Psycho-Socio-Cultural Risk Factors for Breech Presentation

by

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Dedication

This dissertation is dedicated to all the moms who long for answers about their babys' presentation and to the babies who do their best to get here.
Acknowledgments

A big thank you to the following folks who made this dissertation possible:

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SOCIO-CULTURAL RISK FACTORS FOR BREECH PRESENTATION

Caroline Peterson

ABSTRACT

The Breech Baby Study is a mixed methods study which combines qualitative and quantitative inquiry. This study explores psycho-social-cultural risk factors for breech presentation from an evolutionary perspective. The quantitative component of the study uses Florida birth certificate and Medicaid data sets from 1992-2003 to evaluate the influence of ethnicity and socio-economic status on breech presentation. Ethnicity and socio-economic status account for less than two percent of the variance of risk factors for breech presentation.

The qualitative study includes 114 mothers of breech and cephalic presentation babies who completed the State Trait Personality Inventory and a socio-demographic survey. Of these, 52 mothers of cephalic presentation babies and 23 mothers of breech presentation also participated in an in-depth interview about formative life experiences and peri-conception through delivery.

The primary data analysis found mothers of breech presentation babies exhibit psycho-social-cultural characteristics unlike those found in mothers of cephalic presentation babies. These characteristics include being idealistic, analytical, polished, overextended, and fearful. Mothers of cephalic presentation babies were better equipped to adapt to unexpected situations and to be pragmatic in the face of unresolvable circumstances.

Mothers of breech presentation babies were further separated into two categories. One category is achievement focused woman while the other is non-present focused woman. While both sets of breech presentation mothers were
idealistic, the achievement focused mothers were more likely to be analytical, polished, and overextended. In contrast, the non-present focused mothers had a history of abuse and were more likely to have an unresolved pregnancy outcome or to be fearful. Breech presentation is interpreted by attachment theory, evolutionary ecological reproductive theory, and developmental plasticity theory as a fetal strategy to adapt to the intra-uterine relationship environment and an attempt to predict the extra-uterine relationship environment.
CHAPTER ONE
INTRODUCTION

Statement of the Problem

Breech presentation is an enigmatic adverse pregnancy outcome which, unlike most adverse pregnancy outcomes, disproportionately affects white non-Hispanic women and women of moderate to high socio-economic status. While breech presentation occurs in only 3-4% of all pregnancies, it is the most common birth malpresentation and deeply impacts the lives of women and families who experience it. Risk factors for breech presentation have only been minimally researched, but merit additional investigation since breech is associated with higher infant morbidity and mortality (Albrechtsen, et al. 1998b; Berendes, et al. 1965; Brenner, et al. 1974) than is cephalic presentation even after controlling for preterm birth (Croughan-Minihane, et al. 1990) and for congenital anomalies (Dunn 1976). Additionally, the American College of Obstetricians and Gynecologists has strongly recommended cesarean sections for all breech pregnancies based on the results of a recent randomized controlled trial of breech birth outcomes (Hannah, et al. 2000). Thus, women are not allowed to elect their birth experience.

The high rate of cesarean sections for breech presentation poses economic, health, and skill disadvantages for the health care system, mothers, and babies. A cesarean section delivery in the state of Florida is approximately 92% more expensive than is a vaginal delivery (risk-adjusted charge for cesarean delivery in 2004 $14,458 vs. $7,533 for vaginal delivery) (Statistics May 2006). Of equal concern is the probable cesarean of all subsequent births (Guilhard and Blondel 2001; Rageth, et al. 1999; Taffel, et al. 1987), the morbidity of the mother secondary to the cesarean (Hannah, et al. 2002), the
long-term effects of the cesarean on the baby (Lagercrantz and Slotkin 1986; Munstedt, et al. 2001), the earlier intervention with cesarean necessary to avoid labor thus disallowing time for the natural turning of the fetus (Luterkort, et al. 1984; Mukhopadhyay and Arulkumaran 2002; Roberts, et al. 1999; Van Dornsten, et al. 1981; Zhang and Schwingl 1993), and the practitioner’s loss of the skill and art of turning the breech baby and of vaginal delivery of the unexpected breech baby (Herbst and Thorngren-Jerneck 2001; Kayem, et al. 2002; Robinson 2000; Royal College of Obstetricians and Gynaecologists 1999).

Breech presentation largely has been considered to be a normal variant of childbirth in the literature (Bartlett and Okun 1994). It is accepted as an infrequent, but unavoidable, poor pregnancy outcome. This differs from the biomedical health system’s view of low gestational weight and preterm delivery as abnormal, avoidable pregnancy outcomes, although these are characteristics sometimes associated with breech presentation. There are no known, or commonly agreed upon, markers for breech presentation. In fact, markers are not mentioned at all in the breech literature. While most summaries of cesarean section rates include breech presentation, the normalization of cesarean for breech presentation has the potential effect of making breech presentation an invisible event as illustrated by the Healthy People 2010 goals for decreasing cesareans while excluding breech presentation cesareans (US Department of Health 2000). This allows tens of thousands more cesareans to occur each year without appearing in the rate of cesareans.

Birth certificate summaries reported yearly by the CDC indicate breech presentation is more frequent for whites than for other ethnicities and increases as the mother ages (Martin, et al. 2003). However, there is no control for potential confounders in these frequency reports. As yet, no robust multivariate research has focused on the larger socio-cultural environment in which the maternal-placental-fetal unit is embedded as a possible factor for breech presentation. However, known risk factors for breech presentation, such as small-for-gestational age and preterm birth, are differentially distributed across
ethnicities (Collins and Butler 1997; Guillory, et al. 2003; Lang, et al. 1996; Leslie, et al. 2003), and across socio-economic strata (Delgado-Rodriguez, et al. 1998; Finch 2003; Hedegaard, et al. 1996; Longo, et al. 1999). This study will make a small, but important, contribution to the applied anthropology and epidemiology literature by enhancing the profile of risk factors associated with breech presentation and interpreting those risk factors through an evolutionary lens.

**Purpose of the Research**

The goal of this study was to examine the ways in which the psycho-social-cultural environment interfaces with maternal behavioral characteristics and might affect birth presentation.

**Research Questions**

This study included hypothesis testing and question exploration. The first stage of the study assessed the first two questions and tested the four null hypotheses through secondary data analysis and quantitative primary data analysis. The second stage of the study was designed to build on the conclusions of the first stage.

The research questions for this study are:

1) Is ethnicity a risk factor for singleton breech presentation?
2) Is socio-economic status a risk factor for singleton breech presentation?
3) Do maternal psycho-social-cultural factors influence birth presentation?

The null hypotheses for this study are:

**Null Hypothesis 1:** There is no association between the risk for singleton breech presentation and maternal ethnicity.
Null Hypothesis 2: There is no association between the risk for singleton breech presentation and maternal education.
Null Hypothesis 3: There is no association between the risk for singleton breech presentation and Medicaid or WIC eligibility.
Null Hypothesis 4: There is no association between maternal occupation and the risk of singleton breech presentation.

To evaluate these questions and to test the hypotheses, 12 years of Florida birth certificate data and five years of Florida birth certificate data linked with Medicaid/WIC eligibility data were analyzed with logistic regression. Additionally, 114 mothers of breech or cephalic presentation babies completed surveys, a psychometric instrument, and participated in in-depth interviews to determine if personality or lived experiences varied between mothers of breech and cephalic presentation babies.

Significance of the Study
This study is designed to evaluate ethnicity and socio-economic status as risk factors for breech presentation. Additionally, it investigates psycho-social-cultural risk factors for breech presentation by qualitative methods. The findings from this study may be used to enhance our current understanding of ethnicity, socio-economic status and maternal psycho-social-cultural characteristics as risk factors for the breech presentation.

Complementariness of Anthropology and Epidemiology
Anthropology and epidemiology are considered by some to be disciplines in inevitable and irascible conflict secondary to their disparate paradigms, discourses, and research traditions (Streefland 1995). Others contend anthropology and epidemiology are complementary disciplines for the study of health. Though the fields differ in emphasis and history, the disciplines also share commonalities (Trostle and Sommerfeld 1996). Both fields investigate the causes...
of poor health by evaluating biological, social, and cultural variables (although epidemiology tends to focus primarily on biological variables), have their own theories (although epidemiological theory is latent and relatively poorly elaborated), and access qualitative and quantitative methodologies for research design and analysis.

Trostle and Sommerfeld (1996) point to the richness of combining anthropology and epidemiology and propose four goals for this fusion: 1) cross-cultural analysis of disease distribution and determinants 2) identification of surrounding influencing variables and development of relevant theory 3) inclusion of illustrative anthropological ethnographic studies within epidemiologic samples 4) communicate results with both anthropological and epidemiological descriptions (Trostle and Sommerfeld 1996:266). This study responds to all four goals.

**Role of Applied Anthropology in Study**

Applied anthropology seeks to find solutions to problems contextualized within the larger socio-cultural matrix by using anthropological theories, techniques, and data drawn from anthropology’s four sub-fields (Baba 1994:175; Gwynne 2003:2; Hedrick, et al. 1993). Because applied anthropologists are called upon to respond to a wide variety of issues, they must be armed with appropriate research skills to meet a range of demands. These research skills include ethnography, in-depth interviews, participant observation, quantitative research skills, secondary data and archival research, and data management skills (Gwynne 2003:44). Baba (1994:180) emphasizes the necessity of developing non-traditional anthropology skills such as quantitative methodology and analysis skills and computer statistical package skills if one is to be adequately prepared to work as an applied anthropologist.

This applied anthropology research project will draw on theories, techniques, and data from cultural, demographic, and biological anthropology. Cultural anthropology contributes ethnographic data on breech presentation from
various cultures and in-depth interviews with mothers of breech and cephalic presentation babies. Demographic anthropology contributes a reliance upon secondary data for analysis and the recognition of reciprocal relationships between variables (Basu and Aaby 1998:19). Biological anthropology contributes evolutionary reproductive ecology theory, developmental origins of health and disease theory, the concepts of natural selection, adaptation and accommodation, the framework for evaluating biological processes, and an emphasis on quantitative methodology. Biological anthropology also contributes the goal of this study: to understand the causes and consequences of biological variation within a socio-cultural milieu (Bogin 1993:34; Lasker 1993:1). The next step of investigation will be to identify appropriate interventions to prevent or reverse breech presentation based upon these findings.

While the inclusion of cultural and biological anthropology may be common-sensical to this study, the inclusion of demographic anthropology may be less clear. Demographic research has always been central to the field of anthropology (Kertzer and Fricke 1997). Anthropologists such as Malinowski, Radcliffe-Brown, and Gluckman emphasized the importance of census-taking to create the “framework on which all further social research would rest” (Fricke 1997:3). When anthropologists work with small isolated communities they conduct their own population census. However, as anthropologists have begun to work with larger populations in developed countries they take advantage of pre-existing records (Brettell 1986; Duben and Behar 1991; Halpern 1972). As such, secondary data is a legitimate data source for anthropologists. In fact, Basu and Aaby (1998) chastise anthropologists for inadequately exploiting secondary data. For the applied anthropologist secondary data is particularly germane since many of these researchers work in the developed world amongst underserved populations where census data do exist (e.g. (Moberg 2002; Sobo and Sadley 2002; Whittaker and Banwell 2002)).

The critical anthropological approach to research is integral in the analysis of secondary data. In fact, Schepers-Hughes (1997) views secondary data
analysis as sorely in need of the anthropological approach. She encourages anthropologists to embrace a paradigm shift that demands secondary data analysis be theory-driven and critically interpreted rather than “reduced to a set of reified and lifeless variables” (Scheper-Hughes 1997:219). She emphasizes this approach to secondary data is “praxis-oriented, critically applied, and politically engaged” (Scheper-Hughes 1997:219). It is effectually an “attempt to connect social behavior to wider systems” (Kertzer and Fricke 1997).

Secondary data analysis need not only be theory driven, but can also be used to build theories (Mielke and Swedlund 1993), to test theories (Zubrow 1976), and to study cultural and biological evolution (Mielke and Swedlund 1993). Secondary data is a flexible and important, if underused, medium to conduct anthropological research since “[a]t the most abstract level anthropologists are concerned with the discovery, classification, and explanation of mankind” (Zubrow 1976:4) and secondary data has the potential to allow this.

Secondary data such as the birth registry is best analyzed with statistical methods. Although statistical analysis is not unique to anthropology, it is well used by anthropologists to test their hypotheses. Feldesman (1997:74) reviewed six physical anthropology journals published in 1994. Of 351 papers, statistical techniques were used in 79%. While statistical analysis is used in nearly four-fifths of those biological anthropology articles, it is one of the most frequently cited areas of under-development for applied anthropologists (Baba 1994).

Another tool of the applied anthropologist is in-depth, open-ended interviews. This form of interviewing is valuable for exploring new areas without the constraints of predetermined response options or predetermined length of response. The goal of the in-depth interview is not to randomly survey or to interview a representative sample, although breadth of perspective is valued and sought (Schensul, et al. 1999:122; Yow 1994:1-25). Finally, the role of applied anthropology is to remind us that to appropriately prevent and treat a condition, we must understand the evolutionary origins and the social processes that produced said condition (Lappe 1992:9; Ruzek 1997:608)
Role of Epidemiology in Study

Epidemiology seeks to enhance population health by understanding disease causation and distribution then responding with biomedical and public health interventions (Savitz 2006). This study draws from epidemiology for the methodology to study the secondary data and report on the distribution of breech presentation and causation of breech presentation. Epidemiology contributes the case-control design for the entire study and the emphasis on identification of and control for confounders, biases, and effect modifiers. Epidemiology, along with physical anthropology, relies primarily on statistical analysis for results.

Relevance of Study to Applied Anthropology

The primary contribution this study makes to the discipline of anthropology is to study the state of Florida’s population variation for breech presentation by ethnicity and socioeconomic status while drawing evolutionary conclusions about the influence of fetal developmental and phenotypic plasticity. This study also makes three subsidiary contributions to the anthropological literature 1) It brings together the ethnographic and non-human primate literature on breech presentation 2) It hopes to identify means to improve the management of breech presentation 3) It creates the requisite baseline so further anthropological investigations can be conducted using qualitative data and endocrine evaluation to further refine risks and intervention for breech presentation.

Relevance of Study to Epidemiology

The contribution this study makes to the epidemiological literature is to conduct a large population-based case-control study whose strata are large enough to provide enough power for risks to be accurately determined in the uninvestigated role ethnicity and socioeconomic status play in breech etiology. This contribution responds both to the Closing the Gap mandate (Florida Senate 2003) and Healthy People 2010 mandate (US Department of Health 2000) which
enjoin termination of ethnic and socio-economic health inequalities for women and children.
CHAPTER TWO
LITERATURE REVIEW

Explanatory Models of Adverse Pregnancy Outcomes
Explanatory models (EM) are ways individuals and cultural groups attempt to make meaning out of experiences in life (Kleinman 1988). The concept of explanatory models was originally designed to be used in a clinical setting to help health care practitioners and patients communicate better so as to achieve shared outcome goals. Anthropologists have taken the practice out of the clinic and applied it to cultural groupings. For example, previous work has compared AIDS explanatory models of physicians and lay persons in the United States and in Mexico (Baer, et al. 2004), self-understanding of spina bifida among adolescents (Kinavey 2006), psychiatric help-seeking behavior in Uganda (Okello and Neema 2007), and causal models of heart attack and depression (Lynch and Medin 2006), among others. This section compares the explanatory models for breech presentation proffered by Biomedicine/epidemiology, Chinese medicine, Ayurvedic medicine, and the ethnographic record/direct entry midwifery. Two dominant models emerge and are summarized.

Biomedicine & Epidemiology

Western history of childbirth.

Breech birth has been associated with death, bad luck, and the unnatural since Antiquity in Western culture (Gelis 1991:202). The written history of Western childbirth began in Ancient Babylonia. It is rooted in humoral theory and the belief that the status of the uterus determines a woman’s well-being since the uterus is the seat of will, emotion, and movement (Perkins 1996:30). The principles of humoral theory, as applied to pregnancy, were elaborated primarily
by Hippocrates and Galen. They taught an imbalance in the humors was dangerous for the mother and fetus. This theory dominated Western (and non-Western) ideas of health and pregnancy well into the 19th century and persists in some systems of indigenous medicine.

The first formal Western midwifery training program was established by Hippocrates in the 5th century BCE. Around 2 CE Soranus outlined the fundamentals of Western obstetrics (Kay 1982:6-7). He advocated active intervention during labor and birth including manual dilation of the cervix and vagina, abdominal pressure to squeeze out the baby, finger puncture of the amniotic membranes, and pulling on the head of the baby between contractions (Shorter 1990:62-63). Ancient Greek doctors advocated internal cephalic or podalic version for malpresentations or difficult labor and delivery (Graham 1950:167; Shorter 1990:81). These practices were adopted by many Western midwives (Shorter 1990:59). Later, in the American colonies, and throughout the West, aggressive intervention was not reserved for labor and delivery alone. Treatment for the humoral imbalance of plethora began in the fourth month of pregnancy and included purgatives, blistering, leeching, and bleeding (Hay 2002:11-12).

Since the 16th century systems of birth classification often compared natural births with preternatural births. Births were graded along a continuum according to difficulty and type of presentation. Cephalic presentation was always noted as natural while any non-cephalic presentation was preternatural. However, breech presentation was not thought to be necessarily more difficult or dangerous than was cephalic presentation (Appendix A) (Murphy-Lawless 1998:68-74).

Although internal podalic version (Appendix B) (Gaskin 1990:409) was the standard of care for malpresentation fetuses in Antiquity, these practices were forgotten by academic medicine in the Middle Ages and did not reappear until 1550 when Ambroise Pare’ advocated podalic version as the best recourse for malpresentation. Internal podalic version remained the preferred manual
intervention of the medical establishment for obstructed labor until the mid 19\textsuperscript{th} century (Graham 1950:167; Shorter 1990:81). While podalic version may have been the preferred mode of manual intervention during labor for malpresentation, the invention of forceps brought a growing conviction, initiated by male-midwives, that breech births were higher risk pregnancies that could only be delivered with forceps (Murphy-Lawless 1998:55).

Adophe Pinard's (1844 -1934) introduction of maternal abdominal palpation into Western general obstetric practice around 1889 allowed the breech baby to be identified prior to labor. Following this discovery he codified the obstetric protocol for external cephalic version (Appendix C) (Gaskin 1990:332) and advocated its use in the 8\textsuperscript{th} month of gestation for any malpresentation. (Oakley 1986:27; Spencer 1901). While external cephalic version is associated with maternal and fetal risks it did provide an alternative form of intervention for the breech presenting baby to a forceps delivery.

To represent the understated nature of the fear associated with breech presentation for biomedicine in the early 20\textsuperscript{th} century, one need only look at the frontispiece of the first six editions of Williams Obstetrics [e.g.(Williams 1903)] (Appendix D). From 1903-1935, the frontispiece of the text was a photograph-like drawing of the cross-section of a term pregnant woman and her fetus entitled "Vertical Mesial Section Through Body of Woman Dying in Labour, with Unruptured Membranes Protruding from Vulva." The following (7\textsuperscript{th}) edition showed the woman transected and the baby whole in utero. Thereafter the photograph-like drawing was moved within the text due to its disturbing nature. What is not mentioned in the caption of the picture or in Hahn's (1987) review of Williams Obstetrics is that the baby is breech. By the turn of the 20\textsuperscript{th} century, obstetrics in the United States no longer conceptualized breech presentation as an alternative presentation or even as a problematic preternatural presentation, but rather as a mortal danger to mother and child.

Just as the management of malpresentation changed over time in Western culture, so have the roles of the birth attendant and the woman giving
birth. Prior to the 17th century childbirth was principally the domain of women (Shorter 1990). These women who functioned as midwives often were poor, had no formal education, and helped neighbors or relatives with births (Rooks 1997:14). When the forceps were invented in the 17th century doctors began to play a larger part in difficult births and in childbirth of the wealthy who were believed to have particularly difficult labors and deliveries (Hay 2002:18-19, 21; Schnorrenberg 1996). In some regions midwives were forbidden to use instruments such as forceps in delivery (Murphy-Lawless 1998:28). Where instrument births were legal for midwives they often could not afford the instruments. Additionally, doctors were frequently unwilling to show midwives how to use the instruments so midwives began to rely on a physician if there were a birth complication which required instrumentation (Chaney 1980; Litoff 1982). Hostile treatment of midwives by doctors was returned in kind as midwives often refused to share childbirth knowledge with physicians (Shorter 1990).

The professionalization of obstetrics from the 17th through the 19th century placed doctors in the position of giving advice to midwives. Although interventionist strategies had been core to the practice of obstetrics by doctors for centuries, Western obstetricians in the 19th century began to advocate much more conservative management of childbirth (Gelis 1991:136). One example of a physician advising midwives on childbirth is a treatise written in 1836. Hersey (1974:191-196), physician of the Botanic Order and former surgeon in the US Army, identified the most important characteristics for a midwife as patience, perseverance, and focus. Haste, inadvertency, and force would hurt the child, he admonished. Writing specifically of breech presentation he noted an extended labor was to be expected and was advantageous for dilatation of the os uteri, vagina, and os externa. Hersey argued patience was imperative for vaginal delivery of the breech baby. Although labor is slow, he concludes, it is almost the same as a cephalic presentation: “where the buttocks can pass the head will follow of course.”
The incorporation of conservative labor and delivery management was more pronounced in the United States than in Europe. This conservative approach to childbirth was not always appreciated by American women. Anesthesia for labor and delivery was first introduced in Europe and was not included in US labor and delivery until 1847. This innovation was not obstetrician motivated but resulted from the demands of women (Hay 2002:25-26). Another example of the power of women to promote change in obstetric procedures is the case of ‘twilight sleep’ (a drug cocktail which preserves all the sensation of labor and delivery with no memory thereof). Women in the United States eventually gained access to this procedure against doctors' initial refusal (Hay 2002:31).

As midwifery and obstetrics underwent professionalization from the 17th century onward, medical practices continued to develop and change. These developments are well illustrated in the decline of maternal mortality and the increase in cesarean section rates. From 1900 to 1982 maternal mortality rates declined in the United States while cesarean section rates increased (Table 1). Thereafter, maternal mortality rates stabilized and cesarean section rates continued to increase.
### Table 1 US Maternal Mortality Ratios and Cesarean Percentages 1990-2005

<table>
<thead>
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<tbody>
<tr>
<td>1900</td>
<td>1%</td>
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<tr>
<td>1915</td>
<td>607.9/100,000</td>
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</tr>
<tr>
<td>1950</td>
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<tr>
<td>1956</td>
<td>3.7%</td>
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<tr>
<td>1960</td>
<td>37.1/100,000</td>
<td>6.8%</td>
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<tr>
<td>1975</td>
<td>12.6/100,000</td>
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<tr>
<td>1976</td>
<td>12.8%</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>7.9/100,000</td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>6.6/100,100</td>
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<tr>
<td>1996</td>
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<td>26.1%</td>
</tr>
<tr>
<td>2003</td>
<td>12.1/100,000*</td>
<td>27.5%</td>
</tr>
<tr>
<td>2005</td>
<td>30.2%</td>
<td></td>
</tr>
</tbody>
</table>

*Increase due to enhanced surveillance

While cesarean sections may appear to cause the decrease in maternal mortality they actually contribute only minimally to that decrease. In fact, the CDC informs cesarean sections, forceps use, and episiotomies were in part responsible for the high rate of maternal mortality in the early 20th century. These procedures led to sepsis which accounted for 40% of all maternal mortality (Division of Reproductive Health 1999). Infection control produced the early trend of reduced maternal mortality in the United States. After 1930 maternal mortality continued to decrease due to infection prevention through asceptic conditions and safer blood transfusions, more aggressive means to combat infections with antibiotics, better control of hemorrhage with synthetic oxytocin, and better management of pregnancy induced hypertension (Division of Reproductive Health 1999).

The United Nations Population Fund, WHO, and UNICEF recommend cesarean rates between 5%-15% (AbauZahr and Wardlaw 2001). The US data substantiate this recommendation by illustrating no increased benefit for mothers by increasing the rate of cesarean sections over 15%. Additionally, overuse of cesarean sections actually endangers the lives of mothers and babies. One study found women are at least four times more likely to die during a cesarean birth.
than a vaginal birth (van Ham, et al. 1997). Another study found cesarean sections are associated with increased maternal severe morbidity and maternal mortality (p=0.002) and fetal death (p=0.002) after adjusting for demographic, risk, medical, and pregnancy characteristics (Villar 2006).

Maternal morbidity associated with cesarean sections includes responses to anesthesia, increased incidence of infection and use of antibiotics, increase blood loss and increased risk of hemorrhage resulting in anemia or transfusion, longer hospitalization, postoperative pain, adhesions from incision, injury to bowel or bladder secondary to surgery and increased risk of blood clots in legs and pelvis, higher rates of subsequent infertility than vaginal births, increased risk of placenta previa or retained placenta, increased likelihood of future c-section (Simkin, et al. 2001); a 13-fold increase in risk of emergent hysterectomy when compared to vaginal delivery (Kacmar, et al. 2003); persistent occiput posterior in future pregnancies (Ponkey, et al. 2003); at eight weeks post-partum c-section compared to unassisted vaginal births experienced more exhaustion, lack of sleep, bowel problems, and were more likely to be readmitted to the hospital (Thompson, et al. 2002).

Children born by cesarean sections also experience greater morbidity. Infant/later childhood morbidity includes increased immediate risk of breathing and temperature problems (Simkin, et al. 2001); a seven-fold increase in parental perception of allergy to egg and a four-fold increase in confirmed allergies in 2.5 year old children delivered by c-section compared to vaginal delivery (Eggesbo, et al. 2003); a five-fold increase in persistent pulmonary hypertension in c-section babies compared with vaginal births (Levine, et al. 2001). Cesareans are also associated with increased risk of atopic disease (asthma OR 1.33 95% CI 1.01, 1.75, hay fever OR 1.57 95% CI 1.24, 1.99, allergy OR 1.26 95% CI 1.03, 1.53) in childhood regardless of family history of disease (Salam 2006).

Cesarean sections initially were instituted to replace symphysiotomy, high forceps delivery, and craniotomy for obstructed labor and later became widespread (Hay 2002:36). Later, the use of cesarean sections continued to
increase with the “discovery of the fetus” (Shorter 1982:162). In the 1920s and 1930s technology was developed that allowed a peek into the womb. This, and a decrease in maternal mortality, spawned a shift away from the objective of sparing the mother pain and eliminating threats to her health in childbirth to attempts to save the baby from undue “horrors” of childbirth (Mitford 1992; Shorter 1982:172). Additional reasons for the increase in cesarean sections include doctors’ beliefs (Luthy, et al. 2003), doctors’ training (Burns, et al. 1995; Coco, et al. 2000), women’s preference (MacKenzie, et al. 2003) medicalization of birth (Davis-Floyd 1992), malpractice concerns (Carlson 2003; Dubay, et al. 1999; Tussing and Wojtowycz 1997), higher remuneration than for vaginal births (Gruber, et al. 1999; Stafford 1990), doctors’ desire for leisure (Brown 1996), and fewer VBACs (vaginal birth after cesarean section) performed (Carlson 2003). The increase in cesarean sections has contributed a great deal to the burnishment of the technocratic model of birth (Davis-Floyd 1996).

Predictably, the dominance of the technocratic model of birth provoked a response that enjoined the superiority of natural childbirth. The natural childbirth movement began in the mid 20th century with British obstetrician Grantly Dick-Read and French physician Ferdinand Lamaze independently. Feminists joined with them to urge women to reclaim childbirth in its full bloom as a demonstration of agency and liberation (Hay 2002:33-35; Mitford 1992:63). Interestingly, the concept of natural childbirth is still contested and can mean anything from a homebirth with no drugs or incisions to any birth that is not by cesarean (Hay 2002:35; Wertz and Wertz 1989). Whatever the definition of natural childbirth, the technocratic model of birth continues to be the dominant model of childbirth in the United States.

This technocratic model not only connotes dependency upon technology. Rather, it is based upon a belief system and philosophy of how the body functions and what is valuable. Qualities valued in the technocratic model include efficiency, rationality, practical organization, systematization, and control (Rothman 1982:34). These qualities are often assigned exclusively to the
practitioner rather than to the patient or to the woman giving birth (Sterk 2002:105). Within this model the use of technology is normal, expected, and essential to protect the health of mothers and babies (Vande Vusse 2002:137). Within the contemporary Western midwifery model there is also differential valuation of qualities. Experiential knowledge is privileged to observation, babies’ needs and mothers’ needs are co-equal, the individual – not protocol - determines the birth journey, mother and child are active participants in birth, and finally, birth in all its guises is normal (Sterk 2002:105).

The breech baby, in much of contemporary obstetric practice in English speaking countries, is resolutely delivered by cesarean section. Turning the breech baby is not often proposed and vaginal birth is not presented as an option on the grounds that it is more risky for the baby (although cesarean risks to the mother and baby will be glossed). The assumption that any increased risk associated with vaginal delivery of the breech baby is secondary to the inherent nature of breech birth rather than to the lack of expertise by the practitioner in vaginal breech births is not to be questioned (Murphy-Lawless 1998:14).

**Risk Factors for Breech Presentation (1940-2008).**

cases (Takashima, et al. 1995) to 18,914 cases (Roberts, et al. 1999) and from 5 controls (Sival, et al. 1993) to 540,164 controls (Roberts, et al. 1999). Cohort studies varied in size from 48 (Luterkort and Marsal 1985) to 1,592,064 (Albrechtsen, et al. 1998c) women. Only highly valid variables will be specifically reviewed in this section.

**Maternal socio-demographic characteristics.**

Maternal age, ethnicity and socio-economic status were evaluated as risk factors for breech presentation. Three population-based studies (Albrechtsen, et al. 1998a; Rayl, et al. 1996; Roberts, et al. 1999) found that as women age the risk for breech presentation increases (e.g. Rayl 1996 found aOR 1.28 [95% CI 1.22-1.33] for each five year increase in age after controlling for confounders); while three smaller studies (Bartlett, et al. 1997; Luterkort and Gennser 1987; Westgren 1985) found no association between maternal age and breech presentation (p>0.05).

Black ethnicity was found to be protective against breech presentation when compared to white ethnicity in one US study (OR=0.4; 95% CI=0.3, 0.5) (Rayl, et al. 1996) and in a South African study (OR=0.2; 95% CI not reported) (Hofmeyr, et al. 1986). Private insurance was a risk factor (OR=1.21; 95% CI=1.18-1.21) for breech presentation in an Australian study (Roberts, et al. 1999). A Dutch study found low income was not a risk factor for breech presentation (aOR=1.1; 95% CI=0.3, 3.1).

**Fetal characteristics.**

While maternal characteristics have limited ability to predict breech presentation, fetal characteristics associated with breech presentation are more consistent across studies for young gestational age, lighter birth weight, and congenital anomalies. However, the results for other fetal anthropometrics and sex are mixed.
Breech babies were born significantly earlier than were cephalic presentation babies in all reported studies except the subjective component of a Swedish study (Luterkort and Marsal 1985). Breech babies are also more likely than cephalic presentation babies to be preterm (aOR 1.76, 95% CI 1.70-1.83; OR 4.82, 95% CI 3.48-6.69; p<0.05; p<0.05; p<0.001 respectively) (Albrechtsen, et al. 1998c; Amoa, et al. 2001; Luterkort, et al. 1984; Luterkort, et al. 1986; Westgren 1985).

Breech babies weigh less than cephalic presentation babies in all studies reported (e.g. Rayl’s 1996 study found aOR 1.32, 95% CI 1.26-1.38 for each 500g decrease in weight) except the subjective component of a Swedish study (Luterkort and Marsal 1985). Breech babies are also more likely to be small for gestational age (e.g. Robert’s 1999 study aOR 1.33, 95% CI 1.21-1.28) and to have low birth weight (e.g. Robert’s 1999 study cOR 2.07, 95% CI 1.91-2.24) in all reported studies except one Swedish study (Luterkort, et al. 1986).

Finally, term females are more likely than term males to be breech in two studies (OR 1.3 [95% CI 1.2-1.4] and aOR 1.25 [95% CI 1.21-1.28] respectively) (Jonas and Roder 1993; Roberts, et al. 1999). (aOR adjusted for maternal age, parity, placenta previa). However, the other reported studies show no significant difference (p>0.05) in sex for breech and cephalic presentation babies (Bartlett, et al. 1997; Jonas and Roder 1993; Luterkort and Marsal 1985; Luterkort, et al. 1986).

These 22 studies represent the best research on risk factors for breech presentation because they contain measures of association rather than just descriptive statistics. Yet, the quality of these studies is relatively low according to Pocock’s criteria (Pocock, et al. 2004). These criteria are 1) population-based sample by randomization or census, 2) report inclusion/exclusion criteria, 3) report drop outs or missing data, 4) prospective power calculations, 5) pre-specify primary outcomes, 6) report inter-rater reliability when appropriate, 7) test strength of association, 8) test interaction terms, 9) report on confounders and control if needed, 10) report on effect modifiers, 11) report strengths of study, 12)
report weaknesses of study, and 13) place results of the study in the context of
the literature. Furthermore, comparison of studies is difficult due to non-
comparable exclusion/inclusion criteria, study design, study objectives, and
cultural variability.

Although six studies did use multivariate analysis none reported testing for
collinearity or testing for non-linear terms, only two reported testing goodness of
fit (Rayl, et al. 1996; Roberts, et al. 1999), and three did not test interaction
must be more rigorous in design and conduct than those previously reported in
the literature.

**Breech delivery.**

In the United States most breech births are delivered by cesarean section.
In the rare circumstance where biomedicine attempts delivery of the breech baby
vaginally, a trial of labor is acceptable under the following conditions: fetal weight
2,000 – 3,800 grams, frank breech, adequate pelvis, flexed fetal head, fetal
monitoring, Zatuchni-Andros score >=4 (Appendix E), rapid cesarean possible,
good progress in labor, experience and training available, and informed consent.
A cesarean may be indicated if: fetal weight <500 or >4,000 grams, footing
presentation, small pelvis, hyperextended fetal head, Zatuchni-Andros score <4,
absence of expertise, nonreassuring fetal heart rate pattern, and arrest of
progress (Gabbe, et al. 2002; Zatuchni and Andros 1965).

If the breech baby is delivered vaginally, proper management in
biomedicine may include induction or augmentation of labor, probable epidural,
food and fluid restriction thereby necessitating an IV drip in situ, artificial rupture
of membranes to enable placement of an electrode on the buttocks, first stage
immobility, second stage lithotomy position, contractions enhanced by oxytocic
drip, episiotomy when buttocks are on perineum, traction buttocks, legs brought
down, arms extracted, forceps to deliver head, and third stage managed by
oxytocic injection and cord traction (Anonymous 1998).
Outcomes of delivery method for breech presentation have been evaluated by retrospective and prospective cohort studies (Croughan-Minhane, et al. 1990; de Leeuw, et al. 1998; Gimovsky, et al. 1980; Giuliani, et al. 2002; Golfier, et al. 2001; Herbst and Thorngren-Jerneck 2001; Jonas and Lumley 1997; Kayem, et al. 2002; Munstedt, et al. 2001), case-control studies (Belfrage and Gjessing 2002; Krebs and Langhoff-Roos 1999; Sanchez-Ramos, et al. 2001), meta-analysis (Cheng and Hannah 1993; Gifford, et al. 1995), and by a randomized controlled clinical trial (Hannah, et al. 2000). Many of these studies are not recent. The cohort and case-control studies are difficult to compare since virtually all ask different research questions, use divergent inclusion and exclusion criteria, and measure outcomes in ways that impede or prohibit comparison. The two meta-analyses (Cheng and Hannah 1993; Gifford, et al. 1995) evaluating breech presentation outcomes used many of the same studies, asked slightly different questions, and had disparate findings. One found no difference in infant morbidity and mortality when comparing trial of labor and no trial of labor. Maternal morbidity and mortality were not evaluated (Gifford, et al. 1995). The other study found planned cesarean produced the lowest morbidity and mortality for the baby and the highest morbidity and mortality for the mother (Cheng and Hannah 1993).

The term breech trial (TBT) (Hannah, et al. 2000), an international, randomized, multi-center trial, attempted to determine if vaginal or cesarean section were the best mode of delivery for breech presentation. Previous studies suffered from small sample size, lack of randomization, and unclear inclusion protocols and outcome measures. The study’s stated findings are that planned cesarean section results in lower infant mortality and morbidity and there is no difference in maternal mortality or morbidity between vaginal and cesarean groups. However, when the data were analyzed comparing outcomes for countries with low perinatal mortality rates and high perinatal mortality rates this finding held only for countries with low mortality rates (i.e. the industrialized world). For the developing world (perinatal mortality rate >20/1000) there is no
statistical difference between morbidity and mortality outcomes for cesarean babies and vaginally delivered babies (RR=0.66, 95% CI 0.35-1.24, p=0.13).

The largest study to respond to the TBT is an observational prospective study analyzed by intent-to-treat (Goffinet 2006). This study of 8,105 pregnant women found the combined measure of fetal/neonatal mortality and morbidity was not significantly different between babies delivered vaginally and by cesarean section (OR 1.10, 95% CI 0.75-1.61) even after adjusting for confounders (OR 1.40, 95% CI 0.89-2.23). However, cesarean section is still the preferred mode of managing a breech delivery in the United States (Turner 2006).

**Chinese Medicine**

Traditional Chinese medicine teaches breech presentation occurs when there is an imbalance in maternal qi characterized by excessive yin. Qi is vital force or life energy and ideally is composed of a balance of yin and yang. A yin dominance may be caused by stress, over-busyness, excessive worry, over consumption of yin foods such as fruit and refined carbohydrates, cigarette smoking, drugs, and chemicals (Banks 1998:39; Maciocia 1998:572).

Chinese medicine intervention is application of moxibustion (a modality in which a heated herb is placed on or next to an acupuncture point) to the bladder meridian at BL-67. Within this paradigm, turning to cephalic presentation is a developmental stage. The bladder meridian matures in the 10th lunar month of pregnancy and provokes cephalic version. The bladder meridian is associated with the emotion of fear. If cephalic version is not forthcoming this is an indication that the bladder meridian is not mature, possibly due to an excess of fear. Moxibustion is applied to the meridian to help mature it and possibly reorganize the emotion of fear. This treatment removes the barrier preventing cephalic version and the baby turns on his/her own accord (Maciocia 1998:28, 562). Successful turning after application of moxibustion of BL-67 are reported to be between 60.6%-90.3% (Cardini, et al. 1991; Cardini and Hauang 1998; Cardini

Unlike biomedicine, Chinese medicine identifies an immature bladder meridian as the impetus for breech presentation. Chinese medicine teaches the delay in meridian development is due to stress, over-busyness, excessive worry, and over consumption of yin items. None of the risk factors identified by Chinese medicine have been identified by biomedicine.

**Ayurvedic Medicine**

Ayurvedic medicine originated in India and is another ancient system of medicine. Like Chinese medicine Ayurvedic medicine teaches breech presentation is due to an imbalance of vital life energy. Prana is the Indian version of qi. Apana vayu is one manifestation of prana. It influences reproduction and birth and is also responsible for elimination of negative sensory, emotional, and mental experiences (Center. 2004). Ayurvedic texts teach in the ninth lunar month the seated baby acquires consciousness and prays to God while s/he meditates on the karmic destiny of this rebirth. The apana vayu then blows and turns over the baby to cephalic presentation ready to be born. If there is insufficient apana vayu or if the baby fails to accept his or her karmic destiny, the baby may be breech (McGilvray 1994:46-47).

**Direct Entry Midwifery & Breech Delivery**

In the United States direct entry midwifery attended breech births is illegal except in unregulated states. Outside the United States non-biomedical midwifery attended births proceed under the assumption that birth is natural and that women and birth are to be supported, not managed (Banks 1998:35). Support of the breech birth includes the assumption of spontaneous onset of labor after about 37 weeks, Labor is not augmented. If labor progresses poorly, the mother is transported for a c-section. During the first stage the mother selects positions, fetal heart tones are monitored frequently with Pinard stethoscope or
hand held doppler, electrolyte beverages, food and drink are encouraged (but women often don’t eat), membranes are not ruptured artificially, and vaginal exams are avoided until after spontaneous rupture of membranes. In the second stage maternal propulsion and expulsion are expected and the mother is encouraged to be in whatever position feels right to her. There is no routine episiotomy. In the third stage there is no chemical or mechanical assistance (Anonymous 1998).

**Ethnographic Record**

**Emotions.**

In 17th century Europe pregnant women were urged to be even-tempered. Black bile was thought to be created by emotions such as melancholy, unpleasantness, and even too much laughter (Gelis 1991:83). In the 18th century maternal impressions were thought to have an impact on fetal development. Thus the women of Lorraine were encouraged to stay indoors so as to avoid any surprises (Shorter 1990:49). In 1727 Dr. James Blondel included agitations of the body, disappointment, uneasiness, pining, and deprivation of sleep and quiet as maternal experiences that could hurt the fetus (Oakley 1986:23). Well into the 19th century emotions and thoughts were recognized to influence fetal development (Hay 2002:11; Oakley 1986:11). The notion that thoughts can ‘tempt fate’ persisted in 1977 among immigrant South Asian (Indian) women and British women in a British Midlands industrial city. They affirmed that pregnant women should only think good thoughts and avoid any thought of deformity or handicap (Homans 1994:240).

The Mayans in Guatemala, the rural Vietnamese, the Karen people in Thailand, Filipinos, Navajos, and Jamaicans all hold that excessive emotions can damage the unborn fetus. For Guatemalan Mayans anger can cause premature births, miscarriage, stillbirths, retained placenta, insufficient or cold milk and a sickly baby (Cosminsky 1982:246; Cosminsky 1994:203). In some parts of the Philippines people believe anger can change the sex of an unborn child (Hart
Navajos believe all pregnant women, women of childbearing age, and men whose wives are pregnant must avoid any exposure to death or trauma because these experiences could trigger adverse pregnancy outcomes (Schwarz 1997:125). Traditional medicine in Vietnam teaches excessive anger, sorrow or even joy can prolong pregnancy (Coughlin 1965:235-236). The Vietnamese (Coughlin 1965:233), Jamaicans (Kitzinger 1994:181), and the Karen people in Thailand (Lefeber and Voorhoeve 1998:10) believe a pregnant woman should be moderate in everything, surrounded with positive people and experiences so she will feel serene and happy. In sum, many cultures state emotions can negatively impact the mother or the fetus.

Work.

Most cultures reviewed are agricultural and believe normal or hard work is good for the pregnant woman and will make her labor and delivery easy. The Bariba believe hard work makes the woman’s blood flow well so labor will be easy (Sargent 1982:196). The Karen people of Thailand believe hard work is good for pregnant women because the baby will be small and the delivery will be easy (Lefeber and Voorhoeve 1998:10). In the 18th century Finnish peasants believed hard work throughout pregnancy facilitated labor and delivery by separating the pubic bones. In Metz in the 19th century descent and easy delivery were thought to be ensured if women worked hard only during the latter phase of pregnancy (Shorter 1990:53). Recent Hmong immigrants living in San Diego believe a pregnant woman should carry on with her normal work activities, although her pace may slow as pregnancy advances (Scott 1990). Among the Yuki of northern California in the mid 20th century, pregnant women continued their regular work through the sixth or seventh month. At that point they would exclude heavy work like pounding acorns (Foster 1944:178). The Ibo of Onitsha Nigeria, however, warned that working in the hot sun could make the baby melt away (Henderson and Henderson 1982:182-183). The Ibo (Henderson and
Henderson 1982:182-183) and Jamaicans (Kitzinger 1994:181) advise moderation in all activity.

**Malpresentation.**

Several cultures believe fetal malpresentation may occur secondary to supernatural forces, immoral behavior, or symbolic contagion. The Hmong believe the spirits ultimately determine the position of the baby *in utero* (Scott 1990:91). In Haiti, a breech presentation is believed to be caused by bad magic. The child is told s/he “came like a demon” (Meltzer 1981:113).

The ethnographic literature on breech presentation identifies non-normative behavior as a psycho-social-cultural risk factor for breech presentation. The Navajo believe a social infraction (such as one implied by venereal disease) may create a breech baby (Schwarz 1997:128). The Hmong believe an immoral woman may be punished with a breech presentation baby (Scott 1990:91). Among the Mende and Sherbro of the Moyamba District of Sierra Leone, if the transverse baby does not turn, the woman is assumed to have committed a wrong purposely (MacCormack 1994a).

In some cultures breech presentation may be caused by symbolic contagion. The Navajo believe a baby will be breech if a pregnant woman inverts a rug on her loom (Schwarz 1997:123). The Lepcha in Bhutan on the eastern slopes of Mount Kanchenjunga in the Himalayas believe if food is taken out of the sewn end of a bag (i.e. the wrong way) a breech presentation will result (Morris 1938:206). In the Philippines malpresentation may be caused by heat in the stomach, placing wood on the fire the wrong way, being exposed to someone who was born breech, placing something on the cooking pot askance, or situating the sleeping mat crooked on the floor slats (Hart 1965:33, 45).

Four psycho-social-cultural interventions for breech presentation appear in the reviewed anthropological literature: relaxation (Davis-Floyd 1997), emotional support (Lepowsky 1993), spiritual intervention (Schwarz 1997), and the shamanic penetrating gaze (Reichel-Dolmatoff 1971). Sanctioned intervention for
breech presentation aids in understanding the explanatory model in that culture. In the cases described intervention focuses on healing the relationship of the mother with her baby or healing the relationship of the mother with the outside world.

**Dominant Explanatory Model Themes for Breech Presentation**

Two dominant themes emerge from the explanatory models for breech presentation: a biomechanical model and a psycho-social-cultural model.

**Mechanical explanatory model.**

Exactly why babies turn to cephalic presentation is unknown. Therefore, determining why they do *not* turn is even more difficult. Five main theories are proposed for why babies turn to cephalic presentation, each of which have limitations. Absent from the published list of possible reasons the baby turns to cephalic presentation is so the baby can fit through the birthing canal. This may be because the baby can and does fit through the birthing canal to be born.

1. Gravity: The head is heavier than the body so is forced down into the vertex position (Duncan 1868; Schatz 1900; Seitz 1908; Stabler 1947; Stevenson 1950; Vartan 1945; Veit 1860).

2. Accommodation to the Pelvis: The fetus is most comfortable in the vertex position in the average female pelvis so assumes that presentation. If there is pelvic constraint, or if the pelvis is android or platypoid, the fetus may not be able to turn vertex (Stabler 1947; Stevenson 1950).

3. Accommodation to the Uterus: At term the baby fits best in the uterus head down. If the uterus has growths or other anomalies the baby will position itself to make best use of the available space (Stabler 1947; Stevenson 1950).
4. Kinetic: The baby kicks to turn itself to cephalic presentation. If kicking occurs against the boney pelvis the baby turns cephalic. From there, kicking is ineffectual against the fundus and the baby will not turn breech again (Stabler 1947).

5. Neurologic and muscular development: The baby’s musculature develops tone in the caudad to cephalad direction. Therefore turning cephalic allows development of antigravity muscles and of the brainstem subcortical system and the spinal cord (Sekulic 2000).

**Psycho-social-cultural explanatory model.**

Unlike the mechanical model, the psycho-social-cultural model for the etiology of breech presentation postulates breech is not primarily a mechanical problem, but evidence for a life out of balance. This imbalance may be due to underdevelopment of a system, over stimulation of a system, or inappropriate navigation of responsibilities or relationships (Table 2). The psycho-social-cultural model is appreciated throughout much of the world.

<table>
<thead>
<tr>
<th>Risk</th>
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<td>Maternal Life Out of Balance</td>
<td>Chinese medicine, Ayurvedic medicine</td>
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<td>Mother-Fetal Relationship Out of Balance</td>
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Within the psycho-social-cultural model maternal-fetal conflict like that proposed by Trivers (2002), (based on Hamilton’s work (1964)) and elaborated by Haig (1993; 1996), exists. Trivers suggests parents and offspring may disagree over the amount of parental investment required for appropriate growth
and development. Maximization of reproductive success is the parental goal and self-maximization is the offspring goal (Trivers 2002:129).

**Physiological Aspects of Gestation and Development**

*Fetal neurobehavioral development.*

During the first two trimesters of pregnancy about half of all babies are cephalic presentation and half are breech. At gestational week 24 or 25 breech presentation babies begin consistently turning to cephalic presentation (Boos, et al. 1987; Miller and Kouam 1981). At this point in fetal neurodevelopment all tracts in the brainstem (Sidman and Rakic 1982; Weidenheim, et al. 1993; Yamaguchi, et al. 1994), the spinal cord (Sidman and Rakic 1982; Weidenheim, et al. 1993), the vestibular nerve, and the anterior and posterior horns of the spinal cord (Sideman and Rakic 1982) are myelinated except the corticospinal tracts (Sekulic 2000). The sensory and effector components of the vagus nerve are also fully developed at 24 weeks gestation although myelination is not complete until around 32 weeks (Cheng and Hannah 1993; Kinney, et al. 1994; Sachis, et al. 1982).

Most babies turn cephalic between weeks 31-33 (Vartan 1945). During this same period (gestational weeks 28-32) a general developmental transition occurs. Discontinuities for fetal heart rate (FHR) and FHR coupling with fetal movement (FM) occur (DiPietro, et al. 2004). At gestational weeks 28-31 the incidence of fetal stretching peaks and then decreases (Kozuma, et al. 1991) (Sekulic 2000:431-2). The inspiratory component of fetal breathing peaks during this time (Kozuma, et al. 1991), breathing rates plateau (Roodenburg, et al. 1991), maturity of responsiveness to vibroacoustic stimuli occurs (29-32 weeks) (Kisilevsky, et al. 1992), and there is an increase in habituation (Groome, et al. 1993). The mother also appears to experience a shift between weeks 30-32 of gestation where there is a leveling off of the threefold corticotrophic releasing hormone (CRH) concentration experienced between weeks 24-29 and the five fold CRH concentration experienced between weeks 33 and 37 (McLean and
While mothers of all ethnicities experience this plateau, black non-Hispanic women have a significantly lower level \( (p<0.05) \) of CRH during this period than do Hispanic or white non-Hispanic women (Glynn 2007).

By week 32 there is a deceleration of neurobehavioral maturation as antenatal neural development concludes (DiPietro, et al. 2004). By gestational week 35 around 90% of all fetuses are cephalic presentation; very few of those ever revert to breech presentation (Sekulic 2000:432; Zhang and Schwingl 1993). For most babies turning to cephalic orientation seems to be a natural developmental progression (Table 3).

| Table 3: Fetal Neurobehavioral Development and Intra-Uterine Orientation |
|-----------------------------|---------------------------------|-------------------------------|-----------------------------|
| Fetal Turning               | Prior to Week 24                | Week 24-25                    | Week 28-32                  | Week 35                     |
| About half of all babies in breech presentation | Babies begin to consistently turn to cephalic presentation | Most babies turn to cephalic presentation | 90% of all babies in cephalic presentation position |
| Fetal Neurobehavioral Development | -Brainstem tracts, spinal cord, vestibular nerve, and anterior & posterior horns of the spinal cord are myelinated (except the corticospinal tract)* | -Discontinuities between fetal heart rate and fetal movement | -Peak period of fetal stretching | -Peak period of fetal inspiration | -Plateau of breathing rates | -Vibroacoustic maturation | -Habituation increases | -Myelination of vagus nerve |
| Maternal Gestational Development | CRH briefly plateaus |  |

**Breech neurobehavioral development.**

Bartlett and Okun (1994) compared factors that influence breech presentation and concluded that maternal pelvic and uterine factors play a small role in determining fetal presentation. Instead they suggested “inherently different (italics in original) patterns of motor development” (Bartlett and Okun 1994:262). However, Bartlett’s rigorous study and other lesser studies that have compared the motor and neurologic development of breech babies with cephalic presentation babies have largely found no significant differences.
Bartlett et al. (1997) compared 13 primitive reflexes in breech and cephalic presentation babies at birth, six weeks, three months, and five months. There was no significant difference between presentation and neurologic development of primitive reflexes. Thus, assumption of cephalic presentation does not appear to be correlated with maturation of lower extremity placing or stepping reflexes. There was also no significant difference of fine and gross motor skills or age of walking between breech and cephalic presentation babies (Bartlett, et al. 2000). Motor performance for breech and cephalic babies was equal at birth, three months, and at five months (Bartlett, et al. 1997). Sival et al. (1993) also found there was no difference between breech and control infant’s age at which they rolled from back to belly and the reverse, sat, stood, and walked. Finally, a comparison of eye movement in breech and cephalic presentation fetuses between 26-41 weeks gestation indicate the medulla and pons mature similarly for both sets of babies (Rasmussen 1986; Takashima, et al. 1995).

A few developmental differences have been noted between breech and cephalic presentation babies. Bartlett et al. (1997) found breech babies at six weeks post-partum were significantly less likely to demonstrate control of neck and trunk extensors in supported standing, were more likely to have global flexion, and were less likely to take weight in the lower extremities on a consistent basis than were same-age cephalic presentation babies ($X^2 = 13.75; \text{df}=1; p<0.001$). Breech babies also had wider popliteal angles at birth ($X^2 = 282.2; \text{df}=2; p<0.001$). These differences in popliteal angle and motor performance between breech and cephalic presentation babies were normalized upon evaluation at three months or five months. Takashima and colleagues (1995) found that breech fetuses between 26-41 weeks gestation had significantly fewer horizontal eye movements and significantly more vertical and oblique eye movements than did cephalic presentation babies of the same gestational age ($p<0.05$). They did not suggest the implications of this finding.
Breech descent and vaginal delivery.

In the breech presentation baby the fetal sacrum is the point of reference for placement (Appendix F) (Gaskin 1990). The baby generally enters the pelvic inlet diagonally (sacrum posterior left or right) and is engaged when fetal bitrochanteric passage through the pelvic inlet has occurred. Internal rotation typically occurs upon reaching the levator ani musculature which then places the bitrochanteric diameter anteroposterior (and the sacrum transverse) in relationship to the maternal pelvis. The breech then presents at the pelvic outlet and emerges sacrum transverse, which then rotates to sacrum anterior. When the bitrochanteric diameter passes the pubic symphysis crowning occurs. The frank breech will typically be born to the umbilicus and then requires assistance for the legs to be born by the practitioner gently externally rotating each thigh. The baby is wrapped in a towel and supported. With the appearance of the scapula the practitioner may aid the arms to be born by sweeping them away from the chest. The chin and face will then present. The mother may spontaneously expulse the baby, or the practitioner may assist with the Mauriceau-Smellie-Veit maneuver (maximally flex the vertex by pressing the fetal maxilla superior-inferior and anterior-posterior) and the Crede’s maneuver (suprapubic pressure) (Gabbe, et al. 2002).

Ethnographic Record of Birth

In the 1970s Kay (1982) and others issued a call for more ethnographic work on childbirth. Anthropologists rushed to fill the void. In all the excitement two glaring omissions appear in the literature: the absence of detailed work on breech presentation, and the absence of ethnographic work on pregnancy itself. It is as if childbirth is the crowning glory of reproduction and must be recorded but the preceding months of development did nothing to contribute to that moment. Once again, we have fallen prey to our unconscious assumptions and have categorized reproduction as if pregnancy is one thing and birth is another largely unrelated.
Conceptualization of birth shapes the birthing system (Jordan 1978:34). The birth concept is formed by the overlapping cultural systems of religion, economics, social organization, social structure, and the physical environment (Kay 1982:2). By contextualizing childbirth within its cultural milieu, behavior is interpretable rather than just a list of interesting features.

“Normal” Birth

The expected norm of childbirth varies cross-culturally. Birth in the United States is seen as a medical event (Jordan 1978:35) where there is no shared knowledge or “cultural common sense” (Ratcliffe 2002:48). The Dutch, in contrast, see birth as a natural process while the Swedes see birth as a private experience and the Mayans see birth as a part of being human (Jordan 1978:35-46). Rural Vietnamese in the 1960s said birth was like the blossoming of a flower. It was expected to progress without complication or ado (Coughlin 1965:237, 240). In contrast, the Bariba believe while birth is not a disease, it is dangerous. The dangerous elements are delivery of the placenta and delivery of the ‘witch’ child (Sargent 1982:195).

The Mende and Sherbro in the Moyamba District of Sierra Leone believe normal labor may last up to two days (MacCormack 1994a). The Ibo considered labor for up to one day to be normal (Henderson and Henderson 1982:184). In Chan Kom, a Mayan village in the Yucatan, normal labor was expected to last 8-12 hours (Redfield 1934:357). Women who birthed in the 1930s and 1940s in Japan reported their deliveries lasted only a few hours from the start of labor and had no problem nursing (Bernstein and Kidd 1982:106-107). In the middle ages in Europe labor pains were thought to be caused by the baby trying to crawl out of the womb. Therefore, pain was normal and expected (Shorter 1990:55). In the remote Bolivian Andes women who labor quickly are thought to have “hot” interiors which produce a birth canal like a “vicuna pathway.” Often these women birth while herding in the hills (Murphy-Lawless 1998:3).
The Bariba, Bolivian Andean, and Ibo women traditionally birth alone if it is not the first pregnancy and if there are no complications (Sargent 1982:194) (Henderson and Henderson 1982:184; Murphy-Lawless 1998:3). The Bariba and Andean women receive help cutting the umbilical cord (Sargent 1982:194) (Murphy-Lawless 1998:3). Among the Mundurucu’ of Brazil, an older woman, preferably the mother, stands behind the woman in labor and provides physical support (Murphy and Murphy 1985:190). In the Yucatan the husband was expected to attend the birth and participate so he could appreciate the suffering of his wife. If he did not attend and something went wrong like a stillbirth, he would be blamed (Jordan 1978:23). In rural Vietnam in the 1960s, however, a man was never expected to attend the labor or delivery (Coughlin 1965:237, 240).

In the Yucatan, a midwife reserves explanation of the birthing process until the woman actually is in labor. During labor Dona Juana and the other female attendants virtually act out their own birthing experiences demonstrating vocalization and favorite birthing positions (Jordan 1978:19,23). In the Phillipines in the 1960s continuous massage was often used during labor to speed the process. The woman was encouraged to move about during labor standing and then squatting (Hart 1965:55).

Bariba women are taught to work until the contractions become so intense she cannot continue. At that point she isolates herself and when she feels like pushing she must kneel and sit on her heels (Sargent 1982:196). In the US, action is the modus operandi for hospital deliveries. Labor and delivery must progress at a certain pace or intervention will occur. In Sweden, women labor in private rooms in birthing centers and ring for the nurse if help is needed. In Holland, no medication is expected or given during birth. In both Sweden and Holland the woman is supported and encouraged through birth by her birthing team composed of specialists and non-specialists. The midwife merely stands by and observes unless intervention is necessary such as cutting the umbilical cord (Jordan 1978:44-46).
In Jamaica, ill-health is blockage and the cure is to remove the block. The midwife sees her job as ‘freeing’ the mother’s body for birth. Women are encouraged to walk during labor. The midwife may also massage the abdomen or perineum or use hot compresses. (Kitzinger 1994:182).

"Abnormal" Birth

While there are a variety of cultural beliefs about what are normal or expected labors and deliveries, only three types of difficult or abnormal labor and birth are recorded in the ethnographic record reviewed: dystocia, retained placenta, and malpresentation.

**Dystocia.**

Dystocia occurs when labor does not progress as a culture expects. Three causes of dystocia were identified in the reviewed literature: supernatural forces, punishment for immorality or misbehavior, and physical obstruction. In the cultures reviewed dystocia was treated by addressing social or supernatural relationships, by addressing the body of the mother directly, or by addressing the baby’s will to be born.

The Truk (a.k.a. Chuuk) in the Caroline Islands of Micronesia believe a family ghost may hold on to the baby and delay birth if lineage members have neglected family obligations (Gladwin 1953:135). The Umpqua Indians of Mexico believe abnormal births are caused by demons (Graham 1950:10). The Cuna Indians of Panama believe dystocia may occur if the mother’s soul has been captured (Murphy-Lawless 1998:9).

The Guatemalan Indigenous Mayans (Cosminsky 1994:205) and the Mende and Sherbro in Sierra Leone (MacCormack 1994a) believe labor is protracted if the woman has misbehaved or was unfaithful. In Mansi Siberia prolonged labor is believed to be due to infidelity by the mother or the father (Meltzer 1981:182). Rural Vietnamese also believe that dystocia is a punishment
for a woman who did not follow pregnancy food taboos, had sex during pregnancy, or is a bad wife, daughter, or mother (Coughlin 1965:246).

The Cuna Indians of Panama believe dystocia may occur if the mother loses too much blood (Murphy-Lawless 1998:9). If the Mende or Sherbro woman has not been unfaithful, the possibility of a physical obstruction will be investigated (MacCormack 1994a).

The Truk believe if a family ghost has been slighted, all the lineage members must come to the birth and bring presents to the laboring woman to show the solidarity of the family and to please the ghost. (Gladwin 1953:135). The Guatemalan Indigenous Mayans, the Siberian Mansi, and the Mende or Sherbro believe the woman must confess and be forgiven for her labor to progress (Cosminsky 1994:205; MacCormack 1994b; Meltzer 1981:182). The Cuna Indians of Panama believe if the mother’s soul has been captured the only solution is for the shaman to sing the song of Muu. Muu is the soul energy of the baby. If Muu extends beyond the boundaries of the baby, it takes the mother’s soul. The mother’s soul is recaptured and parturition can progress when Muu returns within the boundaries of the baby (Murphy-Lawless 1998:9).

Physical intervention is enlisted by many cultures to facilitate labor. The Umpqua Indians of Mexico will chase the woman with a horse or suspend her from a tree with a belt tightened around her abdomen to push out the baby if they cannot get the baby to be born any other way (Graham 1950:10). If the Mende or Sherbro woman has a physical obstruction the midwife will intervene. In cephalic presentation, the midwife will apply fundal pressure with her hands or a broom stick. She may stretch the vagina and perineum with her feet or induce vomiting (MacCormack 1994a). In the 1970s in Ireland warm compresses and massage were used to speed labor (Scheper-Hughes 1982). If labor for an Ibo woman continued for more than a day, the midwife or traditional doctor came. Birth was expedited with massage, manipulation, or a hook device inserted into the uterus. Palm oil and special herbs might also be prescribed (Henderson and Henderson 1982:184). If a Zuni woman had a difficult labor the midwife would manipulate her
abdomen, plug her nose and breathe into her mouth to force out the baby (Meltzer 1981:158).

Many cultures such as rural Vietnamese, Mayan, Philippines, Mende or Sherbro, colonial Americans, and the Irish attempt to speed labor by inducing vomiting. Frequently a raw egg is given to gag the woman (Cosminsky 1994:205; Coughlin 1965:237, 240; MacCormack 1994a; Redfield 1934:357; Scheper-Hughes 1982) (Hart 1965:55-56; Hay 2002:14; Jordan 1978:54; Ulrich 1996). Only one culture addressed excitation of parturitional hormones to expedite labor. In Jamaica the mother smells the sweat-soaked shirt of the father if she does not progress quickly enough (Kitzinger 1994:182).

Dystocia is treated by the Umpqua Indians of Mexico by enticing the baby with offers of food if it emerges, or threats of punishment if it fails to come forth (Graham 1950:10). The Malay believe the baby’s life force (semangat) can be called out of the womb with the call for the chickens (“kurrr”). But, like chickens, the baby may choose not to respond to the call. In this case, the baby is probably not ready to come out and one must wait until the fruit ripens (Laderman 1982:89).

**Retained Placenta**

Retained placenta occurs when the placenta is not expelled as rapidly as a culture expects. The Bariba believe the placenta, unlike birth, can kill. Therefore it must be removed within five minutes of delivering the child. Postpartum bleeding is thought of as normal and therapeutic (Sargent 1982:207). Among the rural Mayan Guatemalans the body was conceptualized as a tube. Because of this configuration the umbilical cord could not be cut until the placenta was delivered because if the cord were cut the placenta could fly up into the mother’s throat and suffocate her. If the placenta was delayed, the woman was provoked to vomit (Cosminsky 1994:205). In the remote Bolivian Andes people believe if the placenta is not removed immediately after the baby is born it
will rise up in her body and kill her. To avoid this a belt is placed around the mother’s waist after the umbilical cord is cut (Murphy-Lawless 1998:5).

Midwives of the middle ages in Europe practiced immediate manual extraction of the placenta following the birth of the child. In 1779 Regensburg issued a midwife ordinance mandating that the midwife “quietly await” the placenta (Shorter 1990:64). This conflicted with the official stance of medicine over the previous 1000 years which had insisted upon immediate removal of the placenta since the uterus might contract and disallow the placenta to exit (Shorter 1990:65). In late 16th century to early 17th century France, Bourgeois coaxed the placenta to be born by massaging the parturient’s abdomen lateral to medial while the parturient held salt in one hand and blew into her other fist like a bottle while she bore down. If she failed to progress she was given a raw egg or forced to smell wretched things (Perkins 1996:59).

In Philippine regions of Caticugan and Siaton midwives studied in the 1960s had never experienced a delayed placenta. In Tarong the Philippines, if the placenta was delayed careful pressure was exerted on the umbilical cord, the woman blew into her fist, the wooden handle of a spoon was pressed into the woman’s navel, or the husband’s shorts were sprinkled with vinegar, heated, and laid on her abdomen (Hart 1965:62). Among the Malay if the placenta delays in being born the midwife will massage the fundus of the uterus but will never tug on the cord. The placenta must be delivered seriously since the stomach may descend after the baby is born and trap the placenta (Laderman 1982:96).

**Malpresentation**

While most cultures believe the normal progression from intrauterine life to extra-uterine life includes the baby turning from an upright position to an upside-down position, this does not always happen. For thousands of years, fetal malpresentation has been described and documented. Breech presentation is the most frequent malpresentation and is looked upon with unease if not terror in many cultures in the world. Breech presentation does not only affect the mother
and child or the family into which the child is born, it affects the entire community. Among the Kapsiki in Northern Camaroon, people who are inherently different pose a threat. Thus breech birth threatens the whole community and catastrophe may strike in the form of drought or even the death of the child’s father. Although risk cannot be avoided, it can be attenuated by a ritual (van Beek:205). The Yaki believe breech presentation is very bad luck (Foster 1944:180), and in rural Vietnam the worst insult a pregnant woman can be given is to wish her a sideways or upside-down delivery (Coughlin 1965:246).

Malpresentation is treated either as a normal variant or as an abnormal presentation. If the culture believes malpresentation is abnormal, intervention for the cultures reviewed include physical intervention, emotional intervention, spiritual intervention, transfer to the hospital, or resignation and death. Breech presentation as a normal variant will be discussed last.

Many cultures attempt to turn malpresentation babies during labor. If a Hmong woman is determined to be morally chaste, a shaman will be called to move the baby (Scott 1990:91). When a woman who was to have a home birth in the United States found her baby was breech she attempted to turn the baby with crawling and with slant boarding (Davis-Floyd 1997:331). Among the Navajo, there were a few who, long ago, knew how to reposition a transverse or breech baby by shaking a woman’s body while her legs are elevated (Bailey 1950). In the Philippines, if labor is prolonged, the midwife first strokes the abdomen with her/his feet to turn the baby (Hart 1965:55-56). Among the Mende and Sherbro of the Moyamba District of Sierra Leone, if the baby is transverse, the abdomen is heated with a hot bath or with palm oil and the mother lays on her side by the fire to promote the baby to turn (MacCormack 1994a). If an Andean Bolivian woman has a malpresentation the midwife will reposition the baby with external cephalic version or the manteo treatment will be used (Murphy-Lawless 1998:3). In Bang Chan, Thailand the most experienced midwives attempt internal version for malpresentation (Hanks 1963:86). In Papua New Guinea if there is a
malpresentation a ritual specialist may be called to detect and remove the obstruction disallowing turning (Lepowsky 1993; MacCormack 1994b:2).

Some cultures believe there may be an emotional or spiritual component to breech presentation. In a home birth in the United States a baby turned during labor after the mother and midwife had a beer and both of them relaxed and allowed the baby to turn on its own (Davis-Floyd 1997:331). In Papua New Guinea, if there is a malpresentation the woman will be supported physically and emotionally and given herbal teas. The father may invite the baby to come out to join the community or may eventually demand that the child emerges. (Lepowsky 1993; MacCormack 1994b:2). If a Navajo woman has committed a social infraction which produced a breech presentation baby, a religious elder will intervene for her and through song and prayer ask for forgiveness so the baby will turn (Schwarz 1997:128).

With increased access to biomedicine some cultures triage breech presentation deliveries to a local hospital. If a baby presents breech during labor and the Truk (a.k.a. Chuuk) have access to a hospital they will attempt transport, however, many times they cannot arrive in time to save the mother or the child (Gladwin 1953:135). If the placenta emerges before the baby in rural Egypt this is considered to be a sign of malpresentation and the baby is taken to the hospital to be delivered (Morsy 1982:163). If the Jamaican midwife is not successful at turning the baby she may deliver the breech vaginally or send the woman to birth in the hospital (Kitzinger 1994:82).

Other cultures do not possess the skills to deliver the breech baby, or there is a strong cultural bias against breech babies. These births are expected to end in death. If a Hmong woman is determined to be immoral, she must birth her malpresentation baby vaginally and is expected to die in the process (Scott 1990:91). The Aranda in Australia become hysterical if the baby presents breech and if the head delays in being born will pull and claw at the child’s arms and legs and consequently kill it (and often times the mother, too) (DeVidas 1947:118-119).
The Truk (a.k.a. Chuuk) of the Caroline Islands in Micronesia have no techniques for dealing with breech presentation. As a result the breech baby and mother are presumed dead upon initiation of labor (Gladwin 1953:134). In Haiti attempts are made to turn the breech baby. If these attempts are not successful, the baby is not expected to live (Meltzer 1981:113). The Ibo of Onisha Nigeria believed the only solution for breech babies, if they survive birth, was to put them in an earthen pot and leave them in the bush to die (Basden 1966:262-263; Henderson and Henderson 1982:184). The Afikpo in SE Nigeria say a breech baby spoils the ground. The baby is preferably killed or the mother and baby are banned from the compound. If the mother and baby are allowed to stay, no one will touch her or her food and she can only socialize with other mothers of breech babies (Ottenberg 1968:59, 67).

In Bang Chan, Thailand inexperienced midwives allow the baby to come naturally but do not expect the mother or baby to survive (Hanks 1963:90). The Bariba on the Guinean savannah between Benin and western Nigeria believe a breech baby is a witch. The witch baby tries to kill its mother during birth. If the baby survives birth it must be killed because if it were allowed to survive it would grow up to destroy the community (Sargent 1982:199). The Luguru kill all breech babies. They are kgego and are known as ‘unlucky’ or ‘dangerous’ children (Christensen 1963:1321).

While some cultures lack skills to deliver the breech baby and look upon breech birth with nervousness and fear, other cultures look upon breech as an alternative presentation that is not much different from cephalic presentation. Among the Mende and Sherbro of the Moyamba District of Sierra Leone, if the baby is breech, the midwife will attempt to deliver the baby by the feet (MacCormack 1994a). If the Mundurucú have a breech presentation a helper woman will place her hand in the birth canal to assist the delivery (Murphy and Murphy 1985:190). The Indian Vedas (1400 BCE) note midwives only delivered vertex presentations. Doctors delivered all other presentations. Bilateral footling, unilateral footling, and breech were delivered podalically (Appendix G) (Newman
Transverse presentations were turned to cephalic presentation and delivered (Graham 1950:29). In Chan Kom, a Mayan village in the Yucatan, breech presentations are thought to be very rare. Two midwives agreed if two feet present the baby will be delivered that way. If one foot presents it is oiled and pushed back inside the mother then external cephalic version is performed. Only one of the midwives had ever delivered a frank breech presentation. She had attended over 100 births and had delivered one frank breech presentation without drama (Redfield 1934:357, 360). The midwife with whom Jordan (1978:21) worked would uneventfully deliver the breech baby vaginally if it failed to turn. In Bangkhuad, Thailand, a midwife attempts to correct a malposition so the head comes first. If the baby will not turn, the midwife allows the birth to continue unassisted. She does not intervene by pressing on the uterus to hasten the delivery as she does with cephalic presentation (Kaufman:142).
CHAPTER THREE
THEORETICAL ORIENTATION

Introduction

Medicine is a socio-cultural system. As such, it provides an interpretation of reality (Gaines and Hahn 1985). Medical systems, assignation of disease or conditions, and determination of appropriate intervention are all based upon implicit theories about the way the world works and our place in the world. Only through careful research can we come to understand these links of meaning and finally unveil the theory that determines how “facts” are created and interpreted (Navarro 1976).

Three disparate, yet related, theoretical frameworks were employed to guide and interpret the research. The theory of developmental plasticity, and its sub-theory of the developmental origins of health and disease, views the baby as actively engaged in experiencing and responding to the intra-uterine environment. The theory suggests that the intra-uterine experience has long-term consequences for the baby’s health. Attachment theory indicates healthy early childhood development is dependent, in part, on a loving, nurturing relationship between mother and infant. Furthermore, the mother-child relationship begins in utero and influences the formation of the extra-uterine relationship much as the intra-uterine physical environment influences the early physiological development of the infant. Finally, evolutionary ecological reproductive theory points to the influence of status on health and birth outcomes. These three theories allow us to explore the impact of physiology and behavior on pregnancy from a maternal perspective and from a fetal perspective.
This first section will introduce evolutionary ecological reproductive theory, fetal origins hypothesis and attachment theory. These theories attempt to explain physiological and relationship adaptation or accommodative processes in adults and fetuses. It is important to look both at maternal and fetal systems of adaptation due to the reflexivity of the maternal-placental-fetal unit. The following section will provide non-human mammal and human examples of adaptive and accommodative responses to the physical or relationship environment. Finally, the evidence will be summarized and made relevant to the dissertation.

**Evolutionary Ecological Reproductive Theory**

Evolution is a process of genetic change made in a gene pool over generations. Evolutionary success is measured by “fitness”, or, the ability to best reproduce (Banathy 2000). Evolutionary ecology is a sub-theory of evolution that emerged to explain the nexus between biology and culture. It asserts that evolution is more than just a strategy for survival and reproduction. Evolution is an expression of the relationship between organisms and their environment and reflects our capacity to cope with internal and external stressors while attempting to maintain physiological and psychological equilibrium (Moore, et al. 1979).

Reproductive ecology theory is an even more specific sub-category of evolutionary ecology and treats reproduction as an event with a plethora of potential outcomes dependent upon the many variables influencing the maternal-placental-fetal unit (Ellison 2001). If the result is enhanced survival with no significant functional loss the process is termed adaptation. However, if survival probability is enhanced but loss of function is experienced the process is termed accommodation (Frisancho 1993:4, 7).

Evolutionary ecology suggests there are two types of environments. One is the social environment the other is the physical environment. In the social environment there are no independent variables, only interdependent variables. The physical environment, however, includes independent variables (Winterhalder and Smith 1992:8). Reproductive ecology explores both the
relationship environment and the physical environment and their implications for development and adaptation. This study explores the possibility that the breech baby is squeezed between the wall of maternal psycho-socio-cultural patterns of behavior on one side and the wall of biological input on the other (Boyd and Richerson 1985; Csikszentmihalyi 1993; Gould 1996; Laughlin and Brady 1978; Steward 1972). Between these psycho-social-cultural constraints and biological limitations lies a zone of adaptation where the maternal-placental-fetal unit vies for life.

**Developmental Plasticity**

Dorner (1975) was one of the first to begin contemplating the developmental origins of health and disease in the mid 1970s. Later the theory was elaborated by Barker (1989) as the fetal origin hypothesis. This hypothesis suggests the intra-uterine environment prompts the fetus to establish a phenotypic template which attempts to predict the extra-uterine environment. If correct, the baby is well adapted for extra-uterine life. If incorrect, physiologic plasticity will ensue but the baby will never be able to maximize adaptation to the extra-uterine environment (Gluckman, et al. 2007).

Until the early 2000s the fetal origin of disease theory was held suspect by many epidemiologists and physicians. Now, with well over 100 studies involving more than half a million people, improved study designs, and replication of studies, most research indicates intra-uterine influences may impact fetal development and extra-uterine propensities for disease (Gillman 2005; Sallout 2003). This holds true for animal studies (Newell 2006; Vuguin 2007), endocrine disorders such as obesity (Lawlor 2007; Reilly, et al. 2005) and insulin resistance (Hales, et al. 1991; Harder 2007; Ijzerman 2005), the stress response (Jacobson 1999; O'Regan, et al. 2001), birth size (Kajantie, et al. 2005; Sayer and Cooper 2005), and for cardiovascular and other vascular functions (Barker 1995; Khan 2005; Shankaran 2006). A few recent studies demonstrate a lack of association between fetal health and these adult diseases (Ijzerman 2005). Additionally, less
evidence exists about the influence of intra-uterine experiences on adult affect disorders such as depression (Alati 2006), respiratory disease, immunity, and cancer (Sallout 2003). Although evidence may be somewhat uneven at this point for some diseases, for other diseases it is becoming increasingly clear that an intra-uterine template probably exists which may establish patterns of health relevant throughout adult life.

**Attachment Theory**

While fetal origins theory deals primarily with intra-uterine physiologic programming, attachment theory is about the intra- and extra-uterine relationship of mother and baby and how it predicts relationship function throughout life for the child. Psychoanalyst John Bowlby (1969:58-64), the originator of attachment theory, postulated the type of relationship an infant and mother form is an evolutionary response to enhance the possibility of survival and thus eventual reproduction for the baby.

In the mid-1950s Bowlby began studying the phenomenon of attachment (Bowlby 1969). As a student of ethology he drew examples from the non-human animal kingdom to help understand early life relationships and the formation of bonds between infant and mother (or proxie). Mary Ainsworth soon joined him in his pursuit and designed the Strange Situation to study the response of babies to the presence, absence, and return of their mothers (Ainsworth, et al. 1978).

Based on the Strange Situation four types of attachment were identified in the mother-infant dyad: secure, ambivalent, avoidant, and disorganized (Siegel 1999:74-76) (Table 4). The spectrum for this “dance of connection” (Siegel 1999:21) runs from securely attached to avoidantly attached with ambivalent attachment somewhere in the middle and disorganized attachment potentially influencing any of the other three. The type of attachment bond that is formed is determined by the mother’s behavior toward the infant rather than by the personality traits of the baby. Attachment style is ascertained by observing the infant’s behavioral response to the mother.
In the 1980s researchers of attachment theory began to explore the intra-uterine relationship experience of mother and fetus (Cannella 2005). The early studies compared the mother’s perception of her relationship with the child before and after birth using the Maternal-Fetal Attachment Scale. These studies show an inconsistent relationship between the two (Cranley 1981; Fuller 1989; Leifer 1980; Mercer, et al. 1988; Muller 1996; Reading, et al. 1984). However, more recent studies use different psychometric instruments (e.g. The Prenatal Attachment Inventory; the Maternal Attachment Inventory) to measure intra-uterine attachment and may also use post-natal behavioral observations to determine type of attachment between mother and child. These more recent studies consistently point to the similarity between the type of relationship which mother and fetus begin to develop with the type of relationship they continue to develop after birth (Bryan 2000; Damato 2004; Siddiqui and Hagglof 2000; Wilson, et al. 2000). Secure maternal-fetal relationships negatively predict future child abuse and promote well-adjusted children (Gau and Lee 2003).

<table>
<thead>
<tr>
<th>Parental Characteristics</th>
<th>Infant Behavioral Response</th>
<th>Frequency low-risk, non-clinical populations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure</td>
<td>Consistent, Responsive, Emotionally available</td>
<td>Easily engages in play, social interaction, and exploration. Returns to parent or cries when needs comfort.</td>
</tr>
<tr>
<td>Ambivalent</td>
<td>Inconsistently emotionally available, Inconsistently responsive to baby’s needs, Intrusion of parent’s mental states onto baby</td>
<td>Anxious, overly-clingy babies who cannot be easily soothed.</td>
</tr>
<tr>
<td>Avoidant</td>
<td>Unresponsive, Imperceptive, or Rejecting, Emotionally unavailable</td>
<td>Ignores the parent’s return in Strange Situation. Ignores parent.</td>
</tr>
<tr>
<td>Disorganized</td>
<td>Frightened or frightening</td>
<td>Baby actively avoids the parent or freezes upon parent’s return.</td>
</tr>
</tbody>
</table>
Maternal-Fetal attachment may be influenced to some degree by adverse previous pregnancy outcomes. One previous study found pregnancy loss did not directly influence the degree to which a mother attached to her unborn child. However, if that previous loss was unresolved the mother experienced higher anxiety in the index pregnancy and because of that anxiety expressed lower levels of maternal-fetal attachment (Armstrong 2004:769). Other studies report a direct negative impact of the grief from a previous pregnancy loss and index pregnancy attachment (Armstrong and Hutti 1998; Heller and Zeanah 1999; Peterson 1994). This may be because the index pregnancy becomes a crisis as the parent may feel insecure, vulnerable, unworthy, and unable to protect the growing fetus from harm coupled with a persistent desire to control the pregnancy and the outcome thereof (Franche and Mikhail 1999; Janoff-Bulman 1992; Statham and Green 1994).

Another study found that women who are older, more detached, and more ambivalent about the index pregnancy are less attached to the fetus (Hjelmstedt, et al. 2006). Finally, women who are less attached to the fetus have avoidant or ambivalent attachment while those who are more attached have secure attachment (Mikulincer and Florian 1999). Ambivalent attachment is characterized by a mother who is inconsistently available or intrudes her fears upon the fetus or baby. In extra-uterine life the baby responds with clinginess and anxiety. The intra-uterine impact of ambivalent attachment has not been investigated.

Longitudinal studies continue to explore the long-term impact of prenatal and infant attachment on later development and relationships. The style of attachment experienced prenatally or during infancy appears to influence motor development in infancy (Mehl 1992), central nervous system development and appropriate response to stressors in the child (Kramer 1992), childhood behavior (IJzendoorn 1999), adult parenting style (Bloom 1995; Main, et al. 1985; Siddiqui, et al. 2000) and the quality of relationship into which the adult will enter (Bowlby 1988). Hrdy (1999:388) sees secure attachment as an evolutionary adaptive trait
and argues its importance is illustrated by the baby’s persistent insistence upon maternal commitment.

**Integration of Theories**

Until recently the mother and fetus were viewed independently in biomedicine. However, now with evidence mounting from fetal origins theory and from attachment theory we understand mother and fetus must be viewed as a unit constantly giving feedback one to the other. As a result more research has begun to consider psycho-socio-cultural risk factors for fetal neurobehavioral development (DiPietro, et al. 2004; Johnson, et al. 1992; Pressman, et al. 1998). The maternal-fetal unit is embedded within a socio-cultural matrix that informs, and is informed by, the developmental process. Situating the maternal-fetal unit in this matrix treats pregnancy not solely as a biological event, but as an event that is produced socially, culturally, and economically (Ruzek, et al. 1997:13). In fact, fetal sensitivity to maternal emotions is so acute that fetal heart rate and motor activity has been shown to change in response to maternal emotional reactions to film (Van den Bergh, et al. 1989) and music (Zimmer, et al. 1982).

Because the fetus and mother are so tightly connected, reproductive ecology theory has been used to study the maternal-placental-fetal unit’s response to behavior and how this response impacts reproductive success. Stressors in the extra-uterine general social environment, and especially in the relationship with the mother, have been shown to impact human development, neurobiology, and behavior. For instance, children in stable family environments have significantly lower cortisol levels than do children in unstable environments (Flinn 1999; Lupien, et al. 2000). Additionally, mothers who are overprotective dampen the inherent curiosity of their babies who then become disinterested in the external environment (Higley and Suomi 1996:17). Likewise, maternal affect may impact fetal development.

Although the literature is somewhat mixed about the role emotions play in pregnancy (Harville 2006), outcomes they have been shown to have small, but

**Summary and Relevance to Breech Presentation**

Fetal characteristics have been shown to influence health and the propensity for disease throughout life. This process has been termed predictive adaptation. While the fetus garners clues from the intra-uterine physiologic environment in an attempt to predict the extra-uterine physical environment, studies suggest the fetus is making similar evaluations of the intra-uterine relationship environment with its mother in an attempt to predict the extra-uterine relationship environment. This intra-uterine environment is influenced by unresolved previous experiences like pregnancy disappointments and by inconsistent intra-uterine parenting. Unresolved previous experiences and inconsistent maternal behavior potentiates an ambivalently attached child.
CHAPTER FOUR
SECONDARY DATA

Introduction

This chapter is divided into two sections: methods and results. Each section is then separated into the type of data analyzed: birth certificate data (1992-2003) and birth certificate data linked with Medicaid data (1999-2003). In the methods section, study design, study population, data collection, and statistical methods are reported for each data set. The study design section defines the dependent, independent and covariate variables. It also explains why these variables are placed in the logistic regression model. The study population section reports on the population from which the sample was drawn for this research. The data collection section discusses how the birth certificate and Medicaid/WIC eligibility data were collected. Finally, the statistical methods section presents the method and theory used to identify confounders, potential effect modifiers, and to build the logistic regression model. The results section presents the descriptive and analytic statistics for both data sets.

Because the linked data set is primarily birth certificate data with two Medicaid/WIC variables added, much of the information on the study population and data collection is redundant. Additionally, the study design and the statistical methods used for both data sets are the same. When methodology is shared, it will be presented in the birth certificate section and the linked data section will refer the reader back to the birth certificate section in the interest of brevity. The purpose of the secondary data analysis is to 1) assess the impact of ethnicity on breech presentation, 2) assess the impact of education on breech presentation, and 3) assess the impact of WIC/Medicaid eligibility on breech presentation.
Secondary Data Hypotheses Tested

Null Hypothesis 1: There is no association between the risk for singleton breech presentation and maternal ethnicity.

Null Hypothesis 2: There is no association between the risk for singleton breech presentation and maternal education.

Null Hypothesis 3: There is no association between the risk for singleton breech presentation and Medicaid or WIC eligibility.

Secondary Data Methods

The methods section will discuss the study design, study population, data collection, sample inclusion criteria, and statistical methods for the birth certificate data (1992-2003) and for the Medicaid/WIC data (1999-2003). The study design section includes information on the identification, definition, and limitations of the dependent, independent, and covariate variables. The study population section specifies qualities of individuals captured in the birth certificate data. The data collection section reports on how data were collected and prepared for dissemination to researchers. The sample inclusion criteria section notes inclusion criteria for the study. Finally, the statistical methods section reports on the methods and theory used to identify confounders and potential effect modifiers, and the steps taken in logistic regression.


This is a population-based case-control study in which breech presentation pregnancies and cephalic presentation pregnancies are compared to determine risk factors for breech presentation. The dependent variable in the study is breech presentation (yes/no). Where yes indicates the baby was born breech and no indicates the baby was born cephalic presentation. Case-control was selected as the study design since breech presentation is a rare event and case-control studies provide greater statistical efficiency, less cost, and greater time effectiveness than do other studies when analyzing rare events (Szklo and
Nieto 2000). Birth certificate data were selected because nearly all births are included therein. Additionally, there is less risk of selection bias than from clinical studies because all births are included in the birth registry. Stratified analyses are also possible with birth certificate data due to the large sample size. Finally, birth certificate data may be the only large data source available for studying a rare condition such as breech presentation (Schoendorf 2007). While birth certificate validity is not always high, birth certificate coding of malpresentation is up to 91% accurate and when it is less accurate it is underreported (Frost, et al. 1984; Yasmeen 2006). This means if a difference is found between breech and cephalic presentation births, it is likely to be even greater than that identified.


In the birth certificate data, the effect of two independent variables on breech presentation is investigated: maternal ethnicity and maternal educational achievement. Maternal ethnicity and maternal education are selected as the independent variables because breech presentation occurs more frequently in white non-Hispanic women than in other ethnicities and in women who have at least a college education. It is unusual for these populations to be at risk of adverse pregnancy outcomes.

Race and ethnicity are treated as separate categories in the birth certificate data. However, in this study they are combined in a variable called ethnicity. The reason for this, and method of doing so, will be described below.

Race and ethnicity are self-identified by the mother on the birth certificate. Possible race categories on the birth certificate include white, black, Asian, and Pacific Islander. Possible ethnicity categories are Haitian and Hispanic. In this study, the birth certificate categories of race and ethnicity are collapsed into one category called ethnicity. Three categories of maternal ethnicity are considered in this study: white non-Hispanic, black non-Hispanic, and Hispanic. Black non-Hispanic mothers are the reference category. The remaining categories of Asian, Pacific Islander, and Haitian were excluded due to relatively few observations.
It is very well established that human populations are not clearly divided along genetic or phenotypic lines. This is likely due to the recent origin of our species. Therefore, race, as used in the birth certificate data, is a social construct mostly based on skin color. Given that 85% of all human genetic variation exists within human groups, race, as used in the birth certificate data, is only a cultural construct with no genetic markers. All other identifiers of race, besides skin color, are also without genetic or evolutionary merit (Sarich and Miele 2004).

While race is a cultural construct, it does have social and political implications. As such, group membership assigns certain opportunities or disadvantages that far outweigh any shared genetic traits (Molnar 2002) and ultimately serves to codify extant power structures (Armelagos and Goodman 1998:359). Ethnicity, in contrast, is a self-identified association with a group by phenotypic, cultural, linguistic, or behavioral characteristics (Molnar 2002).

Like ethnicity, socio-economic status (SES) is difficult to measure. Socio-economic status represents realized or potential differential access to material, human, or social capital (Oakes 2003:775, 776). It can be measured in many ways but education and income are the two most commonly used variables to estimate socio-economic status in the United States (Braveman 2001; Kreiger 1997:364). Educational level completed by the mother is the only SES proxy available in the birth certificate data.

Kreiger suggests SES is best approximated by education when education is measured by credentials rather than number of years (Kreiger 1997:365). Since educational credentials are not available in the birth certificate data, the data are categorized for descriptive purposes to reflect points in education where credentials are received (i.e. high school diploma and college diploma). A high school diploma is the reference value and the category of college graduate or graduate level education is the comparison of most interest. In logistic regression education is used as a continuous variable.

While a college diploma or graduate education may represent improved income or an occupation with higher prestige, this is not necessarily true.
Sometimes completion of college does not result in improved income or occupation (which cannot be measured in this birth certificate data). However, completion of a college degree may imply persistence, family background, and exposure to stressors and information non-completers are less likely to have. The information college completers and those with graduate education receive through their university experience may change health behaviors or alter the way they interface with the social system (Galobardes 2007:8; Kwok 2001:171). This may help to explain why the correlation between education and income is only modest (0.58) (Braveman 2001:454). Overall, when both education and income are used to measure socio-economic status more variance is accounted for because the two variables appear to measure distinct dimensions of socio-economic status (Braveman 2001:459, 460).


<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Reference Value</th>
<th>Other Categories</th>
<th>Studies Which Found the Variable to be a Risk Factor for Breech Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hispanic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13-15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16-17+</td>
<td></td>
</tr>
</tbody>
</table>

Birth certificate data is compared with other data sources such as medical records to determine the validity of the birth certificate data. This validity may be measured by sensitivity. Sensitivity is the proportion of people who have the condition or characteristic in question (e.g. white non-Hispanic ethnicity) and are correctly identified as having that condition. When sensitivity is low, this indicates underreporting. (i.e. persons who are really White non-Hispanic are not identified as White non-Hispanic, therefore, their true numbers are under-reported). Sensitivity was selected as the validity measure of comparison rather than specificity, positive predictive value or negative predictive value because it is the primary problem in birth certificate data (Reichman 2001; Reichman 2007). From this point on, the term validity will be used in place of the term sensitivity.
Most studies agree birth certificate data is very valid for race (>0.95) (Baumeister 2000; DiGiuseppe, et al. 2002; Zollinger 2006) and education (0.92) (Zollinger 2006). For example, this means more than 95 percent of birth certificate records correctly identify white non-Hispanic mothers as white non-Hispanic or about 92 percent of birth certificate records correctly identify those with a high school education as having a high school education.

**Covariates (1992-2003) Florida birth certificate.**

Covariates are independent variables which are not of primary interest in the study. Covariates were selected for inclusion in the logistic regression analysis based on two criteria: validity of the variable and relevance of the variable to the study. Variables which were relevant and highly valid were placed in one model and variables which were relevant, regardless of validity level, were placed in a second model. These models were then compared to determine which was more parsimonious.

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Reference Value</th>
<th>Other Categories</th>
<th>Studies Which Found the Variable to be a Risk Factor for Breech Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Infant</td>
<td>No</td>
<td>Yes</td>
<td>(Jonas and Roder 1993; Luterkort and Marsal 1985; Roberts, et al. 1999)</td>
</tr>
</tbody>
</table>
If covariates might be related to the afore presented mechanical model or the psycho-socio-cultural model of breech etiology they were deemed to be relevant to the study. The covariates related to the mechanical model pertained to the baby being too light to turn and stay turned (birth weight, gestational age, infant sex), the mother’s abdomen or uterus impeding turning because it was too flaccid, or tight, or full (parity, maternal age, poly- or oligo-hydramnios), the baby being unable to turn due to a uterine obstruction (placenta previa), or the baby being unable to move due to an orthopedic deficiency like congenital hip dysplasia (musculoskeletal anomaly).

The covariates birth weight and gestational age were categorized according to standard categories used in medicine. Birth weight was divided into very low birth weight (500-1499 grams), low birth weight (1500-2499 grams), normal birth weight (2500-4000 grams), and above normal birth weight (4001-5000 grams). Gestational age is categorized as very preterm (21-32 weeks), preterm (33-36 weeks), and term (37-42 weeks). The categories for maternal age are those used by Roberts (1999).

Table 7: Covariates with Moderate or Low Validity: Poly- or Oligo-Hydramnios, Placenta Previa, Musculoskeletal Anomalies, Previously Aborted Pregnancies, Diabetes, Chronic Hypertension, Gestational Hypertension

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Reference</th>
<th>Other Categories</th>
<th>Studies Which Found the Variable to be a Risk Factor for Breech Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musculoskeletal Anomalies</td>
<td>No</td>
<td>Yes</td>
<td>(Mazor, et al. 1988)</td>
</tr>
<tr>
<td>Previously Aborted Pregnancies</td>
<td>No</td>
<td>Yes</td>
<td>(Jonas and Roder 1993)</td>
</tr>
<tr>
<td>Chronic HTN</td>
<td>No</td>
<td>Yes</td>
<td>(Roberts, et al. 1999)</td>
</tr>
<tr>
<td>Gestational HTN</td>
<td>No</td>
<td>Yes</td>
<td>(Roberts, et al. 1999)</td>
</tr>
</tbody>
</table>

Validity for birth certificate covariates ranges from very good (baby’s sex >0.96, birth weight > 0.99, gestational age > 0.98, number of previous live births >92%) to moderate (placenta previa = 0.49, diabetes = 0.52, pregnancy-induced hypertension = 0.59, oligohydramnios=0.55) to poor (chronic hypertension =0.07, chromosomal or orthopedic anomaly 0, polyhydramnios = 0.14) (DiGiuseppe, et
al. 2002; Dobie 1998; Roohan 2003; Yasmeen 2006; Zollinger 2006). One Florida study compared birth certificates for Hillsborough county with records from three hospitals. This study found 100% accuracy in reporting maternal age, race, gravity, and parity. However, the same study found very low accuracy in reporting maternal medical complications, labor and delivery complications, obstetric procedures, and abnormal neonatal conditions (Gore 2002).

Overall, birth certificate data is very accurate for maternal demographics, birth weight, baby sex, and method of delivery. However, prenatal care is typically overreported. In contrast, obstetric procedures, complications of labor and delivery, medical risk factors, and maternal/infant medical conditions are underreported. Therefore, while prevalence levels may not be accurate for underreported variables a large sample size may still allow analysis of association (Northam 2005; Reichman 2006; Schoendorf 2007).

Only one study (Table 8) was identified which compared the accuracy of birth certificate data by maternal race/ethnicity (Reichman 2007). This study compared New Jersey birth certificates with Medicaid data and therefore only included women who were Medicaid eligible. The study found high validity for birth weight and gestational age across all ethnicities, and low validity across all ethnicities for medical risk factors, obstetric procedures, and complications of labor. White mothers typically had slightly higher validity rates than non-white mothers. Hispanic mothers had slightly lower validity rates than non-Hispanic mothers. However, these differences were not statistically significant upon calculation (Preacher 2001; Reichman 2007:32).
Clinical estimation of gestational age is used in this study rather than last monthly period (LMP) to determine the approximate age of the newborn. In 1939 the National Office of Vital Statistics provided a model birth certificate which included the clinical estimation of gestational age for the first time (States. 1950). Clinical estimation of gestational age includes assessment of newborn neurologic, physiologic, and musculoskeletal development, amount of lanugo, quantity of vernix, and quality of the skin (Katz, et al. 2001). The drawback of clinical estimates of gestational age is that they show preferences for even weeks which suggest clinician bias (Mustafa and David 2001).

Estimation of gestational age by LMP is more seriously flawed than is clinical estimation of gestational age although it is the most common way gestational age is analyzed in secondary data sets (Mustafa and David 2001). Last monthly period estimates are limited due to inherent inaccuracy of recollection of the date of initiation of last menstruation (Waller, et al. 2000) and irregularity of menstrual cycle and ovulation (Fraser and E. 1982; Saito, et al. 1972). Bleeding in early pregnancy may also be misinterpreted as menses (Gjessing, et al. 1999). Gestational age may be overestimated by two weeks due to calculation of gestational age from the onset of LMP (Mustafa and David 2001) and use of Naegele’s rule for calculation of gestational age is questionable for women who have long, short, or irregular cycles (Baskett and Nagel 2000). Finally, birth certificate themselves may create errors in gestational age calculation. For instance, LMP has a higher percentage of missing data than does the clinical estimation of gestational age variable in birth registry data.
(Mustafa and David 2001). Also, the birth registry in some states does not provide a birth date to protect patient privacy (Mustafa and David 2001).

The Institute of Medicine now recommends estimation of gestational age by early ultrasound (prior to 20 weeks) (Institute of Medicine 2006). However, this estimation is not available in the birth certificate. When LMP is compared with clinical estimation of gestational age and/or ultrasound LMP is subject to higher random error and systematic inflation of gestational age (Savitz, et al. 2002; Yang, et al. 2002). This tendency for higher estimation of gestational age when calculated by LMP appears to be influenced by socio-economic differences such that younger, unmarried, less educated women have more discordance between ultrasound estimations in early pregnancy and LMP (Morin, et al. 2005). When gestational age is known based on an ovulation date established from repeat measurement of basal body temperature or luteinizing hormone, or when gestational age estimation is compared with expected birth weight, ultrasound estimates are more accurate than are LMP estimates (Breart, et al. 1995).


This study used de-identified Florida birth certificate data from 1992-2003. The study population consisted of mothers of all babies who were born alive in Florida during this time period. Mothers who were Florida residents and birthed in other states and had birth certificates returned to the Florida health department were also included. Inclusion criteria for the study sample were singleton babies born in Florida to a white non-Hispanic, black non-Hispanic or Hispanic mother between 1992 and 2003. The sample was selected after observations which did not meet the inclusion criteria, or had missing salient information, were deleted.


Only one type of certificate of live births was used in the state of Florida from 1992 – 2003. During that time period the Florida certificate of live births was a combination of check line and fill-in line format. Most of the medical information
is in the check-line format and most of the personal and demographic information is in the fill-in format. The Florida Department of Health cleans data by identifying and correcting coding and data entry errors (Czaja and Blair 2005:25). Shively (2003), data manager for the Florida Department of Health, related the Florida Department of Health estimated these data to be 97-99% accurate.

Birth certificate information for the state of Florida is collected by primary care providers or their proxies at the birth place or the location of prenatal care. Birth certificate data are ultimately organized by the Department of Health. Most data are obtained pre-delivery from hospital or clinic records or from patient interviews. Delivery and post-delivery data such as Apgar scores, abnormal conditions, and congenital anomalies are obtained after delivery from medical records. A medical clerk or an individual in the nursing department or records department fills out the birth registrar typically.

All birth certificate data from 1992 – 2002 is from the final birth certificate report which is typically completed the January one year after the year in question (e.g. the final report of the 1989 birth certificate is completed January 1991). The 2003 birth certificate data is the late version. This version does not include final revisions which may impact the total number of births for the year by around 100 or less. The final additions are typically births outside the state of Florida so they are deleted anyway from the sample due to exclusion criterion.


In the initial stage of evaluation for this project crude odds ratios were calculated for each variable of interest (e.g. white non-Hispanic*breech). Then each independent variable was paired with the dependent variable and with the covariates sequentially (e.g. white non-Hispanic*breech*birthweight, Hispanic*breech*maternal age) and the Mantel-Haenszel test was performed. Tables were also created which stratified the odds ratio at each level of the covariate tested. Thus, an odds ratio was calculated for white non-
Hispanic*breech*very low birthweight, white non-Hispanic*breech* low birthweight, white non-Hispanic*breech*normal birthweight etc. Stratum specific ORs were evaluated to determine the presence of homogeneity. Crude odds ratios and adjusted odds ratios were compared to determine the percentage of difference. If there were homogeneity of strata and the crude OR was 20% different from the adjusted OR a confounder was identified. Homogeneity of strata may be assessed for difference between 10% and 20%. Frequently, a difference of 10% is used to determine heterogeneity. In this study the more conservative 20% difference was selected due to the large sample size which made finding heterogeneity more likely. If the strata were heterogeneous and the Breslow-Day test result was <=0.05 and there was biological plausibility a potential effect modifier was identified.

**Logistic regression.**

Unconditional logistic regression was selected as the appropriate statistical approach to test the hypotheses since the dependent variable is binary (Agresti 1996:103), the sample is not matched (Feinstein 1996:361; Rahman, et al. 2003:101), and because of its ability to capture the contextual relationships of the variables in the model (Bagley, et al. 2001:797; Hosmer and Lemeshow 2000). Unlike linear regression, logistic regression transforms the dependent variable into the natural log of its odds. The formula is logit(p) = ln(p/(1-p)) = alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k where the domain of p = (1,0). Thus, logistic regression evaluates changes in the log odds of the dependent variable rather than changes in the dependent variable itself.(Hosmer and Lemeshow 2000). Logistic regression uses odds ratios to measure effect size.

The assumptions of logistic regression are more basic than are those of linear regression. Logistic regression requires absence of multicollinearity, independence of observations, and linear relationship of the logit of the independent variables to the dependent variable (Garson 2006; Hosmer and Lemeshow 2000). Weighted linear regression was used to evaluate
multicollinearity. Tolerance less than 0.40 is considered to be an indicator of high multicollinearity (Agresti 1996:126; Allison 2005:48-51). Birth weight and gestational age were collinear so each was tested separately in the model to determine which produced the better model. The program to test for conformity to a linear gradient for this dataset ran for approximately one week when the computer stopped with the error message “Insufficient resources.”

SAS 9.1.3 was used for statistical analysis. Variables were included in the model based upon theory and the literature. The final model was selected based upon the principles of parsimony (Burnham and Anderson 1998:23, 294-295, 323). Max rescaled $R^2$ is the most appropriate means to measure the predictive power of categorical models (Allison 2005:57; Nagelkerke 1991). The Hosmer and Lemeshow goodness-of-fit statistic was used in this analysis to determine the quality of the fit (Hosmer and Lemeshow 2000). However, when the sample size is large the goodness-of-fit test may be less relevant (Burnham and Anderson 1998:307).

Several diagnostic statistics were calculated after the final model was selected to check for the influence of outliers. The diagnostic statistics evaluated were DFBETAS, DIFDEV, DIFCHISQ, C and CBAR, and the Hat matrix (Allison 2005:60). Not all statisticians agree diagnostic statistics are helpful for logistic regression (Burnham and Anderson 1998; Hosmer and Lemeshow 2000). This study delimited the range of data in the initial stage when variables were defined. Therefore, all observations were deemed to be important to the study in the final analysis.

**Summary of steps taken to fit the model.**

1) Ensure the ratio of outcome events to independent variables was $\geq$ to 10:1
2) Independent variables to be tested in the model were selected based upon the hypothesis tested and upon findings from the literature.
3) Covariates which were originally continuous variables (i.e. birth weight, gestational age, maternal age, and education) were entered in the logistic
model initially. After testing these variables in their continuous form they were then categorized and tested in the model to determine if categorization improved the fit or explanatory value of the model.

4) Collinearity was tested for independent and covariate variables with weighted linear regression.

5) The assumption of conformity to a linear gradient for continuous variables or to the log-odds scale for ranked variables was tested.

6) Confounders and potential effect modifiers were tested for by comparing crude OR with adjusted OR and by comparing stratum specific ORs.

7) Hosmer & Lemeshow goodness-of-fit was reported for the entire model to determine over-all fit of the model.

8) Modeling was attempted which included the variable birthweight first and then modeling was attempted which included the variable gestational age.

9) When the model was unable to explain much of the variance and did not have a good fit additional links were explored (i.e. in addition to the logit link the probit and complimentary log-log links were tested) and respecification of the variables was explored which included respecifying birth weight by kilograms rather than grams.

10) Potential effect modifiers were tested in the model to determine if they added explanatory value. When they did not they were not included in the final model.

Model diagnostics were run and were analyzed from the theoretical perspective which adjures all outliers must be eliminated in the first stage of data analysis wherein variables are coded. The exclusion parameters for these variables were designed to eliminate or reduce spurious findings. Furthermore, studies which have evaluated the efficacy of deleting observations based upon model diagnostics findings found that the new models were not significantly improved and were also challenged by the possibility of being over-fit.

The study design for the linked data is the same as that for the birth certificate data with the exception of the independent variable. The independent variable is Medicaid/WIC eligibility during pregnancy. If a woman is Medicaid or WIC eligible during pregnancy she is coded as a “Yes” whose numeric code is “1”. If she is not eligible, she receives a “No” which is coded as a “0”. “No” or “0” is the reference value. Maternal ethnicity and maternal education are added as covariates rather than as independent variables in the linked data model.

Medicaid/WIC eligibility is a proxy for income, which is the most direct measurement of SES (Galobardes 2007:10). However, Medicaid/WIC eligibility does not measure income as a continuous variable. Income is treated as a dichotomous variable. If a household earns up to 185% of the federal poverty limit it is considered Medicaid/WIC eligible. Those that earn more than 185% of the federal poverty limit are Medicaid/WIC ineligible. For instance, in 2003 185% of the federal poverty limit for a family of four in Florida was $34,040 (Appendix S) {Anonymous, 2003 #1614}. This family would be Medicaid/WIC eligible at the highest tier.


This study used de-identified Florida birth certificate data linked with de-identified Florida Medicaid and WIC eligibility data for the years 1999-2003. The birth certificate data study population is reported in the previous section. The Florida Agency for Health Care Administration (ACHA) declined to provide information on the population for Medicaid and WIC eligibility. However, it is understood that the population is those women who applied for and were eligible to receive Medicaid or WIC during pregnancy. To be eligible for Medicaid during the time period evaluated, households earned up to 185% of the Federal Poverty Guidelines (SOBRA) or earned 100% of the Federal Poverty Guidelines (non-
(Anonymous, 1992 #1621; Anonymous, 1993 #1620; Anonymous, 1994 #1619; Anonymous, 1995 #1618; Anonymous, 1996 #1617; Anonymous, 1997 #1616; Anonymous, 1998 #1615; Anonymous, 1999 #1610; Anonymous, 2000 #1611; Anonymous, 2001 #1612; Anonymous, 2002 #1613)(Anonymous 2003). Because the population for all of the Medicaid data set is undefined, only the Medicaid and WIC eligibility status will be used. Linked data inclusion criteria are the same as those for the birth registry data.


The birth certificate collection method is described in the previous section. ACHA declined to provide information on how Medicaid data was collected and what data was collected. However, the database is presumably derived from hospital discharge data. The birth registry data and Medicaid/WIC eligibility files are linked at the University of Florida. The method is described in Appendix V.


The statistical methods are the same as those employed for the birth certificate data. Multicollinearity was tested in the same way and birth weight and gestational age were again found to be collinear. Again, birth weight and gestational age were separately modeled to see which produced the better model.

**Secondary Data Results**

This section will present the results for the Florida birth certificate sample and later for the sample of linked Florida birth certificate and Florida Medicaid/WIC eligibility data. Excluded observations will first be identified. Then, maternal and neonate characteristics will be described. The following section will
present information on confounders, potential effect modifiers and the logistic regression model. Finally, the results of the hypotheses tested will be explained.


A total of 2,754,693 women had babies registered by Florida birth certificates from 1992-2003. Of these 112 were missing information on the number of babies they birthed in the index pregnancy and 76,280 did not have singletons. Only singleton babies are included because breech presentation is a frequent presentation in non-singleton pregnancies due to space constraint. By eliminating pregnancies with multiple babies the study is simplified. Twenty six mothers were missing information about the state of birth for the index pregnancy and 7,885 did not birth in Florida. Only women who birthed in Florida are included in the study because Medicaid and WIC eligibility rules differ between states.

Only white non-Hispanic, black non-Hispanic, or Hispanic mothers of singleton babies born in Florida were included in the study. Over four thousand (4,377) mothers were missing information on race or ethnicity. Haitian (73,234), Indian non-Hispanic (7,916), Asian/Pacific Islander non-Hispanic (57,954), and Old-World Spanish (21,865) mothers were excluded from the study. White non-Hispanic (1,516,221), black non-Hispanic (536,979), and Hispanic (534,449) mothers were included in the study because they represent the three largest groups of ethnicities in Florida.

Mothers of babies who weighed less than 500 grams at birth (5,580) and mothers of babies who weighed more than 5,000 grams at birth (3,596) were excluded from the study since weight under 500 grams is not considered to be viable and since weight above 5,000 grams is relatively rare. Mothers of babies who were less than 20 weeks old at birth (7,118) or more than 42 weeks at birth (3,081) were also excluded from the study since birth before 20 weeks is considered to be a miscarriage and breech babies are almost always planned cesareans at term. Mothers less than 12 years old (1,307) and more than 49
years old (552) were also excluded from the study due to the rarity of occurrence, biological implausibility in some cases, and the increased possibility of reporting error. Over fourteen thousand (14,254) mothers were missing information on education and 65 babies were missing information on sex. Marital status was missing for 641 mothers.

After exclusion of all observations which did not meet the inclusion or exclusion criteria or which had missing information 2,476,969 mothers remained. Of these, 2.99% had a breech baby. White non-Hispanic women were more likely to have a breech baby (3.42%, OR 1.46, 95% CI 1.43-1.48) than were Hispanic women (2.82%, OR 0.93, 95% CI 0.91-0.94) or black non-Hispanic women (1.93%, OR 1.0). (Since Black non-Hispanic is the reference category, no confidence interval is reported. Reference categories do not have reportable confidence intervals). In the sample, mothers of breech babies were more likely to be married than were mothers of cephalic presentation babies (OR = 1.35). Nearly all breech babies (92.37%) were delivered by cesarean sections while 21.32% of cephalic presentation babies were delivered by cesarean sections.


Frequencies of independent variables and covariates were calculated two ways: 1) for the entire sample comparing breech and cephalic presentation births (Tables 9, 11, 13), and 2) for each of the three ethnicities comparing breech and cephalic presentation births (Tables 9, 11, 13). Odds ratios were also calculated for each variable by ethnicity to evaluate the risk of having or being a breech baby (Tables 10, 12, 14). The reference value for all dichotomous variables is “No.”


Maternal age and education were initially analyzed as continuous variables. Continuous variables in the analysis were evaluated in the raw data
first then again after the upper and lower limits used for this study were defined. The central tendency and the skew and kurtosis of each variable are reported. The skew and kurtosis were evaluated even though normalcy is not an assumption of logistic regression. The skew and kurtosis of each continuous variable were compared with two standard errors of skewness \((2\sqrt{6/N})\) and with two standard errors of kurtosis \((2\sqrt{24/N})\) to determine if they were outside those of the normal curve. A normal curve was not evidenced in any of the continuous variables.

In the raw data the mean maternal age was 27.03 while the median age was 27.00. The skew was 0.23 and the kurtosis was -0.58. After limiting maternal age to 12-49 years old the mean age was 26.86 and median remained 27.00. The skew remained 0.23 and the kurtosis was -0.65 which indicates further flattening of the curve in comparison with the non-restricted data.

Maternal education is recorded in the birth certificate as a value between 0 – 17 indicating no formal education to some graduate school. The mean education for the final sample was 12.70 years and the median was 12 years. The skew was -0.62 and the kurtosis was 1.81. This indicates there were fewer observations for the lower grades and thus a trailing tail for lower education levels. The leptokurtosis indicates a very peaked curve which, in this case, reflects societal recognition of 12th grade completion as a threshold year of education.

While women over 29 years old of all ethnic groups experience an increased incidence of breech births (e.g. 30-34 years old crude OR 1.27, 95% CI 1.25-1.29), (Table 16) the risk is greatest for black non-Hispanic mothers over 40 years old (crude OR 2.18, 95% CI 1.94-2.46) (Table 10). Similarly, mothers with more than a high school diploma experience an increased incidence of breech births across all ethnicities (e.g. 16+ years education crude OR 1.25, 95% CI 1.23-1.28) (Table 16). However, this risk is greatest for black non-Hispanic mothers with at least a bachelor’s degree (crude OR 1.45, 95% CI 1.36-1.54) (Table 10). Like the crude OR, the adjusted OR for age indicates increasing
maternal age increases the risk of breech presentation. For instance, a woman between 40-49 years old has an adjusted OR of having a breech baby of 1.55 (95% CI 1.49-1.63) when compared to a woman of 25-29 years old. The adjusted OR for education reverses the pattern of the crude OR such that education less than a high school diploma (adjOR 1.06, 95% CI 1.04-1.09) is a risk factor for breech presentation when compared with a high school diploma.

<table>
<thead>
<tr>
<th></th>
<th>Black non-Hispanic</th>
<th>White non-Hispanic</th>
<th>Hispanic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic</td>
<td>Breech</td>
<td>Cephalic</td>
<td>Breech</td>
</tr>
<tr>
<td><strong>Age</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-19 years</td>
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<td>23.66</td>
<td>1840</td>
<td>18.62</td>
</tr>
<tr>
<td>20-24 years</td>
<td>168240</td>
<td>33.49</td>
<td>2583</td>
<td>26.14</td>
</tr>
<tr>
<td>25-29 years</td>
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<td>30-34 years</td>
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<td>284</td>
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<td><strong>Education</strong></td>
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<td></td>
</tr>
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<td>0-11 years</td>
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<td>28.95</td>
<td>2528</td>
<td>25.58</td>
</tr>
<tr>
<td>12 years</td>
<td>212897</td>
<td>42.38</td>
<td>3954</td>
<td>40.02</td>
</tr>
<tr>
<td>13-15 years</td>
<td>102027</td>
<td>20.31</td>
<td>2244</td>
<td>22.71</td>
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</table>

### Table 10: Maternal Socio-Demographics Crude Odds Ratios & 95% Confidence Intervals (1992-2003) Florida Birth Certificate Data Comparing Breech and Cephalic Presentation by Maternal Ethnicity

<table>
<thead>
<tr>
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<th>Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude OR</td>
<td>95% CI</td>
<td>Crude OR</td>
</tr>
<tr>
<td><strong>Age</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12-19 years</td>
<td>0.74</td>
<td>0.71-0.78</td>
<td>0.81</td>
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<td>20-24 years</td>
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<tr>
<td>25-29 years*</td>
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<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>30-34 years</td>
<td>1.47</td>
<td>1.39-1.54</td>
<td>1.17</td>
</tr>
<tr>
<td>35-39 years</td>
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<td>1.88-2.13</td>
<td>1.09</td>
</tr>
<tr>
<td>40-49 years</td>
<td>2.18</td>
<td>1.94-2.46</td>
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<tr>
<td><strong>Education</strong></td>
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</tr>
<tr>
<td>0-11 years</td>
<td>0.84</td>
<td>0.81-0.88</td>
<td>0.88</td>
</tr>
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<td>13-15 years</td>
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</tr>
<tr>
<td>16+ years</td>
<td>1.45</td>
<td>1.36-1.54</td>
<td>1.09</td>
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</tbody>
</table>

*Reference Category

All maternal health conditions included in this study occur infrequently (<4% incidence). However, mothers of breech babies are more likely to experience them than are mothers of cephalic presentation babies. Black non-Hispanic mothers of breech babies have the highest risk of experiencing any of the health conditions (e.g. diabetes crude OR 2.03, 95% CI 1.85-2.24) and of having a previous abortion (crude OR 1.38, 95% CI 1.32-1.44) (Table 16). However, white non-Hispanic women who had a breech baby are most likely to have no previous births (crude OR 1.57, 95% CI 1.55-1.60) (Table 11). The odds ratios for these variables in the adjusted analysis were lower than in the crude analysis (e.g. adjusted diabetes OR 1.23, 95% CI 1.19-1.28) (Table 16) suggesting a decrease in importance.

<table>
<thead>
<tr>
<th></th>
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<th>Hispanic</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Breech</td>
<td>Cephalic</td>
<td>Breech</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>Diabetes (Gestational or Chronic)</strong></td>
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<td></td>
<td></td>
</tr>
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<td>Yes</td>
<td>11484</td>
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<td>449</td>
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<tr>
<td><strong>Chronic Hypertension</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5608</td>
<td>1.12</td>
<td>224</td>
<td>2.27</td>
</tr>
<tr>
<td><strong>Gestational Hypertension</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19393</td>
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<td>520</td>
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<tr>
<td><strong>Previously Terminated Pregnancy(ies)</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>125131</td>
<td>24.91</td>
<td>3100</td>
<td>31.37</td>
</tr>
<tr>
<td><strong>Placenta Previa</strong></td>
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<td></td>
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<td></td>
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<td>1237</td>
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<td><strong>Poly- or Oligo-Hydramnios</strong></td>
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<td><strong>First Infant Born</strong></td>
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<tr>
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<td>188268</td>
<td>37.48</td>
<td>3894</td>
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<td>White non-Hispanic</td>
<td>Hispanic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crude OR</td>
<td>95% CI</td>
<td>Crude OR</td>
<td>95% CI</td>
</tr>
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<td>Diabetes (Gestational or Chronic)</td>
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<tr>
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<td>2.03</td>
<td>1.85-2.24</td>
<td>1.30</td>
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<tr>
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<tr>
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<td>Placenta Previa</td>
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</tr>
<tr>
<td>Yes</td>
<td>5.44</td>
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<td>1.00</td>
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<td></td>
</tr>
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<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

*Reference Category

**Newborn characteristics (1992-2003) Florida birth certificate.**

In the raw data the mean birth weight was 3290 grams while the median weight was 3350 grams. The skewness was -0.93 and the kurtosis was 2.92. After delimiting birth weight to 500-5000 grams the mean weight was 3327 grams and the median weight was 3345 grams. The skew was reduced to -0.80 and the kurtosis decreased to 2.50. This indicates most babies are of higher birth weight and the curve is more peaked than that of a normal distribution.

The mean gestational age for the raw data was 38.68 weeks and the median was 39.00. Skewness was -3.21 and the kurtosis was 18.92. After delimiting gestational age to 20-42 weeks the mean was 38.82 and the mode was 39.00. The skewness was -2.79 and the kurtosis was 13.86 which indicate the restricted distribution was more like that expected for a normal curve.

Most breech and cephalic presentation babies across all ethnicities are term (92.07% cephalic, 80.72% breech) and weigh between 2500-4000g (84.59% cephalic, 76.64% breech). (This means 7.93% of cephalic babies and 19.28% of breech babies are not term). Breech babies across all ethnicities are
more likely to be girls (52.12%, crude OR 1.15, 95% CI 1.13-1.17) than to be boys. Breech babies are also more likely than are cephalic presentation babies to have musculoskeletal anomalies such as congenital hip dysplasia (crude OR 2.43, 95% CI 2.13-2.76). White non-Hispanic mothers of breech babies are at greatest risk (crude OR 2.79, 95% CI 2.40-3.25) of this anomaly. However, this type of congenital anomaly is reported in less than 1% of all pregnancies. While the babies of lowest gestational age (20-32 weeks) and the babies of lowest birth weight (500-1499g) are at the greatest risk of being born breech (crude OR 5.51, 95% CI 5.36-5.67 and crude OR 6.69, 95% CI 6.33-7.08 respectively), the risk is highest for babies of black non-Hispanic mothers (crude OR 9.16, 95% CI 8.71-9.64 for 20-32 weeks and crude OR 11.78, 95% CI 11.15-12.45 for 500-1499g). This is due to the higher rates of preterm birth for black non-Hispanic mothers. The trends are in the same direction in the adjusted analysis, but of smaller magnitude (e.g. gestational age 20-32 weeks adjOR 6.25, 95% CI 6.07-6.44 when compared to gestational age 37-42 weeks).
### Table 13 Newborn Characteristics Frequency and Percentage (1992-2003) Florida Birth Certificate Data Comparing Breech and Cephalic Presentation by Maternal Ethnicity and Total Sample

<table>
<thead>
<tr>
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<th>Hispanic</th>
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</tr>
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<td></td>
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<td>%</td>
<td>n</td>
<td>%</td>
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<tr>
<td>20-32 weeks</td>
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<td>8.50</td>
<td>1386</td>
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<td>37-42 weeks</td>
<td>443493</td>
<td>88.28</td>
<td>6392</td>
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<td><strong>Birth weight</strong></td>
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<td>1500-2499 grams</td>
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<td>6085</td>
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<td>1077</td>
<td>0.21</td>
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</table>

### Table 14 Newborn Characteristics Crude Odds Ratios & 95% Confidence Intervals (1992-2003) Florida Birth Certificate Data Comparing Breech and Cephalic Presentation by Maternal Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Black non-Hispanic</th>
<th>White non-Hispanic</th>
<th>Hispanic</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Crude OR</th>
<th>95% CI</th>
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<th>95% CI</th>
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<tr>
<td>20-32 weeks</td>
<td>9.16</td>
<td>8.71-9.64</td>
<td>5.20</td>
<td>4.99-5.43</td>
<td>3.54</td>
<td>4.98-5.72</td>
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<tr>
<td>33-36 weeks</td>
<td>1.68</td>
<td>1.59-1.78</td>
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<td>1.93</td>
<td>1.83-2.03</td>
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<td>37-42 weeks*</td>
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<tr>
<td>500-1499 grams</td>
<td>11.78</td>
<td>11.15-12.45</td>
<td>6.42</td>
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<td>1500-2499 grams</td>
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<td>4001-5000 grams</td>
<td>0.97</td>
<td>0.88-1.06</td>
<td>0.61</td>
<td>0.59-0.63</td>
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<tr>
<td><strong>Female Infant</strong></td>
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</tr>
<tr>
<td><strong>Musculoskeletal/Integumental Anomalies</strong></td>
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<tr>
<td>Yes</td>
<td>2.22</td>
<td>1.66-2.98</td>
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<td>1.64</td>
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<td>1.00</td>
<td>1.00</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Reference Value

Null Hypothesis 1: There is no association between the risk for breech presentation and maternal ethnicity.

Null Hypothesis 2: There is no association between the risk for breech presentation and maternal education.


To determine if confounders were present, Mantel Haenzsel adjusted ORs were calculated for each variable and compared with the crude OR. Furthermore, all variables were stratified and ORs were calculated for each strata. Then, Breslow-Day was run to determine if there were homogeneity of the strata. A Breslow-Day >0.05 indicates homogeneity of the strata. If there was homogeneity of the strata and a 20% difference between the crude and the adjusted OR, a confounder was identified. Gestational age and the sex of the baby were confounders in the analysis of breech*education. Therefore, gestational age and sex of the baby were included in the final model to control for the confounding.


The following interaction terms had a Breslow-Day of <0.05: ethnicity*gestational age and ethnicity*maternal age. These terms were tested in the model but did not add meaningfully so were excluded from the final model.


The model which consists only of highly valid birth certificate covariates (birth weight or gestational age, maternal age, baby’s sex, and maternal parity) (Table 15) produced a max rescaled $R^2$ of 4.18% when gestational age was used rather than birth weight. When birth weight was used the max rescaled $R^2$ for the model exclusively with the highly valid variables was 3.25%. Therefore, the model with the variable gestational age rather than birth weight was selected as
the final model for the highly valid variables. Neither model with only highly valid variables had a Hosmer and Lemeshow goodness of fit statistic greater than 0.0001.

The model which consists of the highly valid birth certificate covariates along with the moderately valid and poorly valid covariates (Table 16) produced a max rescaled $R^2$ of 4.44%. This indicates that the addition of seven variables improved the explanatory value of the model by only 0.26% and did not improve the goodness of fit at all. Thus, the smaller model which consisted only of highly valid variables was selected as the most parsimonious model. The max rescaled $R^2$ indicates this model explains only 4.44% of total variance while the goodness of fit statistic indicates a very poorly fit model. A low goodness of fit may reflect poor data quality, improper specification of variables in the model, or important variables missing from the model.

Since the fit of entire model is not significant, all interpretation of individual variables should be very cautious. A significant finding for an individual variable may be due exclusively to chance. Additionally, although the overall fit of the model for this dataset is not good, the same model may fit other data better. However, the only identified logistic regression study which reported goodness-of-fit, also reported poor fit (Hosmer-Lemeshow goodness of fit = 0.02) (Roberts, et al. 1999).

The final model (Table 15) indicates white non-Hispanic women have an increased OR of 1.72 (95% CI 1.68-1.76) of having a breech baby when compared to black non-Hispanic women. Likewise, holding less than a high school diploma increases risk of having a breech baby. A mother who has not achieved a high school diploma has an OR of 1.06 (95% CI 1.04-1.09) when compared with a mother who received a high school diploma. Mothers who attended school beyond high school show no association between education and birth presentation. The adjusted odds ratio of a woman giving birth to her first baby having a breech baby is 1.70 (95% OR 1.67-1.72) when compared to a woman who had a previous birth. There is an increased risk (adjOR 1.17, 95% CI
1.15-1.19) of having a breech baby if the fetus is female. Additionally, very preterm birth (adjOR 6.51, 95% CI 6.32-6.70) and preterm birth (adjOR 2.17, 95% CI 2.12-2.22) increases the risk of having a breech birth when compared with term births. Finally, a woman’s risk of having a breech baby increases as she ages. For example, women who are 40-49 years old have an adjusted OR of 1.55 (95% CI 1.49-1.63) when compare with women who are 25-29 years old.

Thus, the logistic regression model (Table 15) indicates there is a moderate positive association with both white non-Hispanic ethnicity and with Hispanic ethnicity for breech presentation when compared with black non-Hispanic ethnicity. This means null hypothesis 1 is rejected. Additionally, there is a small negative, although significant, association between education and breech presentation. This means null hypothesis 2 is rejected. These findings must be accepted with caution since the overall fit of the model is not significant.
Table 15: Logistic Regression Model of Highly Valid Variables (1992-2003) Florida Birth Certificate Data, Number and Percentage of Breech Babies, Crude and Adjusted ORs & 95% CI Comparing Breech and Cephalic Presentation. Dependent Variable is Birth Presentation, Independent Variables are Maternal Ethnicity & Maternal Education

<table>
<thead>
<tr>
<th>Variables</th>
<th>Breech n (%)</th>
<th>Individual Variables</th>
<th>Final Model</th>
</tr>
</thead>
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<td>Crude OR</td>
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<td></td>
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<td>White non-Hispanic</td>
<td>49555 (66.98)</td>
<td>1.46</td>
<td>1.43-1.48</td>
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<td>Hispanic</td>
<td>14545 (19.66)</td>
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<td>0.91-0.94</td>
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<td>Black non-Hispanic</td>
<td>9881 (13.36)</td>
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<td>1.00</td>
</tr>
<tr>
<td><strong>Maternal Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-11 years</td>
<td>13316 (18.00)</td>
<td>0.80</td>
<td>0.79-0.82</td>
</tr>
<tr>
<td>12 years*</td>
<td>24818 (33.55)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>13-15 years</td>
<td>18542 (25.06)</td>
<td>1.10</td>
<td>1.08-1.12</td>
</tr>
<tr>
<td>16-17+ years</td>
<td>17305 (23.39)</td>
<td>1.25</td>
<td>1.23-1.28</td>
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<td><strong>Maternal Age</strong></td>
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<tr>
<td>12-19 years</td>
<td>7313 (9.88)</td>
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<td>0.70-0.73</td>
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<td>20-24 years</td>
<td>14772 (19.97)</td>
<td>0.72</td>
<td>0.71-0.74</td>
</tr>
<tr>
<td>25-29 years*</td>
<td>19493 (26.35)</td>
<td>1.00</td>
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<tr>
<td>30-34 years</td>
<td>19596 (26.49)</td>
<td>1.27</td>
<td>1.25-1.29</td>
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<tr>
<td>35-39 years</td>
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<td>40-49 years</td>
<td>2364 (3.20)</td>
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<td><strong>Gestational Age</strong></td>
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<tr>
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<td>37-42 weeks*</td>
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<tr>
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*Reference Value
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<tr>
<th>Maternal Ethnicity</th>
<th>Breech n (%)</th>
<th>Individual Variables</th>
<th>Final Model</th>
</tr>
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<tr>
<td>White non-Hispanic</td>
<td>49555 (66.98)</td>
<td>1.46 1.43-1.48 1.45 1.41-1.49</td>
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<td>Hispanic</td>
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<td>Black non-Hispanic*</td>
<td>9881 (13.36)</td>
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<td>0-11 years</td>
<td>13316 (18.00)</td>
<td>0.80 0.79-0.82 1.06 1.04-1.08</td>
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<td>12 years*</td>
<td>24818 (33.55)</td>
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<td>13-15 years</td>
<td>18542 (25.06)</td>
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<td>16-17+ years</td>
<td>17305 (23.39)</td>
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<td>Maternal Age</td>
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<td>12-19 years</td>
<td>7313 (9.88)</td>
<td>0.71 0.70-0.73 0.63 0.61-0.65</td>
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<td>20-24 years</td>
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<td>20-32 weeks</td>
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<td>33-36 weeks</td>
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<td>37-42 weeks*</td>
<td>59499 (80.42)</td>
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</table>

*Reference Value

A total of 1,000,000 women had babies registered by Florida birth certificates and linked with Medicaid/WIC eligibility data from 1999-2003. Of these 118 were missing information on the number of babies they birthed in the index pregnancy and 30,192 did not have singletons. A full 1,495 women did not birth in Florida.

Only white non-Hispanic, black non-Hispanic, or Hispanic mothers of singleton babies born in Florida were included in the study. Over two thousand (2,013) mothers were missing information on race or ethnicity. Haitian (31,255), Indian non-Hispanic (3,349), Asian/Pacific Islander non-Hispanic (25,393), other non-Hispanic (956), and Old-World Spanish (6,252) mothers were excluded from the study. White non-Hispanic (496,938), black non-Hispanic (228,675), and Hispanic (228,675) mothers were included in the study because they represent the three largest groups of ethnicities in Florida.

Mothers of babies who weighed less than 500 grams at birth (1,696) and mothers of babies who weighed more than 5,000 grams at birth (1,099) were excluded from the study along with 282 mothers missing birth weight information. Mothers of babies who were less than 20 weeks old at birth (467) or more than 42 weeks at birth (960) were also excluded from the study along with the 950 mothers missing this information. Mothers less than 12 years old (9) and more than 49 years old (114) were excluded from the study along with 172 mothers missing this data. Over six thousand (6,269) mothers were missing information on education and were excluded from the study.

After exclusion of all observations which did not meet the inclusion or exclusion criteria or which had missing information 912,107 mothers remained. Of these, 2.76% had a breech baby. White non-Hispanic women were more likely to have a breech baby (3.15%, OR 1.39, 95% CI 1.35-1.43) than were Hispanic women (2.69%, OR 0.97, 95% CI 0.94-1.00) or black non-Hispanic women (1.79%, OR 1.0). In the sample, mothers of breech babies were more likely to be
married than were mothers of cephalic presentation babies (OR 1.35). Nearly all breech babies (93.89%) were delivered by cesarean sections while 24.35% of cephalic presentation babies were delivered by cesarean sections.


Frequencies of independent variables and covariates were calculated two ways: 1) for the entire sample comparing breech and cephalic presentation births (Tables 17, 19, 21), and 2) for each of the three ethnicities comparing breech and cephalic presentation births (Tables 18, 20, 22). Odds ratios were also calculated for each variable by ethnicity (Tables 17, 19, 21). The reference value for all dichotomous variables is “No.”

**Maternal socio-demographic characteristics (1999-2003) linked birth certificate and Medicaid/WIC eligibility data.**

Maternal age and education were initially analyzed as continuous variables. Continuous variables in the analysis were evaluated as raw data first then again after the upper and lower limits used for this study were defined. The central tendency and the skew and kurtosis of each variable are reported. A normal curve was not evidenced in any of the continuous variables.

In the raw data the mean maternal age was 27.23 while the median age was 27.00. The skew was 0.23 and the kurtosis was -0.65. After limiting maternal age to 12-49 years old the mean age was 27.05 and median remained 27.00. The skew was 0.25 which indicates a slightly longer tail of older women. The kurtosis was -0.69. This indicates slight further flattening of the curve in comparison with the non-restricted data.

Maternal education is recorded in the birth certificate as a value between 0 – 17 indicating no formal education to some graduate school. The mean education for the final sample was 12.80 years and the median was 12.00 years.
The skew was -0.69 and the kurtosis was 1.73. This indicates there were fewer observations for the lower grades and thus a trailing tail for lower education levels. The leptokurtosis indicates a very peaked curve which, in this case, reflects societal recognition of 12th grade completion as a threshold year of education.

Black non-Hispanic mothers are younger in general than are white non-Hispanic or Hispanic mothers. The largest age category for black non-Hispanic mothers for both cephalic and breech births is 20-24 years old (64.63% of all black non-Hispanic cephalic, 26.73% of all black non-Hispanic breech). The largest age category for white non-Hispanic (26.34% cephalic, 25.73% breech) and for Hispanic mothers (26.71% cephalic, 26.24% breech) is 25-26 years old. However, women over 29 years of age for all ethnic groups are more highly represented by mothers of breech babies than by mothers of cephalic presentation babies (e.g. 30-34 years old OR 1.28, 95% CI 1.24-1.31). Black, non-Hispanic mothers 35-39 are at greatest risk of having a breech baby (crude OR 2.12, 95% CI 1.92-2.35). Mothers of breech babies (26.66%, crude OR 1.29, 95% OR 1.26-1.33) of all ethnicities are more likely to have a college degree or graduate education than are mothers of cephalic presentation babies (21.92%). However, black non-Hispanic mothers with at least a college education are most at risk of having a breech baby (crude OR 1.35, 95% CI 1.21-1.49). Although Medicaid/WIC eligibility is protective against having a breech baby, white non-Hispanic mothers are least protected (crude OR 0.85, 95% CI 0.82-0.88).

In the adjusted analysis, advancing maternal age is still a risk factor for breech presentation (e.g. maternal age 40-49 years old adjOR 1.65, 95% CI 1.54-1.77). However, education less than a high school diploma is now a risk factor (adjOR 1.09, 95% CI 1.05-1.14), and Medicaid/WIC eligibility is no longer protective against breech presentation (adjOR 1.03, 95% CI 1.00-1.06) (Table 23).

<table>
<thead>
<tr>
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<th>White non-Hispanic</th>
<th>Hispanic</th>
<th>Total</th>
</tr>
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<td>Cephalic</td>
<td>Breech</td>
<td>Cephalic</td>
<td>Breech</td>
</tr>
<tr>
<td>Age</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12-19 years</td>
<td>38903</td>
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<td>528</td>
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</tr>
<tr>
<td>20-24 years</td>
<td>63430</td>
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<td>894</td>
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<tr>
<td>25-29 years*</td>
<td>41193</td>
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<td>753</td>
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<tr>
<td>30-34 years</td>
<td>24585</td>
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<td>634</td>
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<td>35-39 years</td>
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<td>40-49 years</td>
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<td>Education</td>
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<tr>
<td>0-11 years</td>
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<td>12 years*</td>
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<td>43.08</td>
<td>1350</td>
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<td>13-15 years</td>
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<td>16+ years</td>
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<td>9.85</td>
<td>429</td>
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<tr>
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*Reference Group

Table 18: Maternal Socio-Demographics Crude Odds Ratios & 95% Confidence Intervals (1999-2003) Florida Birth Certificate Data Linked with Florida Medicaid/WIC Eligibility Data Comparing Breech and Cephalic Presentation by Maternal Ethnicity

<table>
<thead>
<tr>
<th></th>
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<th>Hispanic</th>
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<tr>
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<td>Crude OR</td>
<td>95% CI</td>
<td>Crude OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Age</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-19 years</td>
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<td>0.63-0.76</td>
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<td>0.79-0.84</td>
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<tr>
<td>20-24 years</td>
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<td>25-29 years*</td>
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<td>40-49 years</td>
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<tr>
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<td>1.10-1.18</td>
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</table>

*Reference Group

All maternal health conditions included in this study (Tables 19, 20) occur infrequently (<4% incidence). However, mothers of breech babies are more likely to experience them (e.g. diabetes crude OR 1.53, 95% CI 1.43-1.63) than are mothers of cephalic presentation babies. Black non-Hispanic mothers of breech babies have the highest risk of experiencing any of the health conditions (e.g. diabetes crude OR 2.22, 95% CI 1.90-2.60) and of having a previous abortion (crude OR 1.47, 95% CI 1.37-1.59). However, white non-Hispanic women who had a breech baby are most likely to have no previous births (crude OR 1.57, 95% CI 1.52-1.63). In the adjusted analysis first time mothers have a greater risk of having a breech baby (adjOR 1.73, 95% CI 1.68-1.78). The other health risk factors have less influence than in the crude analysis (e.g. diabetes adjOR 1.26, 95% CI 1.18-1.35) (Table 24).

<table>
<thead>
<tr>
<th></th>
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<th>Hispanic</th>
<th>Total</th>
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<td>Breech</td>
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<tr>
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<td>n</td>
<td>%</td>
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88
### Table 20 Maternal Health and Obstetric History Crude Odds Ratios & 95% Confidence Intervals (1999-2003) Florida Birth Certificate Data Linked with Florida Medicaid/WIC Eligibility Data Comparing Breech and Cephalic Presentation by Maternal Ethnicity

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<td>95% CI</td>
<td>Crude OR</td>
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*Reference Value

**Newborn characteristics (1999-2003) linked birth certificate and Medicaid/WIC eligibility data.**

In the raw data the mean birth weight was 3273 grams while the median weight was 3317 grams. The skewness was -0.96 and the kurtosis was 2.97. After delimiting birth weight to 500-5000 grams the mean weight was 3321 grams and the median weight was 3345 grams. The skew was reduced to -0.82 and the kurtosis decreased to 2.61. This indicates restriction of the data made the data distribution look more like a normal curve.

The mean gestational age for the raw data was 38.51 weeks and the median was 39.00. Skewness was -3.21 and the kurtosis was 20.14. After delimiting gestational age to 20-42 weeks the mean was 38.66 and the mode was 39.00. The skewness was -2.82 and the kurtosis was 14.34 which indicate the restricted distribution was more like that expected for a normal curve.

Most breech and cephalic presentation babies across all ethnicities are term (92.68% cephalic, 79.87% breech) (Table 21) and weigh between 2500-
4000g (85.33% cephalic, 77.63% breech) (Table 21). Breech babies across all ethnicities are more likely to be girls (52.86%, crude OR 1.18, 95% CI 1.15-1.21) (Tables 21, 22) than to be boys. Breech babies are also more likely than are cephalic presentation babies to have musculoskeletal anomalies such as congenital hip dysplasia (crude OR 4.01, 95% CI 2.03-4.27) (Table 22). Black non-Hispanic mothers of breech babies are at greatest risk (crude OR 2.97, 95% CI 1.82-4.85) (Table 22) when compared to white non-Hispanic and Hispanic mothers. However, this type of congenital anomaly is reported in less than 1% of all pregnancies. While the babies of lowest gestational age (20-32 weeks) and the babies of lowest birth weight (500-1499g) are at the greatest risk of being born breech (crude OR 5.49, 95% CI 5.23-5.77 and crude OR 6.69, 95% CI 6.33-7.08 respectively) (Table 22) the risk is highest for babies of black non-Hispanic mothers (crude OR 9.61, 95% CI 8.81-10.48 for 20-32 weeks and crude OR 11.37, 95% CI 10.35-12.49 for 500-1499g) (Table 22). In the adjusted analysis low gestational age is still a risk factor for breech presentation (e.g. 20-32 weeks adjOR 6.42, 95% CI 6.10-6.76) (Table 23).

<table>
<thead>
<tr>
<th></th>
<th>Black non-Hispanic</th>
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<th>Hispanic</th>
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<td>Cephalic</td>
<td>Breech</td>
<td>Cephalic</td>
</tr>
<tr>
<td></td>
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<td>n</td>
<td>%</td>
<td>n</td>
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<td>21.67</td>
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*Reference Group
Table 22 Newborn Characteristics Crude Odds Ratios & 95% Confidence Intervals (1999-2003) Florida Birth Certificate Data Linked with Florida Medicaid/WIC Eligibility Data Comparing Breech and Cephalic Presentation by Maternal Ethnicity

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<td>8.81-10.48</td>
<td>5.11</td>
</tr>
<tr>
<td>33-36 weeks</td>
<td>1.54</td>
<td>1.39-1.71</td>
<td>2.14</td>
</tr>
<tr>
<td>37-42 weeks*</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Birth weight</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500-1499 grams</td>
<td>11.37</td>
<td>10.35-12.49</td>
<td>6.24</td>
</tr>
<tr>
<td>1500-2499 grams</td>
<td>1.83</td>
<td>1.67-2.01</td>
<td>2.39</td>
</tr>
<tr>
<td>2500-4000 grams*</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>4001-5000 grams</td>
<td>0.93</td>
<td>0.78-1.10</td>
<td>0.59</td>
</tr>
<tr>
<td><strong>Female Infant</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.07</td>
<td>1.00-1.15</td>
<td>1.23</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Musculoskeletal/Integumental Anomalies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2.97</td>
<td>1.82-4.85</td>
<td>2.75</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Reference Group


Null Hypothesis 3: There is no association between the risk for breech presentation and Medicaid or WIC eligibility.


The model which consists only of highly valid birth certificate covariates (birth weight or gestational age, maternal age, baby’s sex, and maternal parity) (Table 23) produced a max rescaled $R^2$ of 4.18% when gestational age was used rather than birth weight. When birth weight was used the max rescaled $R^2$ for the model exclusively with the highly valid variables was 3.18%. Therefore, the model with the variable gestational age rather than the variable birth weight was selected as the final model for the highly valid variables. Neither model had a Hosmer and Lemeshow goodness of fit statistic greater than 0.0001.
The model which consists of the highly valid birth certificate variables along with the moderately valid and poorly valid variables (Table 24) produced a max rescaled $R^2$ of 4.46%. This indicates that the addition of seven variables improved the explanatory value of the model by only 0.28% and did not improve the goodness of fit at all. Thus, the model with only the highly valid variables (Table 23) was selected as the most parsimonious model. The max rescaled $R^2$ indicates the best model explains only 4.18% of the total variance while the goodness of fit statistic indicates a very poorly fit model. A low goodness of fit may reflect poor data quality, improper specification of variables in the model, or important variables missing from the model.

Since the fit of entire model is not significant, all interpretation of individual variables should be very cautious. A significant finding for an individual variable may be due exclusively to chance. Additionally, although the overall fit of the model for this dataset is not good, the same model may fit other data better. However, the only identified logistic regression study which reported goodness-of-fit, also reported poor fit (Hosmer-Lemeshow goodness of fit = 0.02) (Roberts, et al. 1999).

<table>
<thead>
<tr>
<th>Medicaid/WIC Eligibility</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2477 (47.42)</td>
<td>0.74</td>
<td>0.72-0.76</td>
<td>1.03</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Ethnicity</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>White non-Hispanic</td>
<td>496938 (54.26)</td>
<td>1.39</td>
<td>1.35-1.43</td>
<td>1.69</td>
</tr>
<tr>
<td>Hispanic</td>
<td>228675 (25.07)</td>
<td>0.97</td>
<td>0.94-1.00</td>
<td>1.46</td>
</tr>
<tr>
<td>Black non-Hispanic*</td>
<td>186494 (20.45)</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Education</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-11 years</td>
<td>4425 (17.59)</td>
<td>0.71</td>
<td>0.79-0.84</td>
<td>1.09</td>
</tr>
<tr>
<td>12 years*</td>
<td>7920 (31.48)</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>13-15 years</td>
<td>6106 (24.27)</td>
<td>1.08</td>
<td>1.05-1.11</td>
<td>1.01</td>
</tr>
<tr>
<td>16-17+ years</td>
<td>6707 (26.66)</td>
<td>1.29</td>
<td>1.26-1.33</td>
<td>0.97</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Age</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-19 years</td>
<td>2302 (9.15)</td>
<td>0.70</td>
<td>0.67-0.73</td>
<td>0.58</td>
</tr>
<tr>
<td>20-24 years</td>
<td>4945 (19.66)</td>
<td>0.69</td>
<td>0.67-0.71</td>
<td>0.73</td>
</tr>
<tr>
<td>25-29 years*</td>
<td>6397 (25.45)</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>30-34 years</td>
<td>6641 (26.40)</td>
<td>1.28</td>
<td>1.24-1.31</td>
<td>1.25</td>
</tr>
<tr>
<td>35-39 years</td>
<td>3903 (15.51)</td>
<td>1.47</td>
<td>1.42-1.52</td>
<td>1.48</td>
</tr>
<tr>
<td>40-49 years</td>
<td>970 (3.86)</td>
<td>1.61</td>
<td>1.50-1.71</td>
<td>1.65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gestational Age</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-32 weeks</td>
<td>1944 (7.73)</td>
<td>5.49</td>
<td>5.23-5.77</td>
<td>6.42</td>
</tr>
<tr>
<td>33-36 weeks</td>
<td>3120 (12.40)</td>
<td>1.93</td>
<td>1.86-2.01</td>
<td>2.15</td>
</tr>
<tr>
<td>37-42 weeks*</td>
<td>20094 (79.87)</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Female Infant</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>13298 (52.86)</td>
<td>1.18</td>
<td>1.15-1.21</td>
<td>1.20</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First Infant Born</th>
<th>Crude OR</th>
<th>95% CI</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>13036 (51.82)</td>
<td>1.40</td>
<td>1.45-1.52</td>
<td>1.71</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

*Reference Value
Table 24: Logistic Regression Model of All Relevant Variables (1999-2003) Florida Birth Certificate Linked with Medicaid/WIC Eligibility Data, Number and Percentage of Breech Babies, Crude and Adjusted ORs & 95% CI for Comparing Breech and Cephalic Presentation. Dependent Variable is Birth Presentation. Independent Variable is Medicaid/WIC Eligibility

<table>
<thead>
<tr>
<th>Breech n (%)</th>
<th>Individual Variables</th>
<th>Final Model with All Variables Regardless of Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Crude OR</td>
</tr>
<tr>
<td>Medicaid/WIC Eligibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2477 (47.42)</td>
<td>0.74</td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Gestational Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-32 weeks</td>
<td>1944 (7.73)</td>
<td>5.49</td>
</tr>
<tr>
<td>33-36 weeks</td>
<td>3120 (12.40)</td>
<td>1.93</td>
</tr>
<tr>
<td>37-42 weeks*</td>
<td>20904 (79.87)</td>
<td>1.00</td>
</tr>
<tr>
<td>Maternal Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>496638 (54.26)</td>
<td>1.39</td>
</tr>
<tr>
<td>Hispanic</td>
<td>228675 (25.07)</td>
<td>0.97</td>
</tr>
<tr>
<td>Black non-Hispanic*</td>
<td>186494 (20.45)</td>
<td>1.00</td>
</tr>
<tr>
<td>First Infant Born</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13036 (51.82)</td>
<td>1.49</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Maternal Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-19 years</td>
<td>2302 (9.15)</td>
<td>0.70</td>
</tr>
<tr>
<td>20-24 years</td>
<td>4945 (19.66)</td>
<td>0.69</td>
</tr>
<tr>
<td>25-29 years*</td>
<td>6397 (25.43)</td>
<td>1.00</td>
</tr>
<tr>
<td>30-34 years</td>
<td>6641 (26.40)</td>
<td>1.28</td>
</tr>
<tr>
<td>35-39 years</td>
<td>3903 (15.51)</td>
<td>1.47</td>
</tr>
<tr>
<td>40-49 years</td>
<td>970 (3.86)</td>
<td>1.61</td>
</tr>
<tr>
<td>Poly- or Oligo-Hydramnios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>668 (2.66)</td>
<td>2.77</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Female Infant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13298 (52.86)</td>
<td>1.18</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Previous Terminated Pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7361 (29.26)</td>
<td>1.25</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Musculoskeletal/Integumental Anomalies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (0.29)</td>
<td>4.01</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Diabetes</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>949 (3.77)</td>
<td>1.53</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Placenta Previa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>198 (0.79)</td>
<td>2.57</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Maternal Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 0-11</td>
<td>4425 (17.59)</td>
<td>0.71</td>
</tr>
<tr>
<td>Grade 12*</td>
<td>7920 (31.48)</td>
<td>1.00</td>
</tr>
<tr>
<td>Grade 13-15</td>
<td>6106 (24.27)</td>
<td>1.08</td>
</tr>
<tr>
<td>Grade 16-17+</td>
<td>6707 (26.66)</td>
<td>1.29</td>
</tr>
<tr>
<td>Chronic Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6494 (0.71)</td>
<td>1.66</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Gestational Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33532 (3.68)</td>
<td>1.23</td>
</tr>
<tr>
<td>No*</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Reference Value
The final model (Table 23) indicates Medicaid/WIC eligibility is not associated with breech presentation (adjOR 1.03, 95% CI 1.00-1.06). The adjusted OR for White non-Hispanic women (adjOR 1.69, 95% CI 1.63-1.76) indicates they still have an increased risk of having a breech baby when compared to black non-Hispanic women. A woman giving birth to her first baby is at risk of having a breech baby (adjOR 1.71, 95% CI 1.67-1.76) than does a woman who had a previous birth. The fetus being a girl increases the odds of a breech presentation (adjOR 1.20, 95% CI 1.17-1.23). Low gestational age is still a risk factor for breech presentation (e.g. 20-32 weeks gestation adjOR 6.42, 95% CI 6.10-1.67) when compared to term babies. Additionally, advancing maternal age is still a risk factor for breech presentation (e.g. 40-49 years old adjOR 1.65, 95% CI 1.54-1.77) when compared to mothers 25-29 years old. Finally, education less than a high school diploma is now a risk factor for breech presentation (adjOR 1.09, 95% CI 1.05-1.14) when compared with a high school diploma.

Therefore, the logistic regression model (Table 23) indicates there is no association between Medicaid/WIC eligibility and breech presentation. Null hypothesis three is accepted. However, this conclusion must be regarded with extreme caution since the fit of the overall model is not significant.
CHAPTER FIVE
PRIMARY DATA

Introduction

The primary data section of the research was designed to further explore risk factors for breech presentation not captured in the secondary data analysis. This chapter reviews characteristics of qualitative research and presents the methods and results of the primary data portion of the study. The methods section is divided into the study design, population description, data collection, and analysis methods. The results section describes the sample then presents the results from the socio-demographic survey, the Hollingshead’s Index, the State Trait Personality Inventory (STPI), and the in-depth interviews. The in-depth interview results first compare the mothers of breech and cephalic presentation babies then present negative cases of mothers of cephalic presentation babies. Negative cases are instances which “appear to disconfirm” what the researcher has found. They are actually rich data which must not be overlooked because the allow the researcher to refine the model (LeCompte and Schensul 1999a:11). Negative cases offer an opportunity to refine the model by including or deleting information the negative case does not support. (See glossary). After presenting the negative cases, special cases will be presented in which the baby was breech presentation in the latter stage of the pregnancy and then turned to cephalic presentation. Finally, mothers of breech presentation babies are compared to each other.
Qualitative Research Overview

Qualitative research is embedded within the constructivist paradigm (AKA naturalist, hermeneutic, phenomenological, or interpretive paradigm) which views the world as a complex web of relationships. This paradigm differs from the positivist paradigm (AKA conventional or scientific paradigm) which is predominantly employed in quantitative research. The positivist paradigm interprets the world as sets of hierarchical, linear relationships (Shkedi 2005:2,3).

Within qualitative research intuition, the literature, data, and logic all play important roles in the stages of research from study design to presentation of results (Schensul, et al. 1999:55). The logic employed in qualitative research includes inductive, deductive, retroductive, and abductive logic. Inductive logic reasons from specifics to generalizations while deductive logic does the converse. Retroductive logic seeks out evidence to support hypotheses which explain observed phenomenon. Finally, abductive logic aims to understand rather than to explain. It relies on thick description to do so (Blaikie 2003:33-34).

Qualitative research is responsive to patterns observed during the course of fieldwork. Thus, the whole process of gathering data is iterative, and research questions and type of data gathered may change throughout the course of the study (Shkedi 2005:34). Qualitative research primarily seeks to explore questions rather than to disprove hypotheses (Shkedi 2005:33). As such it attempts to identify new variables and concepts that might help explain the research question (Shkedi 2005:36).

The process of altering the type of data collected and even the research questions throughout the research process is facilitated by the phenomena of researcher-as-instrument. Within this paradigm the researcher herself takes in observed and heard information. She then digests it, and determines what is important to the study. The important elements are then included in the data collected. The researcher is aware of her influence over what information is elicited and what aspects of the setting and behavior she notes as important as she participates in conversations and activities with the individuals in her study.
This level of observation and participation allows her to identify contradictions and congruencies between what is said and what is done.

Within the researcher-as-instrument paradigm, personal biases may limit the researcher’s capacity to collect valid and reliable data (Schensul, et al. 1999:273). Therefore, she must carefully consider the impact her a priori assumptions and underlying theoretical orientation have on her ability to collect data and the possible blind spots she may encounter within herself as instrument (Shkedi 2005:2,3). To do this, self-reflection is required. Upon reflection the researcher may deem certain personality or behavioral patterns do not reflect cultural competence and thus may elect to alter said patterns. She may also determine her pre-judgments prevent her from seeing certain patterns. If this is the case, the pre-judgments must be released (Schensul, et al. 1999:72-73).

While validity and reliability are important components of all research, means specific to qualitative research are employed to ensure them in qualitative research. Internal validity is the degree to which data reflect reality. Internal validity is enhanced in qualitative studies by six practices: 1) pilot test questions to ensure participants understand them, 2) ensure participant comfort during the interview by building their trust in the interviewer, 3) clarify questions upon request by the interviewee, 4) record interviews verbatim, 5) request participants review results prior to publishing, and 6) build redundancy into the study protocols (Schensul, et al. 1999:274, 281, 283).

Internal reliability is the probability that other researchers would reach the same conclusions given the same data. To enhance reliability in qualitative studies the researcher must unveil her biases. She ought also to enunciate her relationship to the study participants and to the study itself. Reliability is further enhanced by carefully describing the participants and the location of the study. Summarizing the sampling and observation protocols, and detailing theoretical constructs further aid in ensuring reliability. Finally, the analysis procedure must be carefully documented (Schensul, et al. 1999:275, 288-289).
Just as data collection methods diverge between qualitative and quantitative data, so does data analysis. Qualitative analysis is recursive and takes place in three stages: 1) Initial, 2) Intermediary, and 3) Final. The initial phase includes inscription, description, and transcription. Inscription occurs in the field and consists of self-monitoring for ethnocentric observation and attempting to view with new eyes while taking mental notes. Description consists of detailed fieldnotes which lead to, and capture, the initial hunches and interpretations of observations. Transcription entails typing up observations, interviews, and reflections (LeCompte and Schensul 1999a:12-19). The intermediary stage of analysis is also termed “tidying up.” This includes making copies of all data, ordering fieldnotes, creating a data management system and initial read-through of data (LeCompte and Schensul 1999a:39). The final stage of analysis involves reading the data thoroughly, coding the data, reorganizing the data, making counts, and thinking laterally about the data (LeCompte and Schensul 1999a:12-13). Ultimately, the goal of qualitative research is to create a story and to assign meaning to that story (LeCompte and Schensul 1999a:2).

The main objective of the qualitative portion of this study is to explain the underlying processes observed in the secondary data analysis by exploring the possibility that coping strategies might influence birth presentation (Dale, et al. 1988:41). Specifically, the secondary data shows breech presentation occurs disproportionately in white non-Hispanic women and in college educated women who are not Medicaid/WIC eligible. However, in the logistic regression model the socio-economic proxies of education and Medicaid/WIC eligibility appear to influence breech presentation minimally or not at all and the entire model accounts for less than 6% of the variance of risk factors for breech presentation. This suggests important variables may be missing in the model or that the data are not fully measuring the construct. The qualitative analysis seeks to explore characteristics of mothers of breech presentation not measured in the secondary data which may help explain risk factors for breech presentation and may further elucidate why breech presentation is more prevalent in said populations.
Primary Data Question and Hypothesis Tested

The question explored in the primary data was:
Do maternal psycho-social-cultural factors influence birth presentation?

The hypothesis tested in the primary data was:
Null Hypothesis 4: There is no association between maternal occupation and the risk of singleton breech presentation.

Primary Data Methods

Study Design Primary Data

A purposive, criterion-based, sampling design was selected for this study. This non-randomized qualitative sampling framework recruits individuals to participate who meet prescribed characteristics (LeCompte and Schensul 1999b:113). This approach was further elaborated by attempting to use quota sampling. Quota sampling is beneficial in exploratory research because the researcher attempts to capture variation in a population by ensuring representation of persons with specific characteristics (Brewer and Hunter 2006:93; Schensul, et al. 1999:245-246). The purposive component of the sampling framework entails the inclusion and exclusion criteria. The quota component of the sampling framework entails inclusion of a certain number of women from different ethnic and socio-economic categories. Because this is a non-random sample validity is challenged since chance is not controlled. In all non-random samples, including this study, findings are not automatically invalidated although they may not be well generalized (Spicer 2005:38).

Originally the study was designed to take place in the West Central Florida region. Data collection was to take place in person. The study design was augmented when insufficient numbers of mothers of breech babies were recruited. At that point the study was extended to include Southern Florida and later the rest of the United States. Participants in Southern Florida and the rest of the United States completed surveys online or were mailed the instruments.
Interviews took place on the phone. During the last third of the study, all participants completed online or mailed surveys and were interviewed on the phone.

The qualitative study had two parts. The first part consisted of signing the informed consent document and filling out the State Trait Personality Inventory (STPI) and the socio-demographic survey. The second part was an in-depth interview which took place on a different day. The first encounter lasted about one hour and the second lasted about two hours. Informed consent was obtained in writing or online prior to completion of any instrument.

The STPI was selected after reviewing the psychology literature about affect and adverse pregnancy outcomes. The literature on affect and pregnancy outcomes has mixed results, as addressed in a previous chapter. The researcher consulted with noted psychologist Dr. Charles Spielberger, University of South Florida professor, who recommended the STPI as the appropriate instrument to measure the relationship between affect and pregnancy outcomes. Since the STPI had not been used in any of the psychology studies reviewed, and thus would chart new territory, the researcher decided to use the STPI. This instrument, however, has not been validated specifically for women who were pregnant the year prior to assessment.

The STPI is a validated psychometric instrument consisting of 80 items that compare state and trait for anger, depression, anxiety, and curiosity (Appendix U). In addition to evaluating anger, anxiety, depression, and curiosity the STPI includes four subscales which may be scored for angry temperament character, angry reaction, dysthymia (i.e. a depressed or gloomy mood), and euthymia (i.e. a normal non-depressed, relatively positive mood). The three manifestations of anger assessed by the STPI differ slightly from each other. Persons with high levels of trait anger readily perceive unfair treatment while those with high levels of trait anger temperament are easily provoked and express that anger. Finally, persons with high levels of trait anger reaction are sensitive to criticism and respond with anger.
Trait anxiety is defined by the STPI as the perception of danger in many situations. Trait curiosity is identified by the STPI as a frequent feeling of curiosity. Curiosity is a positive indicator of mental health and may ameliorate the affects of anger, anxiety, and depression. Persons with high levels of depression experience anxiety and anger but direct them inwards and express them as low self-esteem (Spielberger and Reheiser 2003; Spielberger, et al. 1995).

Only the trait component of the inventory is analyzed in this study since this is a retrospective study and the state of pregnancy has passed. Therefore, the state component of the index is irrelevant to the study since the inventory was assessed in the post-partum period and the study does not deal with the post-partum period. The trait assessment is comprised of four 10-item scales. To assess these trait emotions participants indicate how often feelings of anger, anxiety, depression, and curiosity are generally experienced (1) Almost never, (2) Sometimes, (3) Often, and (4) Almost always. Alpha coefficients reported range from .80 to .93 (Spielberger, et al. 2003:216, 223).

The socio-demographic survey was designed especially for this study and consists of 118 items (Appendix V). Variables were selected based upon a review of the literature. Specifically, variables that were identified as potential risk factors for breech presentation were included along with variables that were critiqued as missing in other studies. Additionally, variables were included that attempt to explore the socio-cultural experience of participants before, during, and after pregnancy. The primary purpose of the socio-demographic survey was to develop probes for the interview. The instrument was piloted and pre-tested (Czaja and Blair 2005:105, 121; Schensul, et al. 1999:189). Early in the data collection process the researcher identified several additional relevant variables to explore which were then added. The socio-demographic survey questions consist of fill in the blank, yes/no, and multiple choice responses. Finally, recalled dietary intake was recorded during pregnancy. Diet was not analyzed in this study.
Unlike stand-alone qualitative surveys (Schensul, et al. 1999:167-169) the socio-demographic survey was designed to give an overview of the person that would then be used as the foundation for the in-depth interview (Appendix W). Because of this, sensitive questions (such as previous abortions or miscarriages) are presented in a yes/no format and intended to be followed-up in the interview. However, all respondents did not participate in the interview therefore the survey data is more limited than was originally intended.

Ultimate Surveyor was the online software used to collect the informed consent document, the STPI, and the socio-cultural survey. Branching rules were created which did not allow participation of individuals who did not meet inclusion/exclusion criteria or who did not “sign” the informed consent. (i.e. women who did not meet the inclusion and exclusion criteria were diverted to a page which thanked them for their interest but told them they were not eligible and could not participate. Women who were eligible but did not sign the informed consent were diverted to a page which thanked them for their interest and gave the researcher’s contact information. Neither group of women was allowed to participate). Only women who met the eligibility requirements and who signed the inform consent were allowed to participate.

All online responses were anonymous. Upon completion of the instruments individuals were requested to contact the researcher by email or phone to schedule an interview. Seventeen mothers of breech presentation babies and eighteen mothers of cephalic presentation babies submitted online responses. Of these, 12 mothers of breech presentation babies and seven mothers of cephalic presentation babies completed the interview. This is an attrition rate of 29% for mothers of breech babies and 61% for mothers of cephalic presentation babies.

The benefit of online surveys is fast turn around and low cost (Czaja and Blair 2005:40). An additional benefit was accrued in this study because the hidden population of breech baby mothers was able to be targeted for recruitment. Disadvantages of online surveys include lack of access to the
computer by some in the population. This lack of access is along socio-economic lines so that disadvantaged persons have less access to the computer than more advantaged persons (Czaja and Blair 2005:43). However, this problem is somewhat ameliorated because persons in low socio-economic strata were heavily recruited through County Health Centers, Head Start, and WIC centers.

In-depth, semi-structured interviews were conducted with 75 participants. Nineteen of the interview participants were recruited online and 56 were not recruited online. The content of the interview included in-depth information on early life, pregnancy, labor & delivery, and recovery; cultural knowledge related to advice given women about how to have a healthy pregnancy or an easy labor and delivery and why some babies are born breech. Furthermore, descriptions of practices during pregnancy were elicited such as work schedule and work requirements, food consumption, and exercise routine. Questions were temporally ordered and organized by topics. Questions were also ordered by least invasive to more invasive. For instance, questions about baby’s weight were asked prior to questions about a previous miscarriage or abortion. Any inconsistencies in the socio-demographic survey were discussed. For instance, if a participant noted a specific pregnancy complication on the survey, but did not say she had a pregnancy complication on the yes/no response section, we would discuss the difference and make the appropriate change.

Previous research on adverse pregnancy outcomes focuses primarily on psychosocial factors during pregnancy (Tiedje 2003). This study was designed to ensure internal validity by pilot testing the questions and by creating a conversational atmosphere during the in-depth interview in which participants could ask for clarification about questions. Additionally, the participant became acquainted with the researcher through several contacts prior to the interview. Internal validity was also attempted through verbatim recording of the interview and participant review of the study results. Finally, redundancy was built into data collection by visiting themes multiple times. Initially themes were addressed in the survey in a superficial, often dichotomous fashion (LeCompte and Schensul
Later, these questions were developed within the context of the in-depth interview. Likewise, emotions, first evaluated in the STPI, were further probed in the survey and finally discussed at length in the in-depth survey. In this way data were triangulated. Triangulation of data heightens the probability of accuracy (LeCompte and Schensul 1999b:131).

Validity of response for online participants who did not schedule an in-depth interview was checked to some degree by reviewing IP addresses for repeats. An IP address is a unique number allocated to each computer. By checking IP addresses one can determine if the same computer was used for multiple responses. Although this does not guarantee that all online responses are from different individuals, it does check to see if the same IP address was used multiple times which would arouse suspicion. No IP addresses were repeated. All surveys for individuals not participating in an interview were reviewed for reasonableness of response as another means of ensuring validity.

Internal reliability in this study is achieved through careful description of participants and location of the study. Sample, observation, analytic protocols, and theoretical constructs are detailed in the write-up. Finally the researcher’s biases and relationship to study participants are identified. One of my biases is the mechanical model for the etiology of breech presentation is limited in its ability to explain risk factors for breech presentation. Another of my biases is the conviction of the importance of the mind-body-spirit connection in explaining physical experiences. Finally, a bias I have is that relationships begin in utero. I also had a pre-existing relationship with one of the study participants who had a breech baby.

**Study Population Primary Data**

Mothers of breech presentation babies may be considered to be a “hidden population” in some regards. Although not engaged in clandestine activities, they are a non-clinical, non-institutionalized population which has nothing which holds them together besides their status as having given birth to a breech presentation
baby. They are a difficult population to recruit because there is no natural enclave. Additionally, it is difficult to identify boundaries of the population. Because of these limitations selecting a representative sample is arduous (Singer 1999:125, 130). The researcher began determining boundaries for this hidden group by identifying inclusion and exclusion criteria as stated above (Singer 1999:143).

Three criteria for sampling a hidden population exist: 1) Is the correct population identified? 2) Can the sampling strategy successfully recruit? 3) Can the sampling strategy recruit for follow-up? (Singer 1999:160). To avoid sampling bias the population must be known well enough through secondary data or some other means to ensure the sample is representative (Singer 1999:169). The researcher completed a comprehensive literature review of risk factors for breech presentation prior to collection of primary data. She also completed her own analysis of secondary data during the period primary data were collected. Over the course of recruitment the researcher persistently augmented her sampling strategy in an attempt to capture participants. Because of this, the study population grew from the West Central Florida coast region to later include southern Florida, and finally to include all of the United States. All participants were available for follow-up except those who completed only the Ultimate Surveyor portion of the study.

In addition to the three sampling criteria, four items must be considered when attempting to recruit an unbiased representative sample: 1) Population characteristics must be accurately identified: In this study before most of the breech participants were enrolled the researcher already had the conclusions of the secondary data. Since the findings of the secondary data and the publish literature agreed, she felt she had a general understanding of the population characteristics in question, 2) Sufficient participants must be recruited: In the study the original research plan was to collect a sample stratified by ethnicity, education, and Medicaid/WIC eligibility. However, this strategy became less important when these variables were determined to be marginally influential on
breech presentation in the final logistic regression model. Instead, the research focused on including all eligible mothers of breech presentation babies until saturation was reached. 3) Intra-group heterogeneity must be recruited: Twice as much data was collected for mothers of cephalic presentation babies than for mothers of breech presentation babies. The sample of mothers with cephalic presentation babies was much more diverse ethnically and educationally than was the breech presentation sample.

The inclusion criteria of the study are 1) the baby was born within the past 12 months, 2) the baby was a singleton, and 3) the mother was at least 18 years old. The exclusion criteria are 1) the mother was pregnant at time of contact, and 2) the birth and pregnancy took place outside the US. Initially the researcher hoped to include ten black non-Hispanic women, ten Hispanic women, ten white non-Hispanic women, ten women on WIC/Medicaid, ten women not on WIC/Medicaid, ten women with a high school education or less, and ten women with at least some college in each of the two groups investigated. Each group was projected to contain approximately 40 members to reach these demographic parameters and data saturation. However, the data parameters were not reached for the mothers of breech presentation babies even after 18 months of data collection. Even though the strata numbers were not reached for ethnicity and SES, there was saturation of interview data for mothers of breech presentation babies. This means that no new themes emerged in the interviews, independent of ethnic or SES status of the mother.

All mothers of breech presentation babies who met the inclusion/exclusion criteria were admitted to the study. All mothers of cephalic presentation babies who met the inclusion/exclusion criteria were admitted to the study until the recruitment for white non-Hispanic mothers with cephalic presentation babies was closed three months prior to closing the entire study. After the white non-Hispanic strata data collection was closed only a few mothers of cephalic presentation babies called to be included in the study. All these women were white non-Hispanic with less than a college education.
Because of the difficulty in recruiting minority women for both cases and controls, excess white non-Hispanic women were enrolled. In November 2006 the control group was closed to white non-Hispanic women (18 months after enrollment opened). In January 2007 all further enrollment was closed.

**Data Collection Primary Data**

Women were recruited for the study by posters, flyers, and internet announcements. Posters were placed in obstetric, pediatric, chiropractic, and acupuncture clinics in the West Central Florida region and the South Florida region. Posters were placed in Head Start centers, libraries, birthing centers, grocery stores, children’s furniture and clothing stores, daycare centers, colleges, the county health department, and WIC centers in the West Central Florida region. A two week announcement for the study was placed in a local West Central Florida paper. Two major hospitals in the West Central Florida region placed thousands of study fliers in the discharge materials given to new mothers. When the study was unable to enroll sufficient numbers of mothers of breech presentation babies, internet announcements were placed on breech baby websites and parenting websites. Additionally, the researcher participated in a radio interview about the project and participant recruitment.

Women who were interested in the study contacted the researcher on the internet or by telephone. The researcher reviewed inclusion and exclusion criteria with each woman and then described the study parameters. If the woman was interested in participating, she and the researcher determined how best to collect the data. Women who completed the written and the interview portion of the study received $40. Women who only completed the written portion of the study received $20 unless no contact information was available (i.e. women completed the forms anonymously online).

Because of the nature of the stories told in this study, the interviewer-as-instrument is the “only instrument flexible enough to capture the complexity, subtlety, and constantly changing situation which is the human experience”
The interview generally did not occur until the researcher had approximately four previous contacts with the participant, one of which was in person. It was hoped this would create a greater sense of trust and friendliness in the interview environment.

In the initial phase of the study, when only participants from the West Central Florida region participated, the researcher went to participants’ homes or to a convenient public space to meet the women and have them complete the informed consent, the STPI and socio-demographic survey. This served as a means of establishing a relationship. Completion of paperwork took between 30 minutes to 1 hour. Following completion of paperwork the date and time of the interview was determined. The interview was tape-recorded and took place in the participant’s home or a public space and lasted 90 minutes to two hours. A minimum of five contacts were made with each woman (an initial contact, two phone calls to remind of paperwork appointment and interview appointment, the meeting for completion of the paperwork, and the meeting to complete the interview).

STPI and socio-demographic survey data were collected in three ways: 1) In person, 2) Online, and 3) Filling out hard copies mailed to participants. Ideally the data were collected in person. If that was not possible they were collected either by mailing the forms to participants or by the participant accessing the online version of the STPI and socio-demographic survey. Collection of data in person in the home setting was preferable because it allowed the participant to feel most comfortable in her surroundings and gave the researcher the opportunity to observe the participant in her natural setting much like abridged ethnographic research. Many times while in the home of participants the researcher met husbands, other children, parents, and friends.

Collecting information through in-depth interviews is a process in which researcher and participant make meaning together through conversation. Thus the experiences of the participant are not only related, but re-thought, and sometimes even re-conceptualized (Shkedi 2005:59). Participants appeared to
thoroughly enjoy sharing their early life history and pregnancy experiences. Many stated that they hadn’t been able to talk in depth about their pregnancy and labor/delivery experience and appreciated the opportunity. Some women were so grateful for the experience they indicated they felt the experience had been highly therapeutic and healing. On multiple occasions both the participant and researcher were brought to tears in recounting her life and pregnancy experiences.

Interview data were collected in two ways. Women were interviewed in person (in their homes or in a public space). Additionally, women who were not able to be interviewed in person were interviewed on the telephone. No identifying information was recorded on the tape. Instead, a unique identifying code was used for each participant. During the interview session of approximately 1.5 – 2 hours the participants were offered breaks or the option of continuing at a later date. Typically participants elected to complete the entire interview in one sitting. The most fragmented interview took place in three sections over the course of a week.

When data collection was conducted in the home, family and friends were frequently present. If family and friends were present they sometimes participated in the interview which provided increased depth in relation of events. Two mothers of breech babies were themselves born breech. The mothers of these two participants were visiting while the data were collected. The participants spontaneously volunteered their mothers to be interviewed. As a result those grandmothers were also interviewed.

The presence of family members does not always enhance relay of information. The presence of family members or friends may also provoke a woman to restrict or alter her responses (Schensul, et al. 1999:191) as was noted on at least one occasion. If adult family members were present during the interview the researcher felt it was more socially acceptable to continue with the interview with the family member present than to request a private interview.
On other occasions mothers remonstrated their children or left them to cry. The researcher felt conflicted in these situations because she was unsure if her presence were altering normal behavior to a degree that was harmful to the children or the family. Most often she would give the mothers permission to investigate the situation or to continue the interview later. In all cases, mothers were advised at the initiation of the interview that they could stop at any point.

During an interview, information elicited via questions is not the sole type of data collected. The researcher felt her overall objectives were not compromised in participating in the aforesaid situations as she was given the opportunity to witness interaction between the participant and family members that further helped explain the life setting of the participant. Furthermore, survey and interview responses are never taken at face value in qualitative research. The more complex data gathering environment of the home allowed for more depth, a higher quality of data, and the possibility of contextualizing verbal responses.

Some women required very little prompting to tell their life history and pregnancy history. Others required specific questions to elicit specific information. Women who needed more prompting to tell their story tended to have shorter interviews while women who spontaneously told their story tended to have longer interviews. No interviews were shorter than one hour and none were longer than two and one-half hours.

**Analysis Methods Primary Data**

Mothers of breech presentation babies were compared with mothers of cephalic presentation babies in this study. This comparison was extended to include a comparison of preterm babies or babies who weighed less than 2500 grams (hereafter referred to as small babies) with term babies who weighed more than 2500 grams. Finally, mothers of breech babies were compared with each other.
Qualitative data is collected to the point of data saturation rather than to some particular n. This strategy of sampling allows for analysis of domains but cannot be used to analyze distribution of domains within the population. Probabalistic sampling is necessary to make those types of assertions (Schensul, et al. 1999:264). Inferential statistics are not appropriate for non-probability samples. Only descriptive statistics can be used with purposive samples. Therefore, neither parametric nor non-parametric tests were conducted for the primary data (Blaikie 2003:159, 171; Gravetter and Wallnau 1995:392; Hatcher and Stepanski 1994:209,237).

Transcription of early interviews immediately after the encounter allowed the interviewer to become aware of bias she was introducing to the study by asking leading questions, redirecting the conversation, interrupting the conversation, and inadequately following-up on subjects the participant introduced (Schensul, et al. 1999:144). By carefully monitoring self-conduct in interviews the researcher was able to hone her skills and decrease the introduction of researcher bias. Fortunately, early interviews were conducted with mothers of cephalic presentation babies. Because mothers of cephalic presentation babies are well-represented in the study no important information was lost.

Responses to the STPI and socio-demographic survey were input into an Access database by one individual reading codes on non-identified forms to the researcher who typed them into the database. Each observation was checked throughout input by assuring both reader and in-putter were on the same question number. After input, accuracy was tested by reviewing each answer for three complete observations. After no errors were found arbitrary responses for the following five observations were checked for accuracy. After no errors were found approximately every fifth observation was arbitrarily selected to have arbitrarily selected responses reviewed. No errors were found.

Prior to exporting the Access database into SAS 9.1.3 the database was reviewed again for missing responses and unusual responses. Each missing and
unusual response was double checked with the raw data. No errors were found. Data cleaning continued in the initial stage of data analysis by running frequencies and looking for unexpected responses or outliers (LeCompte and Schensul 1999a:130). During the data cleaning phase responses were standardized. For instance some people responded to the duration of employment in months and others in years. All responses were standardized into years or fractions thereof.

Data manipulation was conducted in SAS to convert pounds and ounces into grams, convert feet and inches into total inches for maternal height, create birth weight categories and gestational age categories and so forth. Other continuous data were categorized to create a dichotomous response for parity and for previous abortion or miscarriage. Frequencies, row percentages, means, and standard deviations were computed. These descriptive analyses occurred after tentative models had been formulated based on the interview analysis.

Occupation and education were compared for mothers of breech and cephalic presentation babies using Hollingshead’s Index of Social Position (Miller and Salkind 2002:462-469). Occupations are ranked by prestige into seven groups which include consideration of size of business and nature of occupation (Appendix X). Each occupation scale score is weighted by seven to produce an occupation score. There are also seven categories of education which are ranked by number of years of education completed (Appendix Y). The scale score for education is weighted by four to produce an education score. The occupation score and the education score are added to produce the index of social position score. Lower scores indicate higher social status. Scores of 11-17 indicate upper class, 18-31 indicate upper-middle class, 32-47 indicate middle class, 48-63 indicate lower-middle class, and 64-77 indicate lower class.

To determine the relationship between household size and income, the poverty income ratio was calculated by dividing household income by the applicable federal poverty line for 2005, the year for which most incomes were reported (Appendix Z) (Anonymous 2005). A ratio below 1.0 indicates a
household below the federal poverty limit while a ratio of 5.0 or more is the highest category recognized (Robbins, et al. 2000). A 3.0, therefore, represents middle class, 2.0 represents lower middle class, and 4.0 represents upper middle class.

Interviews were transcribed by the researcher and by a professional transcriptionist. Transcriptions were returned to participants to keep. Participants were asked to identify any changes or additions they would like to make. No requests for changes were made. Only two transcripts were not successfully delivered to participants. Those participants were contacted by postal mail, email and by telephone to no avail. Thus at least all but two transcripts were deemed to be valid by the participants themselves.

Qualitative data analysis is recursive such that initial analysis begins while data is collected. This allows the data collection process itself to be iterative (LeCompte and Schensul 1999b:147; Shkedi 2005:82). In my study, as is often the case in qualitative studies, as patterns began to emerge new questions arose which were later expanded or discarded as more data were collected.

In this study multiple case narrative is used rather than oral history as the analytic paradigm since groups were being compared rather than individuals (Shkedi 2005:21). Multiple case narrative analysis consists of four phases: 1) The initial stage of analysis, 2) The mapping stage of analysis, 3) The focused stage of analysis, and 4) The theoretical stage of analysis. (Shkedi 2005:80). In the initial phase of analysis the researcher thoroughly read the interviews (with which she was already familiar) and provisionally categorized data in each interview based on the participant’s descriptions rather than a pre-established rubric (Shkedi 2005:96). These categories are considered to represent the relationship between guiding concepts and the actual data (Shkedi 2005:88). Fragmentation of the data into categories allows for patterns to begin to be identified (Shkedi 2005:83).

In the mapping stage of analysis, relationships between categories and components within categories are identified on horizontal and vertical axes much
like hierarchical branching. This process identifies relationships between categories (Shkedi 2005:103-107). Emergence of patterns is a result of systematically applying inductive logic to categories and abstracting overarching themes in compared groups (LeCompte and Schensul 1999a:68). During the mapping stage transcripts were coded in MaxQDA using a branching coding format (Appendix AA). Themes for codes were derived from the literature and from the theoretical basis of the research. New themes also emerged from the data themselves. Thus, coding took place top down and bottom up (LeCompte and Schensul 1999a).

The focused stage of analysis consists of codifying the categories defined in the previous step by building descriptive narratives around each and selecting a core category (AKA the main theme) upon which to base the story. This core category is found repeatedly in relationship to other categories (Shkedi 2005:121-23). Patterns may emerge in the following ways: declaration (e.g. “This is the way things are”), frequency, omission, similarity, co-occurrence, corroboration, sequence, and a priori hypothesizing (LeCompte and Schensul 1999a:98).

Upon completion of coding each participant was profiled. Global impressions of each participant were recorded, transcriptions were re-read, and salient characteristics of the person or life experiences were recorded as themes. Inter-respondent matrices were created in Excel spreadsheets which binarized all participants for each emergent theme (Onwueguzie and Teddlie 2003). Thus, each theme was quantified by giving each participant a 1 if the theme was present in her narrative or a 0 if absent (Onwueguzie, et al. 2007; Tashakkori and Teddlie 1998). Frequencies and percentages were calculated for each theme to determine the prevalence of each (i.e. frequency effect size) (Onwueguzie 2003).

Women with similar thematic characteristics were grouped together and distinct categories of mothers of breech and cephalic presentation babies emerged. Women who had cephalic presentation babies and were similar to
women in each category of mothers of breech presentation babies were compared for dissimilarities. These exceptions to emergent patterns were identified to further elaborate the pattern and to reveal limitations of the pattern. This identification of negative cases is an important stage in the analysis because it impedes drawing premature and possibly incorrect conclusions about the data (LeCompte and Schensul 1999b:153). Negative cases are examples from the cephalic presentation group which do not follow the pattern established by the majority in that group.

Seven personality characteristics differentiated mothers of breech presentation babies from mothers of cephalic presentation babies. Mothers of breech presentation babies were more often idealistic, analytical, polished, overextended and fearful. In contrast, mothers of cephalic presentation babies, particularly exemplified by the negative cases, evidenced flexibility and pragmatism. When mothers of breech babies were compared to each other, two additional domains termed mournful and abuse emerged (Table 25). Often factors which came to be included in each domain were self-identified by the mothers themselves (i.e. declarative statements). However, the characteristics of flexibility and pragmatism were appreciated by their absence in the narratives of mothers of breech presentation babies.
Table 25: Definitions of Mothers’ Personality Domains

<table>
<thead>
<tr>
<th>Domain</th>
<th>Definition</th>
</tr>
</thead>
</table>
| Idealistic     | • Self-defined as “Overachiever”  
• Self-defined as “High-strung”  
• Adamant about what is “right”  
• Reported disappointment if things do not turn out exactly as planned  
• Work hard to make plan come to fruition |
| Analytical     | • Self-defined as “Analytical”  
• Women who report excelling in complex decision-making  
• Women who report enjoyment of cognitive activities |
| Polished       | • Promotes the appearance of having a perfect family, home, and self, even if on the inside she doesn’t feel that way.  
• Has a well-groomed image  
• Great care of personal appearance, reputation, family, and home |
| Overextended   | • Self-defined as “Busy”  
• Takes on more than she can comfortably accomplish  
• Insufficient time to rest or recreate |
| Fearful        | • Fear of losing index pregnancy  
• Fear of an adverse pregnancy outcome such as congenital anomalies  
• Fear of the pain of labor and delivery  
• Fear of not being able to be a good parent |
| Mournful       | • Women who report sadness, guilt, or anger over a previous miscarriage or abortion  
• Women who report they are unable to fully enter into the index pregnancy because a previous pregnancy outcome is unresolved |
| Abuse          | • Women who relate a history of personal physical, sexual, or verbal/emotional abuse  
• Women who relate a history of being exposed to someone in their family being abused |
| Flexible       | • Focus on process  
• Multiple paths are acceptable  
• Able to change mind and plan of action if circumstances change  
• Able to think creatively about options |
| Pragmatic      | • Focus on outcome  
• Reality-based  
• Experiences her emotions, but is not stuck in them. She is able to work through them and find a viable solution to the situation  
• Knows when to give up or give in  
• Accepts some things cannot be changed |

Upon completion of the focused stage of analysis the researcher may elect to continue to the theoretical stage of analysis. This stage builds on the descriptions of the focused analysis stage and links those descriptions to the tacit theory participants imply in their narratives (Shkedi 2005:131). After the researcher completed the focused analysis she returned to the literature and reviewed the theory which under-girded the research. She was then able to place
her findings within the context of theory and extend that theory to explain the data and inversely extend the data to modulate the theory.

In the post-hoc analysis, mothers of breech presentation babies were evaluated by attachment theory. Personality characteristics of mothers of breech presentation babies were similar to those which characterize ambivalent attachment. Ambivalent attachment style is typified by six dimensions identified in the literature.

1. Mother inconsistently emotionally available (D1)
2. Mother inconsistently responsive to baby’s needs (D2)
3. Mother intrudes mental state onto baby (D3)
4. Baby anxious (D4)
5. Baby overly clingy (D5)
6. Baby cannot be soothed (D6)

Evidence for attachment style was garnered through the oral histories, observations of the dyad, maternal comments on her baby’s behavior, maternal explanatory model development, intra-uterine relationship, and previous pregnancy or breech birth experience (Table 26).
### Table 26 Ambivalent Attachment Determination

<table>
<thead>
<tr>
<th>Type of Data</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Histories from Mothers whose Breech babies</td>
<td></td>
<td>Report increased consistency in parenting behavior</td>
</tr>
<tr>
<td>observed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother is awkward and impatient with baby (D1, D2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother drowns baby in attention then ignores baby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D1,D2) Mother fearful about baby’s health or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>outcome (D3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers’ report on baby’s behavior</td>
<td>Baby is unable to be soothed (D4, D5, D6)</td>
<td></td>
</tr>
<tr>
<td>Mothers’ explanatory models</td>
<td>Unable to imagine why baby might be breech (D2)</td>
<td>Complex and well-developed</td>
</tr>
<tr>
<td>Mother fearful about birth, pregnancy loss, or</td>
<td>Single word response or flippant response (D2)</td>
<td></td>
</tr>
<tr>
<td>parenting (D3) Mother fearful about baby’s health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or outcome (D3) Mother fearful about baby’s health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and outcome (D3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers’ report of index pregnancy relationship</td>
<td>Mother asked baby to care for her (D2)</td>
<td>Mother parented fetus by reassuring she was caring for baby</td>
</tr>
<tr>
<td>Mother fearful about birth, pregnancy loss, or</td>
<td>Mother fearful about birth, pregnancy loss, or parenting (D3)</td>
<td></td>
</tr>
<tr>
<td>parenting (D3)</td>
<td>Inconsistent interaction with baby (D1, D2)</td>
<td></td>
</tr>
<tr>
<td>Mother’s previous breech pregnancy report</td>
<td>Mother reported detachment from previous breech baby and contrasts it with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>closeness she experienced with index pregnancy (D1, D2)</td>
<td></td>
</tr>
</tbody>
</table>

### Primary Data Results

The results section will begin with an overview of the study sample. Next, the results from the socio-demographic survey will be reviewed. The socio-demographic survey results will first be presented in a series of tables and later pieces of the survey will be presented in the form of graphs of the Hollingshead Social Index. After the socio-demographic survey results, the State Trait Personality Index (STPI) results are presented. Finally, results from the in-depth interviews will be presented. First, interviews with mothers of cephalic presentation babies are compared with interviews with mothers of breech presentation babies. Then, atypical mothers of cephalic presentation babies (i.e.
negative cases) are compared with mothers of breech presentation babies. Finally, mothers of breech presentation babies are compared with each other.

**Sample Primary Data**

The entire sample consists of 114 mothers. Mothers of cephalic presentation babies represent 72 individuals while mothers of breech presentation babies account for 42 participants. Of the 114 women who completed the STPI and the socio-demographic survey, 52 mothers of cephalic presentation babies and 23 mothers of breech presentation babies also completed the in-depth interview.

Mothers found out about the study in a variety of ways. Most women found out through the internet, friends, the hospital in which they gave birth, or their pediatrician (Table 27). Information on enrollment source is not available for the women who completed the surveys online but did not elect to participate in the interview.

**Table 27 Recruitment Source for Interview Participants (Primary Data): Count and Percentage Comparing Mothers of Cephalic Presentation and Breech Babies. Recruitment Source Not Known for All Participants**

<table>
<thead>
<tr>
<th>Recruitment Source</th>
<th>Cephalic n (%)</th>
<th>Breech n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>7 (12.9)</td>
<td>12 (48.0)</td>
</tr>
<tr>
<td>Friends</td>
<td>9 (16.7)</td>
<td>5 (20.0)</td>
</tr>
<tr>
<td>Pediatrician</td>
<td>11 (20.4)</td>
<td>3 (12.0)</td>
</tr>
<tr>
<td>Hospital</td>
<td>9 (16.7)</td>
<td>2 (8.0)</td>
</tr>
<tr>
<td>OB</td>
<td>1 (1.9)</td>
<td>2 (8.0)</td>
</tr>
<tr>
<td>Newspaper</td>
<td>0 (0)</td>
<td>1 (4.0)</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>4 (7.4)</td>
<td>0</td>
</tr>
<tr>
<td>College</td>
<td>3 (5.6)</td>
<td>0</td>
</tr>
<tr>
<td>WIC</td>
<td>3 (5.6)</td>
<td>0</td>
</tr>
<tr>
<td>Head Start</td>
<td>2 (3.7)</td>
<td>0</td>
</tr>
<tr>
<td>Daycare</td>
<td>2 (3.7)</td>
<td>0</td>
</tr>
<tr>
<td>Birthing Center</td>
<td>2 (3.7)</td>
<td>0</td>
</tr>
<tr>
<td>Library</td>
<td>1 (1.9)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>54 (100.2)*</td>
<td>25 (100)</td>
</tr>
</tbody>
</table>

*Rounding error*

The state of residence is known only for women who participated in the in-depth interviews. The cephalic presentation sample consists of 46 mothers from
Florida, three from Utah, two from California and North Carolina, and one from Washington. The breech presentation sample includes ten from Florida, four from Texas, and one from Oregon, Oklahoma, Illinois, Georgia, Washington, California, Kentucky, and New York.

With a case to control ratio of nearly 1:2, near matching was afforded for particular life events, health experiences, or physical anomalies. For instance, both a case and control mother had a uterine fibroid. In other situations a mother’s previous non-breech pregnancy could be compared with her index breech pregnancy. For example, one case had a unicornate uterus. However, she had carried a previous pregnancy to term and delivered a cephalic presentation baby.

The sample is not representative of the general population as is clearly illustrated by the proportion of participants who have a breech presentation baby in her family or circle of friends. Nearly 40% of all mothers of cephalic presentation babies had a family member who had been born breech while over 50% of all mothers of breech presentation babies did. Clearly, most individuals who elected to participate in this study did so because breech presentation was of interest to them for personal reasons.

The majority of the surveys and interviews completed by mothers of cephalic presentation babies occurred in person. In contrast, the majority of surveys and interviews completed by mothers of breech presentation babies occurred online and on the telephone (Table 28). This is not a surprising finding since breech presentation is a rare occurrence and mothers of breech presentation babies are a hidden population.

<table>
<thead>
<tr>
<th></th>
<th>Survey</th>
<th>Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breech</td>
<td>Cephalic</td>
</tr>
<tr>
<td>In Person</td>
<td>11 (26%)</td>
<td>41 (57%)</td>
</tr>
<tr>
<td>Online</td>
<td>31 (74%)</td>
<td>31 (43%)</td>
</tr>
<tr>
<td>Phone</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>42 (100%)</td>
<td>72 (100%)</td>
</tr>
</tbody>
</table>
Nine (12.50%) cephalic presentation babies and seven (16.67%) breech presentation babies, of the total sample, weighed less than 2500 grams or were born before 37 weeks gestation. Seven (9.7%) of the mothers who had a small or preterm cephalic presentation baby and four (9.5%) of the mothers who had a small or preterm breech baby completed an interview. Mothers of small or preterm babies were sick throughout pregnancy or had other physiologic reasons for the early or small birth.

**Socio-Demographic Survey**

The socio-demographic survey results are presented as six different tables: Maternal Socio-Demographic Characteristics (Table 29), Infant Characteristics (Table 30), Paternal Characteristics (Table 31), Maternal General Health Characteristics (Table 28), Maternal Reproductive History (Table 33), and Household Characteristics (Table 34). Results for these tables are presented by first comparing characteristics by birth presentation and later by comparing characteristics by gestational age or birth weight.
Table 29 Maternal Socio-Demographic Characteristics (Primary Data): Number and Percentage Comparing the Mothers of Cephalic Presentation and Breech Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term & >=2500 grams Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>&lt;37 Weeks Gestational Age or &lt;2500 grams</th>
<th>Term &amp; &gt;=2500 grams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breech (n=7)</td>
<td>Cephalic (n=63)</td>
</tr>
<tr>
<td>Maternal Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-19 years</td>
<td>1 (11.11%)</td>
<td>1 (14.29%)</td>
<td>2 (3.17%)</td>
</tr>
<tr>
<td>20-24 years</td>
<td>2 (22.22%)</td>
<td>2 (28.57%)</td>
<td>19 (30.16%)</td>
</tr>
<tr>
<td>25-29 years</td>
<td>2 (22.22%)</td>
<td>2 (28.57%)</td>
<td>18 (28.57%)</td>
</tr>
<tr>
<td>30-34 years</td>
<td>2 (22.22%)</td>
<td>1 (14.29%)</td>
<td>18 (28.57%)</td>
</tr>
<tr>
<td>35+ years</td>
<td>2 (22.22%)</td>
<td>1 (14.29%)</td>
<td>6 (9.52%)</td>
</tr>
<tr>
<td>Married</td>
<td>6 (66.67%)</td>
<td>6 (85.71%)</td>
<td>40 (63.49%)</td>
</tr>
<tr>
<td>Mom Born in US</td>
<td>8 (88.89%)</td>
<td>6 (85.71%)</td>
<td>60 (95.24%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>5 (55.56%)</td>
<td>6 (85.71%)</td>
<td>41 (65.08%)</td>
</tr>
<tr>
<td>Black non-Hispanic</td>
<td>2 (22.22%)</td>
<td>1 (14.29%)</td>
<td>10 (15.87%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>9 (14.29%)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>3 (4.76%)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 12 years</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>1 (1.59%)</td>
</tr>
<tr>
<td>High School</td>
<td>3 (33.33%)</td>
<td>1 (14.29%)</td>
<td>8 (12.70%)</td>
</tr>
<tr>
<td>Trade School</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>2 (3.17%)</td>
</tr>
<tr>
<td>Some college</td>
<td>2 (22.22%)</td>
<td>2 (28.57%)</td>
<td>26 (41.27%)</td>
</tr>
<tr>
<td>College (4 years)</td>
<td>2 (22.22%)</td>
<td>2 (28.57%)</td>
<td>16 (25.40%)</td>
</tr>
<tr>
<td>Master's</td>
<td>1 (11.11%)</td>
<td>1 (14.29%)</td>
<td>7 (11.11%)</td>
</tr>
<tr>
<td>Doctoral</td>
<td>0</td>
<td>0</td>
<td>3 (4.76%)</td>
</tr>
<tr>
<td>Received WIC or Medicaid in last pregnancy</td>
<td>5 (55.56%)</td>
<td>3 (42.86%)</td>
<td>25 (43.10%)</td>
</tr>
</tbody>
</table>
Mothers of cephalic presentation babies and mothers of breech presentation babies were differentially distributed by ethnicity, Medicaid/WIC eligibility, education, age, and marital status. The ethnic distribution of the mothers with cephalic presentation babies was 64% white non-Hispanic, 17% black non-Hispanic, and 14% Hispanic. The mothers of breech presentation babies, in contrast, were 90% white non-Hispanic, 2% black non-Hispanic, and 7% Hispanic. The mothers of cephalic presentation babies were much more likely to receive Medicaid or WIC (45%) than were the mothers of breech presentation babies (19%). Additionally, mothers of cephalic presentation babies were less likely to have received a four year college degree or more (40%) than were mothers of breech presentation (67%). Mothers of breech babies in the study tend to be older than mothers of cephalic presentation babies. Nearly 55% of breech baby mothers are over 29 while fewer than 40% of cephalic presentation mothers are. Finally, mothers of breech presentation babies were almost one-third more likely to be married (93%) than were mothers of cephalic presentation babies (64%).

While most (60%) of mothers of term breech babies were over 29 years old, fewer than 30% (28.58%) of the mothers of preterm or small breech babies were over 30 years old. Like mothers of term breech babies, mothers of preterm or small breech babies (85.71%) were both more likely to be married than were their counterparts with cephalic presentation babies (66.67%). Mothers of term breech babies were more likely to have at least a four year college degree (71.43%) than were mothers of breech preterm or small babies (42.86%). Mothers of term breech babies were far less likely (14.29%) than were mothers of preterm or small babies (42.86%) to have Medicaid/WIC. Therefore, mothers of preterm or small breech babies have different characteristics than do mothers of term breech babies in terms of age, education, and Medicaid/WIC eligibility.
Table 30 Newborn Characteristics (Primary Data) Number and Percentage or Mean and Standard Deviation Comparing Cephalic Presentation and Breech Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term & >=2500 grams Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>&lt;37 Weeks Gestational Age or &lt;2500 grams</th>
<th>Term &amp; &gt;=2500 grams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breach (n=7)</td>
<td>Cephalic (n=63)</td>
</tr>
<tr>
<td>Female Fetus</td>
<td>3 (33%)</td>
<td>5 (71.43%)</td>
<td>39 (61.90%)</td>
</tr>
<tr>
<td>Fetal complications</td>
<td>1 (11.11%)</td>
<td>2 (28.57%)</td>
<td>8 (12.70%)</td>
</tr>
<tr>
<td>Gestational age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 37 weeks</td>
<td>8 (88.89%)</td>
<td>4 (57.14%)</td>
<td>0</td>
</tr>
<tr>
<td>37-40 weeks</td>
<td>1 (11.11%)</td>
<td>2 (28.57%)</td>
<td>48 (76.19%)</td>
</tr>
<tr>
<td>41-42 weeks</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>15 (23.81%)</td>
</tr>
<tr>
<td>Birthweight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500-1499 grams</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>0</td>
</tr>
<tr>
<td>1500-2499 grams</td>
<td>6 (66.67%)</td>
<td>5 (71.43%)</td>
<td>0</td>
</tr>
<tr>
<td>2500-4000 grams</td>
<td>3 (33.33%)</td>
<td>1 (14.29%)</td>
<td>50 (79.37%)</td>
</tr>
<tr>
<td>4000.001-5500 grams</td>
<td>0</td>
<td>0</td>
<td>13 (20.63%)</td>
</tr>
<tr>
<td>Length (inches)</td>
<td>18.22 (sd=1.30)</td>
<td>18.00 (sd=1.41)</td>
<td>20.25 (sd=1.44)</td>
</tr>
<tr>
<td>Baby’s mother was breech</td>
<td>2 (22.22%)</td>
<td>2 (28.57%)</td>
<td>21 (33.33%)</td>
</tr>
<tr>
<td>Baby’s father was breech</td>
<td>1 (11.11%)</td>
<td>1 (14.29%)</td>
<td>3 (4.76%)</td>
</tr>
</tbody>
</table>

Female babies are over-represented in the study for both breech presentation (57.14%) and cephalic presentation (58.33%) births when compared to the general population for all categories except the cephalic presentation small baby category (33%). Breech babies are less likely to have intra-uterine complications (11.90%) than are cephalic presentation babies (12.50%) in all categories except preterm or small babies (28.57%). The mean gestational age for both cephalic presentation and breech presentation babies nears 39 weeks. However, cephalic presentation babies are more highly represented under week 37 (11.11%) and over week 40 (20.83%). Most breech (80.95%) and cephalic presentation (73.61%) babies weigh 2500 – 4000 grams at birth. However, the mean breech weight is about 200 grams less than the mean cephalic presentation baby weight. Cephalic presentation babies are over-represented in the 4001-5500 gram category (18.06%) and under-represented in the 500-1499g (0%) and 1500-2499g categories (8.33%) when compared with breech presentation babies in this study. Breech and cephalic presentation babies are approximately the same mean length. However, preterm or small babies are predictably shorter than are term babies for both breech and cephalic.
presentation. Both term (54.29%) and preterm or small breech (42.86%) babies are more likely to have a parent who was born breech than are cephalic presentation babies (38.09% and 33.33% respectively). Overall, when comparing neonatal breech and cephalic presentation babies’ characteristics, trends are in the same direction for term and for preterm or small babies.
Table 31 Paternal Characteristics (Primary Data): Number and Percentage Comparing the Fathers of Cephalic Presentation and Breech Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term & >2500 grams Sample

<table>
<thead>
<tr>
<th>Paternal Age</th>
<th>Cephalic (&lt;37 Weeks or &lt;2500 grams)</th>
<th>Cephalic (Term &amp; 2500 grams)</th>
<th>Cephalic (Total)</th>
<th>Breech (&lt;37 Weeks or &lt;2500 grams)</th>
<th>Breech (Term &amp; 2500 grams)</th>
<th>Breech (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breech (n=7)</td>
<td>Cephalic (n=63)</td>
<td>Breech (n=35)</td>
<td>Cephalic (n=72)</td>
<td>Breech (n=42)</td>
</tr>
<tr>
<td>&lt;20</td>
<td>0</td>
<td>2 (28.57%)</td>
<td>7 (11.11%)</td>
<td>8 (22.86%)</td>
<td>7 (9.72%)</td>
<td>10 (23.81%)</td>
</tr>
<tr>
<td>20-29</td>
<td>4 (44.44%)</td>
<td>2 (28.57%)</td>
<td>20 (31.75%)</td>
<td>0</td>
<td>24 (33.33%)</td>
<td>2 (4.76%)</td>
</tr>
<tr>
<td>30-39</td>
<td>4 (44.44%)</td>
<td>2 (28.57%)</td>
<td>32 (50.79%)</td>
<td>23 (65.71%)</td>
<td>36 (50.00%)</td>
<td>25 (59.52%)</td>
</tr>
<tr>
<td>40-49</td>
<td>1 (11.11%)</td>
<td>1 (14.29%)</td>
<td>4 (6.35%)</td>
<td>4 (11.43%)</td>
<td>5 (6.94%)</td>
<td>5 (11.90%)</td>
</tr>
<tr>
<td>Born in the US</td>
<td>8 (88.89%)</td>
<td>6 (85.71%)</td>
<td>53 (84.13%)</td>
<td>26 (74.29%)</td>
<td>61 (84.72%)</td>
<td>32 (76.19%)</td>
</tr>
<tr>
<td>Ethnicity*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>3 (37.50%)</td>
<td>6 (85.71%)</td>
<td>38 (60.32%)</td>
<td>29 (82.86%)</td>
<td>41 (57.75%)</td>
<td>35 (83.33%)</td>
</tr>
<tr>
<td>Black non-Hispanic</td>
<td>4 (50.00%)</td>
<td>1 (14.29%)</td>
<td>8 (12.70%)</td>
<td>1 (2.86%)</td>
<td>12 (16.90%)</td>
<td>2 (4.76%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1 (12.50%)</td>
<td>0</td>
<td>13 (20.63%)</td>
<td>5 (14.29%)</td>
<td>14 (19.72%)</td>
<td>5 (11.90%)</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>4 (6.35%)</td>
<td>0</td>
<td>4 (5.64%)</td>
<td>0</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 12 years</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High School</td>
<td>2 (22.22%)</td>
<td>2 (28.57%)</td>
<td>18 (28.57%)</td>
<td>6 (17.14%)</td>
<td>20 (27.78%)</td>
<td>8 (19.05%)</td>
</tr>
<tr>
<td>Trade School</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>4 (6.35%)</td>
<td>0</td>
<td>4 (5.56%)</td>
<td>1 (2.38%)</td>
</tr>
<tr>
<td>Some college</td>
<td>3 (33.33%)</td>
<td>3 (42.86%)</td>
<td>20 (31.75%)</td>
<td>10 (28.57%)</td>
<td>23 (31.94%)</td>
<td>13 (30.95%)</td>
</tr>
<tr>
<td>College (4 years)</td>
<td>3 (33.33%)</td>
<td>1 (14.29%)</td>
<td>12 (19.05%)</td>
<td>12 (34.29%)</td>
<td>15 (20.83%)</td>
<td>13 (30.95%)</td>
</tr>
<tr>
<td>Master’s</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>7 (11.11%)</td>
<td>5 (14.29%)</td>
<td>8 (11.11%)</td>
<td>5 (11.90%)</td>
</tr>
<tr>
<td>Doctoral</td>
<td>0</td>
<td>0</td>
<td>2 (3.17%)</td>
<td>2 (5.71%)</td>
<td>2 (2.78%)</td>
<td>2 (4.76%)</td>
</tr>
</tbody>
</table>

* cephalic dad ethnicity n=71
Like mothers of breech presentation babies, fathers of breech presentation babies were older than were fathers of cephalic presentation babies. Over 70% of breech baby fathers are over 29 while around 57% of cephalic presentation fathers are over 29. Fathers of breech presentation babies were more likely to be white non-Hispanic (83.33%) than were fathers of cephalic presentation babies (57.75%). Fathers of breech presentation babies were more likely to have advanced education than were fathers of cephalic presentation babies. Nearly 48% of breech presentation fathers have at least a four year college degree while fewer than 35% of cephalic presentation fathers do.

Unlike their term counterparts, fathers of preterm or small breech babies are less likely to be over 29 years old (42.86%). They are also less likely to have at least a college education (14.29%). Therefore, the fathers of preterm or small breech babies differ from the fathers of term breech babies by age and by education.
Table 32 Maternal General Health Characteristics (Primary Data): Number and Percentage or Mean and Standard Deviation Comparing the Mothers of Cephalic Presentation and Breech Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term & >2500 grams Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>&lt;37 Weeks Gestational Age or &lt;2500 grams</th>
<th>Term &amp; &gt;2500 grams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breach (n=7)</td>
<td>Cephalic (n=63)</td>
</tr>
<tr>
<td>Diabetes before pregnancy</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hypertension before pregnancy</td>
<td>0</td>
<td>0</td>
<td>2 (3.17%)</td>
</tr>
<tr>
<td>Heart or lung disease before pregnancy</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>2 (3.17%)</td>
</tr>
<tr>
<td>Gestational diabetes</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>4 (6.35%)</td>
</tr>
<tr>
<td>Gestational hypertension</td>
<td>1 (11.11%)</td>
<td>1 (14.29%)</td>
<td>4 (6.35%)</td>
</tr>
<tr>
<td>Smoke during pregnancy</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>9 (14.29%)</td>
</tr>
<tr>
<td>Alcohol during pregnancy</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>6 (9.52%)</td>
</tr>
<tr>
<td>Illicit drugs during pregnancy</td>
<td>0</td>
<td>0</td>
<td>2 (3.17%)</td>
</tr>
<tr>
<td>Height</td>
<td>5'39&quot; (sd=0.31)</td>
<td>5'31&quot; (sd=0.19)</td>
<td>5'41&quot; (sd=0.23)</td>
</tr>
<tr>
<td>Body Mass Index*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>0</td>
<td>0</td>
<td>3 (4.76%)</td>
</tr>
<tr>
<td>Normal</td>
<td>3 (33.33%)</td>
<td>2 (40.00%)</td>
<td>22 (34.92%)</td>
</tr>
<tr>
<td>Overweight</td>
<td>4 (44.44%)</td>
<td>2 (40.00%)</td>
<td>18 (28.57%)</td>
</tr>
<tr>
<td>Obese</td>
<td>2 (22.22%)</td>
<td>1 (20.00%)</td>
<td>20 (31.75%)</td>
</tr>
</tbody>
</table>

*2 breech missing
Over twice as many mothers of breech presentation babies (14.29%) develop gestational hypertension than do mothers of cephalic presentation babies (6.94%). Nearly three times as many mothers of cephalic presentation babies (13.89%) smoked during pregnancy than did the mothers of breech presentation babies (4.76%). No mothers in the study had diabetes prior to pregnancy and just over 2% of the women in each group had hypertension prior to pregnancy. Three mothers of cephalic presentation babies had heart or lung disease before pregnancy while no mothers of breech presentation did. Gestational diabetes occurred in nearly 7% of mothers of cephalic presentation babies while no cases existed for mothers of breech presentation babies. Alcohol was used minimally by the few mothers of breech and cephalic presentation babies who reported use. Marijuana was used by over 2% of mother of breech and cephalic presentation babies. Half of the mothers of breech presentation babies report a normal body mass index while over 61% of the mothers of cephalic presentation babies are overweight or obese.

Mothers of both breech and cephalic presentation premature or small babies tended to be heavier than were mothers of term breech and cephalic presentation babies. Mothers of premature and small breech babies were about an inch shorter than were mothers of term breech babies or all cephalic presentation babies. Overall, mothers of breech presentation were healthier than were mothers of cephalic presentation babies except for gestational hypertension.
Table 33 Reproductive History Characteristics (Primary Data): Number and Percentage or Mean and Standard Deviation Comparing the Mothers of Cephalic Presentation and Breech Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term or >2500 grams Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>&lt;37 Weeks Gestational Age or &lt;2500 grams</th>
<th>Term or &gt;2500 grams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breech (n=7)</td>
<td>Cephalic (n=63)</td>
</tr>
<tr>
<td>Told uterus unusual</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>11 (17.46%)</td>
</tr>
<tr>
<td>Told pelvis unusual</td>
<td>0</td>
<td>0</td>
<td>1 (1.59%)</td>
</tr>
<tr>
<td>Told placenta unusual</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>0</td>
</tr>
<tr>
<td>Complications during pregnancy</td>
<td>3 (33.33%)</td>
<td>3 (42.86%)</td>
<td>15 (23.81%)</td>
</tr>
<tr>
<td>Assisted conception</td>
<td>1 (11.11%)</td>
<td>0</td>
<td>1 (1.59%)</td>
</tr>
<tr>
<td>Trying to get pregnant</td>
<td>3 (33.33%)</td>
<td>4 (57.14%)</td>
<td>34 (53.97%)</td>
</tr>
<tr>
<td>Took prenatal vitamins like supposed to</td>
<td>8 (88.89%)</td>
<td>4 (57.14%)</td>
<td>43 (74.14%)</td>
</tr>
<tr>
<td>Prenatal Care Began</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st tri</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>56 (88.89%)</td>
</tr>
<tr>
<td>2nd tri</td>
<td>9 (100.00%)</td>
<td>6 (85.71%)</td>
<td>7 (11.11%)</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>0</td>
<td>0</td>
<td>5 (7.94%)</td>
</tr>
<tr>
<td>Oligohydramnios</td>
<td>0</td>
<td>4 (57.14%)</td>
<td>4 (6.35%)</td>
</tr>
<tr>
<td>Exercise Before pregnancy (X/wk)</td>
<td>3.44 (sd=2.13)</td>
<td>2.14 (sd=2.91)</td>
<td>2.78 (sd=1.84)</td>
</tr>
<tr>
<td>Exercise During pregnancy (X/wk)</td>
<td>1.11 (sd=1.62)</td>
<td>2.71 (sd=2.93)</td>
<td>2.32 (sd=1.93)</td>
</tr>
<tr>
<td>First baby born to mother</td>
<td>5 (55.56%)</td>
<td>6 (85.71%)</td>
<td>23 (36.51%)</td>
</tr>
<tr>
<td>Previous miscarriage, abortion, stillbirth</td>
<td>2 (22.22%)</td>
<td>1 (14.29%)</td>
<td>28 (44.44%)</td>
</tr>
<tr>
<td>Cesarean Delivery</td>
<td>1 (11.11%)</td>
<td>7 (100.00%)</td>
<td>12 (19.05%)</td>
</tr>
<tr>
<td>Tried to Turn Breech Baby</td>
<td>0</td>
<td>1 (14.29%)</td>
<td>3 (4.17%)</td>
</tr>
<tr>
<td>Number of Breech Babies Born</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>9</td>
<td>0</td>
<td>56 (88.89%)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>7</td>
<td>7 (11.11%)</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Nearly 67% of breech baby pregnancies were intentional while 51% of cephalic presentation pregnancies were. Two mothers of cephalic presentation babies and two mothers of breech presentation babies became pregnant after assisted conception. Over three-quarters of both groups of mothers took prenatal vitamins as suggested. However, mothers of breech presentation babies (83.33%) were a little more likely to follow the protocol than were mothers of cephalic presentation babies (76.12%).

Oligohydramnios was approximately three times more common in the mothers of breech presentation babies (16.67%) than in the mothers of cephalic presentation babies (5.56%). More mothers of breech presentation babies (21.43%) were told her uterus was unusual than were mothers of cephalic presentation babies (16.67%). However, when probed about what they were told was unusual most mothers reported they had been told their uterus was “tilted” indicating a retro- or ante-verted uterus which is not related to pregnancy outcomes. One mother of a breech baby reported a unicornate uterus. A large fibroid was reported by a mother of a breech baby and a mother of a cephalic presentation baby. More mothers of breech presentation babies were told her pelvis (4.76%) and placenta (2.38%) were unusual than were mothers of cephalic presentation babies (1.39% and 0% respectively). The unusual pelvic characteristics reported by mothers were functional in nature rather than structural. The mother who was told her placenta was unusual could not describe the placenta.

Mothers of breech and cephalic presentation babies exercised in general fewer than three times a week before and during pregnancies. Nearly 70% of all breech mothers were primiparous while fewer than 40% of cephalic presentation mothers were. More mothers of cephalic presentation babies had abortions, miscarriages, or stillbirths than did mothers of breech presentation babies. Nearly 90% of all breech presentation babies were born by C-section while only 18% of cephalic presentation babies were born by cesarean.
Over half of the mothers of breech preterm or small babies reported oligohydramnios while none of the mothers of preterm of small cephalic presentation babies did. Most of the other variables varied in the same direction for preterm/small babies as for term babies. Overall, breech babies were more likely to be intentionally conceived, first born babies whose mothers were at greater risk of having oligohydramnios than were mothers of cephalic presentation babies.
Table 34 Household Characteristics (Primary Data): Number and Percentage or Mean and Standard Deviation Comparing the Mothers of Cephalic Presentation and Breech Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term or >2500 grams Sample

<table>
<thead>
<tr>
<th></th>
<th>&lt;37 Weeks Gestational Age or &lt;2500 grams</th>
<th>Term or &gt;2500 grams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breech (n=7)</td>
<td>Cephalic (n=35)</td>
</tr>
<tr>
<td>Lived with father of baby during pregnancy</td>
<td>8 (88.89%)</td>
<td>5 (71.43%)</td>
<td>57 (90.48%)</td>
</tr>
<tr>
<td>Mean income last year</td>
<td>$55,778 (sd=35,552)</td>
<td>$44,571 (sd=24,419)</td>
<td>$61,645 (sd=47,773)</td>
</tr>
<tr>
<td>Mean Poverty Income Ratio</td>
<td>4.22 (sd=2.82)</td>
<td>3.17 (sd=1.92)</td>
<td>3.90 (sd=2.91)*</td>
</tr>
<tr>
<td>Who Contributed to Household Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self &amp; Partner</td>
<td>5 (55.56%)</td>
<td>4 (57.14%)</td>
<td>27 (42.86%)</td>
</tr>
<tr>
<td>Partner only</td>
<td>3 (33.33%)</td>
<td>2 (28.57%)</td>
<td>21 (33.33%)</td>
</tr>
<tr>
<td>Self only</td>
<td>0</td>
<td>1 (11.11%)</td>
<td>7 (11.11%)</td>
</tr>
<tr>
<td>Mother work outside home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before pregnancy</td>
<td>7 (77.78%)</td>
<td>4 (57.14%)</td>
<td>52 (82.54%)</td>
</tr>
<tr>
<td>During pregnancy</td>
<td>5 (55.56%)</td>
<td>6 (85.71%)</td>
<td>43 (68.25%)</td>
</tr>
</tbody>
</table>

*2 missing
Nearly all mothers lived with the father of the baby during pregnancy. The mean annual income of the household of breech presentation babies was over $20,000 more than that of the cephalic presentation babies. The mean poverty income ratio was approximately one-third lower for households with cephalic presentation babies than for breech presentation babies. This indicates lower income for families of cephalic presentation babies after controlling for household size. Over 57% of all breech households were maintained by only the father and mother working while 44% of cephalic presentation households were supported this way. Mothers of breech presentation babies were a little more likely to work outside the home before (85.71%) and during pregnancy (73.81%) than were mothers of cephalic presentation babies (81.94% and 66.67% respectively).

Mothers of premature or small breech babies (71.43%) were less likely to live with the father of the baby than were any other group. Similarly, their mean income ($44,571) and mean poverty income ratio (3.17) were the lowest among all groups. Finally, they were most likely of all groups to work outside the home during pregnancy (85.71%).

**Comparison of Primary and Secondary Dataset Findings with the Literature**

The primary data and secondary data agree with the literature on seminal characteristics of mothers of breech presentation babies. Mothers of breech presentation babies tend to be older, better educated, less likely to receive Medicaid/WIC, more likely to be having her first baby, and more likely to be married than are mothers of cephalic presentation babies. Mothers of breech babies are also more likely to have gestational hypertension and oligohydramnios than are mothers of cephalic presentation babies. Other maternal complications of pregnancy trend in the same direction in the secondary data and the literature, but the primary data trends in the opposite direction. Neonate characteristics in the primary data such as gender, intra-uterine complications, and gestational age do not follow the same pattern as does the secondary data or the literature. However, breech babies in the primary data still
tend to be of lower birth weight than are their cephalic presentation counterparts, as with the secondary data and literature.

**Hollingshead Social Position Scale**

The social position of mothers of breech and cephalic presentation babies was compared using the Hollingshead Index of Social Position. Mothers of preterm and small babies are not compared with mothers of term babies in this section because their distribution is non-patterned. A low score on the Hollingshead Index indicates high social status while a low score indicates low social status. The distribution of social position for mothers of breech and cephalic presentation babies is bimodal. There is an early crest (between 11 and 50) for working women and a later crest (between 53 and 65) for unemployed women (Figure 1).

![Breech v. Cephalic Mothers' Social Position](image)

**Figure 1: Hollingshead Social Position Comparing Mothers of Cephalic Presentation and Breech Babies**

Additionally, mothers of breech presentation babies crest earlier and higher (i.e. 22) than do the mothers of cephalic presentation babies (i.e. 36). This pattern indicates that the breech mothers who worked during pregnancy had
occupations that are ranked higher on the social index and also had higher levels of education than did mothers of cephalic presentation babies. This graph portrays mothers of cephalic presentation as less educated and employed in less prestigious occupations than are mothers of breech presentation babies. However, because of the quota sampling that was in place, many mothers of cephalic presentation babies with low education levels who wished to be included in the study were not enrolled. Therefore, the actual difference between the mothers of breech presentation and cephalic presentation babies is potentially muted in this graph when compared with the general population.

The social positions for fathers of breech presentation and fathers of cephalic presentation babies were also compared (Figure 2).

Figure 2: Hollingshead Social Position Comparing Fathers of Cephalic Presentation and Breech Babies
The social position of the fathers of breech babies, like that of their partners, is higher than that of the fathers of cephalic presentation babies. The social index for fathers of breech babies crests around 20 while that for the fathers of cephalic presentation babies crests around 40.

Finally, the social positions for the mothers and fathers of breech presentation babies are compared (Figure 3).

Although the two graphs are very similar, mothers of breech presentation babies slightly out-perform their partners on the social position scale. While both mothers and fathers crest around 22, slightly more mothers (17%) than fathers (13%) are represented in this group.

**Null Hypothesis 4**

There is no association between maternal occupation and the risk of breech presentation.
The Hollingshead Social Position analysis demonstrated mothers of breech babies generally rank higher on the Hollingshead Social Index. Therefore, Hypothesis 4 is not supported. Mothers of breech presentation babies are more likely to be trained professionals with higher levels of education than are mothers of cephalic presentation babies. Mothers of breech presentation babies may even out-perform their husbands in careers. Because the sample is non-probabalistic and is small, results are not well generalized.

**State Trait Personality Inventory**

There is virtually no difference between the scores of mothers of breech and cephalic presentation babies for each of the four trait scales (anger, anxiety, curiosity, and depression) and the four trait sub-scales assessed (angry temperament, angry reaction, dysthymia [feelings of depression], and euthymia [absence of depression]) (Table 35).
Table 35: State Trait Personality Inventory (Primary Data): Mean Score and Standard Deviation Comparing Mothers of Breech and Cephalic Presentation Babies for the Total Sample, the Preterm or Birth Weight <2500 grams Sample, and for the Term or >2500 grams Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>&lt;37 Weeks Gestational Age or &lt;2500 grams</th>
<th>Term or &gt;2500 grams</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cephalic (n=9)</td>
<td>Breech (n=7)</td>
<td>Cephalic (n=63)</td>
</tr>
<tr>
<td>Trait Angry Temperament</td>
<td>7.83 (3.37)</td>
<td>8.50 (4.14)</td>
<td>6.94 (2.49)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1 missing)</td>
</tr>
<tr>
<td>Trait Angry Reaction</td>
<td>8.00 (4.34)</td>
<td>10.00 (1.67)</td>
<td>8.35 (2.28)</td>
</tr>
<tr>
<td></td>
<td>(1 missing)</td>
<td>(1 missing)</td>
<td>(2 missing)</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>8.60 (2.88)</td>
<td>8.67 (3.20)</td>
<td>7.11 (2.35)</td>
</tr>
<tr>
<td></td>
<td>(1 missing)</td>
<td>(1 missing)</td>
<td>(1 missing)</td>
</tr>
<tr>
<td>Euthymia</td>
<td>16.40 (2.97)</td>
<td>15.80 (3.70)</td>
<td>16.71 (2.78)</td>
</tr>
<tr>
<td></td>
<td>(1 missing)</td>
<td>(1 missing)</td>
<td>(1 missing)</td>
</tr>
<tr>
<td>Trait Anger</td>
<td>18.83 (4.45)</td>
<td>21.83 (6.65)</td>
<td>18.35 (4.69)</td>
</tr>
<tr>
<td></td>
<td>(1 missing)</td>
<td>(1 missing)</td>
<td>(1 missing)</td>
</tr>
<tr>
<td>Trait Depression</td>
<td>17.00 (4.08)</td>
<td>16.80 (5.12)</td>
<td>15.31 (4.70)</td>
</tr>
<tr>
<td></td>
<td>(2 missing)</td>
<td>(1 missing)</td>
<td>(2 missing)</td>
</tr>
<tr>
<td>Trait Curiosity</td>
<td>27.83 (3.60)</td>
<td>28.80 (3.83)</td>
<td>30.58 (4.11)</td>
</tr>
<tr>
<td></td>
<td>(1 missing)</td>
<td>(1 missing)</td>
<td>(1 missing)</td>
</tr>
<tr>
<td>Trait Anxiety</td>
<td>18.67 (8.24)</td>
<td>20.67 (2.07)</td>
<td>17.86 (5.63)</td>
</tr>
</tbody>
</table>
The mean scores of both groups of mothers are in the 50th percentile for anger, anxiety, and curiosity when compared to previous studies of college women and Navy women (Spielberger). When compared to working women, the mothers in this study had approximately the same mean score for trait anxiety, trait curiosity, and trait anger (Spielberger). However, when compared to working women, the mothers in this study scored approximately one point higher on the angry temperament scale and scored about 1.5 points lower on the angry reaction score (Spielberger). While the STPI fails to distinguish between the anger, depression, anxiety, and curiosity scores for mothers of breech and cephalic presentation babies, the STPI does indicate that the emotional profiles for the women in the study are similar to college women, Navy women, and working women. This suggests that although the sample is purposive it is reflective of larger population emotional trends.

When comparing mothers of preterm or small babies with mothers of term babies the mothers of preterm or small babies were more likely to manifest trait angry temperament, dysthymia, and trait anxiety. Mothers of preterm or small breech babies scored higher than all other mothers for trait angry temperament, trait angry reaction, dysthymia, trait anger, and trait anxiety. They also scored lower than all other mothers for euthymia. This suggests mothers of preterm or small breech babies may have a different personality profile than do mothers of cephalic presentation babies or mothers of term breech babies. However, a larger, randomized study would need to be conducted to verify this.

_In-Depth Interviews_

_Comparison of mothers of breech babies and mothers of cephalic presentation babies._

Analysis of the in-depth interviews allowed for differentiation of mothers of breech presentation babies from mothers of cephalic presentation babies along seven domains defined above. Mothers of breech presentation babies are more likely to to idealistic, analytical, polished, overextended, and fearful than are
mothers of cephalic presentation babies (Figure 4). Idealism is includes qualities such as being an overachiever or being high strung. Analytical includes qualities such as enjoyment of complex decision-making and other cognitive activities. Polished includes qualities such as high valuation of appearing to have or having physical appearance, reputation, family, and home in order. Overextended includes qualities such as self-defined business and insufficient time to rest or recreate. Fearful includes fear in relationship to index pregnancy retention, adverse pregnancy outcomes, pain, or parenting. Flexible includes qualities such as a focus on process where multiple options are acceptable. Pragmatic includes qualities such as a focus on the outcome which is reality-based and realizes some things cannot be changed (Table 25).

In the following section, a vignette which represents an overview of the personality characteristics is presented. Thereafter, specific examples of narrative are provided for each of the characteristics compared.

![Figure 4 Comparison of Psycho-Socio-Cultural Characteristics of Mothers of Breech and Cephalic Presentation Babies](image)

**Overview Vignette of Characteristics of Mothers of Breech Babies**

Isa’s story illustrates many of the characteristics portrayed by mothers of breech babies such as being idealistic, analytical, polished, overextended and fearful. She is a
loving, 30-something, in a happy marriage with a beautiful home. Her graduate degree has enabled her to spend years working as a researcher at prominent national institutions.

Throughout her pregnancy she attempted to manage complicated legal business transactions by flying between two large cities and consulting lawyers. She readily attests “This pregnancy had a lot of stress.” Since she was over 35, she was encouraged to get early diagnostic testing for her baby. When she was five weeks pregnant she had a little bleeding. A few weeks later she decided to get the nuchal translucency ultrasound. She explains the procedure.

The baby was really quiet. I asked if that were normal. [The technician] said “Well, that’s normal.” Then she left. I was like “Oh my god!” Then the doctor comes in and says “The nuchal fold is thicker than we like to see. It’s in the 95th percentile of normal. You need to see a genetic counselor and we need to do a CVS [chorionic villa sampling] – which is like the amnio.” . . . I have a few days to do this test if we’re going to do it.

We went to the genetic counselor. She said the odds are one in five that the baby would be born with a chromosomal abnormality. They recommended the CVS. I was in tears. I said to my husband “I know this baby’s ok. I just know it.” The risk of CVS was miscarriage 1:100 if I did it. My husband thought the risk was low. It was hard for me to argue with the numbers but I kept focusing on 4:5 are fine. I just had a feeling that the baby was going to be fine. But I did it. I ended up doing the CVS.

The results came back that we were having a girl and she was chromosomally fine. But we had to wait through two weeks of intense stress to get the test done and get the results. Waiting to get the test done. Waiting to get the results. Waiting to hope that I wouldn’t miscarriage. We had a toddler who couldn’t understand why I couldn’t pick him up. It was just really stressful. Around 13-14 weeks we started to feel comfortable again that everything was going to be fine.

At 20 weeks, she continued the complicated business dealings and prepared for company. She admits

I was really doing too much. Everyday I was very briskly walking two miles for exercise. I was really, really active. I started to feel a little cramping. My doctor kept saying “Everything’s fine. Everything’s fine.” Something a little
weird, a little different, happened around 23 weeks, a couple days before my company was coming.

She explained she called her doctor again and asked to be checked. The nurse let her come to triage and there she discovered her cervix had shortened. She was admitted to the hospital for five days and given drugs so she wouldn't go into labor. She was to remain on drugs to prevent preterm labor for the rest of her pregnancy. Isa relates

It was so scary because the nurses, meaning well – but not knowing what they were doing, were trying to prepare me for what I had ahead of me. They said I had to get to 24 weeks then there was a chance to save my baby. One nurse in particular, meaning well, told me she didn't think I was going home. She was so sure I was going to have this baby early and I was going to have this baby at any time. I was trying to figure out – reading up on the chances of her surviving at 23 weeks then 24 weeks then 25 weeks.

The beta blockers she was placed on to stop the early contractions caused Isa's heart to pound and her face to flush. Because of the bedrest, her toddler was placed in daycare. That time period was very intense for Isa.

It was so stressful because every week I would get online and see what chance my baby would have if she were born now. Then I ended up going full term. It was very stressful. I was so afraid of her being born. I was doing everything I could with mind control to keep her in control. I am such a believer in the mind body connection. Everyday I would envision a really long cervix cemented closed.

While Isa successfully retained her pregnancy, around 28 or 30 weeks she felt her baby turn to cephalic presentation. This was alarming for her.

I thought “This is not the right time for this!” I felt all this pressure. “Oh no! It's too early!” I got up and put my legs up against the wall and tried to get her to turn and I think she did because I felt the pressure go away. But then she never turned [cephalic presentation] again.

By 34 weeks Isa was concerned her baby was not cephalic presentation. She went for an ultrasound and was told her baby was very large. The tech scared
her by suggesting she may not be able to go to term and she may not be able to
give birth vaginally. In turn, when Isa spoke to her doctor he only added to the
worry.

“Oh my god, how am I going to deliver this baby?!” My son was 7
pounds 8 ounces. I’m not a big person. I thought “Maybe I can’t
deliver a 9 pound baby.”

After learning her baby might be large, she notes

I don’t think my heart was really totally into her turning until the last
week when I was convinced she wasn’t that big. Because I was
starting to believe that she was going to be this huge baby that I
probably couldn’t deliver anyway. . . . Part of me was a little
reserved. I remember saying “I think the only way I can get this
baby to turn is if I do hypnotherapy.” I was a little nervous about
that. You have to trust somebody. I really felt like subconsciously I
was the one holding it back.

Finally, the last week of pregnancy she realized she was more afraid of a
cesarean section than of giving birth vaginally to a big baby. At that point she
intensively began seeking help to turn her baby.

I really, really don’t want this cesarean because I’m terrified of it.
And that was what it was about. I wanted her to turn because I
don’t want the cesarean.

When thinking back over her pregnancy she wonders

If I never would have done that nuchal translucency and if I never
would have gone in that day that I thought maybe something was
wrong . . . . maybe none of this would have happened. I don’t know.
And I’ll never know. Maybe they really helped me out or maybe
they created the problem. I don’t know. I definitely feel like because
she had the false positives . . . she was going to be this huge babe
– but she wasn’t, she was going to have these chromosomal
abnormalities, but she didn’t, and I was going to deliver her early –
which I didn’t.
Isa characterizes herself as anxious. When talking about her coping mechanisms she clarifies

My husband jokes around that I’m fearful. Well, I had a mother who is. I try not to let it . . . I use my mind over my fears. I want to see the world, I don’t want my fears to hold me back. I don’t want that!

I think I’m a philosophical person. I had time to think through what I was going through and what all this meant to me . . . . I was able to cope with making decisions by putting it all in a larger perspective, but the dread and all that was still there. I could rationalize the dread and get it down at times. Especially when we crossed the 28 weeks and the 32 weeks. It definitely got better – the dread and the worry. I knew she would survive.

But even just our [business] . . . and there were other things going on that made the dread and the worry really high. I thought more about my career . . . I coped better with mental stress than with the emotional stress . . . I often think I handle the bigger stresses of life better than the smaller stressors.

When asked about her baby’s current condition, Isa voices concern.

I feel like my baby’s central nervous system is very tightly wired. She is very easily over-whelmed. I was a fussy baby, too. We’ve been calling it colic. She’s not happy, but she’ll give me these lovely smiles.

Isa concludes

Bedrest was actually a gift from my daughter. She forced me to slow down which I’m not very good at. I’m not very good at it, but I’m getting better. I had time to think and look at my life and ask myself where I want to go with it and get myself off this path that I was on. I felt like there were really good things that came out of it. My husband realized how hard it was to care for a child because suddenly he had to do it. There were some really good things that came out of it. I don’t know. Maybe that’s my weird spin on life that I try to find the positive. I think our family is better off because of the bedrest. I was bearing too much of the burden. Now we have an au
pair . . . . There were some positive things that came out of it. That could be my weird little spin on the world. My little world.

Isa’s story represents the intense love that mothers of breech babies feel for their children. At the same time, it is difficult for them to enter into that love fully and to provide a consistent parent-figure for their child. Consistency in parenting is marred by an overlay of fear and distrust of the process of pregnancy and fetal development. Rather than connecting, mothers attempt to analyze and determine best action. Upon reflection on the pregnancy Isa, too, was able to draw these conclusions.

The next section will provide illustrations of each of the characteristics which differentiated mothers of breech presentation babies from mothers of cephalic presentation babies.

**Idealistic**
All mothers of breech presentation shared the characteristic of being idealistic. High expectations manifested themselves in a variety of ways. However, these women tend to push themselves to perform at peak levels and expect others to do the same.

Julia is an energetic engineer acclimating to a new country, a new language, and a new job. While she is following in her father’s footsteps as far as type of career, she set higher goals for herself than her father achieved.

I want to excel in work, too. At home, too. I want to be a great wife, a great mother. I want to think I'm going to another position in my job that involves more skills in me. To be able to do something by myself. That is not the normal thing. I don't want to be working for somebody else all my life. I think because I know I'm bright. I have a lot of things to do. I have a lot of abilities. God give me a lot of good things. Easy for me to develop. I think to use them in a way that reflects that. I feel it in myself.
Similarly, Jennifer is a physician at the top of her game. She describes herself as “driven”. In recounting her growing up experience she relates

I was precocious. It was painful socially. I was the last to drink and drive. I didn't turn 21 until I was almost graduated from college. . . . I've always been an overachiever. . . . My sister and brother didn't have as much focus as I. My sister has never been as focused. I knew I would go to college. That was it.

Jennifer returned to work soon after her first baby was born and her husband stayed home. She wasn't ready to have another baby, but her husband insisted they try for another child while her first was still an infant. After three attempts at in vitro fertilization she finally conceived. In week 36 of her index pregnancy she was placed on bed rest after she developed pre-eclampsia. However, she was unable to follow the bed rest prescription because her husband would not care for her at home. As a result, she pragmatically moved her cesarean section up by a week so she could just end being pregnant and move on to the next phase of her life.

Stephanie was raised in a rural, mid-western town. When she thought back to her early school years she relates

I was one of those kids who pushed myself a lot academically. I think that came from my own personality. I don't remember my parents pushing me. I was in a really small school so there weren't classes and different things. I had to push myself because there weren't opportunities for more interesting things. I kind of had to come up with my own interesting things academically because I was bored. That was through 5th grade. In 6th grade I moved to the slightly bigger town. There still weren't electives or anything. There wasn't much. I got bored then I decided when I was a junior to graduate a year early. I excelled at academic things. For instance I did science fair up to the international level. Yeah. I'm a big geek.

Stephanie completed high school early and was accepted to an Ivy League school where she finished her degree and went on to a successful career.
Idealism provides mothers of breech presentation with an impetus for sustained action and persistence. It also creates the possibility of great disappointment and disillusionment when goals are not met or when outcomes are not as expected. While the idealism promotes excellence, it may also promote separation between mother and child because of the dedication which it demands.

**Analytical**
The mothers of breech babies tend to be very mentally oriented. Their natural comfort zone is thinking. They use cogitation as the primary means of interfacing with the world. It is their coping mechanism and their forte. Because of their innate braininess many of these women have pursued higher education, but even for those who have not, the mind is still their playground.

Mercedes is a chemist who completed her PhD in her mid-20s. She admits

I was the geek in the family. They expected me to finish a career. When I was in 2nd grade they moved me to 3rd grade. I finished high school when I was 16. When I was 16 I was already in college. They did some tests and stuff. When I was 18 I was already a sophomore or junior in college.

I'm a thinker. I'm very analytical. I analyze everybody. Everything they say everything they do. I'm very analytical. I guess in that aspect my sister [who also had a breech baby] and I are the same.

Sharon is trained as a lawyer. Although she doesn't practice currently she feels she has internalized the salient characteristics necessary to succeed in law.

I think there were more expectations of me because I was eldest and I was more intelligent than my three siblings. Not that they are not intelligent, but I was a lot more inquisitive. . . . I'm trained as an attorney. I can fight with a dog. . . . I'm extremely cut throat. I shouldn't say cut throat. I mean aggressive. I would never be cut throat.
Melody is a high school teacher. Throughout her interview she repeatedly spoke of intellectual curiosity, thinking, planning, and engagement. Finally she clarified

Yeah. That’s how I deal with stress. I get mentally active. When I broke my leg, the things that went through my mind were “Ok. How am I going to get my suitcase.” Or when other things happen, it’s the same. People are like “Why are you worrying about that?” It’s like “If I can think about those things and figure out those things this big thing will be ok, too.” If I keep busy enough with these little things the big thing will work itself out and I won’t make myself too upset by the big thing.

For these mothers, analysis is a social buffer, a coping mechanism, and a recreational activity. The tendency to cope through analysis fosters a disconnect between emotions and lived experience, where emotions are either not fully experienced or fully trusted. For these mothers, the mind is trustworthy and therefore the preferred mechanism of interfacing with experience.

**Polished**

Mothers of breech presentation babies strove to provide an image of having their lives together. Because of their tendency to analyze, many of them had spent considerable effort to readjust their lives to make them a more comfortable fit for their expectations. It was important for these mothers to care for their bodies, minds, and spirits. It was also important to have a lovely, well-quafered home, and a happy, functional family. When these goals were not met, women still sought to provide a polished image. Not many quotes captured this value. However, this value was reiterated repeatedly in the interview, the way the mother presented herself, and in the home setting. One narrative example serves to capture the importance of maintaining the appearance of having a life which is “together”.

Concealing duress is important for Ashley. She wants to convey an image to her children that is at ease, independent of her reality.
I have two levels. Laid back and super stressed out. I get that way. . . . I hold everything in. . . . I feel really laid back then all at once everything comes to me and I have 100 things at once that I'm thinking about and worried about. I don't want my kids to grow up and remember mommy being a worry wart or being stressed out all the time so I try not to be that way. Then it all comes to a head. It's like "Oh my god! How will I afford college for two kids? The car needs this . . . " I don't feel stressed out all the time . . . . I try to be very laid back and relaxed.

Another example of Ashley's need to maintain appearances in the face of reality, was specifically illustrated by her index pregnancy. Ashley did not know she was pregnant with her index pregnancy until about 34 weeks gestation. She was still breastfeeding her youngest daughter and was taking the mini-pill so was not concerned that she had no period. Because of these factors she told herself she was gaining weight rather than growing a baby inside. Her mother-in-law had a dream that Ashley was pregnant around the time of conception and persisted in her suspicions although Ashley denied the pregnancy for months.

I think I was hoping I wasn't pregnant. I hate to admit it now. I'm sure on some level I didn't want to be pregnant. I already had a baby. I didn't know if I could handle having two kids at home and everything else. I think on some level I didn't want to be pregnant so I just convinced myself that I wasn't.

The polished appearance provides organizational structure to the lives of these women. The well-kept lawn, lovely home, stylish clothing, and thoughtful etiquette provide them with pegs upon which to hang their busy life. It also provides a glossy means of interfacing with others.

**Overextended**

The tendency for mothers of breech presentation babies to exceed their own limits is also seen in their busyness. These women orchestrate their lives in such a way so they have very little down-time for relaxation and communing.
Although Joanna, a high school teacher, did not work during the final weeks of her pregnancy, it was important to her to stay busy. She discovered her baby was breech the week after school was out.

After work ended I don't remember what happened. I took naps. I cooked and froze food preparing for her birth. I did a lot of preparing. I was trying to stay busy. I'm happier when I have things to do. It's always been that way in my life. If I have too much time I get grumpy. I don't know why. . . . I tend to be pretty fast paced. Not necessarily physically as much as my mind. My mind likes to be busy. My mind likes to be stimulated. It works better when it gets to think fast than when it has time to think over everything.

I didn't want to have a lot of time to think about having a baby. I wanted to keep my life as normal as possible as long as possible. I didn't know what to expect about having a baby and when I don't know what to expect I over-think things “I wonder what this will be like . . . “ instead of staying busy and keeping my mind active with other things.

My sister is the exact opposite. She'd be happy not to work another day in her life and I'm like “No, I need to stay busy. I need to work.”

Karla worked as a university recruiter. When told she should go on bedrest she refused.

It was like the 8th month or something toward the end of pregnancy. The midwife was like “I'm concerned. You have a very high blood pressure. What is your job again?” I was like “I do sales.” She was like “Sales are very stressful. We're going to have to watch that. If at your next appointment it’s like this I'm going to have to suggest you quit work and maybe do bed rest.” I did not want to do bed rest. I couldn't just lay there in bed all day. So boring.

Much of the reason mothers of breech babies are overextended is due to their demanding jobs. These women often hold jobs (or are trained for jobs) that require rigorous mental performance or supervision of others.
Kelly was settling into a new city with a new husband. On the same day she landed a great research position she found out she was pregnant. Because she needed the job she felt unable to reveal to her supervisor and colleagues that she was pregnant.

I was at a new job and I needed to appear eager, hard-working, focused. And they didn't know I was pregnant. I would be sitting in meetings and poking my leg with a pen or pinching myself to keep my eyes open. That was very stressful. And I felt like I don't like to trick people. It was a compromise. It was hard. The work related stuff was the hardest. Trying to adjust to a new environment while having the physical challenge of pregnancy... I wasn't on medication or bed rest. [The OB] had told the midwife about two weeks earlier that he would write the note for me to stay home. I was able to check my blood pressure at work and if I had any x,y,z symptoms at work I was to call them. I wanted to keep working. I didn't want to be home alone.

Susan, an experienced physical therapist, was proud of her ability to maintain a regular work schedule throughout pregnancy. During her formative years her mother emphasized the need for a woman to have a profession to give her a certain level of independence. Her mother advised while marriage was important, self-worth is gained primarily through education. Susan boasted

I met a bonus because my patient load was so high during my pregnancy. I didn't miss one day of work... Everyone is so stressed out [at work]. Everyone is out for themselves - very competitive environment. I was not very surprised. The only accommodation they made that was necessary that I would not lift heavy patients. If I had a stroke patient I couldn't lift them. I could injure myself or them. Later I made sure that everyone remembered not to schedule such patients with me. Otherwise, I did everything.

Emily was a medical assistant in an OB/Gyn practice. She described the end of her pregnancy at work
After I got past 30 weeks my blood pressure started going up. I was working with three doctors and just one me. I started swelling really bad. I tried to take care of all them because we had some people leave and some people get fired so I’m trying to pick up the slack for everybody. Yes. I was very exercised.

Normally I would work with one doctor. He was there Monday morning. All day Wednesday and then they alternate Fridays. So I might have him once or twice a month on Fridays. Now when everybody left I would now have a doctor all day Monday, half day Tuesday, all day Wednesday, half day Thursday and all day on Friday. So I went from not hardly working at all to running my fool head off. Plus I was taking care of all of their patient calls so I’d be there at 6-7pm at night or after.

These women represent a preference shared by many mothers of breech presentation to be busy, even when given the choice to relax. Part of this is due to a concern that if she stops, worries and fears will overcome her. These concerns are held at bay through constant motion. These women are also overextended because they are very responsible by nature. These mothers want to excel and do well at work to facilitate the smooth functioning of the organization. This larger vision and driving force, however, fractures their life into segments for work, sleep, drive, clean, family etc. Because life for these women is compartmentalized, the baby is not allowed into all aspects of everyday living, as is the case with many cephalic presentation babies. Rather, segments of time are designated to focus on the baby like drive time or right before bed.

**Fearful**

Fear of child birth or birth outcomes is another characteristic of many mothers of breech presentation babies. These mothers may have had a previous adverse pregnancy outcome or simply may have a fearful nature.

Mindy was in business school throughout her pregnancy. She didn't want to give herself time to think about the possibilities something might go wrong with her index pregnancy since she’d had a previous miscarriage.
Right after he proposed to me I got pregnant and had a miscarriage. I was probably 10 weeks or 9 weeks along. Pretty early. We almost broke up over the miscarriage. I was really, really distraught over it. I didn’t want to leave the house. He was upset but he handled it differently. To me if he wasn’t crying every day he didn’t care. I was so much of a wreck. We got to the point that we both yelled at each other. I told him he didn’t care and he said he did but since I wasn’t holding the family together he had to. I saw his point of view. I was a nervous wreck because I didn’t want the baby to detach from the wall especially after the miscarriage. I was a little extreme.

I was in school all the time I was pregnant. It kept me focused on something else besides my weight gain and “Oh god, the nursery’s not done.” and “Is the baby going to be healthy?” I used to have a lot of nightmares about the baby suffocating and the cord being wrapped around her neck when she was born. I think I had it because of the miscarriage. You could have a totally normal pregnancy then lose your baby. That freaks me out. I got nervous too. “What kind of a parent am I going to be? How can I raise this child and not mess her up?”

Like Mindy, Susan combated fears. She was in her mid-30s when she had her first (index) pregnancy.

I had many fears. I decided not to have amniocentesis because of the small risk for miscarriage. I didn’t want to take that chance. I did fear that maybe I would have a baby with Down’s syndrome. I remember having a dream toward the end of the pregnancy that I had twins. I remember looking at the babies. They look so Asian. They don’t look anything like me or my husband. The nurse says “No, no, no they do not have Asian features. They have Down’s syndrome.” I was having really bad dreams. I know they were caused by fears that I did not analyze at a conscious level.

Fears of the mothers of breech babies were partially promoted by the medical community since mothers of breech presentation tend to be older. The fears also grew from previous adverse pregnancy outcomes or from a history of abuse by their parents. Mothers who had been abused or had witnessed abuse in their household feared they would be unable to parent in a way that was loving and
responsible. The primary coping mechanism of mothers of breech babies is analysis and is not well suited to mediate the healing of fear or other emotions.

**Flexible**

Characteristics that are not abundant in mothers of breech presentation babies are flexibility and pragmatism. They are noteworthy due to their omission in many of the narratives of mothers of breech babies. These two characteristics, on the other hand, are hallmarks of mothers of cephalic presentation babies. Women who are able to be flexible are well adapted to respond to challenges in life. They are able to reappraise their goals and intentions and alter them without undue drama when circumstances change.

Allison is an example of a woman who had a cephalic presentation baby and chose to take on the full mantel of parenthood during pregnancy. Allison was raised in a conservative home with emotionally unavailable parents. She is a bright, cerebral young woman who completed a bachelor’s degree and later became a certified professional midwife. She was busy with her four children when she unexpectedly discovered she was pregnant again. Her youngest had not yet turned one and she struggled to make sense of her situation. Frazzled and concerned for her own health and her ability to complete another pregnancy while caring for her children she sighed “I don’t want to rise to this occasion”.

However, given time to mull over the situation she finally concluded “children are not the end of the world”. During her pregnancy she and her husband decided to foster two pre-adolescent children. She was dismayed to discover that these foster children were sexually reactive with her children and had threatened to kill her if her children told. She spent the last weeks of her pregnancy coping with this stressful reality and attempting to resolve it. When things became unbearable she would reassure her baby “You know this is ok. This isn’t about you. I’m doing everything I can to make our home safe”.

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When she went into labor she did not progress. Finally, she came to the realization that

My body was hurting because my heart was hurting. . . .
There came a point where I just said to my midwife “I just need to cry.” . . .
and I cried. I just said “It’s ok. It’s ok. It’s ok to come.” He was born in five minutes.

Allison summarized her pregnancy experience and her life philosophy.

Ultimately our goal is to end up changed at some point so that the mistakes we make when we’re 20 aren’t the same mistakes we make when we’re 70. . . . Life has influenced us in such a way to change us for the better – to make us more complete.

Mothers who are flexible easily forgive themselves, others, and life itself for not turning out the way they expected or even hoped. They are able to hold several valid options and to chose the one which best fits the ever-changing circumstances of life. This flexibility is a coping device which proves effective for navigating emotional, relationship, physical, and organizational stressors.

**Pragmatic**

Finally, women who are pragmatic are able to recognize when circumstances are outside their control. They are able to trust others and give into an implacable process, rather than fighting battles which cannot be won. Cassie was once such mother who had a cephalic presentation baby.

Cassie got pregnant with her fourth child six weeks after her third child was born. Her last three children were less than one year apart. When she announced to her family she was pregnant again, her mother was upset. Cassie responded

Yeah, it was too soon. But I’m 27 years old. It’s not like I live in her house or I’m 17, no job, three kids, no school, no nothing. I had a job, I had my own apt. I’m of age. Granted, I know she was scared,
but what are you going to do? I mean what are you going to do? It’s a baby. How can you really be mad unless the situation is really, really bad. And it wasn’t. I was working, my husband was working. We had our other three babies at that time. We had our own place. We weren’t living off anybody or struggling to put food in our mouths. We were perfectly fine. I guess we could have waited. It’s not like we planned it. It was a little irresponsible.

When asked about having her pregnancies back-to-back Cassie explained

I can’t remember if I was ready. I was just pregnant. Toward the end of the pregnancy it was hard. I had one that was just walking, one that was in a car seat, then I had this big belly so it was hard to go anywhere without help. That was the only big thing I can gripe about it. Being sick is just part of pregnancy I guess. You just flip a coin I guess it’s the luck of the draw. You’re just sick or not. I wasn’t very lucky in that department. I just sucked it up. I just did what I could. I griped at the end when I couldn’t sleep and all that heartburn. But I loved every minute of feeling the baby move and just each stage from the moment I took the pregnancy test, the first appointment, the first ultrasound. I looked forward to it. I looked forward to each stage. It got to the point where I wasn’t very prepared mentally for his induction because it was a whole month before he was due. I kind of wanted him to be a little bit older.

Carrie found out her index baby had hydrocephaly when she was in her fifth month of pregnancy.

I was 23 or 24 weeks. Normally they do an amnio at 15-20 weeks. It was kind of late in the game to do it. They gave me all the risk factors for miscarriage. I remember balling my eyes out because I felt my uterus wasn’t strong enough to sustain a prick like that. So I thought I was going to lose the only boy I had, but he’s still here.

The first time they told me – I was having some cramping – they told me to come back because there was some enlargement in his head. I balled and freaked out. My husband stayed home from work and came to the appointment with me. The Dr. said there’s enlargement of the ventricle. We’re going to do an amnio to rule some stuff out, he maybe could have Down’s syndrome . . . I felt like he bombarded me with so much information I was just crying. It was later than the normal amnio would be done. I was on the table
getting ready for it. They did another ultrasound and said “Oh, it’s fine” My baby turned his head!

So the following week when I went back they did it again that large ventricle was showing up again. They realized he flipped his head. That’s when I had the amnio done. It was so painful. I came home and put my feet up. My mom stood with me. She took care of the girls. I was so afraid I was going to lose my baby. But then the fear was my baby has Down’s syndrome. Do I keep the baby to term? So many things ran through my head. When the tests came back he was fine. No Down’s syndrome. No infections or anything.

While Carrie was relieved her baby did not have Down’s syndrome or an infection, the hydrocephaly was confirmed, Carrie and her husband talked.

We said we couldn’t do anything about it, so we’d just go with it and hopefully it would be a boy, and it is! We talked about our options, what are we going to do. I kind of think about the worst thing that could happen and plan for that. I don’t plan for “It’s going to be okay”.

At 36 weeks she went for another ultrasound.

I went to that last visit and the tech didn’t say anything. I was kind of looking, seeing the measurements. He had gone to the 22nd percentile the week before down to 15th. She put me on a fetal stress test. She told me she might have to induce me if the baby was too small and there was no water on that side of the head.

Her doctor decided to induce her immediately thereafter. She phoned her husband to let him know. She said

“Guess what? They’re inducing me today.” He said “Are you kidding?!” And it was almost like I couldn’t believe it myself. So they gave me all the paperwork. I came home and packed my stuff. I took my daughters to my sister’s house. Then my husband and I went and ate Outback, my last meal. I knew once they started the induction I wasn’t going to eat. That’s what they did to me last time and I didn’t know it. I didn’t know I couldn’t eat so I didn’t eat anything. I was the grouchiest person on the whole floor. So I told
him “We’re going to Outback and have a meal without the kids just me and you”. My last meal before I get induced was cheese fries, spring chicken and sweet potato. Then I went into the hospital.

Once her baby was born he stayed in the hospital for a week.

Once he came out of my belly they did an ultrasound on his head and then did another MRI. He was only two days old. He had to be sedated. He recovered in the NICU. Finally he came home.

The head pediatrician discussed the partial ventricular blockage with the family. He felt the situation might resolve itself, or at the most, the baby would need a shunt. Carrie was unprepared when days later she learned her son needed surgery. She admits she was hysterical. After the surgery the baby got a serious infection and also had an allergic response to the shunt. The shunt had to be removed. She spent time with her baby everyday at the hospital. She explains

He had so many IVs and wires and stuff connected to him. I have pictures of all that. He had wires coming out of his head to drain the fluid. He had IVs they had to poke him five or six times because the first IV he had in his hand he pulled out. They put it in his other hand he pulled it out. Kicked it out of both feet. They had to put it in his head. He had the other thing and the stitches on his head. He had seven behind the ear where they put the shunt and two on the head where they put the drain. So my little baby, he’s only two months and he’s had more stitches than I ever had.

At the time of the interview the baby did not have a shunt and fluid was accumulating on his brain. Carrie anticipated another surgery in a few weeks. She terms it a “waiting game”. She was unable to return to work since no daycare or family member would care for the baby. However, Carrie remains optimistic. She compares her son to other babies with hydrocephaly that she saw in the clinic.

There was a [hydrocephalic] baby there nine months old. She was as big as him. Her mental capacity was that of a newborn. She
couldn’t hold up her head. She can’t see, she couldn’t hear, she didn’t cry. She can’t even smile. She couldn’t do anything and she’s nine months.

To see him smiling with me . . . he startles if he hears a high pitch, if you’re talking to him he kind of coos with you. He holds up his head. Being that he can do all those things. . . . I think he can see me, so he’s not blind. I know he can hear somewhat. His newborn tests show he is deaf in that one ear where all the water was, so I’m thinking since they drained it . . . so I got to get that tested again. Once they fix that I’m hoping it was just the water that was there that was making him not be able to hear in that one ear. I can deal with that. Or little delays in walking or talking. They claim boys take longer anyway.

Carrie reflected upon her pregnancy and her relationship with her baby. Like Allison, she parented her baby intra-uterinely. When asked about her fears during pregnancy she responded

I’d talk with my husband about my fears and concerns. I tried to keep it light with the baby. I didn’t want to depress him in my belly. I don’t want to make him sad.

Carrie did not blunt her emotions when she had disappointing news about her baby. When she discovered hydrocephaly was something she had no control over in her pregnancy, she determined to persist loving and parenting her baby just as she did with her others. When faced with unexpected circumstances such as the emergency cesarean, she was sure to care for herself and took the process one step at a time so it would be manageable. Even after birth, she allowed her observations of her son to be optimistic, but reality-based at the same time, when she recounted his ability to see and respond to sound when other hydrocephalic babies could not. Pragmatism allows mothers to maintain their role of parent protecting their baby, while not living in a fantasy.
Mothers of cephalic presentation babies who have characteristics similar to mothers of breech presentation babies (AKA Negative Cases).

Mothers of cephalic presentation babies offer repleat examples of flexibility and pragmatism. However, perhaps the most poignant examples are from those mothers who learned those skills during pregnancy. These women may be thought of as negative cases. They are similar to the mothers of breech presentation babies as far as having high expectations, holding positions of responsibility, and being very cerebral. Upon closer inspection the things that separate the mothers who have cephalic presentation babies from the mothers who have breech presentation babies is ultimately their ability to be flexible or to surrender and experience deep-seated change.

Claudia is a nurse in a high pressure hospital setting who immigrated to the United States as a teenager. When she and her husband became pregnant one year before the index pregnancy they jointly agreed the timing was not right for them and decided to terminate the pregnancy. One year later they were ready to get pregnant and welcomed conception. Claudia was transformed by her pregnancy. Although she had always been a driven, brainy woman, throughout pregnancy she came to care for her body more, to recognize her own limitations, and to learn to listen to her body and relax. Claudia thought about how she was before pregnancy and how she had changed.

I was so obsessed with certain things before. “This is the day I have to such and such” and it really has to be done. But now I’m like “I really wanted to clean the house but I didn’t get to it because I’m playing with her.” I’m loving it. I don’t care. . . .

Before I got pregnant and in my early stages of pregnancy I had a lot of built up anger and tension. I said pregnancy has done me good I’m really happy now. I’m more relaxed and more calm. Things have changed in my life. I don’t identify with aggression anymore. I did. I think it was because I had a lot of struggles in my life. I always had to be strong and stand up for myself and be the
strong person so I would be aggressive. . . . Before [my life philosophy] used to be being successful and getting the things in life that I want. Now it’s just to be happy.

Linda always knew she wanted to follow in her father’s footsteps and become a physician. Linda describes herself as liking to follow the rules and do what you’re supposed to do.

I was always driven. I just always wanted to be the best person, make the most of myself, be the best I could be. So, I guess part of that goal was to finish a doctorate. . . .

She attended an elite college and obtained a master’s degree in science to improve her chances of getting into medical school. When she was not accepted into medical school, although disappointed, she did not despair and searched for alternative ways of making meaning in her life. A couple years later she was accepted into a prestigious dental school where she completed her training. At the time of conception she was working at a dental clinic. Although work was very stressful Linda decided to stay on after finding she was pregnant so she could access the impressive benefit package for her birth and post-partum period. Although she continued to experience stressors throughout pregnancy her response to them changed. She allowed pregnancy to transform her.

I had a lot more stress before I was pregnant. Being pregnant, having that goal, knowing I was going to have a baby, brought so much joy. It really grounded me enough to realize that it’s not that important. These little stupid things would stress me and keep me awake at night. I would lose sleep over the stupidest things and that faded out as my pregnancy progressed because when you realize – and after I had her it was even better – because who cares about this or that stupid little problem at the office. I can go home and see my baby. That’s just something better to focus on than the stupid stuff that happened at work.

These negative cases represent the transformative power of pregnancy. If a mother is able to recognize herself as parent during the pregnancy and enter into
the enjoyment of engaging with her child, her life is reprioritized. The baby is fully integrated in her life and although she may continue experiencing the same stressors as before, they are reevaluated and their meaning is devalued in light of her precious child.

**Special cases of mothers whose babies were breech presentation and permanently turned to cephalic presentation.**

Four mothers in the study initially had babies who were in breech presentation but later turned to cephalic presentation. These mothers were treated as special cephalic presentation cases. The cases were studied to determine if they differed in some seminal way from other mothers of breech presentation babies or if a transformative event occurred for them during their pregnancy.

Megan is a bright technical writer committed to attachment parenting. She moved from the northern US to Florida in the middle of her second pregnancy. She is a stickler for details and successfully rewrote the lease for her house and her husband’s work contract after discovering a multitude of errors. She describes herself as “very exact.” Megan discovered her baby was in breech position around 32 weeks. Her midwife wasn’t overly concerned since she was so early in her pregnancy the baby still had time to turn. However, upon Megan’s request the midwife successfully turned the baby with external cephalic version. The baby reverted quickly to breech presentation. After Megan’s baby resumed breech position one day she just felt like it was the right time for him to turn and used a little flashlight to help guide him.

He was very happy in there. I was very happy to have him and it was wonderful [to be pregnant]. But, I kind of felt like he was getting a little too comfortable and it was time and he just needed a little maternal kick to jumpstart him. . . .I kind of felt like Andy was breech because he wanted to stay close to me you know like he
wanted his head near mine. I felt like he wanted to be close to me for as long as he could and stay inside me as long as he could.

Now, he'll nudge himself so that he's closer to my heart. I try to burp him with his head way high on my shoulder and he'll nudge himself down and he's always been like that whereas [my toddler] not so much.

Both mothers of cephalic presentation babies and mothers of breech babies experienced challenges in life and during pregnancy. However, mothers of cephalic presentation babies either already possessed characteristics which allowed them to respond flexibly to life stressors or were transformed by pregnancy and eventually let go of a stressful external focus and allowed themselves to securely attach to their baby.

**Comparison of mothers of breech presentation babies to each other.**

While there are clear psycho-social-cultural differences between the mothers of breech presentation babies and the mothers of cephalic presentation babies the mothers of breech presentation babies can further be divided into two groups (Figure 5).
Mothers of breech babies who are termed achievement focused (n=17) rate very high for idealism, analysis, polish, and business. Mothers who are termed non-present focused (n=6) have a history of abuse and are more likely to be fearful or mourning a previous adverse pregnancy outcome. Both groups of mothers of breech presentation babies experience the same degree of high expectations and individualism. However, one group is brainy, busy, and has difficulty setting limits for themselves while the other group is very emotional, has a previous miscarriage or abortion which is unresolved, is fearful of childbirth or the outcomes thereof, and had a challenging childhood. One group faces life head-on while the other group ducks behind the shadows. Both groups love their babies deeply but are not able to come into sync with their baby and the needs of the baby for consistency.

Because of the intense life pace, a high level of responsibility, and a tendency to live life from a very cerebral position, the achievement focused breech mothers connect with their baby in an inconsistent manner. Non-present focused mothers operate from a base of fear and sadness and may superimpose those emotions upon their baby. Thus, they are not present-focused and are not
able to meet the baby’s intra-uterine relationship needs for secure attachment. Because of the underlying psycho-social-cultural characteristics of both groups of mothers of breech babies secure attachment is not potentiating. Rather, the template for ambivalent attachment begins to form.

**Breech Presentation and Ambivalent Attachment**

Two vignettes will be presented which highlight the ways in which a mother who is achievement focused may enter into a relationship with her baby which is based on inconsistent ambivalent attachment and the ways in which a mother who is non-present focused may enter into a relationship with her baby which is based on fearful ambivalent attachment.

**Inconsistent Ambivalent Attachment Vignette.**

Natalie is a midwifery student who has chosen a progressive lifestyle, although she was raised in a conservative setting. She has been happily married for years and is dedicated to attachment parenting her children. Thinking back on her childhood she remembers

My mom and I had a frustrating relationship. I was told the story of my birth and made that the metaphor of our relationship. I was induced because Christmas shopping was coming. My mom wanted to be induced. Two hours later I was born. They had an epidural in place but it didn’t get in on time. My mom just remembers a woman putting a mirror up to see her progress and she said “I don’t want to see this!” They tried to hand me to her and she looked at me and just said “I’ve just had enough. She has hair all over her forehead!”

I don’t think of her rejecting me because actually I love her very much. I think of that process . . . because with my sister she was completely put out and doesn’t have a memory at all. Between when my sister was born and when I was born there’s a difference in when they did the Twilight Sleep. So my mom woke up to a pretty package with my sister, and I wasn’t a pretty package.
I think the metaphor was that I was a lot for her. I was almost too much reality. She preferred the pretty package in a sense. Not to say she doesn’t love me. I’m the one who brings things up that she would rather not have to see or know about.

Once she graduated from high school, Natalie left her home state for college.

Part of me started to look outward and find other things to do besides what I was supposed to be doing . . . more so trying to get out of my box! I was getting excited that there was an outside world and there were things going on. That was my route out to questioning the world. . . . I was always excited about thinking outside of the box.

While still in college, Natalie became pregnant with the man who is now her husband. Although her parents did not approve, Natalie’s first birth was a home birth attended by a midwife. When she found herself pregnant years later she decided to have an unassisted home birth since her midwife was in prison for having attended a high risk birth. Again, years passed and she unexpectedly found herself pregnant. This time her response was different.

I didn’t want to be pregnant. I even tried taking some herbs to bring my period on. I thought about it. I took blue cohosh and rue tea, all the things that are contra-indicated for pregnancy. I just wanted to get on with life and get going.

Nothing happened which made it worse. Because then I’m like “Oh my god. Am I going to have an abortion? Am I going to worry the baby will be damaged? Am I going to do this or not?” That whole sensitive pregnancy. It was a little weird. I cried about that several nights. My husband let me know whatever I decided would be fine. He didn’t want to have another child but it’s not his body. He’s pretty straight on that.

I just talked to the baby and told the baby I’d rather not have the baby here unless you’re really meant to be here and you’re fine, then please come on out and I went ahead and welcomed her. I had all those issues. No matter how much you know that your emotional status actually affects your baby you can’t go “Oh, then
change your emotions!” So it’s not like a psychotherapist thing. The fact was I had sadness and that was the way it was.

Once it became clear that her baby was staying, Natalie still struggled with sadness over the changes in her life.

A lot of the sadness was that I’m not going to finish my midwifery stuff. I’m in the middle of an apprenticeship. If I had another year I’d be done and licensed. But now . . . . I don’t know how to parent any other way than being with my child. It’s a lot of sadness.

A lot of sadness. More like depression. My moods swung to the degree that I would get excited about being pregnant and then not excited about being pregnant. I’d be like “Oh my god I’m having a baby! These changes are happening in my body. I have a life” The next minute I’d be like “Oh my god. I feel like shit. I don’t want to do this. This is changing everything.”

At the same time I start feeling like this old woman. I’m 34 right now. My other kids were born in my 20s. I start feeling old. I just started realizing. I felt like this little flower that was going to bloom. My petals were going to fall off and that was it. Like there was no other child going to come. That was a little weird.

I was thinking “God I’m really flowering. I’m beautiful. My body’s getting all puckery.” I’d been thin and he kind of likes my big hips . . . . I had a little sadness – when my baby comes I’m not going to be this young child. Part of it is just realizing you have to appreciate the last time you go through something.

I was too busy dealing with a toddler. I had a 3 year old. I was too busy with a toddler to think about being pregnant. It was work and toddler. It was a lot. I don’t think I was really thinking I had the potential for many more reproductive years. I didn’t really comprehend that. . . . I’m definitely not going to have another baby.

Throughout her pregnancy Natalie was busy studying midwifery and caring for her children. All the business in her life left little time for her to care for herself or her baby.
Now and then I’d talk with [my midwife mentor] about my pregnancy. The other apprentices would palpate me or the midwife would now and then. We didn’t do anything formal at all. We have class work then I have my apprenticeship where I actually assist in birth so I was doing prenataals all day long for work. Then we just never had time for me and I never made the time for me. Now and then I did get blood work. I knew I was anemic but I didn’t have time for blood work then I finally said “Ok I’m just going to get some iron and take care of it and not have to prove it on paper. By the time I prove it on paper I will have already known it.” So I started doing iron supplements.

When her sister-students palpated her belly at 28 weeks they discovered her baby was breech. She knew the baby had time to turn and took the news lightly.

At 28 weeks I was all "Wouldn’t that be funny if I had a breech baby." At 32 weeks it wasn’t that funny. I started calling all these midwives to find out when they turn their breech babies. I tried subtle things to turn her like acupuncture, chiropractic, and slant board. But I didn’t really go in there and try. I talked to her a lot and she didn’t move. I didn’t get a sense of what was going on with her.

As time wore on, Natalie persisted in attempting to get her baby to turn.

Then I had guilt because I’d talk to her to turn. Try to convince her to put her head down and make my life easier and make everyone else’s life easier. I’d be like “If you don’t turn this time . . .”

I tried to manually turn her, another midwife helped me. She tried and she couldn’t do it. The heart rate went down. Then I’d be like “But if for some reason you can’t, it’s ok.” I went through a lot of that. Then I’d be like “Today’s the last day I’m going to try to turn you.” Then the next day I’d do it again. I felt like such a bad parent.

At points in her pregnancy Natalie relied on her baby to help her through difficult moments.

There’d be times when I felt really on with her. I’d be “I’m really going to need energy tonight for this birth.” And she’d give it to me and on the way home I’d be thanking her. Or things like that. We
had that kind of relationship. In the end I needed to just – listening to her – I don’t think she was literally talking – but she just had her own way. A similar way that I had with my own mom. She’s having it another level with me. I’m trying to get her to come out one way and she had another way of doing it.

Even now while celebrating the child, she mourns her career losses.

I’m doing my midwifery protocols and all my homework. The big thing is that I have a certain amount of time until I get my catches and if I miss that window then I have to start over. I have a lot of sadness about “How am I going to get these 18 catches in?” That’s really all I have.

It’d be easy to do if I didn’t want to have a baby. I don’t want to be on call with a baby. I have a hard enough time shoving her in a car seat period. I knew that. That’s part of the sadness in my pregnancy. I knew that would be the case. It’s just not easy for me. It’s a change in lifestyle and giving things up for a while. That’s a lot of the sadness right there.

Natalie represents mothers who are achievement focused and experience inconsistent ambivalent attachment with their babies. In the case of many mothers of breech babies a career focus competes with their desire to have a child and consistently parent that child beginning in utero.

_Fearful Ambivalent Attachment Vignette._

Janelle is a 20-something accountant in a supportive marriage. Although she currently has a lot of stability in her life, her growing-up-years were rocky. She confides

My mom had a drinking problem. She was so unhappy. My parents were fighting all the time. I remember the fights they had when she was pregnant. When she drank too much she got violent, but not really where she would just go beating up people for no reason. She would get angry and start fighting with my dad or yelling at me for something that happened months ago. . . . My younger brother would get scared, he’d be crying, and I would always try to take him
up to my room and try to make him feel better and tell him everything will be ok. Nobody was really nurturing to me.

When Janelle was a teenager her parents divorced and she chose to live with her father, although she felt distanced from him.

Once he and my mom got a divorce he changed to a completely different person. He was going out and partying with these younger girls. He was never home. Then when he got remarried he was so involved with impressing my step-mom and her three kids I wasn’t paid attention to. I kind of feel like I was forgotten when the divorce happened. I wasn’t getting along with my mother so I had no relationship there. My father was off doing other stuff. At the time I felt like I was forgotten.

She dropped out of high school and at age 18 left home to live with her boyfriend.

Even when I was 16 or 17 I always had a fear that I wasn’t going to get pregnant because of my irregular periods and also because between the time I was 17 through 21 I had a serious boyfriend and we weren’t using protection. I never got pregnant. We thought we were going to get married. All my friends were accidentally getting pregnant. Now I think it wasn’t meant to be pregnant at the time.

She compares her experience to those of the rest of her family.

At the time everyone in my family has been able to get pregnant really easily. We never had any unexpected deaths in my family. Everyone always lives to be really old. I always thought I would be the one that something horrible was going to happen to like not getting to have kids or something.

I guess I was just thinking about the percentages. Everything else has been really good in our family and also in my extended family. And also I kind of felt like the black sheep of the family because I was getting in trouble as a teenager and everybody else was on track. Even with my uncles and aunts and cousins I felt like they all kind of looked at me that way. Maybe I would deserve something bad.
Janelle married in her early 20s. Several years later she found a gynecologist who treated her for a thyroid condition. Soon thereafter she conceived.

I didn’t know I was pregnant. . . . I had some weird bleeding and pain and found out it was ectopic. We went to the ER when I was having the pain. My doctor said “Go there just in case it’s your appendix.” When we got there we found out I was pregnant. They said the size of the fetus looked to be around nine weeks and that matched my cycle. But my hCG [human chorionic gonadotropin] levels were about three weeks so they figured I was already miscarrying on my own – having a tubal abortion. So they just did the hCG test every day for the next three weeks until it went down to zero.

She confides

It was really hard even though I only knew I was pregnant for a few minutes and I knew right away something was wrong because I had been bleeding for 3 weeks. It was really hard because I was trying to get pregnant ever since we were married. It was probably devastating to me. Trying for so long. . . . Finally you get pregnant and it’s taken away from you as fast as you know.

My husband was just as upset as I was. We were each other’s support. The only thing that got me through that was starting to do my charts. I had to get pregnant the next cycle. Now that I knew I could get pregnant it gave me some hope that I maybe could get pregnant soon. I wanted to get pregnant right away. I know a lot of people need time before they’re ready to do that again. But for me I had to get pregnant again right away or I didn’t know how I could get through it. To get through it was to get pregnant again.

In the following days, Janelle focused all her efforts on becoming pregnant again. She was relieved to find herself pregnant only weeks thereafter.

I got pregnant on my first cycle. I was using a predictor kit and doing my temperature and everything. That’s all I thought about 24 hours a day. We tried morning and night two weeks straight. I didn’t want to lose any chance of getting pregnant. I started testing five days after I probably would have conceived. Finally, nine days after
I conceived, a test came up positive. My first thought was that I was really happy. Then I was terrified it would be ectopic again.

[When they did the ultrasound] five or six weeks later they said [the implantation] was a little low so that had me terrified. I kept thinking: What if my tubes are blocked? What if I lose this one, too? I was extremely paranoid and stressed out in the beginning.

In the following days and weeks her baby grew and she kept track of her pregnancy’s progress through serial ultrasounds.

I was really happy, but I was terrified every time I went into the ultrasound not knowing what to expect. I was really happy but I had a feeling that the pregnancy was doomed because I’d taken four years to get pregnant, then I’d lost the first one. I kept thinking maybe something would go wrong with this one. I was really scared in the beginning.

I had always felt like something was going to go wrong. Hitting 12 weeks was a huge milestone for me. I looked up on the internet every single day about stuff with pregnancy because I was so worried about it. When I saw the percentage dropped at 12-13 weeks that was a huge milestone for me. And then the next eight weeks were scary for me too because I wasn’t feeling him move at that point because it was too early.

Once I started to feel him move it was even a bigger milestone for me because it verified for me every day that he was still ok and he was still alive in there. Every ultrasound I had was always terrifying before I was going to go in because I was afraid they were going to turn on the screen and his heart wasn’t going to be beating or something. . . . I would read too much on the internet about things that could go wrong.

At 32 weeks, weekly non-stress tests began. Six weeks later, she noticed the movements of her baby decreased simultaneous to a perceived increase in the volume of the amniotic fluid.

That freaked me out. I couldn't start my day until I felt him move. But everyone kept telling me “He’s bigger. He doesn’t have as much room to move.” He had always been very active all the time.
Even on the last non-stress test he wasn’t as active as before, but the doctor said he was moving around and his heart rate looked good. He said “If you have any doubts we can deliver it.” Even though I was worried, once he told me I could have the baby, I knew I wasn’t ready to have the baby. So I was scared about going in and telling someone that I really don’t feel comfortable, then they were going to deliver me right then.

When she found out her baby was breech on the day she was to deliver she decided not to attempt external cephalic version. She explained

I was already scared that something was going to go wrong so I didn’t want to try anything. I just wanted to leave him alone and let him do what he wanted to do.

When Janelle reflected about her relationship with her baby during the pregnancy she stated

I’d say stuff to him and rub my belly and stuff when he moved. I don’t think I did too much, but I would once in a while. I was terrified throughout the pregnancy. Even though my doctor advised against it, I found a website that would sell me a Doppler without a doctor’s consent. So every single time I’d get worried that would help me a little bit to be able to find the heart beat. If his heart was still beating I’d be ok for a couple days.

Janelle represents the mothers who are non-present focused. Their unresolved previous experiences like miscarriage or abuse and their anxious anticipation of childbirth or parenting do not allow them to be fully present in their pregnancy. As a result, their relationship with their baby reflects fearful ambivalent attachment.

**Maternal Explanatory Models for Breech Presentation.**

Explanatory models offered by mothers of breech and cephalic presentation babies also proffer a means of illuminating the intra-uterine relationship. While mothers of breech babies and mothers of cephalic presentation babies contributed similar models, those of the mothers of cephalic presentation were better developed, in general. Additionally, four mothers of
breech babies (17%) were unable to imagine any possible reason their baby was breech. This, in itself, may be an indication of disconnect in the maternal-fetal relationship.

Six over-arching explanations were given by breech and cephalic presentation mothers for why some babies are born breech (Figure 6): mechanical problems, choice of the baby, developmental stage of the baby, mother’s lifestyle and psycho-emotional qualities, factors external to the baby and to the mother, genetics or heredity, and natural or divine reasons.

![Explanatory Models: Why Breech?](image)

Figure 6: Maternal Explanatory Models Risk Factors for Breech Presentation

Although mothers of breech babies identify mechanical and baby factors as causes of breech presentation about 10% more frequently than do the mothers of cephalic presentation babies, the models elaborated are nearly identical. Developmental factors, External factors, Nature/god, and Hereditary explanatory models are neither well elaborated nor do they account for a high
percentage of responses in either group. The greatest difference in explanatory models is that of the role the mother plays in breech presentation. The model is much more elaborated by cephalic presentation mothers and cephalic presentation mothers identify it as a potential risk factor 12% more often than do mothers of breech presentation babies.

Mechanical factors that are identified as possible contributors to breech presentation include the size of the baby (too big or too small), the size or shape of the uterus (too big or too small), a physical barrier preventing turning such as the umbilical cord or an anterior placenta, and the volume of amniotic fluid. The baby is thought to be responsible for breech presentation in some cases. Mothers claim the baby may be physically more comfortable head up, wants to be close to mother, is stubborn and doesn’t want to do the right thing, is lazy or fearful so doesn’t want to turn, wants to make the mother’s life difficult, is weak or tired, doesn’t know how to turn, or doesn’t feel like it’s time to be born.

The EM of development simply points to turning to cephalic presentation as a developmental stage so if it is avoided something is wrong with the baby’s development. Factors external to the baby and the mother were noted only by mothers of cephalic presentation babies. These factors include things like exposure to water (like bubble baths or swimming), food, prenatal care, exercise, weather, drugs, and alcohol. Genetics is another self-explanatory, poorly elaborated model. A final poorly elaborated EM is the influence of nature or God in determining birth presentation. These comments referred to birth presentation as out of the control of baby or mother and primarily a mystery.

The model which is best elaborated is that of the influence the mother plays in birth presentation. When mothers talked about this possibility they gave a lot of personal and observed examples of why this model was reasonable. While the mother-centric risk EM of the mothers of cephalic presentation babies includes the risk factors identified by the mothers of breech presentation babies it is expanded to include more concepts. This model comes at the notion of the mother’s life being out of balance from several perspectives. The mother’s life
may be out of balance from being too active or too inactive. Her life may be out of balance because of personality traits or external demands that do not allow her to relax and connect with her baby. Because of the circumstances or practices of her life she is not caring for her mind, body, and spirit in a way that is conducive to having a healthy pregnancy. Because of the lack of peace in her life she is unable to connect to her baby in a way that is meaningful to the baby and responsive to the baby’s environmental needs.

Melinda is a doula and a feminist. For over ten years she has volunteered to support women through their labors and deliveries. She spends a lot of time thinking about women’s reproduction and agency. Although her baby was cephalic presentation, she readily related her understanding of why some babies are born breech.

I’m thinking the mother’s uterus can encapsulate the baby so the baby can’t reposition itself. It has to do with the relationship between the mom and baby. It’s almost like if the womb encapsulates the baby so it can’t move into the position it’s supposed to be in – it’s almost like a foreign – the body treats any foreign object the same way where they encapsulate it. It’s just the way you embrace the pregnancy.

Dahlia is a chiropractic pediatrician. Her practice focuses on pregnancy and children’s health so she has extensive experience with breech presentation pregnancies. Additionally, her baby was breech during the latter stage of pregnancy then turned to cephalic presentation after she cut back on the hours she worked. She reflects on her own pregnancy and those of her patients. While she observes uterine constraint plays a role in breech presentation she adds

I’ve also found that emotionally there’s either a high stress that things aren’t gonna work out or that they’re trying to fight some kind of thing. . . . A lot of moms that come, they’re kinda desperate. They’re willing to do anything but they’re also higher strung personalities. . . . It’s just that they just come in carrying a lot of
tension. You can just feel it in their whole body that it’s just, they, things are not in rhythm in their life for whatever reason and they are not, they’re not okay with it so whether they’re holding it in but it’s just things are not, things haven’t lined up yet and so . . . and they’re hoping that this baby will, but not address the other things.

Thus, mothers of breech presentation babies tend to have either an achievement focus or a non-present focus. These foci translate into parenting behavior which may set the template for ambivalent attachment based on inconsistency or ambivalent attachment based on fearful overlay. Intra-uterine physiologic templates and relationship templates can be altered throughout life to some degree. Mothers enter into secure attachment with their children by consistently and sensitively meeting the needs of their children for love and care.
CHAPTER SIX
DISCUSSION

Brief Summary of Major Findings

This study was conducted to explore the quandary of the etiology of breech presentation. Although breech presentation is associated with increased infant morbidity and mortality and is the most common birth malpresentation (3-4%), very little is understood about its origin. Part of the conundrum of breech presentation is demonstrated by the increased incidence of breech presentation for white non-Hispanic women, compared to black non-Hispanic women, and for women who are of middle or upper socio-economic strata, compared to women of lower socio-economic strata.

To explain the occurrence of breech presentation a biomechanical model has been proposed by the biomedical community while a psycho-social-cultural model has been suggested by other medical systems, such as Chinese medicine and Ayurvedic medicine. This study evaluated the effect of maternal ethnicity, education, Medicaid/WIC eligibility, and social prestige (a combination of education and occupation) on breech presentation. Logistic regression of both the birth certificate data set (1992-2003) and the linked birth certificate/Medicaid data set (1999-2003) indicated ethnicity, education, and Medicaid/WIC eligibility influence birth presentation minimally. The final model for the birth certificate data set (1992-2003) indicates white non-Hispanic mothers have an 72% increased risk and Hispanic mothers have a 49% increased risk of having a breech baby when compared to black non-Hispanic women. Additionally, having less than a high school diploma increases risk of having a breech baby by 6%. However, the full model accounts for only 4.18% of the variance of risk factors for breech presentation and is not statistically significant. Since the entire model is not
significant, all interpretation of variables in the model must be cautious and may be due to chance. However, the same model may produce significant results in other datasets.

Similarly, logistic regression of the linked birth certificate/Medicaid data set (1999-2003) found Medicaid/WIC eligibility is not associated with breech presentation. The entire model accounted for 4.46% of the variance of risk factors for breech presentation. The goodness-of-fit for both models was <0.0001. This suggests either the data is of a poor quality or that other important variables are not accounted for by the models. As with the 1992-2003 birth registry data set, since the entire model is not significant, all interpretation of variables in the model must be cautious and may be due to chance. However, the same model may produce significant results in other datasets.

The qualitative research was conducted to explore additional variables which were not captured in the secondary data. In particular, psycho-social-cultural influences on breech presentation were explored. Primary data variables of education and occupation were combined and submitted to evaluation in the Hollingshead Social Position Index. The results indicate mothers of breech presentation babies have higher social status than do mothers of cephalic presentation babies.

While mothers of breech babies do not love their children less than do mothers of cephalic presentation babies, they do differ in other regards. Unlike mothers of cephalic presentation babies, mothers of breech babies have exceedingly high expectations for themselves and for others, are idealistic and individualistic, are most comfortable in their roles as analyst or thinker, are very busy, have difficulty setting limits for themselves, and tend to be more fearful. Negative cases (i.e. mothers of cephalic presentation babies who possess psycho-social-cultural characteristics similar to those possessed by mothers of breech presentation babies) reveal the most potent differentiating characteristics possessed by mothers of cephalic presentation babies, and not found in mothers
of breech presentation babies, are the abilities to surrender to life circumstances outside of one’s control and to take on the full mantel of parenthood.

Just as mothers of breech and mothers of cephalic presentation babies differ, the data indicated that mothers of breech babies are further divided into two sub-groups: the achievement focused mothers who are often the busy professionals in high status careers demanding a lot of time and mental effort, and the non-present focused mothers who had an abusive childhood, a history of unresolved pregnancy loss, and fear about childbirth or the outcomes thereof. These two groups of mothers of breech presentation babies mirror the characteristics of mothers of babies who are ambivalently attached, as diagnosed in attachment theory. The template for secure attachment is difficult to establish in these pregnancies because of these characteristics.

**Interpretation of Findings**

Since the secondary data logistic regression model was not a good fit, the findings of ethnicity and socio-economic status as risk factors must be interpreted with caution and may be due exclusively to chance. If ethnicity and socio-economic status are risk factors for breech presentation, they contribute less than two percent of the variance to the issue. The primary data results suggest the psycho-social-cultural explanatory model of risk factors for breech presentation, as described by Chinese medicine and Ayurvedic medicine, may help elucidate the origins of breech presentation. The psycho-social-cultural model suggests maternal stress, over-busyness, excessive worry, unresolved experiences, and fear influence birth presentation. Ayurvedic texts further elaborate the model by teaching turning to cephalic presentation is an act of individuation on the part of the baby which is possible only in an environment of unconditional maternal love and consistency. The results from the primary data must also be interpreted with caution since this is a small, exploratory study.
Integration of Findings with Published Research

The maternal-fetal unit is embedded within a psycho-social-cultural matrix (Ellison 2001). This matrix influences maternal-fetal health, development, and relationship (Boyd and Richerson 1985; Csikszentmihalyi 1993; Gould 1996; Laughlin and Brady 1978; Steward 1972). The intra-uterine environment is experienced by the fetus as a facsimile of the extra-uterine environment (Gillman 2005; Sallout 2003). Thus, exposure to nutrients, stress, nurturance, and other variables predisposes the fetus to characteristics which can be tempered, if the extra-uterine environment is different from the intra-uterine environment, but never completely undone (Gluckman, et al. 2007).

The psycho-social-cultural explanatory model of breech etiology considers turning to cephalic presentation to be a fetal developmental stage (Maciocia 1998:28, 562). This phase of maturation, in part, reflects the baby's differentiation from his/her mother and willingness to proceed to the extra-uterine phase of life (McGilvray 1994:46-47). Chinese medicine, Ayurvedic medicine and ethnographic texts indicate turning may be delayed or detoured if the mother is not behaving in a way which is socially appropriate, experiences excessive negative emotions or stress, is fearful, or if she is unable to consistently parent her baby intra-uterinely. Likewise, if the baby is unwilling to take on his karmic destiny or if he is fearful turning will not occur. Thus, the psycho-social-cultural explanatory model asserts breech presentation is a manifestation of the intrauterine relationship environment (Center. 2004; Maciocia 1998:28, 562).

Attachment theory indicates mothers who are inconsistently available to their babies or impose their own fears upon their babies construct ambivalent relationships (Armstrong and Hutti 1998; Heller and Zeanah 1999; Peterson 1994). Ambivalent attachment is characterized by proximity seeking behavior on the part of the baby (Siegel 1999:74-76). Further, attachment theory suggests the type of attachment experienced by the maternal-baby dyad is an evolutionary strategy on the part of the baby to ensure survival (Bowlby 1969). Thus, just as the fetus attempts to predict the extra-uterine physical environment through the
intra-uterine physical exposures, so too may the fetus attempt to predict the extra-uterine relationship environment based upon intra-uterine relationship exposures (Gau and Lee 2003). Additionally, the psycho-social-cultural model proposes maternal-fetal conflict (Trivers 2002) exists wherein a mother and fetus may disagree over the amount of parental investment required for appropriate growth and development. Maximization of reproductive success is the parental goal and self-maximization is the offspring goal (Trivers 2002:129).

While previous work indicates women who produce their own wealth experience a loss in reproductive fitness (Hopcroft 2006; Weeden 2006), findings from this study seem to suggest the work environment itself is not what differentiates mothers of breech presentation from mothers of cephalic presentation babies. Rather, mothers of breech presentation babies may possess characteristics which lead them to seek out positions of influence and affluence. So, while the US culture is gender biased and women who produce their own wealth do not experience the same physiologic and reproductive advantages as do men who produce their own wealth or women who inherit their wealth through their husbands or fathers, adverse pregnancy outcomes experienced by mothers of breech presentation babies cannot be blamed directly on their employ.

**Limitations**

Validity of research results may be compromised by selection bias, information bias, and by confounding. Selection bias occurs when cases and controls are enrolled using different criteria (Hennekens and Buring 1987). Information bias occurs when different information is elicited from cases and controls. Selection bias and information bias may be influenced by systematic or by random errors. Confounding occurs when a third variable, related to the independent variable and to the dependent variable, obscures the true relationship between the dependent and the independent variable. In this section, potential biases, confounders, and limitations will be discussed for the secondary
and primary datasets. For both the secondary and primary datasets additional future analysis would be beneficial.

**Secondary Data**

The primary weaknesses of the case-control study include selection bias and recall bias (Szklo and Nieto 2000). Due to the manner in which birth certificate data and Medicaid/WIC eligibility data are collected, selection bias is also minimized since cases and controls are selected in the same way from the same population. Recall bias is limited by using only the most highly valid variables.

All births, independent of location of birth or training of attending health care practitioner (e.g. OB, midwife, nurse-midwife), are recorded in the birth certificate. Therefore, although breech presentation is thought of as a more high-risk delivery than is cephalic presentation, there is no reason to believe breech and cephalic presentation are differently represented in the birth certificate. The potential for recall bias on the birth certificate is limited since some of the data were gathered prospectively. For questions where recall is a factor, such as last menstrual period, there is no reason to believe breech presentation mothers would recall the last menstrual period any differently than would cephalic presentation mothers.

Accuracy of reporting birth certificate variables is uneven. The primary systematic error is that of under-reporting. Thus, if a difference is found between breech and cephalic presentation the true difference is probably greater. This problem with validity was dealt with by comparing a model which included variables which are consistently only highly valid and another model which also included moderate and low validity variables. The final model accepted included only the variables which were highly valid. Confounders were also controlled for in this final model. The large sample size also offsets potential random errors. This can be noted by the relatively narrow confidence intervals in the final model.
One of the main limitations of the secondary data study is that no variable is included which directly measures income. Only approximations of income were available. Low levels of education and Medicaid/WIC eligibility proved to be small, yet significant, risk factors for breech presentation in the final model.

**Primary Data**

The primary data component of the study is limited because it is retrospective, does not have a large participant/observation component, is not a random sample, and has insufficient SES and ethnic diversity representation in the sample. The primary data study serves as a pilot study which explores psycho-socio-cultural components of pregnancy. The results of this study may be used to design a more rigorous study in the future however, they should be generalized only with extreme caution.

The study design attempted to limit selection bias by making inclusion/exclusion criteria identical for cases and controls. Also, cases and controls were recruited from the same sources except for the breech presentation websites. Internet recruitment, itself, may introduce selection bias. Although internet recruitment appeals to women who are more highly education and thus may have more elite occupations, women were also recruited at head start centers, WIC, and the county health department where those types of mothers would be under-represented. Other recruitment sites such as the hospital do not introduce selection bias since they are widely used by all women to birth babies.

Surprisingly, mothers of cephalic presentation babies in the primary data had more health problems than did mothers of cephalic presentation babies in the birth certificate data. Many of the mothers of cephalic presentation babies stated they wished to participate in the study because they had a stressful pregnancy and did not have a breech baby. Effectually, they were trying to disprove the possibility that mothers of breech babies have more stress in their pregnancies than do mothers of cephalic presentation babies. Thus, healthy
pregnancies were under-represented among mothers of cephalic presentation babies. This suggests if differences were found between mothers of breech and cephalic presentation babies in this study, the actual differences may be more acute.

Limitation of information biases was attempted by ascertainment of information through a variety of means, including close ended questions. Another way of limiting information bias is through blinding of research, participant, and analyst. However, blinding was not possible in this study. This limitation is somewhat offset by the high value placed upon negative cases in qualitative research. Because of this, each control was explored as a possible negative case.

Measurement error occurred in several circumstances. One example of systematic error is that most mothers reported the baby weight in pounds and ounces. These measurements were then converted into grams. However, because ounces is a less accurate measurement than are grams, the grams reported are actually not the actual weight of the baby in grams. Another measurement error occurred when types of stressors were ascertained. Originally, the research hypothesized mothers of breech babies were subjected to higher levels of mental stressors than were other mothers. To determine if this were so, she asked mothers to differentiate between mental, emotional, and physical stressors. However, no adequate definition was identified which could differentiate between mental and emotional stressors. Therefore, the data from this question was not analyzed. Also, physical constraints related to the mother and baby were not measured. Finally, the study did not capture household responsibilities and necessary expenditures which may impact net income. Net income was only approximated by considering household size.

The Hollingshead scale also has some measurement bias. It was originally created in the 1950s and has not been updated to include new careers such as those in computers. Additionally, growth in the economy is not reflected and changes in professionalization are not captured. Most professions, however,
have not shifted categories. Occupations not represented in the scale were placed in a category based upon the category description and similarity of other occupations in the category.

Recall bias is an information bias. Cases are presumed to remember experiences better than do controls. The researchers attempted to limit recall bias by ensuring all participants had a baby within the past 12 months. Also, recall bias is limited since pregnancy is a special event for everyone, not just mothers of breech babies.

In the primary data confounding was attempted to control for by matching ethnicity and SES. However, this strategy had very limited success. This limitation may not be as grave as assumed since all qualities of mothers in the primary direction trended in the same direction as the secondary data except health of the mother. Neonate characteristics differed between the primary and secondary data possibly because they are related to the poorer health of the mother of cephalic presentation babies in the primary data than in the secondary data.

**Strengths of Study**

This study is the largest and most rigorous study to date to evaluate the role of ethnicity and SES in breech presentation. It also included an evaluation of the explanatory power of the psycho-social-cultural model of risk factors for breech presentation.

**Ethical Considerations**

This study received IRB approval through a large university in west-central Florida, the Florida Department of Health, and the research division of a large regional hospital. Permission to use the Florida birth certificate data was granted from the Florida Office of Vital Statistics and the Florida Agency for Health Care Administration granted permission to use the Medicaid data. Upon receipt of permission the University of Florida linked the variables of interest.
Publication of Results and Who Will Benefit

The results of this study will be published in the epidemiology and anthropology academic literature, the professional maternal and child health journals, and in the parenting lay journals. Academicians will benefit from the theoretical contributions this research makes while health professionals and parents will benefit from the practical applications of the findings.

Conclusions

Variables in the logistic regression model explored explain less than five percent of the variance in risk factors for breech presentation and produced a model which was not statistically significant. The psycho-socio-cultural model may have more explanatory power and points to inherent differences in the way that mothers of breech presentation babies and mothers of cephalic presentation babies interpret the world, live their lives, cast priorities, and parent their baby in utero. Future longitudinal and intervention studies will further investigate the validity of the psycho-social-cultural explanatory model and the role these variables may play as risk factors for breech presentation. The present findings must be considered with extreme caution due to the non-probabilistic sample selection and the small sample size.

For applied anthropology the possibility that breech presentation may be related to intra-uterine ambivalent attachment means early intervention may be designed to help prevent or reverse breech presentation. Prevention or reversal of breech presentation can improve the health for the baby and mother, improve their developing relationship, and decrease the financial burden on the health care system. For biological anthropology this finding suggests adaptation and accommodation may also occur in the intra-uterine relationship environment, not only the physiological environment. Qualities which allow for secure attachment in the extra-uterine environment appear to influence attachment in the intra-uterine environment similarly. Moreover, this study shows that the active role of fetuses to intra-uterine environments may extend not only to disease processes.
but also to basic milestones of development, such as turning to cephalic presentation \textit{in-utero}. 
GLOSSARY

**Accommodation**: Evolutionary strategy to promote survival at the loss of fitness.

**Adaptation**: Evolutionary strategy to promote survival and fitness.

**Adrenocorticotropic hormone (ACTH)**: Secreted from the anterior pituitary lobe. Stimulates the adrenal cortex to release other hormones. Secretion is increased with stress.

**Attachment theory**: Relationship template between mother and baby secondary to maternal characteristics. Dominant types of attachment are secure, ambivalent, and avoidant.

**Beta-endorphin (B-EP)**: Secreted by pituitary to promote feeling of well-being and boost the immune system when exposed to stressors.

**Birth malpresentation**: Non-vertex presentation.

**Breech presentation**: Baby presents bottom first or feet first or a combination thereof.

**C and CBAR**: determine the change in the regression coefficients if an observation is deleted.

**Case-control study**: An epidemiology study design which compares people with the condition of interest with those without the condition of interest to study variables which may influence that condition.

**Central nervous system (CNS)**: Composed of the brain and spinal cord. Designed to process information.

**Cephalic presentation**: Head first birth presentation.

**Collinearity (AKA Multicollinearity)**: Occurs when two or more independent variables or covariates are too closely correlated and provoke an apparent dilution of effect.
**Complementary log-log link (cloglog):** A link function in logistic regression whose formula is \( f(z) = \log(\log(1-z)) \)

**Confounder:** A confounder is a covariate \((Z)\) which is related to both the independent variable \((X)\) and the dependent variable \((Y)\) and obscures the between \(X\) and \(Y\) (as measured by the crude odds ratio [OR]).

**Corticosteroids (CORT):** Produced by the adrenal cortex as part of the stress response. Includes glucocorticoids (e.g. cortisol) and mineralocorticoids (e.g. aldosterone).

**Cortisol:** A corticosteroid produced in the adrenal cortex. It is released as a response to stress to increase blood pressure and blood sugar levels. Also suppresses the immune system.

**Developmental plasticity:** An evolutionary response which prompts variability in development secondary to environmental exposures.

**Effect Modifier (AKA Interaction Term):** Interaction occurs when a covariate \((Z)\) influences the impact the independent variable \((X)\) has on the dependent variable \((Y)\) thereby producing heterogeneity in the magnitude of effect of \(X\) on \(Y\).

**DFBETAS:** is a statistic which calculates change in the regression coefficient divided by the standard error of that coefficient if an observation is deleted.

**DIFCHISQ** is the change in Pearson's chi squared if an observation is deleted.

**DIFDEV** is the change in the deviance if an observation is deleted.

**Ethnicity:** A self-identified association with a group by phenotypic, cultural, linguistic, or behavioral characteristics

**Evolution:** Biological change over generations which increases reproductive fitness.

**Evolutionary ecological reproductive theory:** Reproductive outcomes are influences by the physical and socio-cultural environment in a way which seeks to enhance fitness.

**Fetal-origins hypothesis (AKA Barker's Hypothesis):** Intra-uterine environmental exposures determine fetal development in an attempt to predict the extra-uterine environment.

**Hat matrix diagonal:** determines how far each observation is from the centroid
Interaction Term: See Effect Modifier

Kurtosis: Compares the flatness or peak of a distribution curve in comparison with a normal distribution.

Link Function: The function in logistic regression which allows a linear relationship to be shown between a dependent and independent variable. Possible links are logit, probit, and cloglog.

Logit: A link function in logistic regression whose formula is \( f(z) = \log\left(\frac{z}{1-z}\right) \)

Low birth weight: <2500g

Metabolic system: Includes those systems (e.g. thyroid) involved in the catabolism and assimilation of energy sources.

Morbidity: Disease, illness or other health condition.

Multicollinearity: (See collinearity)

Negative Cases: Sought after examples in qualitative research which contradict the developing pattern observed. Negative cases give an opportunity to reject parts of a developing model or further expand the explanation.

Neuroendocrine system: Systems of the body where the nervous system and endocrine system interface such as the HPA, ovaries, thyroid, and peripheral nervous system.

Noradrenergic system: Synthesizes, stores, and releases norepinephrine (AKA noradrenalin).

Noradrenalin: See Norepinephrine

Norepinephrine (AKA Noradrenalin): Exists in the central and peripheral nervous systems. Released by the sympathetic nervous system to produce tachypnea, tachycardia, increased glucose metabolism, and decreased GI motility. Also associated with sleep, memory, learning, and emotions. Low levels are found in people with affective disorders like major depressive disorder or bipolar disease.

Ontogenetic: Development of an organism from fertilized egg to maturity

Outliers: are observations which are at the edges of the distribution and may have undue influence on the outcome.
**Parsimony:** Parsimony is a balance between bias and variance where parameters added to the model decrease bias but increase variance. An over-fit model is avoided best through *a priori* determination of model parameters to be tested based on the science of the condition in question (Burnham and Anderson 1998:318). The most parsimonious model is that with the lowest AIC, although no model may actually approximate “truth” (Burnham and Anderson 1998:23, 294-295, 323).

**Peri-conception:** The time around conception. Sometimes defined as 60 days before conception to 15 days after.

**Phenotypic plasticity:** Changes in appearance in an individual which reflect environmental exposures.

**Phylogenetic:** Developmental changes in species over the course of evolution

**Premature**

**Probit:** A link function in logistic regression whose formula is $f(z) = \text{invnorm}(z)$ where invnorm is the inverse of the standard normal cumulative distribution function.

**Risk Markers:** Necessary, but insufficient, findings (e.g. RA factor for rheumatoid arthritis, monoclonal paraprotein spike for multiple myeloma) for a condition or presentation to be diagnosed. In contrast, risk factors are characteristics that potentiate a condition or presentation. However, they are neither necessary nor sufficient for that condition to be diagnosed.

**Sensitivity:** Sensitivity is the proportion of people who have the condition or characteristic in question (e.g. white non-Hispanic ethnicity) and are correctly identified as having that condition.

**Skew:** A description of the curve and tail of a distribution in comparison with a normal distribution.

**Socio-economic status (SES):** Socio-economic status represents realized or potential differential access to material, human, or social capital

**State:** A psychology term used to indicate a characteristic of a person which is situationally dependent. (e.g. Right now I feel angry)

**Stressor:** Noxious stimuli or benign stimuli misinterpreted as a noxious stimuli.

**Thyrotrophin** (AKA thyroid stimulating hormone, TSH): Produced in the anterior pituitary secondary to ACTH stimulation. Promotes T3 and T4 secretion by the thyroid.
Triiodothyronine (T3): Derived from T4. Regulates gene transcription. Fundamental for fetal development but may cause malformations or death in excess.

Thyroxine (T4): Secreted from the thyroid. Influences metabolic rate.

Trait: A psychology term used to indicate a characteristic of a person which is not situationally dependent. (e.g. In general I am happy)
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Roberts, C. L., C. S. Algert, B. Peat and D. Henderson-Smart

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Rothman, B. K.

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Scheper-Hughes, N.


Schnorrenberg, B. B.

Schoendorf, K. C. A. M. B.

Schwarz, M. T.

Scott, G. M. J.

Seitz

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Streefland, P. H.

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Szklo, M. and J. Nieto
Taffel, S. M., P. J. Placek and T. Liss  

Takashima, T., T. Koyanagi, N. Horimoto and S. Satoh  

Tashakkori, A. and C. Teddlie  

Thompson, J., C. Roberts, M. Currie and D. Ellwood  

Tiedje, L. B.  

Trivers, R.  

Trostle, J. A. and J. Sommerfeld  

Turner, M. J.  

Tussing, A. D. and M. A. Wojtowycz  

Ulrich, L. T.  
US Department of Health

van Beek, W. E. A.


Van Dornsten, J. P., B. S. Schrifrin and R. L. Wallace

van Ham, M., P. van Dongen and J. Mulder

Vande Vusse, L.

Vartan, C. K.

Veit
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Weeden, J. A., Michael J.; Gree, Melanie C.; Sabini, John  

Weidenheim, K. M., I. Epshteyn, W. K. Rashbaum and W. D. Lyman  

Wertz, R. and D. Wertz  

Westgren, M.  

Whittaker, A. and C. Banwell  

Williams, J. W.  

Wilson, M., E., M. A. White, B. Cobb, R. Curry, D. Greene and D. Popovich  
Winterhalder, B. and E. A. Smith  

Yamaguchi, K., N. Goto and K. Honma  

Yang, H., M. S. Kramer, R. W. Platt, B. Blondel, G. Breart, I. Morin, R. Wilkins and R. Usher  

Yasmeen, S. P. S. R. M. E. S. J. M. K. W. M. G.  

Yow, V. R.  

Zatuchni, G. and G. Andros  

Zhang, J. and P. J. Schwingl  


Zollinger, T. W. P., Michael J.; Gamache, Roland E.  

Zubrow, E. B. W.  
APPENDICES
Appendix A
Classification of Birth by Difficulty and Presentation

<table>
<thead>
<tr>
<th>Natural</th>
<th>Preternatural</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deventer 1716</strong> (Murphy-Lawless 1998:68)</td>
<td><strong>Natural</strong></td>
</tr>
<tr>
<td>“Most Easy” Requires all of the following</td>
<td>Healthy Woman</td>
</tr>
<tr>
<td>• Healthy Woman</td>
<td>Uterus and Pelvis Properly Sized and Positioned</td>
</tr>
<tr>
<td>• Baby full Term</td>
<td>Baby Alive at Start of Labor</td>
</tr>
<tr>
<td>• Baby Free of Defects</td>
<td>No Assistance Required for Labor</td>
</tr>
<tr>
<td>• Vertex Presentation</td>
<td>Placenta Follows Quickly</td>
</tr>
<tr>
<td>• Accident May Happen, Must Control</td>
<td></td>
</tr>
<tr>
<td><strong>Ould 1742</strong> (Murphy-Lawless 1998:72)</td>
<td><strong>Cephalic Presentation</strong></td>
</tr>
<tr>
<td>Cephalic Presentation</td>
<td>Easy (i.e. Only Receive Child, Tie Cord, Keep Child Warm, Deliver Placenta) or</td>
</tr>
<tr>
<td>• Easy or</td>
<td>Difficult</td>
</tr>
<tr>
<td>• Tedious or</td>
<td></td>
</tr>
<tr>
<td>• Laborious</td>
<td></td>
</tr>
<tr>
<td><strong>Nihel 1760</strong> (Murphy-Lawless 1998:69)</td>
<td></td>
</tr>
<tr>
<td>Cephalic Presentation</td>
<td>Easy or</td>
</tr>
<tr>
<td>• Easy or</td>
<td></td>
</tr>
<tr>
<td>• Tedious or</td>
<td></td>
</tr>
<tr>
<td>• Laborious</td>
<td></td>
</tr>
<tr>
<td><strong>Dease 1783</strong> (Murphy-Lawless 1998:74)</td>
<td></td>
</tr>
<tr>
<td>Cephalic Presentation</td>
<td></td>
</tr>
<tr>
<td>• Easy or</td>
<td></td>
</tr>
<tr>
<td>• Tedious or</td>
<td></td>
</tr>
<tr>
<td>• Laborious</td>
<td></td>
</tr>
<tr>
<td><strong>Rotunda Hospital</strong> (Murphy-Lawless 1998:76)</td>
<td></td>
</tr>
<tr>
<td><strong>Hersey 1836</strong> (Hersey 1974:188-198)</td>
<td></td>
</tr>
<tr>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>End 20th Century</strong> (Oakley 1986:142)</td>
<td><strong>Midwife Attended Possibly</strong></td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

*Note: Podalic version refers to turning.*
Appendix B
Internal Podalic Version

Fig. 106A. Grasp the Feet.

Fig. 106B. While pulling down on the baby’s feet, push upward on his head.

(Gaskin 1990:409)
Appendix C
External Cephalic Version

Fig. 48. External Version.

(Gaskin 1990:332)
Appendix D
Williams Obstetrics Frontispiece

From J. Whitridge Williams, Obstetrics: A Textbook for the Use of Students and Practitioners (1912).
## Appendix E

Zatuchni and Andros Prognostic Index for Vaginal Delivery

<table>
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<th>Factor</th>
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<th>2</th>
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<tbody>
<tr>
<td>Estimated Fetal Weight</td>
<td>8 lb</td>
<td>7-8 lb</td>
<td>7 lb</td>
</tr>
<tr>
<td>Previous Breech</td>
<td>No</td>
<td>One</td>
<td>Two</td>
</tr>
<tr>
<td>Dilatation</td>
<td>2</td>
<td>3</td>
<td>4 or more</td>
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Appendix F
Breech Descent and Birth

Descent continues until breech reaches pelvic floor. The anterior buttock rotates forward under the pubis (internal rotation).

Lateral flexion of the fetal body round the pubis allows the anterior buttock to slip forward under the pubis and the posterior buttock to slip over the perineum. The breech is delivered followed by the legs. A movement of restitution of the hips takes place.

The shoulders now engage in the same pelvic diameter as the hips - the left oblique. (The bisacromial diameter of the shoulders is 11cm).

As descent continues internal rotation of the shoulders occurs in the pelvic cavity bringing one shoulder beneath the pubis and the other into the hollow of the sacrum. The anterior shoulder and arm are born first.

(Gaskin 1990)
Appendix G
Podalic Delivery (Plate 6)

Appendix H
1992 Poverty Guidelines
US Department of Health and Human Services

<table>
<thead>
<tr>
<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
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<tr>
<td>1</td>
<td>6,810</td>
</tr>
<tr>
<td>2</td>
<td>9,190</td>
</tr>
<tr>
<td>3</td>
<td>11,570</td>
</tr>
<tr>
<td>4</td>
<td>13,950</td>
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<tr>
<td>5</td>
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<td>6</td>
<td>18,710</td>
</tr>
<tr>
<td>7</td>
<td>21,090</td>
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<tr>
<td>8</td>
<td>23,470</td>
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For each additional person add $2,380 (Anonymous 1992)
<table>
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<th>Size of Family Unit</th>
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<td>3</td>
<td>11,890</td>
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<tr>
<td>4</td>
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<tr>
<td>5</td>
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<td>19,270</td>
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<td>7</td>
<td>21,730</td>
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<td>24,190</td>
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For each additional person add $2,460 (Anonymous 1993)
Appendix J
1994 Poverty Guidelines
US Department of Health and Human Services

<table>
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<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
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<tr>
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<td>9,840</td>
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<tr>
<td>3</td>
<td>12,320</td>
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<tr>
<td>4</td>
<td>14,800</td>
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<td>5</td>
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<td>19,760</td>
</tr>
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<td>22,240</td>
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<td>8</td>
<td>24,720</td>
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For each additional person add $2,480 (Anonymous 1994)
# Appendix K

## 1995 Poverty Guidelines

US Department of Health and Human Services

<table>
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<td>12,590</td>
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<td>17,710</td>
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<td>22,830</td>
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For each additional person add $2,560 (Anonymous 1995)
Appendix L
1996 Poverty Guidelines
US Department of Health and Human Services

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<td>20,840</td>
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<td>23,460</td>
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<td>8</td>
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For each additional person add $2,620 (Anonymous 1996)
## Appendix M
### 1997 Poverty Guidelines
US Department of Health and Human Services

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<th>Yearly Income ($)</th>
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<td>21,490</td>
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<tr>
<td>7</td>
<td>24,210</td>
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<td>8</td>
<td>26,930</td>
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For each additional person add $2,720 (Anonymous 1997)
Appendix N
1998 Poverty Guidelines
US Department of Health and Human Services

<table>
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<td>8</td>
<td>27,650</td>
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For each additional person add $2,800 (Anonymous 1998)
### Appendix O

#### 1999 Poverty Guidelines

*US Department of Health and Human Services*

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<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
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$2,820 for each additional person (Anonymous 1999)
Appendix P
2000 Poverty Guidelines
US Department of Health and Human Services

<table>
<thead>
<tr>
<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8,350</td>
</tr>
<tr>
<td>2</td>
<td>11,250</td>
</tr>
<tr>
<td>3</td>
<td>14,150</td>
</tr>
<tr>
<td>4</td>
<td>17,050</td>
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<tr>
<td>5</td>
<td>19,950</td>
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<tr>
<td>6</td>
<td>22,850</td>
</tr>
<tr>
<td>7</td>
<td>25,750</td>
</tr>
<tr>
<td>8</td>
<td>28,650</td>
</tr>
</tbody>
</table>

For each additional person add $2900 (Anonymous 2000)
## Appendix Q

### 2001 Poverty Guidelines

US Department of Health and Human Services

<table>
<thead>
<tr>
<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8,590</td>
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<tr>
<td>2</td>
<td>11,610</td>
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<tr>
<td>3</td>
<td>14,630</td>
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<tr>
<td>4</td>
<td>17,650</td>
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<tr>
<td>5</td>
<td>20,650</td>
</tr>
<tr>
<td>6</td>
<td>23,690</td>
</tr>
<tr>
<td>7</td>
<td>26,710</td>
</tr>
<tr>
<td>8</td>
<td>29,730</td>
</tr>
</tbody>
</table>

For each additional person add $3,020 (Anonymous 2001)
## Appendix R

### 2002 Poverty Guidelines

**US Department of Health and Human Services**

<table>
<thead>
<tr>
<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8,860</td>
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<tr>
<td>2</td>
<td>11,940</td>
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<td>3</td>
<td>15,020</td>
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<tr>
<td>4</td>
<td>18,100</td>
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<td>5</td>
<td>21,180</td>
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<tr>
<td>6</td>
<td>24,260</td>
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<tr>
<td>7</td>
<td>27,340</td>
</tr>
<tr>
<td>8</td>
<td>30,420</td>
</tr>
</tbody>
</table>

For each additional person add $3,080 (Anonymous 2002)
## Appendix S

### 2003 Poverty Guidelines

**US Department of Health and Human Services**

<table>
<thead>
<tr>
<th>Size of Family Unit</th>
<th>Yearly Income ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>12,120</td>
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<tr>
<td>3</td>
<td>15,260</td>
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<tr>
<td>4</td>
<td>18,400</td>
</tr>
<tr>
<td>5</td>
<td>21,540</td>
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<tr>
<td>6</td>
<td>24,680</td>
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<tr>
<td>7</td>
<td>27,820</td>
</tr>
<tr>
<td>8</td>
<td>30,960</td>
</tr>
</tbody>
</table>

For each additional person add $3,140 (Anonymous 2003)
Appendix T

Linkage of Birth Certificate and Medicaid/WIC Eligibility Data Sets

1) All shared variables in the Birth Registry and Medicaid datasets are used to merge, except for a few unreliable ones (such as race).

2) The data sets are cleaned (abbreviations standardized, blank spaces removed, extraneous characters such as ".-'()/" are removed).

3) New variables are created and names are coded using NYIIS method that accounts for misspellings of the first and last name in both datasets.

4) Missing values are purposely set to different values in each dataset so they don't accidentally match.

5) One ID per mother is verified for the Medicaid data. If there is more than one ID, only one is selected.

6) Sibling births are separated into two groups, first born and siblings, for the Birth Registry data set.

7) Siblings are temporarily set aside and a 15 pass one-to-one merge on the first-borns is run for the Medicaid and Birth Registry data. This means 15 separate attempts are made to match observations from each data set.

8) The 15 passes are various combinations of social security number, first name, last name (maternal, paternal, and infant last names are all used from the birth certificate since the Medicaid last name could be maiden, married, or other last name), first line of street address, maternal date of birth, zip code, and county. No variable is used alone except social security number. When the social security number is used only approximately 30 matches remain, all of which are hand checked.

9) If there is a match, both Birth Registry and Medicaid records for that match are removed from the pool of records available to match. Subsequent passes proceed in a similar manner.

10) The linking steps are arranged from strongest to weakest. This means a match in the first pass is more likely to be correct than a match in the seventh pass.

11) A combination of automated checking and hand checking is used to verify accurate matches. This process acknowledges the probability that not all matches are valid due to the stronger-to-weaker linking arrangement.

12) If poor matches are identified, they are removed from the final dataset.

13) Siblings are remerged back into the linked dataset.

14) The Department of Health independently validates the matches are correct.
Appendix U
Self-analysis Questionnaire
SPTI Form Y-1

Part 1 Directions: A number of statements that people have used to describe themselves are given below. Read each statement and then darken the appropriate value to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to best describe your present feelings.
(1=Not at all, 2=Somewhat, 3=Moderately so, 4=Very much so)
1. I feel calm
2. I am in a questioning mood
3. I am furious
4. I feel strong
5. I am tense
6. I feel curious
7. I feel like banging on the table
8. I feel blue
9. I feel at ease
10. I feel interested
11. I feel anger
12. I feel miserable
13. I am presently worrying over possible misfortunes
14. I feel inquisitive
15. I feel like kicking somebody
16. I feel downhearted
17. I feel nervous
18. I feel like exploring my environment
19. I feel like breaking things
20. I feel alive
21. I am jittery
22. I feel stimulated
23. I am mad
24. I feel sad
25. I am relaxed
26. I feel mentally active
27. I feel irritated
28. I feel safe
29. I feel worried
30. I feel bored
31. I feel like hitting someone
32. I feel gloomy
Appendix U (Continued)

33. I feel steady
34. I feel eager
35. I feel annoyed
36. I feel healthy
37. I feel frightened
38. I feel disinterested
39. I feel like swearing
40. I feel hopeful about the future

Part 2 Directions: A number of statements that people have used to describe themselves are given below. Read each statement and then darken the appropriate value to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel. (1=Almost never, 2=Sometimes, 3=Often, 4=Almost always)

33. I am a steady person
34. I feel like exploring my environment
35. I am quick-tempered
36. I feel gloomy
37. I feel satisfied with myself
38. I am curious
39. I have a fiery temper
40. I feel happy
41. I get in a state of tension or turmoil as I think over my recent concerns and interests
42. I feel interested
43. I am a hot-headed person
44. I feel depressed
45. I wish I could be as happy as others seem to be
46. I feel inquisitive
47. I get angry when I’m slowed down by others mistakes
48. I feel sad
49. I feel like a failure
50. I feel eager
51. I feel annoyed when I am not given recognition for doing good work
52. I feel hopeless
53. I feel nervous and restless
54. I am in a questioning mood
55. I fly off the handle
56. I feel low
57. I feel secure
58. I feel stimulated
59. When I get mad, I say nasty things
Appendix U (Continued)

60. I feel whole
61. I lack self-confidence
62. I feel disinterested
63. It makes me furious when I am criticized in front of others
64. I feel safe
65. I feel inadequate
66. I feel mentally active
67. When I get frustrated, I feel like hitting someone
68. I feel peaceful
69. I worry too much over something that really does not matter
70. I feel bored
71. I feel infuriated when I do a good job and get a poor evaluation
72. I enjoy life.
Appendix V
Demographic Survey

Today’s Date ______________

This survey is designed to help us understand if there are any social and cultural differences between the families of breech presentation babies and the families of cephalic presentation babies. We will talk about some of these questions more in the interview. Do not write in the gray area.

Questions About Your Most Recent Baby

Please circle the appropriate answer

1. Was your most recent baby Breech 1
   Head First Presentation 2

2. Is your baby a Girl 1
   Boy 2

3. How did you know when your baby was due?
   Ultrasound 1
   Last Monthly Period 2
   Other 3 ________________

4. Did you have your baby by Cesarean Section 1
   Vaginal Delivery 2

5. Did your baby have any complications while inside of you?
   No 0
   Yes 1

6. Did your baby have any complications during labor or delivery?
   No 0
   Yes 1

7. Did your baby have any complications after birth?
   No 0
   Yes 1

Please fill in the blank

8. How old is your baby today? _______ months _______ weeks

9. How long did you carry your baby inside you (gestational age)? _______ weeks

10. How much did your baby weigh at birth? _______ pounds _______ ounces
    _______ kilos _______ grams

11. How long (tall) was your baby when born? _______ inches
    _______ centimeters
Appendix V (Continued)

Questions About You

<table>
<thead>
<tr>
<th>Question</th>
<th>No</th>
<th>Yes</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Did you have diabetes before you were pregnant?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. Did you have high blood pressure before you were pregnant?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14. Did you have heart or lung disease before you were pregnant?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15. Did you develop diabetes while pregnant?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16. Did you develop high blood pressure while pregnant?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>17. Did you smoke tobacco during pregnancy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>18. Did you drink alcohol during pregnancy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>19. Did you use illicit drugs during pregnancy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20. Did you have assisted conception (like in-vitro fertilization)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>21. Were you trying to get pregnant when you conceived?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>22. During pregnancy did you receive chiropractic care?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>23. Were you ever told your uterus was unusual?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>24. Were you ever told your pelvis was unusual?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>25. Were you told the placenta from your last pregnancy was unusual?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>26. Was your labor started by a drug (induced)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>27. Was your labor sped up by a drug (augmented)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>28. Did you take something to decrease pain in labor (like epidural)?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>29. Did you have any complications during pregnancy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>30. Did you have any complications during labor and delivery?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>31. Did you have any complications after birth?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>32. Do you work outside the home now?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>33. Did you work outside the home during pregnancy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>34. Did you work outside the home prior to pregnancy?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendix V (Continued)

35. Were you born in the US? ______0 ______1 ______2

36. Was the baby's father born in the US? (Skip 37 if didn't have breech) ______0 ______1 ______2

37. Did you try to do something to turn your breech baby? ______0 ______1 ______2

38. Has anyone in your family had a breech baby? ______0 ______1 ______2

39. Has anyone in the family of the baby's father had a breech baby? ______0 ______1 ______2

40. Did you have WIC or Medicaid during your last pregnancy? ______0 ______1 ______2

41. Did you take your prenatal vitamins like you were supposed to? ______0 ______1 ______2

Please Circle All Answers That Apply to Your Last Pregnancy

42. What was your marital status during your last pregnancy?
   Married, ______1
   Single, ______2
   Divorced, Widowed, or Separated, ______3

43. What types of adults did you live with during your last pregnancy?
   Father of baby, ______1
   Partner/boyfriend not father of baby, ______2
   My Parent(s), ______3
   Friend(s), ______4
   With no other adults, ______5
   Other, ____________________________

44. What is your ethnicity?
   White Non-Hispanic, ______1
   Black Non-Hispanic, ______2
   Hispanic, ______3
   Asian/Pacific Islander, ______4
   American Indian, ______5
   Other, ____________________________

45. What is the ethnicity of the father of the baby?
   White Non-Hispanic, ______1
   Black Non-Hispanic, ______2
   Hispanic, ______3
   Asian/Pacific Islander, ______4
   American Indian, ______5
   Other, ____________________________
Appendix V (Continued)

46. What is the highest educational level you completed?
   Grade School
   High School
   Trade School
   Some College
   College (4 Years)
   Master's Degree
   Doctoral Degree

47. What is the highest educational level the father of your baby completed?
   Grade School
   High School
   Trade School
   Some College
   College (4 years)
   Master's Degree
   Doctoral Degree

48. During your last pregnancy who worked in your household and contributed to the household income?
   Self
   Partner/Husband/Boyfriend
   Other Adult
   Child

49. During your last pregnancy when did your prenatal care start?
   1st Trimester
   2nd Trimester
   3rd Trimester
   Never

50. At the end of your last pregnancy was your amniotic fluid (your water) level
   Too much (Polyhydramnios)
   Not enough (Oligohydramnios)
   Just right
   Don't Know

51. In general, how many times a week did you exercise before pregnancy?
   0  1  2  3  4  5  6  7  >7

52. What sort of exercise did you do before pregnancy?
   __________________________________________________________
   __________________________________________________________

53. In general, how many times a week did you exercise during pregnancy?
   0  1  2  3  4  5  6  7  >7

54. What sort of exercise did you do during pregnancy?
   __________________________________________________________
   __________________________________________________________
Appendix V (Continued)

Please fill in the blank

55. How tall are you? ________ feet ________ inches

56. How old were you when your last baby was born? ________ years

57. How old was your baby’s father when baby was born? ________ years

58. How much did you weigh before you were pregnant? ________ pounds

59. How much weight did you gain during pregnancy? ________ pounds

60. How long did you labor in your last pregnancy? ________ hours

61. Including this baby, how many times have you been pregnant? ________

62. Including this baby, how many times have you given birth? ________

63. How many miscarriages, abortions, or stillbirths have you had? ________

64. How many of your babies were born breech in total? ________

65. If your baby was breech, when did you find out? ________

66. During your last pregnancy what was your occupation? ________

67. How long have you worked in that field? ________

68. During your last pregnancy how many people lived in your household? ________

69. What were the occupations of other wage-earners in your household then?

________________________________

________________________________

________________________________

70. What was your gross household income last year? ________

Please rate your stress level. 0=No Stress, 10=Extreme Stress. Circle the appropriate answer

71. Stress prior to your last pregnancy

0 1 2 3 4 5 6 7 8 9 10

72. Stress during your last pregnancy

0 1 2 3 4 5 6 7 8 9 10

73. Stress now

0 1 2 3 4 5 6 7 8 9 10
Appendix V (Continued)

Please rate your overall health.
0=Not healthy at all, 10= Extremely healthy

74. How healthy were you prior to pregnancy?
   0 1 2 3 4 5 6 7 8 9 10

75. How healthy were you during pregnancy?
   0 1 2 3 4 5 6 7 8 9 10

76. How healthy are you now?

Please rate the amount of love you received/receive.
0=None, 10= A Lot.

77. Prior to your last pregnancy how much love did you feel from other people?
   0 1 2 3 4 5 6 7 8 9 10

78. During your last pregnancy how much love did you feel from other people?
   0 1 2 3 4 5 6 7 8 9 10

79. Now how much love do you feel from other people?
   0 1 2 3 4 5 6 7 8 9 10

Please rate how you felt during your last pregnancy.
0= None/No, 10= Extreme/Yes

80. During my last pregnancy I felt happy about the way my life was going.
   0 1 2 3 4 5 6 7 8 9 10

81. During my last pregnancy I felt happy about my baby.
   0 1 2 3 4 5 6 7 8 9 10

82. During my last pregnancy I felt happy about the way I was treated.
   0 1 2 3 4 5 6 7 8 9 10

83. During my last pregnancy I felt resentment about the way my life was going.
   0 1 2 3 4 5 6 7 8 9 10

84. During my last pregnancy I felt resentment about my baby.
   0 1 2 3 4 5 6 7 8 9 10

85. During my last pregnancy I felt resentment about the way I was treated.
   0 1 2 3 4 5 6 7 8 9 10

86. During my last pregnancy I received a lot of support.
   0 1 2 3 4 5 6 7 8 9 10
87. During my last pregnancy I felt the world was a safe place for my baby.
   0 1 2 3 4 5 6 7 8 9 10

88. During my last pregnancy I felt worried for my baby and me.
   0 1 2 3 4 5 6 7 8 9 10

89. During my last pregnancy I felt profound love for my baby.
   0 1 2 3 4 5 6 7 8 9 10

90. During my last pregnancy I felt the world was a good place for my baby.
   0 1 2 3 4 5 6 7 8 9 10

91. During my last pregnancy I wanted to protect my baby from the world.
   0 1 2 3 4 5 6 7 8 9 10

92. During my last pregnancy I was really excited to bring my baby into the world.
   0 1 2 3 4 5 6 7 8 9 10

93. During my last pregnancy I felt detached from my baby.
   0 1 2 3 4 5 6 7 8 9 10

94. Prior to my last pregnancy I had too many obligations and responsibilities.
   0 1 2 3 4 5 6 7 8 9 10

95. During my last pregnancy I had too many obligations and responsibilities.
   0 1 2 3 4 5 6 7 8 9 10

96. Now I have too many obligations and responsibilities.
   0 1 2 3 4 5 6 7 8 9 10

97. Prior to your last pregnancy how much help did you have with your kids or house?
   0 1 2 3 4 5 6 7 8 9 10 11 12

98. During pregnancy how much help did you have with your kids or house?
   0 1 2 3 4 5 6 7 8 9 10 11 12

99. Now how much help do you have with your kids or house?
   0 1 2 3 4 5 6 7 8 9 10 11 12

Please rate the amount of help you had/have,
0=No help, 10=A lot of help (really good, ideal amount),
12=Too much help or intrusion

100. As a child I felt valued and loved by my mother as her daughter.
    0 1 2 3 4 5 6 7 8 9 10
    Mother was dead
Appendix V (Continued)

101. As a child I felt valued and loved by my father as his daughter.
   [0 1 2 3 4 5 6 7 8 9 10] Father was dead

102. Now I feel valued and loved by my mother as her daughter.
   [0 1 2 3 4 5 6 7 8 9 10] Mother is dead

103. Now I feel valued and loved by my father as his daughter.
   [0 1 2 3 4 5 6 7 8 9 10] Father is dead

Please recall back to when you were pregnant. State how often you had the following foods or beverages each day on average

<table>
<thead>
<tr>
<th></th>
<th>Less than Once a day</th>
<th>1-2 times/day</th>
<th>3-4 times/day</th>
<th>5+ time/day</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>104. Fruit juice</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>105. Coffee</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>106. Ice Cream</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>107. Milk, Cheese, Yogurt, Other Dairy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>108. Cookies, Cakes, Muffins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>109. Candy, Cough Drops</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>110. Tropical Fruit</strong> (like pineapple, mango, papaya)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>111. Other Fruit</strong> (like apple, banana, orange)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>112. Vegetable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>113. Cold Water Fish</strong> (like salmon, halibut, anchovies or sardines)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>114. Meat, Chicken, Other Fish</strong> (like grouper, trout, tuna)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>115. Beans or Soy Products</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>116. Bread, Crackers, White Rice</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix V (Continued)

117. Brown Rice or Other Whole Grains
   Less than Once a day \( _0 \), 1-2 times/day \( _1 \), 3-4 times/day \( _2 \), 5+ time/day \( _3 \)

118. Fish Oil Supplement
   Less than Once a day \( _0 \), 1-2 times/day \( _1 \), 3-4 times/day \( _2 \), 5+ time/day \( _3 \)
Appendix W

In-Depth Interview Guide

A. Background
   1) When you were little did you think about what it would be like to have a baby? If so, what did you imagine it would be like?

   2) Were you around pregnant women when you were little and growing up? (what were your impressions?)

   3) Profile of family and growing up situation/dynamics

   4) When you were growing up were you groomed to fit a certain role in life as a woman as far as relationships and work are concerned? (Who did the grooming? Family? Who in the family? Culture? Did you feel like you were suited to that role?)

   5) Do you think your economic class influenced the way you were groomed?

   6) Have you experienced any advantages or disadvantages because of your skin color or ethnicity?

   7) Do you know anything about your mother’s pregnancy(ies)? (How she felt about being pregnant? How she felt through the pregnancy? What her lifestyle was like during the pregnancy? What labor and delivery were like for her?)

   8) Paint a picture of the woman’s life prior to conception and during pregnancy (where she lived, what she was doing, who she lived with, what she enjoyed, what she feared).

B. Prenatal Care

   1) What was prenatal care like? (How did you decide where to go? What evaluations did they do? Where did you receive prenatal care? Did you always see the same person? What did you talk about? Did you feel cared for?)

   2) Do you feel you benefited from prenatal care? (Howso?)

   3) Were you given any advice (from friends, professionals, or family or strangers) about how to have a good/easy pregnancy, labor and delivery? (Like food, thoughts, or activities to engage in or avoid.)

C. Survey Questions Follow-Up
Appendix W (Continued)

D. Questions for Mothers of Breech Babies
   1) How/When did you become aware of your baby’s presentation during pregnancy?
   2) How did you feel when you found out your baby was breech?
   3) Did you know anyone who had ever had a breech baby?
   4) What did you do when you found out about your baby’s presentation?
   5) Did you consider options for turning the baby?
   6) What was your experience if you tried to turn the baby?
   7) Why do you think you had a breech baby
   8) How did you expect your pregnancy, labor, and delivery to go before you found out you were going to have a breech baby? Did that change after you found your baby was breech? If so, how so?

Questions for Mothers Who Had Cesarean Sections
   1) Did you decide you wanted a CS or was that the only possibility offered you?
   2) How did you feel about having your baby by CS?

E. Work and Pregnancy
   1) Review what type of work did before and during pregnancy
   2) What exactly did your job consist of during pregnancy?
   3) Was there any change in the amount of responsibility you had at work during pregnancy?
   4) Was there any change in the physical demands of your work during pregnancy?
   5) Was there any change in the mental demands of your work during pregnancy?
   6) Was there any change in the emotional demands of your work during pregnancy?
   7) Do you think your job is a good job for a woman?
Appendix W (Continued)

8) Do you think your job is a good job for a pregnant woman?

Home and Work
9) Who decides how work gets done in the household and who does the work?

10) How would you describe your role in the household?

11) How do you feel about that role?

12) How would you describe your role as mother?

13) How do you feel about that role?

14) Was there any change in the household responsibility demands (house and kids) on you during pregnancy?

F. Relationships and Pregnancy
1) How did you feel when you found out you were pregnant?

2) How did your partner/friends/family feel?

3) Did you have financial stability during pregnancy?

4) Did your relationship with your husband/partner change once you became pregnant?

5) What was your relationship like with your husband/partner before and during pregnancy?

6) How did s/he respond to your changing body?

7) If you had changing mood or energy levels how did s/he respond?

8) How did friends, other family members and work colleagues respond to the changes you went through in pregnancy?

9) Did you talk/communicate with your baby while pregnant? What about?

10) Are there people in your life who love you unconditionally?
Appendix W (Continued)

G. Stress and Pregnancy

2) During pregnancy how was your mood? Did it change throughout your pregnancy? Daily?

3) Talk about whether the conception was planned and what was response

4) Do you still think about what happened during your pregnancy, labor, and delivery and if so, what are your reflections? (blame?)

H. Closing questions
1) Why are some babies born breech?

2) Do you think your pregnancy and mothering experiences would be different if you were to experience them earlier or later than you did?

2) Use a few words to describe yourself

3) What is your life philosophy?
Appendix X
Hollingshead Occupational Scale

1. Higher Executives of large Concerns, Proprietors, and Major Professionals
   A. Higher Executives (Value of corporations $500,000 and above as rated by Dun and Bradstreet)
      Bank
      Presidents
      Vice-Presidents
      Assistant vice-presidents
      Business
      Vice-presidents
      Assistant vice-presidents
      Executive secretaries
      Research directors
      Treasurers
   B. Proprietors (Value over $100,000 by Dun and Bradstreet)
      Brokers
      Contractors
      Dairy owners
      Farmers
      Lumber dealers
   C. Major Professionals
      Accountants (CPA)
      Actuaries
      Agronomists
      Auditors
      Architects
      Artists, portrait
      Astronomers
      Bacteriologists
      Chemical engineers
      Clergymen (professional trained)
      Dentists
      Economists
      Engineers (college trained)
      Foresters
      Geologists
      Judges (superior courts)
      Lawyers
      Metallurgists
      Military: commissioned officers, major and above
Appendix X (Continued)

Officials of the executive brance of government, federal, state, local: e.g., Mayor, City manager, City plan director, Internal Revenue director
  Physicians
  Physicists, research
  Psychologists, practicing
  Symphony conductor
  Teachers, university, college
  Veterinarians (verterinary surgeons)

2. Business Managers, Proprietors of Medium Sized Businesses, and Lesser Professionals
   A. Business Managers in Large Concerns (Value $500,000)
      Advertising directors
      Branch managers
      Brokerage salesmen
      Directors of purchasing
      District managers
      Executive assistants
      Export managers, international concerns
      Government officials, minor, e.g., Internal Revenue agents
      Manufacturer’s representatives
      Office managers
      Personnel managers
      Police chief; Sheriff
      Postmaster
      Production managers
      Sales engineers
      Sales managers, national concerns
      Store managers
   B. Proprietors of Medium-Sized Business (Value $35,000-$100,000)
      Advertising
      Clothing store
      Contractors
      Express company
      Farm owners
      Fruits, wholesale
      Furniture business
      Jewelers
      Poultry business
      Real estate brokers
      Rug business
      Store
      Theatre
Appendix X (Continued)

C. Lesser Professionals
   Accountants (not CPA)
   Chiropodists
   Chiropractors
   Correction officers
   Director of Community House
   Engineers (not college graduate)
   Finance writers
   Health educators
   Labor relations consultants
   Librarians
   Military: commissioned officers, lieutenant, captain
   Musicians (Symphony orchestra)
   Nurses
   Opticians
   Optometrists, D.O.
   Pharmacists
   Public health officers (MPH)
   Research assistants, university (full-time)
   Social workers

3. Administrative Personnel, Owners of Small Businesses, and Minor Professionals
   A. Administrative Personnel
      Advertising agents
      Chief clerks
      Credit managers
      Insurance agents
      Managers, departments
      Passenger agents, railroad
      Private secretaries
      Purchasing agents
      Sales representatives
      Section heads, federal, state, and local governmental offices
      Section heads, large businesses and industries
      Service managers
      Shop managers
      Store managers (chain)
      Traffic managers
   B. Small Business Owners
      Art gallery
      Auto accessories
      Awnings
      Bakery
Appendix X (Continued)

Beauty shop
Boatyard
Brokerage, insurance
Car dealers
Cattle dealers
Cigarette machines
Cleaning shops
Clothing
Coal businesses
Contracting businesses
Convalescent homes
Decorating
Dog supplies
Dry goods
Engraving business
Feed
Finance companies, local
Fire extinguishers
Five and dime
Florist
Food equipment
Food products
Foundry
Funeral directors
Furniture
Garage
Gas Station
Glassware
Grocery, general
Hotel protection
Jewelry
Machinery brokers
Manufacturing
Monuments
Music
Package stores (liquor)
Paint contracting
Poultry
Real estate
Records and radios
Restaurant
Roofing contractor
Shoe
Appendix X (Continued)

Signs
Tavern
Taxi company
Tire shop
Trucking
Trucks and tractors
Upholstery
Wholesale outlets
Window shades

C. Semiprofessionals
Actors and showmen
Appraisers (estimators)
Army, master sergeant
Artists, commercial
Clergymen (not professionally trained)
Concern managers
Deputy sheriffs
Dispatchers, railroad
Interior decorators
Interpreters, courts
Laboratory assistants
Landscape planners
Morticians
Navy, chief petty officer
Oral hygienists
Physiotherapists
Piano teachers
Publicity and public relations
Radio, TV announcers
Reporters, court
Reporters, newspapers
Surveyors
Title searchers
Tool designs
Travel agents
Yard masters, railroad

D. Farmers
Farm owners

4. Clerical and Sales Workers, Technicians, and Owners of Small Businesses
   A. Clerical and Sales Workers
      Bank clerks and tellers
      Bill collectors
Appendix X (Continued)

Bookkeepers
Business machine operators, offices
Claims examiners
Clerical or stenographic
Conductors, railroad
Factory storekeepers
Factory supervisors
Post office clerks
Route managers
Sales clerks
Sergeants and petty officers, military services
Shipping clerks
Supervisors, utilities, factories
Supervisors, toll stations

B. Technicians
Dental technicians
Draftsmen
Driving teachers
Expediter, factory
Experimental tester
Instructors, telephone company, factory
Inspectors, weights, sanitary, railroad, factory
Investigators
Laboratory technicians
Locomotive engineers
Operators, PBX
Proofreaders
Safety supervisors
Supervisors of maintenance
Technical assistants
Telephone company supervisors
Timekeepers
Tower operators, railroad
Truck dispatchers
Window trimmers (stores)

C. Owners of Little Businesses ($3,000-$6,000)
Flower shop
Grocery
Newsstand
Tailor shop

D. Farmers
Owners
Appendix X (Continued)

5. Skilled Manual Employees
   Auto body repairers
   Bakers
   Barbers
   Blacksmiths
   Bookbinders
   Boilermakers
   Brakemen, railroad
   Brewers
   Bulldozer operators
   Butchers
   Cabinet makers
   Cable splicers
   Carpenters
   Casters (founders)
   Cement finishers
   Cheese makers
   Chefs
   Compositors
   Diemakers
   Diesel engine repair and maintenance (trained)
   Diesel shovel operators
   Electricians
   Engravers
   Exterminators
   Firemen, city
   Frement, railroad
   Fitters, gas, steam
   Foremen, construction, dairy
   Gardeners, landscape (trained)
   Glass blowers
   Glaziers
   Gunsmiths
   Gauge makers
   Hair stylists
   Heat treaters
   Horticulturists
   Linemen, utility
   Linoleum layers (trained)
   Linotype operators
   Lithographers
   Locksmiths
   Loom fixers
Appendix X (Continued)

Machinists (trained)
Maintenance foremen
Masons
Masseurs
Mechanics (trained)
Millwrights
Moulders (trained)
Painters
Paperhangers
Patrolmen, railroad
Pattern and model makers
Piano builders
Piano tuners
Plumbers
Policemen, city
Postmen
Printers
Radio, television maintenance
Repairmen, home appliances
Rope splicers
Sheetmetal workers (trained)
Shipsmiths
Shoe repairmen (trained)
Stationery engineers (licensed)
Stewards, club
Switchmen, railroad
Tailors (Trained)
Teletype operators
Tool makers
Track supervisors, railroad
Tractor-trailer trans.
Typographers
Upholsterers (trained)
Watchmakers
Weavers
Welders
Yard supervisors, railroad

6. Machine Operators and Semiskilled Employees
Aides, hospital
Apprentices, electricians, printers, steam fitters, toolmakers
Assembly line workers
Bartenders
Bingo tenders
Appendix X (Continued)

Bridge tenders
Building superintendents (construction)
Bus drivers
Checkers
Coin machine fillers
Cooks, short order
Delivery men
Dressmakers, machine
Elevator operators
Enlisted men, military services
Filers, sanders, buffers
Foundry workers
Garage and gas station attendants
Greenhouse workers
Guards, doorkeepers, watchmen
Hairdressers
Housekeepers
Meat cutters and packers
Meter readers
Operators, factory machines
Oilers, railroad
Practical nurses
Pressers, clothing
Pump operators
Receivers and checkers
Roofers
Setup men, factories
Shapers
Signalmen, railroad
Solderers, factory
Sprayers, paint
Steelworkers (not skilled)
Standers, wire machines
Strippers, rubber factory
Taxi drivers
Testers
Timers
Tire moulders
Trainmen, railroad
Truck drivers, general
Waiters-waitresses ("better placed")
Weighers
Welders, spot
Appendix X (Continued)

Winders, machine
Wiredrawers, machine
Wine bottlers
Wood workers, machine
Wrappers, stores and factories
Farmers who are smaller tenants who own little equipment

7. Unskilled Employees
Amusement park workers (bowling alleys, pool rooms)
Ash removers
Attendants, park lots
Cafeteria workers
Car cleaners, railroad
Carriers, coal
Countermen
Dairy workers
Deck hands
Domestics
Farm helpers
Fishermen (clam diggers)
Freight handlers
Garbage collectors
Gravediggers
Hod carriers
Hog killers
Hospital workers, unspecified
Hostlers, railroad
Janitors (sweepers)
Laborers, construction
Laborers, unspecified
Laundry workers
Messengers
Platform men, railroad
Peddlers
Porters
Relief, public, private
Roofers' helpers
Shirt folders
Shoe shiners
Sorters, rag and salvage
Stage hands
Stevedores
Stock handlers
Street cleaners
Appendix X (Continued)

Struckmen, railroad
Unemployed (no occupation)
Unskilled factory workers
Waitresses ("hash houses")
Washers, cars
Window cleaners
Woodchoppers
Appendix Y
Hollingshead Educational Scale

1. Graduate professional training
2. Standard college or university graduation
3. Partial college training
4. High school graduation
5. Partial high school
6. Junior high school
7. Less than seven years of school
Appendix Z
2005 Poverty Guidelines for the
48 Contiguous States and the District of Columbia

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(Anonymous 2005)
Appendix AA
Codebook for Interviews

Advice
  Conception
  Labor/Delivery
  Post-partum
  Pregnancy
Breastfeeding
  Index baby
  Nutrition
  Other
  Pain
  Previous baby
  Surrogate baby
Breech Baby
  Family
  Index
    Turned
  Non-family breech
  Other position
  Previous
    Turned
Turning Techniques
  Catback
  Cold
  Communicate
  ECV
  Flashlight
  Homeopathy
  Hypnotherapy
  Manual
  Moxi/acupuncture
  Music
  Pelvic tilts
  Pool
  Posture
  Webster’s

Children
  Age
  Chiropractic
  Communication in-utero
  Community Support
  Conception
Appendix AA (Continued)

IVF
Conception cont.
  Previous Pregnancy
  Un/Planned
Cravings
  Index pregnancy
  Previous pregnancy
Due Date
  Early
  Late
Education
  College
  Grad school
  Grade school/Jr. High
  High School
  Husband
Ethnicity
  Advantages
  Disadvantages
  Profile
Family
  Dad’s partners
  Mom’s partners
  Siblings
Goals
Grooming
  Attachment
  Behavior
  Children
  Class
  Discipline
  Driven/Regulated/Dogmatic/Rules
  Education
  Encourage
  Ethnicity
  Gender
  Hands-off
  Independence
  Innocence
  Marriage/Dating
  Modeling
  Neighborhood
  Prejudice
Appendix AA (Continued)

Religion
Responsibility
Grooming cont.
Restrictive
School
Strong
Success
Surrogate parents
Values
Want to please
Wealth
Work
Growing up
Husband
Developed Relationship
How met
Previous
Qualities she likes
Labor & Delivery
Birthing lore
Fear
Pain
Mom’s
Participant’s
Active labor
Augment
Baby’s complications
Baby’s position
Birthing center
Bloody show
Break waters
Busy
Cesarean
Confident
Contractions
Control
D&C
Disappointment
Doula
Early Labor
Epidural
Episiotomy
Fear
Appendix AA (Continued)

Fetus to baby
Focus
High risk
Pregnancy cont.
Participant’s cont.
Homebirth
Hospital birth
Husband
Induce
IV
Labor position
Meconium
Midwife
Mom complications
Natural neonate
OB
Older children
Pain
Panic attack
Placenta
Previous L&D
    Vaginal
    Baby position
    Cesarean
    D&C
    Laboring position
    Placenta
    Recovery
    Timing
    Transfer
Recovery
Relax
Strip membranes
Support
Tear
Tension
Throw up
Tired
Transfer
Trust
VBAC
Visualization
Appendix AA (Continued)

Worry
Relative/Friend
Self Birth story
Fear
Life Challenge
Father
Mother
Self
Life philosophy
Medical Model v Midwifery
Mother/Birthing
Earlier
Later
Personality
Other adult
Baby
Father
Husband
Mother
Other children
Previous breech baby
Self
Post-partum
Previous
Pregnancy
Imaginary
Tomboy
Wanted kids
Mom’s
Participant’s
Accident
Alcohol
Alone/Independent
Amnio
Anemia
Appearance
Attachment
Baby
Bed rest
Birthing class
Bleeding
Braxton Hicks
Cascade of events
Appendix AA (Continued)

Cesarean
Change of care
Confidence
Depressions
Diabetes

Pregnancy cont.
Participant’s cont.
Dizzy
Drugs
Exercise
Fatter
Fear
Feel
Finances
Health
Help
High risk
Hope
Hypertension
Joyful
Lifestyle
Living situation
Midwife
Mood
Musculoskeletal pain
Nausea
Nucal folds
OB
Older children
Overachiever
Overwhelmed
Pain
Panic attack
Paranoid
Posture
Premature labor
Preparation
Previous pregnancy
Recovery from previous pregnancy
Relationships
Father
Husband
Mother
Appendix AA (Continued)

Relax
Sex of baby
Stress
   Emotional
   Mental
   Physical
Pregnancy
   Participant’s
      Support
      Swelling
      Tired
      Tobacco
      Ultrasound
      UTI
      Worry
Prenatal Care
   Compare midwife and OB
   Benefit?
   Previous pregnancy
   Care
   Procedures
Relationships
   Father as a child
   Husband
   Mother as a child
   Other adult as child
   Parents’ relationship to each other
   Siblings
SES
   Childhood lower class
   Childhood lower middle class
   Childhood middle class
   Childhood upper class
   Childhood upper middle class
   Time of conception
Stress
   Now
   Before pregnancy
Terminated Pregnancies
   Abortion
   Ectopic
   Miscarriage
      Fear
Appendix AA (Continued)

Sadness
Mom’s
Stillborn
Unconditional love
Uterus
Work
  Dad’s work as a child
Work cont.
  Her during pregnancy
  Husband during pregnancy
  Mom’s work as child
About the Author

Caroline DeAnne Peterson is a chiropractic physician and midwife. Her research and clinical emphasis is on periconception through infancy. Her dream is to help families develop loving, supportive relationships with their babies.