The Need for Prenatal Programs in Areas of Low Socioeconomic Status

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Introduction

Adverse birth outcomes are a continual issue throughout the United States despite current research and major medical advances over the past few decades. One of the target goals set forth by Healthy People 2010 is for 90% of pregnant women to begin receiving prenatal care in the first trimester. According to Healthy People 2010, prenatal care includes three major areas which are: assessment of risk, treatment for current medical condition and education. Approximately three-quarters of all pregnant women receive some type of prenatal care at some point during their pregnancy. This number varies greatly over different levels of socioeconomic status (SES). Research suggests that pregnant women in areas of low SES are more likely to receive prenatal care late in pregnancy or not at all (Sunil T et al., 2008). Receiving little or no prenatal care throughout pregnancy can result in poor birth outcomes, pregnancy associated complications and infant mortality. According to the CDC, it is projected that approximately one-half of all pregnancy associated dealths could have been prevented with early prenatal care. These adverse events include birth defects, stillbirths, pre-term birth, neonatal and post-neonatal deal, SGA (small-gestational age), among many others. Recent studies have shown that the introduction of a prenatal program can greatly reduce these adverse birth events in areas of low SES.

The History of Prenatal Care

The implementation of the first prenatal care program can be dated back to the 1800's when Elizabeth Lowell Putnam initiated one of the first prenatal programs that has been recorded at the Boston Lying-In Hospital. Pregnant women were encouraged to seek prenatal care as early as possible in pregnancy. This program consisted of pregnant women being visited by a nurse every 10 days and given prenatal instructions (Kiely & Kogan, 2008). Elizabeth Lowell

Putnam was known as a "pioneer" of prenatal care through her work with the executive committee of the Massachusetts Milk Consumer's Association, the Department of Public Health, the Committee on Prenatal and Obstetrical Care of the Women's Municipal League of Boston and the American Association for the Study and Prevention of Infant Mortality (www.oasis.lib.harvard.edu/oasis/deliver/~sch00070 accessed February 2009). It is possible that the infant death of one of her children is what led her on a lifetime crusade to educate the public on the importance of prenatal and infant health care. Likewise, a Scottish physician by the name of J. W. Ballantyne, noted in the earlier 1900's that while much care was given to women and infants during labor little care was given to prevent birth defects or infant mortality prior to labor. Ballantyne also noted that hazards such as alcohol, nicotine and lead and diseases such as syphilis and tuberculosis could cause fetal harm (Moos, 2006). Moreover, in New York City in 1907 under the care of a physician by the name of Josephine Baker prenatal care programs were initiated for pregnant women beginning in their seventh month. By 1920, the Maternity Center Association (MCA) initiated that prenatal care begin earlier in pregnancy than the seventh month. At this time nurses began seeing pregnant women in their homes every two weeks until the seventh month and then weekly until birth. These nursing visits included education and blood pressure and urine screening. By the end of the 1920's prenatal care had evolved to include pregnant women being seen by an obstetrician in their office on the following schedule: "1st obstetric visit by 16 weeks, with subsequent visits at 24 weeks, every 2 weeks starting at 28 weeks and weekly beginning at 36 weeks." (Moos, 2006) This obstetrics schedule is still in use today at many physicians offices in the United States. One aspect that has changed though is that early on obstetric visits include pre-eclampsia and routine urine examination but today also

include additional screenings and education that have evolved through research and advanced technology.

Adverse Birth Outcomes Associated with Lack of Prenatal Care in Areas of Low SES

Lack of prenatal care is more prevalent in areas of low SES and has been associated with adverse birth events such as neural tube defects, orafacial and heart defects, stillbirths, pre-term births, neonatal and post neonatal death, SGA (small gestational age), fetal alcohol syndrome and increased infant mortality and higher incidence of maternal transfer of infectious diseases such as HIV. Areas of low SES are often characterized by lower levels of maternal and paternal education, occupation and income. The pregnant women in these areas are more likely to be single, under the age of 20 and most have not completed high school (Luo, Wilkins & Kramer, 2006).

In a birth cohort-based study using statistics from a Canadian database that record live births, stillbirths and infant death from 1991 to 2000 maternal education and poor neighborhoods were associated with adverse birth outcomes. Pre-term birth is associated with an infant being born before 37 completed weeks of pregnancy. SGA or small for gestational age can be characterized by weighing in at less than in the 10^{th} percentile. Stillbirth and neonatal death occur within the first 27 days after birth and post neonatal death occurs between 28 and 364 days after birth. The results of this trial demonstrated that women with lower levels of education and those who lived in poor areas were more likely to have higher rates of stillbirth, pre-term labor, SGA, neonatal death and post neonatal death than women who lived in richer areas and had higher education levels (Lou, Wilkins & Kramer, 2006).

The National Birth Defects Prevention Study (NBDPS) began in 1997 and is a large, case-controlled, ongoing study being conducted in the United States to evaluate more than 30

birth defects using a variety of SES factors. Data was collected through various surveillance systems put in place in a variety of states across the US. The following table demonstrates maternal characteristics evaluated in this study and has been adapted from: Yang, Carmichael, Canfield, et al., 2008.

TABLE 1. Characteristics of infants with birth defects and nonmalformed control infants, National Birth Defects Prevention Study, 1997–2000[*],[†]

	Cases (%)	Controls (%)
Maternal race/ethnicity		
Non-Hispanic White	61.5	61.2
Non-Hispanic African American	7.6	11.9
Hispanic	24.6	21.8
Other	4.8	3.7
Maternal age (years)		
<25	36.9	33.8
25–34	48.8	52.7
≥35	14.3	13.5
Gravidity		
0	29.1	30.0
1	29.8	28.9
2	18.5	21.6
≥3	22.2	19.2
Prepregnancy obesity		
No	73.9	78.6
Yes	20.4	16.8
Periconceptional[‡] smoking		
No	77.3	79.5
Yes	21.7	19.7

Periconceptional binge drinking		
No drinking	60.5	60.3
Non-binge drinking	28.7	29.1
Binge drinking	8.3	9.1
Folic acid-containing multivitamin supplement use		
Use began during 3 months before pregnancy or the first month of pregnancy	47.1	50.8
Use began in the second or third month of pregnancy	34.0	34.0
No use or began after the third month of pregnancy	13.9	12.4

- There were 1,841 cases and 2,551 controls.
- †Percentages may not equal 100 because of missing data or rounding.
- ‡The "periconceptional period" refers to the month before conception and the first 3 months after conception.

Table 1 above demonstrates that the largest differences between mothers of birth defect cases versus controls shows that case control mothers were between the ages of 25 and 34, were least likely to be African American, more likely to not be obese and used folic acid supplements during pregnancy month one and before. Control infants were live born infants randomly selected by use of hospital birth certificates who did not have major birth defects. An association was indicated between the father's occupation and spina bifida. Father's who fell under the operator/laborer category were shown to have an increased risk to have a child with spina bifida. A higher risk of anencephaly was associated with a lower level of education as opposed to a higher level of education. Also shown was a decreased risk of anencephaly with a higher household income. An association was not shown between cleft lip and SES. The greatest evidence for an association between SES and birth defects was shown with specific neural tube defects when SES was measured by occupation, education and income but revealed inconsistent finding with orofacial and conotruncal heart defects (Yang, Carmichael & Canfield, et al., 2008).

In a study conducted across a 28-county region in Central Pennsylvania in 2002 socioeconomic status, health care and health status characteristics were examined in order to look for a relationship of pre-term birth and low birth weight compared to females living in urban areas and a range of rural areas (Hillemeier, Weisman & Chase, et al. 2007). Examining population data from the 2000 Census, investigators collected birth records for approximately 11,546 singleton first births. According to the U.S. Census Bureau, the poverty range in those counties evaluated at that time measured between 6.6% to 18.8% with a median household income from approximately $30,000 to $47,000. According to Hillemeier, Weisman and Chase et al., approximately 20% of births in the U.S. occur in a rurally populated area and the outcomes in these areas are less publicized. In this article it states that women living in more rural areas tend to have higher rates of poverty, lower education and limited health care access, therefore expecting an outcome of higher risks of preterm labor and low birth weights than in urban populated areas. The following characteristics were used during the data analysis of this study: age group, education, marital status, tobacco use, history of chronic diseases such as hypertension and diabetes, amount and type of prenatal care, use of prenatal care available, zip code in order to analyze how rural the population and access to health care, percentage of high school graduates in zip code, percentage of people below poverty level in different zip codes and birth outcomes. The following tables 2 and 3 which have been adapted from Hillemeier, Weisman and Chase et al. 2008, demonstrate the results of this study as broken down by characteristic and analyzed:

Table 2. Multiple Logistic Regression Results Using Generalized Estimating Equations to Model Low Birth weight Risk, Singleton First Births, 2002*†

	Maternal Variables Only	Maternal Plus Community Variables
	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Maternal variables		
Age category		
≤19 versus 25-29 y	1.07 (0.82, 1.40)	1.08 (0.82, 1.41)
20-24 versus 25-29 y	0.95 (0.78, 1.15)	0.95 (0.79, 1.16)
30-34 versus 25-29 y	1.25 (1.01, 1.55)	1.25 (1.00, 1.55)
≥35 versus 25-29 y	1.37 (1.01, 1.87)	1.36 (1.00, 1.85)
Race/ethnicity		
Non-Hispanic black versus non-Hispanic white	1.65 (1.26, 2.17)	1.51 (1.14, 2.02)
Hispanic versus non-Hispanic white	1.09 (0.80, 1.48)	1.01 (0.74, 1.37)
Other versus non-Hispanic white	1.43 (0.99, 2.05)	1.35 (0.93, 1.96)
Not married versus married	1.30 (1.09, 1.55)	1.30 (1.09, 1.56)
Not high school graduate versus HS graduate	1.08 (0.87, 1.33)	1.08 (0.87, 1.34)
Smoker versus nonsmoker	1.84 (1.54, 2.21)	1.83 (1.53, 2.20)
Chronic hypertension versus no chronic hypertension	1.76 (1.06, 2.94)	1.79 (1.07, 3.00)
Diabetes versus no diabetes	0.79 (0.54, 1.16)	0.78 (0.54, 1.15)
Prenatal care utilization		
Inadequate versus adequate	1.78 (1.37, 2.30)	1.72 (1.33, 2.24)
Intermediate versus adequate	0.83 (0.62, 1.11)	0.80 (0.60, 1.07)
Adequate plus versus adequate	3.57 (2.99, 4.27)	3.62 (3.03, 4.33)
Community variables		
Rural-urban classification		
Large rural city versus urban focused		0.73 (0.60, 0.89)
Small rural town versus urban focused		0.96 (0.70, 1.31)
Isolated small rural versus urban focused		0.75 (0.55, 1.03)
≤80% versus >80% HS graduates		1.09 (0.94, 1.27)
>8% versus >8% individuals below poverty		0.96 (0.82, 1.13)
Primary care health professional shortage area		1.55 (0.92, 2.61)

* OR, odds ratio; CI, confidence interval; HS, high school

† N = 11,546 births.

Table 3. Multiple Logistic Regression Results Using Generalized Estimating Equations to Model Preterm Birth Risk, Singleton First Births, 2002*†

	Maternal Variables Only	Maternal Plus Community Variables
	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Maternal variables		
Age category		
≤19 versus 25-29 y	1.11 (0.83, 1.49)	1.10 (0.82, 1.49)
20-24 versus 25-29 y	0.95 (0.77, 1.17)	0.95 (0.77, 1.18)
30-34 versus 25-29 y	1.24 (1.01, 1.51)	1.25 (1.02, 1.53)
≥35 versus 25-29 y	1.53 (1.12, 2.08)	1.54 (1.13, 2.10)
Race/ethnicity		
Non-Hispanic black versus non-Hispanic white	1.23 (0.95, 1.60)	1.20 (0.93, 1.55)
Hispanic versus non-Hispanic white	0.81 (0.50, 1.30)	0.72 (0.43, 1.19)
Other versus non-Hispanic white	0.91 (0.60, 1.36)	0.87 (0.57, 1.33)
Not married versus married	1.04 (0.87, 1.24)	1.06 (0.88, 1.27)
Not high school graduate versus HS graduate	1.16 (0.95, 1.42)	1.17 (0.95, 1.42)
Smoker versus nonsmoker	1.18 (0.98, 1.43)	1.18 (0.98, 1.43)
Chronic hypertension	1.73 (1.08, 2.79)	1.68 (1.03, 2.73)
Diabetes	1.24 (0.93, 1.65)	1.21 (0.91, 1.61)
Prenatal care utilization		
Inadequate versus adequate	2.24 (1.70, 2.95)	2.25 (1.70, 2.98)
Intermediate versus adequate	0.96 (0.73, 1.24)	0.94 (0.72, 1.23)
Adequate plus versus adequate	5.91 (4.96, 7.04)	6.01 (5.05, 7.16)
Community variables		
Rural-urban classification		
Large rural city versus urban focused		0.82 (0.67, 1.02)
Small rural town versus urban focused		0.81 (0.54, 1.21)
Isolated small rural versus urban focused		1.03 (0.78, 1.35)
<80% versus ≥80% HS graduates		1.07 (0.90, 1.28)
>8% versus >8% individuals below poverty		0.96 (0.79, 1.16)
Primary care health professional shortage area		0.83 (0.46, 1.52)

* OR, odds ratio; CI, confidence interval; HS, high school.

† N = 11,546 births.

As demonstrated in the above tables the results of this study indicate that a rural or urban location of a birth mother can possibly interpret a low birth weight or pre-term birth outcome. This study is an important indicator that more attention is needed to add a prenatal emphasis in rural communities with low socioeconomic status. In addition, as in all studies there were a few limitations identified. For example, the bulk of the data collected relied on birth records. Much of this data is actually self reported and does not account for varying degrees of human interpretation. Moreover, the rural counties used for data collection in this study did not include the most densely populated rural counties in Central Pennsylvania due to the unavailability of data.

In addition to the adverse birth outcomes associated with areas of low socioeconomic status (SES) research also shows that women with low SES and lack of prenatal care go hand in hand. Women who fit this population characteristic are more likely to expose their unborn child to alcohol, cigarettes, elicit drugs and are more likely to be a victim of domestic violence. For decades smoking during pregnancy has been documented as a contributor of adverse birth events and it is one of the most preventable causes of adverse birth events (Brodsky, Viner-Brown, Handler, 2008). Over the past 19 years pre-natal smoking average has fallen from 18.4% to 10.2% in the United States and approximately one-half of the individuals who smoked before getting pregnant continue during or after delivery (Adams, Melvin, Raskind-Hood, 2008). Some of the smoking determinants that have been examined include level of education, private insurance versus Medicaid and access to prenatal care. The majority of pregnant women in areas of low SES are either on Medicaid or use free clinics for health access. The type of health care that women who have private insurance versus those who have no insurance or

Medicaid have access to is very different (Adams, Melvin, Raskind-Hood, et al. 2008). Many women who have no insurance or Medicaid often seek health care from emergency rooms or free clinics. These types of health care settings do not offer much in terms of pre-natal care. In a recent study examining the behaviors and life-styles of smoking pregnant women one of the conclusions reached was that women who smoked while pregnant were more likely to engage in hazardous behavior, find themselves in abusive relationships and more likely to engage in other unhealthy habits other than smoking (Adams, Melvin, Raskind-Hood, et al. 2008).

Prenatal Programs

The Centering Healthcare Institute is a non-profit organization that developed a prenatal program in the early 90s called CenteringPregnancy®. "The mission of the Centering Healthcare Institute is to change the paradigm of health services to a group care model in order to improve the overall health outcomes of mothers, babies, new families and all individuals across the life cycle" (www.centeringpregnancy.com accessed February 2009). The CenteringPregnancy Program is an alternative approach to traditional prenatal care. Patients are seen for their initial prenatal visit in their clinician's office or clinic. The remainder of their prenatal care occurs in a group setting consisting of approximately 12 other women give or take. The group setting is initiated between the 12^{th} and 16^{th} week of pregnancy and the groups continue to meet monthly in the beginning and bi-weekly toward the end of pregnancy. The group activities include chart recording which encompass checking weight, blood pressure and gestational age. In addition, the practitioner checks the babies heart beat, uterus size and the group engages in a discussion surrounding any concerns or questions regarding childbirth, pregnancy

and parenting. Self assessment sheets are then completed by each group member at the conclusion of every class. All handouts, worksheets and teaching aids are available in Spanish and English. The education topics touched on throughout the groups include exercise, nutrition, preparation for childbirth, infant care, breastfeeding, bottle feeding, postpartum concerns, sexuality, abuse, parenting and many others (www.centerpregnancy.com accessed February 2009). Recently a study including a prenatal and postpartum medical chart review was completed of 110 women who were enrolled in a CenteringPregnancy group in a public health clinic in the Midwest. Each CenteringPregnancy group ranged from 4 to 10 members and included women who began prior to their 18th week gestation and who agreed to be followed through the remainder of their pregnancy. The CenteringPregnancy group in this public health clinic was evaluated in three ways which included a medical record review, patient survey and the accessibility of the program. Data collected from the chart review included maternal age, infant weight at birth, weight gain during pregnancy, number of prenatal visits during pregnancy, gestational age at birth and breastfeeding after release from the hospital. The comparison group used in this study included 207 women who delivered at the same University hospital as the 110 CenteringPregnancy group members. The time period reviewed for this study was from December 2004 through October 2006. The study participants were entirely African American and ranged in age from 14 to 38 years. The average age of the women in the comparison group was significantly higher than the study group. The women enrolled in the CenteringPregnancy group reported only positive outcomes to their experiences which included their appreciation for the group setting and for being able to bond with other women who had the same concerns and

fears about pregnancy and childbirth. Also, women in the CenteringPregnancy group reported feeling well equipped for pregnancy and childbirth and they were very grateful of the relationship they built with their provider and the level of comfort established. The participants also appreciated not having to spend time in a waiting room as they would for a normal appointment with a practitioner which sometimes could be lengthy. Each member was pleased that the scheduled group sessions always started and ended on time unlike scheduled doctor's appointments. Table 4 below adapted from Klima, Norr, Vonderheid, et al. 2009, displays many of the outcomes found after comparison between the CenteringPregnancy group and the comparison group.

Table 4. Perinatal Outcomes for CenteringPregnancy and Individual Care Participants

	CenteringPregnancy (n = 61)	**Individual Care (n = 207)**	***p*[a]**
No. of prenatal visits, mean (SD)	9.7 (2.7)	8.3 (3.4)	<.05
Weight gain during pregnancy (lbs), mean (SD)	32.2 (13.6)	28.5 (15.6)	<.05
Exclusive breastfeeding at discharge[a] (%)	44.3%	31.2%	<.05
Any breastfeeding at discharge[a] (%)	59.0%	43.6%	<.05

[a] Independent *t* test for continuous variables, χ^2 for percentages

Eight premature births were recorded in the CenteringPregnancy group and 23 premature births were recorded in the comparison group. Also, the CenteringPregnancy group had babies born at a much later gestational age than the comparison group and were approximately 200 g heavier. In conclusion, the CenteringPregnancy group showed improved birth outcomes when compared to the comparison group. The

CenteringPregnancy group shows great potential especially when implemented in rural populations and areas of low SES (Klima, Norr, Vonderheid, et al. 2009).

The Colorado Department of Public Health and Environment has launched a program called the Healthy Baby Campaign. The goal of this program is to provide education materials to pregnant women and health care providers regarding prenatal care. According to research conducted by the Colorado Department of Health and Environment the state has the highest number of low birth weights on average over any other US state. In this case low birth weight is defined as less than 5 pounds, 8 ounces or born before 37 weeks gestation. The various factors weighed in determining low birth rate were poor maternal weight gain, premature membrane rupture, pre-eclampsia, smoking during pregnancy, previous pre-term birth and hydramnios/oligohydramnios (www.cdphe.state.co.us/pp/womens/PWGDocuments.html accessed February 2009). The educational material available through the Healthy Baby Campaign includes nutritional information such as how much weight should be gained based on a patients current body mass index (BMI), tools for tracking weight gain during pregnancy, community resources and programs available such as WIC (Women, Infants and Children Program) which is available in 125 clinics throughout Colorado, a Family Healthline which is a statewide phone program that provides referral services to pregnant women and the 2-1-1 network which provides information about health care access. Additionally, the Healthy Baby Campaign offers information about smoking during pregnancy and the risks and adverse birth outcomes associated with smoking and also a link is provided so that a dietician can be emailed if nutritional advice is needed. Much improvement has been seen in decreasing the number of low birth weight infants since

the implementation of the Healthy Baby Campaign (www.healthy-baby.org accessed February 2009).

The Prenatal Care Assistance Program (PCAP) is a prenatal program available through the state of New York to women and teens who are state residents that are pregnant and who meet particular income requirements. Patients who qualify for this program can still participate even if they already have health insurance coverage. In addition to the PCAP program the MOMS (Medicaid Obstetrical and Maternal Services) program is also available in areas of New York state where PCAP health care centers are not located. The PCAP and the MOMS program offer patients and their babies routine medical care such as lab work, access to obstetrical specialists, hospital care during pregnancy and delivery, pregnancy and delivery education, HIV counseling and testing, information about the WIC program and family planning services. The PCAP and MOMS programs also offer this health care coverage up to two months post delivery and offer a 24 hour hotline that can refer patients to a provider in their area (www.health.state.ny.us/nysdoh/pcap/index.htm accessed February 2009).

The Public Health Agency of Canada began a program in 1994 entitled the Canada Prenatal Nutrition Program (CPNP) which provides long term funding for prenatal care programs in various neighborhood organizations for women of low SES and rural populations. The main goal of the CPNP is to reduce the number of low birth weight infants, to improve the overall health of mother and child and to promote breastfeeding among this population. The services provided by the CPNP include education, food supplements, nutritional advice, support groups and specialist referrals. The population targeted in this program are pregnant women and teens with poor to no

access to health care and those living below the poverty line. In 2002, over 44,650 pregnant women and teens participated in the CPNP. At this time 27 million dollars was allocated directly to the programs and managed through a joint effort through the Federal government and the Provincial/Territorial governments. It was found through a data search from 1996 to 2002 that breastfeeding was initiated among 79% of the participants in the CPNP. Throughout the years much of the programs funding has come from donations and many of the man hours working on the programs were done so voluntarily (www.phac-aspc.gc.ca/dca-dea/programs-mes/cpnp_goals-eng.php accessed February 2009).

The state of Maryland Department of Health and Mental Hygiene has adopted a new initiative called Babies Born Healthy which looks at all of the characteristics that lead to adverse birth outcomes and infant mortality and ways to reduce these rates through their broad public health imitative. The Babies Born Healthy initiative has a strong focus on prevention and improvement of negative pregnancy outcomes. Since the year 2000 the number of women receiving care in the first trimester has dropped significantly. In addition, the number of preterm births has increased by 6 % in that same time frame. The Babies Born Healthy initiative supports the Maternal Child Health-WIC project which provides family planning programs, distribution of folic acid and other WIC services. Also, the Babies Born Healthy initiative supports the Maryland Patient Safety Center Perinatal Collaborative. The goal of this program is to improve and maintain the health care and safety in Maryland hospitals. Teams from each hospital are mandated to participate in extra training events including simulated emergencies (www.fha.state.md.us/mch/bbh.cfm accessed February 2009).

The Centers for Diseases Control and Prevention (CDC) has a surveillance program underway known as PRAMS (the Pregnancy Risk Assessment Monitoring System) which collects data throughout all states. The data collected analyzes maternal experiences prior to, throughout and following pregnancy as well as maternal attitudes and lifestyles regarding their pregnancy. The PRAMS program was originally brought about in 1987 when the decline of infant mortality rates was at a plateau but at the same time the rates of babies born at low birth weights had not changed in decades. The data collected by PRAMS is important because it allows communities to assess where weaknesses lie and to establish programs based on need. State officials and the CDC are able to monitor trends in maternal and infant health such as prenatal care, smoking during pregnancy, unintentional pregnancy, breast-feeding rates and overall infant health as well as adverse birth outcomes. The PRAMS database is an important tool in the field of infant, child and maternal health. The data collection methods of PRAMS is standardized across all states which allows for comparison within and among various states. The PRAMS data collection occurs two ways through a telephone interview and through a mailed survey. The steps involved in the mailed survey usually occurs 2 to 4 months after delivery of the infant. Additionally, the surveys are broken down into 2 sections. The first section is a standardized section that all states receive and the section consists of state specific questions which are adapted to the needs of that particular state. General topics addressed in the PRAMS questionnaire include history of obstetric care, use of drugs or alcohol by the mother, history of physical abuse, contraception, economic status, infant health status and development, history of prenatal care, mental health, injury history and support networks. PRAMS data is available to outside researchers through a

standard proposal form which must be sent to the PRAMS coordinator explaining the use of the data. An example of use of PRAMS data includes PRAMS and breastfeeding. Data was collected from the year 2000 to 2004 looking at 25 states that had a response rate of at least 70% for 3 uninterrupted years. Some of the breastfeeding specific questions asked of the survey takers included the following: Did you ever breastfeed or give your new born baby breast milk directly after delivery by way of a pump? Are you currently breastfeeding or giving your child pumped breast milk? How long did you continue breastfeeding or pumping for? After data collection it was found that there was an increase in breastfeeding initiation over the time period of data collection. On average the initiation of breastfeeding was approximately 75.2%, Louisiana having the lowest rate of 55.5% and Hawaii and Utah having the highest rate of 91.1%. After 4 weeks the average number of people still breastfeeding had dropped to 62.6% with Louisiana falling to 41.7% and Utah to 81.3%. This PRAMS breastfeeding data was useful to analyze which states had the lower prevalence of breastfeeding initiation and continuation and to choose where programs were needed the most to improve overall breastfeeding rates (www.cdc.gov/prams/ accessed February 2009).

Through a thorough literature search it is evident how important the need for prenatal programs are in areas of low socioeconomic status in decreasing the rates of adverse birth events. The PRAMS database set forth by the CDC can be a useful tool in locating areas of low SES with high adverse birth outcomes that are in need of prenatal programs in order to reach the Health People 2010 goal of having 90% of pregnant women receive prenatal care in the first trimester. As research has shown early prenatal care can decrease the number of adverse birth outcomes including infant mortality. As

discussed earlier the CenteringPregnancy model for prenatal care has shown remarkable progress when put in motion in areas of low SES. This group prenatal setting offered through the CenteringPregnancy model can be useful in areas of low SES due to convenience of scheduling and the cost effectiveness of group classes as opposed to individual appointments. The establishment of prenatal care programs in areas of low SES can greatly reduce the number of adverse birth outcomes which then decreases cost of hospitalization and other types of medical care that may be needed. Early admission into a prenatal program in pregnancy and a satisfactory number of prenatal visits has shown to be connected with positive birth outcomes. Research has also shown that women with health insurance are more likely to receive prenatal care which indicates a needed for prenatal programs in areas of low SES where women do not have health insurance or access to health care. Adverse birth outcomes are a growing issue despite the knowledge associated with receiving prenatal care and adverse birth events. The establishment of prenatal programs in areas of low SES are a way to combat these growing number of birth effects associated with lack of prenatal care.

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