

Westside Family Healthcare

Prenatal Care Evaluation 2008



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prepared for

Westside Family Healthcare

by

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SUMMARY

During 2003, 2004, 2006, 2007 and the first half of 2008, Westside Family Healthcare provided **prenatal care to a total of 2,962 women**. During the funding period (2006, 2007 and the first half of 2008), **1,878 cases of women's prenatal care took place under the auspices of Westside Family Healthcare's Infant Mortality Reduction Grant**. Overall, the tabulation of demographic characteristics of mothers served by Westside Family Healthcare indicates that **Westside Family Healthcare serves populations that are much more diverse than the general Delaware population**. The population served by **Westside Family Healthcare has a significantly higher proportion of women of Hispanic origin, and women who were born outside of the United States**. In addition to these characteristics, women receiving prenatal care at Westside Family Healthcare are more likely to fall into one of the younger age groups than their counterparts who were not provided prenatal care at Westside Family Healthcare.

- About 77% of women participating in the grant program were Caucasian, while almost 21 % were Black/African American.
- An overwhelming majority (97%) of the participants in the program were of Hispanic origin.
- More than half of the women who were enrolled in the Westside Family Healthcare's Infant Mortality Reduction Grant indicated their country Mexico (56%) as the country of origin, with women from the United States comprising (26%) of the population served.
- Almost 60% of women enrolled in the program indicated Spanish as their primary language, compared to 31% of women whose primary language was English.
- Just under 40% of women participating during the funding period were age 18-24, 28% were between the ages of 25 and 29, and approximately five percent of the pregnancies were among teenagers under the age of 18.
- Of the overall births to the patient population participating in the program, 6.4% were under 2,500 grams. The proportion of low weight births to African American mothers was 12.2% compared to 5.2% to Caucasian mothers.

The analysis involving the comparison of Westside Family Healthcare births to a control group indicates that the **birth outcomes for Westside mothers are at least as good as those for the control group**. Particularly, **no difference was observed in the mean birth weight and the median birth weight** between Westside and the control group. Looking at the data on the incidence of low weight births, **Westside mothers are actually better off**. In both years under investigation (2006 and 2007), the **probability of occurrence of low**

birth weights to Westside mothers was at least 30% lower than for the control group.

Similarly, the comparison of the number of prenatal visits again indicates that Westside mothers are no worse off than those of the control group. The median number of prenatal visits for each group and each year under scrutiny is 12. Around 6% of all mothers in both the Westside group and the control group have had fewer than six prenatal visits. Basically, **the frequency of prenatal care provided to Westside mothers equals the frequency of prenatal care provided to the control group.**

Looking at the data for infant deaths for 2006 (only year for which infant death data is available) Westside Family Healthcare seems to be doing better than the control group. For 2006 births, 84 infant deaths were recorded. Out of these, one can be attributed to Westside Family Healthcare and two are attributable to the control group. While the number of infant deaths is relatively small and confirmation of this observation for the additional year is lacking, the **data indicates that Westside Family Healthcare mothers are less likely to lose their children to infant mortality than their counterparts from the control group.**

Clearly, prenatal care provided to mothers at Westside Family Healthcare under the auspices of the Infant Mortality Reduction Grant is successful. Westside Family Healthcare serves a population that is much more diverse than the general Delaware population. Despite this, mothers who receive prenatal care at Westside Family Healthcare under the auspices of the Mortality Reduction Grant experience birth outcomes that are comparable and in some cases exceed the birth outcomes of mothers who did not receive prenatal care at Westside Family Healthcare.

INTRODUCTION

In the United States infant death and low birth weight are directly correlated. Low birth weight infants are those that are born at term but weigh 2,500g (5.8 lb) or less. Some of the “factors associated with high risk of low birth weight fall into three general categories: (1) demographic characteristics of the mother and infant, (2) physiological characteristics of the mother, and (3) behavioral practices of the mother.”¹ There have been some prenatal care programs in the United States that have worked to reduce the incidence of low birth weight by providing a more comprehensive program of prenatal care. A commonly used name for this model of prenatal care is the Health Belief Model. These programs, in addition to medical care, are designed to provide social services that work to overcome the barriers that women, and in particular low income women, face in utilizing prenatal care. A 1986 study by the Institute of Medicine (IOM) identified multiple barriers to receiving adequate prenatal care which included “transportation difficulties, lack of child care and cultural barriers to participation in prenatal care.”²

A 2002 study was conducted to determine if a prenatal program in Colorado providing a comprehensive case management, mental health, smoking cessation, and nutrition services to high risk pregnant women was successful in reducing the incidence of low birth weights.³ This program, Prenatal Plus, included a team that worked with women to make non medical lifestyle changes that were thought to affect birth outcomes. Through a descriptive analysis, it was determined that the “Prenatal Plus patients were significantly less likely than the comparison-

¹ Kehrer, Barbara H and Wolin, Charles M, Impact of Income Maintenance on Low Birth Weight: Evidence from the Gary Experiment (The Journal of Human Resources, 1997) 440.

² Brown, Sarah S., Drawing Women into Prenatal Care, based on Institute of Medicine Report “Prenatal Care: Reaching Mothers, Reaching Infants (Institute of Medicine Report, 1989) 75.

³ Glazner, Judith E. and Beaty, Brenda L., The Effects of the Prenatal Plus Program on Infant Birth Weight and Medicaid Costs, (Colorado Department of Public Health and Environment, 2002) 1.

group mothers to have low birth weight infants.”⁴ Of these program participants, 10.6 percent of women gave birth to low birth weight infants versus 12.5 percent in the comparison group.⁵

A prototype program was instituted at Tampa General Hospital in Florida to provide a variety of care to low income women. This program was “staffed by obstetricians, pediatricians, nurses, midwives and social workers” to work on reducing the risk of women giving birth to low birth weight babies.⁶ This program offered a combination of “child care for women with children, assistance with Medicaid acquisition, nutritional counseling, literacy programs and food stamps.”⁷ The success of this prototype program eventually led to Tampa General Hospital creating a new program that serves the needs of “high risk” women who are in need of prenatal care.⁸

Rush Prenatal Program at St. Basil’s Free Peoples Clinic in Chicago is another example of a program that attempted to provide a variety of different services to pregnant women who were considered high risk.⁹ This program involved medical students providing comprehensive care to at risk pregnant women before, during and after birth. In addition to performing the prenatal exam, the students also served as “patient advocates by keeping in touch with patients by phone or mail, helping them obtain forms for public aid and for the Special Supplemental Food Program for Women, Infants, and Children (WIC) and scheduling appointments at the hospital.”

A program in North Carolina, a “prematurity prevention project,” was successful in reducing the incidence of low birth weight infants.¹⁰ While the approaches of this program were more medically focused, it provided some opportunities for pregnant women to receive services outside the scope of typical prenatal care including a “risk assessment of patients,

⁴ Glazner and Beaty 6.

⁵ Glazner and Beaty 6-7.

⁶ Stout, Anne (1997) Prenatal Care for Low-Income Women and the Health Belief Model: A New Beginning, (Journal of Community Health Nursing, 1997) 176.

⁷ Stout 176.

⁸ Stout 176.

⁹ Bardack, Michelle A. and Thompson, Susan H. Model Prenatal Program of Rush Medical College at St. Basil’s Free Peoples Clinic, Chicago (Rush Medical College, 1993) 161.

¹⁰ Stout, Anne (1997) Prenatal Care for Low-Income Women and the Health Belief Model: A New Beginning, (Journal of Community Health Nursing, 1997) 178.

education of patients and providers, intensive care for high-risk patients, and an assessment of uterine activity of all patients showing signs of premature labor.¹¹

In Gary, Indiana, an income maintenance experiment was conducted from 1970 to 1974 to determine the impact that a negative income tax (NIT) had on the problem of low birth weight infants. This study found that there was not a direct correlation between utilization of prenatal care and the birth weight of infants. However, indirect evidence that was available suggested that “the negative income tax is associated with a small but statistically significant improvement in the quality of diets of families in North Carolina, but not in Iowa”¹² These results supported the view that maternal nutrition served as a mechanism to influence infant health. The results of this early study support the theory that a comprehensive method of family practice centered care, including guidance on proper nutrition during pregnancy, improves the likelihood of positive outcomes with regards to the birth weight of infants. The NIT enabled women to improve their nutrition, and it was concluded that “children who would have had suboptimal birth weight and whose mothers were at particularly high risk of experiencing an adverse pregnancy outcome will exhibit an average birth weight gain of about 0.3 to 1.2 pounds in response to NIT treatment at the level provided in the Gary experiment.”¹³

Utilizing the birth weight of newborn infants to determine the success of the family health model is a positive method for evaluating this program. Pregnant women have multiple needs with regards to giving birth to healthy infants at a normal birth weight. Women who are considered high risk oftentimes have multiple barriers to care that fall outside of the services provided by medical providers. A comprehensive program of care as demonstrated through the family health model connects women to multiple networks to help meet their needs so that they can maintain access to care throughout their pregnancies. The practice of providing social support services and family planning services, in addition to regular medical care, enhances the

¹¹ Stout 178.

¹² Kehrer, Barbara H and Wolin, Charles M Impact of Income Maintenance on Low Birth Weight: Evidence from the Gary Experiment (The Journal of Human Resources, 1979) 454-455.

¹³ Kehrer and Wolin 456.

ability of women to access care, remain healthy during pregnancy and plan subsequent births, all of which have a direct impact on the birth weight of infants.

Westside Family Healthcare is a “nonprofit community health center that provides family medical care, prenatal and maternity care, mental health, and dental care to medically underserved individuals in New Castle County.” Westside Family Healthcare is comprised of three health care centers including two in Wilmington, and one in Newark. They also have a dental office located in Wilmington, as well as their administrative offices. Westside Family Healthcare first began providing services in 1988. The services provided at the facility are very comprehensive with prenatal care comprising a large portion of care through the practice. The overall mission of Westside Family Healthcare is “mission is to provide equal access to quality healthcare, regardless of ability to pay.” The prenatal services at Westside Family Healthcare centers include: Pre-conception care, Pregnancy planning, Complete prenatal care in the medical center, Education in Spanish & English - pregnancy, nutrition, childbirth, early childhood development and care, safety, and parenting, Financial aid assistance, Laboratory Services, Assistance accessing services and resources, 24-Hour emergency care, Delivery at Christiana Hospital, and Care in the hospital and afterward for the mother and baby.

In this report, demographic and birth outcome data for mothers serviced at Westside Family Healthcare centers will be tabulated and examined. Overall, the objective of this report is to evaluate the Infant Mortality Reduction grant awarded by the Delaware Department of Public Health to Westside Family Healthcare. This grant intends to reduce the number of low birth weight infants among women who are considered high risk in Delaware. The analysis presented below will evaluate the success of the program that provides preconception, prenatal, and postnatal care implemented by Westside Family Healthcare and its impact on reducing the number of low birth weight infants. The topic of infant mortality is of particular concern among women who are considered “at risk” in Delaware. Black infant mortality rates are two and a half times higher than infant mortality rates for whites in all three Delaware counties. Delaware Racial and Ethnic Disparities Health Status Report Card determined that among Black infants,

the infant mortality rate receives a grade of an F. The percent of Delaware low birth weight births and the percent of women with late or no prenatal care received a score of C.¹⁴

The first section of the report looks at the entire prenatal care population at Westside Family Healthcare facilities in years 2003, 2004, 2006, 2007 and the first half of 2008. This will be followed up by a section comparing mothers and their birth outcomes before funding and during the funding period. The third section of the report tabulates demographic characteristics and birth outcomes of mothers for years 2006 and 2007 (both funded) for which complete birth data is available. The final section of the report presents a comparative analysis of birth outcomes for Westside mothers whose prenatal care took place during the period of the state grant and a comparative group of mothers with similar demographic characteristics.

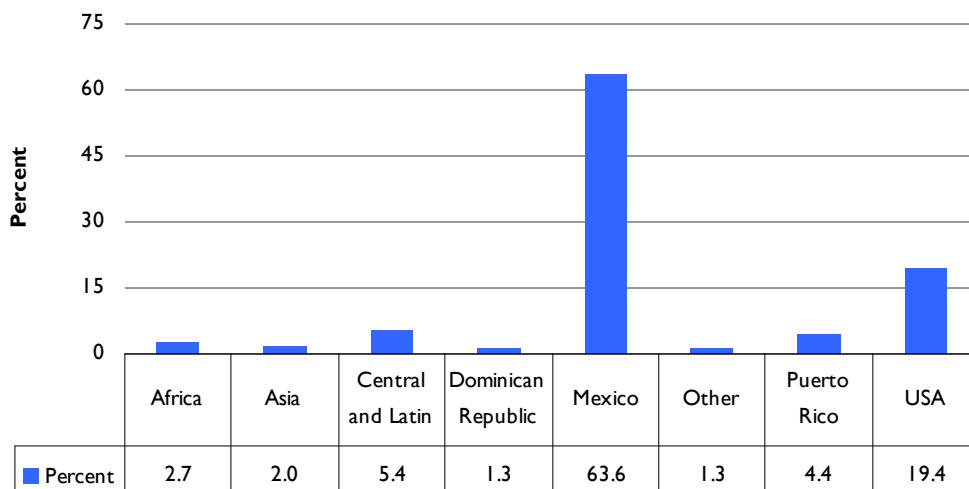
¹⁴ 2008 Delaware Racial and Ethnic Disparities Health the Status Report Card. Delaware Division of Public Health

ALL MOTHERS

This section of the report presents the tabulation of both demographic characteristics and birth outcomes of all mothers (without regard to their participation in the grant program) served at Westside Family Healthcare centers during 2003, 2004, 2006, 2007 and the first half of 2008. The charts presented here are based on the database made available by Westside Family Healthcare. This database contained a total of 2,962 records.

Westside Family Healthcare serves a diverse group of mothers. Figure I.1 summarizes the mother's place of origin. The most frequently reported country of origin was Mexico (64%) with women from the United States comprising (19%) of the population.

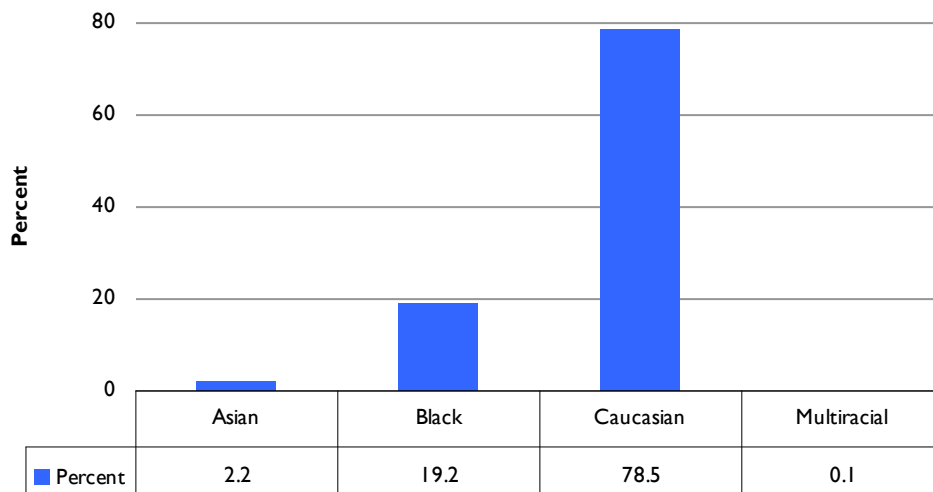
Figure I.1
Mother's Place of Origin



Source: Center for Applied Demography & Survey Research
University of Delaware

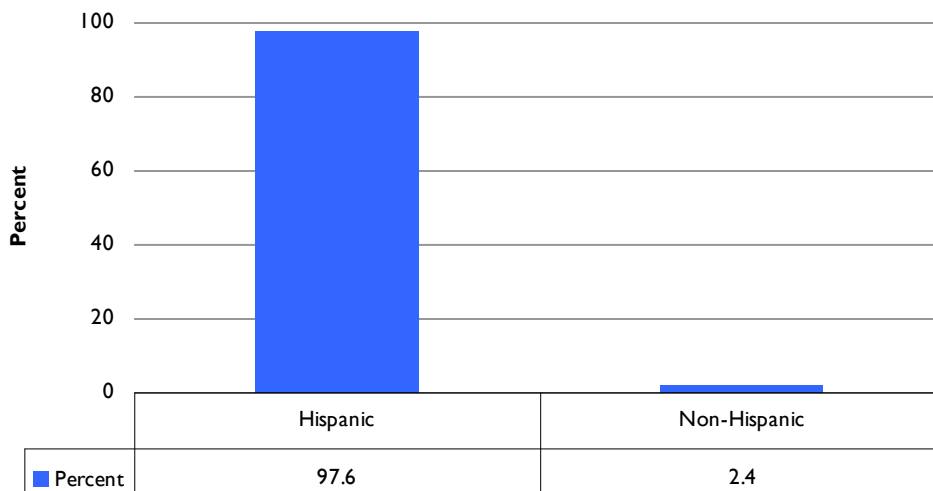
Figure I.2 provides data on the race of mothers. Most numerous among Westside mothers served during the study period were Caucasian women who represent 79% of the population followed by Black/African American women who comprise 19% of the cohort.

Figure 1.2
Mother's Race



Source: Center for Applied Demography & Survey Research
University of Delaware

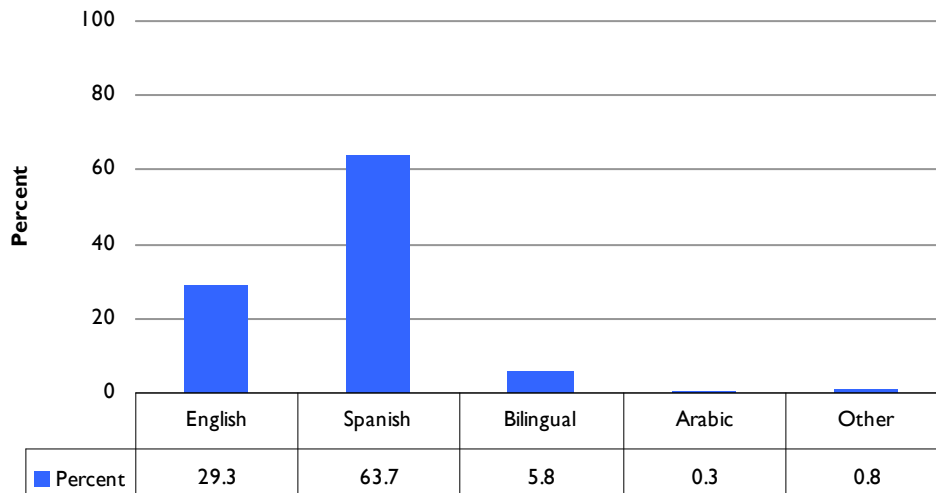
Figure 1.3
Hispanic versus Non Hispanic Ethnicity



Source: Center for Applied Demography & Survey Research
University of Delaware

While about 5% of Delaware's population is of Hispanic origin, Westside's mothers are predominantly of Hispanic origin – the Hispanic mothers comprise 98% of the population.

Figure I.4
Mother's Primary Language

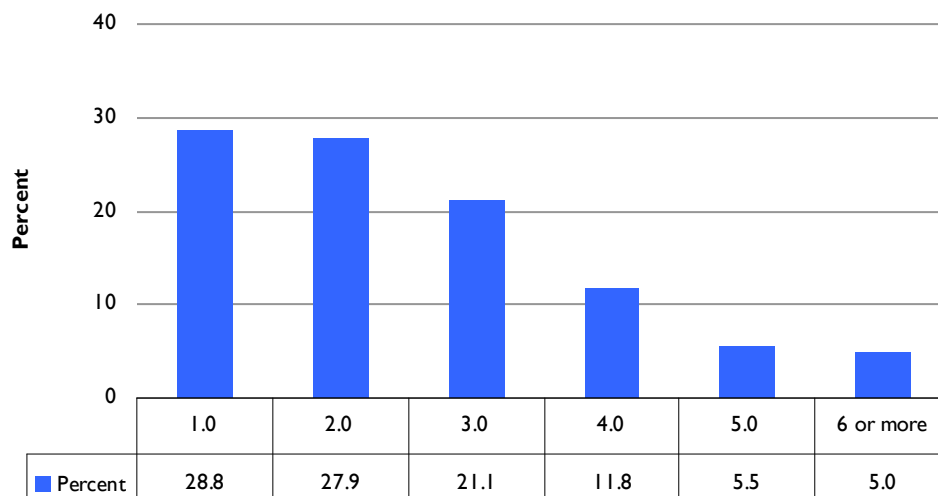


Source: Center for Applied Demography & Survey Research
University of Delaware

The primary language of the women who sought care at the Westside Family Healthcare centers is Spanish. Almost 64% of the women indicated Spanish being their primary language compared to 29% who listed English as their primary language (Figure I.4).

For about 29% of the women at Westside Family Healthcare centers, this was their first pregnancy, while 28% of women indicated that this was their second pregnancy. Figure I.5 below includes all pregnancies during the study period including those that were not carried to term.

Figure 1.5
Mother's Total Number of Births



Source: Center for Applied Demography & Survey Research
University of Delaware

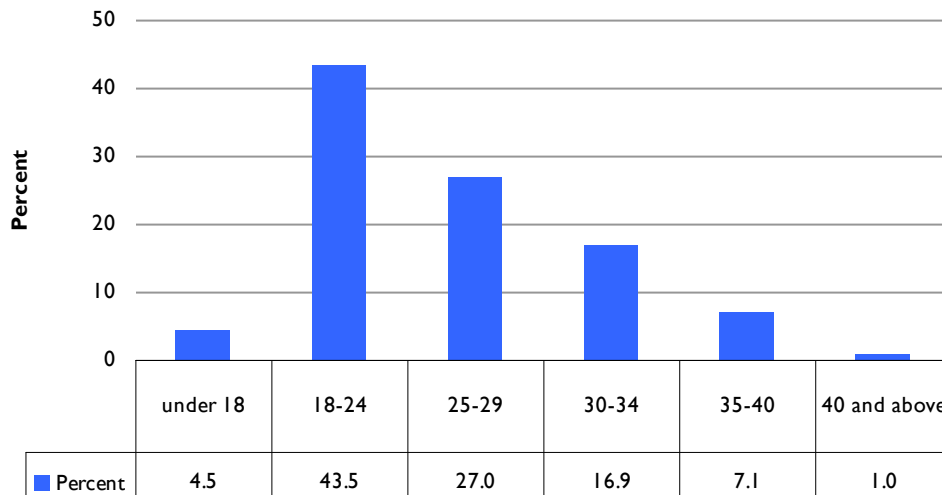
The age categories of the women who were enrolled in Westside Family Healthcare's prenatal program included a range of ages from 13 to 47. Almost 44% were ages 18-24, 27% ranged in age from 25-29, and approximately four percent of the pregnancies were among teenagers between the ages of 13-17.

Births to teenagers are of particular interest. In Delaware between 2001 and 2005, Hispanic teens were 3.8 times more likely to give birth than Caucasian teenagers; black teenagers 2.1 times more likely to give birth as Caucasian teenagers.¹⁵ This difference is significant due to the fact that teenagers in general, are more likely to give birth to infants with a low birth weight.¹⁶ The distribution of age categories among women served at Westside Family Health centers is found in Figure 1.6.

¹⁵ 2008 Delaware Racial and Ethnic Disparities Health Status Report Card, Delaware Division of Public Health

¹⁶ Health Status Report Card

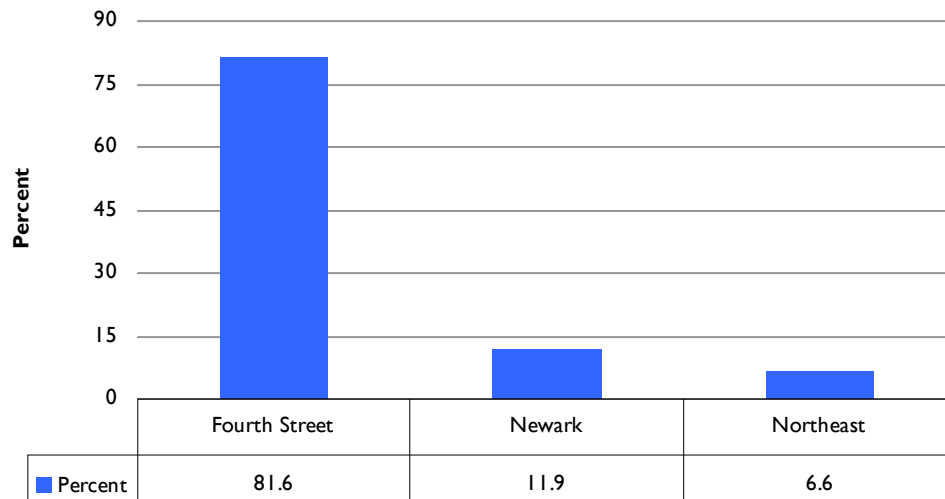
Figure 1.6
Age Categories of Mother



Source: Center for Applied Demography & Survey Research
University of Delaware

Westside Family Healthcare has three primary center locations including: Fourth Street in Wilmington, East 16th Street in Wilmington and Marrows Road in Newark. Figure 1.7 presents the proportion of Westside mothers served at each location. The Fourth Street location opened first in Adams Four Shopping Center in 1988 and became a federally funded, federally qualified health center (FQHC) in 1994. This site then relocated to its current Fourth Street office in Wilmington in 1998. The second Westside location in Northeast Wilmington opened first at the Wilmington Hospital Annex in 2003. In 2006, this site relocated and expanded, and is now the Northeast center of Westside Family Healthcare. The third Westside Family Healthcare center is located in Newark at the Brookside location on Marrows Road, and was opened in 2004. Among the different site locations, there are a number of distinct demographic differences among the groups of women served. The majority of women at Westside Family Healthcare received services at the Fourth Street location (82%) while 12% of women received care at the Newark center. Just under 7% of the mothers during the study period received prenatal care at the Northeast facility.

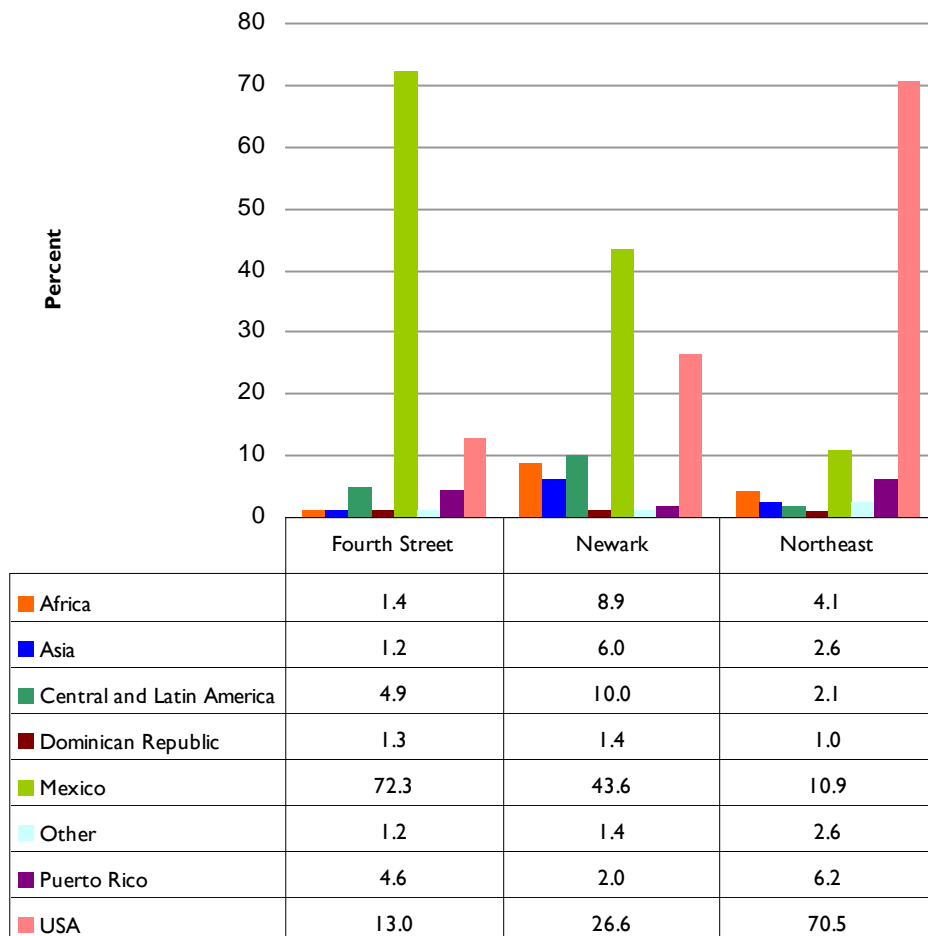
Figure 1.7
Mother's Location of Care



Source: Center for Applied Demography & Survey Research
University of Delaware

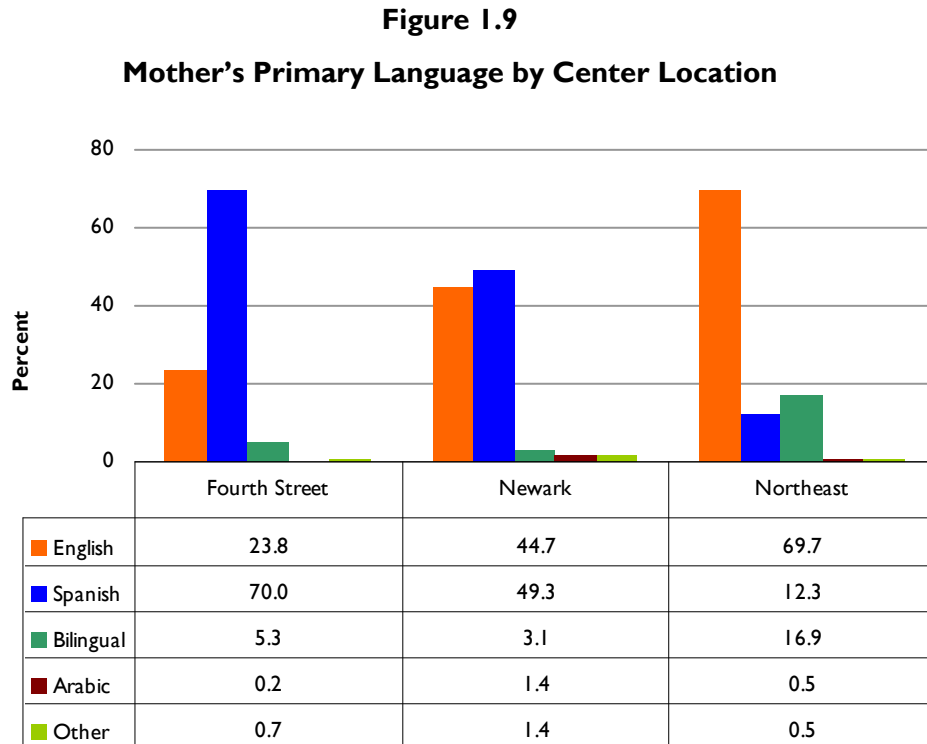
While overall, the majority of women served in the program were from Mexico, the most frequent country of origin varies depending on the center location. The summary of country of origin of the women who sought care at each of the three centers is presented in Figure 1.8. At the Fourth Street location, mothers who list Mexico as their country of origin are the most numerous (72%). While at the Northeast location women from the United States are the most numerous (71%).

Figure 1.8
Mother's Place of Origin by Center Location



Source: Center for Applied Demography & Survey Research
 University of Delaware

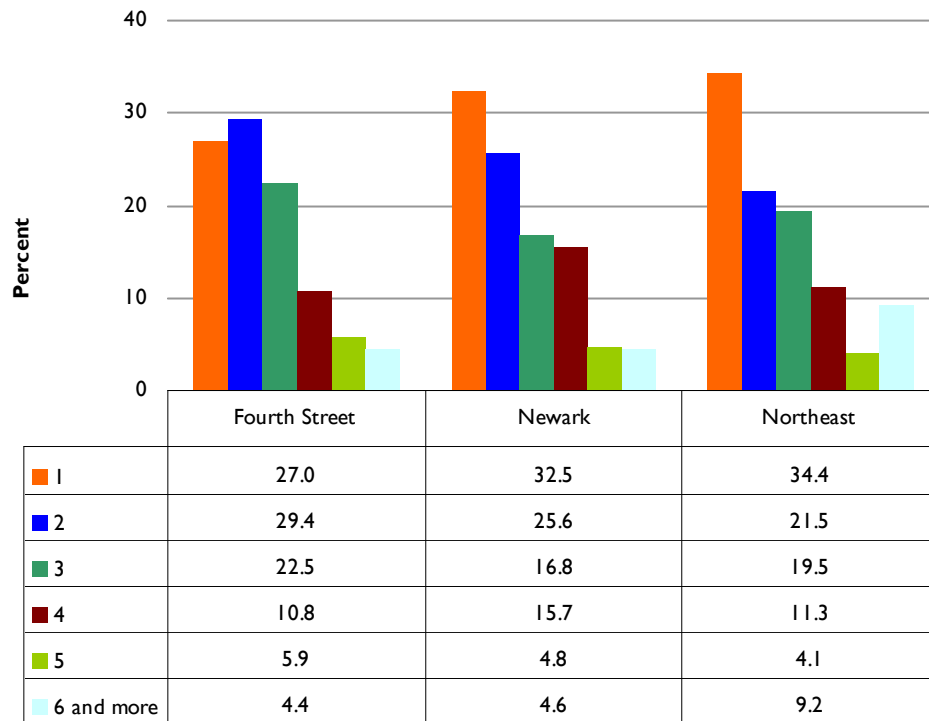
Accordingly, the primary language spoken at each of the centers virtually mirrors the country of origin distribution. Seventy percent of the patients at the Fourth Street center indicate their primary language to be Spanish (majority of patients at this center are from Mexico), and 70% of the patients accessing care at the Northeast center speak primarily English (here the primary country of origin is the United States). Figure 1.9 further identifies the various primary languages spoken by mothers at the three centers.



Source: Center for Applied Demography & Survey Research
University of Delaware

The number of pregnancies reported varies somewhat by the location (Figure 1.10). Most populous (33% and 34%) at the Newark and Northeast locations are women who are reporting their first pregnancy, while women served at the Fourth Street location are most frequently (29%) to report their second pregnancy. While the number of women served at the Northeast location is smallest (just under 200) it is interesting to point out that around 9% of them have indicated that this is their 6th or higher pregnancy.

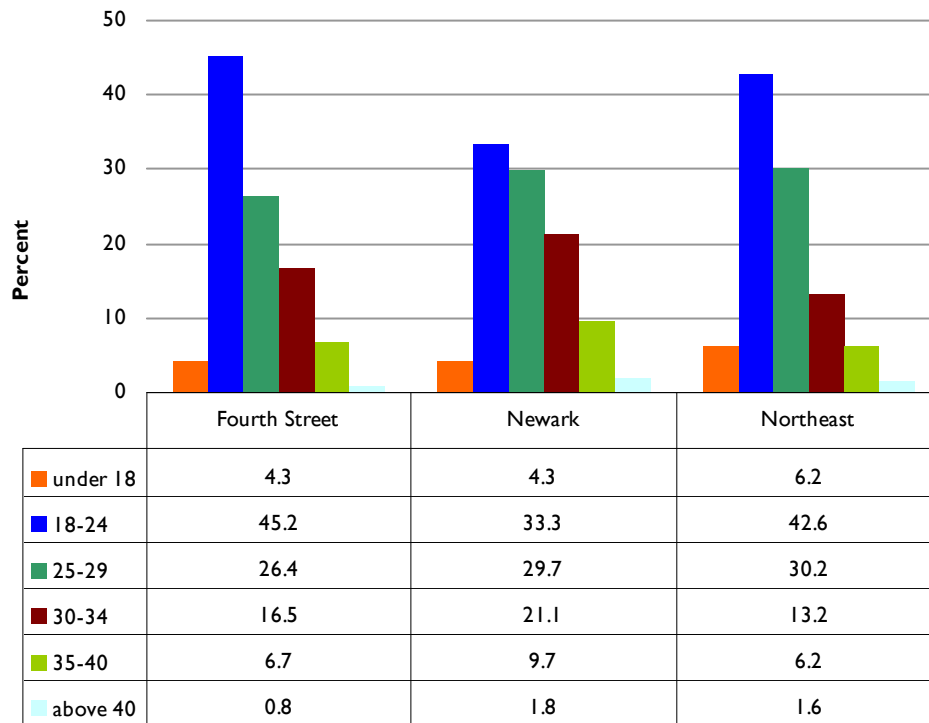
Figure 1.10
Mother's Total Number of Births by Center Location



Source: Center for Applied Demography & Survey Research
 University of Delaware

Again, some variance is apparent when comparing the age categories of women across different centers. Figure 1.11 highlights the differences among the age categories within the three centers. The Fourth Street center and the Northeast center seem to serve a similar clientele as far as age is concerned. However, the population served at the Newark center is somewhat different. Particularly, the proportion of women 18-24 is lower in Newark while the proportion of women age 30-34 is higher compared to the Fourth Street location and the Northeast location.

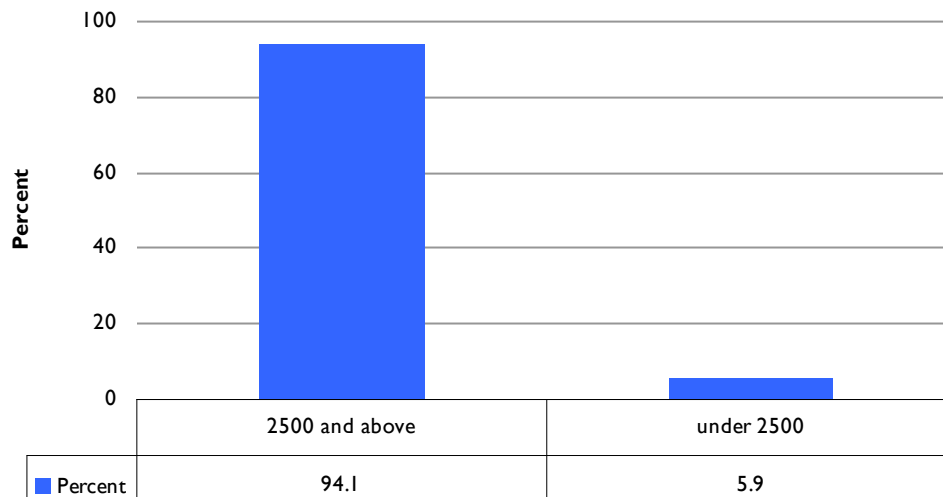
Figure 1.11
Age Category by Center Location



Source: Center for Applied Demography & Survey Research
 University of Delaware

Of the overall births, six percent were under 2,500 grams birth weight, which classifies as low birth weight infants, and 94 percent were 2,500 grams and above which falls into the category of infants who were born normal or above normal birth weight (Figure 1.12).

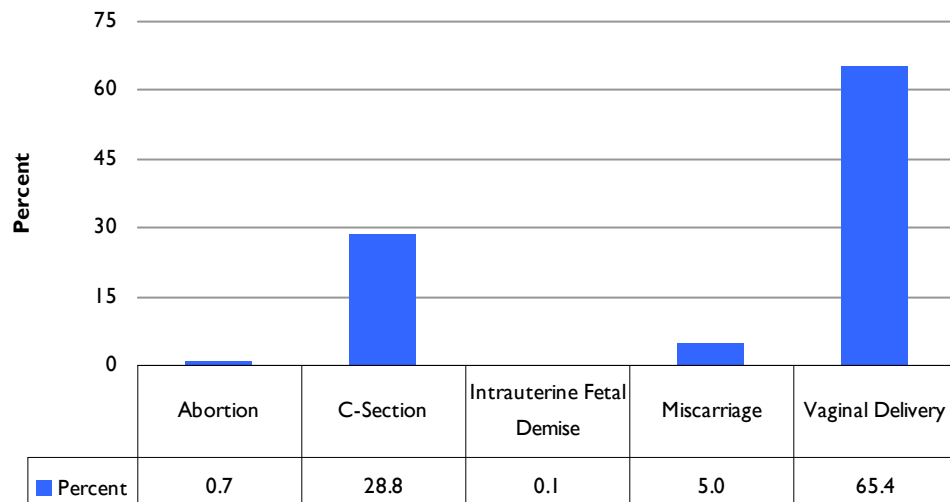
Figure I.12
Birth Weight of Infant



Source: Center for Applied Demography & Survey Research
University of Delaware

When reviewing the study population for the type of delivery, the majority of participants who received prenatal care gave birth to their infants through vaginal delivery (65%). Approximately 29% of the infants were given birth to through c-section and six percent of the pregnancies were not viable, with the fetus being miscarried or lost due to intrauterine fetal demise. Less than 1% of the pregnancies were aborted (Figure I.13)

Figure 1.13
Type of Delivery



Source: Center for Applied Demography & Survey Research
University of Delaware

MOTHERS BY FUNDING PERIOD

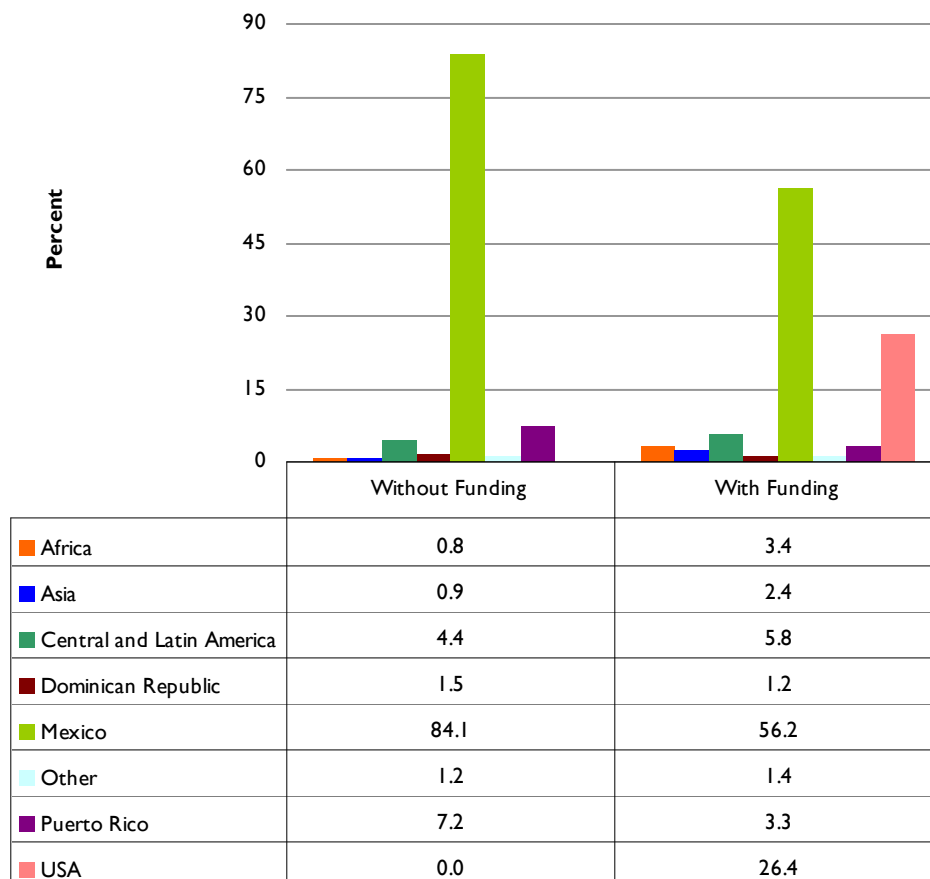
The purpose of the “Implementation of Services to Reduce Infant Mortality in Delaware” awarded by the Division of Public Health, Delaware Health and Social Services, to Westside Family Healthcare was to expand the capacity of Westside to serve more individuals in targeted “at risk” communities and to provide a number of different means of prenatal and post natal care. The “at risk” women enrolled in the Westside Family Healthcare Prenatal Program include “African American women, women with a poor history of birth outcomes, those with chronic diseases and psychosocial risk factors, and those who are Medicaid eligible, uninsured, or underinsured.” Westside Family Healthcare’s goals for utilization of this funding included: “To increase the breadth and depth of Westside Family Healthcare’s community outreach program, to provide access to preconception care for all women of reproductive age with a long-term goal of improving birth outcomes and decreasing rates of pre-term labor, low birth weight, and infant mortality, to provide prenatal care, and to increase the depth and breadth of Westside Family Healthcare’s pediatric program for children age 0 – 2 years.” To this extent it is important to compare the demographic characteristics and birth outcomes for mothers who were served before the implementation of the grant and during the plan implementation.

Funding for the Infant Mortality Reduction Grant first began in 2006 at the Wilmington center of Westside Family Healthcare. The Newark and the Northeast locations were added in 2007. This section of the report tabulates data for all 2,962 women and compares them based on their participation in the program. Out of the 2,962 women in the database, 1,878 were provided care under the auspices of the grant (referred to as “With funding”) and 1,084 were provided care before the grant was awarded (referred to as “Without funding”).

Comparing the country of origin for mothers served during the two time periods (“Without funding” and “With funding”) differences are apparent. In both cases, women from Mexico represent a significant proportion. Before funding was awarded, 84% of the women

indicated their country of origin as Mexico, compared to 56% during the funding period. Also, a difference is apparent in the proportion of mothers from the US (Figure 2.1). However, what is not pictured here are the missing data. Before funding was awarded, 38% of the records did not have a country indicated, while during the “With funding” period only 2% of the cases did not have a country of origin recorded. The big difference seems to be more of a data entry/record keeping issue than a difference in the population.

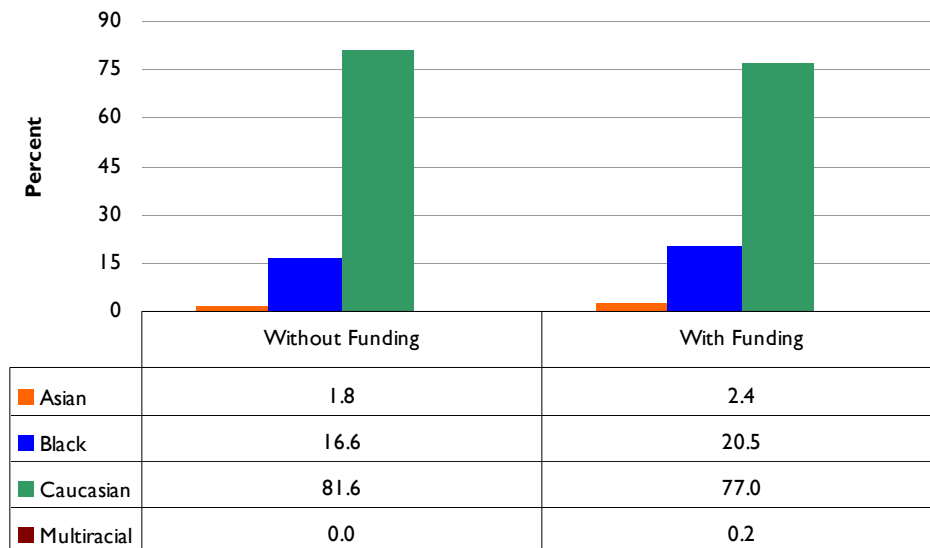
Figure 2.1
Mother’s Place of Origin



Source: Center for Applied Demography & Survey Research
University of Delaware

The racial characteristics vary somewhat between the two time periods. During both years, Caucasian women are most numerous; however, their proportion is lower during the funding period (77% vs. 82% (Figure 2.2).

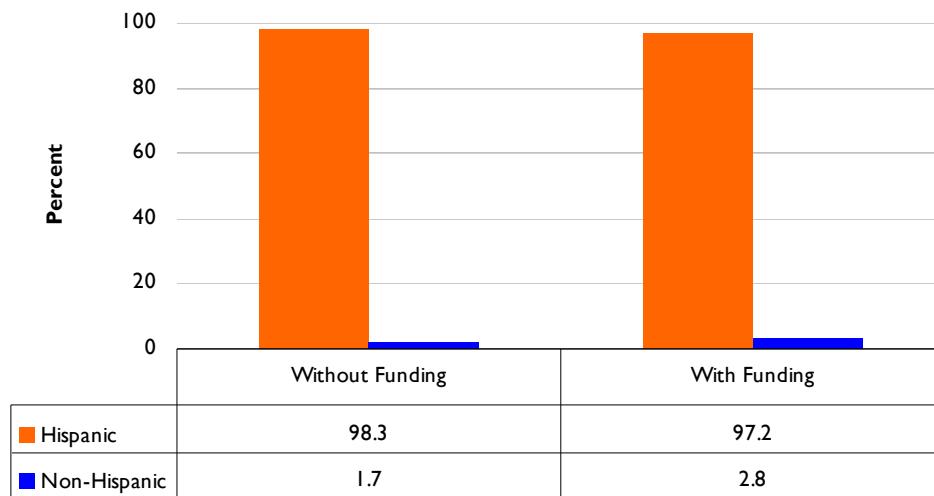
Figure 2.2
Mother's Race



Source: Center for Applied Demography & Survey Research
University of Delaware

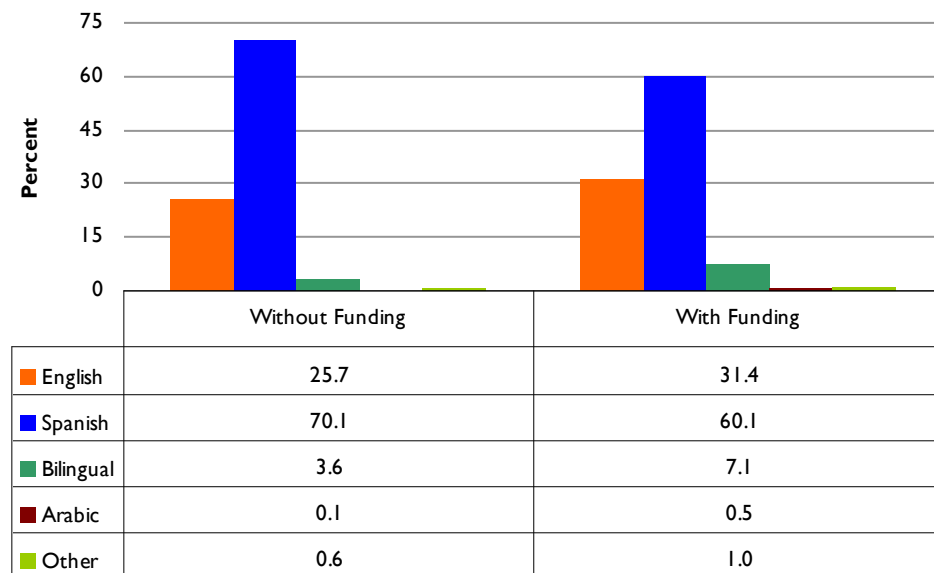
No differences are apparent when comparing Hispanic origin of mothers by funding period. Before receiving funding, 98% of the women in the Westside Family Healthcare prenatal program were of Hispanic descent; after funding was awarded, 97% of women were of Hispanic origin.

Figure 2.3
Hispanic vs. Non Hispanic Origin



Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 2.4
Mother's Primary Language



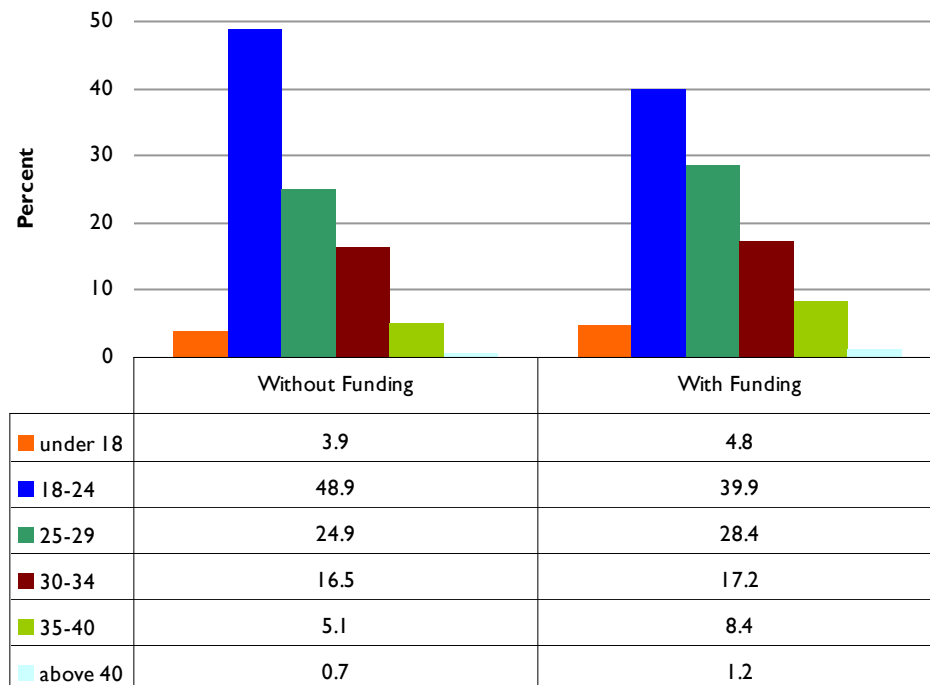
Source: Center for Applied Demography & Survey Research
University of Delaware

The distribution in Figure 2.4 shows that the most commonly spoken primary language among mothers served at Westside Family Healthcare was Spanish. Before funding was

awarded, 70% of mothers indicated Spanish as their primary language, while a somewhat lower percentage of mothers indicated this primary language during the funding period.

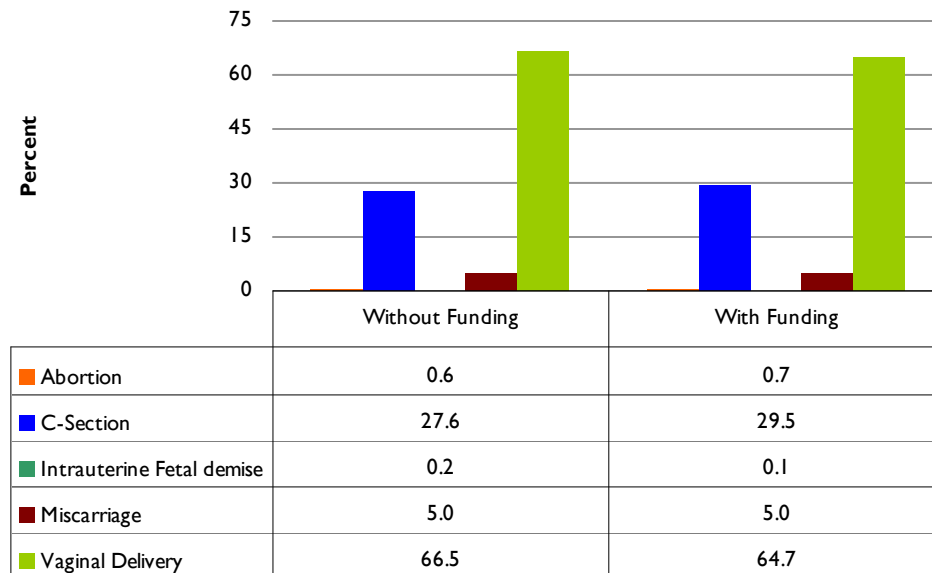
The age categories of the women who received prenatal care at Westside Family Healthcare vary somewhat during the two time periods. Prior to the awarding of the grant, about 50% of all women were aged 18-24, while this proportion decreased to 40% during the funding period (Figure 2.5). Figure 2.6 tabulates the distribution of delivery types. No significant differences exist between the two funding periods.

Figure 2.5
Age Categories of Mother



Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 2.6
Type of Delivery

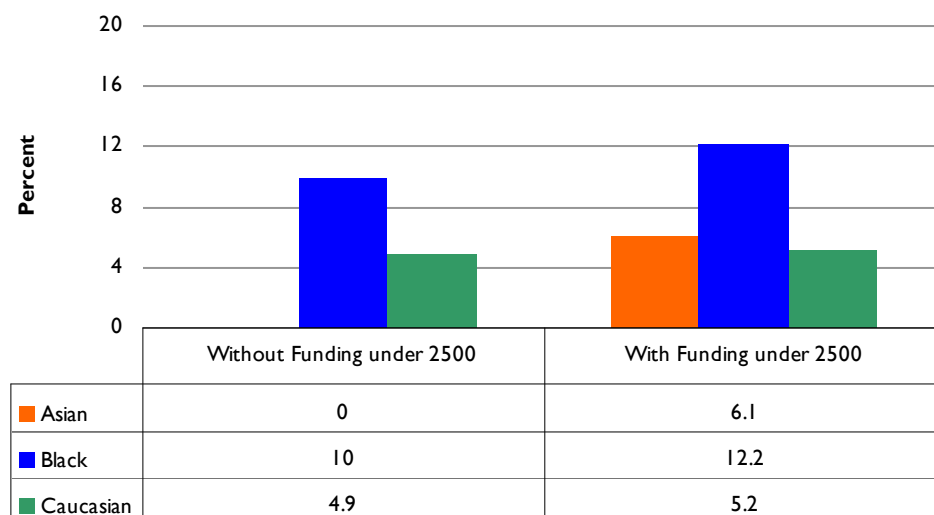


Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 2.7 presents the distribution of low weight births by funding periods. The proportion of low weight births is about one percentage point higher during the period with funding than during the period without funding. This is very likely the result of the fact that the funding period includes centers that are different (in terms of their demographic characteristics) than the centers that were excluded.

Figure 2.7**Percentage of Low Birth Weight Infants vs. Normal/High Birth Weight Infants**

Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 2.8**Race of Mother by Birth Weight**

Source: Center for Applied Demography & Survey Research
University of Delaware

Below, Figure 2.8 highlights the percent of low and normal/high birth weight infants born to mothers of different races. Prior to funding being awarded, the highest percentage of infants (10%) born at low birth weight were Black. After funding was awarded, Black infants were still the highest percent of infants born at low birth weight with this group comprising 12 percent of the population.

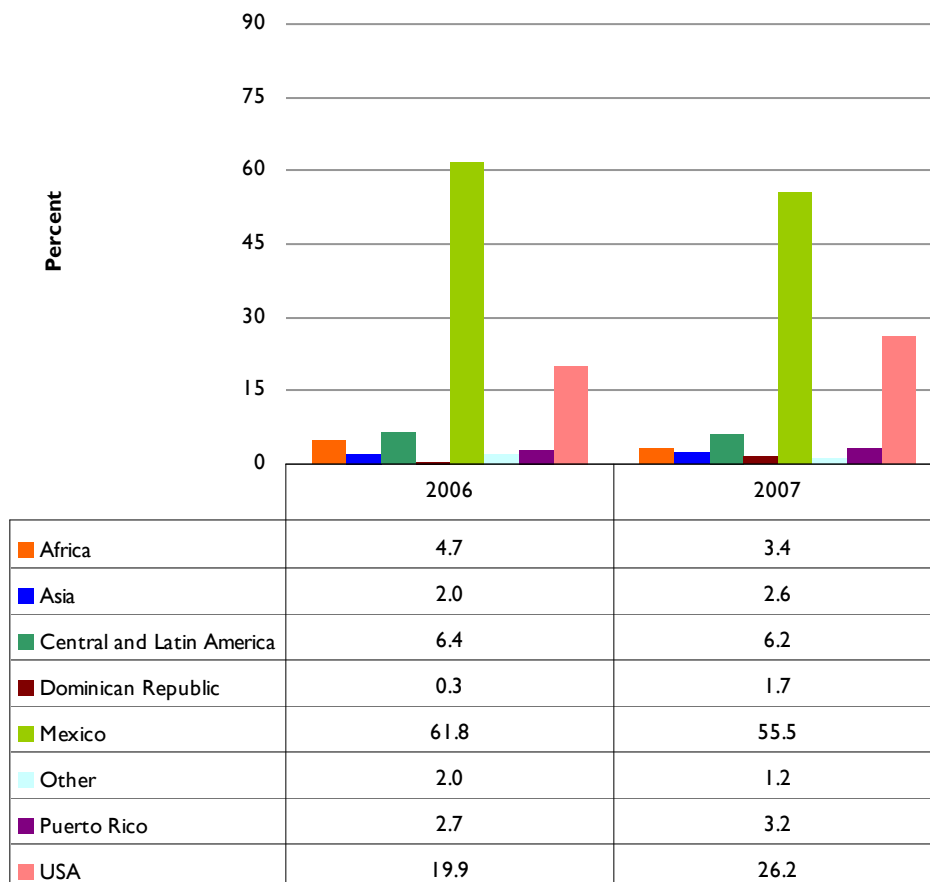
MOTHERS IN 2006 AND 2007

The tabulations presented below compare the two years, 2006 and 2007, during which Westside Family Healthcare received the grant. The year 2008 is excluded from this analysis because most of the women in the database for year 2008 (January through July) had not yet delivered by the time the analysis began.

In 2006 only the Fourth Street center location participated in the funded prenatal program. This represents a total of 296 women receiving prenatal care. In 2007 the grant was expanded and women receiving prenatal care at the following Westside Family Healthcare center locations were covered by the grant: Fourth Street center, Newark and the Northeast center. In 2007, 823 women received prenatal care from Westside Family Healthcare under the auspices of the grant. Their characteristics are tabulated in the section below.

Figure 3.1, below highlights the country of origin for years 2006 and 2007. From 2006 to 2007, the percent of women in the prenatal program whose country of origin was Mexico decreased from approximately 62% to 56%. The percent of mothers whose country of was the United States increased from 20% to 26%.

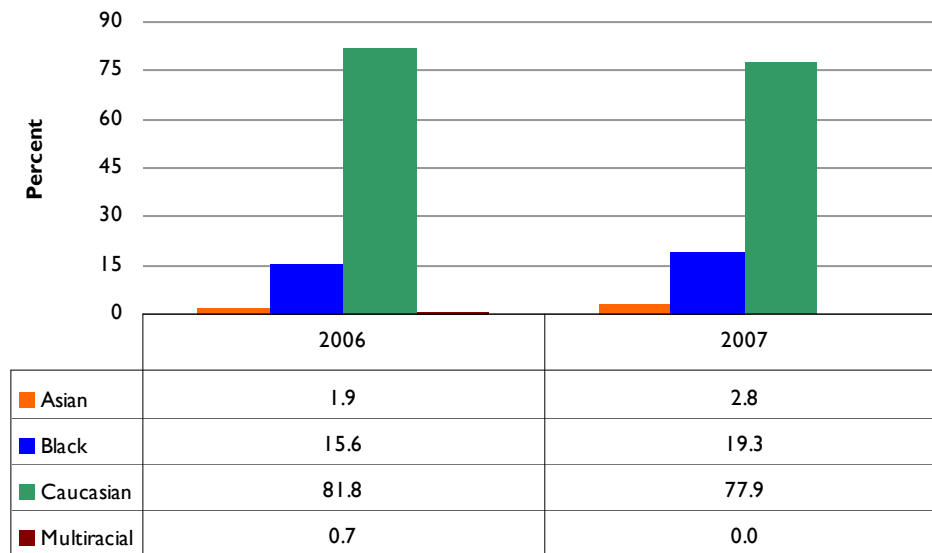
Figure 3.1
Mother's Place of Origin 2006-2007



Source: Center for Applied Demography & Survey Research
 University of Delaware

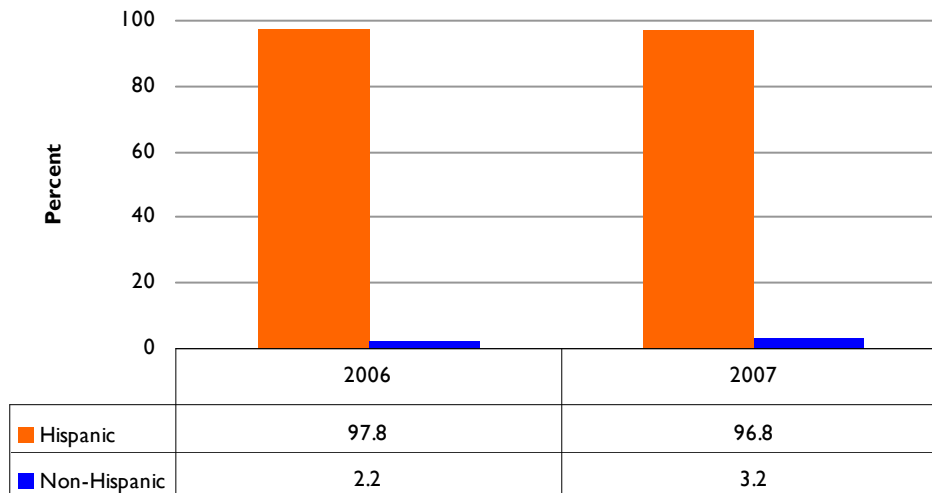
The most frequently reported race in 2006 was Caucasian (82%) followed by Black (16%). The percent of Caucasian women decreased to 78%, while the proportion of Black women increased in 2007 to 19% (Figure 3.2). An overwhelming majority of women who participated during the two funded years were of Hispanic origin (Figure 3.3). There is no significant difference between the 2 years - 98% were of Hispanic origin in 2006 and 97% were of Hispanic origin in 2007.

Figure 3.2
Mother's Race 2006-2007



Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 3.3
Hispanic vs. Non Hispanic Ethnicity 2006-2007

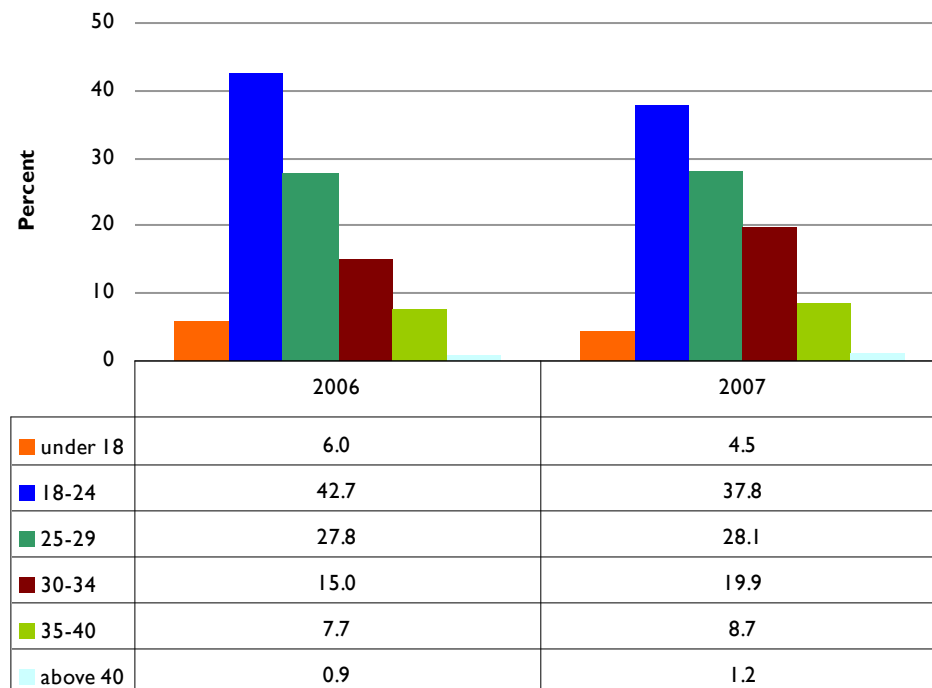


Source: Center for Applied Demography & Survey Research
University of Delaware

When reviewing age groups for each of the years, no differences that would change the magnitude of the distribution are apparent. In 2006, 43% of the women in the prenatal program

were 18 – 24 years old while, in 2007 that number was 38% of the total study participant population. The smallest number of women who participated in the prenatal program drew from the forty plus age group (1%). Six percent of the women in 2006 were under 18 while about 5% were under 18 in 2007.

Figure 3.4
Age Categories of Mother 2006-2007

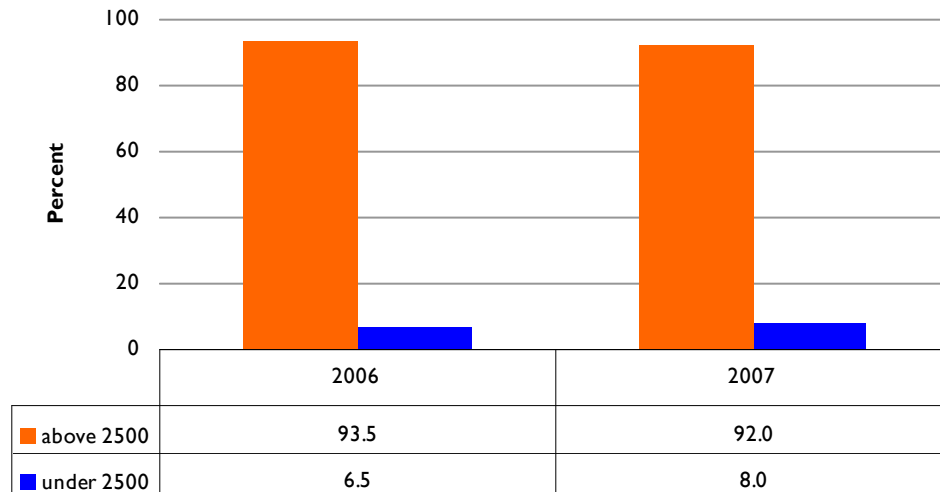


Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 3.5 presents the low birth weight statistics for 2006 and 2007. In 2006 the proportion of low birth babies was 7%, while in 2007 the proportion increased to 8%. While the proportion of low birth weight infants appears to be relatively low among the population of women who received prenatal care at Westside Family Healthcare, significant differences exist among women of different racial backgrounds (Figure 3.6). In 2006, 20% of all births to Black women were low birth weight (this is about five times more than for Caucasian women). Including women from two different centers (Newark and Northeast) in 2007, the proportion of low birth weights for Black women decreased to about 10 percent, still somewhat higher than the ratio for Caucasian women. Interestingly, between 2006 and 2007, the proportion of low

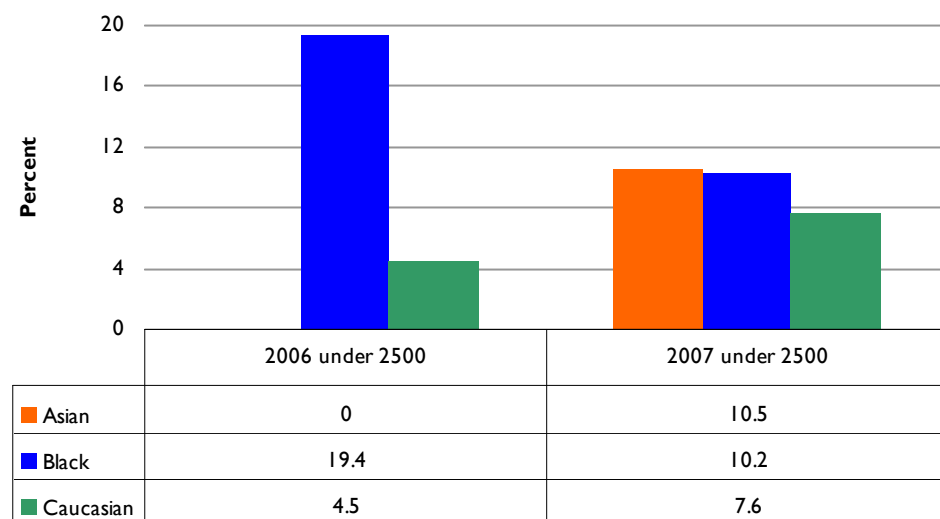
weight births to Asian women increased from 0% in 2006 to about 10% in 2007 (likely an artifact caused by low frequency of Asian women in the population served by Westside centers).

Figure 3.5
Percentage of Low Birth Weight Infants vs. Normal/High Birth Weight Infants
2006-2007



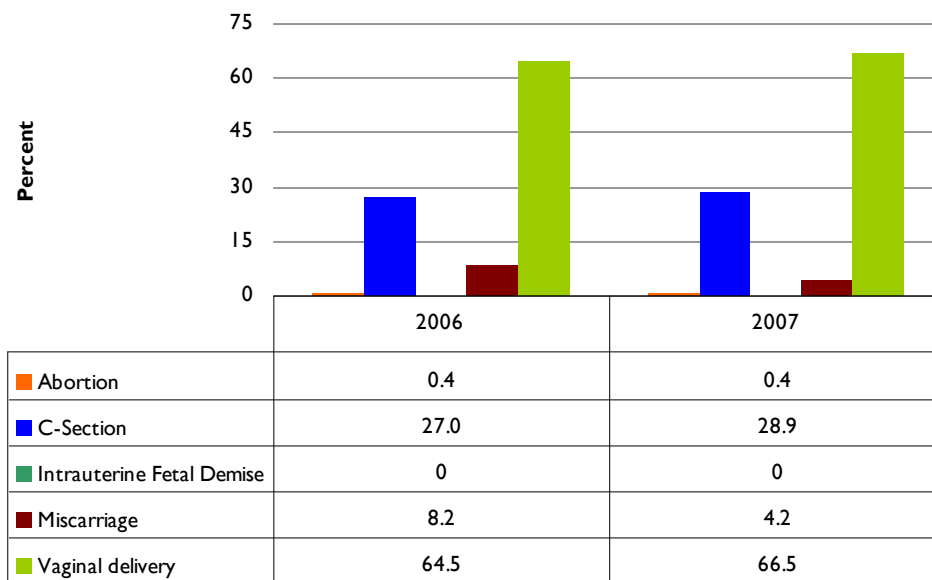
Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 3.6
Mother's Race by Birth Weight 2006-2007



Source: Center for Applied Demography & Survey Research
University of Delaware

In both 2006 and 2007 the most common birth among Westside mothers was a vaginal delivery (65 and 67%). About 30% of the births in 2006 and about 29% of the births in 2007 were Cesarean sections. In 2006, the percent of miscarriages among the prenatal program participants was 8%. This was about twice as high as in 2007 (Figure 3.7).

Figure 3.7**Type of Delivery 2006-2007**

Source: Center for Applied Demography & Survey Research
University of Delaware

COMPARISON WITH A CONTROL GROUP

The previous sections of the report provided a tabulation of demographic characteristics of mothers served at Westside Family Healthcare and their birth outcomes. In the next section, birth outcomes of mothers serviced at Westside Family Healthcare will be compared to a control group. By comparing the two groups, an overall assessment of the state grant provided to Westside Family Healthcare will be carried out.

Source of Data

Three sources of data will be utilized in the analysis. The first source of data is the records obtained from Westside Family Healthcare about mothers who were provided prenatal care at their facilities. Overall, Westside Family Healthcare provided records for years 2003, 2004, 2006, 2007 and 2008 (through July 2008). This database represented a total of 2,962 mothers who received all or part of their prenatal care at Westside Family Healthcare facilities. Out of these, 2,342 mothers received prenatal care during one of the two funding periods (years 2006-2007, and 2008). These mothers and their births are the primary focus of this analysis. However, the limitations in data availability from the vital statistics birth records confine further analysis to years 2006 and 2007.

The second set of data is the vital statistics birth records for Delaware. Delaware vital statistics are compiled on an annual basis. Permission was obtained from Delaware's Office of Vital Statistics to use the birth records for this evaluation. By the time the analysis was launched, birth data was complete and available for years 2006 and 2007. Overall 11,898 births were recorded to Delawareans in 2006, and 12,102 births were recorded to Delawareans in 2007. Birth records for year 2008 were not finalized by the time the analysis was launched. This limits the analysis to funding years 2006 and 2007.

The third source of data is the infant deaths data from the vital statistics. Permission was obtained from Delaware's Office of Vital Statistics to use infant death records for this evaluation. Given the nature of the infant death database, it gets compiled on an annual basis with a significant time delay from the time the birth occurred. By the time the analysis began, data on infant deaths were available only for the year 2006. A total of 84 infant deaths occurred in 2006.

Definitions

Westside mother – a mother who appeared in the Westside database, thus having had at least one pre-natal visit at one of the Westside facilities.

Matched Westside mothers – those mothers from the Westside database for which a one to one match to the vital statistics Birth record was successful (232 out of 296 in 2006 and 670 out of 822 in 2007).

Weighted Control Group – a sub group of Delaware's births that was selected based on the place of delivery (Christiana Hospital) and adjusted so that its demographic characteristics match those of Westside Family Healthcare births (age and race/Hispanic origin).

Matching of Records

To facilitate the analysis, it was required to match the vital statistics records (all recorded births to Delawareans and all infant deaths) and births to mothers served at Westside Family Healthcare. The reason behind record matching is two-fold. First, since the object of the analysis is to document birth weight, it was essential to obtain the official birth weight data. While the database from Westside contained this information, it was important to obtain an independent source of this data – in this case the official data on birth weights is recorded in the vital statistics data. Second, the weight recorded in the Westside data used a combination of the imperial/U.S. customary weight system and the metric system. For consistency purposes, the data reported using the metric system in the vital statistics records will be used.

Matching of data from two or more databases on the same populations requires a use of unique identification keys that exist in each of the databases to be matched. Given population served by Westside Family Healthcare, no reliable identification key existed in the three databases. For this reason, five variables (Key 1 through Key 5) were constructed for each database (Vital Statistics 2006, Vital Statistics 2007, Westside Mothers 2006, and Westside Mothers 2007). The tabulation of the key variables and their content is presented in Figure 4.1.

Figure 4.1
Keys used for data matching

KEY	Mother's Last Name	Mother's First Name	Mother's Date of Birth (MDYY)	Child's Date of Birth (MDYY)
Key1	x	x	x	x
Key2		x	x	x
Key3	x		x	x
Key4	x	x	x	
Key5	x	x		x

These key variables were then used in a consecutive order to match the records in the Westside Family Healthcare database and vital statistics birth database. In 2006, out of the 296 unique records in the Westside database, 142 matched based on Key1, 51 matched on Key2, 19 matched on Key3, 8 matched using Key4 and 12 using Key5. In total, for the year 2006, 232 records (out of 296 records, 78.4%) from the Westside database had a match in the Delaware vital statistics birth record. For 2007, 670 records (out of 822 records, 81.5%) from the Westside Database had a match in the Delaware vital statistics birth record. The unmatched records were mostly abortions and miscarriages. Some were also actual births that should have matched with the vital statistics record. These records did not match because the combination of mother's name and dates of births (for the child and the mother) in the Westside records did not match the records in the vital statistics records. Despite this limitation, the level of matching achieved provides a solid base for the analysis.

In addition to matching the Westside Family Healthcare data to the vital statistics birth records, records from the vital statistics database on infant deaths were matched to the birth records. For the births that took place in 2006, 84 infant deaths occurred. These were manually matched to the vital statistics birth records and Westside Family Healthcare prenatal care data. Infant deaths data was not available for year 2007.

The matching procedures resulted in two data sets, one for the year 2006, the other for the year 2007. The data set for 2006 contained 11,898 records with variables from the vital statistics birth data, 232 records and variables from the 2006 Westside Family Healthcare database and 84 records from the vital statistics infant death database. For the year 2007, the database contained 12,102 records with variables from the vital statistics birth records and 670 records and variables from the 2007 Westside Family Healthcare database. No infant death records were available and thus matched for the year 2007.

Control Groups and Weighting

For the purpose of this analysis two control groups – one for 2006 and another one for 2007 – were identified. The control groups were derived first by selecting unweighted control groups and later applying weights to these unweighted sub groups.

Unweighted Control Group Selection

The single criterion used to select the control group was the place of delivery. From the vital statistics records, only the births that took place at Christiana Hospital were included in the control groups. This criterion was selected based on the observation that an overwhelming majority (98.7% in 2006 and 97.2% in 2007) of all matched Westside mothers delivered their babies at Christiana Hospital. As shown previously, out of the 11,898 births in Delaware in 2006, 232 were attributable (matched) to Westside Family Healthcare. This left 11,666 births as non Westside births. Of these births, 50.8% (5,922) took place at Christiana Hospital. These 5,992 were identified as the unweighted control group for 2006. The selection of the unweighted control group for 2007 used the same exact criterion. Out of the 12,102 Delaware

births, 670 were attributable to Westside Mothers. This left 11,432 non-Westside births. Out of these, 48.8% (5,584) took place at Christiana Hospital. These were included in the unweighted control group for 2007.

The selection of these unweighted control groups insured that Westside mothers' births (and their outcomes) that overwhelmingly took place at Christiana Hospital would only be compared to other Christiana Hospital births.

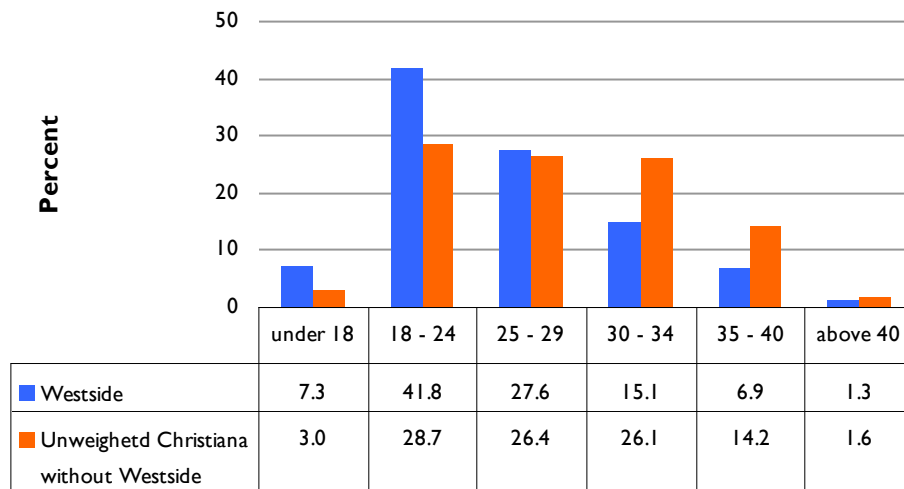
Weighting procedure

Once the unweighted control groups were selected, weights were calculated and applied to the control groups. The weights were derived based on the demographic characteristics (age and race/Hispanic origin) of the matched Westside births.

The reason behind weighting the control group is the fact that the demographic characteristics between unweighted control group and the Westside births differ significantly. For example, in 2006 the proportion of births to mothers aged 18-24 at Christiana Hospital (excluding Westside) stood at 29%, while the proportion of births to Westside mothers in the same age category was significantly higher and stood at 42%(Figure 4.2). A similar relationship exists in 2007. Also, significant differences exist when looking at the percentage of mothers by Race/Hispanic Origin. Comparing the data for 2007, (Figure 4.3) it is apparent that Westside's mothers are significantly more likely to be of Hispanic origin and of any race (72%) than their counterparts who also delivered at Christiana Hospital (6%).

Figure 4.2

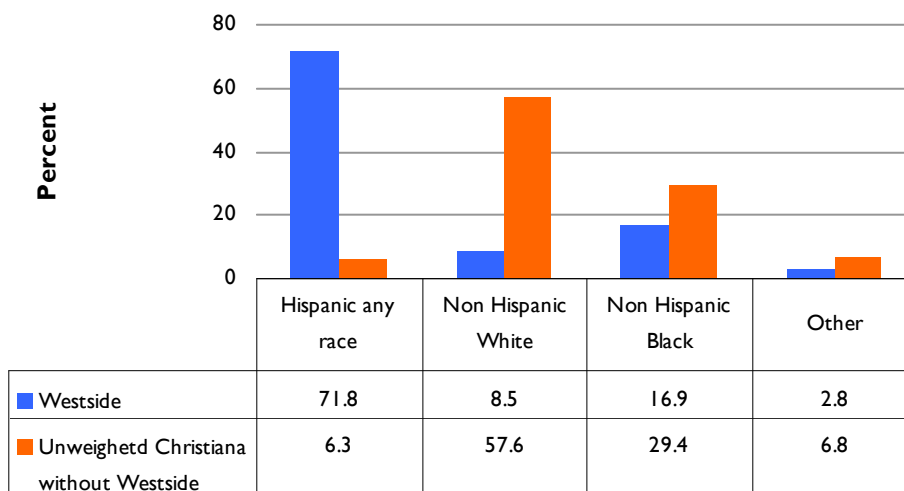
2006 Births by Mother's Age Group



Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 4.3

2007 Births by Mother's Race/Hispanic origin



Source: Center for Applied Demography & Survey Research
University of Delaware

Demographic differences among groups of mothers served by different providers (such as Westside Family Healthcare vs. Non Westside prenatal care) are common due to access related issues. However, these differences are important factors in birth outcomes, thus controlling for these differences when comparing groups of mothers is essential to birth outcomes evaluations. As a solution, a weight was calculated for every mother/birth included in the unweighted control group.

The result of this weighting procedure is that demographic characteristics of the control groups (births that took place at Christiana Hospital but were not attributable to Westside) now match the demographic characteristics (age distribution and Race/Hispanic origin) of the Westside births. This now allows for a meaningful comparison of the two groups and facilitates answers to questions like: How do birth outcomes of Westside Family Healthcare mothers compare to birth outcomes of other mothers who delivered at Christiana Hospital (when demographic characteristics of mothers delivered at Christiana Hospital match the demographic characteristics of Westside Family Healthcare mothers)?

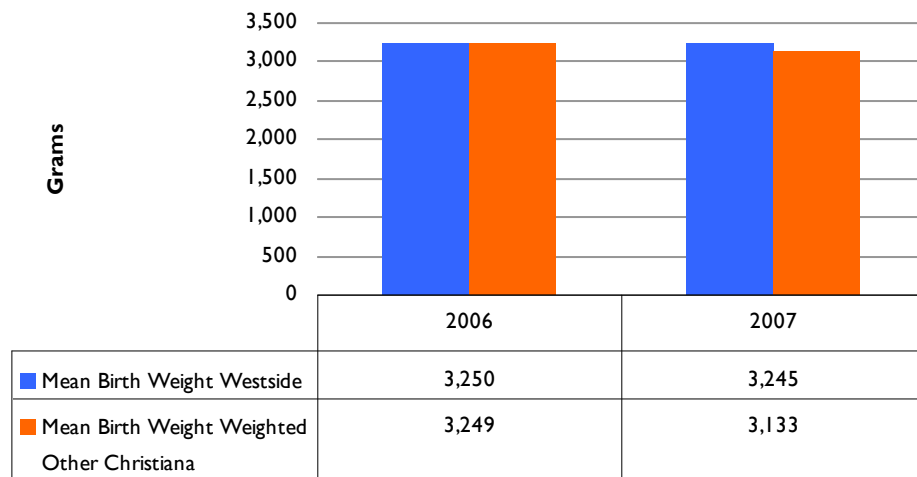
Analysis

The analysis outlined below evaluated the effect of participation in Westside Family Healthcare's prenatal care program, for years 2006 and 2007. The outcome measures for the Westside participants were compared to the outcome measures of the weighted control group. The effect of prenatal care provided at Westside Family Healthcare on birth weight, number of prenatal visits and infant deaths were examined.

Birth Weight

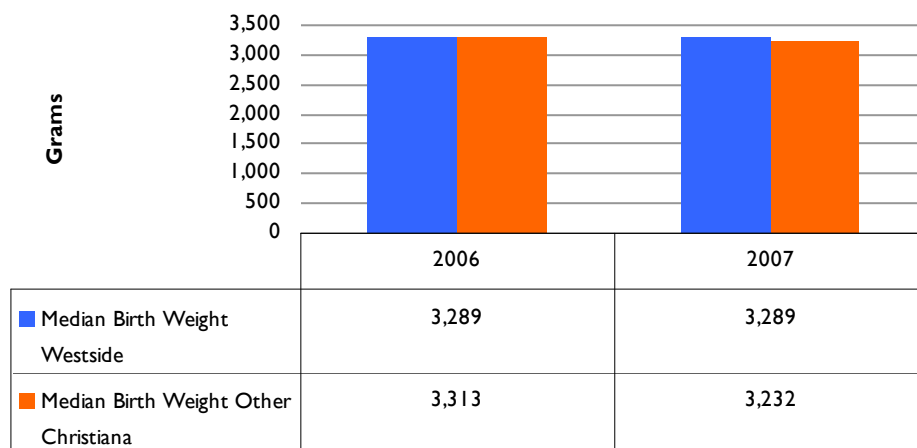
The comparison of mean birth weight for births attributable to Westside Family Healthcare and those of the control group (births at Christiana Hospital weighted to reflect the age Race/Hispanic origin of the Westside mothers) shows no difference in 2006, and a nominal difference of around 100g in 2007 (Figure 4.4).

Figure 4.4
Mean Birth Weight



Source: Center for Applied Demography & Survey Research
University of Delaware

Figure 4.5
Median Birth Weight



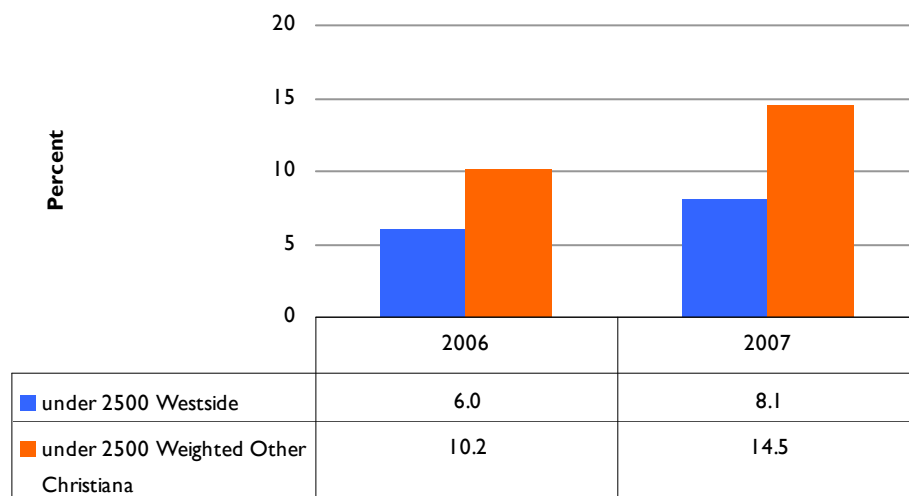
Source: Center for Applied Demography & Survey Research
University of Delaware

Looking at the median birth weight, a similar result is apparent (Figure 4.5). Again, no significant differences exist between the median for the two groups. However, it is interesting

to point out that between 2006 and 2007 the median birth weight for the control group decreased nominally while the Westside median weight did not change at all.

More important than the mean or the median birth weight is the occurrence of low births among the two groups. In general, the goal of improved prenatal care is not necessarily to increase the average birth weight to the population of mothers (we do not necessarily need bigger babies), but to decrease the occurrence of low birth weights. To discover how the two groups compare on this dimension, the data on birth weights was recoded into two categories; under 2,500g (low birth weight), and 2,500g and over (normal birth weight) and then the percentage of low birth weight was calculated. The results are shown in Figure 4.6.

Figure 4.6
Percentage of Low Weight Births (under 2,500g)*



**Source: Center for Applied Demography & Survey Research
University of Delaware**

* Please note that statistics reported for low weight births presented here differ somewhat from comparable statistics presented in Figure 3.5. The difference exists because weight data reported in Figure 3.5 is from the Westside database while the data reported in Figure 4.6 is based on the official vital statistics birth record of matched mothers.

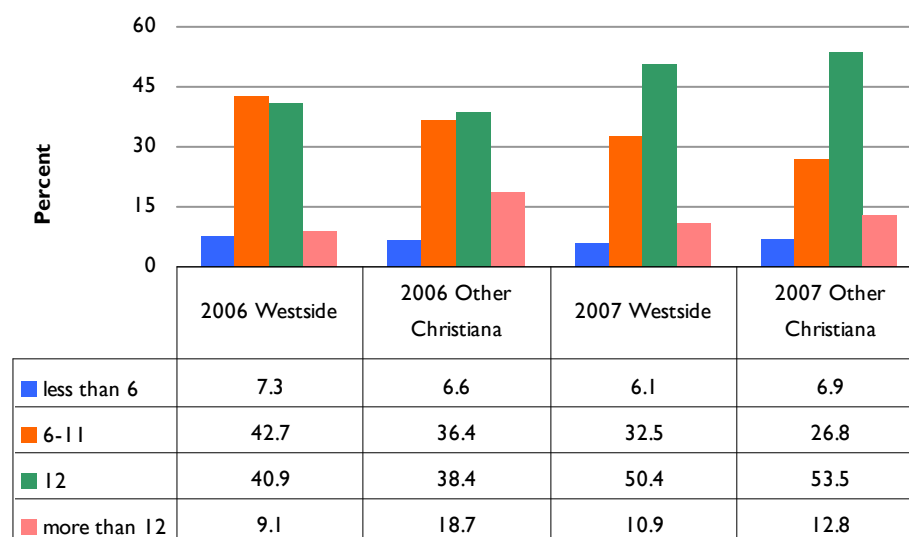
Here, differences exist between Westside births and births to the control group. In 2006, 6% of births to Westside's mothers were less than 2,500 grams compared to 10% for the control group. In 2007, 8% of Westside's births were low birth weight births compared to 14.5%. While no significant differences existed between the median and mean birth weights for the groups and the two years under scrutiny, a measurable difference exists in the proportion of low birth weights for the two groups. In both years, Westside Family Healthcare is better off than the control groups.

Number of Prenatal Visits

While the number of prenatal visits is not necessarily a birth outcome, its impact on birth weight is well documented. Also, one of the goals identified for the state grant was to increase the frequency of prenatal visits by mothers served at Westside Family Healthcare facilities. The vital statistics data (the birth record) contained a variable on the number of prenatal visits by the mothers. A frequency distribution comparing Westside mothers and the control group for years 2006 and 2007 is presented in Figure 4.7.

Figure 4.7

Number of Prenatal Visits by Year



Source: Center for Applied Demography & Survey Research
University of Delaware

While individual situations dictate the number of prenatal visits, the data indicate that the median number of prenatal visits for both groups and both years was 12. Comparing Westside to the control group in 2006, around 40% of mothers in each group indicated 12 prenatal visits. In 2007, the proportion increased to around 50% for both groups. Interestingly, both groups share the same proportion of around 6% for fewer than six prenatal visits. In 2006, mothers in the control group were twice as likely (9% vs. 19%) to indicate that they had more than 12 prenatal visits. However, this is not repeated in 2007. At that time fewer than 13% of mothers indicated having had more than 12 prenatal visits.

Infant Deaths

Minimizing infant deaths is just as important as minimizing the number of low births in a given population. Data on infant deaths were available for births that occurred to Delaware mothers in 2006 only. The vital statistics database on infant deaths for 2006 indicates a total of 84 of these incidents. Out of these, one can be attributed (through matching infant death data to the birth data and Westside data) to Westside Family Healthcare and two are attributable to the weighted control group. While the number of infant deaths is relatively small and confirmation of this observation for the additional year is lacking, the data indicate that Westside Family Healthcare mothers are less likely to lose their children to infant mortality than their counterparts from the control group.

Conclusion

The analysis involving the comparison of Westside births to a control group indicates that the birth outcomes for Westside mothers are at least as good as those for the control group. Particularly, no difference was observed in the mean birth weight and the median birth weight between Westside and the control group. Looking at the data on the incidence of low weight births, Westside mothers are actually better off. In both years under investigation, the probability of occurrence of low birth weights to Westside mothers was at least 30% lower than for the control group.

The comparison of the number of prenatal visits again indicates that Westside mothers are no worse off than those of the control group. The median number of prenatal visits for each group and each year under scrutiny is 12. Around 6% of all mothers in both the Westside group and the control group have had fewer than six prenatal visits. Basically, the frequency of prenatal care provided to Westside mothers equals the frequency of prenatal care provided to the control group.

Looking at the data for infant deaths for 2006 (only year for which infant death data is available) Westside Family Healthcare seems to be doing better than the control group. For 2006 births, 84 infant deaths were recorded. Out of these, one can be attributed to Westside Family Healthcare and two are attributable to the control group. While the number of infant deaths is relatively small and confirmation of this observation for the additional year is lacking, the data indicates that Westside Family Healthcare mothers are less likely to lose their children to infant mortality than their counterparts from the control group.

Overall, the tabulation of demographic characteristics of mothers served by Westside Family Healthcare indicates that Westside Family Healthcare serves populations that are much more diverse than the general Delaware population. The population served by Westside Family Healthcare has a significantly higher proportion of women of Hispanic origin, and women who were born outside of the United States. In addition to these characteristics, women receiving prenatal care at Westside Family Healthcare are more likely to fall into one of the younger age groups than their counterparts who were not provided prenatal care at Westside Family Healthcare. Despite these indicators, during the study period, mothers receiving prenatal care at Westside Family Healthcare are just as well off in terms of occurrence of low birth weight, number of prenatal visits and also infant mortality as other mothers who share their characteristics (race/Hispanic origin, age groups and a delivery at Christiana Hospital).

REFERENCES

Bardack, Michelle A. and Thompson, Susan H. Model Prenatal Program of Rush Medical College at St. Basil's Free Peoples Clinic, Chicago. Rush Medical College, 1993

Brown, Sarah S., Drawing Women into Prenatal Care, based on Institute of Medicine Report "Prenatal Care: Reaching Mothers, Reaching Infants", Institute of Medicine Report, 1989

Glazner, Judith E. and Beaty, Brenda L., The Effects of the Prenatal Plus Program on Infant Birth Weight and Medicaid Costs. Colorado Department of Public Health and Environment, 2002

Kehrer, Barbara H and Wolin, Charles M, Impact of Income Maintenance on Low Birth Weight: Evidence from the Gary Experiment. The Journal of Human Resources, 1997

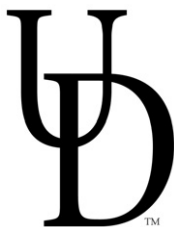
Stout, Anne (1997) Prenatal Care for Low-Income Women and the Health Belief Model: A New Beginning. Journal of Community Health Nursing, 1997

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