



Baby's 1st Project

Perinatal Periods of Risk Study & Community Action Plan

September 2017

What is Baby's 1st?

Baby's 1st Project is a cross-sector group of community partners working to reduce disparities in birth outcomes and to improve the feto-infant mortality rate in Delaware County. We do this by strengthening partnerships among maternal and child health organizations who work with Delaware County families during pregnancy through their child's 5th birthday. The Perinatal Periods of Risk (PPOR) study informs Baby's 1st.

What is Perinatal Periods of Risk?

PPOR is an analytic framework for studying fetal and infant mortality in a specific community. It focuses on a community's **racial disparities** in fetal and infant mortality rates. PPOR helps communities **identify and prevent risk factors** during the greatest periods of risk.

PPOR has 3 phases, which are undertaken by a committee:

- Phase 1: Determine the “period of risk” in which the most babies are dying;
- Phase 2: Identify the factors that contribute to deaths in that period;
- Phase 3: Take action based on the priorities established during the earlier phases.

The PPOR process originated with the World Health Organization and has been modified by CityMatCH, along with health departments, the CDC, HRSA, and the March of Dimes. It has been used in communities across the country since its creation in 2004.

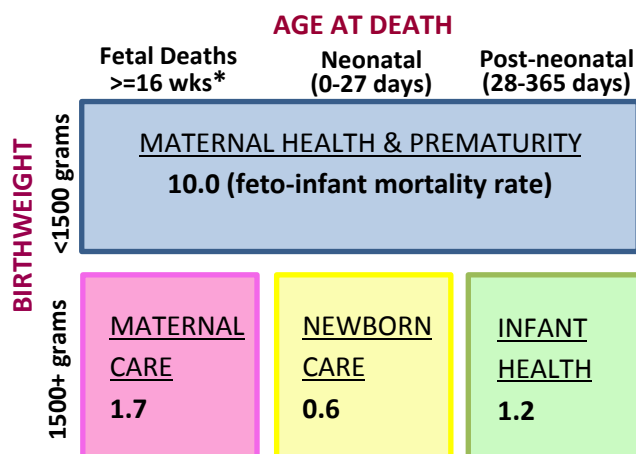
The Baby's 1st Project PPOR committee is a subcommittee of the Delaware County Child Death Review Team.

How does PPOR work?

PPOR uses vital records data of all live births, infant deaths, and fetal deaths in Delaware County between 2008 and 2012.

- **Each death is categorized** based on the **birthweight** and the **age at death**.
- There are 4 categories: Maternal Health & Prematurity, Maternal Care, Newborn Care, and Infant Health.
- These categories – which are the “periods of risk” – correspond with risk factors that tend to contribute to specific poor birth outcomes.

In Delaware County, there were a total of **13.5 deaths per 1,000 births** (feto-infant mortality rate). In the Maternal Health & Prematurity category, there were 10 deaths per 1,000 births. This period of risk has the highest mortality rate in Delaware County. It tends to correspond with the mother's preconception health and health behaviors risk factors, such as smoking, substance abuse, and chronic disease.



* In Pennsylvania, deaths are required to be reported starting at 16 weeks. The PPOR map was also created limiting fetal deaths to at least 20 weeks of gestation or 500 grams (Chao et al., 2010). Using these criteria, the overall fetio-infant mortality rate was 11.4 deaths per 1,000 births; the rate in the MH&P category was 7.7, and the rate for maternal care was 1.8. The other rates were the same. The traditional PPOR exclusion criteria would have excluded a disproportionate number of black fetal deaths; an important group when targeting communities with disparate birth outcomes.

Who is the target of our efforts?

Determining the category with the most disparity in deaths focuses community efforts. This is done by comparing the rates of a target population to a reference group.

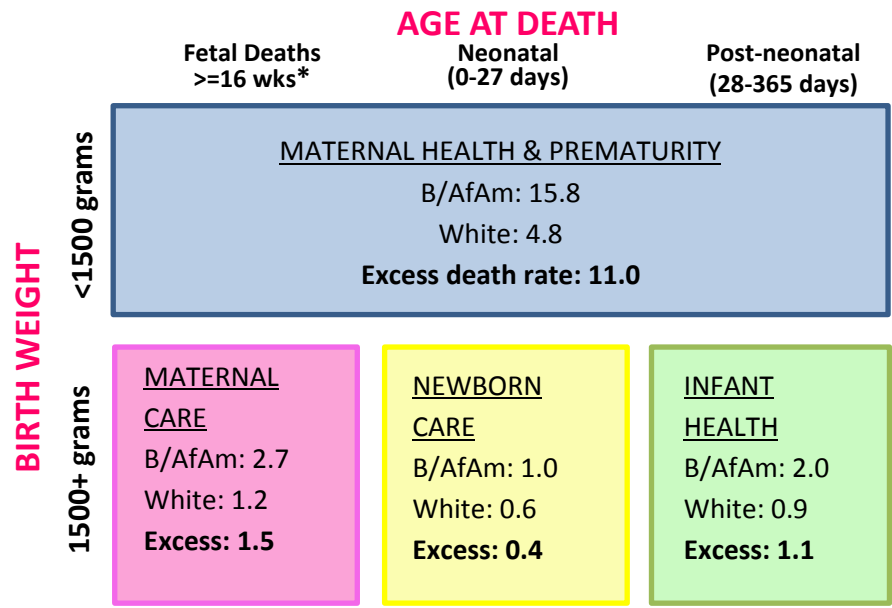
- A **target population** – a group with poor birth outcomes – is identified. The data revealed, and our community partners reported, that **black or African American, non-Hispanic women in Delaware County** (herein after referred to as “black”) have disparately poor birth outcomes.
- A **reference group**, or comparison group, with more ideal birth outcomes is identified. The committee identified **white, non-Hispanic women in Delaware County** (herein after referred to as “white”) as the reference group. This was also supported by the data.
- The mortality rates in the reference and target groups are compared in order to determine where the “**excess deaths**” exist. The rationale behind the comparison is that there is no reason why one group in a community cannot have the same fetio-infant mortality rate as another group in the same community.

Finding the PPOR category with the **most excess deaths** helps establish where to focus efforts.

In which Period of Risk does the most disparity occur in Delaware County?

We created another PPOR map – this time with excess death rates. To determine which period of risk has the most excess deaths, we subtract the reference group rates from the target population rates.

- There were a total of 146 fetal and infant deaths (0.7%) among white women and 194 deaths (2.1%) among black women.
- The overall fetio-infant mortality rate among black women was 3 times higher than that of white women: the fetio-infant mortality rate was 21.5 deaths per 1,000 births among black women compared to 7.4 deaths per 1,000 births for white women. Per 1,000 births, there are 127 excess deaths to black women.



- 78% of the total disparity is within the **Maternal Health & Prematurity (MH&P) period of risk**. This is where the disparity between the two groups is highest: **among babies weighing less than 1500 grams**.

What is driving the disparity among these very low birthweight babies?

To help us understand why there is a Maternal Health & Prematurity disparity, we need to know whether the problem of excess MH&P deaths is because black babies are more likely than white babies **to die at low birthweights** or because there are **more very low birthweight** black babies. This step is called a Kitagawa analysis.

- We found that 100% of the disparity in this period of risk is **due to too many small African American or black babies being born**. When we exclude the smallest babies (those weighing less than 500 grams and born before 24 weeks), we still found that 70% of the disparity is due to too many small babies.
- The way to prevent excess very low birthweight (VLBW) deaths among black babies is to **prevent VLBW births**. We can address reducing VLBW births by understanding what puts black women at risk and also what protects them.

What factors are associated with an increased or reduced risk of having a very low birthweight baby among black women?

We analyzed our vital records data to study associations between risk and protective factors and birthweight, comparing black women with VLBW babies to black women with normal weight babies. Vital records data for 9,000 births were included, 234 of which were VLBW (3%); 90% were normal weight. Women with plural births were excluded. We also interviewed 10 local individuals who represent various social service and health care organizations and who work with women before, during, and after pregnancy.

From the vital records analysis, we calculated the adjusted odds ratio and the population attributable risk.

- The adjusted odds ratio (AOR) compares the odds of having a very low birthweight baby if a woman does or does not have a certain risk factor. We controlled for age, education, marital status, WIC participation, and prior pregnancy outcomes. AORs speak to the association between a risk factor and the outcome, not causality. Here, the AOR is interpreted as risk, as very low birthweight is a relatively rare occurrence.¹
- The population attributable risk (PAR) refers to how much of an outcome could be theoretically prevented if the risk factor were eliminated. It also controls for the variables listed above.
- The findings shared below include the significant results from the data analysis and the key informant interviews² and focus on:
 - women's health;
 - stress and mental health;
 - pregnancy spacing;
 - women with prior poor birth outcomes;
 - prenatal care and the health care system; and
 - housing.

¹ (<http://www.citymatch.org/sites/default/files/documents/MCHEPITraining/Absolute%20and%20Relative%20Measures%20of%20Association.pdf>)

² Informants listed additional risk factors besides those described in the following text, including substance abuse, smoking, infections, and being a teen, but these were less frequently discussed. Baby's 1st Project is well aware of the opioid crisis in Delaware County and has developed an NAS subcommittee. Baby's 1st Project also has a group devoted to breastfeeding support. Other vital records risk factors were analyzed but were not significantly associated with VLBW. Of the demographic factors studied and controlled for, only not being married was significantly associated with VLBW; age and education were not.

Women's Health

- Women with gestational or pre-pregnancy hypertension or pre-pregnancy diabetes were more than 3 times as likely to have a very low birthweight baby, and women who gained more than the recommended amount of weight during pregnancy were almost twice as likely. Women gaining less than the recommended amount of weight were also more likely to have a VLBW birth, but this was only moderately significant. The percent of very low birthweight births that could be prevented if these risk factors were removed ranged from 27% (too much weight gain) to 2% (diabetes). Key informants agreed that women's health was a significant risk factor and spoke extensively about nutrition.

Almost all of the key informants discussed nutrition and underlying medical conditions, like diabetes, hypertension, and obesity, as important risk factors affecting black women in Delaware County. Informants identified multiple concerns related to diet, including lack of access to healthy, high-quality foods, poor eating habits, lack of knowledge of healthy meal preparation, irregular meals, not consuming three meals a day, and not accessing public benefits. Informants familiar with Chester noted the lack of local healthy food options.

"It's a lack of education and a lack of desire to eat healthy. The services catch women too late."

Informants also talked about how women may not realize that they have health problems and may not have been getting regular medical care prior to pregnancy. Access to quality health care is an important barrier related to having regular care.

"Underlying medical problems already exist. These health concerns are not as well controlled in black and African American women. When women have underlying health issues; doctors must induce the birth early."

"I have seen an increased risk associated with maternal disease, such as obesity, hypertension, and diabetes. I am seeing

increasing numbers of young women entering pregnancy with one or several of these risk factors. Early access to care and preconception prevention and treatment of maternal disease are desperately needed."

Some informants spoke globally about the concept of preparing and being healthy for pregnancy.

"Preparing to be pregnant is a missing piece in this culture."

The vital records data showed that WIC participants were at a lower risk of having a very low birthweight baby. WIC participants were 2.5 times less likely to have a VLBW baby. Key informants who are clinical providers spoke strongly about the benefit of low-dose aspirin to treat hypertension.

Sample of Interventions Suggested by Key Informants:

- Promote WIC enrollment
- Nutrition education that starts at an early age
- Early screenings for hypertension risk and low-dose aspirin when indicated
- Increase access to quality healthcare prior to pregnancy

Stress and Mental Health

- Informants were extremely concerned about stress and mental health; however the vital records data does not address these specific issues.

Almost all key informants discussed stress as a significant risk factor associated with VLBW among black women in Delaware County. Different reasons for being under extreme stress were identified, including living in unsafe and violent neighborhoods, racism on personal and structural levels, trauma, having unmet basic needs, mental health problems, such as anxiety and depression, having a low income, and lacking support during pregnancy. There is a growing body of public health and medical literature suggesting that racial discrimination can cause chronic stress, which in turn, affects birth outcomes and other diseases.

"Stress, we always come back to this. There is an overwhelming amount of stress for

these women. Things they are experiencing – problems with housing, food, lack of support. Health is hard to focus on; their basic needs are not being met. It's toxic."

"If you're telling me I'm at risk for preterm birth, but I'm not sure if my lights are going to turn on when I get home, I'm not going to listen to you about what may or may not happen in the pregnancy."

"Racism causes stress. You look at the news and your worry about everything, especially for young boys... Being on Medicaid is not easy, it's stressful to maintain coverage. It causes you to always feel on guard with a flight or fight mentality. We need people to say, 'I'm always going to be here with you.'"

Perhaps indicative of stress and mental health issues, the vital records data did show that women who had lost children, at any age (beyond the neonatal period), were 3 times more likely to have a VLBW birth. However, multiple informants suggested that, in general, those with supportive families and friends tend to do much better.

With mental health problems, informants discussed barriers to care, including women being resistant to treatment or being undertreated, perceptions of stigma, and lack of access for those with Medicaid. Women with Medicaid have limited mental health treatment options. At *Community Hospital* in Chester, there is immediate intake, but a woman may not see a psychiatrist for one month after the initial assessment and may not see a counselor during that time either. Some informants felt that there were enough treatment options, but others felt that mental health services were understaffed. One informant talked about the need for treatment options that cater to women, specifically.

Sample of Interventions Suggested by Key Informants:

- Removing lag between intake assessment and treatment
- Combining social services with prenatal care
- Addressing racism
- Harnessing the power of supportive networks

Pregnancy Spacing

- Black women who had less than 18 months between their last live birth and their current birth were 3 times as likely to have a very low birthweight baby compared to those with longer intervals. Theoretically, 22% of very low birthweight births could be prevented if pregnancy spacing were increased to at least 18 months. Key informants did not mention pregnancy spacing specifically, but discussed family planning and how it can affect pregnancy.

About one-half of the key informants discussed family planning, focusing on women who were ambivalent about or ashamed of their pregnancy. Informants suggested that these women were less likely to get timely and appropriate prenatal care. A few key informants mentioned that some women might have been planning to have an abortion, but ultimately did not have one. It is important to think about why these women did not have the abortion – cost, access, religious concerns, or other reasons. The discussion of how preparing to be pregnant is overlooked is relevant here. Informants also brought up the importance of empowering and valuing women and how fostering these messages can lay the foundation for family planning goals.

Sample of Interventions Suggested by Key Informants:

- Long-Acting Reversible Contraception (LARC) initiated during delivery hospital stay
- Family planning discussed during prenatal care and regular health care
- Messaging around preparing to be pregnant and empowerment

Women with Prior Poor Birth Outcomes

- Black women with a prior preterm birth (less than 37 weeks) were almost 5 times more likely to have a VLBW baby; women with a previous poor outcome, including fetal or neonatal death and small for gestational age/IUGR, were 3 times more likely to have a VLBW birth. Women with both a preterm birth and a birth with another poor outcome were

12 times more likely to have a VLBW birth (PARs ranged from 20% to 9%).

When key informants were asked about women with prior poor birth outcomes, they talked about how women may not have resolved the issues that resulted in their previous birth outcome. A few informants mentioned that women may not be worried about preterm birth—that they are told the baby will be OK, that the outcome is accepted as fate and normalized, and that the mom will “fatten the baby up.” A few informants said that general messaging about having a full-term baby is lacking.

“It’s a different mentality to talk about the longer the baby stays in the mom, the better. What happened to that mantra? It used to be talked about more.”

Sample of Interventions Suggested by Key Informants:

- Promoting full-term pregnancies
- Messaging around increased risk among those with poor prior outcomes
- Early and increased care for women with prior poor outcomes

Prenatal Care and the Health System

- The vital records data did not show an association between VLBW and the timing of prenatal care initiation or the number of prenatal care visits. However, about 23% of the VLBW records were missing data on prenatal care compared to 5% of the normal weight births. The key informants, however, were very concerned about the adequacy of prenatal care, quality of care, and about the health care system, more generally.³

³ Women with clinical interventions, including clinical chorioamnionitis (inflammation of the fetal membranes due to bacterial infection), cervical cerclage (cervical stitch), tocolysis (medications used to suppress premature labor), version (procedure to turn fetus head-down) were 9 times more likely to have a VLBW birth (PAR = 16%). Women who had taken antibiotics were 2 times more likely to have a VLBW birth (PAR = 22%).

Many informants talked about how late entry into prenatal care and inconsistent prenatal care are significant risk factors of VLBW births among black women in Delaware County. For example, women starting prenatal care in the 5th month of pregnancy seemed to be a common story. In the Darby area, informants were concerned about the immigrant population who do not have US citizenship. A few people talked transportation barriers to care.

“Late entry into care is a big problem. Whenever a woman is seeking care, she’s brought into a network of caring professionals- WIC, nurses, referrals. When she starts late, there is a limit on what can be done for her. You find problems in the 1st trimester. The 2nd trimester is so important for the health of mom and baby. You can’t impact that much when they come in late. You can’t help nutrition problems, substance abuse problems, STIs. You can’t be as much of source of care and comfort.”

Some informants described how patients’ lack of knowledge and education around health and pregnancy leads to poor decision making. However, clinical recommendations may not be heeded because it is simply impossible for women to do them, such as bedrest.

Several key informants talked about the quality of prenatal care that black women receive, the way information is shared, and the need to combine social services with health care. A few informants described problems with the resident-clinic model, citing inefficiency, the need for residents to work in both clinics and private practices, or residents’ developing bedside manner.

“We spend so much time worrying about the clinical and medical and not enough on the social, spiritual and environmental side of things. You have to think about where a woman’s head is... handing a resource to a mom is not enough, you need follow-up.”

“They go through the clinics and they don’t feel respected. The providers don’t engage with them. They get asked the same questions over and over. They went there

for the doctor and they only get 5 minutes with the doctor. They feel too rushed to feel comfortable asking questions.”

“The residency program complicates and impacts service delivery. The resident does the initial assessment and reports back to the attending and then the attending goes in. There’s no room for the intimacy that patients need to build with the provider... the residents are rushed.”

Informants described how the closures of a prenatal clinic in Chester and a midwifery group in Darby have led to a decrease in access to services. The Chester clinic had walk-in days, a teen clinic, and provided wrap-around services with a social worker, dietician, and a child birth educator. One key informant thought that women are getting fewer services compared to when the clinic was open.

Having Medicaid can make aspects of care more difficult. Informants shared that it takes time to enroll in Medicaid, which can delay prenatal care. According to one informant, getting approval for progesterone shots, which is instrumental in preventing preterm births, is more of a “hassle” for doctors when patients have Medicaid. Additionally, some medications or compounds may only be available at certain pharmacies, thereby complicating access. One key informant mentioned that black women may also decline these treatments or commence prenatal care too late for their use. Key informants who are clinical providers spoke strongly about the benefit of widespread screening for risk of VLBW and for the use of progesterone and aspirin.

Sample of Interventions Suggested by Key Informants:

- Widespread screening for at-risk pregnancy and medical interventions when indicated
- Training for providers on racism, cultural competency, and on trauma
- Centering model of prenatal care
- Embed social services in doctor’s offices

Housing

- Vital records data does not allow for analysis of housing issues, but about one-half of informants discussed housing problems as contributing to poor birth outcomes.

Informants described various housing issues, including lack of permanent housing, overcrowding in houses, decrepit or unsafe housing conditions, and homelessness.

“A lot of clients don’t have permanent housing. They aren’t considered homeless because they have someone to stay with, but they aren’t guaranteed housing forever. They are bopping from one place to another and may be sleeping on a sofa. This is reflective of an unstable home life to begin with.”

“These living arrangements contribute to a lack of sleep and poor nutrition. If you’re not getting proper rest and you have bad nutrition, of course your baby’s birthweight will be low.”

During CAN meetings, informants also talked about housing issues, particularly regarding homes contaminated with lead.

Sample of Interventions Suggested by Key Informants:

- Increase the supply of affordable, safe, and permanent housing
- Identification of women without stable housing
- Promoting lead testing and lead abatement

Using PPOR findings to inform the Action Plan

Throughout the PPOR analysis, preliminary findings were reviewed with the Baby’s 1st Project PPOR committee for discussion and analytical decision making. During multiple strategic planning sessions with Baby’s 1st Project members, the final results and report were shared and discussed in order to develop a community action plan. The Action Plan follows.

Context

Our Perinatal Periods of Risk (PPOR) study found that in Delaware County, the fetoinfant mortality rate among black or African American women was 3 times higher than that of white women. The majority of this disparity was found among very low birthweight babies; thus our work focuses on preventing very low birthweight babies among black women. Analysis of risk and protective factors associated with very low birthweight births, interviews with community key informants, and meetings with Baby's 1st Project partners directly led to the development of this Action Plan.

Mission

To create strong partnerships, working systemically and grounded in data and community input, to strengthen health and social services, advance health equity, and improve pregnancy and birth outcomes for Black and African-American women, babies, and families in Delaware County.

Vision

A Delaware County where racial disparities in birth outcomes are eliminated through community support for women and families across their lifespans and through widespread, equitable access to robust health care and social services.

Principles

- Racism and trauma are prominent stressors and determinants of health, including preterm birth.
- Chronic stress affects all aspects of the lives of women and families.
- Reproductive life planning is an essential aspect of women's health.

Strategies

Strengthen Baby's 1st Project

- Ensure the voices of mothers are central to the design and implementation of new initiatives
- Create memorandums of agreement with key community partner organizations to work towards common goals
- Strengthen engagement with upper level leadership at large anchor institutions
- Identify and establish relationships with under-represented sectors such as transportation, business and faith communities
- Engage other collaborative groups to strategically align and assist with dissemination of public health messaging

Improve Health Care and Social Service Delivery and Access

Short term

- Expand access to services by embedding them in frequently visited locales and co-locating services.

Long term

- Develop a universal intake, shared referral system, and/or virtual catalog of services that connects clients and providers to community services
- Implement new models of service delivery with a focus on behavioral health and nutrition, such as Centering Pregnancy and mobile mental and physical health care

Build Provider Capacity

Short term

- Expand information and education for all providers so they can help families achieve reproductive life planning goals
- Examine practices and criteria used in screening women for risk of pre-term delivery, including stress and race as prominent risk factors

Long term

- Train all health and social service providers in trauma-informed care and in cultural competence and humility
- Support primary health care providers through patient navigators, doulas, and other allied health workers

Bolster Community- Based Support	Short term	<ul style="list-style-type: none"> Develop social marketing campaigns with messages related to improving birth outcomes, such as the importance of prenatal care and full term births, pregnancy planning and preparation, female empowerment, racial disparities in birth outcomes, and risks associated with pre-term births Engage the faith-based sector as hubs and gateways to social services and health care
	Long term	<ul style="list-style-type: none"> Increase neighborhood access to healthy foods

Develop Programs for Targeted Populations	Short term	<ul style="list-style-type: none"> Establish outreach to women with prior poor birth outcomes Expand multigenerational education on nutrition, health, and sexuality
	Long term	<ul style="list-style-type: none"> Increase availability of programming for fathers

Improve Access to Quality Housing	Short term	<ul style="list-style-type: none"> Prioritize need for various types of housing, including emergency shelters, public housing, or housing for women and mothers
	Long term	<ul style="list-style-type: none"> Increase housing supply that is in greatest demand Expand housing inspection and lead remediation programs

Recommendations

Although beyond the current scope of Baby's 1st Project, we recommend:

- Making transportation more accessible
- Including a social justice lens in trauma informed care trainings that examines the impact of racism & discrimination on health
- Ensuring access to high quality health insurance with swift enrollment and approval for pre-term interventions
- Incorporating social justice and health equity in health promotion

Key Measures of Success

- Varied sectors are engaged in Baby's 1st Project
- Organizations align goals, programming, and measurement with Baby's 1st Project Community Action Plan
- Diverse sources of continued organizational and programmatic funding are secured
- Access to health and social services improves through increased connectivity
- Providers receive training in trauma informed care and cultural competency
- Social marketing campaigns and partnerships engage the community, especially at-risk populations, in birthing healthy babies
- **Fetal-infant mortality rates and disparities improve**

Appendix A. Tables and Methodological Notes

Exclusion Criteria:

Exclusion criteria included missing gestational age or birthweight, less than 16 weeks gestational age, and implausible cases. Of live births, 0.6% of cases were excluded (n=206); 26.9% of fetal deaths were excluded (n=97), and 4.5% of infant deaths were removed (n=9).

Table 1. Type of Case by Year

Type of Case	2008		2009		2010		2011		2012		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Fetal Deaths	46	0.7	61	0.9	54	0.8	60	0.9	43	0.7	264	0.8
Infant Deaths	41	0.6	33	0.5	32	0.5	43	0.6	42	0.6	191	0.6
Live Births	6,877	98.8	6,839	98.6	6,676	98.7	6,634	98.5	6,462	98.7	33,488	98.7

Table 2. Type of Case by Race

Type of Case	White Non-Hispanic		Black Non-Hispanic		All	
	#	%	#	%	#	%
Fetal Deaths	82	0.4	116	1.3	264	0.8
Infant Deaths	64	0.3	78	0.9	191	0.6
Live Births	19,665	99.6	8919	97.9	33,488	98.7

For the vital records, women were asked the race with which they most identified. The exact options include: "White; Black or African American; American Indian or Alaska Native; Asian Indian; Chinese; Filipino; Japanese; Korean; Vietnamese; Other Asian; Native Hawaiian; Guamanian or Chamorro; Samoan; Other Pacific Islander; Other; Don't Know/Not Sure; Refused; Unknown."

Table 3. Type of Case by Mother's Education Level

Type of Case	High School or Less		Some College or More		Total	
	#	%	#	%	#	%
Fetal Death	91	0.9	94	0.4	185	0.6
Infant Death	66	0.6	93	0.4	159	0.5
Live Birth	10,203	98.5	22,788	99.2	32,991	98.9

Table 4. Type of Case by Mother's Age

Type of Case	Younger than 20 Years		20 Years or Older		Total	
	#	%	#	%	#	%
Fetal Death	18	0.8	240	0.8	258	0.8
Infant Death	24	1.0	167	0.5	191	0.6
Live Birth	2,252	98.2	31,219	98.7	33,471	98.7

Table 5. All Births and Deaths by Mother's Age and Race

Race	Younger than 20 Years		20 Years or Older		Total	
	#	%	#	%	#	%
White Non-Hispanic	617	3.1	19,194	96.9	19,811	100.0
Black Non-Hispanic	1,319	14.5	7,794	85.5	9,113	100.0

Table 6. Type of Case by Mother's Age and Race

Age	White Non-Hispanic N=19,811						Black Non-Hispanic N=9,113					
	Fetal Death		Infant Death		Live Birth		Fetal Death		Infant Death		Live Birth	
	#	%	#	%	#	%	#	%	#	%	#	%
Younger than 20 Years	3	0.02	10	0.05	604	3.05	11	0.12	7	0.07	1,301	14.23
20 Years or Older	79	0.40	54	0.27	19,061	96.21	105	1.15	71	0.78	7,618	83.59
Total	82	0.41	64	0.32	19,665	99.21	116	1.27	78	0.86	8,919	97.87

Table 7. Live Births and Fetal and Infant Deaths by Town

Town	Percent of all Live Births	Percent of all Infant/Fetal Deaths
ALDAN	0.74	0.00
ASTON	2.60	0.88
BETHEL	0.80	0.88
BROOKHAVEN	1.47	1.76
CHADDS FORD	0.42	0.44
CHESTER CITY	9.10	13.41
CHESTER HEIGHTS	0.39	0.44
CHESTER TWP	1.04	1.98
CLIFTON HEIGHTS	1.45	1.98
COLLINGDALE	1.99	3.74
COLWYN	0.64	0.66
CONCORD	1.05	0.22
DARBY BORO	3.44	7.03
DARBY TWP	1.96	1.10
EAST LANSDOWNE	0.56	1.10
EDDYSTONE	0.43	0.44
EDGMONT	0.33	0.44
FOLCROFT	1.57	1.76

Town	Percent of all Live Births	Percent of all Infant/Fetal Deaths
GLENOLDEN	1.39	1.76
HAVERFORD	9.18	3.52
LANSDOWNE	2.25	4.18
LOWER CHICHESTER	0.86	0.22
MARCUS HOOK	0.67	0.66
MARPLE	2.83	1.10
MEDIA	0.95	0.66
MIDDLETOWN	1.65	0.44
MILLBOURNE	0.24	0.44
MORTON	0.50	0.44
NETHER PROVIDENCE	1.77	0.88
NEWTOWN	1.40	1.32
NORWOOD	0.91	0.00
PARKSIDE	0.52	0.88
PROSPECT PARK	1.16	0.88
RADNOR	3.13	1.10
RIDLEY	5.44	5.05
RIDLEY PARK	1.03	0.22
ROSE VALLEY	0.08	0.00
RUTLEDGE	0.10	0.00
SHARON HILL	1.35	1.10
SPRINGFIELD	3.78	1.98
SWARTHMORE	0.62	0.44
THORNBURY	0.85	0.00
TINICUM	0.58	0.66
TRAINER	0.42	0.44
UPLAND	0.84	1.32
UPPER CHICHESTER	2.65	2.86
UPPER DARBY	19.06	24.62
UPPER PROVIDENCE	1.41	0.66
YEADON	2.39	3.96

Table 8. Cause of Death by PPOR Categories

	Fetal Maternal Health & Prematurity	Infant Maternal Health & Prematurity	Maternal Care	Newborn Care	Infant Health
Fetus and newborn affected by maternal factors and by complications of pregnancy, labor, and delivery	109	28	23	-	-
Deadborn fetus of unspecified cause	54	-	14	-	-
Disorders related to length of gestation and fetal growth	20	52	-	-	-
Transitory endocrine and metabolic disorders specific to fetus and newborn	1	-	7	-	-
Respiratory and cardiovascular disorders specific to the perinatal period	1	27	1	3	-
Congenital malformations of the circulatory system	4	1	3	1	2
Congenital malformations of the nervous system	4	1	-	2	2
Congenital malformations and deformations of the musculoskeletal system	-	1	-	2	-
Other congenital malformations	1	2	-	-	-
Chromosomal abnormalities, not elsewhere classified	2	1	3	-	2
Infections specific to perinatal period	-	4	-	2	-
Other bacterial diseases	-	3	-	-	-
Influenza and pneumonia	-	-	-	-	5
Ill-defined and unknown causes of mortality	-	-	-	1	12
Other	10	10	7	6	8

Table 9. PPOR Categories by Race

PPOR Categories	White Non-Hispanic		Black Non-Hispanic		All	
	#	Rate per 1,000 Births	#	Rate per 1,000 Births	#	Rate per 1,000 Births
Maternal Health & Prematurity	95	4.8	143	15.8	336	9.95
Maternal Care	23	1.2	24	2.7	58	1.7
Newborn Care	11	0.6	9	1.0	21	0.6
Infant Health	17	0.9	18	2.0	40	2.0
Overall	146	7.4	194	21.5	455	13.5

Table 10. Birthweight among Live Births

(excludes plurals- 4.6% of total sample)

	White Non-Hispanic		Black Non-Hispanic	
	#	%	#	%
Very Low Birthweight	125	0.7	234	2.6%
Low Birthweight	685	3.7	691	7.7%
Normal Weight	17,921	95.7	8,075	89.7%
All	18,731	100.0	9,000	100.0%

Black women with missing data on Hispanic ethnicity were coded as non-Hispanic, as there are few black Hispanics in Delaware County according to census data. This recode did not affect overall percentages. It was performed in order to preserve the sample size for the adjusted odds ratio analyses.

Table 11. Number and Percent of Very Low Birthweight Births with and without Risk Factors among Black, Non-Hispanic Women (plurals excluded)

	VLBW births to mothers with risk factor		VLBW births to mothers without risk factor	
	#	%	#	%
Pre-pregnancy Hypertension	25	9.8	209	2.6
Gestational Hypertension	46	7.3	188	2.4
Pre-pregnancy Diabetes	8	8.8	226	2.8
Gestational Diabetes	5	1.5	229	2.9
Mother Smoked During or within 3 months of Pregnancy	28	3.2	172	2.6
Clinical Interventions (clinical chorioamnionitis, cervical cerclage, tocolysis, version)	41	22.9	193	2.4
Pregnancy Spacing (< 18 mos between last live birth and current birth)	26	5.8	60	2.0
Mother Has STD or Vaginal Infection	36	2.7	198	2.8
Mother Gained more than Recommended Weight (compared to those that gained expected amount)	124	3.0	30	1.5
Mother Gained less than Recommended Weight (compared to those that gained expected amount)	37	2.7	30	1.5
Any prior poor birth outcome (among those with prior births)	81	9.0	72	2.3
Antibiotics (mother)	107	3.7	127	2.1
Without WIC	116	3.7	96	1.7

The above table is a sub-set of the available data in vital records. These risk and protective factors were either significant in bivariate analysis or are traditionally significant factors. Examples of factors not included in further analysis include BMI, paternal demographic factors, and other smoking variables.

Table 12. Adjusted Odds Ratio (AOR), Risk Factor Prevalence and Population Attributable Risk (PAR) for Risk Factors associated with Very Low Birthweight among Black, Non-Hispanic Women, 2008-2012

The AOR refers to the odds of having a very low birthweight birth among women with and without a given risk/protective factor. Those with plurals were excluded.

Risk/Protective Factor	Prevalence % (N=234)	AOR	PAR
Any prior poor birth outcome	34.6% (n=81)	4.6*	28.2%
Prior birth: preterm	24.8% (58)	4.7*	19.5%
Prior birth: poor outcomes	16.2% (38)	3.3*	10.4%
Prior birth: preterm and poor outcome	8.9% (21)	12.3*	9.2%
Mother Gained more than Recommended Weight (compared to those that gained expected amount)	64.9% (124)	1.7*	26.7%
Pregnancy Spacing (< 18 mos between last live birth and current birth)	30.2% (26)	3.2*	22.0%
Antibiotics (mother)	45.7% (107)	1.9*	22.0%
Clinical Interventions (clinical chorioamnionitis, cervical cerclage, tocolysis, version)	17.5% (41)	9.4*	15.6%
Gestational Hypertension	19.7% (46)	3.3 *	14.8%
Mother Gained Less than Expected Weight (compared to those that gained expected amount)	19.4% (37)	1.6 (mod. sig.)	10.6%
Pre-pregnancy Hypertension	10.7% (25)	3.4*	7.0%
Pre-pregnancy Diabetes	3.4% (8)	3.1*	2.2%
Late or No Prenatal Care (after 12 weeks) *30% of data missing	53.0% (95)	1.1	6.3%
Inadequate - Kotelchuck Index for adequate prenatal care *24% of data missing	14.7% (26)	1.1	1.8%
Mother Has STD or Vaginal Infection	15.4% (36)	1.0	0.6%
Mother Smoked During or within 3 months of Pregnancy	14.0% (28)	1.1	0.7%
Gestational Diabetes	2.1% (5)	0.6	n/a
Controlling Factors			
< = 17	4.3% (10)	1.2	1.3%
>35	12.4% (29)	1.4	3.4%
Not HS graduate	7.6% (28)	0.8	n/a
Not married	74.4% (174)	1.4*	25.1%
WIC Participant	45.3% (96)	0.4*	n/a

* statistically significant

Risk and protective factors that were significant in bivariate analysis or are traditionally significant factors were included in the AOR and PAR calculations. We also included typical sociodemographic factors, such as age. PAR and AOR calculations controlled for age, education, marital status, and WIC participation.

In the report, the AOR is discussed in terms of risk. This is advisable when specific conditions are met, as risk is more easily interpreted than odds (<http://www.citymatch.org/sites/default/files/documents/MCHEPITraining/Absolute%20and%20Relative%20Measures%20of%20Association.pdf>).