



PREGNANCY RISK ASSESSMENT MONITORING SYSTEM
A survey for healthier babies in New Jersey

Maternal Risk Factors and Adverse Birth Outcomes, 2014-2020 (April 2022)

NJ PRAMS is a joint project of the New Jersey Department of Health (NJDOH) and the Centers for Disease Control and Prevention (CDC). Information from PRAMS is used to help plan better health programs for NJ mothers and infants. One out of every 50 mothers are sampled each month, when newborns are 2-6 months old. Survey questions address their feelings and experiences before, during, and after pregnancy. The PRAMS sample design oversamples smokers and minorities. Data are weighted to give representative estimates of proportions in specific categories and of actual persons. Almost 30,000 mothers are included between 2002-2020 with an average response rate of 70%.

KEY RECOMMENDATIONS

Obstetricians and gynecologists shall continue to adopt a preventative approach by:

1. *Scheduling an appointment with patients considering pregnancy and/or trying to become pregnant to identify and make a plan to address any potential risk factors that may adversely affect pregnancy and birth outcomes.*
2. *Promoting healthy physical habits- more exercise, drink 6-8 glasses of water per day, eat more fruits and vegetables.*
3. *Promoting healthy mental habits- adoption of techniques (e.g., meditation, positive thoughts) to manage chronic, toxic stress.*

Obstetricians and gynecologists are encouraged to ensure that their clients know their numbers: Blood Pressure (diastolic and systolic), Body Mass Index (BMI), cholesterol levels, etc.

Background

When assessing adverse maternal and infant birth outcomes, several factors in a mother's medical history can severely impact the overall health of both a mother and her newborn. Medical factors such as a pre-pregnancy history of diabetes can increase the risk of severe maternal morbidity and mortality as well as preterm birth and low birthweight for infants.^{1,2} According to the CDC, as of 2018, roughly 2-10% of pregnant women in the United States will develop gestational diabetes every year, while 1-2% of pregnant women will have an existing history of type I or type II diabetes mellitus.¹ In addition, 1 in 10 live births in the United States were preterm (<37 weeks gestational age), with even higher rates among non-Hispanic (NH) Black mothers (14.1%) compared to NH White (9.1%) and Hispanic (9.8%) mothers, which highlights a need to address disparate birth outcomes among race/ethnicity.³

The percentage of infants born with a low birthweight (<2,499 grams or 5 pounds, 8 ounces) has also steadily risen in the United States. In 2019, the rate of low birthweight in the United States was 8.31%, which is the highest peak since 2006 (8.26%).⁴ At the state level, the rate of low birthweight among New Jersey mothers in 2019 was 7.9%. When compared across race/ethnicity, Black, NH infants had a rate of low birthweight (12.9%) that was nearly 2 times higher compared to both White, NH mothers and Hispanic mothers (6.2% and 7.7%, respectively).⁴

In this brief, NJ PRAMS data from 2014-2020 was analyzed to assess the associations between pregestational and gestational maternal morbidity factors and the risk of adverse birth outcomes (low birthweight, preterm birth, and NICU admission).

Prevalence

Maternal risk factors assessed included pregestational factors: asthma, diabetes, hypertension, polycystic ovary syndrome (PCOS), and anxiety, as well as gestational diabetes. When assessing pregestational maternal risk factors from 2014-2020, 8.6% of women in the NJ PRAMS sample identified having pregestational asthma. When assessing differences across race/ethnicity, Black, NH women had the highest prevalence of asthma (13.6%), while Asian, NH women had the lowest (4.7%). Asthma was also highest among women who had Medicaid as their primary source of pre-pregnancy insurance (13.3%). Pregestational diabetes was highest among Asian, NH women (5.2%), compared to an overall prevalence of 3.9% across all race/ethnicity groups. Pregestational hypertension was highest among Black, NH women (9.7%), women over the age of 35 (7.1%), and those insured by Medicaid (8.0%) prior to their pregnancy. Prevalence of pregestational PCOS was highest among White, NH women (9.3%), women aged 25-34 years (8.1%), and women who were privately insured prior to pregnancy (9.2%). Pregestational anxiety had an overall prevalence of 14.6% from 2014-2020. Assessing pregestational anxiety across demographics indicated that anxiety was highest among White, NH women (20.1%), women under the age of 24 (17.2%), and women insured by Medicaid prior to their pregnancy (17.6%). Additionally, gestational diabetes was highest among Asian, NH women (18.3%), women over the age of 35 (16.5%), and women with some college education or above (16.5%) (Table 1).

When assessing adverse birth outcomes, 13.0% of the NJ PRAMS sample had infants who experienced low birthweight from 2014-2020. The examined adverse birth outcomes while lower amongst White, NH varied widely across race/ethnicity. The rate of having a baby with a low birthweight (17.8%) was highest among Black, NH women. Black women also experienced the highest rates of preterm birth (17.0%) and NICU admission (19.1%), compared to overall prevalence rates of 8.8% and 13.8%, respectively. Similarly, the rate of low birthweight (16.2%) and preterm births among Hispanic women (16.3%) was 2 times higher compared to White, NH women (8.3%). Among Asian, NH women, the prevalence of low birthweight and NICU admission was 15.9% for each outcome, while the prevalence of preterm births was 12.6%. (Table 2).

Across maternal risk factors, 13.6% of women with low birthweight children also had pregestational diabetes, 19.8% had pregestational hypertension, 15.0% had pregestational anxiety, and 16.1% had gestational diabetes. Preterm births were highest among women with pregestational hypertension (17.2%) and diabetes (16.8%), compared to an overall prevalence of 8.8% from 2014-2020. In addition, 21.7% of women with infants who were admitted to NICU also had pregestational diabetes, compared to 21.2% that had pregestational hypertension and an overall NICU admission prevalence of 13.8% (Table 3).

Table 1. Prevalence of pregestational (asthma, diabetes, hypertension, polycystic ovary syndrome (PCOS), and anxiety) and gestational (diabetes) maternal risk factors in NJ PRAMS, 2014-2020.

	PRAMS (%)	Pregestational					Gestational
		Asthma (%)	Diabetes (%)	Hypertension (%)	PCOS* (%)	Anxiety* (%)	Diabetes (%)
All		8.6	3.9	5.6	7.5	14.6	11.2
Race/Ethnicity							
White, NH	44.9	9.1	4.0	5.5	9.3	20.1	9.1
Black, NH	13.7	13.6	3.6	9.7	4.5	11.1	9.0
Hispanic	30.2	7.1	3.3	4.7	5.9	11.2	12.4
Asian, NH	11.2	4.7	5.2	3.7	8.1	5.5	18.3
Marital Status							
Married	67.8	7.1	4.1	5.0	8.5	13.6	11.6
Not married	32.2	11.8	3.4	6.8	5.1	16.7	10.3
Age, years							
≤24	15.6	12.6	2.9	4.6	4.9	17.2	5.2

25-34	60.0	8.5	3.8	5.0	8.1	14.8	10.6
35+	24.5	6.5	4.5	7.1	7.4	12.5	16.5
Education							
Some high school or less	10.5	5.1	6.2	7.0	-.**	10.6	10.7
High school graduate	24.1	11.4	4.3	6.4	5.8	15.8	10.8
Some college or above	65.4	8.1	3.3	5.0	8.7	14.8	16.5
Pre-Pregnancy Insurance							
Medicaid	19.5	13.3	5.2	8.0	4.3	17.6	9.9
Private Insurance	63.2	8.4	3.6	5.2	9.2	15.1	10.9
No insurance	17.3	4.6	3.4	4.4	4.8	9.3	14.0
Prenatal Care Insurance							
Medicaid	29.3	11.7	4.6	6.6	4.6	16.4	10.7
Private Insurance	62.8	8.3	3.6	5.0	9.5	15.0	10.8
No insurance	7.9	3.4	4.6	6.9	5.0	9.8	16.5

*Pregestational PCOS and anxiety were not incorporated into the NJ PRAMS survey until 2016.

**Suppressed due to low sample size.

Table 2. Prevalence of adverse birth outcomes by race/ethnicity in NJ, 2014-2020.

	All	White, non-Hispanic	Black, non-Hispanic	Hispanic	Asian, non-Hispanic
Birth Outcomes	%	%	%	%	%
Low birthweight	13.0	8.3	17.8	16.2	15.9
Preterm birth	8.8	8.3	17.0	16.3	12.6
NICU admission	13.8	12.5	19.1	12.9	15.9

Table 3. Prevalence of adverse birth outcomes by maternal risk factors in NJ, 2014-2020.

	All	Pregestational Diabetes	Pregestational Hypertension	Pregestational Anxiety	Gestational Diabetes
Birth Outcomes	%	%	%	%	%
Low birthweight	13.0	13.6	19.8	15.0	16.1
Preterm birth	8.8	16.8	17.2	9.7	11.0
NICU admission	13.8	21.7	21.2	16.8	19.3

*Pregestational anxiety was not incorporated into the NJ PRAMS survey until 2016.

Risk of Adverse Birth Outcomes

Overall risk of adverse birth outcomes due to pregestational maternal risk factors from 2014-2020 were assessed after adjusting for race/ethnicity, age, educational attainment, and pre-pregnancy insurance status. NJ PRAMS data indicates that women with pregestational diabetes were: 10% more likely to have a baby with a low birthweight (OR =1.1, 95% CI: 0.7, 1.7) 20% more likely to experience a preterm birth (OR=1.2, 95% CI: 0.8, 1.9), and twice as likely to have a baby who requires a NICU admission (OR=2.0, 95% CI: 1.5, 2.7). NICU admission among mothers with pregestational diabetes was statistically significant, while preterm births and low birthweight among mothers with pregestational diabetes was not. Additionally, women with pregestational hypertension were: 60% more likely to have a baby with a low birthweight (OR =1.6, 95% CI: 1.2, 2.1), 50% more likely to experience a preterm birth (OR=1.5, 95% CI: 1.1, 2.1), and 80% more likely to have a baby who requires a NICU admission (OR=1.8, 95% CI: 1.4, 2.2), all of which were statistically significant. Women with pregestational anxiety were: 20% more likely to have a low birthweight baby (OR =1.2, 95% CI: 0.9, 1.6), 30% more likely to experience a preterm birth (OR=1.3, 95% CI: 1.0, 1.7), and 40% more likely to have a baby who requires a NICU admission (OR=1.4, 95% CI: 1.1, 1.7). NICU admission among mothers with pregestational anxiety was statistically

significant, while preterm births and low birthweight among mothers with pregestational anxiety were not. When assessing the risk of adverse outcomes due to gestational diabetes, women with gestational diabetes were: 20% more likely to have a low birthweight baby (OR =1.2, 95% CI: 0.9, 1.6), 40% more likely to experience a preterm birth (OR=1.4, 95% CI: 1.1, 1.8), and 50% more likely to have a baby who requires a NICU admission (OR=1.5, 95% CI: 1.3, 1.8). After adjusting for race/ethnicity, age, educational attainment, and prenatal care insurance status, risk of NICU admission and preterm birth were statistically significant among mothers with gestational diabetes, while low birthweight was not (Table 4).

Table 4. Risk of Adverse Birth Outcomes Due to Maternal Risk Factors in NJ, 2014-2020.

	Pregestational Diabetes	Pregestational Hypertension	Pregestational Anxiety	Gestational Diabetes
Birth Outcomes	Adjusted OR 95% CI	Adjusted OR 95% CI	Adjusted OR 95% CI	Adjusted OR 95% CI
Low birthweight	1.1 (0.7, 1.7)	1.6 (1.2, 2.1)*	1.2 (0.9, 1.6)	1.2 (0.9, 1.6)
Preterm birth	1.2 (0.8, 1.9)	1.5 (1.1, 2.1)*	1.3 (1.0, 1.7)	1.4 (1.1, 1.8)*
NICU admission	2.0 (1.5, 2.7)*	1.8 (1.4, 2.2)*	1.4 (1.1, 1.7)*	1.5 (1.3, 1.8)*

OR = Odds Ratio, CI = Confidence Interval

*Statistically significant at 0.05-level

Risk of Adverse Birth Outcomes, by Race/Ethnicity

The risk of adverse birth outcomes among mothers with pregestational hypertension (Figure 1) and mothers with gestational diabetes (Figure 2) was assessed across race/ethnicity, using White, NH women as a reference group. As seen in Figure 1, Black, NH women with pregestational hypertension were 80% more likely to have a low birthweight baby (OR=1.8, 95% CI: 1.4, 2.3) and 70% more likely to experience a preterm birth (OR=1.7, 95% CI: 1.3, 2.7) compared to White, NH women from 2014-2020. Hispanic women with pregestational hypertension were 50% more likely to have a low birthweight baby (OR=1.5, 95% CI: 1.2, 1.9) and 80% more likely to experience a preterm birth (OR=1.8, 95% CI: 1.4, 2.3) compared to White, NH women. In addition, Asian, NH women with pregestational hypertension were twice as likely to give birth to a low birthweight baby (OR=2.0, 95% CI: 1.5, 2.6) and 60% more likely to experience a preterm birth compared to White, NH women (OR=1.6, 95% CI: 1.2, 2.1) (Figure 1).

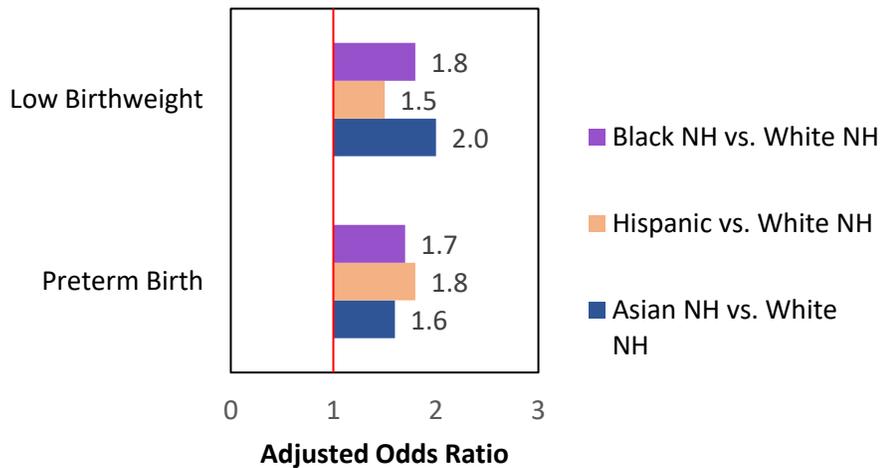
Risk of adverse birth outcomes across women who were diagnosed with gestational diabetes varied across race/ethnicity (Figure 2). Asian, NH mothers with gestational diabetes had the greatest increased risk for low birthweight (OR=2.2, 95% CI: 1.7, 3.0) compared to White, NH mothers. Additionally, Black, NH mothers who were diagnosed with gestational diabetes had an increased risk of having a baby with low birthweight (OR=1.9, 95% CI: 1.4, 2.4) and a preterm birth (OR=1.8; 95% CI: 1.4, 2.3), compared to White, NH mothers. Hispanic mothers diagnosed with gestational diabetes were also at an increased risk for having a baby with a low birthweight (OR=1.5, 95% CI: 1.1, 1.9) and preterm birth (OR=1.7, 95% CI: 1.3, 2.2) compared to White, NH mothers (Figure 2).

Agenda for Action

The findings presented in this NJ PRAMS analysis highlight a need to address maternal risk factors and their differences across race/ethnicity. While non-white individuals make up 45% of NJ's population and continue to grow, women of color have an increased likelihood of experiencing maternal risk factors leading to several adverse birth outcomes. This reiterates a need to work toward equitable maternity care that is both inclusive and culturally competent to protect the overall health and well-being of both a mother and her baby. Particularly in the periods prior to pregnancy, it is essential for providers to ensure that they are not only informed of the best clinical practices for their patients but also that their

patients have adequate access, such as early entry into prenatal care, and community resources and/or referrals. Currently, NJ has several programs in the work toward achieving equitable maternity care and reducing racial bias in healthcare, some of which include:

Figure 1. Risk of Adverse Birth Outcomes Among NJ Mothers with Pregestational Hypertension, by Race/Ethnicity, 2014-2020 NJ PRAMS



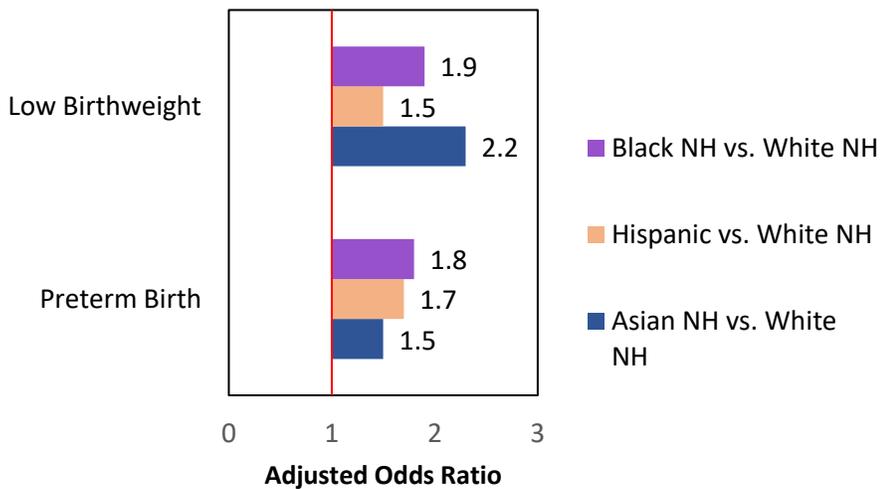
- Nurture NJ:** The Nurture NJ Maternal and Infant Health Strategic Plan was released in January 2021 and aims to reduce both maternal mortality and racial disparities in birth outcomes. The strategic plan is also part of ongoing efforts that include more than 36 pieces of maternal and infant health legislation signed by Governor Phil D. Murphy.

- NJ Maternal Care Quality Collaborative:** The NJ Maternal Care Quality Collaborative launched in June 2021 is a multidisciplinary committee of stakeholders that has convened to promote collaboration, translate maternal health data into actionable steps, and implement the department’s tasks outlined in the Nurture NJ Strategic Plan.

- NJ Maternal Health Hospital Report Card:** The NJ Maternal Health Hospital Report Card is designed to inform members of the public about maternity care provided in each general hospital licensed for maternal care. The annual report card provides key insight on metrics such as number of vaginal and cesarean deliveries performed, and the rate of complications experienced by patients receiving maternity care at each birthing facility.

- NJ Maternal Mortality Review Committee:** The NJ Maternal Mortality Review Committee relaunched in August 2020, under P.L. 2019, c.75. The multidisciplinary committee meets on an

Figure 2. Risk of Adverse Birth Outcomes Among NJ Mothers with Gestational Diabetes, by Race/Ethnicity, 2014-2020 NJ PRAMS



ongoing basis to review all cases of maternal mortality to identify the drivers that lead to a maternal death and make recommendations that will have the most impact on preventing future deaths.

- Implicit/Explicit Bias Training:** Under N.J. Stat. § 26:2H-12.108, implicit and explicit bias training will be implemented for all healthcare providers in the state of NJ to advance the understanding and impact of structural racism on health outcomes, explore the roles of conscious and unconscious bias in decision-making and communication, and encourage providers to identify internal systems that may be contributing to disparate outcomes and working to change them.

- **Shared-Decision Making (SDM):** Requires the informed involvement of women in decisions around childbirth, with special relevance to C-sections. As mandated by P.L.2019, c.133, NJDOH will design and evaluate an SDM tool for hospitals that provide inpatient maternity services and birthing centers under the HRSA Maternal Health Innovation Grant.
- **Increased Use and Interoperability of the Perinatal Risk Assessment (PRA):** Expanding use and interoperability of this universal risk assessment tool to facilitate timely connections for women to community-based services and risk-appropriate care. Under P.L.2019, c.88, NJ's Medicaid program will require PRA completion for reimbursement.
- **Healthy Women, Healthy Families (HWHF):** In 2018, in response to New Jersey's maternal and infant health crisis, the New Jersey Department of Health (NJDOH), Division of Family Health Services (FHS), funded diverse community-based organizations to support the new HWHF formerly known as the Improving Pregnancy Outcomes initiative. HWHF aims to improve maternal and infant outcomes with a focus on reducing black infant mortality. HWHF works to reduce racial, ethnic, and economic disparities through a collaborative, community-driven approach using Community Health Workers, Community Doulas, and Central Intake Hubs.
- **Home Visitation Program (HWP):** Program goals are to reduce disparities in maternal and child health outcomes, prevent child abuse and neglect, increase economic self-sufficiency, and promote early childhood development and school readiness (conducted in collaboration with the NJ Department of Children and Families).
- **Expansion of NJ State Medicaid:** In 2019, to combat New Jersey's Maternal and Infant Health Crisis, Governor Murphy signed P.L.2019, c.85. This package includes a [bill](#) that supports the expansion of the State Medicaid program to include coverage for doula care for pregnant people covered by Medicaid. Medicaid coverage makes doula support more accessible to communities with the greatest needs. The utilization of Medicaid coverage allows equitable access to a service that was otherwise unaffordable to women with limited financial resources. Considering the benefits are particularly important for those most at risk of poor outcomes, this policy expanding access to doula services has the potential to reduce health disparities and improve health equity.
- **New Jersey Department of Health (NJDOH) & Health Connect One:** NJDOH awarded funding to [Health Connect One](#) to work on the establishment of the Doula Learning Collaborative (DLC) which provides training, workforce development, supervision support, mentorship, technical assistance (TA), direct billing, and sustainability planning to community doulas and doula organizations throughout the State of NJ. Upon program completion, the trained doulas will be skilled to provide physical, emotional, and informational support before, during, and after childbirth. They will understand the physical, social, and emotional impacts of racism, will provide much-needed support to their clients, and above all, act as their advocates while navigating systems of care.

Resources

[NJ Department of Health](#)

Division of Family Health Services, [Maternal Child Health Services](#)

[NJ Maternal Data Center](#)

Sources

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4. Martin J., Hamilton B., Osterman M., et al. Births: Final Data for 2019. National Center for Health Statistics (U.S.), Division of Vital Statistics. 2021. Accessed December 28, 2021. [Births: Final Data for 2019 \(cdc.gov\)](#)

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