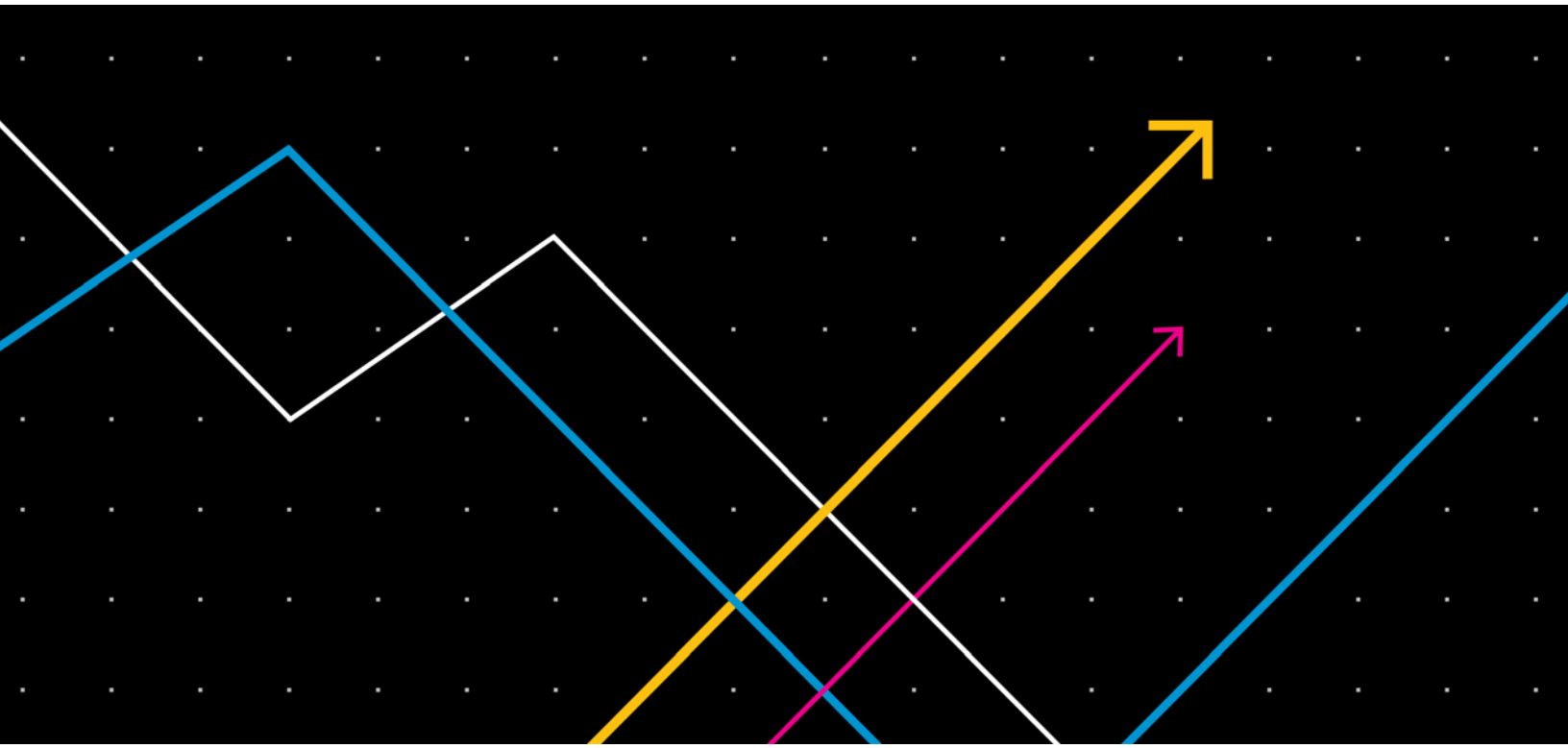

RESEARCH REPORT

Community Health Is Maternal Health

Insights from Six North Carolina Counties about Community Strengths and Challenges to Best Maternal and Infant Health in Medicaid

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Executive Summary

High rates of preterm birth, low birth weight, and late initiation of prenatal care can be a sign of poor health and high levels of social risk factors in a community. On the other hand, early entry into prenatal care and better-than-expected birth outcomes can signal a supportive community environment. We identified six counties in North Carolina with better-than- and worse-than-expected birth outcomes among Medicaid members (Bladen, Catawba, Cumberland, Halifax, Orange, and Wayne; Johnston et al., forthcoming) and interviewed public health officials and health care and social service providers in each county to examine community-level strengths and challenges to optimal maternal and infant health. As North Carolina looks to improve birth outcomes and reduce health disparities in its new Medicaid managed care program, findings from this study can provide useful insights.

Challenges to Maternal Health

- Inconsistent access to health insurance coverage
  - » Key informants shared that while most pregnant and postpartum people have health insurance through pregnancy-related Medicaid, because North Carolina has not expanded Medicaid,[1] many people have inconsistent access to health insurance and high rates of uninsurance outside of pregnancy. Immigrant populations experience greater barriers to Medicaid coverage, including barriers during pregnancy.
  - » Among people eligible for pregnancy-related Medicaid, key informants noted that some experience difficulty enrolling in and maintaining Medicaid coverage.
- High unmet social needs and inadequate community resources and infrastructure
  - » Across all counties, informants described lack of transportation, lack of stable and affordable housing, limited affordable child care options, and food insecurity as the most common unmet social needs among families living in poverty.
  - » In some counties, we heard that social services and supports are inadequate to meet the needs of community members, particularly for housing assistance. In others, we heard that while various programs and resources exist, it can be difficult to connect people to the help they need.

- An underfunded public education system, limited employment opportunities with good wages and benefits, unreliable internet connections, limited recreation options, and rising crime rates were cited as additional challenges to good health.

- Limited access to health care services and poor population health
  - In all study counties, prenatal care for those with Medicaid and those uninsured was available through the county health department, but informants in some counties noted that staffing turnover and shortages, as well as limited ability to provide interpretation and translation services, posed barriers to care.
  - Most commonly, key informants believed that more effective education could lead to better engagement in prenatal care. Key informants also cited a host of structural barriers, such as lack of sick leave and paid time off or limited transportation, that contribute to delayed or sporadic prenatal care visits.
  - In describing access to other health care services for Medicaid members, key informants voiced concerns, particularly with shortages of behavioral and specialty care.
  - Diabetes, hypertension, heart disease, substance use, obesity, and stress and other mental health concerns were identified as common health conditions and risk factors for pregnant and postpartum women.

Supports for Maternal Health

- Access to quality and continuous maternity care
  - In some counties, county health departments have undertaken creative approaches to invest in and support positive birth outcomes for Medicaid families by establishing partnerships with local maternity care clinics and birthing hospitals, through which the hospital or private practice clinicians provide high-quality and continuous prenatal care to patients at a health department clinic.
  - Key informants spoke highly of the midwifery model of care, which involves a holistic and wellness approach to pregnancy and birth with an emphasis on comprehensive education and patient-centered care. Midwifery was identified as a promising practice for supporting good birth outcomes through person-centered care that relies on establishing rapport and trust between midwives and patients.

- Connections to social services and care coordination

- Besides clinical perinatal services, county health departments support positive birth outcomes by offering other services and programming in-house to support women's health in the pregnancy and postpartum period, employing dedicated staff to serve as care managers, maintaining relationships with other supports and services in the community, and using these relationships to connect patients to needed services.
- When working well, in-house services and supports and relationships and referrals to external partners help county health departments provide comprehensive and coordinated care to pregnant women that meets physical health, behavioral health, and social needs. However, as discussed earlier, these additional programs and supports are often underfunded and thus may not be available to all who need them.

- Collaborative community dynamics and extended social supports
  - Several key informants pointed out that the strength of the social networks and supports that exist at home and in the community could protect maternal health. According to some, established relationships and community trust in the health care and social services system promote engagement in care and could positively affect birth outcomes.

Policy Implications

Our findings suggest that families with low incomes across North Carolina counties face similar challenges that affect their ability to access health care and other resources, and even counties with better-than-expected birth outcomes face consistent challenges. To improve maternal and infant health outcomes, we propose the following multisector and multilevel changes:

1. Implementing Medicaid policies to expand eligibility and improve quality of care;
2. Expanding access to the midwifery model of care;
3. Investing in public health and the social sector;
4. Examining and working to eliminate economic inequality and racial inequity;
5. Recognizing and eliminating structural barriers to care while addressing potential unconscious bias among some providers; and
6. Engaging Medicaid members to identify maternal health needs and preferred solutions.

These key findings are insightful, but not surprising. Poverty and limited resources to meet one's basic needs for food, shelter, transportation, and health care pose challenges to the optimal health and well-being of families, including pregnant and postpartum women and their infants. Alone, reforming clinical approaches or improving the coverage and access of maternity care services funded by Medicaid will not likely improve health and eradicate disparities in maternal and infant health outcomes in this country. Serious, systemic, and large-scale changes are also needed at the local, state, and federal levels to address structural inequalities and inequities in the United States.

Community Health Is Maternal Health

Poor maternal and child health outcomes are of alarming concern in the United States. In 2020, the national maternal mortality rate was 23.8 per 100,000 live births, with rates rising annually compared with 2019 (20.1 deaths per 100,000) and 2018 (17.4 per 100,000; Hoyert 2020). Among other similar high-income countries, the United States ranks as one of the worst countries for maternal health (Tikkanen et al. 2020). However, not all women[2] are affected the same—different racialized groups exhibit large disparities in maternal and infant health outcomes. For example, Black women and American Indian and Alaska Native women[3] are more likely to die from pregnancy-related causes than white women (Petersen et al. 2019). Infants born to Black women have more than twice the mortality rate of infants born to white women,[4] and rates of preterm birth and low birth weight are higher among Black births than white or Hispanic births (Hill, Artiga, and Ranji 2022). Promoting good birth outcomes supports children's overall health and well-being, as children born prematurely or at low birth weight can have serious health problems (Behrman et al. 2007; Paneth 1995).

Disparities in maternal and child health outcomes also exist at the state level. Black mothers in North Carolina are more likely to die from pregnancy-related causes than white mothers.[5] In 2020, North Carolina had the 8th-highest low birth weight rate and the 12th-highest preterm birth rate in the country.[6] In 2019, the infant mortality rate in North Carolina was at an all-time low (6.8 deaths per 1,000), yet the Black infant mortality rate was 12.5 per 1,000 live births and the non-Hispanic American Indian infant mortality rate was 12 per 1,000 live births (Pettiford 2021). Considering births paid for by North Carolina's Medicaid program, in 2018, rates of preterm birth (11.8 percent) and low birth weight (11.7 percent) were significantly higher than the Healthy People 2020 goals of 9.4 percent and 7.8 percent, respectively. Furthermore, low birth weight rates were significantly higher for Black infants than for white infants born to Medicaid members in North Carolina (Alvarez Caraveo and Johnston 2023).

Understanding disparities in birth outcomes within Medicaid is critical, as the program covers 4 in 10 births in North Carolina and pays for more than two-thirds of births among Black and American Indian or Alaska Native residents (Alvarez Caraveo and Johnston 2023). Though poor maternal and infant health outcomes and disparities in outcomes by race, ethnicity, and income are well documented, solutions to these challenges are not. Increasingly, Medicaid programs across the country have been developing new interventions to improve maternal and infant health outcomes, such as designing

payment and delivery models that incentivize improvements in maternal care and outcomes and expanding Medicaid-covered prenatal services to include behavioral health, dental, home visiting, and doula services[7] (Artiga et al. 2020).

Over the last decade, the North Carolina Medicaid program (NC Medicaid) implemented several initiatives aimed at better supporting maternal and infant health. In 2011, the state launched the Pregnancy Medical Home program (to provide comprehensive and coordinated maternity care for Medicaid-enrolled pregnant women statewide, including enhanced case management services for women with high-risk pregnancies).[8] Beginning in July 2021, NC Medicaid and the state's Children's Health Insurance Program transitioned from a fee-for-service system to risk-based managed care for most members, including most parents, children, and pregnant women.[9] As part of this shift to managed care, Pregnancy Medical Home transitioned to the Pregnancy Management Program (NC Medicaid 2018).[10] To promote improvements in health outcomes, managed care organizations are required to report their performance on selected measures by race, ethnicity, and various other demographic and socioeconomic characteristics and must address any identified disparities of more than 10 percent. Three of the measures managed care organizations can choose from pertain to maternal and infant health: (1) low birth weight, (2) prenatal and postnatal care, and (3) rate of screening for pregnancy risk (NC DHHS 2021).

As North Carolina looks ahead to opportunities to improve birth outcomes and reduce disparities in its new Medicaid managed care program, we studied North Carolina counties with better-than-expected and worse-than-expected birth outcomes for Medicaid members to identify community-level challenges and solutions. Higher-than-expected rates of poor health at birth can be a sign of poor health and high levels of social risk factors in a community, while better-than-expected birth outcomes can signal a supportive community environment that may have solutions to share.

Building on related analysis, we identified counties in North Carolina with better-than- and worse-than-expected birth outcomes, such as preterm birth, low birth weight, and late initiation of prenatal care, among Medicaid members. We then conducted interviews with key informants in six counties (Bladen, Catawba, Cumberland, Halifax, Orange, and Wayne; Johnston et al., forthcoming). The county selection and interview process are described in the methods section, which is followed by discussion of key findings and their implications for programs and policy. Lessons learned from these counties highlight the role of community characteristics, resources, and infrastructure in contributing to birth outcomes and inform the current and future maternal and infant health programs and policies in North Carolina and elsewhere.

Methods

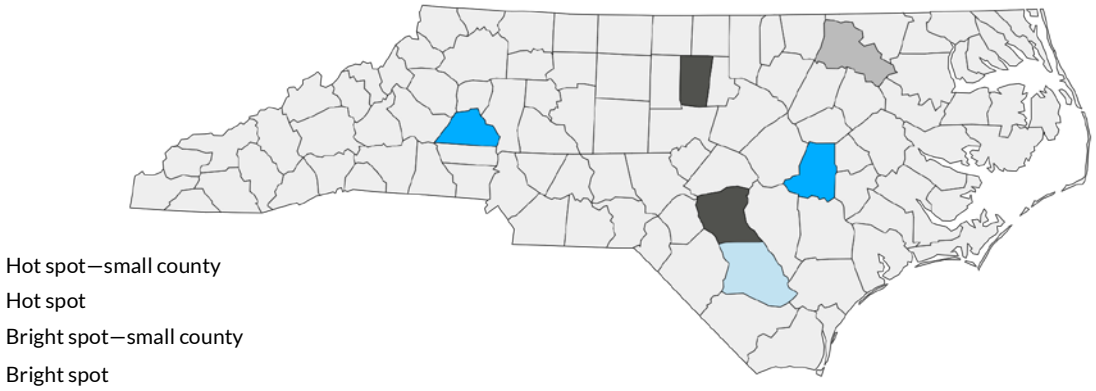
County Selection Process

We selected the six counties included in this case study analysis based on the results of our quantitative Bright Spots analysis (Johnston et al., forthcoming). In this analysis, we constructed a model to estimate expected birth outcomes for North Carolina counties based on county-level socioeconomic, household, and health system characteristics, then identified North Carolina counties with better-than-expected or worse-than-expected birth outcomes (preterm birth, low birth weight, and late initiation of prenatal care)[11] for all women and separately for Black, Hispanic, and white women. All analyses consider outcomes among mothers residing in a county, regardless of delivery location. For example, outcomes in Orange County include all mothers residing in Orange County, regardless of where their child's birth occurred, but do not include births occurring in Orange County among mothers residing outside of the county.

Our primary analysis focused on outcomes for births paid for by Medicaid and, because of data limitations, was restricted to the 27 North Carolina counties with at least 100,000 residents. From this analysis, we identified two large counties (Catawba and Wayne) with better-than-expected Medicaid birth outcomes and two large counties (Cumberland and Orange) with worse-than-expected Medicaid birth outcomes (figure 1; table 1). We also investigated outcomes among all births for the remaining 73 smaller North Carolina counties. From this analysis, we identified one small county (Bladen) with better-than-expected birth outcomes overall, and one small county (Halifax) with worse-than-expected birth outcomes overall (figure 1; table 2). Key county characteristics for all case study counties are presented in table 3. More information on the county selection process, including data sources and how "expected outcomes" are determined, is presented in appendix A and more details about each selected county are presented in appendix B.

FIGURE 1

Map of North Carolina Case Study Counties



Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database and healthypeople.gov.
Notes: "Bright spots" are counties with better-than-expected birth outcomes and "hot spots" are counties with worse-than-expected birth outcomes. Dark blue counties (Catawba and Wayne) have more than 100,000 residents and better-than-expected birth outcomes. Light blue county (Bladen) has fewer than 100,000 residents and better-than-expected birth outcomes. Dark gray counties (Cumberland and Orange) have more than 100,000 residents and worse-than-expected birth outcomes. Light gray county (Halifax) has fewer than 100,000 residents and worse-than-expected birth outcomes.

TABLE 1

County and State Comparison of Birth and Pregnancy Outcomes for Medicaid Births, 2018

	Counties with Better-Than-Expected Outcomes		Counties with Worse-Than-Expected Outcomes			Among 27 Largest North Carolina Counties		Healthy People 2020 goal
	Catawba County	Wayne County	Cumberland County	Orange County	North Carolina	Highest county	Lowest county	
Preterm birth rate	10.5	10.2	14.4	12.4	11.8	15.5	9.2	9.4
Low birth weight rate	9.4	11.4	14.1	13.4	11.7	14.4	9.3	7.8
Rate of late prenatal care initiation	26.7	34.3	35.8	37.1	35.6	54.5	14.1	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database and healthypeople.gov.
Notes: Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census. Preterm birth is birth before 37 weeks. Low birth weight is weight below 2,500 grams. Late prenatal care initiation is prenatal care not initiated until after the first trimester.

TABLE 2

County and State Comparison of Birth and Pregnancy Outcomes for All Births, 2019

				Among All North Carolina Counties		
	Bladen County	Halifax County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	9.9	16.2	10.6	17.3	5.9	9.4
Low birth weight rate	7.3	16.6	9.3	16.6	4.8	7.8
Rate of late prenatal care initiation	38.7	27.4	31.4	46.6	12.5	15.2

Source: Authors' analysis of 2019 birth data from the 2021 North Carolina County Health Data Book and healthypeople.gov.
Notes: Highest county and lowest county estimates are among all North Carolina counties. Preterm birth is birth before 37 weeks. Low birth weight is weight below 2,500 grams. Late prenatal care initiation is prenatal care not initiated until after the first trimester.

TABLE 3

Case Study Counties at Glance, 2018

County	Population	NC region	Urban status	Share of births paid by Medicaid	Racial and ethnic composition of Medicaid or all births[a]	County racial and ethnic composition[b]	Economic characteristics[c]	Maternity care health system characteristics[d]
Counties with better-than-expected birth outcomes								
Catawba	159,000	NW	Regional city or suburb	68%	▪ 14% Black ▪ 14% Hispanic ▪ 59% white ▪ 13% other	▪ 9% Black ▪ 10% Hispanic ▪ 75% white ▪ 6% other	▪ 13% poverty ▪ 7% unemployment ▪ $27,000 income	▪ 0.01 FQHCs ▪ 0.49 providers ▪ Has NICU
Wayne	123,000	E	Rural	64%	▪ 45% Black ▪ 19% Hispanic ▪ 33% white ▪ 3% other	▪ 31% Black ▪ 12% Hispanic ▪ 53% white ▪ 4% other	▪ 21% poverty ▪ 8% unemployment ▪ $24,000 income	▪ 0.05 FQHCs ▪ 0.26 providers ▪ 37 NICU distance
Bladen	33,000	SE	Rural	75%	▪ 31% Black ▪ 16% Hispanic ▪ 49% white ▪ 4% other		▪ 26% poverty ▪ 7% unemployment ▪ $21,000 income	▪ 0.03 FQHCs ▪ 0.18 providers ▪ 35 NICU distance
Counties with worse-than-expected birth outcomes								
Orange	146,000	NE	Regional city or suburb	42%	▪ 30% Black ▪ 18% Hispanic ▪ 40% white ▪ 12% other	▪ 11% Black ▪ 9% Hispanic ▪ 69% white ▪ 12% other	▪ 13% poverty ▪ 4% unemployment ▪ $41,000 income	▪ 0.01 FQHCs ▪ 1.39 providers ▪ Has NICU
Cumberland	332, 000	SE	Regional city or suburb	47%	▪ 54% Black ▪ 12% Hispanic ▪ 23% white ▪ 11% other	▪ 37% Black ▪ 12% Hispanic ▪ 43% white ▪ 9% other	▪ 18% poverty ▪ 9% unemployment ▪ $24,000 income	▪ 0.01 FQHCs ▪ 0.53 providers ▪ Has NICU
Halifax	51,000	E	Rural	80%	▪ 57% Black ▪ 3% Hispanic ▪ 35% white ▪ 4% other		▪ 25% poverty ▪ 9% unemployment ▪ $21,000 income	▪ 0.26 FQHCs ▪ 0.26 providers ▪ 57 NICU distance

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.

[a] Maternal race and ethnicity among Medicaid births in Catawba, Wayne, Orange, and Cumberland counties. Maternal race and ethnicity among all births in Bladen and Halifax counties. [b] County-level race and ethnicity data not available for counties with fewer than 100,000 residents. [c] Income is annual per capita. [d] FQHCs are federally qualified health centers per 1,000 residents. Providers are the number of obstetricians and gynecologists (OB/GYNs), midwives, and family medicine physicians per 1,000 residents. NICU distance is the distance in miles to the center of the closest county with a neonatal intensive care unit (NICU).

Key Informant Interviews

Between September and November 2022, we conducted 13 semi-structured virtual interviews with key informants across the six counties: one each in Bladen and Halifax; two each from Catawba, Cumberland, and Orange; and five in Wayne. The interview protocol is presented in appendix C. Informants included those knowledgeable about their respective community's health and social resources, specifically county public health officials, prenatal care providers and pediatricians, social service providers, consumer advocates, and one Medicaid member. We identified these informants through internet searches, input from our community advisory board members, existing relationships with North Carolina—based stakeholders, and referrals from those already interviewed. The interviews explored key informants' insights and experiences regarding the birth outcomes of Medicaid-covered babies born in their respective counties, access to and quality of local health care and social services, and other key resources and infrastructure that may promote or harm the health and well-being of pregnant women and infants. The research team recorded and transcribed all interviews then analyzed them to identify key insights and common themes.

Throughout our research project, we consulted with members of our community advisory board. The board consisted of five community members from North Carolina who have lived experience with the Medicaid program. Throughout the project period, we met four times virtually to seek guidance on various parts of the study, including the proposed research approach, interview questions, key informant selection, and interpretation of findings. Community advisory board members were instrumental in helping the research team understand the local dynamics, contextualize birth outcomes data, select case study counties, and facilitate connections with organizations in North Carolina for recruitment in interviews.

Limitations

Given the small number of key informants and members who participated, some important perspectives and experiences may not be captured and others may be overrepresented. The study was designed to include five key informant interviews in each county, but we were unable to achieve this level of participation. We only achieved five interviews in Wayne County, speaking with two informants each in three other counties and only one informant each in the remaining two counties. Similarly, we intended to conduct as many as six focus groups with Medicaid-enrolled pregnant and postpartum people, but recruitment challenges meant we were only able to interview a single Medicaid member. Therefore, we

are unable to make policy inferences from the direct input from Medicaid members about the ways they experience or would prefer to experience comprehensive maternity care and other related supports. This experience points to the challenges in engaging community stakeholders and Medicaid members in research projects and highlights the importance of building trust and meaningfully engaging communities in all efforts to better understand and address maternal and infant health outcomes. Finally, this analysis was not designed to objectively assess differences among counties, such as whether supporting systems were stronger in counties with better-than-expected birth outcomes or whether challenges were more pressing in counties with worse-than-expected birth outcomes. Our findings and conclusions should therefore be interpreted with these limitations in mind.

Findings

In the following section, we discuss major findings from the study in detail. We start with a description of factors that key informants characterized as challenges to good maternal and infant health in their respective communities and follow with a discussion of factors described as supporting maternal health.

Challenges to Maternal and Infant Health

Key informants spoke frankly about numerous structural and community-wide challenges and barriers they think affect the overall health and well-being of community members and contribute to poor birth outcomes among Medicaid members. These barriers broadly fall into the following three categories of community well-being: (1) inconsistent access to health insurance, (2) poor population health and limited access to health care services, and (3) high unmet social needs and inadequate community resources and infrastructure. We consistently heard these barriers from key informants in counties with better-than-expected birth outcomes as well as those in counties with worse-than-expected birth outcomes.

INCONSISTENT ACCESS TO HEALTH INSURANCE COVERAGE

The first barrier to good birth outcomes was a lack of health insurance. Key informants reported that few employment opportunities in their respective counties offered, as one informant put it, "living wages" with benefits. Furthermore, as North Carolina has not adopted the Affordable Care Act's Medicaid expansion,[12] many adults with low incomes have limited access to and experience with health insurance coverage. Key informants reported that limited access to and familiarity with health insurance affected the pregnant and postpartum women they serve in two major ways: (1) inconsistent

access to health insurance and high rates of uninsurance overall and specifically among immigrant populations, and (2) difficulty enrolling in and maintaining Medicaid coverage among those eligible.

Uninsurance. Key informants shared that the public health insurance eligibility landscape in North Carolina (box 1) results in uninsurance for many nonpregnant women with modest incomes. Most informants did not know or think uninsurance rates were high among pregnant and postpartum women in their respective counties, likely because of more generous Medicaid eligibility during pregnancy and the ability to maintain pregnancy-related Medicaid coverage postpartum during the COVID-19 public health emergency.

However, a few informants noted a high uninsurance rate among Hispanic immigrant mothers, including those without documentation, during and surrounding pregnancy. North Carolina does allow lawfully present immigrants who are state residents to enroll in Medicaid without a five-year waiting period, but immigrants without documentation are not eligible for pregnancy-related Medicaid. Some key informants noted that immigrants without documentation are able to receive two months of coverage through presumptive eligibility. Otherwise, informants noted that immigrant mothers without documentation may obtain free or sliding-fee-based care, but the need to pay out of pocket may also contribute to forgone or delayed care. Beyond eligibility barriers, key informants speculated that high uninsurance among Hispanic immigrant mothers may be attributed to general distrust of the government, fueled by anti-immigrant rhetoric. For example, some immigrant women may choose not to enroll in Medicaid even if they are eligible.

BOX 1

Medicaid Eligibility in North Carolina

Pregnancy-Related Medicaid Eligibility[1]

- Pregnant women in North Carolina with incomes up to 201 percent of the federal poverty level (FPL; $55,777.50 a year for a family of four in 2022) are eligible for Medicaid coverage.[2]
- Beginning April 1, 2022, NC Medicaid extended eligibility for pregnancy-related Medicaid coverage from 60 days following the end of pregnancy to 12 months.
- North Carolina covers all income-eligible pregnant women lawfully residing in the state without the typical five-year waiting period for Medicaid eligibility among immigrants.

Presumptive Eligibility and Emergency Medicaid[3]

- Presumptive eligibility allows pregnant women to receive care if they are likely to be eligible for Medicaid before an official eligibility decision is made. While income and immigration eligibility

requirements are the same as for pregnancy-related Medicaid, presumptive eligibility decisions cannot be held up pending verification of immigration status. Presumptive eligibility begins on the day an individual is determined to be presumptively eligible for a provider and lasts until the individual transfers to regular Medicaid or, if deemed ineligible for Medicaid, until the last day of the second month. Only ambulatory prenatal care services are covered by presumptive eligibility.

- Immigrants without documentation who do not receive presumptive eligibility may qualify for emergency coverage if they meet income eligibility requirements. Medicaid emergency medical services are limited to labor and delivery and do not cover prenatal or postpartum care.

Medicaid Eligibility for Nonpregnant Adults[1]

- As a nonexpansion state, North Carolina's Medicaid income eligibility limits for nonpregnant adults are low compared with expansion states. Only parents with incomes up to 39 percent of the FPL ($10,822.50 a year for a family of four in 2022) are eligible for Medicaid, while nondisabled adults without children are not eligible for the program.
- North Carolinians with incomes between 100 and 400 percent of FPL may be eligible for subsidized coverage through the Marketplace, but this coverage may still be unaffordable for some.
- North Carolinians living below the FPL fall into the so-called coverage gap and are not eligible for any type of subsidized health insurance.

Public Health Emergency[4]

- Under the public health emergency declared in response to the COVID-19 pandemic, states must maintain continuous enrollment for people enrolled in Medicaid to receive enhanced federal matching funds. Thus, people whose coverage would have otherwise been terminated following a renewal or redetermination, including some whose pregnancy-related Medicaid coverage would otherwise have expired after 60 days postpartum, would stay enrolled until the continuous enrollment requirement ended on March 31, 2023.

[1] Jennifer M. Haley, Emily M. Johnston, Ian Hill, Genevieve M. Kenney, and Tyler W. Thomas, *The Public Health Insurance Landscape for Pregnant and Postpartum Women: State and Federal Policies in 2020* (Washington, DC: Urban Institute, 2021).
[2] Assistant Secretary for Planning and Evaluation, "2022 HHS Poverty Guidelines: 48 Contiguous States (All States Except Alaska and Hawaii)" (Washington, DC: US Department of Health and Human Services).
[3] Carolyn McClanahan, Sheila Platts, and Liz O'Dell, "Presumptive Eligibility for Pregnant Women," presentation (Raleigh: North Carolina Department of Health and Human Services); Fabióla Carrion and Courtney Mendoza, "Presumptive Eligibility and Abortion" (Washington, DC: National Health Law Program, 2020); MACPAC, "Report to Congress on Medicaid and CHIP," June (Washington, DC: MACPAC, 2013).
[4] Emily M. Johnston, Jennifer M. Haley, and Tyler W. Thomas, *Promoting Continuous Coverage during the Postpartum Period: Lessons Learned from Medicaid Coverage Transitions and the Public Health Emergency* (Washington, DC: Urban Institute, 2021); CMCS Informational Bulletin, "Key Dates Related to the Medicaid Continuous Enrollment Condition Provisions in the Consolidated Appropriations Act, 2023" (Baltimore: Center for Medicaid and CHIP Services, January 5, 2023).

Difficulty Enrolling and Staying Enrolled in Medicaid. Key informants reported that some pregnant women face challenges enrolling and staying enrolled in pregnancy-related Medicaid coverage. Multiple informants stated that pregnancy-related Medicaid is not widely advertised, and, as such, many potentially eligible participants may not be aware they could obtain coverage. Furthermore, some informants also noted there is a stigma associated with Medicaid, which may make some women hesitant to enroll in the program. Still, knowledge about the program is only one factor and may not be enough—eligible recipients must also know whom to contact for enrollment assistance. While some informants stated that the enrollment process itself is not difficult, others thought it was cumbersome and that many women need help completing it. While larger clinics, hospitals, and county health and social service departments typically have case workers and navigators to help people enroll in available benefits, some informants reported that staffing shortages may limit the availability and timeliness of enrollment assistance. Furthermore, at least one informant noted that smaller clinics may not necessarily have staff hours to help people enroll in Medicaid and may avoid accepting new patients who are not enrolled yet.

It's difficult for residents to access Medicaid in many counties. The process for signing up for Medicaid is not straightforward and there's just a lot of paperwork and red tape they have to go through…It's always been challenging for community practices, with those barriers in place, getting people signed up [in Medicaid], and it's been a bit of a problem for them to accept Medicaid individuals because there are so many barriers for them to get signed up for coverage.

—Key informant

HIGH UNMET SOCIAL NEEDS AND INADEQUATE COMMUNITY RESOURCES AND INFRASTRUCTURE

Across the case study counties, key informants suggested that high poverty rates and limited or hard-to-access community resources and infrastructure are often underlying factors that affect the health and well-being of women long before, during, and after they are pregnant and may contribute to poor birth outcomes. Most informants described their respective counties as "low resourced," with inadequate infrastructure and community resources. Key informants who lived in supposedly "better-resourced counties" acknowledged that access to resources was not equitable because of low

awareness and other barriers to access among families with low incomes. Furthermore, some key informants stated that racial and ethnic disparities in access to economic opportunities and other resources existed because of systemic racism, but noted that acknowledgement of racism as a root cause of disparities was not widely accepted and could even be controversial in some communities.

High Unmet Social Needs. Across all counties, informants described transportation, stable and affordable housing, affordable child care options, and food security as the most common unmet social needs among families with low incomes. Many informants noted the lack of reliable public transportation as a major barrier to care. For example, bus routes tend to be located in major towns and do not reach all parts of the county, which leaves many who do not own a car without options to travel to care. Medicaid covers nonemergency medical transportation services. However, people must schedule a ride and transportation can arrive hours early and pick up hours late, making it a nonviable option for people who are employed or have caregiving responsibilities. Key informants reported that food access is also a high unmet social need and acknowledged that food deserts exist even in more urban and well-resourced counties. Depending on where people live, they may be 20 miles from a grocery store. Additionally, some informants stated that there is a lack of knowledge about the Women, Infants, and Children (WIC) program that offers food benefits to eligible pregnant and parenting women, so families not connected to health and social service organizations may not be enrolled. Several key informants noted that the high cost of child care often posed barriers for women to get or maintain jobs or attend prenatal care appointments. Finally, key informants highlighted that growing housing costs were also a widespread problem. Several counties experienced high rates of housing instability and homelessness but had limited shelters or transitional housing options. For example, one key informant reported that domestic violence survivors had to be referred to a shelter in a neighboring county.

Poverty is one of the huge factors here in our community. And the disparity that we have in poverty…The outcome for a child can be predicted based on the race of the child. When you look at the poverty indicators in our community, some 50 percent of African American children and 60 percent of Hispanic/Latino children are in poverty, versus 12 percent of their white counterparts.
—Key informant

Difficulty Accessing Social Services. Informants identified several sources of support and resources available for families, including publicly sponsored services such as WIC programs and other benefits administered by local departments of social services. Most counties in our case study also had community-based organizations offering early childhood development supports, such as child care assistance, food banks, employment training opportunities, and other supports aimed at improving economic opportunities for families with low incomes. However, key informants noted that services tend to be concentrated in larger towns and cities and may not be as accessible to people in more remote areas of the county.

Informants also noted that outreach and education to families about available resources was challenging in many places. For example, county departments and community-based organizations have limited budgets to advertise or hire outreach workers. In some counties, we heard that social services and supports are inadequate to meet the needs of community members, particularly with housing assistance. In others, we heard that while various programs and resources exist, it can be difficult to connect people to the help they need. One informant stated, "Even though we have the resources available, people aren't necessarily accessing them." It is not clear whether these resources do not match the needs of community members or whether there are other barriers to accessing them, such as lack of awareness, distrust, or stigma about seeking assistance.

Key informants were not aware of any programs or initiatives specifically designed to support healthy pregnancies and healthy babies other than services and supports available from local health departments. But informants noted that health department services are subject to availability and often inadequately funded, resulting in restrictions on who can access them (such as requiring Medicaid eligibility or being a first-time mother), or they may be suspended or discontinued at any time. For example, some mentioned that programs for lactation support or childhood immunizations are no longer available because of lack of funding. Informants were also not aware of any emotional support services for pregnant and postpartum women, such as mother support groups.

Other Infrastructure and Resources. Informants named additional challenges that could negatively affect access to economic opportunities and resources and have consequences for maternal and child health. For example, several informants described underfunded public education systems, and one informant observed disparities in education because of a "fragmented and segregated" school system. Another informant serves a county in one of the state's lowest-rated public education systems, which has many difficulties because funding is insufficient. Other challenges included limited employment opportunities with good wages and benefits, unreliable internet connections (especially in more rural areas), and limited recreation options. A few informants also mentioned rising crime rates as a concern.

Finally, we consistently heard in all counties that limited health care resources, particularly shortages of behavioral and specialty care providers who take Medicaid, were contributing to poor population health and maternal health outcomes. The health care challenges are discussed in more detail in the following section.

LIMITED ACCESS TO HEALTH CARE SERVICES AND POOR POPULATION HEALTH

Key informants across all six counties shared similar observations about challenges with the availability and quality of maternity care and other health care services and possible reasons for delayed entry into prenatal care. Furthermore, key informants noted that the lack of health insurance, limited access to care, and poor population health (such as high levels of obesity and chronic health conditions) contributed to increased health risks for women during pregnancy.

Access to Prenatal Care. County health departments were a common source of prenatal care for women enrolled in Medicaid and those without insurance coverage in all six counties. However, informants in some counties noted that staffing turnover and shortages at their county health department, as well as limited ability to provide interpretation and translation services, sometimes posed barriers to care. For example, there could be long wait times to get an appointment, or some programming may be suspended or limited in scope because of staffing shortages. Similarly, informants in some counties remarked that there are often few, if any, clinicians and staff who speak Spanish and other languages. In contrast, other key informants highlighted county health departments as vital supports for good birth outcomes in their county.

Except for two suburban counties (Cumberland and Orange), options for prenatal care services covered by Medicaid outside of county health departments were limited. For example, some counties only had one private practice and one hospital where women can seek care and deliver babies; otherwise, they would need to travel outside the county boundaries. Informants reported that local hospitals often lacked capacity to treat complicated conditions among mothers and infants, and, as such, some patients were forced to travel outside of the county to access specialist prenatal care or NICU services. In some counties, key informants shared that pregnancy resource centers—also referred to as crisis pregnancy centers and anti-abortion counseling centers[13]—provide some pregnancy-related services and supports such as early ultrasounds to confirm pregnancy but do not offer clinical care. While several informants reported doulas, who provide emotional support to women during pregnancy and birth, were available in their communities, they were not sure whether Medicaid members could afford them. NC Medicaid does not provide doula coverage and key informants were not aware of any grant funding available to help offset the cost of doula services for women with low incomes.

Key informants' views on the quality of perinatal care for Medicaid members varied across counties. For example, in counties with limited options for prenatal care, informants were more likely to report that the same level of care and attention was given to all pregnant women regardless of insurance status because most everyone received services from the same providers and delivered in the same hospital. However, several key informants speculated that in counties with more options for prenatal care there could be some segregation in care, whereby Medicaid members predominately receive prenatal services at a health department or clinic while privately insured patients receive care from private practices. One informant thought that prenatal care for patients who rely on Medicaid may not be as high quality as for patients covered by private insurance, likely because of the discrepancy in resources that health departments can offer versus those of private and hospital-affiliated clinics.

Late Entry into Prenatal Care. Late initiation of prenatal care (defined as beginning care after the first trimester) can contribute to poor maternal and infant health outcomes. When we asked key participants for their perspectives on why some women in their communities may delay or completely forego prenatal care, we heard that the burden of initiating care often falls on the patient. While most key informants acknowledged they had limited data to support their statements, particularly direct input from women themselves, they shared several opinions that reflected this burden.

Most commonly, key informants thought that some women did not know how important prenatal care was and believed that more effective education could lead to better engagement in care. Some responses blamed individual patients for not accessing care. For example, we heard providers often interpret late initiation of prenatal care or missed appointments as indicating a woman did not know how to take care of herself or her baby. This may suggest unconscious bias on the part of some providers in thinking that low engagement in prenatal and postnatal care was solely attributable to a need for education, rather than to structural barriers such as lack of insurance, sick leave, or transportation. It is also possible that prenatal education was the greatest priority for most providers because education is the primary resource they could offer or have in their control.

Many key informants also cited a host of structural barriers that contribute to delayed or sporadic prenatal care visits. Structural barriers cited by informants included a lack of health insurance or delays in enrolling in Medicaid coverage. For example, some informants noted that even after successfully enrolling into the program, enrollees may not receive their Medicaid card immediately. One informant said that "a lot of local offices refuse to see the patients until they have insurance, which causes late prenatal care." Some informants noted that county-provided prenatal care services are typically housed within a government building, which may discourage immigrants who do not have documentation from accessing those services from fear of being discovered and deported. Other structural barriers to early

or regular prenatal care that informants mentioned included limited paid time off and sick leave, and lack of reliable transportation and child care. Finally, some key informants also hypothesized that patients may not know that they are pregnant in the first trimester, or may be in denial or afraid to seek care because of issues such as unhealthy substance use.

As a public health practitioner, that's the most frustrating thing is you know that there's women out there who need prenatal care right now. And they either don't know or they are in that state of denial, where they're not getting care.
—Key informant

Limited Access to Behavioral and Specialty Care. In describing access to other health care services for Medicaid members, key informants voiced concerns, particularly with behavioral and specialty care. According to key informants, behavioral health services in their counties were limited to begin with, but even fewer behavioral health providers accept Medicaid because of factors such as administrative burden related to billing for services and low reimbursement rates. Medicaid members seeking behavioral health care tend to experience long wait times for appointments or may have to travel outside the county. Although substance use was mentioned as a concern among expecting mothers in all counties, key informants in only one county reported having an outpatient treatment program for pregnant women with substance use disorder. Furthermore, informants reported a lack of transitional housing for mothers in treatment and recovery. Other types of specialty care, including dental care, are also in short supply and challenging for pregnant Medicaid enrollees to access.

Underlying Health Risks. Diabetes, high blood pressure, heart disease, unhealthy substance use, obesity, and stress and other mental health concerns were identified as common health conditions and risk factors for pregnant and postpartum women in the six case study counties. Informants' assessments of disparities in health status based on race and ethnicity varied—while some believed these health risks were common across all populations, others thought women from racial and ethnic minority groups had higher rates of poor health.[14] Some informants also noted that uninsurance contributed to poor health among pregnant women. For example, women without insurance may forgo preventative care and as a result enter pregnancy in worse health, which can lead to complications and high-risk pregnancy. One informant observed that the overall health of pregnant women in their county has been getting worse over time, with a growing prevalence of obesity and chronic conditions.

Supports for Maternal Health

Key informants suggested that several factors play an important role in supporting pregnant and postpartum women. These factors can be broadly summarized in four categories. First, key informants discussed health system factors that support positive maternal and infant health outcomes, citing the importance of access to quality and continuous perinatal care, including free or low-cost perinatal care through county health departments and midwifery models of care. Second, we heard that additional supports, such as care coordination and links to social services, were helpful. Third, key informants also highlighted the importance of collaborative and trusting relationships across health care and social service providers and family supports. Finally, informants shared other community and social supports beyond the health care system that can support positive health. According to key informants, the most necessary changes to improve birth outcomes included (1) more education and awareness about maternal health and prenatal care, (2) a more accessible and culturally/linguistically effective health care system, (3) increased funding for health department prenatal care clinics and programs, (4) affordable housing options, and (5) public transportation.

ACCESS TO QUALITY AND CONTINUOUS MATERNITY CARE

As mentioned above, across case study counties, local health departments were an important, and often the only, source of perinatal care for women enrolled in Medicaid and those without insurance. While key informants in some counties shared challenges associated with health department care, key informants in Catawba and Wayne counties highlighted their county health departments as critical to supporting positive birth outcomes for Medicaid families (box 2). In both counties, health departments established successful partnerships with local maternity care clinics and maternity units at local hospitals, through which hospitals and private practice clinicians provide high-quality prenatal care to patients at a health department clinic. This type of collaboration supports continuity of care, whereby pregnant women can see the same providers for prenatal care visits and hospital delivery and the same trusted providers for subsequent pregnancies. Other health departments typically employ clinicians who deliver prenatal and postpartum care services in-house but do not necessarily integrate with hospital delivery care.

BOX 2

Lessons Learned from the Catawba County Public Health Department and Catawba Valley Medical Center Partnership

We identified Catawba County as a bright spot for birth outcomes among Medicaid births, with

- better-than-expected rates of preterm birth and low birth weight among Medicaid births overall,
- better-than-expected rates of preterm birth among Medicaid births to Black mothers.
- better-than-expected rates of low birth weight among Medicaid births to Black and white mothers, and
- better-than-expected initiation of prenatal care among Medicaid births to Hispanic mothers.

Key informants shared the unique partnership between the Catawba County Public Health Department and the Catawba Valley Medical Center:

- The Public Health Department passes the state funding they receive to provide prenatal care to Catawba Valley Medical Center to support their prenatal care clinic.
- The Catawba Valley Medical Center prenatal care clinic is located in the health department building and staffed by medical center providers. The clinic
    - offers a midwifery model of care provided by Catawba Valley Medical Center midwives and nurses;
    - has physicians come to the clinic twice per week to see high-risk patients; and
    - offers Centering Pregnancy, a group-based model of prenatal care, for patients interested in group care.
- The clinic sees all patients, regardless of ability to pay, and offers sliding scale payment.
- The clinic serves high-risk patients and offers care management services whereby
    - all patients are categorized by level of risk,
    - high-risk patients are seen in-house by Catawba Valley Medical Center physicians without being referred out for care,
    - high-risk patients meet monthly with physicians and midwives to review their care plans, and
    - two care managers connect patients to needed medical and social services.

We also heard that the type of maternity care matters. Key informants spoke highly of the midwifery model of care, which involves a holistic and wellness approach to pregnancy and birth with an emphasis on comprehensive education and patient-centered care (Hill et al. 2018). Midwives are health

care professionals specialized in providing prenatal, birthing, and postpartum services to women with uncomplicated pregnancies. Catawba, Cumberland, and Wayne counties provide wide access to the midwifery model of care for Medicaid members. For example, private practice–based midwives provide prenatal care to women who receive services at the Wayne County Health Department. Several informants noted that the midwifery model of care is particularly promising for supporting good birth outcomes through person-centered care that relies on establishing rapport and trust between midwives and patients.

I still feel very strongly that our midwife-led model is a great thing. We recently won recognition as being one of the best hospitals in the country to have a baby. We have an incredibly low C-section rate; it's about 12 percent. We're very proud of that. Our midwife-led teams help improve continuity of care.
—Key informant

CONNECTIONS TO SOCIAL SERVICES AND CARE COORDINATION

Besides clinical perinatal services, county health departments support positive birth outcomes by offering other services and programming in-house to support women during the pregnancy and postpartum period, such as case management services for women with high-risk pregnancies, early childhood home visiting programs such as nurse-family partnership, childbirth preparation, nutrition education, parenting classes, and lactation counseling. Some health departments have dedicated staff serving as care managers who connect prenatal care patients with available resources and social services offered by the health department and in the community. These wraparound services help county health departments meet patients' social needs while providing clinical medical care.

County health departments also maintain relationships with other supports and services in the community and use these relationships to connect patients to needed services. These departments are frequently collocated with other public benefits programs, such as the county social services department, which also administers Medicaid enrollment, WIC offices, and Head Start and Early Head Start programs. Several of our case study counties also have various private nonprofit community-based organizations that assist families with child care, food and nutrition, and economic empowerment, such as Partnership for Children and Families[15] and Wages.[16]

When working well, in-house services and supports and relationships and referrals to external partners help county health departments provide comprehensive and coordinated care for pregnant women that meets physical health, behavioral health, and social needs. However, as discussed earlier, these additional programs and supports are often underfunded and thus may not be available to all who need them.

COLLABORATIVE COMMUNITY DYNAMICS AND EXTENDED SOCIAL SUPPORTS

Several key informants pointed out that the strength of the social networks and supports that exist in the community and at home could protect maternal health. For example, community dynamics were described as exceptionally collaborative in one county where local officials, health care and social services providers, and consumer advocates and community leaders have a history of working together to address pressing community problems. Informants described concerted efforts to improve childhood immunization rates and to lower teen pregnancy rates, which have been successful because of close collaborative relationships among key community stakeholders. In another example, this type of collaboration extended to maternal and child health when a local prenatal care clinic, hospital, and pediatric clinic coordinated to exchange patient information and conduct warm handoffs as families move through the health care system. According to some informants, established relationships and trust of the community in the health care and social services system promote engagement in care and could positively affect birth outcomes. Finally, one informant thought that extended family support played a key role in maternal and infant health and well-being, particularly in more rural counties where generations of families live in close-knit communities.

OTHER SUPPORTS THAT ARE NEEDED

We asked the key informants to tell us what other supports or changes would be beneficial in their communities to better support maternal and child health and improve birth outcomes. Most frequently, informants believed that better understanding and awareness of community members about the importance of prenatal care was a top priority for them and could greatly support better birth outcomes. Furthermore, key informants highlighted that more attention and resources were needed to expand access to comprehensive physical and behavioral health care services in their communities. This would include increased funding for local health departments to expand their prenatal care clinics and enhance language interpretation and other capacities to provide more culturally effective care. Finally, key informants also identified broader infrastructure and resource investments that they believed would support population health and in turn lead to better birth outcomes, such as higher-income jobs, affordable housing, and reliable public transportation.

Discussion and Policy Implications

Our findings suggest that families with low incomes across North Carolina counties face similar challenges that affect their ability to access health care and other resources. Even counties with better-than-expected birth outcomes face consistent challenges. Many of these challenges relate to larger structural factors such as uninsurance; underfunding of public health, education, infrastructure, and social service sectors; wage stagnation; and systemic racism (Braveman et al. 2022; Kresge 2015; TFAH 2020).[17] County health departments play a critical role in supporting maternal and infant health outcomes for the Medicaid population. In some counties, we heard about limitations and challenges to providing high-quality care at health departments, while other counties cited innovative approaches and high-quality care offered at their health department as a key to positive outcomes. To improve maternal and infant health outcomes in NC Medicaid and beyond, multisector and multilevel changes are needed. Specifically, our findings highlight the following areas for consideration:

1. Implementing Medicaid policies to expand eligibility and improve quality of care;
2. Expanding access to the midwifery model of care;
3. Investing in public health and the social sector;
4. Examining and working to eliminate economic inequality and racial inequity;
5. Recognizing and eliminating structural barriers to care while addressing potential unconscious bias among some providers; and
6. Engaging Medicaid members to identify maternal health needs and preferred solutions.

Implementing Medicaid Policies to Expand Eligibility and Improve Quality of Care

NC Medicaid has recently taken several steps toward improving birth outcomes and eliminating racial and ethnic disparities in maternal health. These include extending Medicaid postpartum coverage and incorporating maternal health–related incentive metrics in managed care contracts (NH DHHS 2021).[18] NC Medicaid's transition to managed care presents an opportunity to improve maternal and infant health outcomes if managed care organizations provide additional services and supports, such as care coordination and social services, beyond those experienced in North Carolina's traditional Medicaid program. However, the transition to Medicaid managed care could worsen maternal and infant health outcomes if members experience challenges enrolling in a managed care plan and finding an in-network primary care provider or if incentive structures lead managed care plans to ration services, potentially

making it more difficult for members to get needed referrals or to access specialty services. The state is also operating a long-standing pregnancy medical home model for women with complex risk factors, though in our earlier work we uncovered some concerns about the ability of managed care plans to maintain the integrity of the model (Allen et al. 2022). State Medicaid officials, managed care plans, and participating maternity care providers need to collaborate closely in order to ensure wide access to high-quality wraparound services through managed care and the Pregnancy Management Program.

North Carolina could make further strides to improve maternal health. First and foremost, access to health insurance coverage can help decrease maternal health disparities by increasing access to health care even before a woman becomes pregnant. Research shows women living in states that expanded Medicaid under the Affordable Care Act have better access to preventive care, experience fewer adverse health outcomes during and after pregnancy, and have lower maternal mortality rates than women living in states that did not expand Medicaid (Searing and Ross 2019). Our case studies took place before North Carolina expanded Medicaid, and adopting the Medicaid expansion was highlighted as a policy priority by key informants. With a new bill signed on March 27, 2023, that expands Medicaid, North Carolina is one step away from improving access to health care for about 600,000 state residents.[19] Several states have implemented or are pursuing Medicaid coverage of doula services, and are experimenting with other enhanced prenatal care models (Ranji et al. 2022, table 14).[20] Study of these initiatives can inform approaches in North Carolina.

Improving Access to Midwifery Model of Care

Expansion of the midwifery model of care, which is already covered by NC Medicaid, is another opportunity to improve birth outcomes. In counties where midwives provide prenatal care to Medicaid members, key informants spoke encouragingly about the positive impacts of midwife-led care on experiences and outcomes of Medicaid-enrolled women. Encouraging evidence shows that the midwifery model of care improves outcomes and could help address racial and ethnic disparities in maternal and infant health (Renfrew et al. 2014; Sandall et al. 2016). In contrast to obstetricians, midwives spend more time on average with pregnant and postpartum women during visits, provide individualized education and counseling on pregnancy and other health-related matters, and offer culturally sensitive, holistic care in which women share decisionmaking (Hill et al. 2018).[21] Available research also suggests that Medicaid members with uncomplicated pregnancies who received midwifery care in birth centers have better outcomes at a lower cost than women with uncomplicated pregnancies who receive traditional hospital-based care (Benatar et al. 2013; Centers for Medicare and Medicaid Innovation-2018; Dubay et al. 2020; Howell et al. 2014). Maintaining and expanding Medicaid

enrollees' access to midwifery and birth center models of care thus presents an opportunity for North Carolina to further improve the quality of maternity care in the state. The Institute for Medicaid Innovation launched a national learning collaborative and developed a webinar series and other resources to assist states in improving access to midwifery in Medicaid (Institute for Medicaid Innovation 2020).[22]

Investing in Public Health and the Social Sector

Key informants offered several examples of how local infrastructure and public and private resources often did not have the capacity to serve all people who needed them. For example, public health departments were often the only source of maternity care for women enrolled in Medicaid and women without insurance in the six case study counties but, according to key informants, were often understaffed and underfunded. Furthermore, we observed some variation across counties in how well local health departments coordinate with other health care providers in the community to stretch their limited resources and provide the best care possible. For policymakers and health care payers, it will be important to understand and address the challenges health departments face and expand and replicate successful strategies (box 2). Increased funding for staff and services at the local health departments may be a promising way to engage and better serve women who are most at risk of poor birth outcomes.

Furthermore, for families living in poverty, constant stress from not having enough resources to make ends meet has detrimental effects on health and well-being.[23] The health care sector has recognized that unmet social needs have negative effects on health and consequently, health care organizations have been exploring ways to better address patients' needs outside of clinical care (Kenney et al. 2019). For example, NC Medicaid has recently launched Healthy Opportunities pilots in three regions of the state: Medicaid funds are used to deliver housing and nutritional assistance, transportation, and interpersonal violence interventions.[24] However, it is not clear that health care dollars are a viable or efficient source for ensuring all communities have the resources to meet the needs of residents with low incomes. To improve the availability and capacity of public health and social services sectors, including funding for housing, nutritional assistance, transportation, and child care, considerable investments are essential at the federal, state, and local levels. A recent study found that county investments in building infrastructure and social services were associated with higher life expectancy of county residents (Cardona et al. 2021).

Finally, it is also important to eliminate barriers that immigrant populations face in accessing public programs and benefits, such as language and cultural barriers and the fear of immigration enforcement.

These challenges often deter families eligible for assistance from accessing benefits that could help improve their health and financial well-being (ASPE 2012a; Haley, Gonzalez, and Kenney 2022). Prior research suggests that trusted community-based organizations address these barriers and help immigrant families enroll in programs and benefits they are eligible for (ASPE 2012b; Chaudry, Fortuny, and Pedroza 2014).

Examining and Working to Eliminate Economic Inequality and Racial Inequity

Poverty and lack of economic opportunities, including well-paid jobs that offer health insurance coverage and other benefits, were common challenges facing the uninsured and Medicaid enrollees in case study counties. Growing income inequality has been a long-standing problem in the US, driven in part by a stagnant federal minimum wage, slow wage growth for workers versus those in executive positions, and the decline in unions.[25] In 2019, the top 1 percent of US families owned 75 percent of US wealth while the bottom 50 percent of families owned just 1 percent.[26] Furthermore, there are large disparities in economic security and wealth by race and ethnicity in the US, driven by institutional policies that systemically exclude large segments of the population from economic opportunity.[27] Families with the lowest incomes often face tough decisions on how to spread their limited resources around, and paying for nutritious foods and medical services may not always be possible. Research shows that economic insecurity and racism have negative impacts on mental health and well-being and negatively affect one's ability to pursue higher education, purchase a home, start a business, or access high-quality health care (Kopasker, Montagna, and Bender 2018; Rhode et al. 2016).[28] Thus, examining and eliminating racism and other structural barriers is necessary to help individuals and families achieve greater economic security and, consequently, better health.

Recognizing and Eliminating Structural Barriers to Care while Addressing Potential Unconscious Bias among Some Providers

In many ways, insights and experiences of our health and social services providers painted a compelling picture of how structural barriers, such as lack of well-paid jobs or limited public transportation, affect the ability of many pregnant women in their communities to thrive and deliver healthy babies. Yet, when asked about the most important changes needed to improve birth outcomes, most key informants said that women need better education about the importance of early and regular prenatal care. Furthermore, many informants also expressed frustration about not being able to conduct outreach and engage women in care and other supports more effectively.

A focus on patient behavior may not be effective, as evidence shows that individuals face myriad systemic and structural barriers to care. Though prenatal education is the primary support providers can offer, these suggestions may also reflect unconscious bias among some providers. Negative sentiments about patients can affect relationships between providers and patients, leading to mistrust and miscommunication. A large national study found that about 1 in 6 women in the US reported experiencing some form of mistreatment during pregnancy or delivery, with women of color more likely exposed to mistreatment than white women (Vedam et al. 2019). Recognizing and eliminating unconscious bias in maternity care while refocusing attention on structural barriers can help more women to have healthy pregnancies and healthy babies.[29]

Engaging Medicaid Members to Identify Maternal Health Needs and Preferred Solutions

Often missing in maternal and infant health efforts are the voices of pregnant and parenting women. Including Medicaid members in developing and implementing interventions can be challenging unless providers can invest time and resources to establish relationships and build trust with women and the community-based organizations that serve them. A case in point is this study, in which, despite multiple attempts and strategies, we were unable to effectively engage Medicaid-enrolled women and their local service providers in our research. This experience highlights the importance of finding effective ways to partner with communities in all efforts to improve health, from research to development, implementation, and evaluation of solutions (Allen et al. 2021).

Conclusions

Maternal health and disparities in maternal and infant health outcomes reflect overall population health and inequitable health care. Our conversations with health and social service providers who serve Medicaid-covered and uninsured pregnant and postpartum women have been insightful, but not surprising. Poverty and limited resources to meet one's basic needs for food, shelter, transportation, and health care pose challenges to families' optimal health and well-being, including pregnant and postpartum women and their infants. Reforming clinical approaches or improving the coverage and access of maternity care services funded by Medicaid alone are not likely enough to improve health and eradicate disparities in maternal and infant health outcomes in this country. Serious, systemic, and large-scale changes are also needed at the local, state, and federal levels to address structural inequalities and inequities in the United States.

Appendix A. Methodology of North Carolina Medicaid Perinatal Health Bright Spots Analysis

Our quantitative Bright Spots analysis (Johnston et al., forthcoming) identified counties that experienced better-than-expected or worse-than-expected birth outcomes among women enrolled in NC Medicaid, on the basis of county-level socioeconomic, household, and health system characteristics. Supplemental analysis of smaller counties identified those with better-than or worse-than-expected outcomes among all births. From these findings, we selected six counties to investigate in greater detail through qualitative case studies to better understand the factors affecting the health of moms and new babies served by Medicaid in North Carolina.

Data

For this analysis, we use 2018 vital statistics Natality data accessed through the CDC WONDER online database. This database uses birth certificate data to report on almost all live births to US residents occurring within the United States. We compile county-level characteristics from the 2018 CDC/ATSDR Social Vulnerability Index, the 2018 American Community Survey, and the 2018 HRSA Area Health Resources Files.

Analytic Sample

County-level birth data from CDC WONDER are available only for the 27 North Carolina counties with at least 100,000 residents as of the 2010 Census. Our primary analytic sample is limited to these larger counties and to births paid for by Medicaid and occurring in 2018. We analyze outcomes for all births and separately for racial and ethnic groups. To include the 73 smaller North Carolina counties, we conducted additional analysis of all births (not only births paid for by Medicaid) occurring in these smaller counties in 2019.

Outcomes

We look at three outcomes:

- the share of births that are preterm (before 37 weeks of pregnancy)
- the share of births that have low birth weight (less than 2,500 grams)
- the share of births for which the mother started prenatal care late (after the first three months of pregnancy)

Because each outcome measured is a poor health outcome, a lower share is considered positive.

County Characteristics

We selected county characteristics that might indicate whether a county is more or less likely to have the resources needed to help promote good health for moms and babies.

- Socioeconomic status
  - share of county residents living in poverty
  - share of county residents ages 16 and older who are unemployed
  - share of county residents ages 25 and older without a high school diploma
  - county per capita income
- Household characteristics
  - share of county residents ages 65 and older
  - share of county residents ages 17 and younger
  - share of county residents with a disability
  - share of households with a single parent and children under age 18
- Health system characteristics
  - the number of federally qualified health centers (FQHCs) per 1,000 county residents
  - the number of OB/GYNs, advanced practice nurse midwives, and family medicine provers per 1,000 county residents
  - distance to the nearest county with a neonatal intensive care unit (NICU) in miles

Many other factors may impact the health of moms and babies covered by Medicaid. We do not include measures of social determinants of health (such as access to housing, food, or transportation)

because we plan to investigate how these factors differ across counties with better-than-expected and worse-than-expected outcomes in our case studies.

Analysis

For each outcome, we use linear regression models to estimate the relationship between each county characteristic and the outcome. We then use these values along with each county's measured characteristics to estimate the expected rate of the outcome for each county. We then compare the expected outcome with the actual outcome to identify counties with better-than-expected and worse-than-expected outcomes. We repeat this analysis for each outcome for all Medicaid births and for Medicaid births to non-Hispanic Black, non-Hispanic white, and Hispanic women.

We selected two counties with better-than-expected outcomes and two with worse-than-expected outcomes to study further in qualitative case studies, along with two smaller counties not included in this analysis because they were not identifiable in the WONDER data. These case studies include key informant interviews with community leaders and focus groups with community residents. Our goal is to understand the community perspective for why their county is achieving better-than-expected or worse-than-expected outcomes after accounting for the factors in the model.

Appendix B. County Profiles

Bladen County

This profile summarizes 2018 Bladen County characteristics and key birth and pregnancy outcomes for all births to Bladen County residents.

Bladen County Characteristics, 2018

- Rural county with 33,000 residents located in southeastern NC and home to Elizabethtown
- Economic characteristics
  - $21,000 per capita annual income
  - 26 percent of county residents live below the federal poverty level[30]
  - 7 percent unemployment rate
  - 20 percent of county residents do not have a high school diploma
- Birth characteristics
  - 300 births[31]
  - 31 percent Black mothers[2, 3]
  - 16 percent Hispanic mothers[2, 3]
  - 49 percent white mothers[2]
  - 4 percent other mothers[2]
  - 75 percent paid for by Medicaid
- Maternal health care system
  - 35 miles from the nearest county with a neonatal intensive care unit (NICU)
  - 0.18 maternal health care providers per 1,000 county residents
  - 0.03 federally qualified health centers per 1,000 county residents

Bladen County Birth and Pregnancy Outcomes for All Births, 2019

As described in Appendix A, we classified county outcomes as better than or worse than expected on the basis of each county's socioeconomic, household, and maternal health care system characteristics.[32]

- Bladen County had better-than-expected outcomes for
  - low birth weight for all births
  - preterm birth for births to Black and white mothers
  - low birth weight for births to Black and white mothers

Tables B.1 and B.2 present birth and pregnancy outcomes for births paid in Bladen County in 2019 as well as comparisons with North Carolina overall, other North Carolina counties, and Healthy People 2020 goals.

TABLE B.1

County and State Comparison of Birth and Pregnancy Outcomes for All Births, 2019

	Bladen County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	9.9	10.6	17.3	5.9	9.4
Low birth weight rate	7.3	9.3	16.6	4.8	7.8
Rate of late prenatal care initiation	38.7	31.4	46.6	12.5	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate better-than-expected outcomes. Highest county and lowest county estimates are among the counties with at least 100 births in 2019.

TABLE B.2

Birth and Pregnancy Outcomes for All Births, by Race and Ethnicity, 2019

	Bladen County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate					
Black births	9.4	14.3	20.4	9.4	9.4
Hispanic births	—	9.4	16.3	4.3	9.4
White births	7.6	9.5	15.8	5.8	9.4
Low birth weight rate					
Black births	8.5	15.0	19.9	8.5	7.8
Hispanic births	—	7.3	12.2	0.9	7.8
White births	7.1	7.4	12.8	5.0	7.8
Rate of late prenatal care initiation					
Black births	42.5	38.0	57.6	18.4	15.2
Hispanic births	—	42.6	72.9	24.1	15.2
White births	34.7	24.8	42.7	12.7	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate better-than-expected outcomes. Highest county and lowest county estimates are among the counties with at least 100 births in 2019.
— = estimate is suppressed because of small sample size.

Catawba County

This profile summarizes 2018 Catawba County characteristics and key birth and pregnancy outcomes for Catawba County residents with births paid for by Medicaid.

Catawba County Characteristics, 2018

- Regional city or suburban county with 159,000 residents located in northwestern North Carolina and home to Hickory and Catawba Valley Medical Center
- Economic characteristics
  - $27,000 per capita annual income
  - 13 percent of county residents live below the federal poverty level[33]
  - 7 percent unemployment rate
  - 15 percent of county residents do not have a high school diploma
- Race and ethnicity of county residents
  - 9 percent Black
  - 10 percent Hispanic
  - 75 percent white
  - 6 percent another or multiple races
- Birth characteristics
  - 1,700 births[34]
  - 68 percent paid for by Medicaid
    - 14 percent Black mothers[2, 3]
    - 15 percent Hispanic mothers[2, 3]
    - 59 percent white mothers[2]
    - 13 percent other mothers[2]
- Maternal health care system
  - Neonatal intensive care unit (NICU) at Catawba Valley Medical Center
  - 0.49 maternal health care providers per 1,000 county residents
  - 0.01 federally qualified health centers per 1,000 county residents

Catawba County Birth and Pregnancy Outcomes for Medicaid Births, 2018

As described in Appendix A, we classified county outcomes as better-than or worse-than expected on the basis of each county's socioeconomic, household, and maternal health care system characteristics.[35]

- Catawba County had better-than-expected outcomes for
  - preterm birth and low birth weight for all Medicaid births
  - preterm birth for births to Black mothers
  - low birth weight for births to Black and white mothers
  - prenatal care initiation for Hispanic mothers

Tables B.3 and B.4 present birth and pregnancy outcomes for births paid for by Medicaid in Catawba County in 2018 as well as comparisons to North Carolina overall, other North Carolina counties, and Healthy People 2020 goals.

TABLE B.3

County and State Comparison of Birth and Pregnancy Outcomes for Medicaid Births, 2018

	Catawba County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	10.5	11.8	15.5	9.2	9.4
Low birth weight rate	9.4	11.7	14.4	9.3	7.8
Rate of late prenatal care initiation	26.7	35.6	54.5	14.1	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate better-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census.

TABLE B.4

Birth and Pregnancy Outcomes for Births Paid for by Medicaid, by Race and Ethnicity, 2018

	Catawba County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate					
Black Medicaid births	10.1	13.8	18.4	9.7	9.4
Hispanic Medicaid births	—	9.4	14.4	5.1	9.4
White Medicaid births	12.1	10.9	15.2	7.9	9.4
Low birth weight rate					
Black Medicaid births	10.1	14.9	21.9	10.1	7.8
Hispanic Medicaid births	8.3	8.1	12.3	6.8	7.8
White Medicaid births	10.4	10.1	15.5	6.2	7.8
Rate of late prenatal care initiation					
Black Medicaid births	25.7	39.1	57.3	16.0	15.2
Hispanic Medicaid births	28.1	38.7	56.7	11.8	15.2
White Medicaid births	25.3	30.0	51.3	14.4	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate better-than-expected outcomes. Highest county and lowest county estimates are among the counties with at least 100 births in 2019. — = estimate is suppressed because of small sample size.

Cumberland County

This profile summarizes 2018 Cumberland County characteristics and key birth and pregnancy outcomes for Cumberland County residents with births paid for by Medicaid.

Cumberland County Characteristics, 2018

- Regional city or suburban county with 332,000 residents located in southeastern North Carolina and home to Fayetteville and one of four counties home to Fort Bragg
- Economic characteristics
  - $24,000 per capita income
  - 18 percent of county residents live below the federal poverty level[36]
  - 9 percent unemployment rate
  - 9 percent of county residents do not have a high school diploma
- Race and ethnicity of county residents
  - 37 percent Black
  - 12 percent Hispanic
  - 43 percent white
  - 9 percent another or multiple races
- Birth characteristics
  - 5,500 births[37]
  - 47 percent paid for by Medicaid
    - 54 percent Black mothers[2, 3]
    - 12 percent Hispanic mothers[2, 3]
    - 23 percent white mothers[2]
    - 11 percent other mothers[2]
- Maternal health care system
  - Neonatal intensive care unit (NICU) at Cape Fear Valley Medical Center
  - 0.53 maternal health care providers per 1,000 county residents
  - 0.01 federally qualified health centers per 1,000 county residents

Cumberland County Birth and Pregnancy Outcomes for Medicaid Births, 2018

As described in Appendix A, we classified county outcomes as better-than or worse-than-expected on the basis of each county's socioeconomic, household, and maternal health care system characteristics.[38]

- Cumberland County had worse-than-expected outcomes for
  - » preterm birth and low birth weight for all births
  - » preterm birth for births to Hispanic mothers
  - » low birth weight for births to Hispanic and white mothers

Tables 1 and 2 present birth and pregnancy outcomes for births paid for by Medicaid in Catawba County in 2018 as well as comparisons to North Carolina overall, other North Carolina counties, and Healthy People 2020 goals.

TABLE 1

County and State Comparison of Birth and Pregnancy Outcomes for Medicaid Births, 2018

	Cumberland County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	14.4	11.8	15.5	9.2	9.4
Low birth weight rate	14.1	11.7	14.4	9.3	7.8
Rate of late prenatal care initiation	35.8	35.6	54.5	14.1	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate worse-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census.

TABLE 2

Birth and Pregnancy Outcomes for Births Paid for by Medicaid, by Race and Ethnicity, 2018

	Cumberland County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate					
Black Medicaid births	15.5	13.8	18.4	9.7	9.4
Hispanic Medicaid births	12.6	9.4	14.4	5.1	9.4
White Medicaid births	13.0	10.9	15.2	7.9	9.4
Low birth weight rate					
Black Medicaid births	15.1	14.9	21.9	10.1	7.8
Hispanic Medicaid births	12.3	8.1	12.3	6.8	7.8
White Medicaid births	12.6	10.1	15.5	6.2	7.8
Rate of late prenatal care initiation					
Black Medicaid births	25.8	39.1	57.3	16.0	15.2
Hispanic Medicaid births	36.5	38.7	56.7	11.8	15.2
White Medicaid births	33.9	30.0	51.3	14.4	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate worse-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census.

Halifax County

This profile summarizes 2018 Halifax County characteristics and key birth and pregnancy outcomes for all births to Halifax County residents.

Halifax County Characteristics, 2018

- Rural county with 51,000 residents located in Eastern North Carolina and home to Roanoke Rapids
- Economic characteristics
  - $21,000 per capita annual income
  - 25 percent of county residents live below the federal poverty level[39]
  - 9 percent unemployment rate
  - 23 percent of county residents do not have a high school diploma
- Birth characteristics
  - 500 births[40]
  - 57 percent Black mothers[2, 3]
  - 3 percent Hispanic mothers[2, 3]
  - 35 percent white mothers[2,]
  - 4 percent other mothers[2,]
  - 80 percent paid for by Medicaid
- Maternal health care system
  - 57 miles to the nearest county with a neonatal intensive care unit (NICU)
  - 0.26 maternal health care providers per 1,000 county residents
  - 0.26 federally qualified health centers per 1,000 county residents

Halifax County Birth and Pregnancy Outcomes for All Births, 2019

As described in Appendix A, we classified county outcomes as better-than or worse-than-expected on the basis of each county's socioeconomic, household, and maternal health care system characteristics.[41]

- Halifax County had worse-than-expected outcomes for
  - low birth weight for all births
  - preterm birth for births to white mothers

» low birth weight for births to Black and white mothers

Tables B.5 and B.6 present birth and pregnancy outcomes for births in Halifax County in 2019 as well as comparisons to North Carolina overall, other North Carolina counties, and Healthy People 2020 goals.

TABLE B.5

County and State Comparison of Birth and Pregnancy Outcomes for All Births, 2019

	Halifax County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	16.2	10.6	17.3	5.9	9.4
Low birth weight rate	16.6	9.3	16.6	4.8	7.8
Rate of late prenatal care initiation	27.4	31.4	46.6	12.5	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate worse-than-expected outcomes. Highest county and lowest county estimates are among the counties with at least 100 births in 2019.

TABLE B.6

Birth and Pregnancy Outcomes for All Births, by Race and Ethnicity, 2019

	Halifax County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate					
Black births	19.0	14.3	20.4	9.4	9.4
Hispanic births	—	9.4	16.3	4.3	9.4
White births	13.2	9.5	15.8	5.8	9.4
Low birth weight rate					
Black births	19.9	15.0	19.9	8.5	7.8
Hispanic births	—	7.3	12.2	0.9	7.8
White births	12.6	7.4	12.8	5.0	7.8
Rate of late prenatal care initiation					
Black births	32.9	38.0	57.6	18.4	15.2
Hispanic births	—	42.6	72.9	24.1	15.2
White births	18.4	24.8	42.7	12.7	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate worse-than-expected outcomes. Highest county and lowest county estimates are among the counties with at least 100 births in the race/ethnicity subgroup in 2019.
— estimate suppressed because of small sample size.

Orange County

This profile summarizes 2018 Orange County characteristics and key birth and pregnancy outcomes for Orange County residents with births paid for by Medicaid.

Orange County Characteristics, 2018

- Regional city or suburban county with 146,000 residents located in Northeastern North Carolina and home to Chapel Hill, Carrboro, and UNC-Chapel Hill
- Economic characteristics
  - $41,000 per capita annual income
  - 13 percent of county residents live below the federal poverty level[42]
  - 4 percent unemployment rate
  - 7 percent of county residents do not have a high school diploma
- Race and ethnicity of county residents
  - 11 percent Black
  - 9 percent Hispanic
  - 69 percent white
  - 12 percent another or multiple races
- Birth characteristics
  - 1,200 births[43]
  - 42 percent paid for by Medicaid
    - 30 percent Black mothers[2, 3]
    - 18 percent Hispanic mothers[2, 3]
    - 40 percent white mothers[2]
    - 12 percent other mothers[2]
- Maternal health care system
  - Neonatal intensive care unit (NICU) at Children's Health of Orange County Hospital
  - 1.39 maternal health care providers per 1,000 county residents
  - 0.01 federally qualified health centers per 1,000 county residents

Orange County Birth and Pregnancy Outcomes for Medicaid Births, 2018

As described in Appendix A, we classified county outcomes as better-than or worse-than-expected on the basis of each county's socioeconomic, household, and maternal health care system characteristics.[44]

- Orange County had worse-than-expected outcomes for
  - preterm birth and prenatal care initiation for all Medicaid births
  - preterm birth for births to Black mothers
  - prenatal care initiation for Black, Hispanic, and white mothers

Tables B.7 and B.8 present birth and pregnancy outcomes for births paid for by Medicaid in Orange County in 2018 as well as comparisons to North Carolina overall, other North Carolina counties, and Healthy People 2020 goals.

TABLE B.7

County and State Comparison of Birth and Pregnancy Outcomes for Medicaid Births, 2018

	Orange County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	12.4	11.8	15.5	9.2	9.4
Low birth weight rate	13.4	11.7	14.4	9.3	7.8
Rate of late prenatal care initiation	37.1	35.6	54.5	14.1	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate worse-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census.

TABLE B.8

Birth and Pregnancy Outcomes for Births Paid for by Medicaid, by Race and Ethnicity, 2018

	Orange County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate					
Black Medicaid births	16.9	13.8	18.4	9.7	9.4
Hispanic Medicaid births	—	9.4	14.4	5.1	9.4
White Medicaid births	8.8	10.9	15.2	7.9	9.4
Low birth weight rate					
Black Medicaid births	14.5	14.9	21.9	10.1	7.8
Hispanic Medicaid births	—	8.1	12.3	6.8	7.8
White Medicaid births	12.3	10.1	15.5	6.2	7.8
Rate of late prenatal care initiation					
Black Medicaid births	33.7	39.1	57.3	16.0	15.2
Hispanic Medicaid births	36.5	38.7	56.7	11.8	15.2
White Medicaid births	37.7	30.0	51.3	14.4	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.
Notes: Shaded cells indicate worse-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census.
— estimate suppressed because of small sample size.

Wayne County

This profile summarizes 2018 Wayne County characteristics and key birth and pregnancy outcomes for Wayne County residents with births paid for by Medicaid.

Wayne County Characteristics, 2018

- Rural county with 123,000 residents located in eastern North Carolina and home to Goldsboro, Seymour Johnson Air Force Base, and Wayne UNC Health Care
- Economic characteristics
  - $24,000 per capita annual income
  - 21 percent of county residents live below the federal poverty level[45]
  - 8 percent unemployment rate
  - 16 percent of county residents do not have a high school diploma
- Race and ethnicity of county residents
  - 31 percent Black
  - 12 percent Hispanic
  - 23 percent white
  - 4 percent another or multiple races
- Birth characteristics
  - 1,600 births[46]
  - 64 percent paid for by Medicaid
    - 45 percent Black mothers[2, 3]
    - 19 percent Hispanic mothers[2, 3]
    - 33 percent white mothers[2, 3]
    - 3 percent other mothers[2,]
- Maternal health care system
  - 37 miles from the nearest county with a neonatal intensive care unit (NICU)
  - 0.26 maternal health care providers per 1,000 county residents
  - 0.05 federally qualified health centers per 1,000 county residents

Wayne County Birth and Pregnancy Outcomes for Medicaid Births, 2018

As described in Appendix A, we classified county outcomes as better-than or worse-than-expected on the basis of each county's socioeconomic, household, and maternal health care system characteristics.[47]

- Wayne County had better-than-expected outcomes for
  - preterm birth, low birth weight, and prenatal care initiation for all Medicaid births
  - preterm birth for births to Hispanic and white mothers
  - low birth weight for births to Black and white mothers
  - prenatal care initiation for Black, Hispanic, and white mothers

Tables B.9 and B.10 present birth and pregnancy outcomes for births paid for by Medicaid in Wayne County in 2018 as well as comparisons to North Carolina overall, other North Carolina counties, and Healthy People 2020 goals.

TABLE B.9

County and State Comparison of Birth and Pregnancy Outcomes for Medicaid Births, 2018

	Wayne County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate	10.2	11.8	15.5	9.2	9.4
Low birth weight rate	11.4	11.7	14.4	9.3	7.8
Rate of late prenatal care initiation	34.3	35.6	54.5	14.1	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.

Notes: Shaded cells indicate better-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census.

TABLE B.10

Birth and Pregnancy Outcomes for Births Paid for by Medicaid, by Race and Ethnicity, 2018

	Wayne County	North Carolina	Highest county	Lowest county	Healthy People 2020 goal
Preterm birth rate					
Black Medicaid births	12.6	13.8	18.4	9.7	9.4
Hispanic Medicaid births	7.6	9.4	14.4	5.1	9.4
White Medicaid births	8.6	10.9	15.2	7.9	9.4
Low birth weight rate					
Black Medicaid births	15.7	14.9	21.9	10.1	7.8
Hispanic Medicaid births	10.1	8.1	12.3	6.8	7.8
White Medicaid births	6.4	10.1	15.5	6.2	7.8
Rate of late prenatal care initiation					
Black Medicaid births	37.6	39.1	57.3	16.0	15.2
Hispanic Medicaid births	36.6	38.7	56.7	11.8	15.2
White Medicaid births	39.9	30.0	51.3	14.4	15.2

Source: Authors' analysis of 2018 vital statistics Natality data accessed through the CDC WONDER Online Database; 2021 North Carolina County Health Data Book; 2018 CDC/ATSDR Social Vulnerability Index; 2018 American Community Survey; and 2018 HRSA Area Health Resources Files.

Notes: Shaded cells indicate better-than-expected outcomes. Highest county and lowest county estimates are among the 27 North Carolina counties with at least 100,000 residents in the 2010 Census. — estimate suppressed because of small sample size.

Appendix C. Interview Protocol

Interviewee Background

1. Briefly describe the work your organization does and the responsibilities of your position.
    a. How long have you been in this position? Are you also a resident of COUNTY?
    b. [*If not mentioned earlier*] In what ways does your organization serve or support pregnant women in COUNTY?
    c. What language do you and your clients prefer to use when referring to pregnancy (e.g., pregnant women versus pregnant people)?
    d. In what ways does your organization serve or support new mothers and infants in COUNTY?
    e. Does your organization only serve residents of COUNTY or do you serve those in neighboring counties, as well? If yes, can you name the counties?

Birth Outcomes

Note: Email a county-specific results handout to interviewees prior to the interview.

2. As part of this project, our research team analyzed outcomes among women and infants covered by Medicaid in your county, which we shared via email. Have you had a chance to review the results? We found COUNTY to have better-than-expected/worse-than-expected rates of low birth weight/preterm birth/late initiation of prenatal care among Medicaid births based on county socioeconomic, household, and health care system characteristics.
    a. What is your reaction to the rates of these outcomes in COUNTY? Are they expected? Surprising?
    b. What is your reaction to how COUNTY'S results compare to Medicaid covered births statewide and in other counties?
    c. [*If respondent had time to review outcomes beforehand*] What do you think about birth and pregnancy outcomes by race and ethnicity?
    d. How do you think these results compare with birth outcomes among women and infants covered by private insurance? What makes you think that?

Medicaid Enrollment

3. How easy or difficult is it for residents of COUNTY to enroll in the pregnancy Medicaid program?
    a. Are uninsured pregnant women generally aware they may be eligible for Medicaid coverage for pregnancy? How do they typically find out?
    b. How do pregnant people generally enroll in the program?
    c. What local resources are available to assist uninsured pregnant women in enrolling in Medicaid coverage?
    d. Do people enrolled in pregnancy Medicaid typically have insurance coverage prior to their pregnancy?
    e. What education is available to pregnant women to help them access and use benefits available while pregnant?
    f. How are women informed when their Medicaid coverage ends following birth?
4. How common is uninsurance among pregnant people in COUNTY?
    a. What reasons are pregnant people uninsured (immigration status, income, unable to enroll in Medicaid, etc.)?

Health and Health Care

5. Overall, how would you describe the overall health of COUNTY residents? What are the main population health concerns in COUNTY (e.g., tobacco use, obesity, etc.)?
6. How would you characterize the overall health and health risks of women of childbearing age, pregnant and postpartum women in COUNTY?
    a. Is the health of pregnant people with Medicaid in COUNTY similar to or different from pregnant people overall?
    b. What are some of the most common pregnancy-related conditions that you see in pregnant women in COUNTY?
    c. What do you think contributes to these health issues?
    d. Have you observed differences in health status of pregnant people by race and ethnicity?
7. What types of care are available to women with Medicaid benefits in COUNTY or nearby (e.g., hospital, OB/GYN, midwife, birth center, doula, perinatal health workers, home visiting)?
    a. How easy or difficult is it to access perinatal care?

b. For perinatal services not offered in COUNTY, which neighboring cities or counties do people travel to get these services? How far do people have to travel to get care?
c. How would you rate the quality of perinatal care Medicaid members receive? What makes you give this rating?
d. How easy or difficult is it to access behavioral health care, dental care, other specialty care?
e. How would you rate the quality of these types of care for Medicaid members?
f. Have you observed any differences in access to and quality of perinatal services among Medicaid-enrolled people by race/ethnicity?

8. What factors do you think contribute to delayed entry to prenatal care for people in COUNTY with Medicaid paid deliveries? (e.g., delayed discovery of pregnancy, barriers to timely enrollment in Medicaid, challenges accessing prenatal care)
9. What health care services are available to uninsured women who recently gave birth in COUNTY? How easy or difficult is it to access these services? How would you rate the quality of these services?

Social Needs and Services

10. What are some of the main unmet social needs among residents in COUNTY?
    a. How are these needs similar or different among people enrolled in Medicaid?
    b. What social needs are most common among pregnant and postpartum women who are enrolled in Medicaid?
    c. Have you observed any differences in unmet social needs among Medicaid-enrolled people by race/ethnicity?
11. What resources and assistance are available to address social needs of pregnant and postpartum women enrolled in Medicaid in COUNTY?
    a. How well do you think these resources meet the needs? What are the major gaps?
    b. What would you say are the most commonly used resources?
    c. How do women learn about these resources? For example, do Medicaid health plans, health care providers, or other service providers screen women for social needs? Are plans and providers using NCCare360 to make referrals/connect people to social services?
12. What types of education and emotional supports are available to pregnant and postpartum women enrolled in Medicaid in COUNTY?

a. Nutrition education
b. Mother's self-care
c. Childbirth preparation
d. Newborn care/parenting classes
e. Lactation support
f. Domestic violence interventions
g. Mom clubs, groups
h. Are any of these supports offered outside of the Medicaid program through community organizations?

13. Are there any programs or initiatives in COUNTY to specifically support healthy pregnancies, including addressing both health and social needs of women who are pregnant and postpartum?
    a. What supports and services are available through these efforts?
    b. Who is sponsoring these efforts?
    c. How effective have they been in promoting the health of pregnant and postpartum women?

Local Infrastructure and Environment

14. How would you describe the availability of or quality of key infrastructure and physical environment in COUNTY in:
    a. Education and employment opportunities
    b. Housing
    c. Food and nutrition
    d. Transportation
    e. Broadband internet
    f. Recreation facilities
    g. Crime and neighborhood safety
    h. Environmental hazards
15. In your opinion, how, if at all, does the local infrastructure and environment we just discussed affect the health and well-being of pregnant women in COUNTY?
16. Are there any other health, social, economic, or community factors we have not discussed yet that you think affect the health of pregnant women and birth outcomes in COUNTY?

Wrap-up

17. Is there anything unique about COUNTY that makes it a good [or not so good] place to be pregnant and have a baby?
18. What do you think are the major strengths of COUNTY in supporting healthy pregnancies? What are the major weaknesses or challenges?
19. Overall, what do you consider to be the most needed change to improve birth outcomes in COUNTY?
20. What advice would you have for your county or state officials to improve birth outcomes in COUNTY?
21. Who else should we reach out to in COUNTY to ask similar questions we discussed with you? Specifically, we are looking to talk to health care providers, social service providers, advocates, community leaders, and community-based organizations that serve pregnant and parenting women.
22. We are also interested in hearing directly from pregnant and parenting women in COUNTY to learn about their perspectives and experiences with health care and other community services and resources or other factors that help them have healthy pregnancies. Do you have a suggestion for an individual or organization that could help us organize a focus group?

Notes

[1] While North Carolina has not expanded the Medicaid program as of April 2023, the state legislators reached a deal in February 2023 to expand Medicaid by 2024. Gary D. Robertson, "N. Carolina Legislators Reach Medicaid Expansion Deal," AP News, March 2, 2023, https://apnews.com/article/medicaid-expansion-north-carolina-agreement-legislature-237f261d1a4ac29a0d81481c3b745d81.

[2] In this report, we use "women" and "mothers" as shorthand for all people who might need pregnancy, birth, and postpartum care. We recognize some people who become pregnant and give birth do not identify with these terms, and we remain committed to using respectful, inclusive language.

[3] In this report, we use the terms American Indian and Alaska Native, Black, and Hispanic. We recognize, however, that these terms do not resonate with all people in these groups, and we remain committed to using respectful, inclusive language.

[4] "Infant Mortality," Centers for Disease Control and Prevention, accessed March 29, 2023, https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm#:~:text=About%20Infant%20Mortality,-Infant%20mortality%20is&text=In%202018%2C%20the%20infant%20mortality,the%20United%20States%2C%202018.

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[6] "North Carolina," National Center for Health Statistics, Centers for Disease Control and Prevention, accessed December 27, 2022, https://www.cdc.gov/nchs/pressroom/states/northcarolina/nc.htm.

[7] The doula is trained to provide emotional, physical, and educational support to a woman during pregnancy, in childbirth, and after birth. Most often the term doula refers to the birth doula or labor support companion. However, there are also antepartum doulas and postpartum doulas. Doulas can also be referred to as labor companions, labor support specialists, labor support professionals, birth assistants, or labor assistants. For more information, see "Having a Doula: What Are the Benefits?," American Pregnancy Association, https://americanpregnancy.org/healthy-pregnancy/labor-and-birth/having-a-doula/.

[8] "Understanding Community Care of North Carolina," North Carolina Institute of Medicine, https://nciom.org/wp-content/uploads/2018/04/CCNC-Primer-FINAL-4-26-18.pdf.

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[10] "Pregnancy Medical Home Transitioned to Pregnancy Management Program," NC Medicaid, Division of Health Benefits blog, October 19, 2021, https://medicaid.ncdhhs.gov/blog/2021/10/19/pregnancy-medical-home-transitioned-pregnancy-management-program.

[11] Preterm birth is defined as before 37 weeks, low birth weight is defined as less than 2,500 grams, and late initiation of prenatal care is after the first trimester.

[12] While North Carolina has not expanded the Medicaid program as of May 2023, the state legislators reached a deal in February 2023 to expand Medicaid by 2024. Gary D. Robertson, "N. Carolina Legislators Reach Medicaid Expansion Deal," AP News, March 2, 2023, https://apnews.com/article/medicaid-expansion-north-carolina-agreement-legislature-237f261d1a4ac29a0d81481c3b745d81.

[13] Associated Press, "Abortion Topical Guide," AP Stylebook, https://www.apstylebook.com/topical_most_recent.

[14] Data suggest that there are racial and ethnic disparities in health status and chronic disease prevalence in North Carolina. See, for example, Luo and coauthors (2018) and NC DHHS (2018).

[15] Partnership for Children and Families, http://www.pfcf.org/.

[16] Wages, https://www.wagesnc.org/.

[17] "TCF Study Finds US Schools Underfunded by Nearly $150 Billion Annually," Century Foundation, announcement, July 22, 2020, https://tcf.org/content/about-tcf/tcf-study-finds-u-s-schools-underfunded-nearly-150-billion-annually/; Juhohn Lee, "Why American Wages Haven't Grown Despite Increases in Productivity," CNBC web site, July 19, 2022, https://www.cnbc.com/2022/07/19/heres-how-labor-dynamism-affects-wage-growth-in-america.html.

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[25] "Income Inequality in the United States," Inequality.org, https://inequality.org/facts/income-inequality/.

[26] Ana Hernández Kent and Lowell R. Ricketts, "Has Wealth Inequality in America Changed over Time? Here Are Key Statistics," *Open Vault* (blog), Federal Reserve Bank of St. Louis, December 02, 2020, https://www.stlouisfed.org/open-vault/2020/december/has-wealth-inequality-changed-over-time-key-statistics.

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[30] The federal poverty level was defined as annual income of $27,750 for a family of four in 2022.

[31] Births in 2019

[32] Characteristics include county-level measures of population, poverty, unemployment, education, single-parent households, disability, age, per capita income, federally qualified health centers, OB/GYNs, advanced practice nurse midwives, family medicine providers, and distance to a neonatal intensive care unit.

[33] Federal poverty rate was defined as annual income of $27,750 for a family of four in 2022.

[34] Births in 2019

[35] Characteristics include county-level measures of population, poverty, unemployment, education, single-parent households, disability, age, per capita income, federally qualified health centers, OB/GYNs, advanced practice nurse midwives, family medicine providers, and distance to a neonatal intensive care unit.

[36] Federal poverty rate was defined as annual income of $27,750 for a family of four in 2022.

[37] Births in 2019

[38] Characteristics include county-level measures of population, poverty, unemployment, education, single-parent households, disability, age, per capita income, federally qualified health centers, OB/GYNs, advanced practice nurse midwives, and family medicine providers, and distance to a neonatal intensive care unit.

[39] Federal poverty rate was defined as annual income of $27,750 for a family of four in 2022.

[40] Births in 2019

[41] Characteristics include county-level measures of population, poverty, unemployment, education, single-parent households, disability, age, per capita income, federally qualified health centers, OB/GYNs, advanced practice nurse midwives, and family medicine providers, and distance to a neonatal intensive care unit.

[42] Federal poverty rate was defined as annual income of $27,750 for a family of four in 2022.

[43] Births in 2019

[44] Characteristics include county-level measures of population, poverty, unemployment, education, single-parent households, disability, age, per capita income, federally qualified health centers (FQHCs), OB/GYNs, advanced practice nurse midwives, family medicine providers, and distance to a neonatal intensive care unit (NICU).

[45] Federal poverty rate was defined as annual income of $27,750 for a family of four in 2022.

[46] Births in 2019

[47] Characteristics include county-level measures of population, poverty, unemployment, education, single-parent households, disability, age, per capita income, federally qualified health centers (FQHCs), OB/GYNs, advanced practice nurse midwives, and family medicine providers, and distance to a neonatal intensive care unit (NICU).

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