary perspectives on lived experiences of maternity care</li></ul>

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the EDW will occur on August 1, 2026 for claims with DOS in the study period. All data delivered to HMA-Burns from the HCPF will come directly from the EDW, including Vital Statistics data matched to CHP+ enrollees. HMA-Burns will leverage all data validation techniques used by Gainwell before the data is submitted to the EDW. HMA-Burns will also conduct its own validations upon receipt of each monthly file from the HCPF to ensure accuracy and completeness when creating our multi-year historical database.

When additional data is deemed necessary for the evaluation, HMA-Burns will outreach directly to the MCOs and/or RAEs when they are determined to be the primary source. HMA-Burns will build data validation techniques specific to the ad hoc requests from the MCOs and/or RAEs.

Additional data from the MCOs and/or RAEs and the State will be collected on care coordination activities. There could be some data validity or quality issues with these sources as they are not as rigorously collected as claims and encounters data. That being said, we will use a standard quality review and data cleaning protocol in order to validate these data, as well as provide detailed specifications and reporting tools to the MCOs, RAEs and the State to minimize potential for differences in reporting of the requested ad-hoc data.

#### **Survey and Facilitated Interview Data**

##### **Colorado Pregnancy Risk Assessment Monitoring System (PRAMS)<sup>6</sup>**

The Colorado Pregnancy Risk Assessment and Monitoring System (PRAMS) is a survey of women to assess their experiences before, during and after pregnancy and includes CHP+ beneficiaries. Data is reported for women and infants at a granular level including, but not limited to, demographics and insurance status, including CHP+, Medicaid, commercial insurance and uninsured breakouts. The data will be used to review for descriptive trends over time of the percent of Colorado women who report being uninsured prior to, during, and after their pregnancy.

##### **Facilitated Interview Guides**

The evaluation team will construct facilitated interview guide instruments as a means to collect primary data for the prenatal care focus study. The instruments will be provided to CMS for their feedback in advance of fielding. The types of respondents that the evaluators propose to interview are identified at the metric level in Section III. G. Respondents will include beneficiaries, the MCOs and RAEs. Beneficiary perspectives will be gathered using Colorado's Maternity Advisory Council, which leverages the lived experiences of maternity care to inform existing and emerging policy and is comprised primarily of Black, Indigenous and People of Color.<sup>7</sup> Where focused interviews are used to collect data, B&A will use semi-structured interview protocols that are intended to be standardized within the population being interviewed. Although semi-structured in nature, each stakeholder will have the opportunity to convey additional information that he/she would like to convey to the evaluators in an open-ended format at the conclusion of each interview.

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<sup>6</sup> Accessed at <https://cdphe.colorado.gov/center-for-health-and-environmental-data/survey-research/pregnancy-risk-assessment-monitoring>

<sup>7</sup> Accessed at <https://hcpf.colorado.gov/maternity-advisory-committee>

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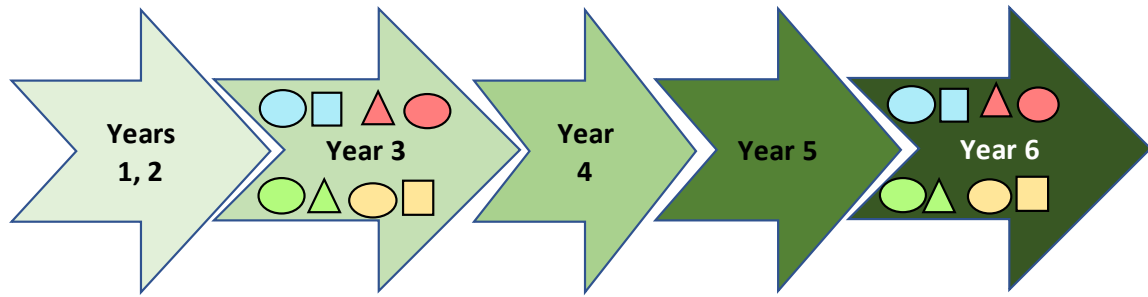
Whereas the Colorado CHP+ administrative data will be collected and used on a monthly basis throughout the waiver period and after the waiver concludes to produce the Summative Evaluation, HMA-Burns anticipates that data from our sources will be collected in CY 2023 and CY 2025 for use in evaluation activities. Exhibit III.3 that appears on the next page contains the proposed primary data collection activities by source, year, and hypotheses. Exhibit III.4 that appears on page III-7 demonstrates the proposed primary data collection timeline by type, year, and hypotheses.

**Exhibit III.3. Proposed Primary Data Collection Activities, by Source, Year and Hypotheses**

	Source	Desk Review			Facilitated Interviews / Focus Groups			
		MCOs RAEs	Other State Partners	State Agencies	Members	Other State Partners	State Agencies	MCOs RAEs
<b>Hypotheses</b>	<b>Contract Year 1&amp;2, CYs 2021-2022</b>							
	All Hypotheses			X				
	<b>Contract Year 3, CY 2023</b>							
	1 Continuity of Enrollment		X	X	X			
	2 Trends in Access to Care			X	X			
	3 Trends in Outcomes for Mother	X		X			X	X
	4 Trends in Outcomes for Baby	X	X	X		X	X	X
	<b>Contract Year 4, CY 2024</b>							
	All Hypotheses			X				
	<b>Contract Year 5, CY 2025</b>							
	All Hypotheses			X				
	<b>Contract Year 6, CY 2026</b>							
	1 Continuity of Enrollment		X	X	X			
	2 Trends in Access to Care			X	X			
	3 Trends in Outcomes for Mother	X		X			X	X
	4 Trends in Outcomes for Baby	X	X	X		X	X	X

\* Years shown correspond to Independent Evaluator contract years. Note: Presently, the State only has the authority to contract with HMA-Burns through December 31, 2022. There are deliverables due to CMS after this period reflected above.

Exhibit III.4. Proposed Primary Data Collection Timeline, by Type, Year and Hypotheses



Hypotheses

- 1 Continuity of Enrollment
- 2 Trends in Access to Care
- 3 Trends in in Outcomes for Mother
- 4 Trends in Trends in Outcomes for Baby



Methods

- Desk Review
- △ Member Survey
- Facilitated Interview/Focus Group

Evaluator contract years. Note: Presently, the State only has the authority to contract with HMA-Burns through 12/31/22. There are deliverables due to CMS after this period which are reflected in this timeline.

### III.F Analytic Methods

Exhibit III.1 depicted the analytic methods to be used in the analysis. A detailed discussion of each method is described below. This includes, where applicable, HMA-Burns' approach to address the impact of the COVID-19 pandemic within each method.

#### Method #1: Descriptive Statistics

In order to facilitate ongoing monitoring, all measures will be summarized on an ongoing basis over the course of the waiver. The descriptive statistics will be stratified by MCO, RAE and FFS delivery systems, and/or by region where possible. For reporting purposes, the descriptive studies will be subject to determination of a minimum number of beneficiaries in an individual reported cell (i.e., minimum cell size) and subject to blinding if the number falls below this threshold. While a conventional threshold is 10 or fewer observations, given the sensitivity of the small population size and the public dissemination of report findings, a higher threshold may be established by the evaluators upon review of the final data.

Results will primarily be reported in terms of longitudinal descriptive statistics of defined groups of beneficiaries and using regional maps where possible.

#### **COVID-19 Considerations**

For metrics where descriptive trends is the appropriate methodology, the evaluators propose to include a marker of pre- and post- COVID overlaid onto any graphs so one can visually inspect if there is an obvious change in the particular outcome starting mid-2020 and adding a comparator group.

In both cases, newly eligible members who became CHP+ eligible as a result of COVID will be identified and treated as a subpopulation in the analysis. This will allow the evaluators to continue to include those newly eligible members for which enrollment is unrelated to the pandemic.

#### **Method 2: Statistical Tests**

##### *T-test or Chi-square test*

Tests will be used to determine whether the observed differences in the mean value or rate differs for the most recent evaluation two-year period compared to the two-year period prior to waiver implementation. To assess if results for each metric compared to the pre-waiver timeframe are not due to chance alone, the evaluators will use chi-square tests for categorical data and t-tests for continuous data. Testing of the assumptions of normality and adjustments will be made before performing the final statistics and discussed below.

#### **COVID-19 Considerations**

For those metrics where simple statistics (chi square or t-test) is the appropriate quantitative methodology, the evaluators propose testing two separate post years to baseline to estimate the treatment effects before, during and after the pandemic. In both cases, members who became newly-

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### Evaluation Design Plan for Colorado's CHP+ 1115 Demonstration Waiver

eligible for CHP+ as a result of COVID will be identified and treated as a subpopulation in the analysis. By doing this, HMA-Burns will be able to continue to include other newly-eligible members for which enrollment in CHP+ is unrelated to the pandemic.

#### *T-test*

The t-test is a type of inferential statistics. It is used to determine whether there is a significant difference between the means of two groups. Conceptually, it represents how many standardized units of the means of the pre- and post- populations differ. There are generally five factors to contribute to whether a statistically significant difference between the pre- and post-periods will be considered significant:<sup>8</sup>

1. How large is the difference? The larger the difference, the greater the likelihood that a statistically significant mean difference exists, and confidence increased.
2. How much overlap is there between the groups? The smaller the variances between the two groups, the greater probability a difference exists, hence increasing confidence in results.
3. How many subjects are in the two samples? The larger the sample size, the more stable and hence, confidence in results.
4. What alpha level is being used to test the mean difference? It is much harder to find differences between groups when you are only willing to have your results occur by chance 1 out of 100 times ( $p < .01$ ) as compared to 5 out of 100 times ( $p < .05$ ) but confidence in results is less.
5. Is a directional (one-tailed) or non-directional (two-tailed) hypothesis being tested? Other factors being equal, smaller mean differences result in statistical significance with a directional hypothesis so less confidence can be assigned to the results.

The assumptions underlying the t-test include:

- The samples have been randomly drawn from their respective population.
- The scores in the population are normally distributed.
- The scores in the populations have the same variance ( $s_1=s_2$ ). A different calculation for the standard error may be used if they are not.

There are two types of errors associated with the t-test:

- Type I error —whereby the evaluator would detect a difference between the groups when there really was not a difference. The probability of making a Type I error is the chosen alpha level; therefore, an alpha level at  $p < .05$ , results in a 5% chance that you will make a Type I error.
- Type II error —whereby the evaluator detects no difference between the groups when there really was one.

The evaluators will consider results significant at a level of probability of  $p < .05$ . A test statistic will be generated in the SAS© statistical program. Assumptions will be tested and addressed if detected,

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<sup>8</sup> T-test. <https://researchbasics.education.uconn.edu/t-test/#>. Accessed May 14, 2020.

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including tests of normality and variance in the pre- and post- data. Metrics which are continuous will be tested using a t-test. The lowest level of reliable granularity available and reliability will be used for conducting tests (i.e., monthly or quarterly observations instead of annual).

#### *Chi-square test*

A chi-square test may be used in lieu of the t-test for some categorical variables. Chi-square may be preferable to t-test for comparing rates. All  $\chi^2$  tests are two sided.

The chi-square test for goodness of fit determines how well the frequency distribution from that sample fits the model distribution. For each categorical outcome tested, the frequency of patients in the pre- and post-period would be tested. The chi-square test for goodness of fit would determine if the observed frequencies were different than expected; in other words, whether the difference in the pre- and post-outcomes were significantly different statistically than what would have been expected given the pre-period. The null hypothesis, therefore, is that the expected frequency distribution of all wards is the same. Rejecting the null would indicate the differences were statistically significant (i.e., exceeded difference more than would be expected at a given confidence level).

The chi-square formula is:  $\chi^2 = \sum_{i=1}^k (O^i - E^i)^2 / E^i$

The assumptions of the chi-square are:

- Simple random sample
- Sample size. Small samples subject to Type II error.
- Expected cell count. Recommended 5-10 expected counts.
- Independence. Evaluation of the appropriateness of a McNemar's test may be warranted.

The evaluators will consider results significant at a level of probability of  $p < .05$ . A test statistic will be generated in the SAS® statistical program. Annually-reported categorical metrics for chi-square testing will either be derived from pooled population data (i.e., create one rate in pooled years of pre- and post-data) or two calendar year time periods (i.e., compare last year pre-waiver to last year post-waiver). Final approach will be determined upon examination of the data.

#### *Interrupted Time Series (ITS)*

Interrupted time series (ITS) is a quasi-experimental method used to evaluate health interventions and policy changes when randomized control trials (RTC) are not feasible or appropriate.<sup>9,10,11</sup> As it would

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<sup>9</sup> Bonell CP, Hargreaves J, Cousens S et al. Alternatives to randomisation in the evaluation of public health interventions: Design challenges and solutions. *J Epidemiol Community Health* 2009;65:582-87.

<sup>10</sup> Victora CG, Habicht J-P, Bryce J. Evidence-based public health: moving beyond randomized trials. *Am J Public Health* 2004;94:400-05.

<sup>11</sup> Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, Spiegelhalter D, et al. . Framework for design and evaluation of complex interventions to improve health. *BMJ* 2000;321:694.

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not be ethical or consistent with CHP+ policy to withhold services resulting from waiver changes from a sub-set of beneficiaries for purposes of evaluation, an RTC is therefore, not possible. Per CMS technical guidance, the ITS is the preferred alternative approach to RTC in the absence of an available, adequate comparison group. The ITS method is particularly suited for interventions introduced at the population level which have a clearly defined time period and targeted health outcomes.<sup>12,13,14</sup>

An ITS analysis relies on a continuous sequence of observations on a population taken at equal intervals over time in which an underlying trend is "interrupted" by an intervention. In this evaluation, the waiver is the intervention, and it occurs at a known point in time. The trend in the post-waiver is compared against the expected trend in the absence of the intervention.

While there are no fixed limits regarding the number of data points because statistical power depends on a number of factors like variability of the data and seasonality, it is likely that a small number of observations paired with small expected effects may be underpowered.<sup>15</sup> The expected change in many outcomes included in the evaluation are likely to be small; therefore, the evaluators will use 72 monthly observations where possible and 24 quarterly observations where monthly data are not deemed reliable.

In order to determine whether monthly or quarterly observations will be created, a reliability threshold of having a denominator of a minimum number of 100 observations at the monthly or quarterly level will be used. If quarterly reporting is not deemed reliable under this threshold, the measure and/or stratification will not be tested using ITS. Instead, these measures will be computed using calendar year data in the pre- and post- period and reported descriptively.

#### *ITS Descriptive Statistics*

All demographic, population flags, and measures will be computed, and basic descriptive statistics will be created: mean, median, minimum, maximum, standard deviation. These data will be inspected for identification of anomalies and trends.

To identify underlying trends, seasonal patterns and outliers, scatter plots of each measure will be created and examined. Moreover, each outcome will undergo bivariate comparisons; a Pearson

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<sup>12</sup> Soumerai SB. How do you know which health care effectiveness research you can trust? A guide to study design for the perplexed. *Prev Chronic Dis* 2015;12:E101.

<sup>13</sup> Wagner AK, Soumerai SB, Zhang F, Ross-Degnan D. Segmented regression analysis of interrupted time series studies in medication use research. *J Clin Pharm Ther* 2002;27:299-309.

<sup>14</sup> James Lopez Bernal, Steven Cummins, Antonio Gasparrini; Interrupted time series regression for the evaluation of public health interventions: a tutorial, *International Journal of Epidemiology*, Volume 46, Issue 1, 1 February 2017, Pages 348–355, <https://doi.org/10.1093/ije/dyw098>

<sup>15</sup> James Lopez Bernal, Steven Cummins, Antonio Gasparrini; Interrupted time series regression for the evaluation of public health interventions: a tutorial, *International Journal of Epidemiology*, Volume 46, Issue 1, 1 February 2017, Pages 348–355, <https://doi.org/10.1093/ije/dyw098>

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correlation coefficient will be produced for each measure compared to the others as well as each measure in the pre- and post- periods.

#### Regression Analysis

Wagner et al. described the single segmented regression equation as<sup>16</sup>:

$$\hat{Y}_t = \beta_0 + \beta_1 * time_t + \beta_2 * intervention_t + \beta_3 * time\_after\_intervention_t + e_t$$

Where:  $Y_t$  is the outcome

*time* indicates the number of months or quarters from the start of the series

*intervention* is a dummy variable taking the values 0 in the pre-intervention segment and 1 in the post-intervention segment

*time\_after\_intervention* is 0 in the pre-intervention segment and counts the quarters in the post-intervention segment at time  $t$

$\beta_0$  estimates the base level of the outcome at the beginning of the series

$\beta_1$  estimates the base trend, i.e., the change in outcome in the pre-intervention segment

$\beta_2$  estimates the change in level from the pre- to post-intervention segment

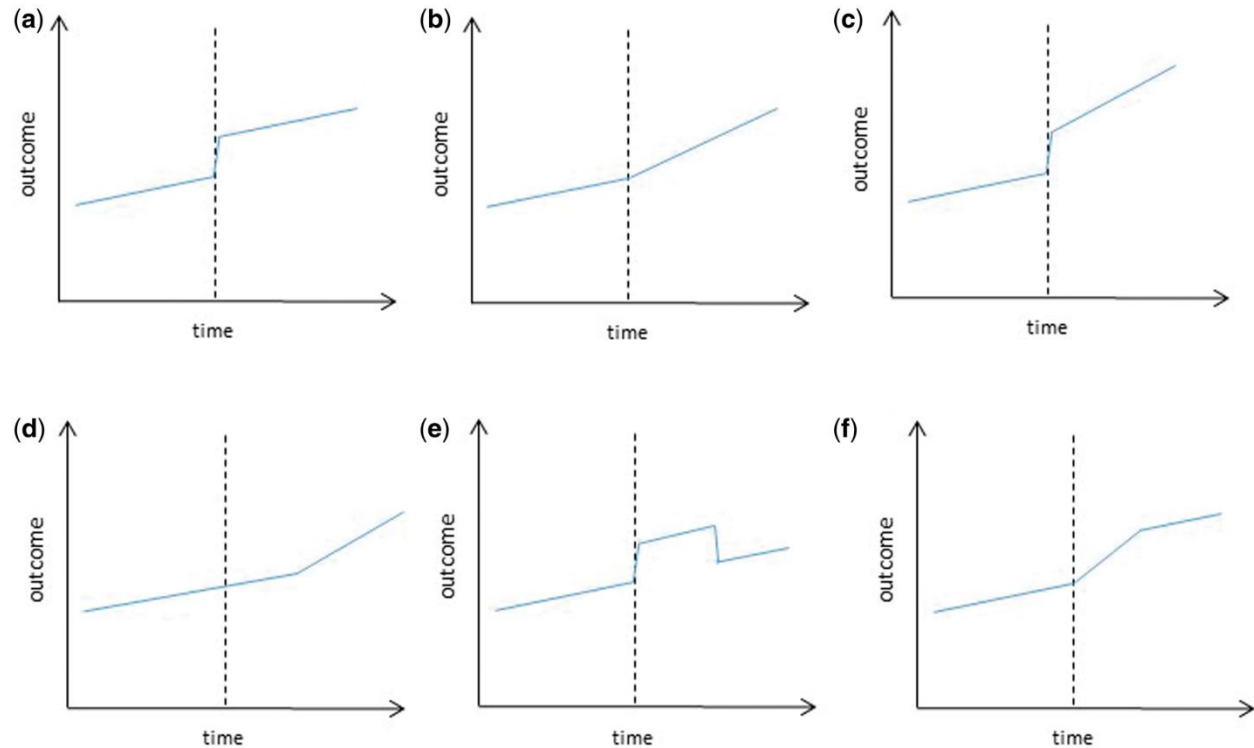
$\beta_3$  estimates the change in trend in the post-intervention segment

$e_t$  estimates the error

Visualization and interpretation will be done as depicted in the Exhibit III.5. Each outcome will be assessed for one of the following types of relationships in the pre- and post-waiver period: (a) Level change; (b) Slope change; (c) Level and slope change; (d) Slope change following a lag; (e) Temporary level change; (f) Temporary slope change leading to a level change.

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<sup>16</sup> Wagner AK, Soumerai SB, Zhang F, Ross-Degnan D. Segmented regression analysis of interrupted time series studies in medication use research. *J Clin Pharm Ther* 2002;27:299-309.

Exhibit III.5. Illustration of Potential ITS Relationships<sup>17</sup>*Seasonality and Autocorrelation*

One strength of the ITS approach is that it is less sensitive to typical confounding variables which remain fairly constant, such as population age or socio-economic status, as these change relatively slowly over time. However, ITS may be sensitive to seasonality. To account for seasonality in the data, the same time period, measured in months or quarters, will be used in the pre- and post-waiver period. Should it be necessary, a dummy variable can be added to the model to account for the month or quarter of each observation to control for the seasonal impact.

An assumption of linear regression is that errors are independent. When errors are not independent, as is often the case for time series data, alternative methods may be warranted. To test for the independence, the evaluators will review a residual time series plot and/or autocorrelation plots of the residuals. In addition, a Durbin-Watson test will be constructed to detect the presence of autocorrelation. If the Durbin-Watson test statistic value is well below 1.0 or well above 3.0, there is an indication of serial correlation. If autocorrelation is detected, an autoregressive regression model, like the Cochrane-Orcutt model, will be used in lieu of simple linear regression.

<sup>17</sup> From: Interrupted time series regression for the evaluation of public health interventions: a tutorial  
Int J Epidemiol. 2016;46(1):348-355. doi:10.1093/ije/dyw098. Int J Epidemiol.

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Other assumptions of linear regression are that data are linear and that there is constant variance in the errors versus time. Heteroscedasticity will be diagnosed by examining a plot of residuals versus predicted values. If the points are not symmetrically distributed around a horizontal line, with roughly constant variance, then the data may be nonlinear, and transformation of the dependent variable may be warranted. Heteroscedasticity often arises in time series models due to the effects of inflation and/or real compound growth. Some combination of logging and/or deflating may be necessary to stabilize the variance in this case.

#### *Controls and Stratification*

As described in Section III.B, the regression analysis will be run both on the entire target population and stratified by relevant sub-populations. The sub-population level analysis may reveal waiver effects that would otherwise be masked if only run on the entire population. Similarly, common demographic covariates such as age, gender, and race will be included in these models to the extent they improve the explanatory power of the ITS models.

#### **COVID-19 Considerations**

For those metrics where multivariate analysis is the appropriate quantitative methodology, the evaluators propose to construct a 0/1 dummy variable that indicates if the observations are post-March 2020 until a defined "post" COVID period for use as a control in the regression model. Members who became newly-eligible for CHP+ as a result of COVID will be identified by aid category and benefit plan and treated as a subpopulation in the analysis. This will allow the evaluators to continue to include those newly-eligible members for which enrollment is unrelated to the pandemic (e.g., aged, blind and disabled, pregnant women, newborns).

#### **Method #3: Onsite Reviews**

A limited number of desk reviews will supplement the other study methods included in the evaluation. These reviews will focus on hypotheses which are directed at assessment of process outcomes like avoidance of implementation delays, system changes according to schedules, transparency of policy and rates, and utility of stakeholder tools and analytics. Each desk review will use a questionnaire that asks for the information sought, the documentation reviewed, and the finding. Any gaps in information will also be noted as findings. The evaluators will review publicly-available information and/or documentation specifically requested from the HCPF and/or the MCOs and RAEs.

#### **Method #4 Facilitated and/or Focus Group Interviews**

As needed, the evaluators will construct facilitated interview guide instruments as a means to collect primary data for the focus studies. Intended respondents will include the MCOs, the RAEs, and beneficiaries eligible under this waiver demonstration. Where focused interviews are used to collect data, the evaluators will use semi-structured interview protocols that are intended to be standardized within the population being interviewed. The interview protocols will vary, however, for each population interviewed due to the type of information that is intended to be collected. Although semi-

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structured in nature, each stakeholder will have the opportunity to convey additional information that he/she would like to convey to the evaluators in an open-ended format at the conclusion of each interview.

HMA-Burns will ensure that, for each population that interviews are conducted, there is sufficient representation within the population among those being surveyed. Sampling may be completed by using geographic location, provider size (large and small), and beneficiary age, to name a few.

**III.G Other Additions**

Beginning on the next page, Exhibit III.16 provides information on each measure selected for use in the evaluation, by research question and hypothesis.

**Exhibit III.6. Summary of Evaluation Questions, Evaluation Hypotheses, Data Sources, and Analytic Approaches**

Outcome	Measure description	Measure steward, endorsement	Numerator	Denominator	Data source	Analytic approach
<b>Evaluation Question #1: Does the waiver improve or maintain the uninsured rate of pregnant women in Colorado during the demonstration period?</b>						
<b>Demonstration Goal: G.1 Decrease the uninsurance rate for pregnant women.</b>						
<b>Evaluation Hypothesis #1: Trends in continuity of enrollment in the demonstration sustains (or does not worsen) for pregnant women in the current waiver period.</b>						
Short Term (Continuity of Enrollment)	Proportion of enrollees continuously enrolled in CHP+	HMA-Burns	Frequency distribution of enrollees continuously enrolled for the 9 months prior to delivery in the measurement period, stratified subpopulations of interest	Total number of enrollees during the measurement period.	Enrollment data	Descriptive statistics (trends in the proportion of enrollees continuously enrolled by subpopulations of interest)
	Enrollment duration during pregnancy	HMA-Burns	Frequency distribution of CHP+ enrollees by the number of months of eligibility in the measurement period, stratified by aid category and assignment plan.		Enrollment data	Descriptive statistics (trends in enrollment duration by subpopulations of interest)
Long Term (Continuity of Enrollment)	Prenatal care paid by type of insurance	Colorado PRAMS	Weighted percentage of respondents who reported the type of insurance coverage for prenatal care		Colorado PRAMS	Descriptive statistics (trends in Colorado reported percentages over the demonstration period); comparison to baseline period and available national and regional values

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Outcome	Measure description	Measure steward, endorsement	Numerator	Denominator	Data source	Analytic approach
<b>Evaluation Question #2: Do CHP+ members achieve similar (or improved) access and health outcomes in the current waiver period?</b>						
<b>Demonstration Goal: G.2 Increase prenatal and postpartum care for pregnant women enrolled in the demonstration.</b>						
<b>Evaluation Hypothesis #2: Trends observed in access to health care for pregnant women sustains (or does not worsen) in the current waiver period.</b>						
Short Term (Access to Care)	Average driving distance to prenatal care services	HMA-Burns	Sum of the driving distances traveled from member home to their prenatal care provider	Sum of the unique trips to the member's prenatal care provider in the year	Claims data	Descriptive statistics (trends in average driving distance stratified by MCO/RAE and region)
	Beneficiary perspectives on lived experiences of maternity care	HMA-Burns	Beneficiary perspectives on lived experiences of maternity care gathered through the Maternity Advisory Council		Facilitated Interview / Focus Group	Descriptive statistics (frequencies and percentages)
Long Term (Access to Care)	Utilization of prenatal care services per 1000	HMA-Burns	Count of prenatal care services in the measurement period for CHP+ enrollees, and overall by sub-populations of interest	Total CHP+ enrollee member months for a 12-month study period (result of this formula expressed as per 1,000 member months)	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation
	Proportion of PPC women using the emergency department	HMA-Burns	Number of PPC Timeliness of prenatal care women who had an emergency department visit during the pregnancy	Number of PPC Timeliness of Prenatal Care members	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation
Long Term (Improved Outcomes)	Prenatal care for pregnant women (PPC): Timeliness of Prenatal Care	NCQA	1. Timeliness of Prenatal Care. Number of women having a prenatal care visit as a member of the organization in the first trimester, on the enrollment start date or w/in 42 days of enrollment in the organization.	1. Timeliness of Prenatal Care. Number of deliveries of live births.	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation

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Outcome	Measure description	Measure steward, endorsement	Numerator	Denominator	Data source	Analytic approach
<b>Evaluation Question #3: Do CHP+ members achieve similar (or improved) pregnancy outcomes in the current waiver period?</b>						
<b>Demonstration Goal: G.3 Increase the number of healthy babies born to pregnant women enrolled in the demonstration</b>						
<b>Evaluation Hypothesis #3: Trends observed in the health of the mother sustains (or does not worsen) in the current waiver period.</b>						
Short Term (Improved Outcomes)	Percentage of women determined to be at risk of poor maternal and/or infant health outcome	HMA-Burns	Count of women determined to be at risk of poor maternal and/or infant health outcome	Count of women screened	MCO/RAE specific report	Descriptive statistics (trends in the proportion of members determined to be at risk by subpopulations of interest)
Long Term (Improved Outcomes)	Percentage of women who follow ACOG guidelines overall and by subpopulation of interest	HMA-Burns	Count of pregnant women who followed ACOG guidelines overall	Number of CHP+ members	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation
	Proportion of at-risk deliveries	HMA-Burns	Number of at-risk deliveries	Number of deliveries of live births	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation
	Prenatal care for pregnant women (PPC): Postpartum Care	NCQA	2. Postpartum Care. Number of women having a postpartum visit on or between 21 and 56 days after delivery.	2. Postpartum Care. Number of deliveries of live births.	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation
Long Term (Access to Care)	Proportion of PPC women using the emergency department	HMA-Burns	Number of PPC Postpartum Care women who had an emergency department visit during the pregnancy	Number of PPC Postpartum Care members	Claims data	Descriptive statistics (frequencies and percentages) stratified by populations of interest; chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation

Outcome	Measure description	Measure steward, endorsement	Numerator	Denominator	Data source	Analytic approach
<b>Evaluation Question #4: Do CHP+ members achieve similar (or improved) birth outcomes in the current waiver period?</b>						
<b>Demonstration Goal: G.3 Increase the number of healthy babies born to pregnant women enrolled in the demonstration</b>						
<b>Evaluation Hypothesis #4: Trends observed in the number of healthy babies (over 2500 grams) sustains (or does not worsen) in the current waiver period.</b>						
Long Term (Improved Outcomes)	Live Births Weighing Less Than 2,500 Grams (LBW-CH)	CDC	Number of babies born low birthweight (less than 2500 grams).		State vital records, CoHID	Descriptive statistics (frequencies and percentages); chi square or t-tests of significance comparing target population to baseline for Interim Evaluation; ITS for Summative Evaluation
	Well-Child Visits in the First 15 Months of Life (W15)	NCQA	Number of children who turned 15 months old during the measurement year who had 6 or more well-child visits with a PCP	Number of children who turned 15 months old during the measurement year.	Claims data	

## **SECTION IV: METHODOLOGICAL LIMITATIONS**

There are inherent limitations to both the study design and its specific application to the 1115 waiver evaluation. That being said, the proposed design is feasible and is a rational explanatory framework for evaluating the impact of the 1115 waiver on the demonstration population. Moreover, to fill gaps left by the limitations of this study design, a limited number of desk reviews and facilitated interviews/focus groups are proposed to provide a more holistic and comprehensive evaluation. Some known limitations are addressed below.

Since Colorado's population will be small compared to other states, some metrics and/or sub-populations may not be meaningful for reporting and there will be a concern about insufficient statistical power to detect a difference. For any observational studies, it may be difficult to find statistically significant results, particularly if the population size is low. We will recommend a threshold for a minimum number of observations. For any measures below this threshold, the expectation of statistical testing would be waived.

While CMS prefers a true comparator group from another state, this would require significantly more resources and cooperation with another state on sharing data. Therefore, HMA-Burns is recommending the use of ITS and descriptive statistics including the use of chi square or t-tests as the starting point in development of the evaluation design. One exception to this would be to use available results from CMS's Core Set of Health Care Quality Measures for Children in Medicaid and CHIP and the Initial Core Set of Health Care Quality Measures for Medicaid-Eligible Adults as a benchmark comparator for nationally recognized metrics included in the evaluation design. While the populations and benefit packages may be similar, there will still be differences from Colorado's demonstration population. In this scenario, HMA-Burns would compare these trends to two other states and national values if desired and if the data is available. The determination of the states to compare to would be done in consultation with the State, CMS and other stakeholders, and will note the limitations associated with the selected benchmarks.

For non-Core measures that align with Colorado Medicaid goals and initiatives for pregnant women, HMA-Burns will compute a benchmark using Colorado Medicaid as the comparator population. Using Medicaid as the comparator has its limitations as the benefit package is identical, with the only difference being the demonstration population has income that is more than 141% to 195% FPL.

For average driving distance, HMA-Burns will use Colorado Medicaid and CHIP managed care organization, and Accountable Care Collaborative RAE distance standards to benchmark access. Using Medicaid, RAE and CHIP distance standards as comparators is limitations as they include a broader population than the demonstration.

Use of Colorado's Maternity Advisory Council to obtain beneficiary perspectives on lived experiences of maternity care offers a unique opportunity to collect qualitative information. However, the council is not specific to the demonstration population and will also include Medicaid beneficiary input. Therefore, it may not be possible to attribute qualitative observations solely to the demonstration population.

The use of Colorado PRAMS data as the source for insurance status was proposed because it is obtained using a standard survey instrument collecting data from pregnant women and includes CHP+ breakouts

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as well as commercial insurance and Medicaid breakouts. While it can provide broad context, there is no ability to link the survey results to demonstration enrollees.

The fact that the 1115 waiver components have been in place during what would be considered the pre-waiver period for evaluation purposes will make identifying any changes in outcomes directly attributable to waiver implementation difficult. Therefore, it is expected that not all outcomes or process measures included in the study will show a demonstrable change descriptively, and in fact may show no change in trends from the prior demonstration period. Where possible, the use of national or benchmark trends may provide context in this instance.

Equally, observed changes in outcome metrics in the current waiver period will be difficult, if not impossible, to attribute to one specific demonstration component given the interrelationship of the components themselves and the longstanding nature of the demonstration. Therefore, it will be important to use statistical tests of significance so that findings are properly put into context.

Related to the issues mentioned above, many of the outcome measures are multi-dimensional and influenced by social determinants of health. In addition, the State has multiple efforts underway to address prenatal care and birth outcomes that may influence the results of the demonstration. While changes under the waiver related to access to care may be one dimension of various outcomes of interest, and may contribute to improvements, it may be difficult to achieve statistically significant findings in the absence of data on other contributing dimensions, such as housing and employment.

Lastly, the evaluators recognize that the utilization patterns that will occur relatively early in this demonstration period will be severely disrupted due to the COVID-19 pandemic. The predictability of future utilization patterns remains uncertain as of the date of this document. The evaluators are prepared to work with CMS in the event that guidance is provided to states for all waiver evaluations as to options that CMS will offer with respect to how to account for the acute period of the pandemic. The initial plan for handling COVID-19 effects are addressed in Section III. Methodology.

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## **ATTACHMENT A: INDEPENDENT EVALUATOR**

### **Process**

Burns & Associates, a division of HMA, (HMA-Burns) submitted a proposal through a competitive bid process to be retained for professional services to facilitate the research and design of the Colorado Adult Prenatal Coverage in CHP+ Section 1115 demonstration evaluation with the Colorado Department of Health Care Policy & Financing (HCPF). The current contract was entered into effective March 1, 2021 with an end date of December 31, 2022.

### **Vendor Qualifications**

Burns & Associates (B&A) was founded in 2006 and was in continual operations until September 1, 2020 when it was acquired by Health Management Associates. The staff at Burns & Associates all migrated to Health Management Associates with this change. The B&A team, now a division of HMA, works almost exclusively with state Medicaid agencies or related social services agencies in state government. The B&A team has worked with 33 state agencies in 26 states. Current team members are also completing Section 1115 waiver evaluations in Delaware and Indiana. For Delaware, the evaluation of its 1115 Diamond State Health Plan Waiver Demonstration Project and its Substance Use Disorder waiver; for Indiana, the evaluation of its 1115 Substance Use Disorder waiver. For all three projects, the B&A team has developed the approved Evaluation Design Plan and completed CMS-approved Interim Evaluation and Mid-Point Assessment reports (in Indiana). B&A has also conducted independent assessments of Indiana's 1915(b) waiver for Hoosier Care Connect and served as the External Quality Review Organization (EQRO) for Indiana from 2007 to 2020.

### **Assuring Independence**

In accordance with standard term and condition Section IX Evaluation of the Demonstration and Attachment A– Developing the Evaluation Design, HMA-Burns attests to having no conflicts to perform the tasks needed to serve as an independent evaluator on this engagement. The HMA-Burns Principal Investigator is prepared to deliver a signed attestation to this effect upon request.



## **ATTACHMENT B: EVALUATION BUDGET**

As part of the procurement process, Burns & Associates, a Division of HMA (HMA-Burns) was required to submit a work plan that presents the level of effort to complete all deliverables associated with the independent evaluation of Colorado's Adult Prenatal Coverage in CHP+ Section 1115 demonstration evaluation. Presently, the State only has the authority to contract with HMA-Burns through December 31, 2022, and there are deliverables due to CMS after December 31, 2022 which are reflected in the Attachment C Timelines and Milestones.

In an effort to show the complete level of effort that would be proposed to complete all deliverables, Exhibit B.1 Proposed Costs for 1115 Waiver Evaluation found on the following page summarizes the total amount to complete all deliverables associated with the independent evaluation due to CMS through January 31, 2027.

**Exhibit B.1 Proposed Costs for 1115 Waiver Evaluation through January 31, 2027**

	<b>Deliverable</b>	<b>Proposed Cost</b>
<b>SFY 21</b>	2019-2020 Annual Monitoring Report	\$30,000
	2020-2022 Project Work Plan	\$3,875
	2020-2025 Evaluation Design	\$15,200
	2020-2025 Final Evaluation Design	\$4,950
<b>SFY 22</b>	2015-2020 Draft Summative Evaluation	\$42,325
	2015-2020 Final Summative Evaluation	\$3,300
	2020-2025 Project Charter	\$2,750
	2020-2021 Annual Monitoring Report	\$28,000
<b>SFY 23</b>	2021-2022 Annual Monitoring Report	\$35,000
<b>SFY 24</b>	2022-2023 Annual Monitoring Report	\$35,000
	2020-2025 Draft Interim Evaluation	\$159,000
<b>SFY 25</b>	2023-2024 Annual Monitoring Report	\$35,000
	2020-2025 Final Interim Evaluation	\$16,000
<b>SFY 26</b>	2024-2025 Annual Monitoring Report	\$35,000
<b>SFY 27</b>	2020-2025 Draft Summative Evaluation	\$180,000
	2020-2025 Final Summative Evaluation	\$20,000
	Total Year 1 (SFY 2021)	\$54,025
	Total Year 2 (SFY 2022)	\$76,375
	Total Year 3 (SFY 2023)	\$35,000
	Total Year 4 (SFY 2024)	\$194,000
	Total Year 5 (SFY 2025)	\$51,000
	Total Year 6 (SFY 2026)	\$35,000
	Total Year 7 (SFY 2027)	\$200,000
	<b>TOTAL</b>	<b>\$645,400</b>



## ATTACHMENT C: TIMELINE AND MILESTONES

As part of the procurement process, Burns & Associates, a Division of HMA (HMA-Burns) was required to submit a work plan, including major tasks and milestones to complete the scope of work. Presently, the State only has the authority to contract with HMA-Burns through December 31, 2022. There are deliverables due to CMS after December 31, 2022.

HMA-Burns has built a work plan for the independent evaluation of Colorado's Adult Prenatal Coverage in CHP+ Section 1115 demonstration that is constructed around the development of each deliverable identified as part of CMS required deliverables and the State's obligations related to monitoring and evaluation (M&E) activities.

The main sections of the work plan are as follows:

- Section A, **Project Management**, includes Tasks 1, 2 and 3. The tasks in the section will be conducted across the entire engagement.
  - Tasks in this section:
    - Kickoff meeting
    - Project management and project plan
    - Project charter
  - Deliverables in this section:
    - Monthly status and other project management reports
    - Project charter
  
- Section B, **Annual Monitoring Activities and Ongoing Assistance**, includes Tasks 4 through 6. It is anticipated that the work in this section will start immediately upon contract execution and continue until January 31, 2027.
  - Tasks in this section:
    - Obtain and read in data for project
    - Create Annual Monitoring Reports
    - Ongoing consultation and technical assistance
  - Deliverables in this section:
    - Creation and maintenance of the analytic data warehouse specific to the Evaluation Design Plan and associated focus study
    - Compute and validate metrics specific to the Evaluation Design Plan on an annual basis
    - Annual Monitoring Reports (6 total)
  
- Section C, **Summative Evaluation and Evaluation Design Plan Activities**, includes Tasks 7 through 8. It is expected that the work in this section will start immediately upon contract execution and continue until September 30, 2021.
  - Tasks in this section:
    - Prepare Summative Evaluation for 2015 to 2020 Demonstration
    - Develop Evaluation Design Plan for 2020 to 2025 Demonstration
  - Deliverables in this section:
    - Draft Evaluation Design for 2020 to 2025 Demonstration to CMS (May 15, 2021)
    - Final Evaluation Design for 2020 to 2025 Demonstration to CMS (July 14, 2021)
    - Draft Summative Evaluation for 2015 to 2020 to CMS (July 14, 2021)

- Final Summative Evaluation for 2015 to 2020 to CMS (September 13, 2021)
- Section D, **Interim Evaluation Activities**, includes Task 9. It is expected that the work in this section will start in Q4 of CY 2023 and continue until July 31, 2024. Task 9 includes a pregnancy services focus study with an internal report to HCPF along with work to produce the Interim Evaluation itself. Results from the focus study will be included in the Interim Evaluation to CMS.
  - Tasks in this section:
    - Conduct one focus study (September 2023 – January 2024)
    - Prepare Interim Evaluation
  - Deliverables in this section:
    - Intermittent reports for the focus study during the 4-month period study period
    - Detailed outline of the Interim Evaluation (January 2024)
    - Draft Version of Interim Evaluation to CMS (June 31, 2024)
    - Final Version of Interim Evaluation to CMS (July 2024)
- Section E, **Summative Evaluation Deliverables**, includes Task 10 and is expected to repeat the pregnancy services focus study as a follow-up to what was reported on in the Interim Evaluation. It is expected that the work in this section will start in Q1 of CY 2026 and continue until January 31, 2027.
  - Tasks in this section:
    - Conduct one focus study (March 2026 – June 2026)
    - Prepare Summative Evaluation
  - Deliverables in this section:
    - Intermittent reports for the focus study during this 4-month study period
    - Detailed outline of the Summative Evaluation (July 2026)
    - Draft Version of Summative Evaluation to CMS (December 2026)
    - Final Version of Summative Evaluation to CMS (January 2027)

## **APPENDIX B: Maternity Advisory Council Focus Group Questions**

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**Maternity Advisory Council (MAC) Mini Focus Group CHP Plus Member Questions  
April 25, 2023 MAC Meeting**

Pre-Natal Discussion Questions

1. What barriers do you experience in getting pre-natal care and post-partum care? What are you experiencing?
  - a. Are you finding it difficult getting to the doctor after you have had your baby?
  - b. Where do you get your kids vaccinated?
  - c. Do you find it hard getting to the pediatrician for?
    - i. Well Visits?
    - ii. Sick Visits?
    - iii. If you have multiple children – do you try and schedule all pediatrician appointments together?
2. When you were pregnant, how did you find your OBGYN?
3. Did you receive and/or attend baby safety classes?
  - a. How did you learn about these resources?
    - i. Was it a pamphlet? Video? Class to register for?
    - ii. Was it helpful?
4. Why do you think people are not making or getting it to appointments?

Post-Partum Discussion Questions

5. Did you see your OBGYN after delivering your baby? How many times?
6. What did your support look like during post-partum?
7. What did you wish you had but didn't know about?

## **APPENDIX C: Detailed Measure Results**

**Exhibit 6. Results for Metric #1.1: CHIP Enrollment Trends Over Time**

CY	Denom	Enrolled in CHIP	Enrolled in Medicaid	No Longer Enrolled in Medicaid	Percentage		
					Enrolled in CHIP	Enrolled in Medicaid	No Longer Enrolled in Medicaid
CY 2018	19,398	11,485	4,842	3,071	59.2%	25.0%	15.8%
CY 2019	19,438	11,586	4,770	3,082	59.6%	24.5%	15.9%
CY 2020	15,456	11,271	3,371	814	72.9%	21.8%	5.3%
CY 2021	13,338	7,018	2,425	3,895	52.6%	18.2%	29.2%
CY 2022	8,944	4,513	1,902	2,529	50.5%	21.3%	28.3%
CY 2023	11,961	8,553	1,943	1,465	71.5%	16.2%	12.2%
CY 2024	14,148	9,242	3,247	1,659	65.3%	23.0%	11.7%

**Exhibit 7. Results for Metric #1.2: CHIP Enrollment Trends Over Time for Members Turning Age 19**

CY	Denom	Enrolled in CHIP	Enrolled in Medicaid	No Longer Enrolled in Medicaid	Percentage		
					Enrolled in CHIP	Enrolled in Medicaid	No Longer Enrolled in Medicaid
CY 2018	714	39	296	379	5.5%	41.5%	53.1%
CY 2019	678	37	288	353	5.5%	42.5%	52.1%
CY 2020	635	356	169	110	56.1%	26.6%	17.3%
CY 2021	669	191	171	307	28.6%	25.6%	45.9%
CY 2022	372	46	115	211	12.4%	30.9%	56.7%
CY 2023	359	51	108	200	14.2%	30.1%	55.7%
CY 2024	702	362	150	190	51.6%	21.4%	27.1%

**Exhibit 9. Results for Metric #2.1: Utilization of Services by Category Per 1000 CHIP Members Age ≥19**

CY	Denom	PCP	BH	Dental	ED	CHIP members per 1,000			
						PCP	BH	Dental	ED
CY 2018	3,231	770	284	312	108	238	88	97	33
CY 2019	3,075	729	371	346	92	237	121	113	30
CY 2020	4,862	944	546	383	126	194	112	79	26
CY 2021	6,387	1,356	747	572	193	212	117	90	30
CY 2022	1,840	399	286	156	60	217	155	85	33
CY 2023	1,713	393	287	181	53	229	168	106	31
CY 2024	3,586	723	432	336	105	202	120	94	29

**Exhibit 10. Results for Metric #2.2: Utilization of Primary Care Services  
by Place of Service on a Per 1000 CHIP Members Age >19**

<b>CY</b>	<b>Place of Service</b>	<b>Denom</b>	<b>Primary Care</b>	<b>CHIP members per 1,000</b>
CY 2018	Office	2,127	665	313
	Urgent Care	508	93	183
	ED	692	5	7
	Telehealth	18	2	111
	All Other	1,935	5	3
CY 2019	Office	2,206	633	287
	Urgent Care	495	76	154
	ED	629	2	3
	Telehealth	11	1	91
	All Other	2,056	17	8
CY 2020	Office	3,323	717	216
	Urgent Care	745	66	89
	ED	959	10	10
	Telehealth	744	115	155
	All Other	3,317	36	11
CY 2021	Office	4,466	1,039	233
	Urgent Care	1,102	119	108
	ED	1,211	29	24
	Telehealth	984	121	123
	All Other	4,562	49	11
CY 2022	Office	1,238	324	262
	Urgent Care	207	30	145
	ED	320	4	13
	Telehealth	249	37	149
	All Other	1,157	6	5
CY 2023	Office	1,222	337	276
	Urgent Care	282	23	82
	ED	246	5	20
	Telehealth	175	24	137
	All Other	988	9	9
CY 2024	Office	2,380	559	235
	Urgent Care	550	67	122
	ED	638	8	13
	Telehealth	446	101	226
	All Other	2,018	27	13

**Exhibit 11. Results for Metric #2.2: Utilization of Behavioral Health Services  
by Place of Service on a Per 1000 CHIP Members Age >19**

<b>CY</b>	<b>Place of Service</b>	<b>Denom</b>	<b>Behavioral Health</b>	<b>CHIP members per 1,000</b>
CY 2018	Office	2,127	152	71
	OP Hospital	993	54	54
	ED	692	21	30
	Telehealth	18	0	0
	All Other	1,450	57	39
CY 2019	Office	2,206	260	118
	OP Hospital	965	28	29
	ED	629	14	22
	Telehealth	11	0	0
	All Other	1,586	69	44
CY 2020	Office	3,323	198	60
	OP Hospital	1,473	51	35
	ED	959	18	19
	Telehealth	744	231	310
	All Other	2,589	50	19
CY 2021	Office	4,466	226	51
	OP Hospital	1,978	69	35
	ED	1,211	31	26
	Telehealth	984	360	366
	All Other	3,686	62	17
CY 2022	Office	1,238	92	74
	OP Hospital	521	21	40
	ED	320	7	22
	Telehealth	249	136	546
	All Other	843	35	42
CY 2023	Office	1,222	199	163
	OP Hospital	470	20	43
	ED	246	10	41
	Telehealth	175	39	223
	All Other	800	25	31
CY 2024	Office	2,380	211	89
	OP Hospital	983	41	42
	ED	638	14	22
	Telehealth	446	145	325
	All Other	1,585	41	26

**Exhibit 12. Results for Metric #2.3: Utilization of Services by Category for CHIP Members Age ≥ 19  
with a Primary Behavioral Health or Substance Use Disorder Diagnosis**

CY	Denom	PCP	BH	Dental	ED	CHIP members per 1,000			
						PCP	BH	Dental	ED
CY 2018	452	258	237	65	38	571	524	144	84
CY 2019	480	228	321	60	30	475	669	125	63
CY 2020	763	337	494	72	37	442	647	94	48
CY 2021	1,002	481	628	117	64	480	627	117	64
CY 2022	281	131	271	29	15	466	964	103	53
CY 2023	272	174	266	41	15	640	978	151	55
CY 2024	529	330	394	60	34	624	745	113	64

**Exhibit 14. Results for Metric #3.1: Per Member Per Month Costs by Metric 2.1 Service Category**

CY	Denom	PCP	BH	Dental	ED	Spending per member month			
						PCP	BH	Dental	ED
CY 2018	3,231	\$88,745	\$87,695	\$84,479	\$99,048	\$2.29	\$2.26	\$2.18	\$2.55
CY 2019	3,075	\$88,362	\$70,703	\$92,819	\$79,618	\$2.39	\$1.92	\$2.52	\$2.16
CY 2020	4,862	\$117,963	\$148,915	\$123,430	\$97,578	\$2.02	\$2.55	\$2.12	\$1.67
CY 2021	6,387	\$179,578	\$120,380	\$180,383	\$121,323	\$2.34	\$1.57	\$2.35	\$1.58
CY 2022	1,840	\$52,673	\$45,859	\$47,713	\$49,091	\$2.39	\$2.08	\$2.16	\$2.22
CY 2023	1,713	\$54,052	\$50,129	\$60,135	\$43,592	\$2.63	\$2.44	\$2.93	\$2.12
CY 2024	3,586	\$102,791	\$63,261	\$113,081	\$82,823	\$2.39	\$1.47	\$2.63	\$1.92

**Exhibit 15. Results from Metric #3.2:  
Primary Care PMPM Cost by Metric 2.2 Place of Service**

<b>CY</b>	<b>Place of Svc</b>	<b>Denom</b>	<b>PCP</b>	<b>Spending per member month</b>
CY 2018	Office	2,127	75,211	\$2.95
	Urgent Care	508	10,995	\$1.80
	ED	692	1,148	\$0.14
	Telehealth	18	181	\$0.84
	All Other	1,935	1,209	\$0.05
CY 2019	Office	2,206	77,307	\$2.92
	Urgent Care	495	8,608	\$1.45
	ED	629	438	\$0.06
	Telehealth	11	132	\$1.00
	All Other	2,056	1,877	\$0.08
CY 2020	Office	3,323	89,328	\$2.24
	Urgent Care	745	7,825	\$0.88
	ED	959	2,611	\$0.23
	Telehealth	744	12,268	\$1.37
	All Other	3,317	5,930	\$0.15
CY 2021	Office	4,466	128,977	\$2.41
	Urgent Care	1,102	15,997	\$1.21
	ED	1,211	6,461	\$0.44
	Telehealth	984	14,499	\$1.23
	All Other	4,562	13,901	\$0.25
CY 2022	Office	1,238	41,843	\$2.82
	Urgent Care	207	3,630	\$1.46
	ED	320	928	\$0.24
	Telehealth	249	4,742	\$1.59
	All Other	1,157	1,804	\$0.13
CY 2023	Office	1,222	46,477	\$3.17
	Urgent Care	282	2,487	\$0.73
	ED	246	1,060	\$0.36
	Telehealth	175	3,123	\$1.49
	All Other	988	1,951	\$0.16
CY 2024	Office	2,380	81,357	\$2.85
	Urgent Care	550	7,865	\$1.19
	ED	638	1,936	\$0.25
	Telehealth	446	13,540	\$2.53
	All Other	2,018	5,042	\$0.21

**Exhibit 16. Results for Metric #3.2  
Behavioral Health PMPM Cost by Metric 2.2 Place of Service**

<b>CY</b>	<b>Place of Svc</b>	<b>Denom</b>	<b>BH</b>	<b>Spending per member month</b>
CY 2018	Office	2,127	15,757	\$0.62
	OP Hospital	993	61,085	\$5.13
	ED	692	1,076	\$0.13
	Telehealth	18	0	\$0.00
	All Other	1,450	9,777	\$0.56
CY 2019	Office	2,206	31,034	\$1.17
	OP Hospital	965	27,449	\$2.37
	ED	629	1,107	\$0.15
	Telehealth	11	0	\$0.00
	All Other	1,586	11,114	\$0.58
CY 2020	Office	3,323	40,382	\$1.01
	OP Hospital	1,473	78,723	\$4.45
	ED	959	938	\$0.08
	Telehealth	744	23,209	\$2.60
	All Other	2,589	6,061	\$0.20
CY 2021	Office	4,466	29,409	\$0.55
	OP Hospital	1,978	47,911	\$2.02
	ED	1,211	1,875	\$0.13
	Telehealth	984	34,448	\$2.92
	All Other	3,686	6,835	\$0.15
CY 2022	Office	1,238	9,205	\$0.62
	OP Hospital	521	21,187	\$3.39
	ED	320	697	\$0.18
	Telehealth	249	14,185	\$4.75
	All Other	843	1,208	\$0.12
CY 2023	Office	1,222	20,156	\$1.37
	OP Hospital	470	22,946	\$4.07
	ED	246	752	\$0.25
	Telehealth	175	4,913	\$2.34
	All Other	800	2,426	\$0.25
CY 2024	Office	2,380	20,848	\$0.73
	OP Hospital	983	27,381	\$2.32
	ED	638	1,249	\$0.16
	Telehealth	446	13,723	\$2.56
	All Other	1,585	2,892	\$0.15

**Exhibit 17. Results from Metric #3.3: Spending a PMPM Basis by Metric 3.3 Service Categories for  
CHIP Members ≥ 19 with a Primary Behavioral Health or Substance Use Disorder Diagnosis**

CY	Denom	PCP	BH	Dental	ED	Spending per member month			
						PCP	BH	Dental	ED
CY 2018	452	\$28,158	\$64,058	\$22,999	\$46,028	\$5.2	\$11.8	\$4.2	\$8.5
CY 2019	480	\$28,979	\$38,962	\$15,337	\$19,049	\$5.0	\$6.8	\$2.7	\$3.3
CY 2020	763	\$39,968	\$96,965	\$32,620	\$24,433	\$4.4	\$10.6	\$3.6	\$2.7
CY 2021	1,002	\$61,033	\$80,168	\$31,189	\$33,801	\$5.1	\$6.7	\$2.6	\$2.8
CY 2022	281	\$16,682	\$35,026	\$5,296	\$12,765	\$4.9	\$10.4	\$1.6	\$3.8
CY 2023	272	\$21,512	\$38,931	\$16,569	\$10,577	\$6.6	\$11.9	\$5.1	\$3.2
CY 2024	529	\$45,230	\$45,921	\$20,005	\$26,608	\$7.1	\$7.2	\$3.2	\$4.2

**Exhibit 20. Results from Metrics #4.6 and #4.7:  
Member Grievances and Appeals**

**Grievances**

<b>CY</b>	<b>Denominator</b>	<b>Numerator</b>	<b>Rate</b>
CY 2018	2,229,938	565	0.3
CY 2019	2,216,642	626	0.3
CY 2020	2,336,722	754	0.3
CY 2021	2,666,026	956	0.4
CY 2022	2,901,559	1,908	0.7
CY 2023	3,025,947	5,003	1.7

**Appeals**

<b>CY</b>	<b>Denominator</b>	<b>Numerator</b>	<b>Rate</b>
CY 2018	2,229,938	448	0.2
CY 2019	2,216,642	555	0.3
CY 2020	2,336,722	465	0.2
CY 2021	2,666,026	1,056	0.4
CY 2022	2,901,559	1,055	0.4
CY 2023	3,025,947	1,181	0.4

## **APPENDIX D: Statistical Tests on Measures**

**Metric #3.1: The TTEST Procedure of Spending in total and on a per member month basis for reported service categories in Metric 2.1**

Variable: pcp (pcp)

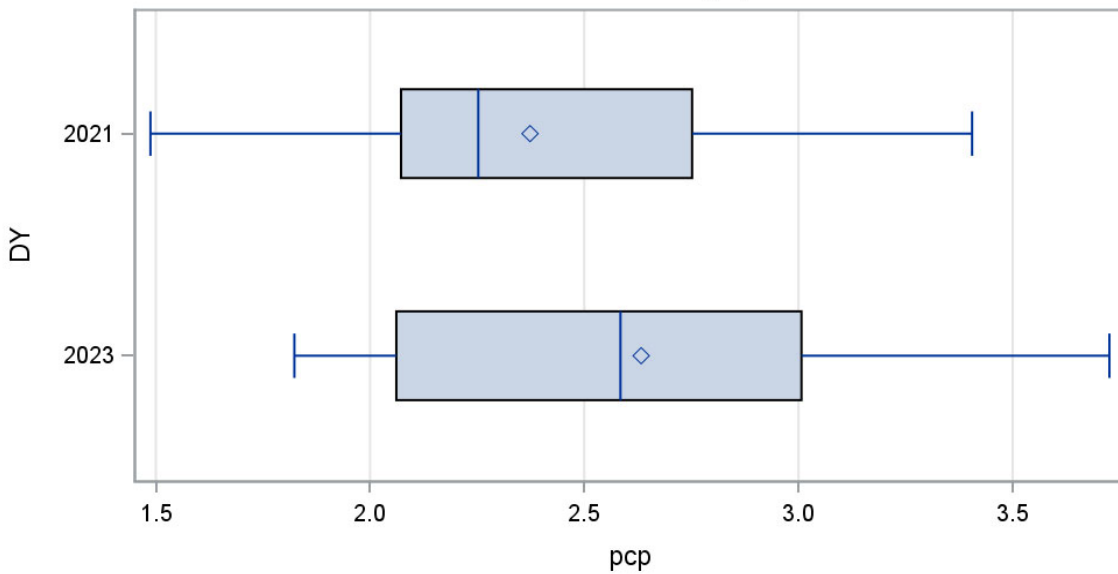
DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	2.3735	0.5392	0.1556	1.4874	3.4053
2023		12	2.6329	0.6048	0.1746	1.8234	3.7258
Diff (1-2)	Pooled		-0.2594	0.5729	0.2339		
Diff (1-2)	Satterthwaite		-0.2594		0.2339		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-1.11	0.2794
Satterthwaite	Unequal	21.716	-1.11	0.2795

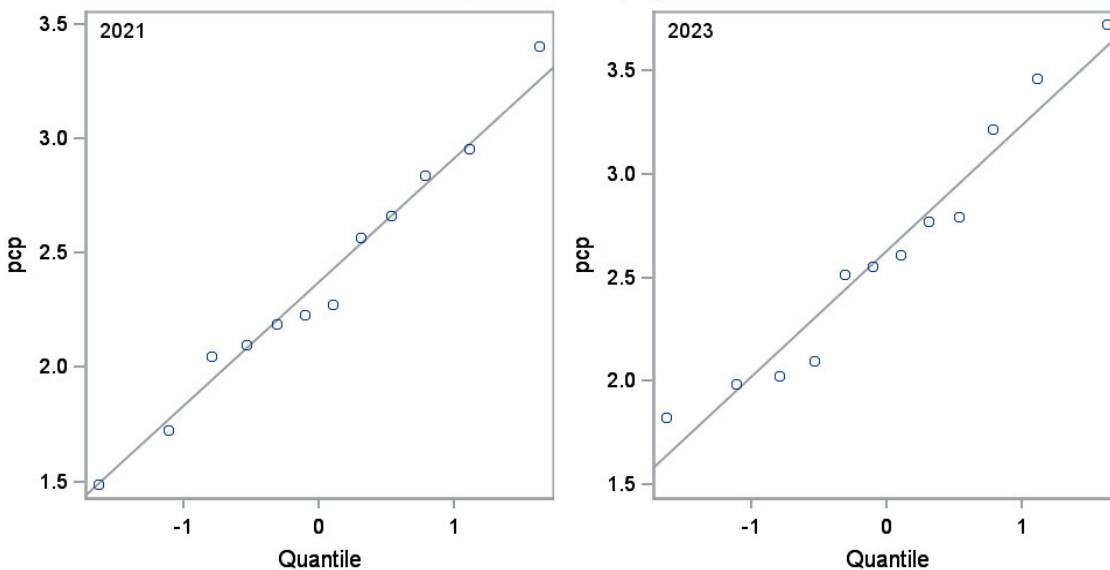
Not Significant

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	1.26	0.7100

**Distribution of pcp**



**Q-Q Plots of pcp**



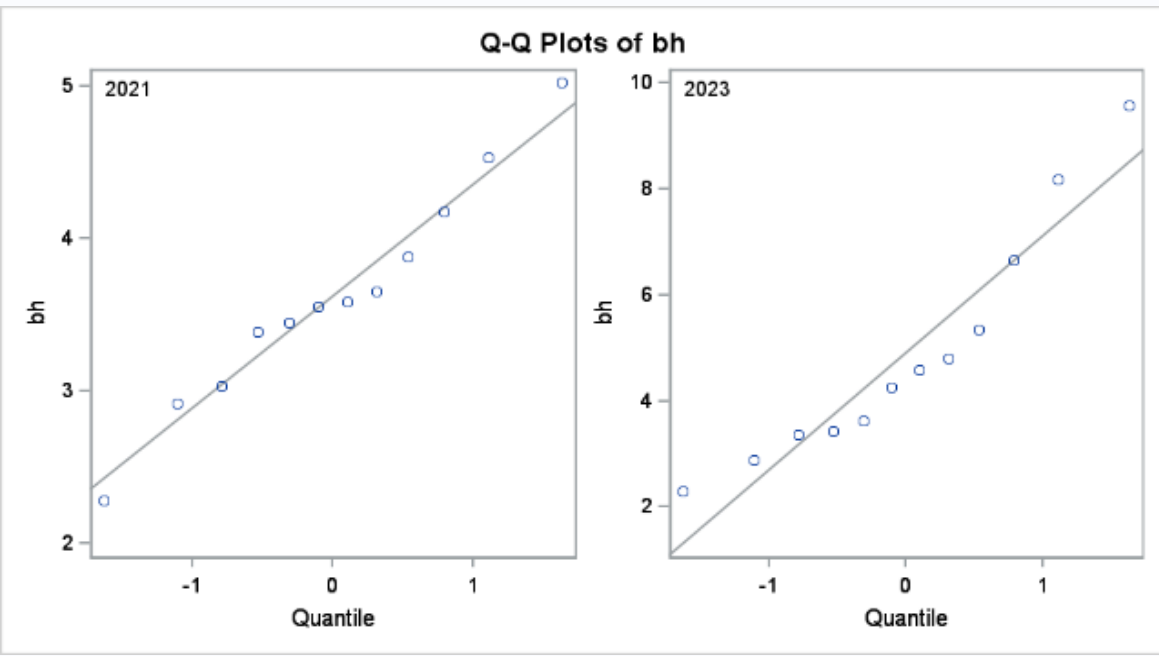
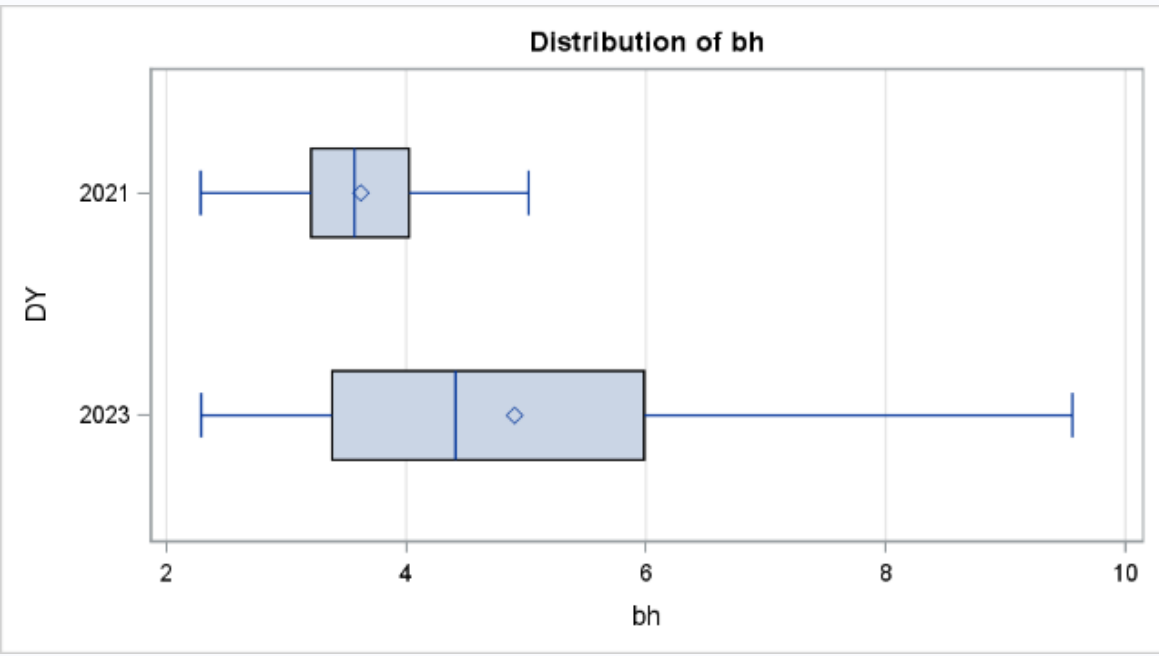
**Metric #3.1: The TTEST Procedure of Spending in total and on a per member month basis for reported service categories in Metric 2.1**

Variable: bh (bh)

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	3.6221	0.731	0.211	2.2849	5.0219
2023		12	4.9048	2.2004	0.6352	2.29	9.558
Diff (1-2)	Pooled		-1.2827	1.6395	0.6693		
Diff (1-2)	Satterthwaite		-1.2827		0.6693		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-1.92	0.0684
Satterthwaite	Unequal	13.4	-1.92	0.0769

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	9.06	0.001



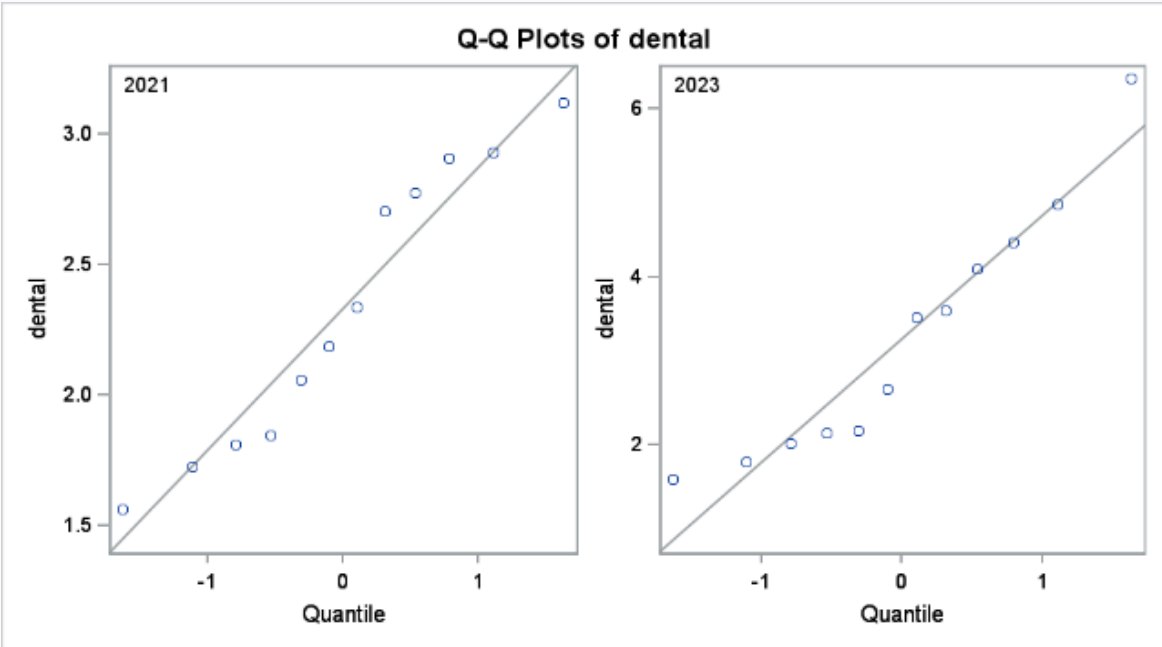
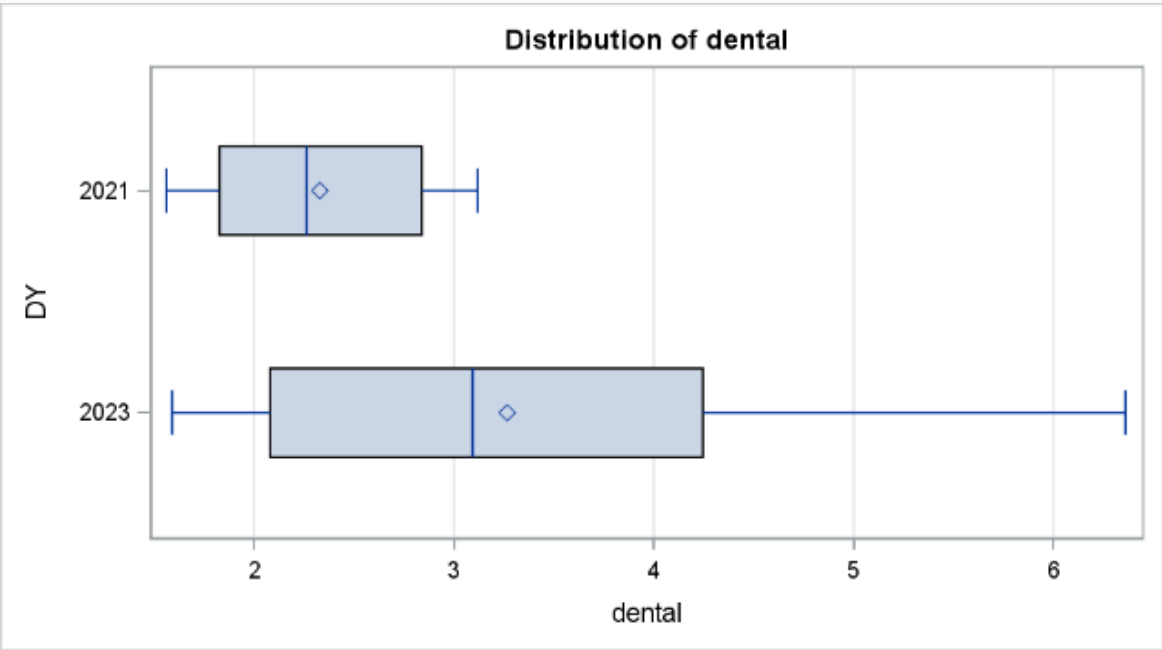
**Metric #3.1: The TTEST Procedure of Spending in total and on a per member month basis for reported service categories in Metric 2.1**

**Variable: dental (dental)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	2.3291	0.5396	0.1558	1.5611	3.118
2023		12	3.2663	1.4651	0.4229	1.5897	6.3599
Diff (1-2)	Pooled		-0.9373	1.104	0.4507		
Diff (1-2)	Satterthwaite		-0.9373		0.4507		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-2.08	0.0494
Satterthwaite	Unequal	13.93	-2.08	0.0565

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	7.37	0.0025



**Metric #3.1: The TTEST Procedure of Spending in total and on a per member month basis for reported service categories in Metric 2.1**

Variable: ed (ed)

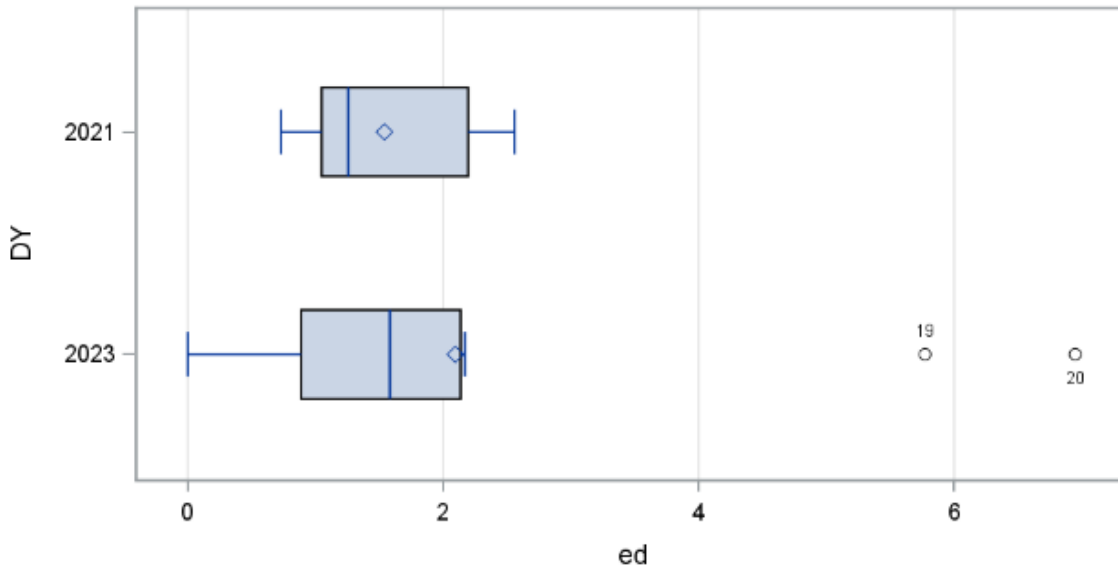
DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	1.5405	0.6811	0.1966	0.7306	2.5589
2023		12	2.0953	2.1364	0.6167	0	6.9476
Diff (1-2)	Pooled		-0.5549	1.5856	0.6473		
Diff (1-2)	Satterthwaite		-0.5549		0.6473		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-0.86	0.4006
Satterthwaite	Unequal	13.21	-0.86	0.4066

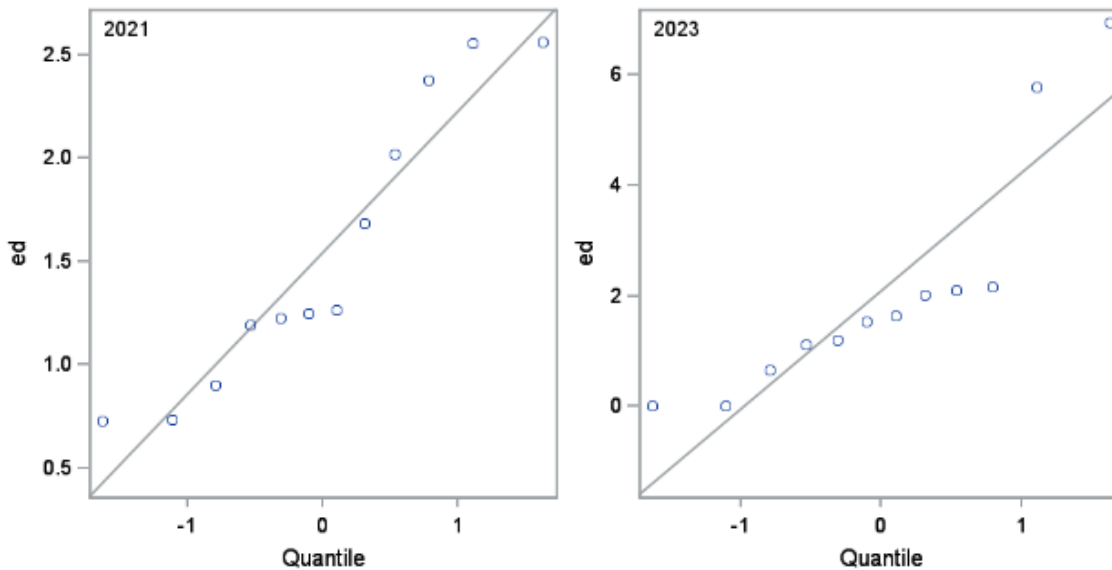
Not Significant

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	9.84	0.0007

**Distribution of ed**



**Q-Q Plots of ed**



**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - Office**  
**Variable: pcp (pcp)**

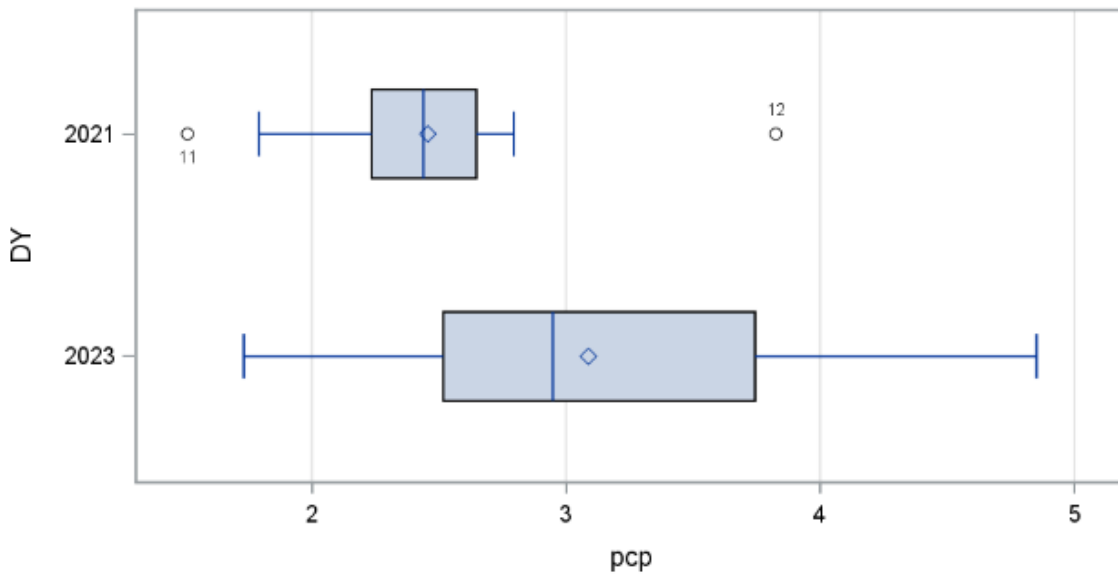
DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	2.4564	0.5679	0.1639	1.5109	3.8256
2023		12	3.0883	0.8936	0.258	1.7321	4.8515
Diff (1-2)	Pooled		-0.6319	0.7487	0.3056		
Diff (1-2)	Satterthwaite		-0.6319		0.3056		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-2.07	0.0506
Satterthwaite	Unequal	18.64	-2.07	0.0529

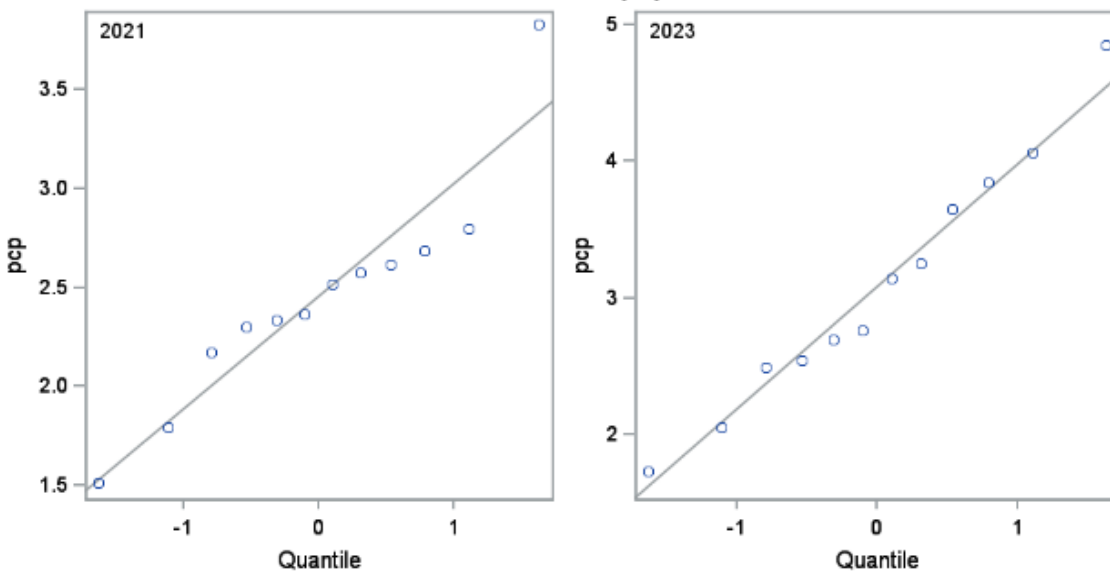
**Equality of Variances**

Method	Num	Den	F Value	Pr > F
Folded F	11	11	2.48	0.1481

**Distribution of pcp**



**Q-Q Plots of pcp**



**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - Telehealth**  
**Variable: pcp (pcp)**

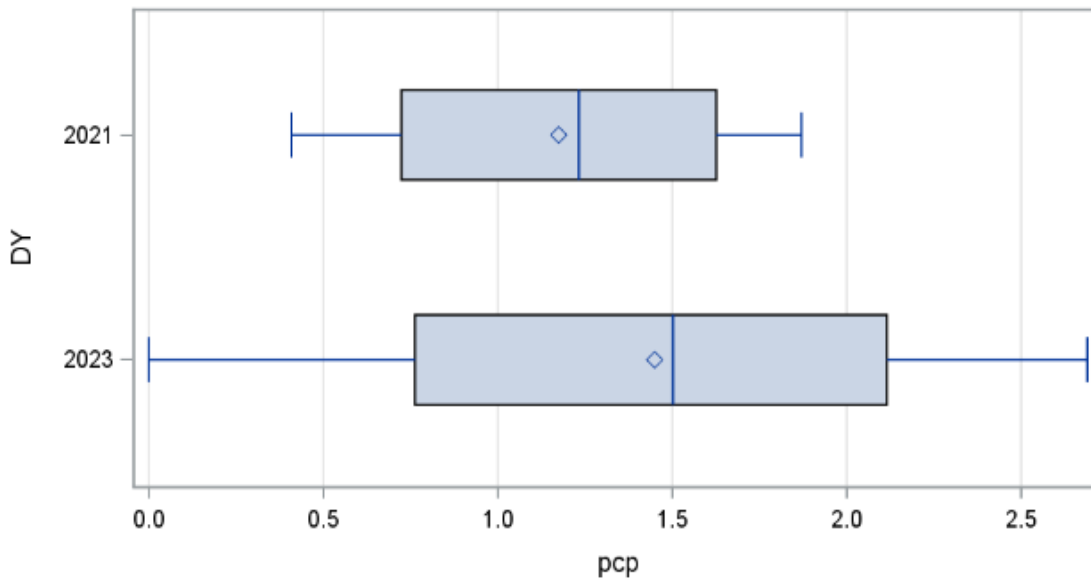
DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	1.1748	0.5155	0.1488	0.4088	1.8707
2023		12	1.4499	0.8391	0.2422	0	2.6898
Diff (1-2)	Pooled		-0.2751	0.6963	0.2843		
Diff (1-2)	Satterthwaite		-0.2751		0.2843		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-0.97	0.3436
Satterthwaite	Unequal	18.269	-0.97	0.3457

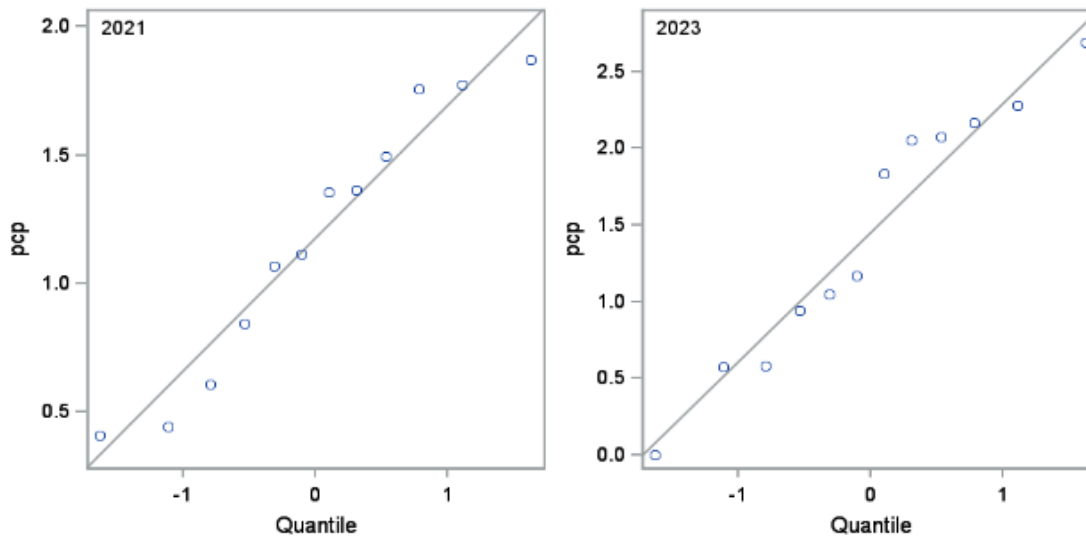
Not Significant

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	2.65	0.121

**Distribution of pcp**



**Q-Q Plots of pcp**

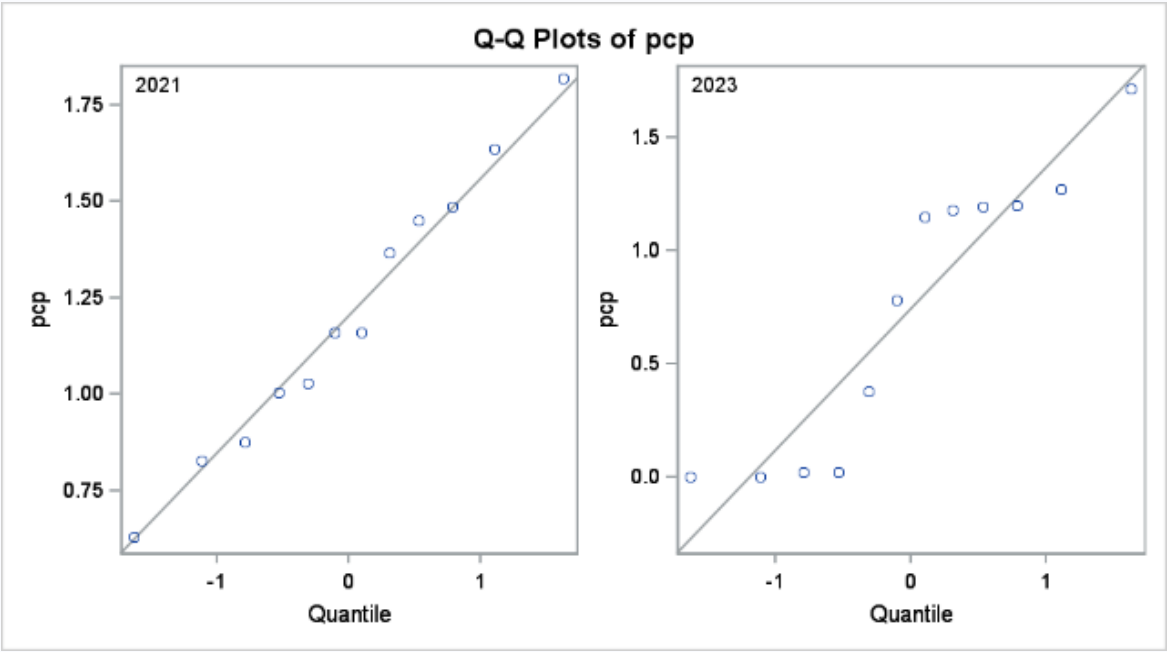
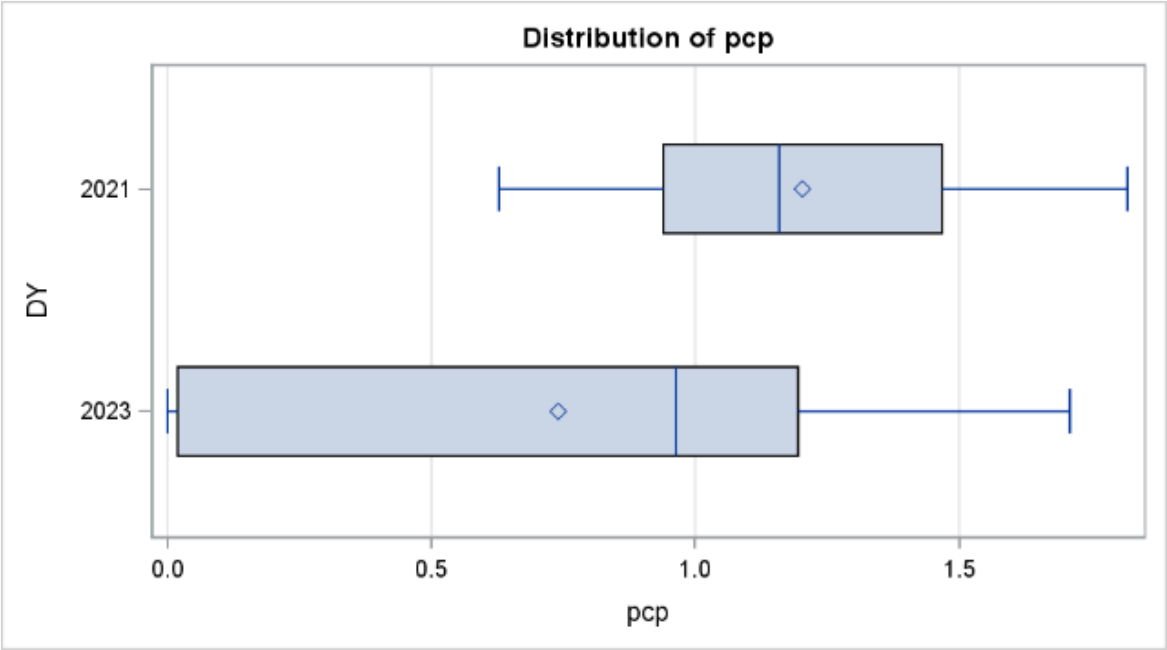


**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - Urgent Care**  
**Variable: pcp (pcp)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	1.203	0.355	0.1025	0.6279	1.8189
2023		12	0.7403	0.6221	0.1796	0	1.71
Diff (1-2)	Pooled		0.4627	0.5065	0.2068		
Diff (1-2)	Satterthwaite		0.4627		0.2068		

Method	Variances	DF	t Value	Pr >  t	Significant
Pooled	Equal	22	2.24	0.0357	
Satterthwaite	Unequal	17.48	2.24	0.0385	

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	3.07	0.0759



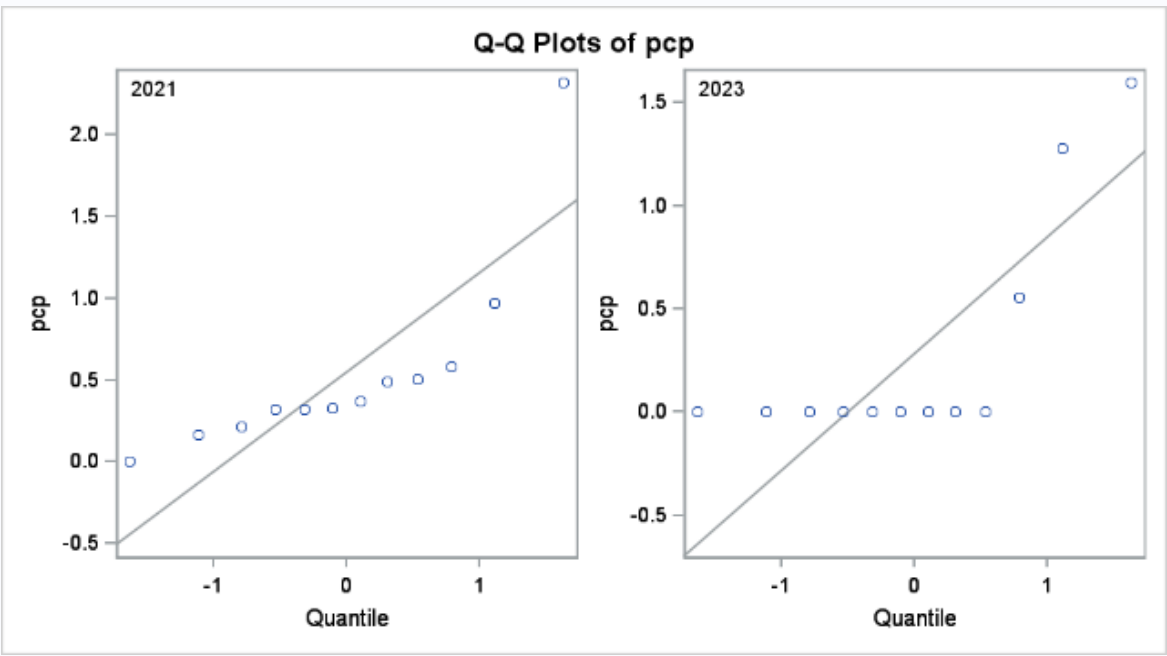
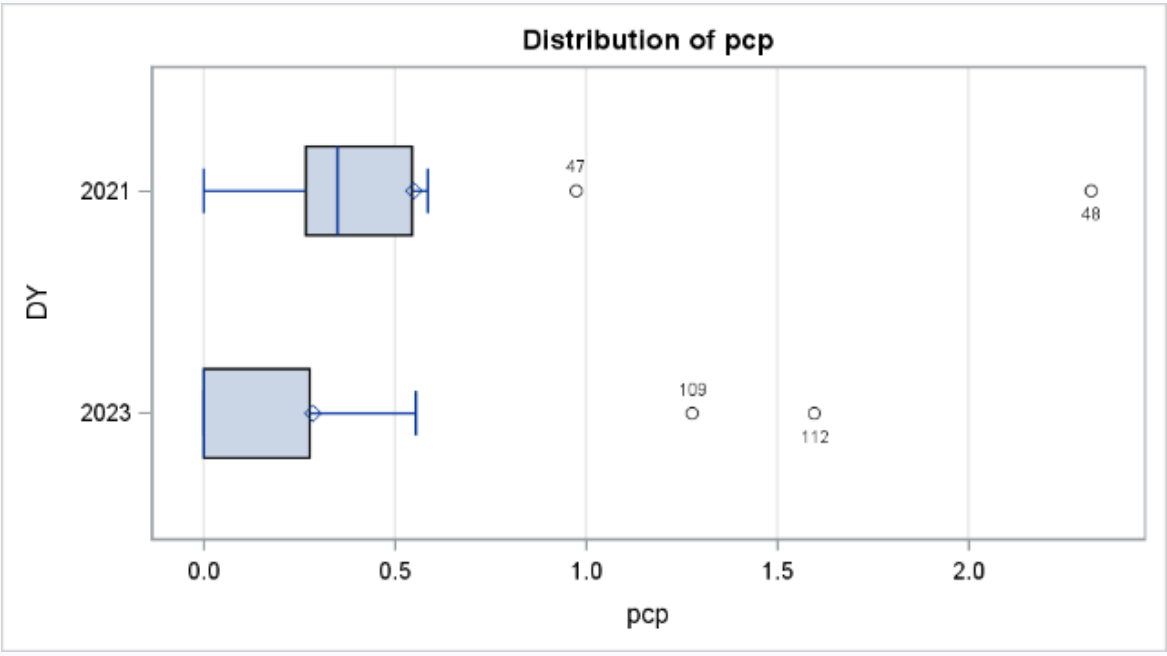
**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - ED**  
**Variable: pcp (pcp)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	0.5498	0.6085	0.1757	0	2.3215
2023		12	0.2859	0.565	0.1631	0	1.5972
Diff (1-2)	Pooled		0.264	0.5872	0.2397		
Diff (1-2)	Satterthwaite		0.264		0.2397		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	1.1	0.2827
Satterthwaite	Unequal	21.88	1.1	0.2828

Not Significant

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	1.16	0.81

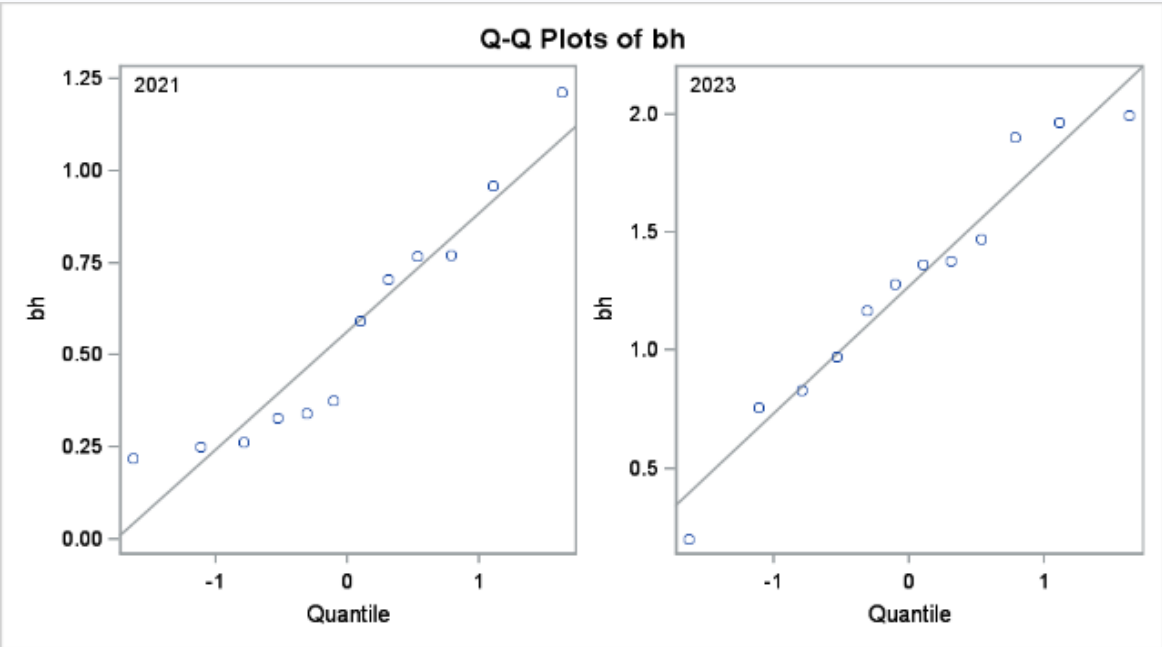
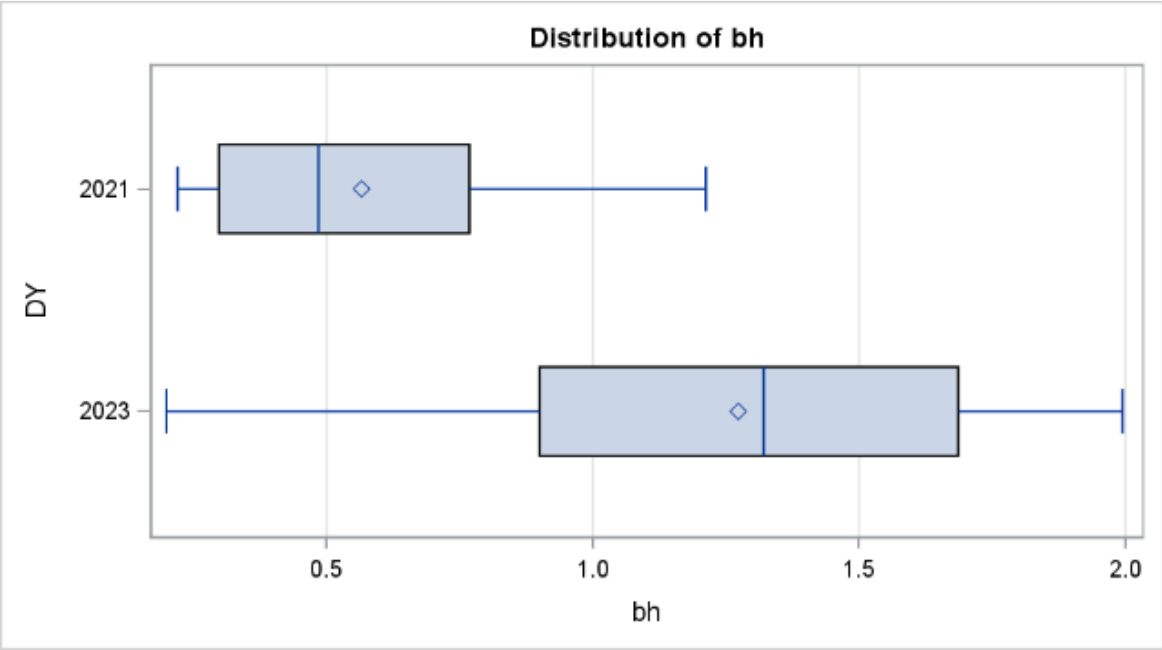


**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - Office**  
**Variable: bh (bh)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	0.5656	0.3199	0.0923	0.2201	1.2124
2023		12	1.2731	0.537	0.155	0.1991	1.9944
Diff (1-2)	Pooled		-0.7074	0.442	0.1804		
Diff (1-2)	Satterthwaite		-0.7074		0.1804		

Method	Variances	DF	t Value	Pr >  t	Significant
Pooled	Equal	22	-3.92	0.0007	
Satterthwaite	Unequal	17.93	-3.92	0.001	

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	2.82	0.1



**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - Urgent Care**  
**Variable: bh (bh)**

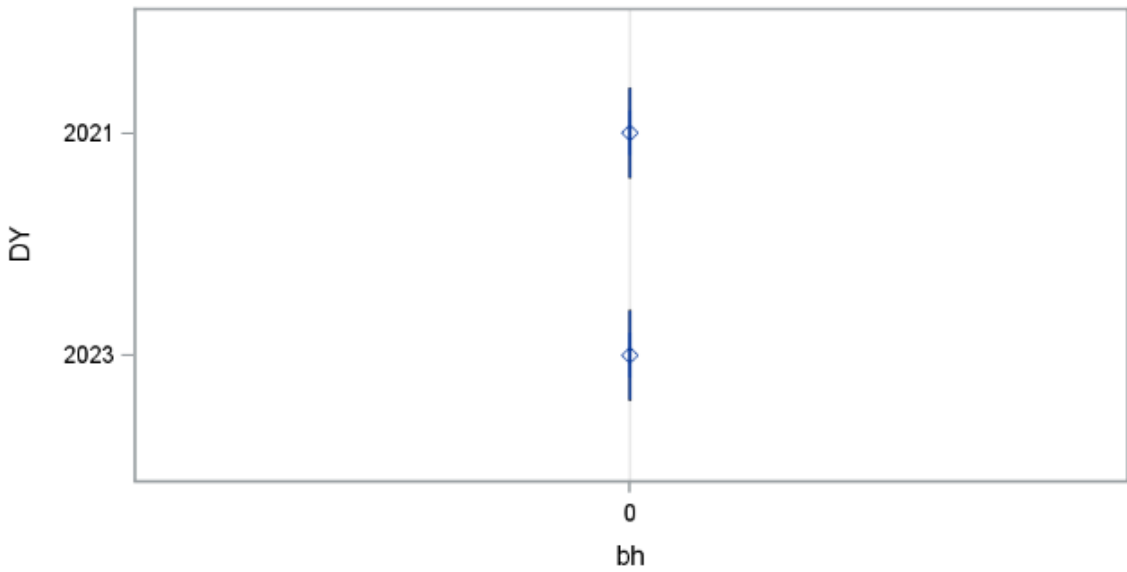
DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	0	0	0	0	0
2023		12	0	0	0	0	0
Diff (1-2)	Pooled		0	0	0		
Diff (1-2)	Satterthwaite		0		0		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	.	.
Satterthwaite	Unequal	22	.	.

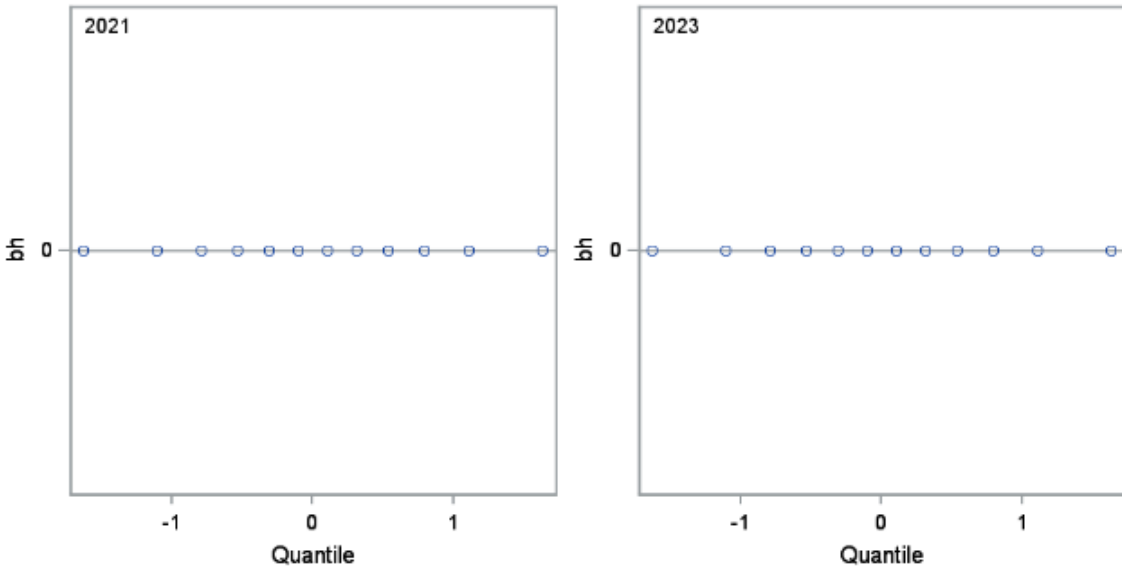
**Equality of Variances**

Method	Num	Den	F Value	Pr > F
Folded F	11	11	.	.

**Distribution of bh**



**Q-Q Plots of bh**



**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - Telehealth**  
**Variable: bh (bh)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	2.8341	0.7142	0.2062	1.8698	3.977
2023		12	2.1878	1.8693	0.5396	0	5.072
Diff (1-2)	Pooled		0.6463	1.415	0.5777		
Diff (1-2)	Satterthwaite		0.6463		0.5777		

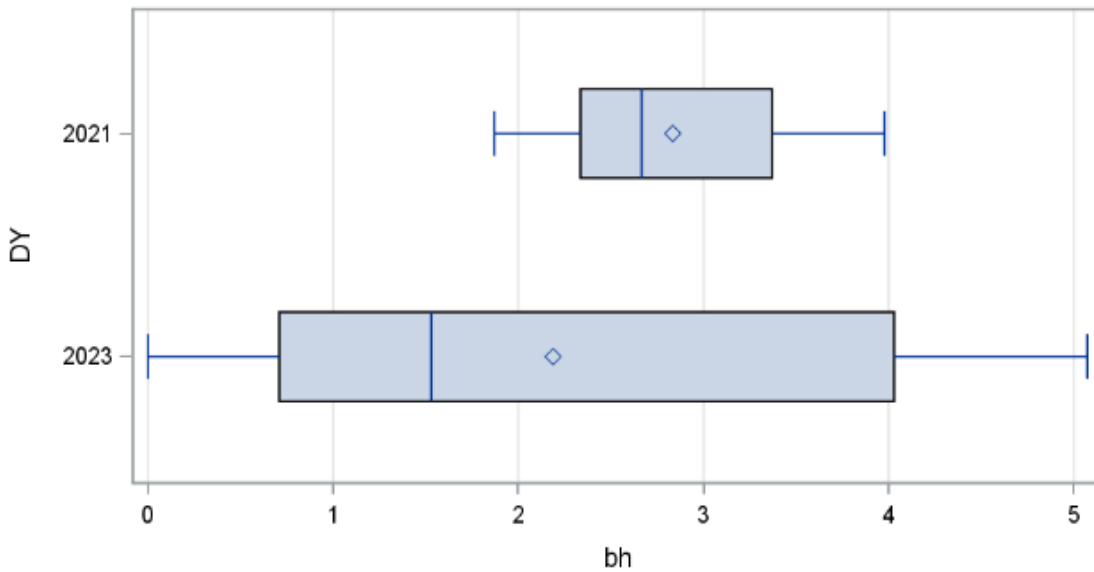
Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	1.12	0.2753
Satterthwaite	Unequal	14.145	1.12	0.2819

Not Significant

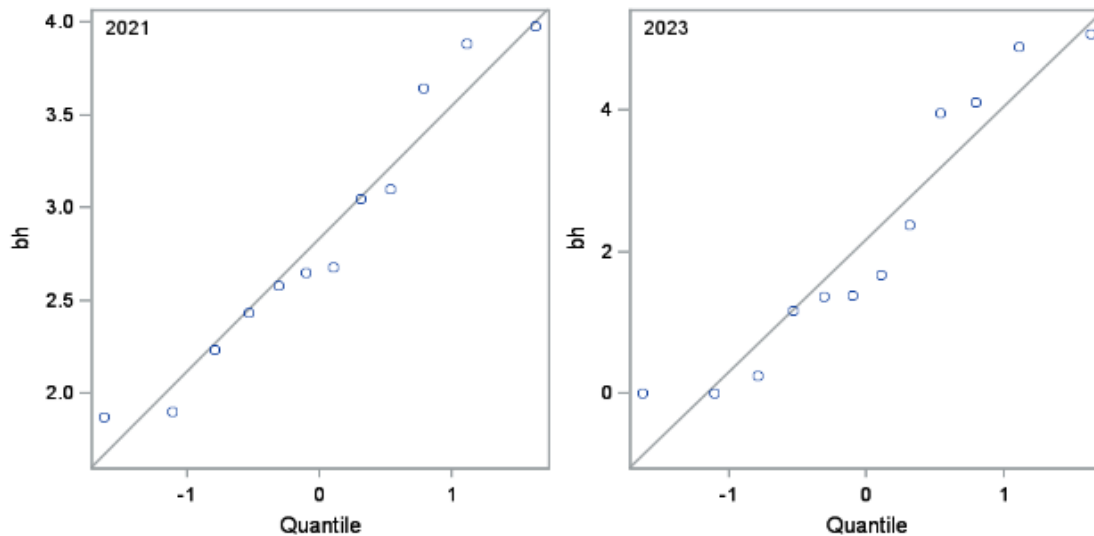
**Equality of Variances**

Method	Num	Den	F Value	Pr > F
Folded F	11	11	6.85	0.0035

**Distribution of bh**



**Q-Q Plots of bh**

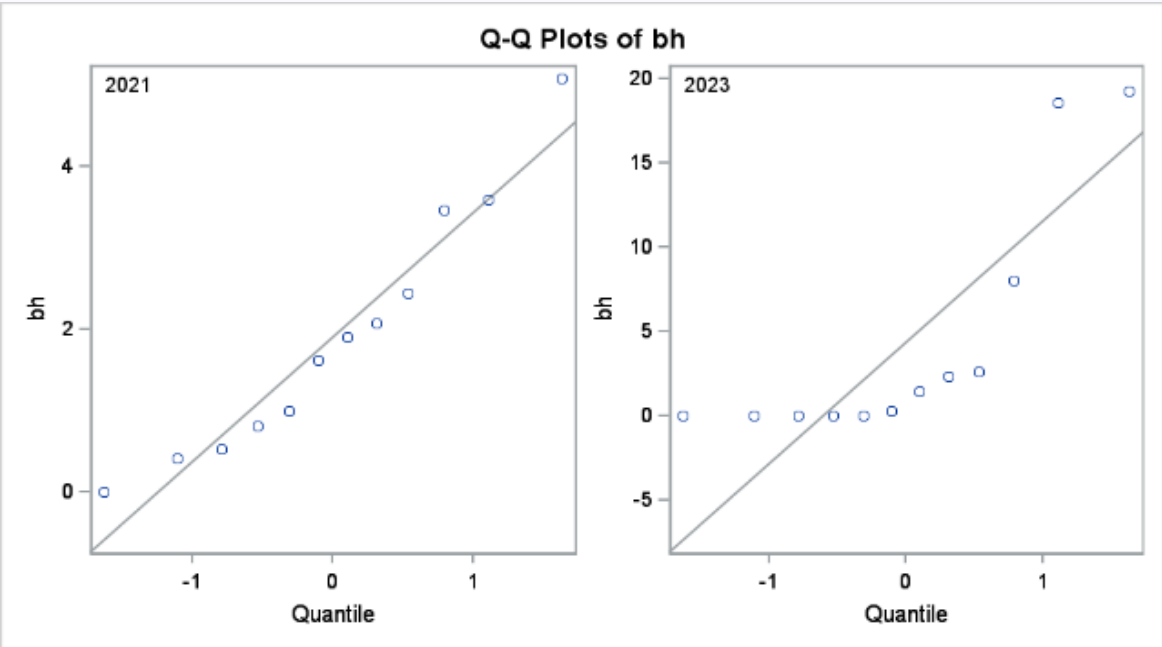
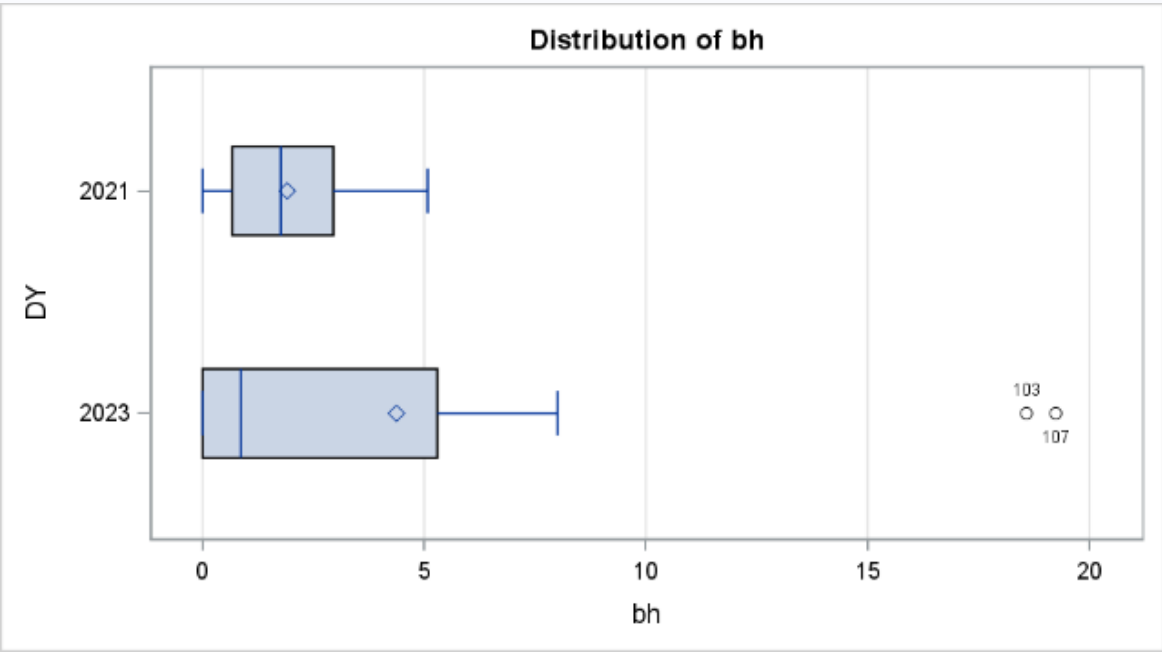


**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - OP Hospital**  
**Variable: bh (bh)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	1.9099	1.5225	0.4395	0	5.0818
2023		12	4.3742	7.164	2.0681	0	19.2437
Diff (1-2)	Pooled		-2.4644	5.1789	2.1143		
Diff (1-2)	Satterthwaite		-2.4644		2.1143		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-1.17	0.2563
Satterthwaite	Unequal	11.99	-1.17	0.2664

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	22.14	<.0001



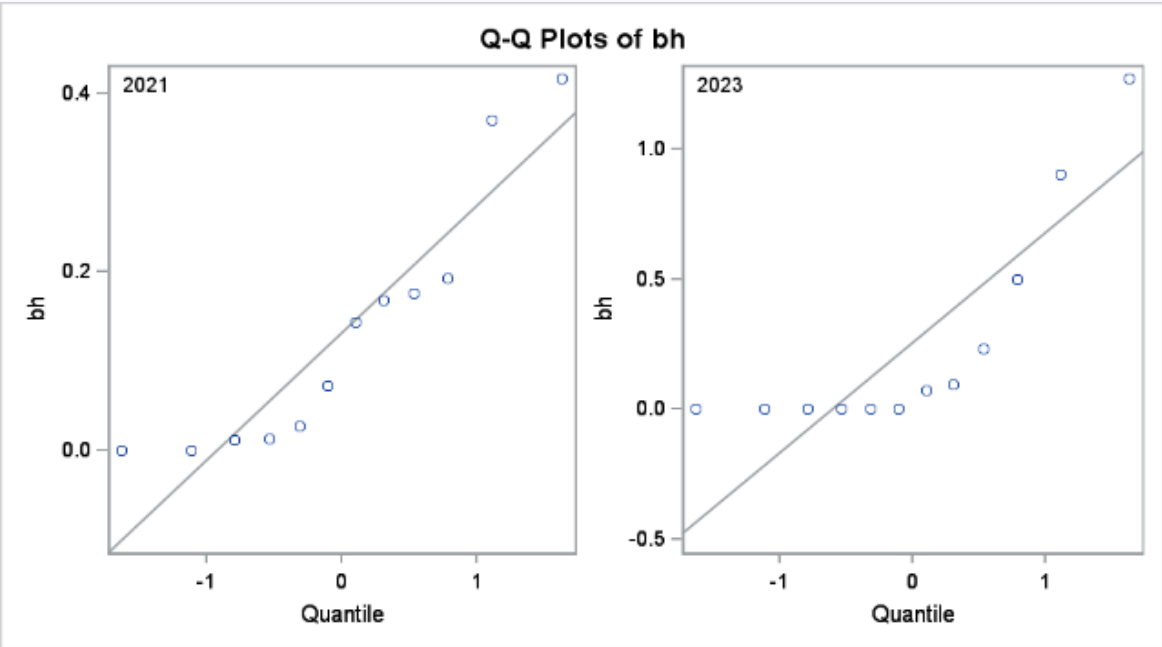
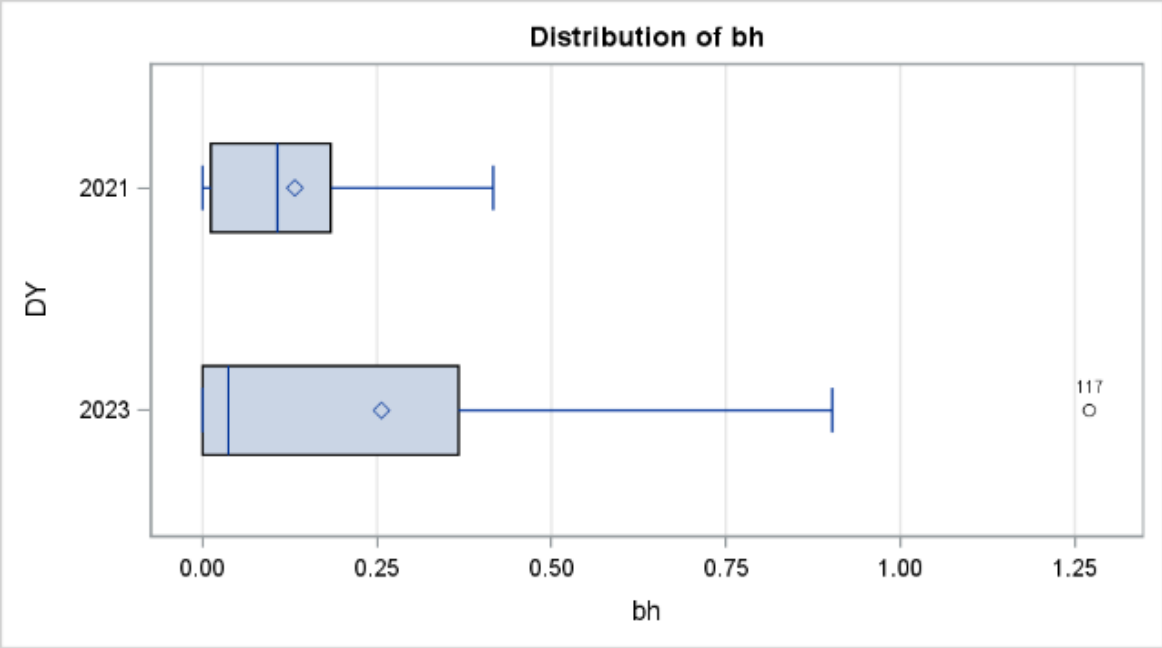
**Metric #3.2: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by Place of Service Categories Reported in Metric 2.2 - ED**  
**Variable: bh (bh)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	0.1323	0.1423	0.0411	0	0.4166
2023		12	0.2565	0.4221	0.1218	0	1.2708
Diff (1-2)	Pooled		-0.1241	0.315	0.1286		
Diff (1-2)	Satterthwaite		-0.1241		0.1286		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-0.97	0.3449
Satterthwaite	Unequal	13.47	-0.97	0.3514

Not Significant

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	8.8	0.0011

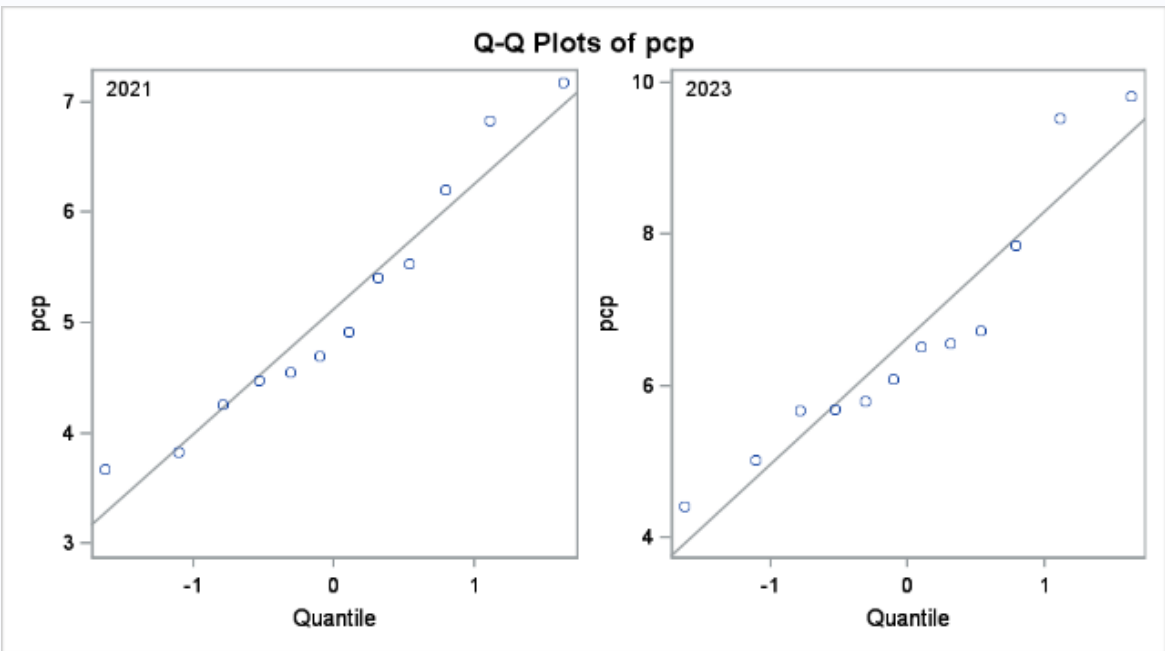
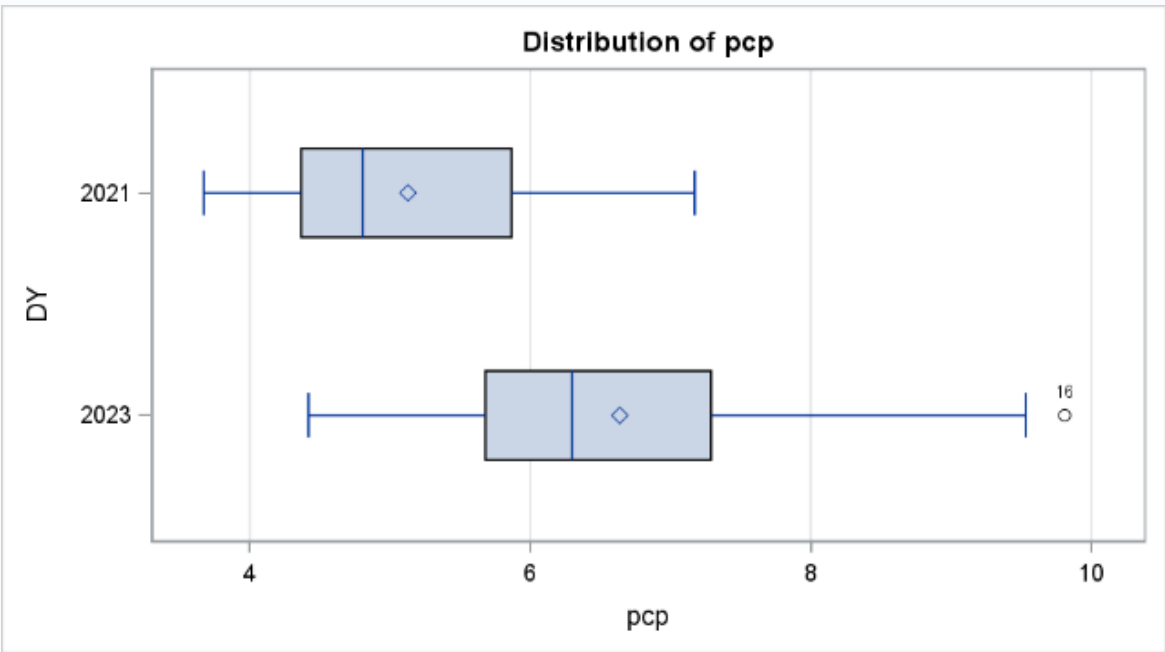


**Metric #3.3: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by  
Diagnosis Categories Reported in Metric 2.3  
Variable: pcp (pcp)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	5.1276	1.1294	0.326	3.6709	7.173
2023		12	6.6381	1.6617	0.4797	4.4184	9.8107
Diff (1-2)	Pooled		-1.5105	1.4207	0.58		
Diff (1-2)	Satterthwaite		-1.5105		0.58		

Method	Variances	DF	t Value	Pr >  t	Significant
Pooled	Equal	22	-2.6	0.0162	
Satterthwaite	Unequal	19.38	-2.6	0.0172	

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	2.16	0.216



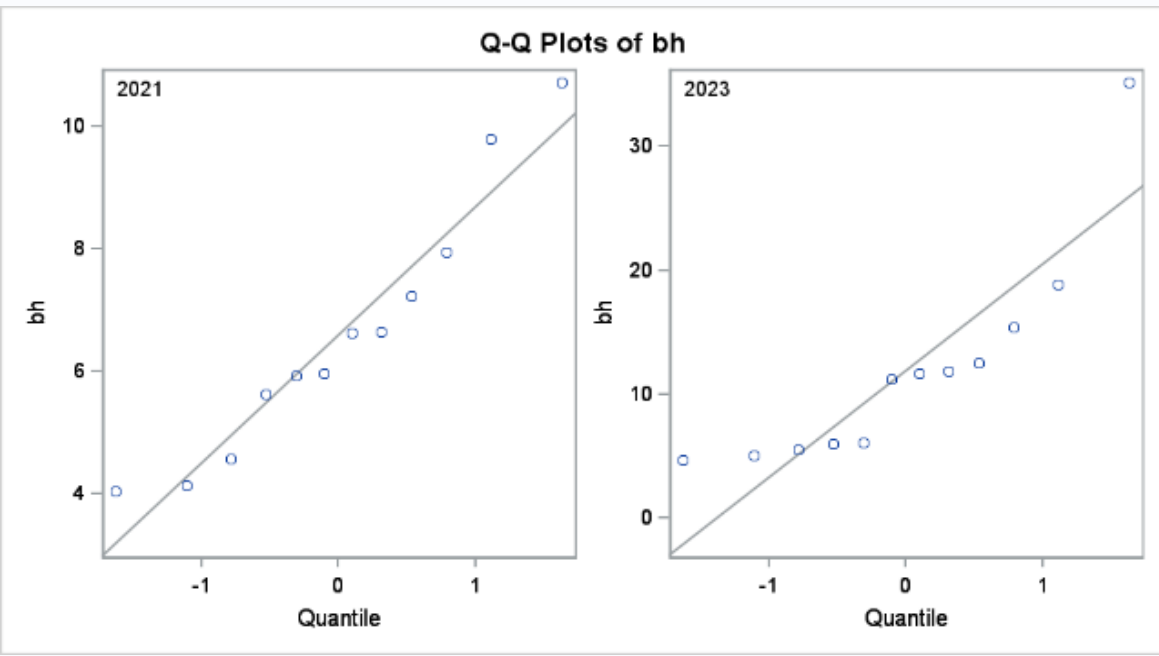
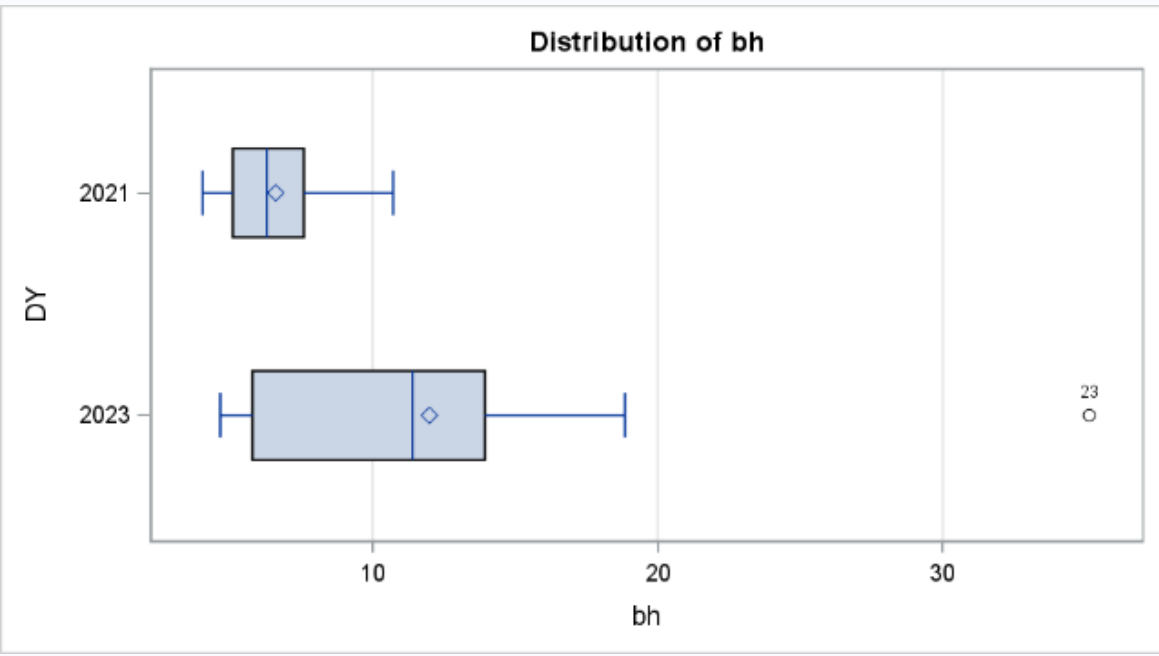
**Metric #3.3: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by  
Diagnosis Categories Reported in Metric 2.3**

Variable: bh (bh)

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	6.6007	2.0891	0.6031	4.0336	10.72
2023		12	11.9909	8.5775	2.4761	4.659	35.1363
Diff (1-2)	Pooled		-5.3903	6.2425	2.5485		
Diff (1-2)	Satterthwaite		-5.3903		2.5485		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-2.12	0.046
Satterthwaite	Unequal	12.3	-2.12	0.0555

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	16.86	<.0001

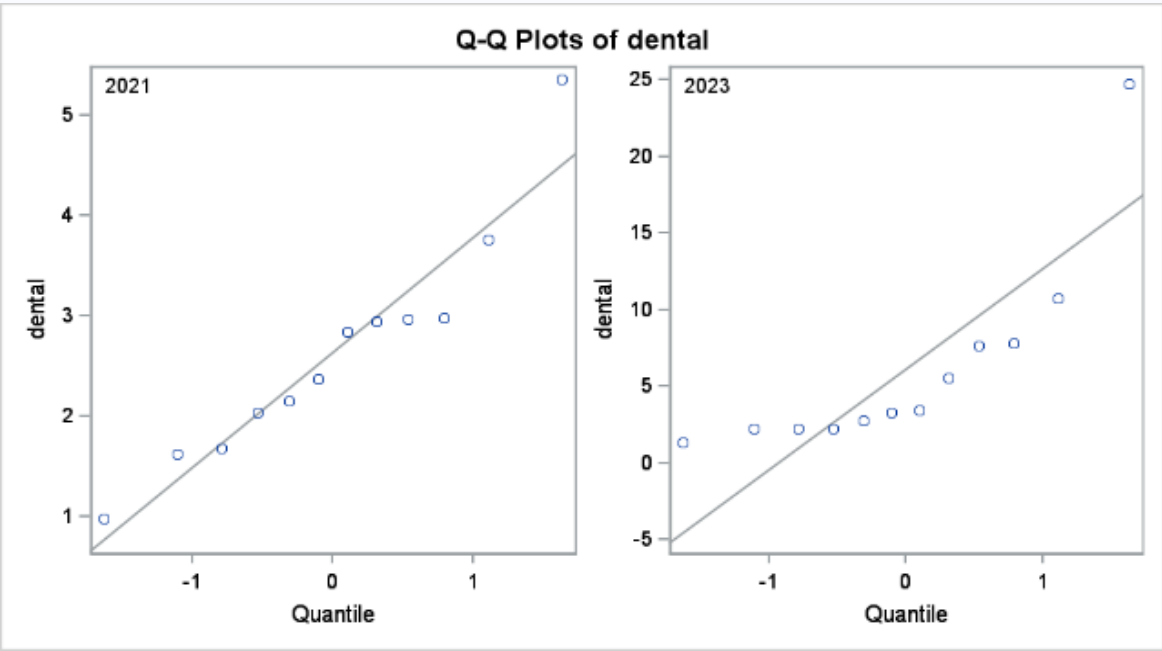
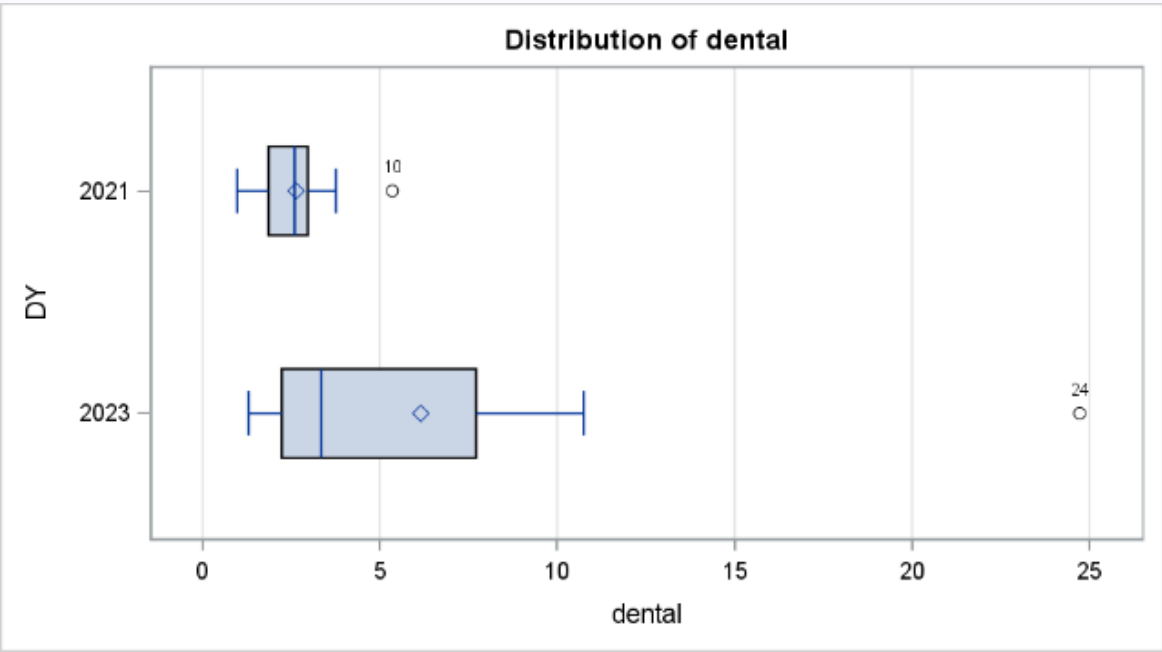


**Metric #3.3: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by  
Diagnosis Categories Reported in Metric 2.3  
Variable: dental (dental)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	2.6392	1.1423	0.3298	0.9784	5.3523
2023		12	6.1544	6.5283	1.8845	1.298	24.729
Diff (1-2)	Pooled		-3.5152	4.6863	1.9132		
Diff (1-2)	Satterthwaite		-3.5152		1.9132		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-1.84	0.0797
Satterthwaite	Unequal	11.67	-1.84	0.0917

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	32.66	<.0001



**Metric #3.3: The TTEST Procedure of Spending in Total and on a Per Member Month Basis by  
Diagnosis Categories Reported in Metric 2.3  
Variable: dental (dental)**

DY	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
2021		12	2.7744	2.4964	0.7207	0	9.1318
2023		12	3.2267	4.5603	1.3164	0	12.5881
Diff (1-2)	Pooled		-0.4523	3.6762	1.5008		
Diff (1-2)	Satterthwaite		-0.4523		1.5008		

Method	Variances	DF	t Value	Pr >  t
Pooled	Equal	22	-0.3	0.766
Satterthwaite	Unequal	17.05	-0.3	0.7668

Equality of Variances				
Method	Num	Den	F Value	Pr > F
Folded F	11	11	3.34	0.0574

