Improving Community Outcomes for Maternal and Child Health (ICO4MCH)

Long-Term Outcomes Overall Report

Working together to improve maternal and child health in North Carolina

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Long-Term Outcomes Report

*ICO4MCH Overall: Durham, Mecklenburg, Union, Hoke, Montgomery, and Richmond Counties**

*Report contains data from counties continuously funded for ICO4MCH through the close of fiscal year (FY) 2024 (May 2024).

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Improving Community Outcomes for Maternal and Child Health

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Acknowledgements:
Thank you to Sarah McCracken, Kathleen Jones-Vessey, Steve Guest, Shelby Weeks, and LaDonna Warren for support with the data or for reviewing and providing advice on the report.

Understanding this Report

What is the purpose of this report?
In this report, we display ICO4MCH long-term outcome data from 2014 to 2023 and describe emerging trends and patterns for North Carolina and counties receiving continuous ICO4MCH funding from Fiscal Year 2017 (June 2016) through Fiscal Year 2024 (May 2024): Durham, Mecklenburg, Union, Hoke, Montgomery, and Richmond counties. We also compare long-term outcome rates in different race-ethnicity groups during a pre-ICO4MCH/early ICO4MCH period (2014-2018) and a post-ICO4MCH implementation period (2019-2023). We included the first two and a half years of ICO4MCH (June 2016 – Dec. 2018) in the pre-ICO4MCH period because the programs took time to initially implement and we wanted to have equal years of data pre and post program implementation data. Additionally, literature suggests it can take a few years for a program to start achieving intended outcomes. New in this report is the addition of cesarean section and breastfed at discharge as long-term outcomes.

Can we draw conclusions about the direct impact of the ICO4MCH from this report?
No, unfortunately the trends and comparisons presented here do not necessarily reflect the impact of the ICO4MCH evidence-based strategies on the outcomes. Outcomes shown here are at a population level while the number of people reached by ICO4MCH represents a small percent of the population and varies by county, thus we may not see an impact at the population level. We have not controlled for other programs and external factors that may have also influenced these outcomes, such as the COVID-19 pandemic.

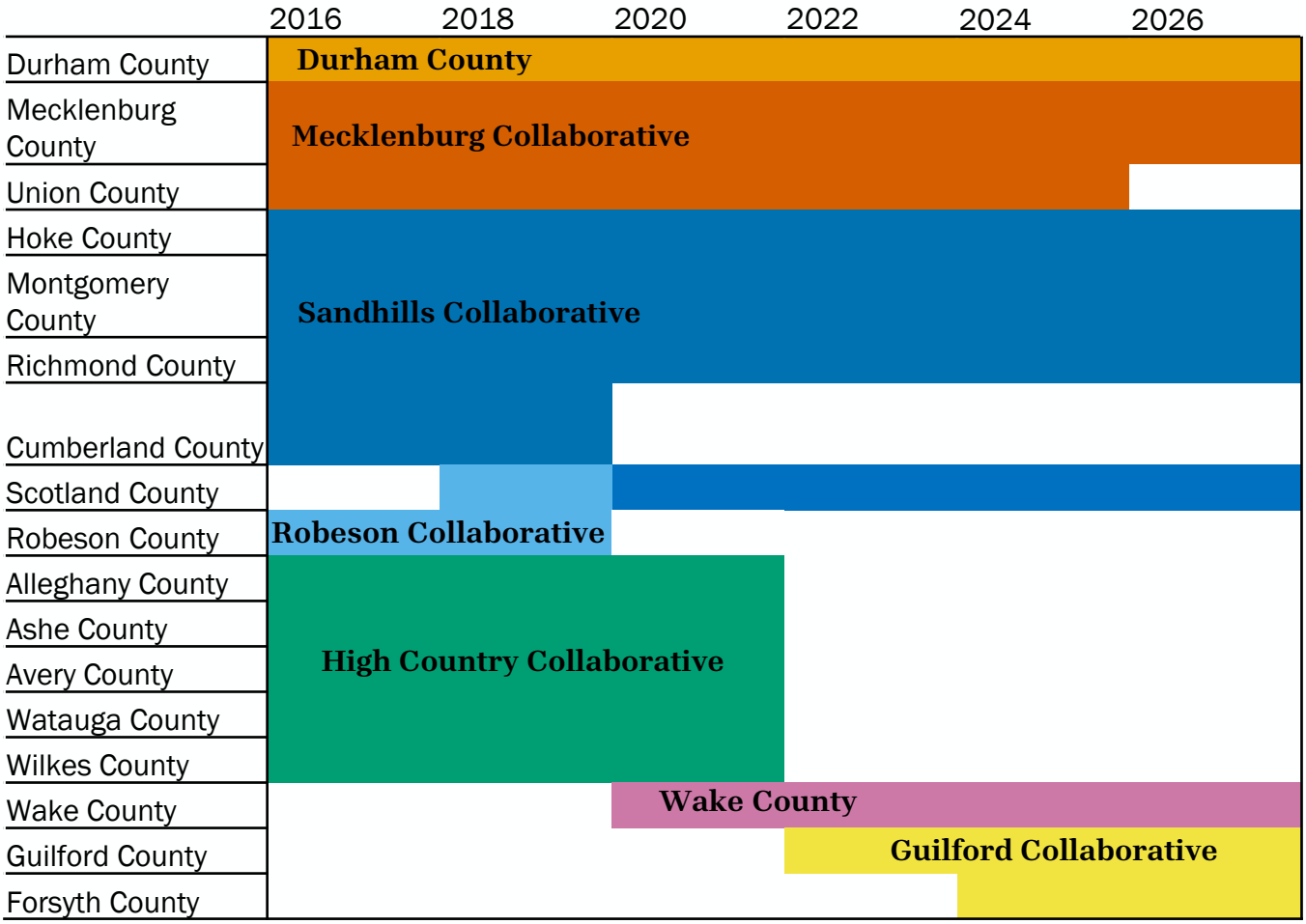
What are the sources of data for this report?
The numerators and denominators used to calculate rates for preterm, low birthweight, very low birthweight, short birth interval, cesarean birth, breastfed at hospital discharge, infant death, and child death were provided by the NC Division of Public Health based on birth certificate, death certificate, and US Census Bureau population estimates. The numerators for the child welfare data (substantiated reports of child abuse/neglect and out-of-home placements) were obtained from the Management Assistance for Child Welfare, Work First, and Food & Nutrition Services in North Carolina at UNC Jordan Institute for Families. Population denominators for the child welfare rates are from the U.S. Census Bureau Population Estimates. The data provided by the NC Division of Public Health classifies people by combined race-ethnicity categories whereas the data from Management Assistance separates race and ethnicity as distinct categories.

How did we calculate confidence intervals?
When the numerator for the rate is ≥ 20, we used a normal distribution approximation to calculate the confidence intervals. For numerators < 20, we calculated inverse gamma confidence intervals. Rates based on small numbers (fewer than 20 people in the numerator) are unstable and should be interpreted with caution.

What method did we use for comparing two rates?
We did not conduct any statistical testing to compare the annual rates. However, we did assess to see if there were statistically significant differences between the 2014-2018 rates and the 2019-2023 rates. We did not assess for statistical significance when any numerator had <20 events and described the comparison as "unstable." When comparing two rates with >99 events in numerator, we calculated a test statistic to determine statistical significance. For a comparison where at least one rate contained 20-99 events in the numerator, we assessed significance by looking at confidence interval overlap. If confidence intervals overlapped, we concluded that the rates were not statistically significantly different. We recommend interpreting the statistical significance conclusions with caution as the ability to detect a statistically significant difference depends on the size of the population. For example, we have a greater ability to detect differences in the child welfare outcome data because of the larger population size for those data points.

ICO4MCH Overview

In Session Law 2015-241, the North Carolina General Assembly allocated funding to be distributed to Local Health Departments (LHD) to implement evidence-based strategies (EBS) with the following aims: **1) Improving birth outcomes**, **2) Reducing infant mortality**, and **3) Improving child health ages 0 to 5**. In June 2016, the NC Division of Public Health (DPH), Women, Infant, and Community Wellness Section funded five grantee LHDs to implement three evidence-informed strategies for two years. In June 2018, funding was renewed for the initial five grantee LHDs and Scotland County joined as a partner with Robeson County, increasing the reach of ICO4MCH from 13 to 14 counties. In June 2020, funding was renewed for four initial grantees, and a new grantee, Wake County, was added; 13 counties were funded for Fiscal Year (FY) 21-22. In June 2022, funding was renewed for four continuing grantees, and a new grantee, Guilford County was added; 9 counties were funded for FY23-24. In June 2024, funding was renewed for five continuing grantees; 9 counties were funded for FY25-26. Two of these grantees changed county composition: Union County stopped participating in the Mecklenburg Collaborative, while Forsyth County joined Guilford County to create the Guilford-Forsyth Collaborative. The figure below shows each of the counties and the collaborative that they belong to for each two-year funding cycle.

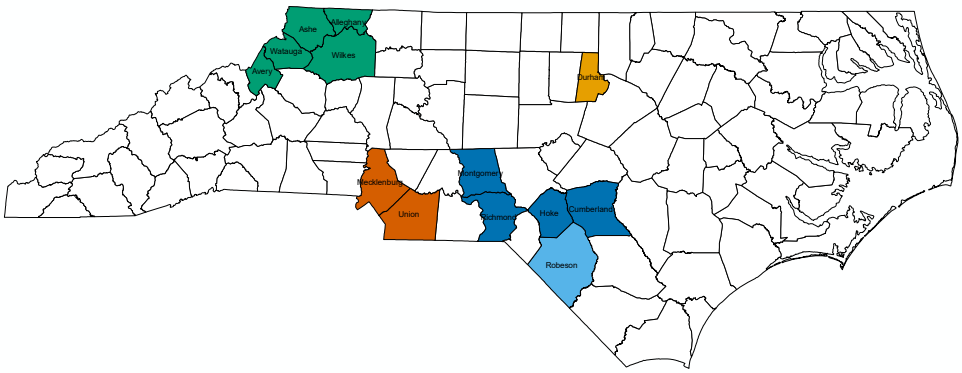


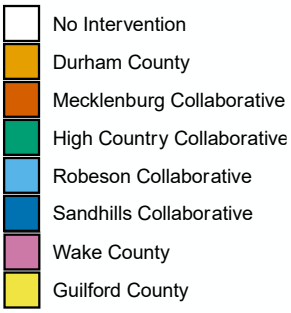
Sandhills Collaborative included Cumberland County from FY2017-FY2020. In FY2021, Scotland County joined Sandhills Collaborative and Cumberland County stopped participating. Robeson County participated on its own in FY2017 and FY2018. In FY2019 and FY2020, Robeson County and Scotland County counties participated together as the Robeson Collaborative. Funding for Robeson Collaborative ended at the close of FY2020 and for High County Collaborative at the close of FY2022. Union County left Mecklenburg Collaborative at the end of FY2024. Guilford Collaborative added Forsyth County at the beginning of FY2025.

ICO4MCH Overview

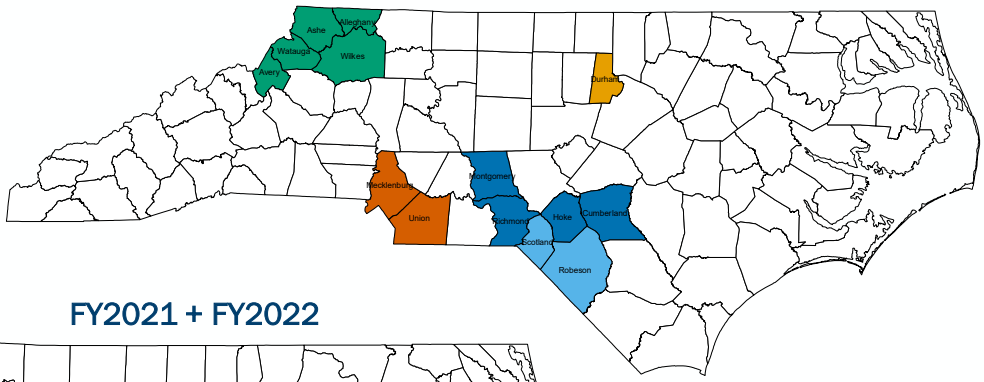
Maps of counties receiving funding for ICO4MCH during fiscal years 2017-2024

FY2017 + FY2018

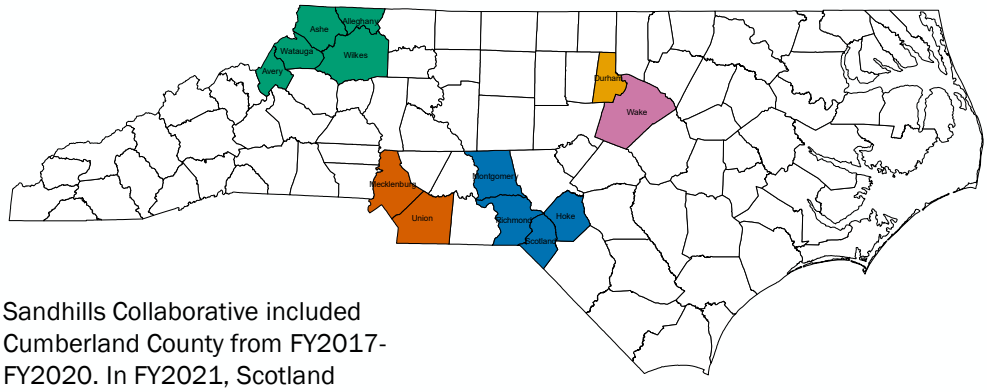




FY2019 + FY2020



FY2021 + FY2022



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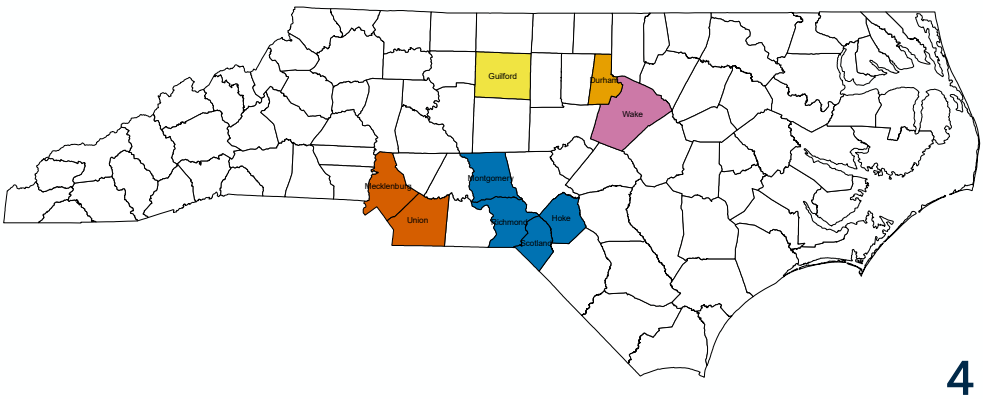
FY2023 + FY2024



ICO4MCH Overview

Evidence-based strategies implemented by grantees in each fiscal year with the aim of improving birth outcomes

Grantee	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26
Durham County	LARC	LARC	RLP	RLP	RLP	RLP	RLP	PC	PC	PC
Mecklenburg Collaborative ***	LARC	LARC	RLP	RLP	PC	PC	PC	PC	PC	PC
Sandhills Collaborative*	LARC	LARC	RLP	RLP	PC	PC	PC	PC	DOULA	DOULA
Robeson County/ Collaborative**	LARC	LARC	RLP	RLP						
High Country Collaborative	LARC	LARC	RLP	RLP	RLP	RLP				
Wake County					RLP	RLP	RLP	RLP	DOULA	DOULA
Guilford County/ Collaborative ****							PC	PC	PC	PC

- LARC = Long-Acting Reversible Contraception
- RLP = Using a Reproductive Justice Framework to improve the utilization of Reproductive Life Planning (note that LARC turned into RLP at the beginning of FY2019)
- PC = Preconception and Interconception Health
- DOULA = Doula Services

A full description of each of the evidence-based strategies is in the Appendix on page 31.

*Sandhills Collaborative included Cumberland County from FY2017-FY2020. In FY2021, Scotland County joined Sandhills Collaborative and Cumberland County stopped participating.
**Robeson County participated on its own in FY2017 and FY2018. In FY2019 and FY2020, Robeson County and Scotland County counties participated together as the Robeson Collaborative.
*** Union County left Mecklenburg Collaborative at the end of FY2024.
**** Guilford Collaborative added Forsyth County at the beginning of FY2025.

ICO4MCH Overview

Evidence-based strategies implemented by grantees in each fiscal year with the aim of reducing infant mortality

Grantee	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26
Durham County	TB	TB	TB	TB	BF	BF	BF	BF	BF	BF
Mecklenburg Collaborative ***	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF
Sandhills Collaborative*	BF	BF	BF	BF	BF	BF	BF	BF	BF	BF
Robeson County/ Collaborative**	BF	BF	BF	BF						
High Country Collaborative	TB	TB	TB	TB	TB	TB				
Wake County					BF	BF	BF	BF	BF	BF
Guilford County/ Collaborative ****							BF	BF	BF	BF

- TB = Tobacco Cessation and Prevention
- BF = Ten Steps for Successful Breastfeeding, with a focus on Steps 3 & 10

A full description of each of the evidence-based strategies is in the Appendix on page 31.

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**Robeson County participated on its own in FY2017 and FY2018. In FY2019 and FY2020, Robeson County and Scotland County counties participated together as the Robeson Collaborative.
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ICO4MCH Overview

Evidence-based strategies implemented by grantees in each fiscal year with the aim of improving child health ages 0 to 5

Grantee	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26
Durham County	Family Connects, Triple P	Family Connects	Family Connects	Family Connects	Family Connects	Family Connects	Family Connects	Family Connects	Family Connects	Family Connects
Mecklenburg Collaborative ***	Triple P	Triple P	Triple P	Triple P	Triple P	Triple P	Triple P	Triple P	Triple P	Triple P
Sandhills Collaborative*	CEASE	CEASE	CEASE	CEASE	Triple P	Triple P	Triple P	Triple P	Triple P	Triple P
Robeson County/ Collaborative**	CEASE	CEASE	CEASE	CEASE						
High Country Collaborative	Triple P	Triple P	Triple P	Triple P	Family Connects	Family Connects				
Wake County					Family Connects	Family Connects	Triple P	Triple P	Triple P	Triple P
Guilford County/ Collaborative ****							Triple P	Triple P	Triple P	Triple P

- Family Connects = Family Connects Newborn Home Visiting Program
- Triple P = Positive Parenting Program
- CEASE = Clinical Effort Against Secondhand Smoke Exposure

A full description of each of the evidence-based strategies is in the Appendix on page 31.

*Sandhills Collaborative included Cumberland County from FY2017-FY2020. In FY2021, Scotland County joined Sandhills Collaborative and Cumberland County stopped participating.
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ICO4MCH Overview

Long-Term Outcomes

The evaluation stakeholder group developed an evaluation plan in 2016 and initially chose eight long-term outcomes to evaluate the effectiveness of ICO4MCH. In FY2024, the group added two more long term outcomes (#5 and #6) which are newly presented in this report.

Effectiveness of ICO4MCH is achieving the long-term (3 to 5 years) goals of:

1. **improving birth outcomes**
2. **reducing infant mortality**
3. **improving the health status of children ages 0-5.**

1. Decrease preterm birth rates (<37 weeks gestation) (rate per 100 live births)
2. Decrease low (<2500 g) birthweight rates (rate per 100 live births)
3. Decrease very low (<1500 g) birthweight rates (rate per 100 live births)
4. Decrease short birth interval [<18 months between previous birth and conception] rate per 100
5. Decrease cesarean delivery (rate per 100 live births)
6. Increase breastfeeding at hospital discharge (rate per 100 live births)
7. Decrease infant mortality rates for all racial and ethnic groups (rate per 1,000 live births)
8. Decrease deaths of children ages 1 to 5 (rate per 100,000 children)
9. Decrease rate of substantiated reports of child abuse and neglect for children ages 0 to 5 (includes abuse, neglect, abuse & neglect, dependency, services needed, and services provided but not longer needed) (per 1,000 children)
10. Decrease the rate of out-of-home placements for children ages 0-5 (per 1,000 children)

Key Takeaways

Birth outcomes: The rates of preterm births (PTB) and short birth intervals increased in the continuously funded ICO4MCH counties from the pre-ICO4MCH implementation period to the post-ICO4MCH implementation period while the rates of low birthweight (LBW) births and very low birthweight (VLBW) births did not significantly change. In North Carolina overall, the rates of PTB, LBW, and short birth intervals increased slightly from 2014 to 2023. For PTB and short birth intervals, there was a greater increase for North Carolina overall compared to ICO4MCH counties. In ICO4MCH counties, the rate of PTB significantly increased for Hispanic/Latine mothers, while the rate of LBW and VLBW significantly decreased for non-Hispanic White mothers.

New long-term outcomes: This reporting period, the Evaluation Advisory Committee voted to add two new long-term outcomes (cesarean section and breastfed at discharge) because of the recently added evidence-based strategies on Preconception Health and Doula Services.

- Cesarean deliveries increased in both ICO4MCH counties and statewide. These rates increased significantly among multi-racial, Asian or Pacific Islander, African American, and Hispanic/Latine mothers. The Doula Services strategy, which started in FY25, is specifically designed to address these disparities.
- Although the Breastfeeding evidence-based strategy has been implemented since ICO4MCH started, this is the first report to examine breastfeeding at hospital discharge. Before ICO4MCH funding began, breastfeeding rates were higher in ICO4MCH counties compared to North Carolina, and when comparing rates across 2014-2018 to 2019-2023, they increased two percentage points higher in ICO4MCH counties compared to North Carolina, which reflects positively on the breastfeeding evidence-based strategy. Moreover, there were significant increases in breastfeeding at discharge among White, African American, Asian and Pacific Islander and Hispanic/Latine women from 2014-2018 to 2019-2023, and these increases were highest among African American mothers.

Infant mortality: In the counties receiving continuous ICO4MCH funding, there was some evidence of a drop in the infant death rate among non-Hispanic white mothers, though there was not a statistically significant difference between the 2014-2018 to 2019-2023 overall rates. The infant death rate remained stable in North Carolina overall from 2014 to 2023.

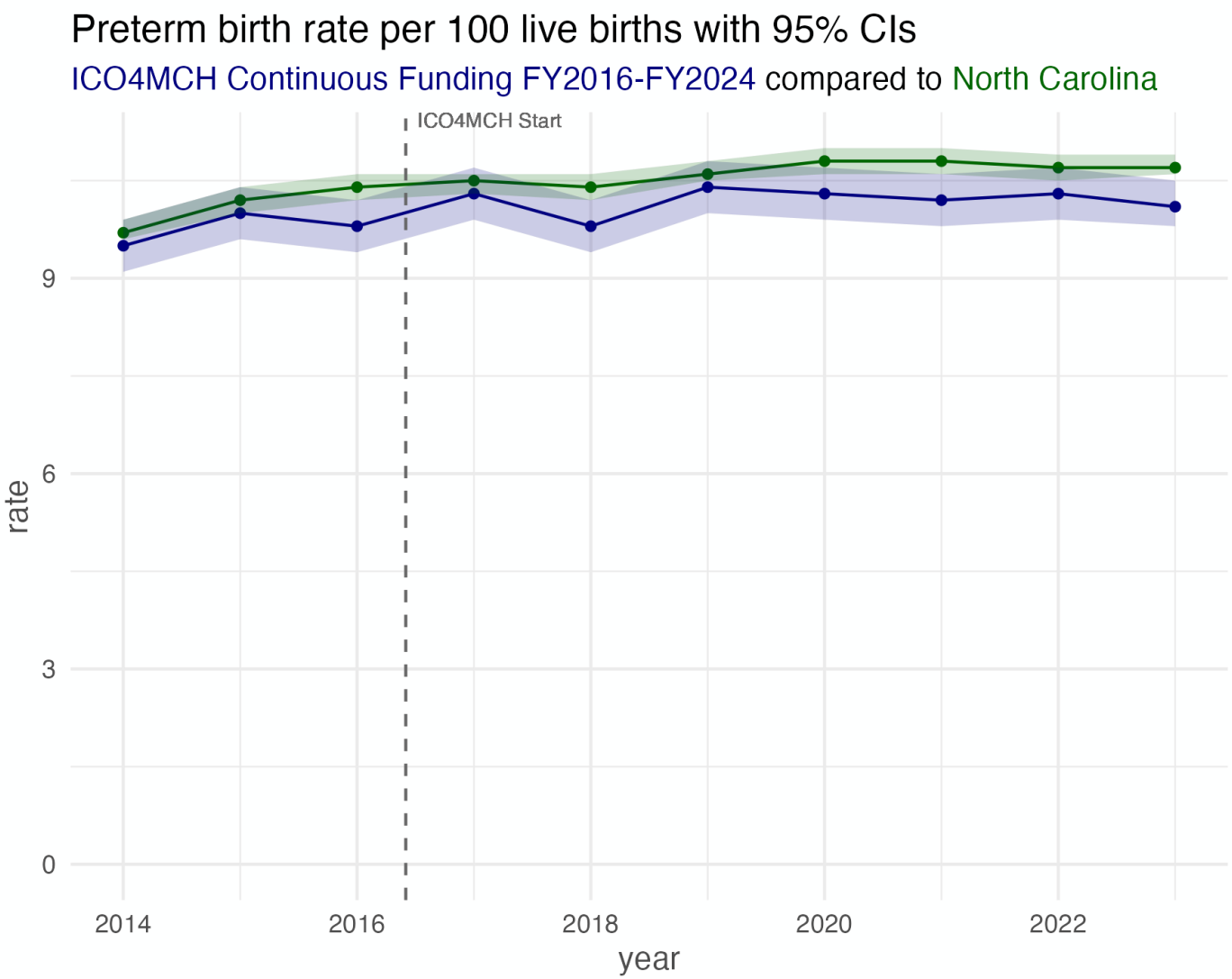
Child health: With so few child deaths, we were unable to see a clear pattern regarding death rates for children ages 1-5 in the ICO4MCH counties. From 2014-2023, the rate of substantiated reports of child abuse and neglect increased in the ICO4MCH counties. Rates of substantiated reports of child abuse and neglect dropped among other race and increased among non-Hispanic and African American children. The rate of out-of-home placements decreased in the ICO4MCH counties from 2014 to 2023. When looking within race and ethnicity groups, out-of-home placements decreased among other race, non-Hispanic children, and African American children post-ICO4MCH period compared to the pre-ICO4MCH period.

Disparities: In North Carolina, non-Hispanic African American mothers experience worse birth outcomes than other groups due to historical inequities. This was true in ICO4MCH counties, in which during 2019-2023, non-Hispanic African Americans experienced almost twice the rate of PTB, twice the rate of LBW births, almost four times the rate of VLBW births, and three times the rate of infant deaths compared to non-Hispanic White mothers. In ICO4MCH counties, rates of short birth intervals were lowest among Hispanic/Latine mothers and highest among non-Hispanic White mothers. African American children experienced higher rates of child abuse and neglect and out-of-home placement than the other race groups. In some cases, disparities worsened comparing the post-ICO4MCH period to the pre-period. For example, non-Hispanic African American mothers had 2.1 times the rate of LBW in 2014-2018 and 2.5 times the rate of LBW in 2019-2023 compared to non-Hispanic White mothers. Cesarean deliveries increased for several groups but remained stable among White women. Additionally, rates of child abuse and neglect increased among African American children. Despite persistent racial disparities, the rate of out-of-home placements decreased significantly for African American children from 2014-2018 to 2019-2023. Other positive gains were in breastfeeding at discharge, where the rate increased for several racial-ethnic groups, including African American mothers.

Preterm Birth

Preterm birth rate per 100 live births with 95% confidence intervals

The PTB rate per 100 live births increased in North Carolina from 9.7 (95% CI: 9.6, 9.9) in 2014 to 10.7 (95% CI: 10.6, 10.9) in 2023, an increase of about 10%. From 2014 to 2023, the rate of PTB in ICO4MCH counties increased from 9.5 (95% CI: 9.1, 9.9) to 10.1 (9.8, 10.5) per 100 live births, peaking in 2019 at 10.4 (95% CI: 10, 10.8), though there does not appear to be a clear directional trend with the annual rates. **Overall, preterm birth rates appear to be similar in counties continuously funded by ICO4MCH and in North Carolina overall.**



Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Preterm Birth

Preterm birth rate per 100 live births with 95% confidence intervals

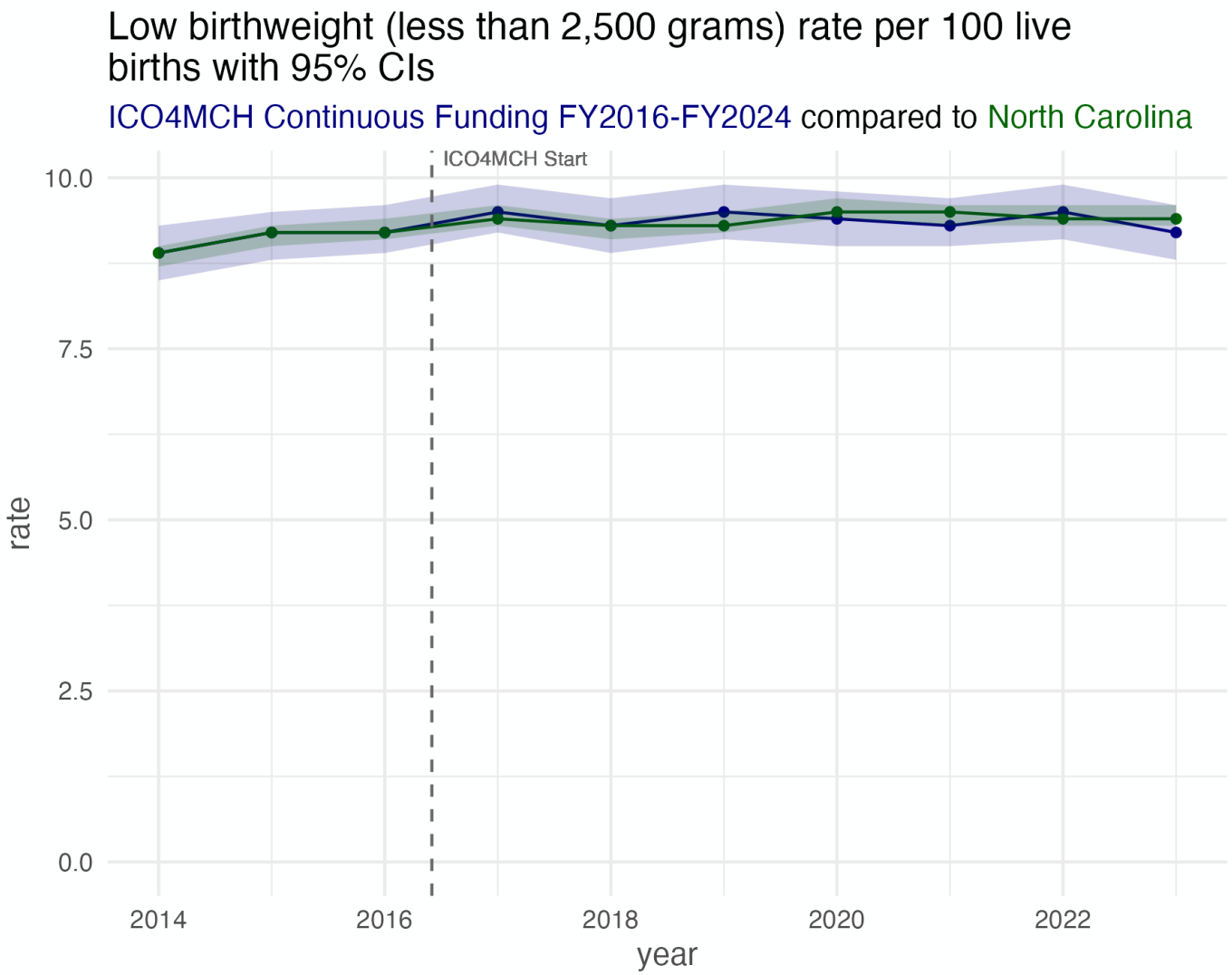
The PTB rate per 100 live births in the continuously funded ICO4MCH counties increased slightly from 2014-2018 (9.9, 95% CI: 9.7, 10.1) and 2019-2023 (10.3, 95% CI: 10.1, 10.4). This seemed to be driven mostly among increases in the Hispanic/Latine mothers in ICO4MCH counties from 8.9 (95% CI: 8.5, 9.3) to 10.0, (95% CI: 9.7, 10.4) comparing the two time periods but did not significantly change within the other race-ethnicity groups. In 2019-2023 in ICO4MCH counties, non-Hispanic African American mothers had 1.7 times the rate of PTB compared to White mothers (14.1 compared to 8.0). **Overall, preterm birth rates increased slightly from the before to after period.**

Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.
Note: For non-Hispanic White, the rate and 95% CIs are the same for both time periods, so that is why only the blue dot shows.
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Low Birthweight

Low birthweight rate per 100 live births with 95% confidence intervals

The rate of low birthweight (LBW) births is similar in the continuously funded ICO4MCH counties and North Carolina overall. The LBW rate per 100 live births in North Carolina overall increased from 8.9 (95% CI: 8.7, 9.0) in 2014 to 9.4 (95% CI: 9.3, 9.6) in 2023. The annual rates of LBW births in continuously funded ICO4MCH counties changed from 8.9 (95% CI: 8.5, 9.3) in 2014 to 9.2 (95% CI: 8.8, 9.6) in 2023. **Overall, low birthweight rates were similar across ICO4MCH continuously funded counties and North Carolina.**



Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Note: Similarities between LBW rates for ICO4MCH continuously funded counties and North Carolina overall led to large overlaps in confidence intervals. ICO4MCH continuously funded counties have a greater confidence interval because of having a smaller denominator, creating a less precise measurement.

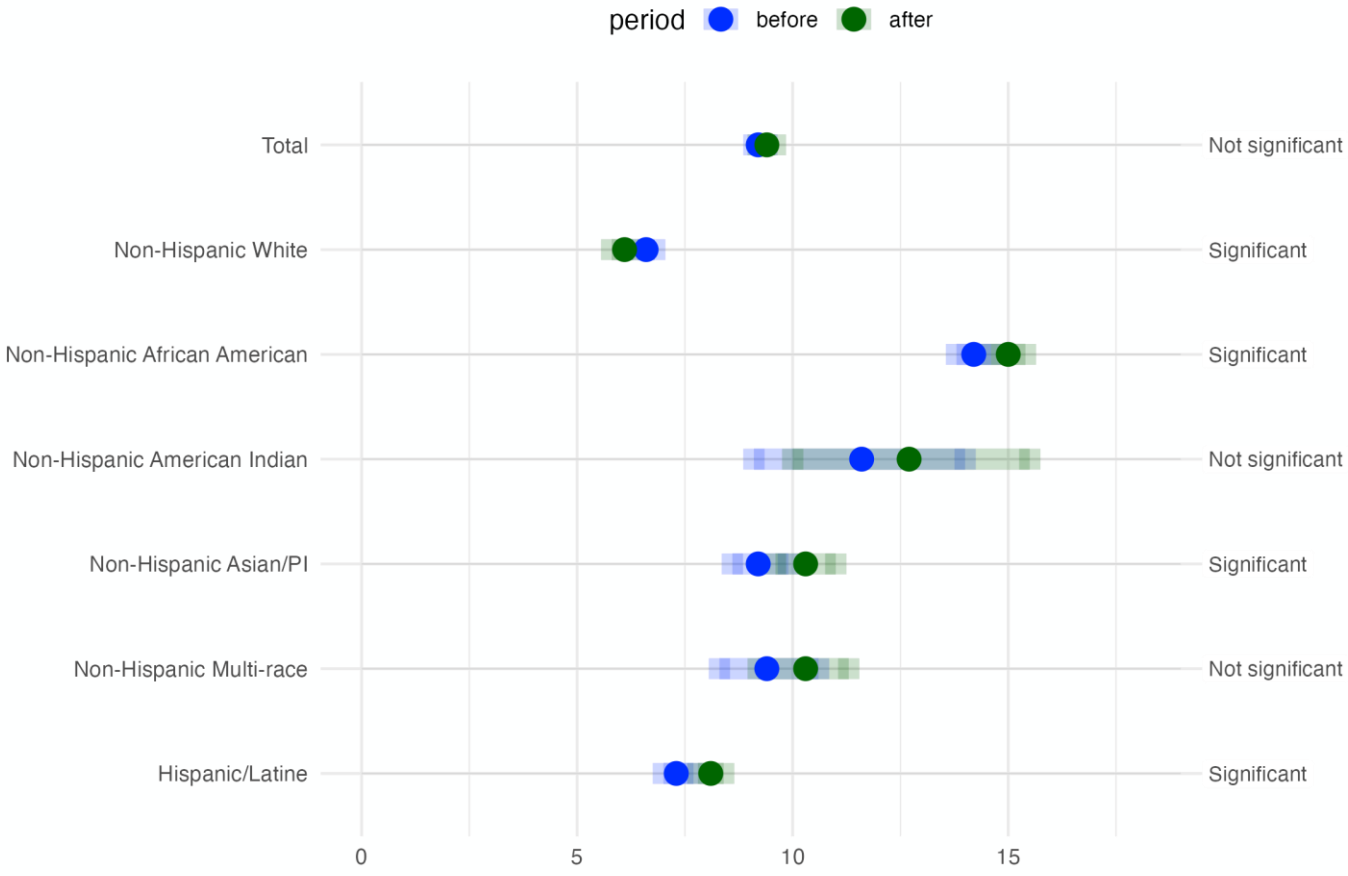
Low Birthweight

Low birthweight rate per 100 live births with 95% confidence intervals

The LBW rate per 100 live births in continuously funded ICO4MCH counties was 9.2 (95% CI: 9.1, 9.4) in 2014-2018 and 9.4 (95% CI: 9.2, 9.6) in 2019-2023. The LBW rate significantly decreased from 2014-2018 to 2019-2023 among non-Hispanic White mothers (6.6 to 6.1) and significantly increased among Hispanic/Latine mothers (7.3 to 8.1), African American mothers (14.2 to 15.0), and Asian/Pacific Islander mothers (9.2 to 10.3). Non-Hispanic African American mothers had 2.1 times the rate of LBW in 2014-2018 (14.2) and 2.5 times the rate of LBW in 2019-2023 (15.0) compared to non-Hispanic White mothers (6.6 and 6.1, respectively). **Overall, the rate of LBW did not change from before to after, but there was a decrease among non-Hispanic White mothers. Disparities worsened between 2014-2018 and 2019-2023.**

Low birthweight (less than 2,500 grams) rate per 100 live births

ICO4MCH Continuous Funding FY2016–FY2024
comparing before (2014-2018) and after (2019-2023) ICO4MCH with 95% CIs

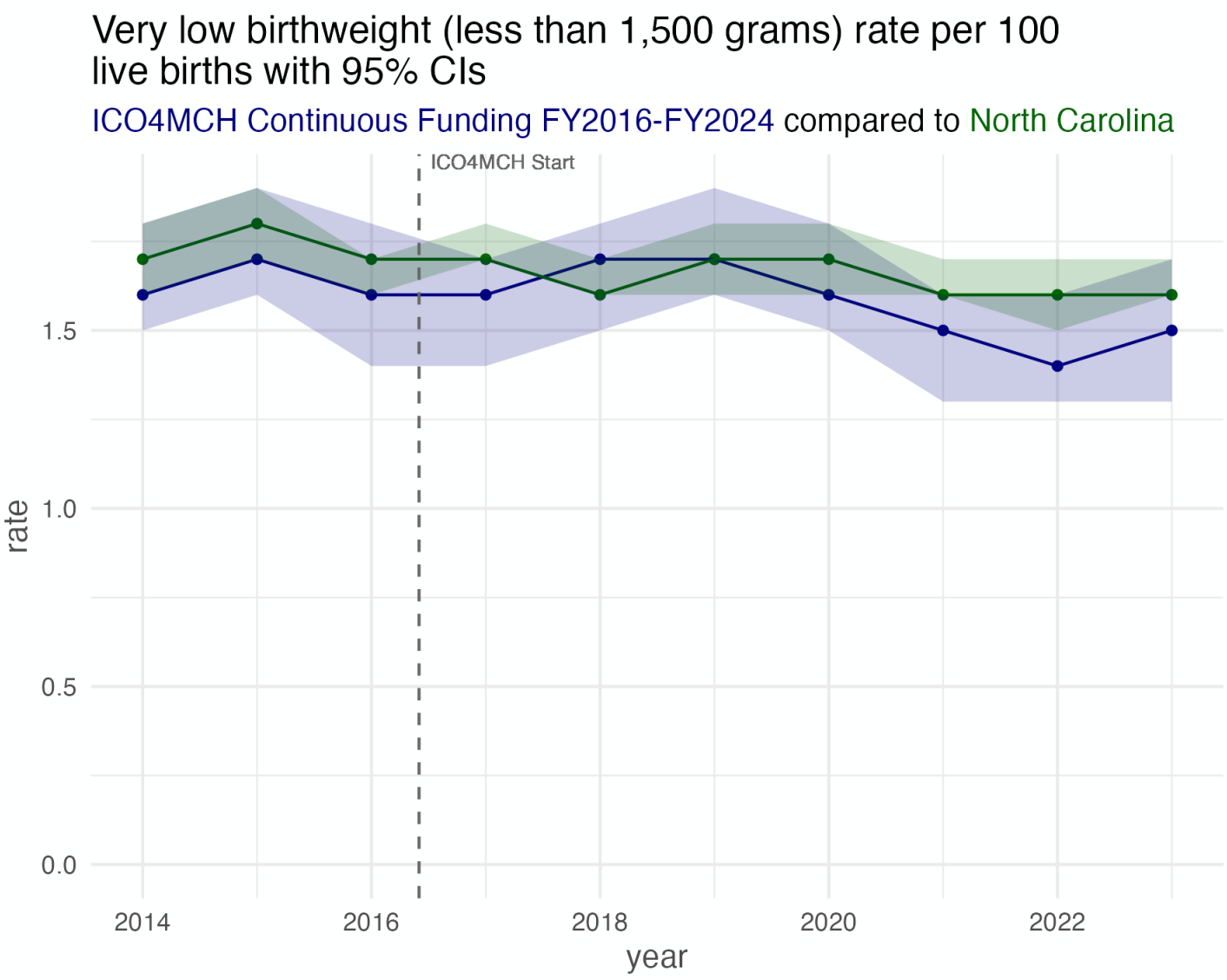


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Very Low Birthweight

Very low birthweight rate per 100 live births with 95% confidence intervals

Very low birthweight (VLBW) rates in continuously funded ICO4MCH counties were similar to North Carolina overall. In ICO4MCH counties, VLBW rates decreased from 1.6 (95% CI: 1.5, 1.8) per 100 live births in 2014 to 1.5 (95% CI: 1.3, 1.7) in 2023. In North Carolina overall, these rates decreased from 1.7 (95% CI: 1.6, 1.8) in 2014 to 1.6 (95% CI: 1.6, 1.7) in 2023. **Overall, low birthweight rates were similar across ICO4MCH continuously funded counties and North Carolina.**

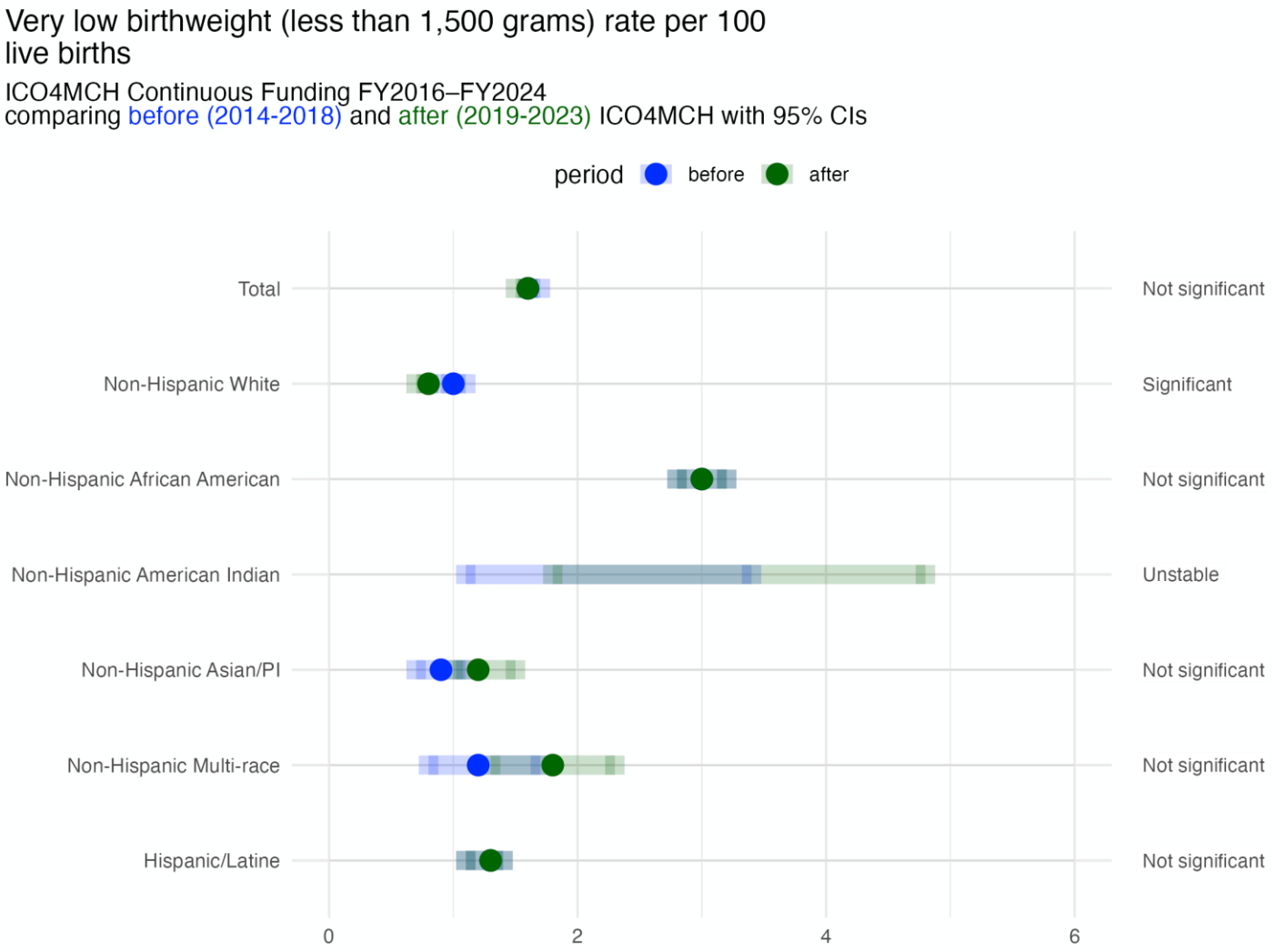


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Very Low Birthweight

Very low birthweight rate per 100 live births with 95% confidence intervals

The VLBW rate in the continuously funded ICO4MCH counties was similar in 2014-2018 (1.6 per 100 live births (95% CI: 1.6, 1.7)) and in 2019-2023 (1.6 per 100 live births (95% CI: 1.5, 1.6)). The VLBW rate among non-Hispanic White mothers significantly decreased from 2014-2018 to 2019-2023 (1.0 to 0.8). In 2019-2023. The VLBW rate was 3.0 per 100 live births for non-Hispanic African American mothers (3.8 times the rate of non-Hispanic White mothers). **Overall, very low birthweight rates did not change, but there was a decrease among non-Hispanic White mothers. Disparities did not improve between 2014-2018 and 2019-2023.**

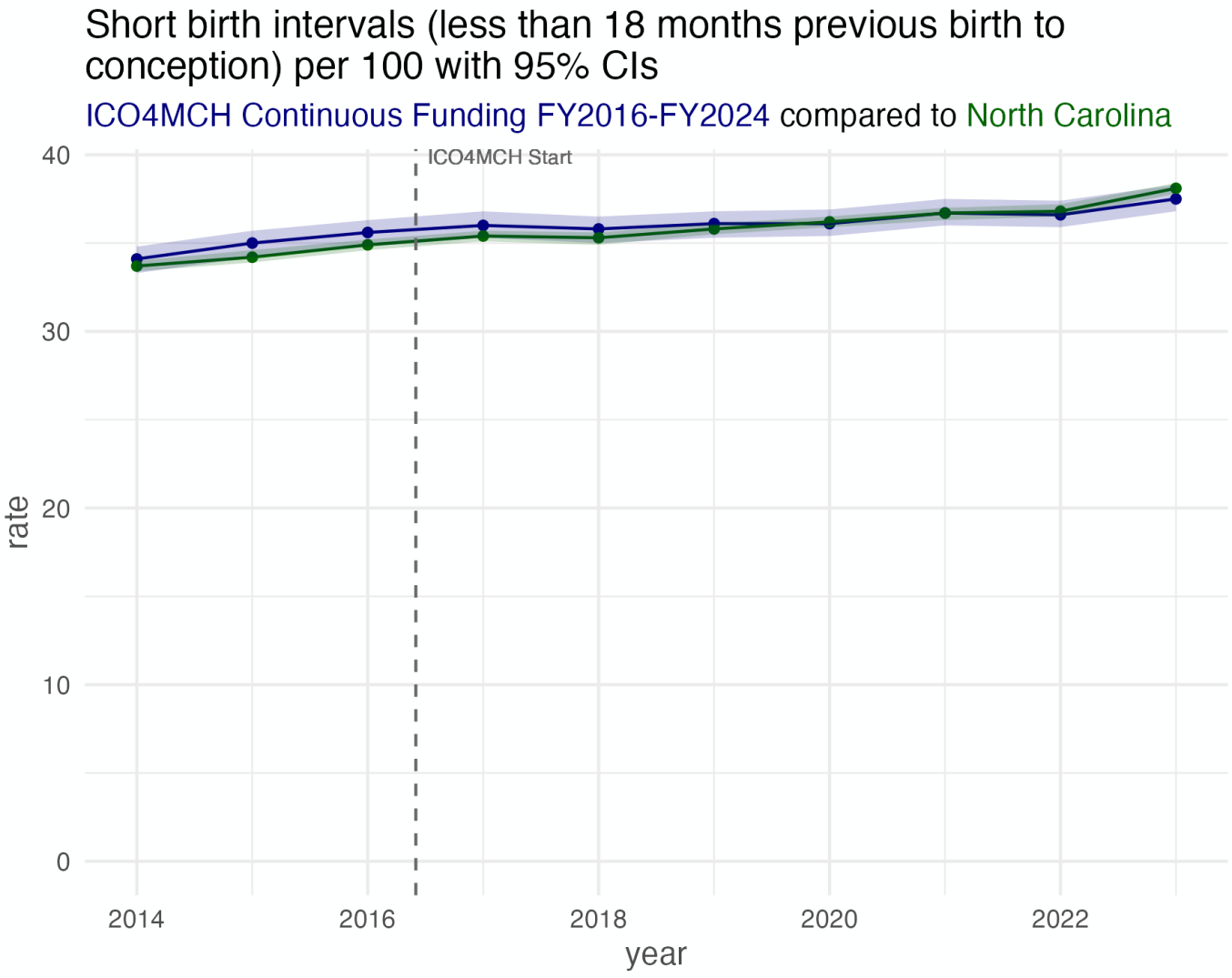


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Short Birth Interval

Short birth intervals per 100 births with 95% confidence intervals

The short birth interval rate is similar in continuously funded ICO4MCH counties compared to North Carolina overall. From 2014 to 2023, short birth interval births increased by 13.1% in North Carolina overall (33.7 per 100 to 38.1 per 100) and by 10.0% in continuously funded ICO4MCH counties (34.1 per 100 to 37.5 per 100). **Overall, short birth intervals are increasingly common within North Carolina and ICO4MCH continuously funded counties.**



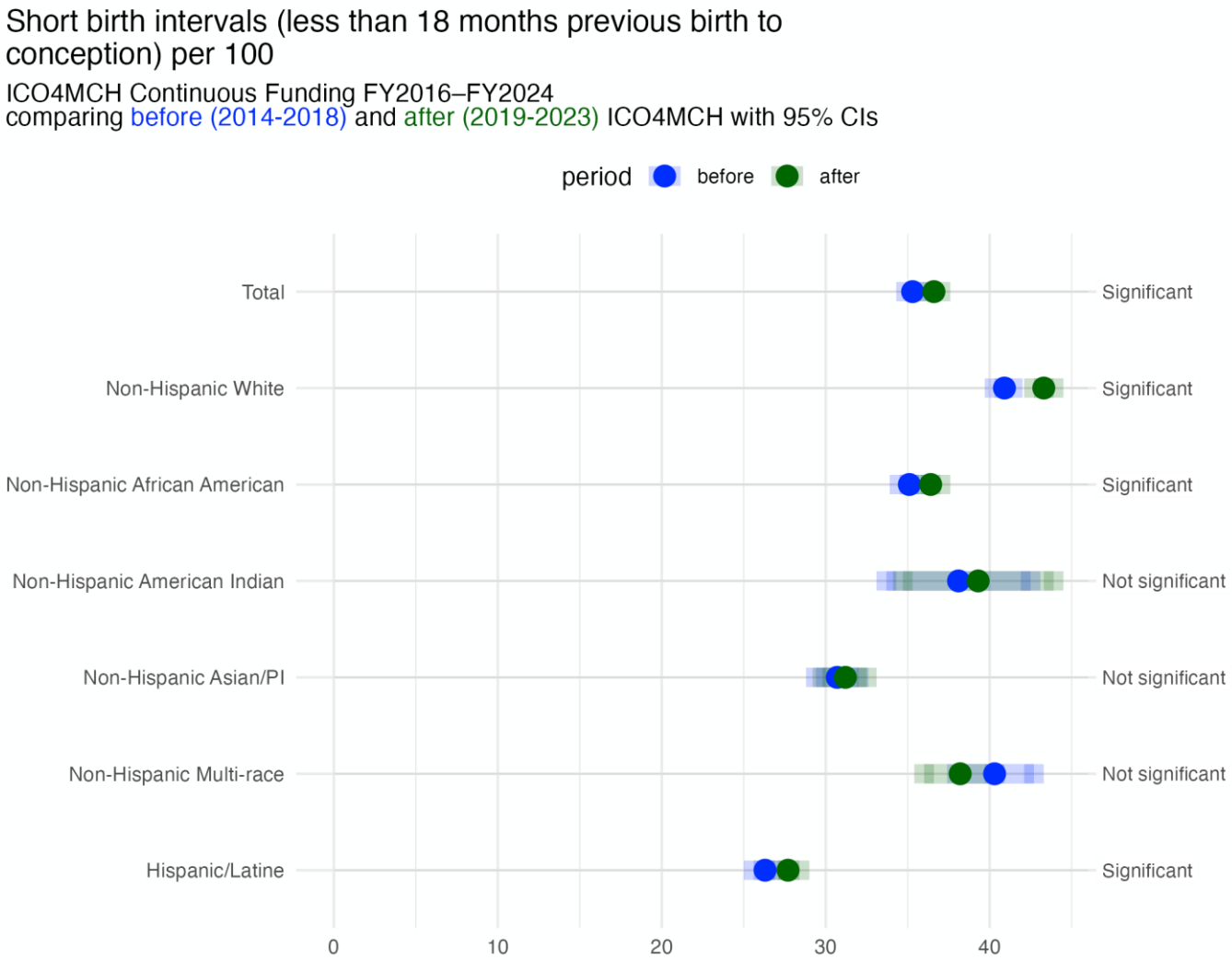
Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Note: First pregnancies excluded from rate denominator.

Short Birth Interval

Short birth intervals per 100 births with 95% confidence intervals

The rate of short birth interval per 100 births in continuously funded ICO4MCH counties increased from 35.3 (95% CI: 34.9, 35.6) in 2014-2018 to 36.6 (95% CI: 36.3, 37.0) in 2019-2023. The rates increased significantly among non-Hispanic White mothers, African American mothers, and Hispanic/Latine mothers. The rates of short birth interval births differed markedly by race ethnicity group: Hispanic/Latine mothers had the lowest rates of short birth intervals (27.7 in 2019-2023) whereas non-Hispanic White mothers had the highest (43.3 in 2019-2023). **Overall, short birth intervals increased from before to after and for several race-ethnicity groups.**



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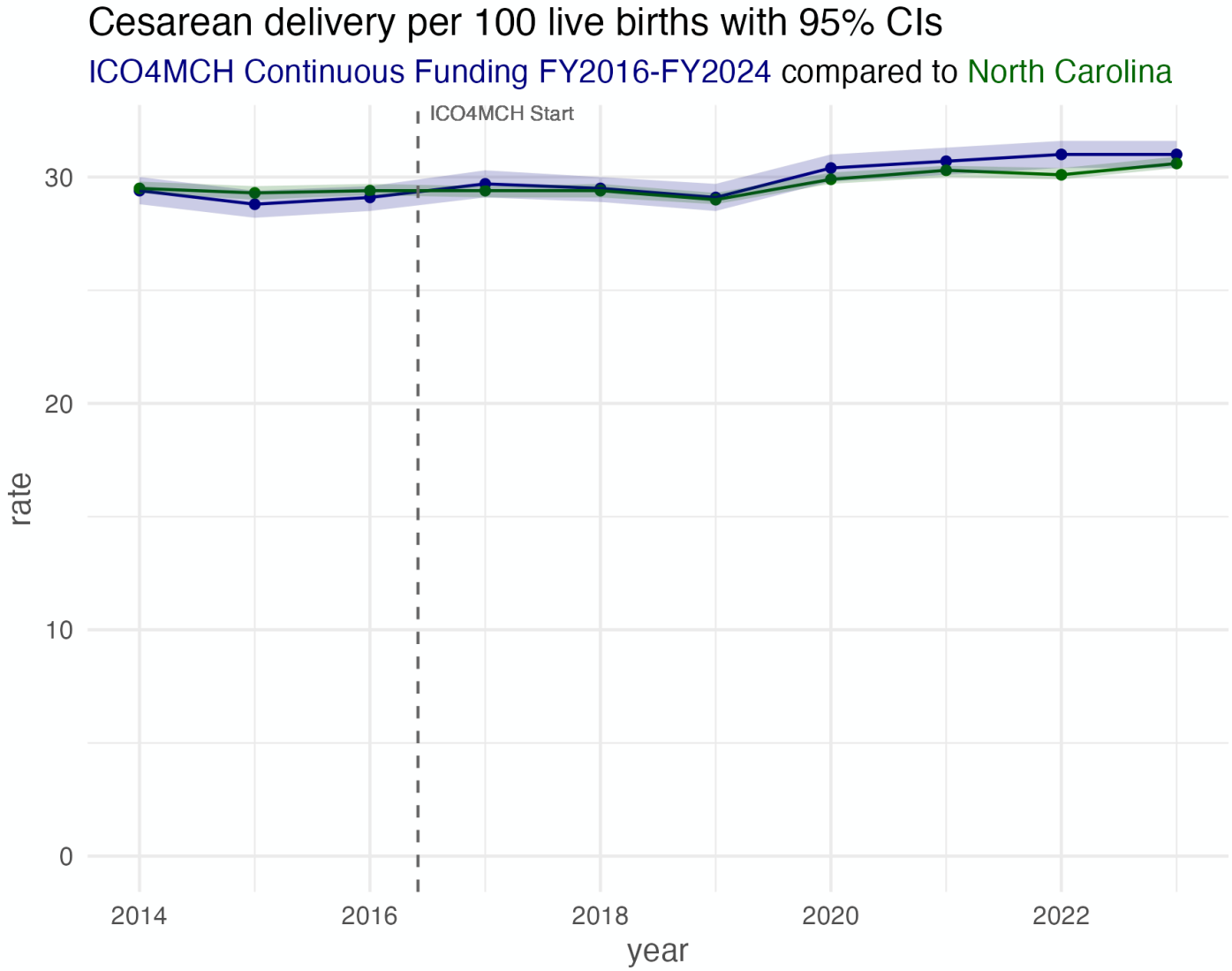
Note: First pregnancies excluded from rate denominator.

Cesarean Delivery

Rate of cesarean delivery per 100 live births with 95% confidence intervals

The Cesarean section rate per 100 live births is similar in continuously funded ICO4MCH counties compared to North Carolina overall. From 2014 to 2023, Cesarean sections increased by 3.7% in North Carolina overall (29.5 per 100 to 30.6 per 100) and by 5.4% in continuously funded ICO4MCH counties (29.4 per 100 to 31.0 per 100). **Cesarean delivery was similar in counties continuously funded by ICO4MCH and North Carolina overall.**

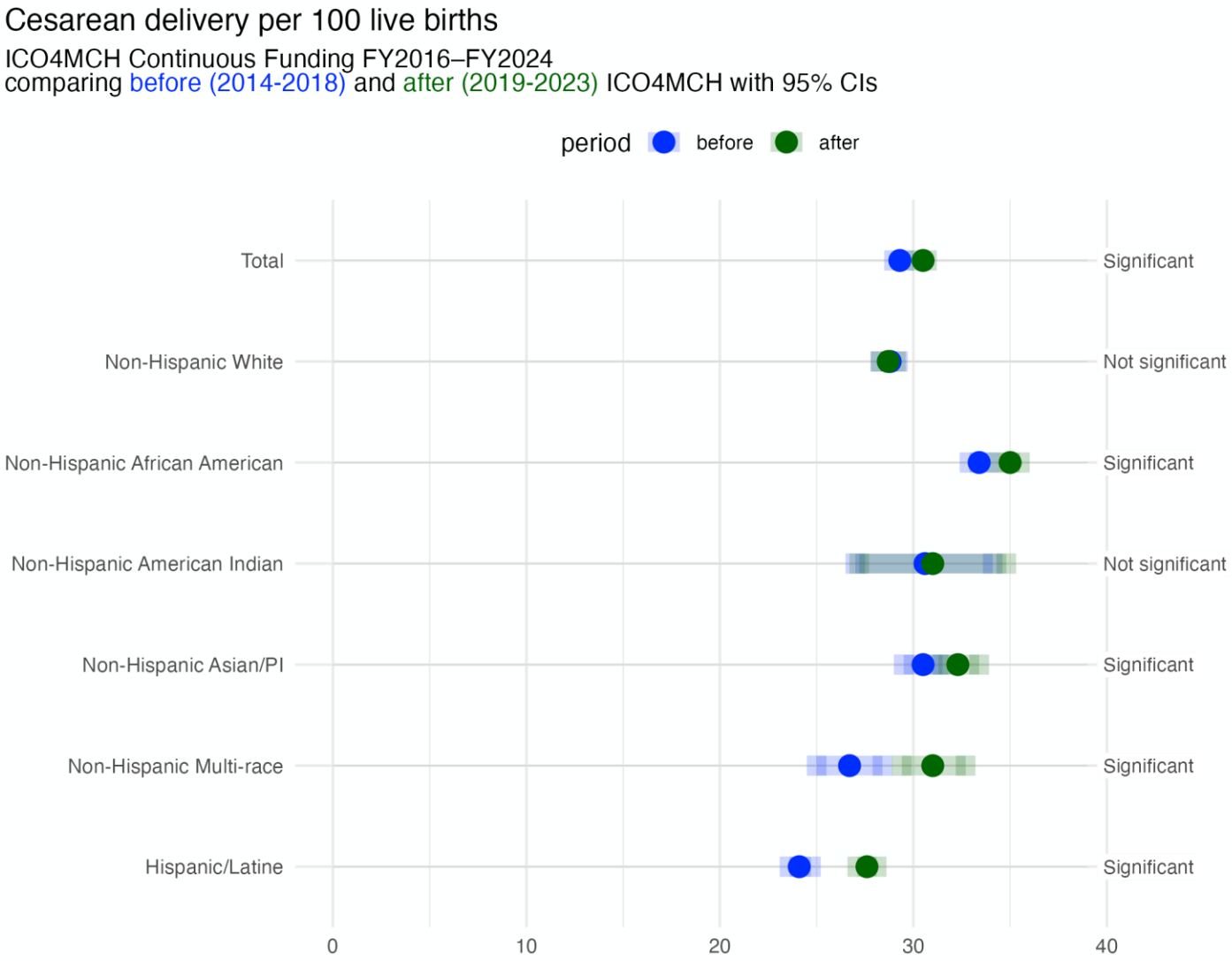


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Cesarean Delivery

Rate of cesarean delivery per 100 live births with 95% confidence intervals

The Cesarean section rate per 100 live births increased across continuously funded ICO4MCH counties from 2014-2018 (29.3 per 100 (95% CI: 29.0, 29.5) to 2019-2023 (30.5 per 100 (95% CI: 30.2, 30.7)). Rates significantly increased across time periods for non-Hispanic multi-race, Asian/Pacific Islander, African American, and Hispanic/Latine racial groups. Non-Hispanic African American mothers experienced the highest rates of Cesarean section at 35.0 per 100 births (95% CI: 34.4, 35.5) in 2019-2023. **Overall, rates of Cesarean delivery increased significantly from 2014-2018 to 2019-2023.**

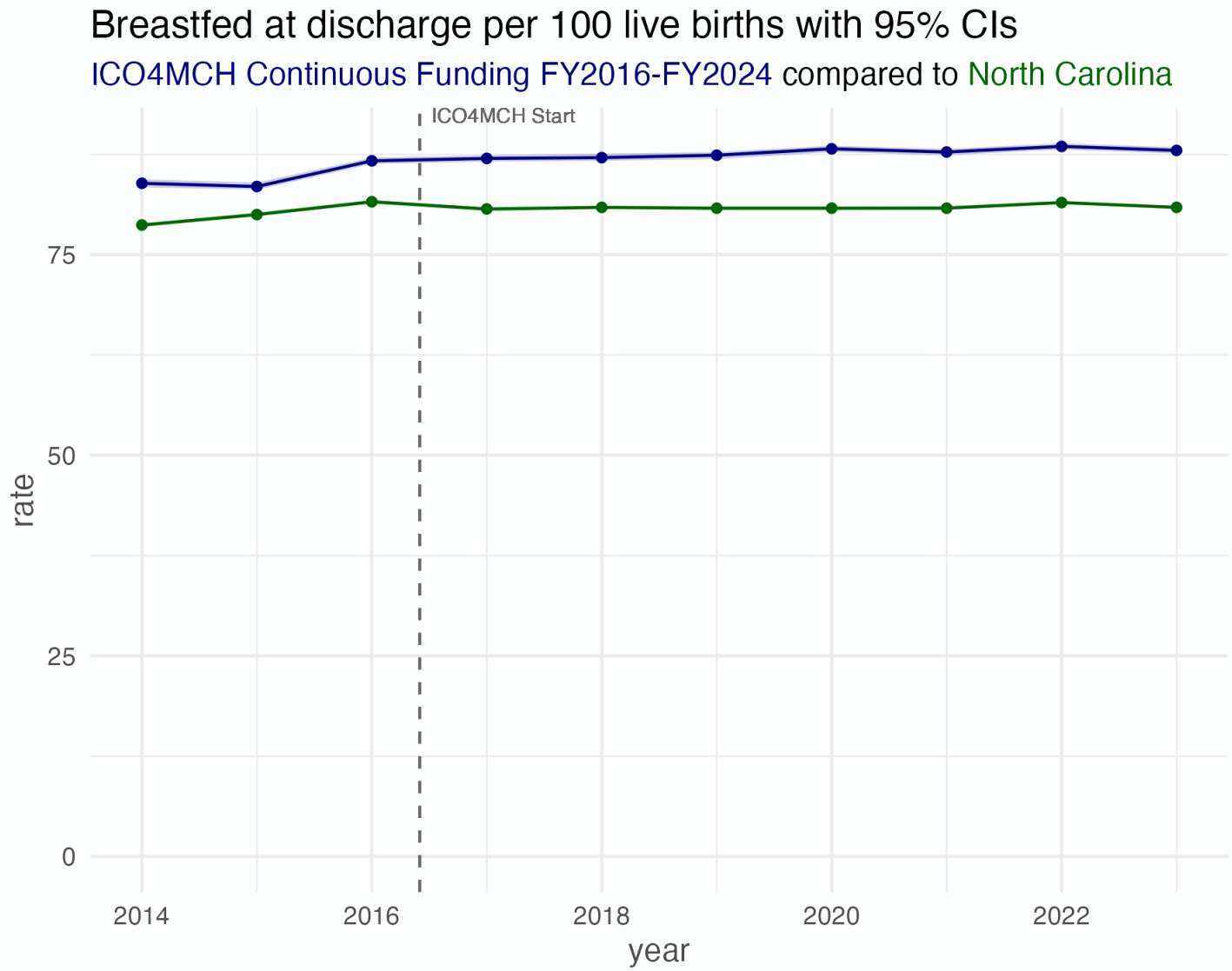


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Breastfed at Discharge

Rate of infants breastfed at discharge per 100 live births with 95% confidence intervals

From 2014 to 2023, breastfeeding at discharge rates increased by 4.9% in ICO4MCH counties (83.9 per 100 to 88.0 per 100) and by 2.8% in North Carolina overall (78.7 per 100 to 80.9 per 100). **Rates of infants breastfed at discharge are higher in counties continuously funded by ICO4MCH than in North Carolina overall.**



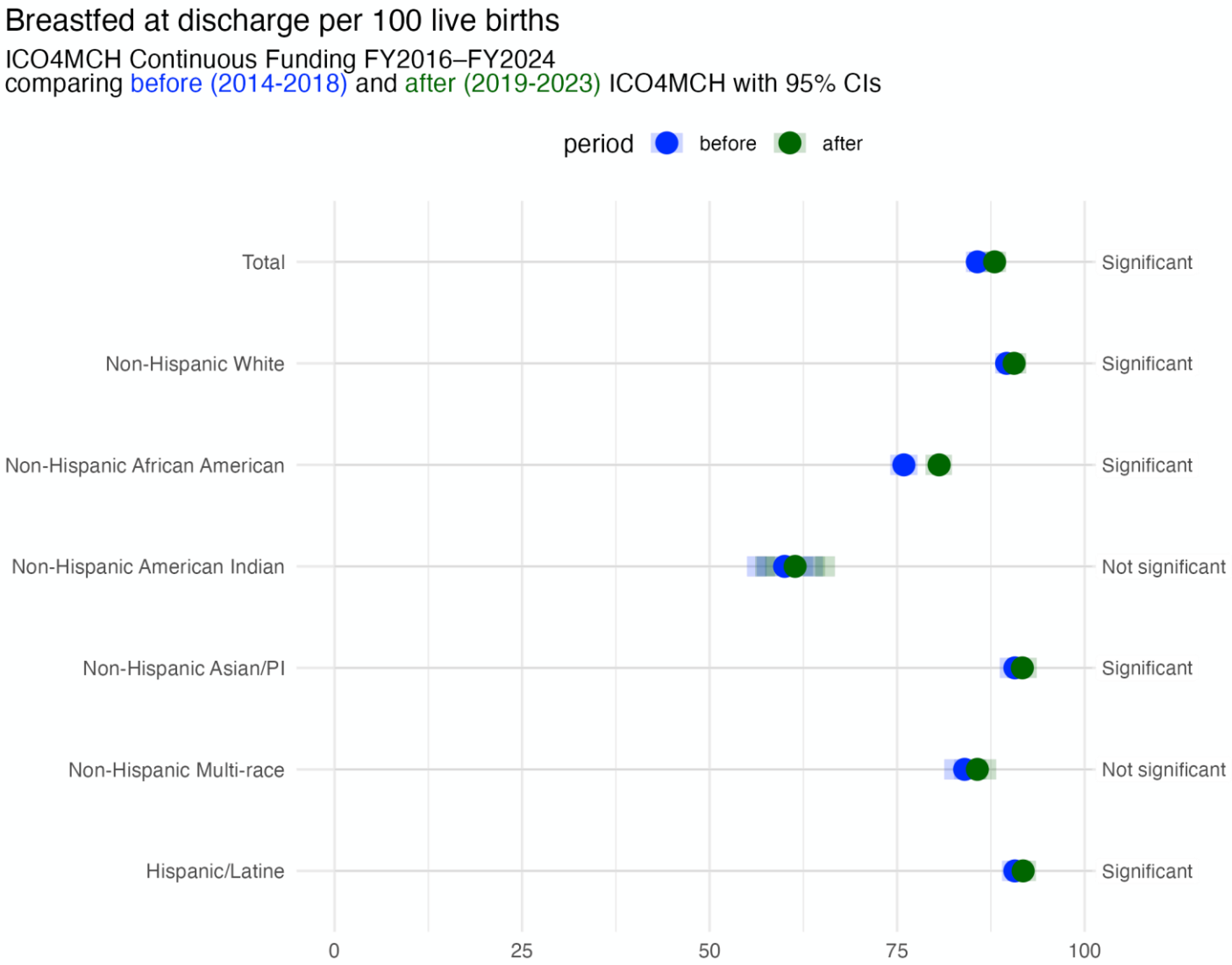
Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Note: 95% Confidence Intervals are included on this graph. Due to high levels of precision in the measurements, they may be difficult to see on the graph.

Breastfed at Discharge

Rate of infants breastfed at discharge rate per 100 live births with 95% confidence intervals

The rate of breastfeeding at hospital discharge per 100 births in continuously funded ICO4MCH counties increased from 85.7 (95% CI: 85.5, 85.9) to 88.0 (95% CI: 87.8, 88.2). The rates increased the most among non-Hispanic African American mother-infant dyads by 6% from the before period (75.9 per 100 in 2014-2018) to after (80.6 per 100 in 2019-2023). **Overall, rates of infants breastfed at discharge significantly increased and increased the most for non-Hispanic African American mothers.**



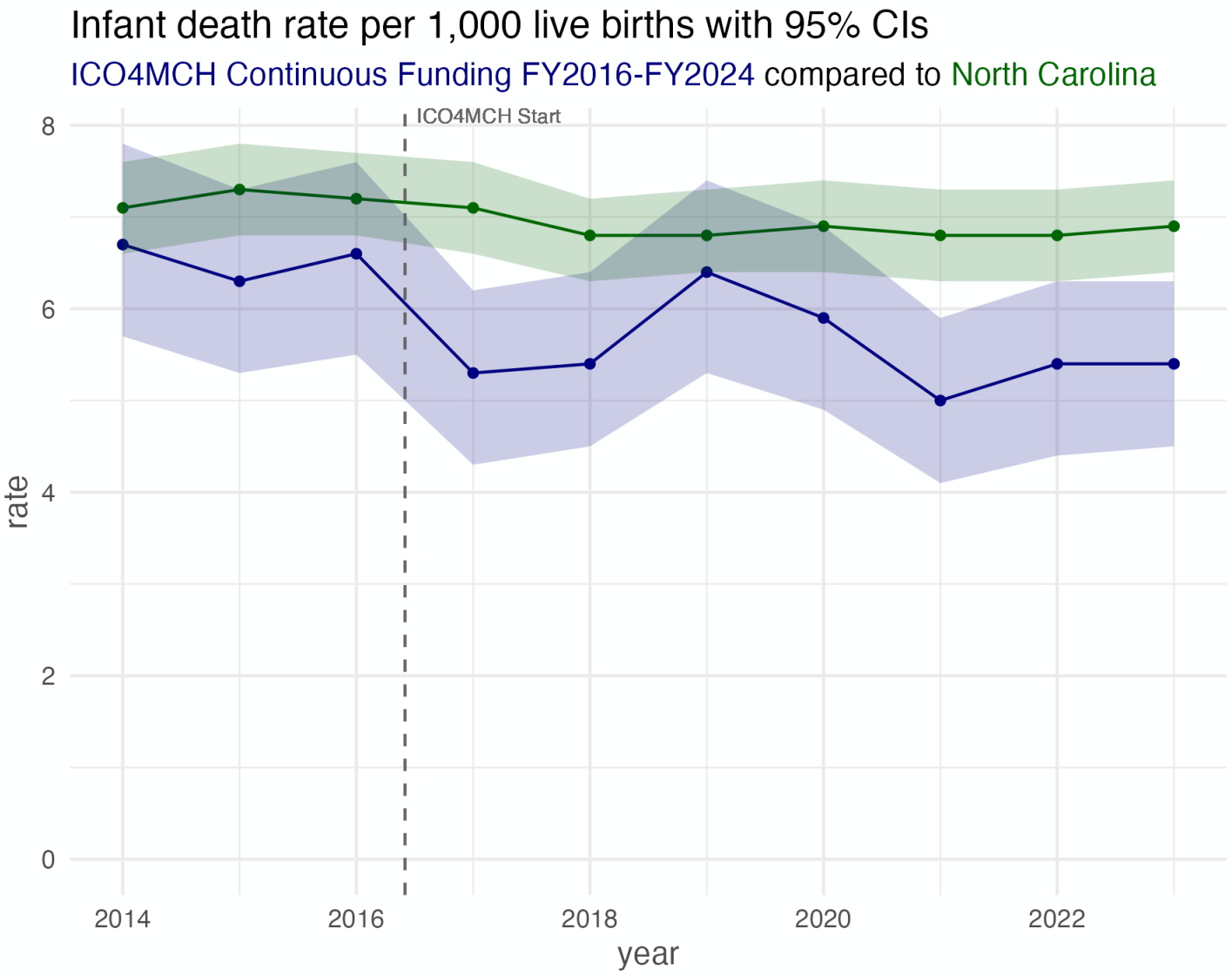
Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Infant Mortality

Infant death rate per 1,000 live births with 95% confidence intervals

The infant death rate remained stable in North Carolina overall from 2014 to 2023. In the continuously funded ICO4MCH counties, there is some evidence of a downward trend in the infant death rate per 1,000 live births from 6.7 (95% CI: 5.7, 7.8) in 2014 to 5.4 (95% CI: 4.4, 6.3) in 2023, though there was an uptick in infant deaths in 2019. **Overall, single year patterns in infant mortality are challenging to interpret due to frequently overlapping confidence intervals. Five-year aggregate comparisons (presented on the next page) can provide a more stable analysis of trends.**

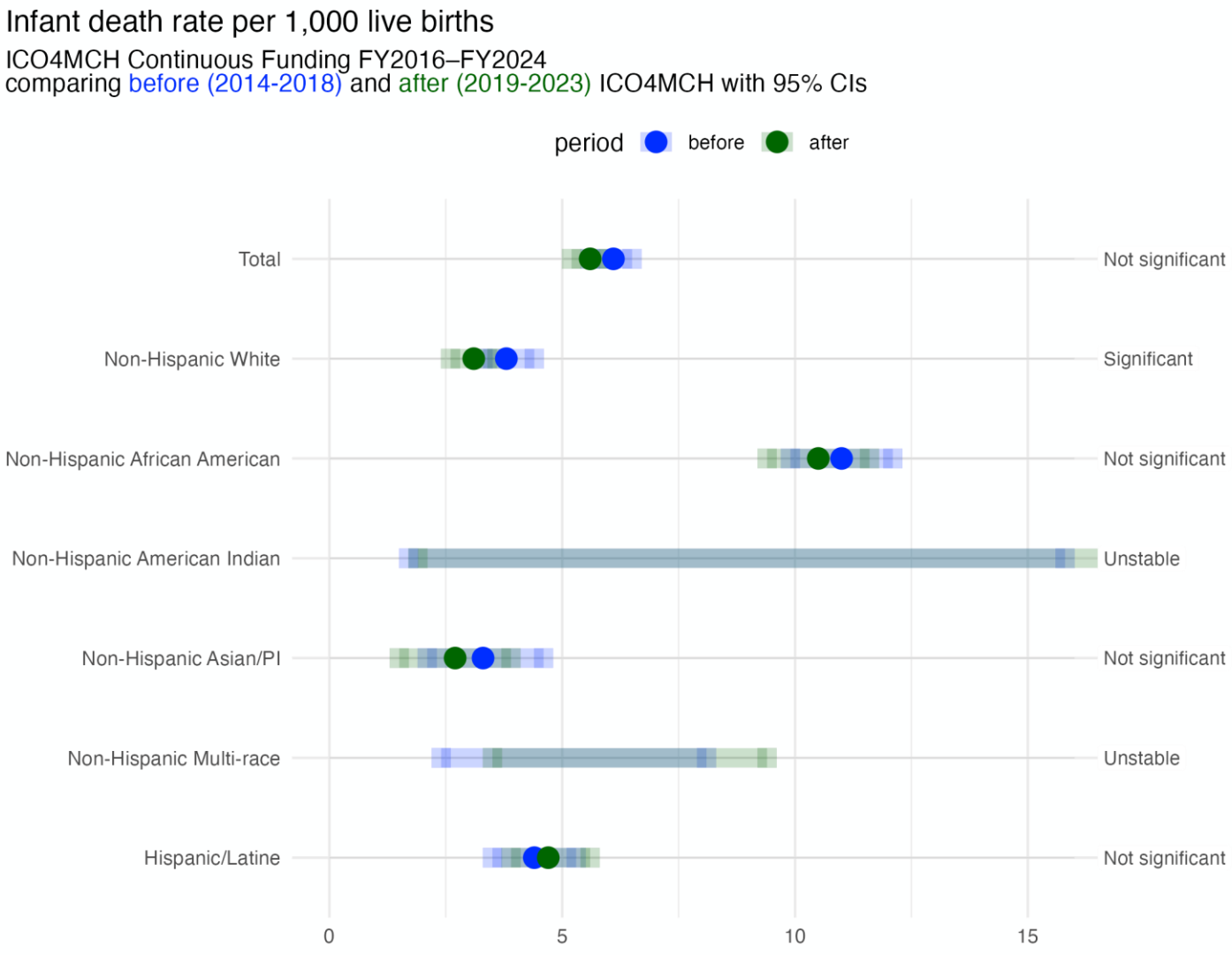


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Infant Mortality

Infant death rate before 1,000 live births with 95% confidence intervals

Overall the infant death rate did not change significantly from 2014-2018 to 2019-2023 in ICO4MCH continuously funded counties from 6.1 (95% CI: 5.6, 6.5) to 5.6 (95% CI: 5.2, 6.0). However, there was a statistically significant decrease in the non-Hispanic White race-ethnicity group. The data also elucidates persistent disparities in infant death rates across race groups, with non-Hispanic African American mothers in ICO4MCH having 3.4 times the rate of non-Hispanic White mothers in 2019-2023 (10.5 compared to 3.1). **Overall, infant mortality in counties continuously funded by ICO4MCH showed a downward trend among the non-Hispanic White group, but the disparities across race-ethnicity groups did not improve.**

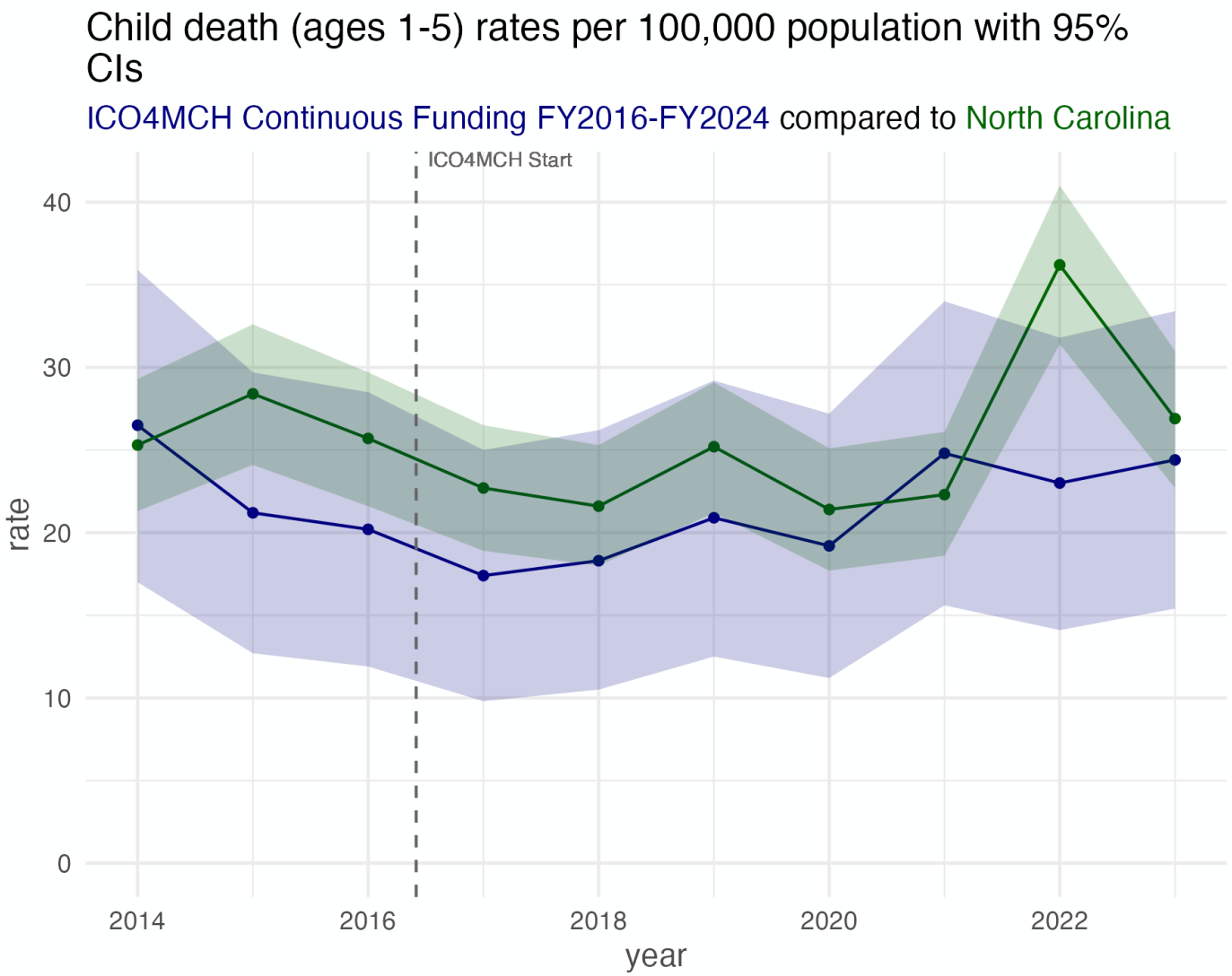


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Child Death

Child death rate per 100,000 children (ages 1-5) with 95% confidence intervals

(Fortunately) the counts of child death in the continuously funded ICO4MCH counties are small. As a result, the annual death rates are too unstable to draw any conclusions about trends over time. **Overall, the rates in ICO4MCH continuously funded counties (26.5 in 2014 to 24.4 in 2023) were similar to North Carolina (25.3 in 2014 to 26.9 in 2023) from 2014 to 2023.**



Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

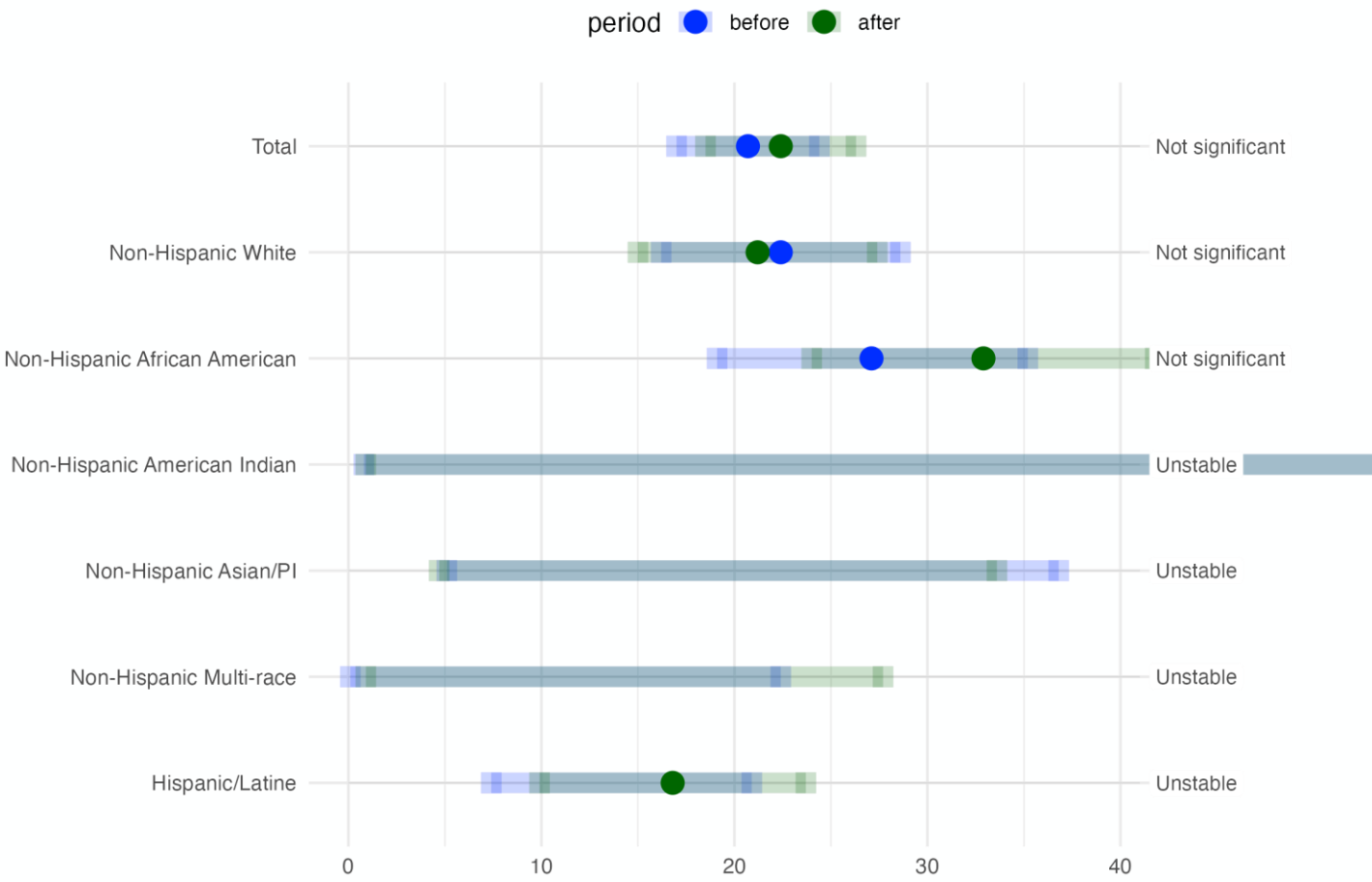
Child Death

Child death rate per 100,000 children (ages 1-5) with 95% confidence intervals

There was no meaningful detectable change in the child death rate per 100,000 population in continuously funded ICO4MCH counties; with a rate of 20.7 (95% CI: 17.0, 24.4) in 2014-2018 and 22.4 (95% CI: 18.5, 26.3) in 2019-2023. No racial or ethnicity group had significant changes in child death rates from before or after ICO4MCH but many of the rates were unstable. **Overall, the small number of child deaths occurring to children ages 1 to 5 during this period prohibited discerning clear patterns by race and ethnicity.**

Child death (ages 1-5) rates per 100,000 population

ICO4MCH Continuous Funding FY2016–FY2024
comparing before (2014-2018) and after (2019-2023) ICO4MCH with 95% CIs



Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

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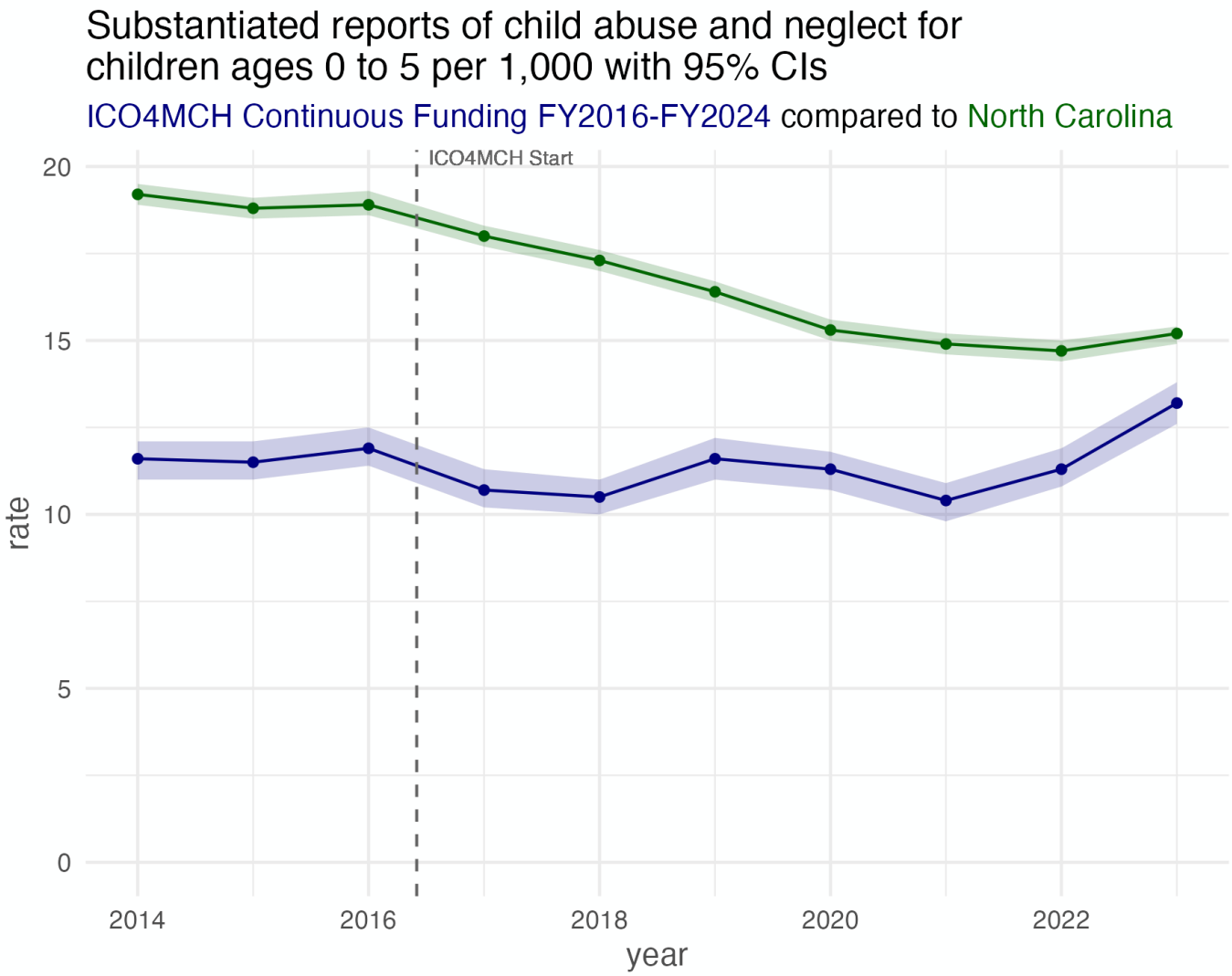
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Child Abuse and Neglect

Substantiated reports of child abuse and neglect per 1,000 children (ages 0-5) with 95% confidence intervals

Overall, substantiated reports of child abuse and neglect appear lower in counties continuously funded by ICO4MCH than in North Carolina. From 2014 to 2023, the rate of substantiated reports of child abuse and neglect in ICO4MCH continuously funded counties increased from 11.6 per 1,000 children (95% CI: 11.2, 12.0) to 13.2 (95% CI: 12.8, 13.6). In 2022, counties continuously funded by ICO4MCH seemed to experience an uptick in substantiated report abuse and neglect. **Overall, substantiated reports of child abuse and neglect appear lower in counties continuously funded by ICO4MCH than in North Carolina.**

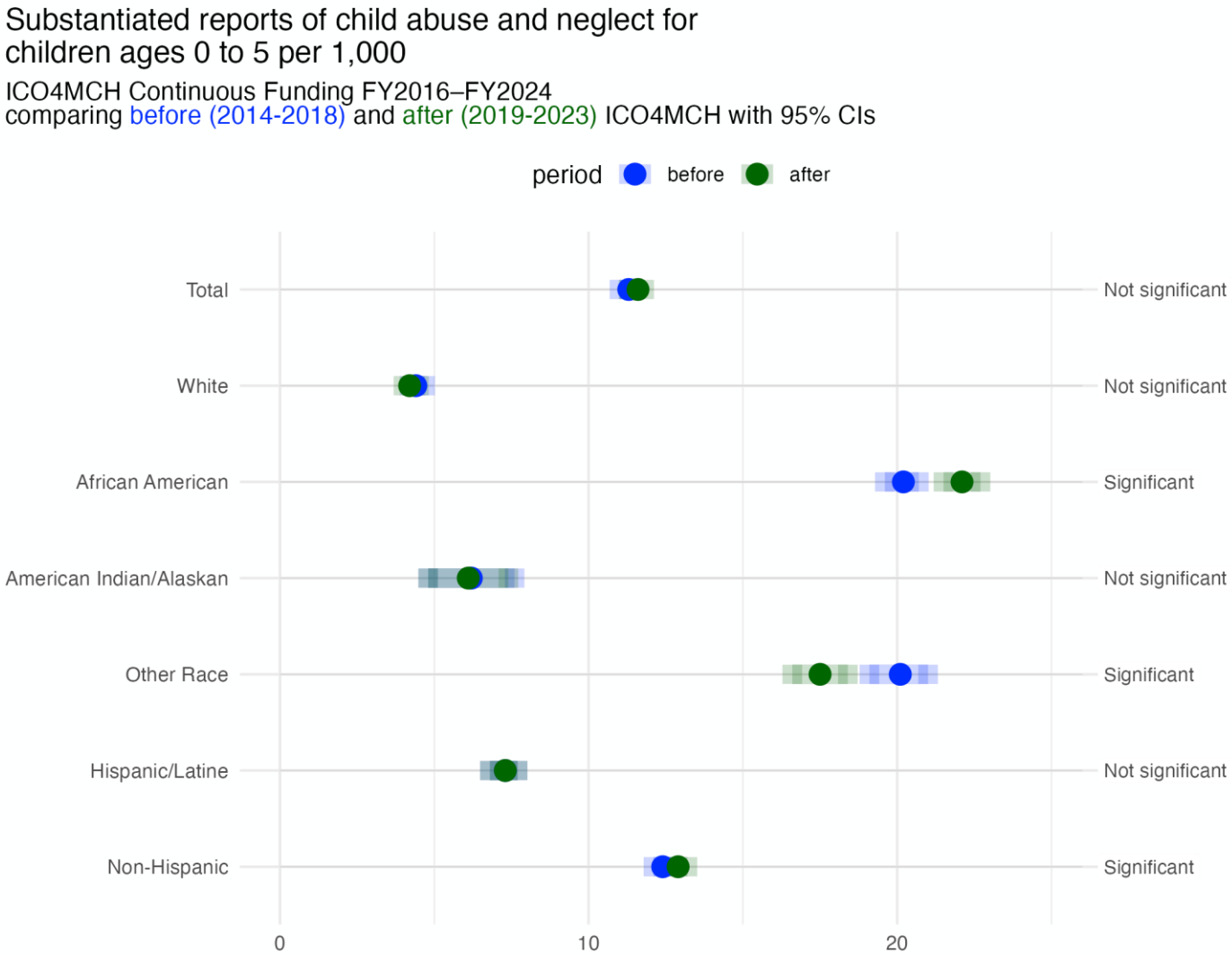


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Child Abuse and Neglect

Substantiated reports of child abuse and neglect per 1,000 children (ages 0-5) with 95% confidence intervals

The rate of substantiated reports of child abuse and neglect per 1,000 children in the continuously funded ICO4MCH increased from 11.3 (95% CI: 11.1, 11.4) in 2014-2018 to 11.6 (95% CI: 11.4, 11.7) in 2019-2023, though this change was not statistically significant overall. Rates of child abuse and neglect were highest among African American children (22.1 per 1,000 children in 2019-2023) and increased from before to after. **Overall, substantiated reports of child abuse and neglect significantly increased for African American and non-Hispanic children aged 0 to 5 from before ICO4MCH.**



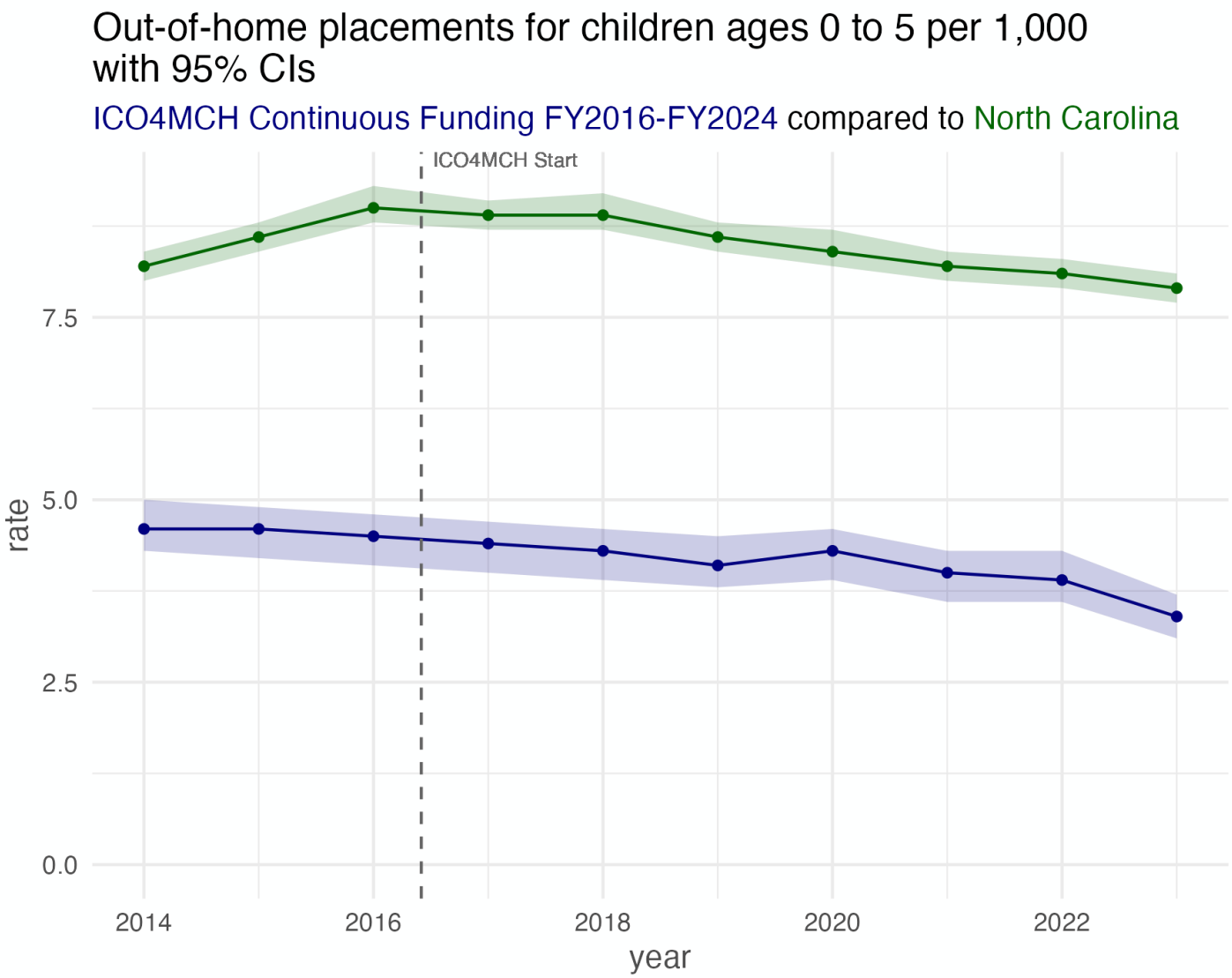
Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Out-of-Home Placements

Out-of-home placements per 1,000 children aged 0-5 with 95% confidence intervals

The rate of out-of-home placements in counties continuously funded by ICO4MCH decreased from 4.6 (95% CI: 4.4, 4.9) to 3.4 (95% CI: 3.2, 3.6) from 2014 to 2023. In North Carolina, the rate of out-of-home placements decreased throughout the same time period, but to a lesser extent. The North Carolina rate decreased from 8.2 (95% CI: 8.0, 8.4) to 7.9 (95% CI: 7.7, 8.1) from 2014 to 2023. **Rates of out-of-home placements were consistently higher in North Carolina overall compared to counties continuously funded by ICO4MCH.**

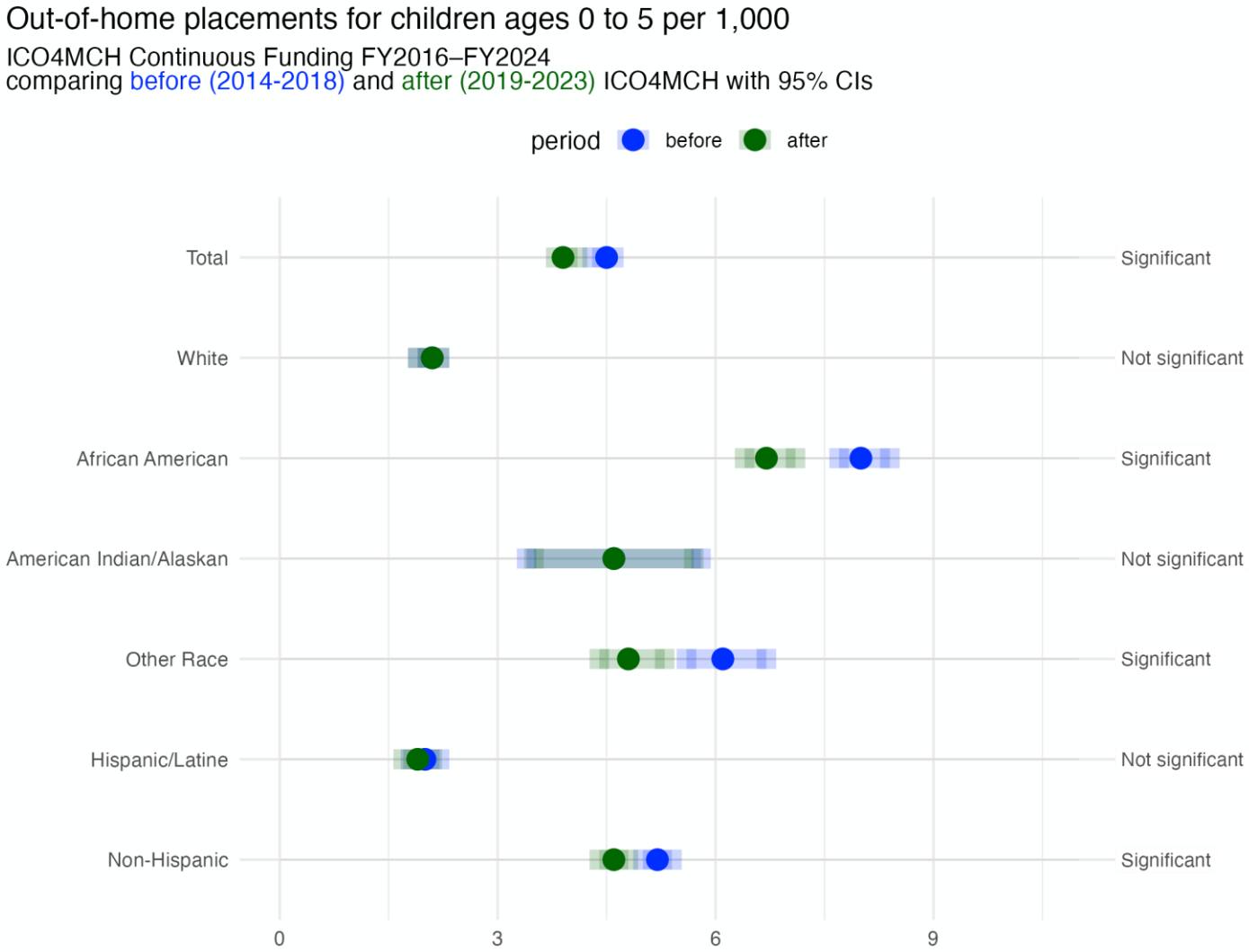


Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.

Out-of-Home Placements

Out-of-home placements per 1,000 children aged 0-5 with 95% confidence intervals

Overall, the rate of out-of-home placements in continuously funded ICO4MCH counties significantly decreased between periods 2014-2018 and 2019-2023 (from 4.5 to 3.9). These changes were driven by significantly significant decreases for African American, Other race, and non-Hispanic race-ethnicity groups. Despite these changes, rates of out-of-home placements continue to be higher for non-Hispanic African American children (decreased from 8.0 in 2014-2018 to 6.7 in 2019-2023) than for non-Hispanic White children (2.1 in 2014-2018 and 2019-2023). **The rate of out-of-home placements in continuously funded ICO4MCH counties significantly decreased and disparities may be narrowing.**



Source: NC Department of Health & Human Services / Division of Public Health / Title V Office, 19MAR2025.
Note: Though ICO4MCH funding began in June 2016, we classify 2016 – 2018 as the pre-period because the programs took time to implement. We also expect there to be a delay in impact on pregnancy outcomes.

Limitations and Conclusions

Preterm birth rate per 100 live births with 95% confidence intervals

Limitations

In this report, we describe patterns in the long-term outcomes over time and across different race-ethnicity groups. We cannot directly attribute any differences in long-term outcome rates to ICO4MCH because there may be other programs and external factors influencing these outcomes, such as the COVID-19 pandemic. When the outcome is rare and/or the population is small, it also becomes more challenging to see if there are any changes in the rates over time. We have been cautious about over-interpreting data when the number of events is rare since these rates are unstable.

Many data systems also experienced disruptions due to the COVID-19 pandemic. We noted a pronounced drop in substantiated reports of child abuse and neglect during the COVID-19 pandemic and are thus particularly cautious about interpreting the child welfare data due to challenges facing the child welfare system. The COVID-19 pandemic directly impacted the child welfare data by decreasing reports of child maltreatment (particularly through education school personnel) and foster care placements. Additionally, thirty-five counties across the state changed their system for tracking this child welfare data between 2016-2018. Richmond County changed child welfare database systems during this timeframe. Around this same time, the state also implemented a new participant ID to try to reduce duplicates within the system. Finally, there is a possibility of some data entry lag in the system, so more recent years of data may not be complete.

Conclusions

Except for a drop in LBW and VLBW among non-Hispanic White mothers, we did not see evidence of improvement in birth outcomes in the continuously funded ICO4MCH counties following implementation of ICO4MCH. We saw evidence of an increase in breastfeeding at hospital discharge among mothers in the continuously funded ICO4MCH counties following implementation of ICO4MCH, and these increases were noted among White, African American, Asian and Pacific Islander and Hispanic/Latine mothers. Additionally, breastfeeding rates increased from 2014 to 2023 in ICO4MCH counties more so than in North Carolina overall.

We saw evidence of a decrease in infant deaths, but only among non-Hispanic white mothers. Overall, we saw evidence of a decrease in rates of out of home placements. There are persistent disparities in these outcomes across race-ethnicity groups with non-Hispanic African Americans experiencing worse outcomes. These disparities in ICO4MCH counties did not improve, and in some situations worsened, comparing the post-ICO4MCH period to the pre-ICO4MCH period, except for out-of-home placements and breastfeeding at hospital discharge.

Appendix

Preterm birth rate per 100 live births with 95% confidence intervals

Aim 1: Improving Birth Outcomes

Improving Access to long-acting reversible contraception (LARC): The goal of this evidence-based strategy is to increase access to and utilization of LARC, implants and intrauterine devices (IUDs). To achieve this, local health departments educate patients in the local health departments (LHDs) and in private practices on the benefits of LARC, informed consent, and potential side effects of the methods and provide outreach and education to members of the community at large. Increase the number of healthcare providers (e.g., local health departments and private practices) with a same day LARC insertion policy. Improve patient satisfaction and knowledge of counseling and family planning services, including LARC, received at the LHDs and in private practices. Conduct an annual survey with local health department health care providers and private practices regarding the knowledge, attitudes, and beliefs surrounding LARC and family planning services including barriers to same day insertion, postpartum insertion, and training needs. Facilitate health care providers in LHDs and private practices being trained to provide access to LARC, including same day and immediate postpartum insertion among health care providers. Increase the amount of LARC counseling and insertion at postpartum delivery.

Reproductive Life Planning (RLP): The goal of the evidence-based strategy is to utilize a Reproductive Justice (RJ) Framework and the principles of Reproductive Life Planning (RLP) to provide education, training, resources, and access to family planning methods (including long-acting reversible contraception, or LARC) to individuals of childbearing age, healthcare providers, and other clinical and non-clinical staff with the long-term goal of improving birth outcomes. SisterSong defines Reproductive Justice (RJ) as "the human right to maintain personal bodily autonomy, have children, not have children, and parent the children we have in safe and sustainable communities." RLP aims to encourage individuals to reflect on their reproductive intentions which may include selecting family planning strategies that work for them.

Preconception and Interconception Health: The goal of the evidence-based strategy is to implement a Preconception and Interconception Health program for individuals of reproductive age with the goal of improving birth outcomes. To accomplish this, Local Health Departments (LHDs) are implementing Northwestern University's Mothers & Babies program to enhance perinatal mental health support by: implementing a community-based outreach program for women of reproductive age, utilizing social media to expand public awareness of preconception and interconception health, and partnering with a local community college or four-year university to reach students through a Preconception Health Peer Educator (PPE) program or enhancing efforts to promote and increase utilization of pre-pregnancy services through the Local Health Department's Family Planning clinic.

Doula Services: The goal of this evidence-based strategy is to implement a doula services program for pregnant and postpartum individuals with the goal of improving birth and maternal health outcomes. A doula is a trained professional that provides physical, emotional, and informational support to a woman and their partner before, during, and after childbirth, including continuous labor support, to help them achieve the healthiest, most satisfying birth experience as possible. Birth doulas are an evidence-based intervention to reduce the likelihood of Cesarean birth, reduce the likelihood of using Pitocin during labor, and increasing the likelihood of a high satisfaction birth for mothers. To accomplish this, Local Health Departments are conducting community outreach and education on doula services, recruiting and training community members as doulas, establishing a collaborative relationship with at least 1 birth facility, and providing clients with doula services. Complete doula services include a minimum of 1 prenatal visit, the provision of childbirth education, continuous onsite labor support at the hospital, at least 1 postpartum visit either in the hospital or within 1 week after birth, and at least 1 telephone contact within 30 days after birth.

Appendix

Preterm birth rate per 100 live births with 95% confidence intervals

Aim 2: Reducing Infant Mortality

Tobacco Cessation and Prevention: The goal of the tobacco evidence-based strategy is to reduce tobacco use as well as second- and third-hand smoke exposure to reduce the risk of infant mortality. To accomplish this, the LHDs are: providing direct clinical support around tobacco use, screening, and counseling; educating community members through worksite cessation classes; conducting outreach promoting the use of QuitlineNC resources; advocating for and helping to enforce smoke-free/tobacco-free policies in public spaces throughout their service areas; and training practitioners in the 5As (Ask, Advise, Assess, Assist, Arrange) method of counseling and/or as Certified Tobacco Treatment Specialists (CTTS), a more intensive method for those who deliver moderate to intense tobacco treatment services in a healthcare or community setting.

Ten Steps for Successful Breastfeeding: The goal of the evidence-based strategy is to reduce infant mortality by encouraging and promoting breastfeeding. The Ten Steps for Successful Breastfeeding is an evidence-based protocol used by Baby-Friendly USA. Steps 3 and 10, to "*inform all pregnant women about the benefits of and management of breastfeeding*" and "*foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center*" are areas that grantees can support as they focus on broader strategies to increase initiation, duration, and support of breastfeeding. To accomplish this, Local Health Departments (LHDs) are training and collaborating with health care providers, community-based and faith-based organizations to increase the knowledge and skills to support breastfeeding women; increasing social media messaging; and implementing one of the following: 1) the Making It Work: Empowering Employers and Mothers, 2) Breastfeeding-Friendly City Program, 3) Shared Decision-Making Using Patient Decision Aids, or 4) Establish Public Lactation Rooms.

Appendix

Preterm birth rate per 100 live births with 95% confidence intervals

Aim 3: Improving Child Health Ages 0-5

Clinical Effort Against Secondhand Smoke Exposure (CEASE): The goal of the CEASE program is to: educate the parents and caregivers of children ages 0 to 5 regarding the elimination of tobacco use and secondhand smoke exposure of children. To accomplish this, LHDs are: increasing the proportion of health care providers and health practices implementing CEASE, increasing documentation of household smoking and secondhand smoke exposure status of the parents/caregivers served by CEASE, increasing the number of unduplicated parents/caregivers who are screened with the CEASE intervention, increasing the number of unduplicated parents/caregivers who receive the CEASE Action Sheet, and increasing the percent of people who screen positive that get the services needed.

Positive Parenting Program (Triple P): The goal of the evidence-based strategy is to improve the health status of children ages 0 to 5 by enhancing parents' knowledge, skills, confidence and self-sufficiency; promoting the development of non-violent, protective, and nurturing environments for children; promoting development, growth, health, and social competence of young children; and reducing the incidence of child maltreatment and behavioral/emotional problems in childhood and adolescence. Local Health Departments (LHDs) are increasing access to and utilization of Triple P programming in daycare/childcare centers for both caregivers and parents and targeting pediatric and family practice clinics, faith-based organizations, and other agencies that serve children ages 0 to 5 as ways to expand availability of and access to the various levels of Triple P programming including the Positive Early Childhood Education program (PECE) and Triple P Online (TPOL).

Family Connects (FC) Nurse Home Visiting Program: The goal of this evidence-based strategy is to increase child well-being by bridging the gap between parent needs and community resources. Utilizing the Family Support Matrix, home visiting nurses ask questions pertaining to the well-being of the mother, father, and infant in the following domains: health (parental and infant), infant care, safe home (including safe sleep), and social and emotional support for the parents, as well as other needs. Nurses make referrals to resources for the family as indicated by the score on the Family Support Matrix. Activities include: one integrated home visit (IHV) by a registered nurse to all parents of newborns 2 – 12 weeks old born in the service area; two additional home visits from the nurse home visitor for families who need additional support; and referrals to resources and services for the parents or infant.