



Partners for a Healthy Baby Research Basis

Before Baby Arrives

The purpose of the *Partners for a Healthy Baby* (*Partners*) curriculum is to support home visitors in providing research informed guidance and support to expectant families to optimize birth outcomes. Toward this goal, our FSU multidisciplinary faculty created the *Partners* series in 1996 when no other prenatal home visiting curricula existed. Our home visitors struggled in knowing when to talk about critical topics during the pregnancy and spent hours searching for information to give families about the best strategies for quitting smoking or reducing preterm births. To provide research informed guidance, our faculty team continues to review the literature from multiple disciplines and simplify into practical strategies for home visitors and easy-to-read handouts for families. Our wisdom has grown over the two decades that our FSU team has administered home visiting programs including federal Healthy Start, Early Head Start, and the Young Parents Program for court-involved teen mothers. We've also had the privilege of working with expert practitioners from MIECHV and a diversity of home visiting programs across the world, and researchers from Johns Hopkins, Harvard, UNC, Georgetown and others to get firsthand the latest research in improving birth outcomes. It is with this collective home visiting expertise and vast body of research that the *Partners for a Healthy Baby* curricular series was created and continues to be updated.

We know now better than ever before the interactive effects of biological factors, social determinants, and environmental influences during pregnancy that impact the fetus (American Academy of Pediatrics, 2012). Poverty can be a toxic stressor, which predisposes preterm birth that causes poor neurodevelopmental outcomes, which can then decrease school readiness and educational attainment, thereby perpetuating the cycle of poverty. Addressing social determinants of health can result in a strong return on investment (Brumberg & Shah, 2015), which home visiting programs are well positioned to do.

In order to achieve healthy birth outcomes, we must address the complex needs of the expectant family. The purpose of the prenatal curriculum, *Before Baby Arrives*, is to do just that — to address the comprehensive array of issues facing expectant families that impact birth outcomes, especially for vulnerable expectant families including young mothers and other first-time mothers; families struggling in poverty; and families with multigenerational histories of adversity.

Toward achieving the best outcomes possible, the *Partners* curriculum is grounded in multidisciplinary research that addresses four key issues critical to healthy birth outcomes: (1) understanding the role of trauma and adverse childhood experiences in preventing poor birth outcomes; (2) optimizing the family's physical and emotional well-being; (3) strengthening families in order to prevent maltreatment; and (4) mediating the pervasive effects of poverty and other social inequalities on the family and their developing baby.

1. Understanding the Role of Trauma and Adverse Childhood Experiences

Understanding the role of trauma and Adverse Childhood Experiences (ACEs) is key in preventing poor birth outcomes. A large body of research has documented extensive negative correlations between ACEs and maternal reproductive health. Sub-optimal pregnancy outcomes may result from ACEs themselves or from pregnancy-related health behaviors common in women who have experienced ACEs. Smoking was the main behavior through which the number of ACEs that the mother had affected birth outcomes (Smith, Gotman, & Yonkers, 2016). Childhood sexual abuse is strongly associated with drug or alcohol dependence. Women who experienced any type of sexual abuse in childhood were almost three times more likely than non-abused girls to report drug dependence as adults (Greenfield, Beck, Lawson, & Brady, 2010). It is estimated that as many as 75% to 90% of women in treatment for substance use disorders have a history of sexual abuse or assault (Kendler et al., 2000). ACEs have also been related to depressive symptoms (Chung et al., 2016) and suicidality in pregnancy (Farber, Herbert, & Reviere, 1996), somatic complaints in pregnancy (Lukasse et al., 2009), and maternal and infant health complications after childbirth (Leeners et al., 2010). Each additional ACE decreased birth weight and gestational age, and increased the risk of having an operative delivery or infant's admission to the neonatal intensive care unit (Smith, Gotman, & Yonkers, 2016). Pregnancy is a time when women may be more motivated

to address addictive behaviors through the empathetic, trauma informed care of home visitors, obstetricians, and home visitors (Mitchell et al., 2008).

2. Optimizing the Family's Physical and Emotional Well-Being

The physical and emotional well-being of the family plays a paramount role in optimizing healthy birth outcomes starting even before conception. Preconception care gives babies the best start in life as mothers-to-be are as healthy as can be before pregnancy by addressing issues like blood pressure, diabetes, obesity, or by taking steps to quit smoking, which decreases the chance of preterm and low birthweight babies (Centers for Disease Control and Prevention, 2017). Fetal development is much more vulnerable to environmental influence than ever suspected. Research shows that the maternal stress hormones cross the placenta affecting the developing nervous system of the fetus (O'Donnell, Reissland, & Glover, 2017) increasing risks for neuropsychiatric, cardiovascular, and metabolic disease in later life (Rakers et al., 2017).

The emerging field of epigenetics provides evidence that prolonged stress, nutritional deficits, and environmental toxins may chemically alter the DNA impacting multiple generations (Murgatroyd & Spengler, 2011; Cao-Lei et al., 2017). Knowing this concept of fetal programming of adult disease, where experiences in the womb can have profound, long-lasting consequences on health and risk of disease in later life, gives additional importance to home visitors to support expectant families in decreasing stressors and other environmental risks (British Neuroscience Association, 2013).

This edition of the *Partners* curriculum boasts an extensive new section on emotional health translating the research about healthy habits that decrease stress and increase well-being. In addition to managing smoking, poor nutrition, and other causes of poor birth outcomes, supporting and nurturing relationships play a crucial role in healthy birth outcomes. Social support by the father increases healthy birth outcomes (Furr, 2017). The father's presence during pregnancy reduces the mother's rate of smoking, stress, and high blood pressure as well as the likelihood of obstetric complications, placental abruption, eclampsia, and infant mortality (Alio et al., 2011). Having a grandmother reside in the home has been shown to reduce the incidence of low birth weight deliveries (Pope et al., 1993). The *Partners* curriculum translates this compelling research literature into practical ways that physical and emotional health can be enhanced to optimize birth outcomes.

3. Strengthening Families To Prevent Maltreatment

In addition to addressing issues that impact the physical and emotional well-being of the expectant family, the content in the *Partners* curriculum is aligned with the classic research about strengthening families. In an effort to develop a strength-based approach toward child abuse and neglect prevention, the Center for the Study of Social Policy's Strengthening Families Program identified five protective factors that are linked to a reduction in child abuse and neglect. The factors shown to promote stable and nurturing families include: nurturing and attachment; knowledge of parenting and child development; parental resilience and the ability to cope; social connections and a network of friends, family and neighbors; and concrete support to help meet basic needs (Child Welfare Information Gateway, 2009).

The protective factors of parental resilience, social connections, and concrete support for families are addressed in the *Family Development* and *Maternal & Family Health* Categories, which include information and strategies for ensuring the family's healthy emotional development. When families have their needs met they are more resilient, and better able to access and appropriately use the social connections and support needed to meet their basic needs, including the needs of their developing baby. The protective factor of parenting knowledge is addressed under the Category *Preparing for Baby* to help expectant parents become more prepared to meet their young child's basic needs, especially in the areas of safe sleep and breastfeeding. The *Baby's Development* Category includes information to help expectant parents know what is happening with their baby's development throughout the pregnancy and provides strategies for them to begin the important process of bonding with their baby, even before birth. These protective factors also promote children's health and resiliency as shown in partnership with the American Academy of Pediatrics promotion for primary care providers (Center for the Study of Social Policy and American Academy of Pediatrics, 2015).

4. Mediating the Pervasive Effects of Poverty and Other Social Inequalities

The content of the *Partners* curriculum is also aligned with the latest research on the impact of poverty, one of the most pervasive social determinants of health disparities and adverse health outcomes across the life cycle (American Academy of Pediatrics, 2016; Egen, Beatty, Blackley, Brown, & Wykoff, 2017). By almost every measure of health and development, children born into poverty are at greater risk for poorer outcomes than their higher income peers. Health inequities begin in pregnancy stemming from higher

rates of unplanned pregnancies, less maternal education, poor nutrition and more obesity (Van der Klaauw & Farooqi, 2015), and higher stress including more addictions such as smoking and substance abuse (King, Dube, & Tynan, 2012), exposure to violence, environmental toxics and mental disorders for pregnant women in poverty. Depression is more common in low income pregnant women, and is linked to poor nutrition, increased substance use, inadequate prenatal care, and preterm delivery. Depression in pregnancy continues to negatively affect children postnatally by increasing the risk of behavior and emotional problems (Herba, Glover, Ramchandani, & Rondon, 2016).

In infancy, developmental disparities for children in poverty are evident in higher rates of low birth weight, infant mortality, chronic illnesses and injuries, maltreatment, and environmental toxics (AAP, 2016). Poverty-induced stress increases the risk for maternal depression, which is widespread among low income mothers and endangers emotional, cognitive, and behavioral development in young children (Schmit, Golden, & Beard, 2014). Effects can be lifelong, including the persistent disruption of children's brain architecture and stress response system, which can interfere with both physical and mental health (Center on the Developing Child, 2009).

At school age, children exposed to poverty are at an increased risk of difficulties with executive function such as self-regulation, inattention, impulsivity, and poor peer relationships (Boyle et al., 2011), as well as being at risk for poorer cognitive outcomes and school performance, in addition to the continued impact on mental, emotional and behavioral health into adulthood (Yoshikawa, Aber, & Beardslee, 2012). Although adverse childhood experiences that negatively impact lifelong health (Felitti et al., 1998) are common across socioeconomic levels, children in poverty are more likely to be exposed to maltreatment or violence, or to live in a single parent household with a family member who is incarcerated, or has a mental health or substance abuse issue.

Poverty impacts brain development (Noble, Houston, Kan, & Sowell, 2012; Jednorog et al., 2012) not only from the economic stress but the high amounts of toxic stress that decreases cortical gray matter, and hippocampal and amygdal functions (Luby et al., 2013). Home visitors can play a pivotal role in reducing the effects of early adversity and poverty (Rosenthal et al., 2010) by helping families manage stress, expand support systems, and enhance early caregiving (Schickedanz, Dreyer, & Halfon, 2015; McEwen & McEwen, 2017).

Decades of research have informed us about interventions that can minimize the disparities associated with poverty. The more recent neuroscience inspires hope that the malleability of the brain allows it to respond positively to nurturing stable relationships. This means that by ensuring a good start in life, we have more opportunities than ever imagined to promote learning and prevent damage. The *Partners* curriculum incorporates this research in an effort to support the home visitor's ability to work more effectively with families living in poverty and improve the likelihood they will experience positive birth outcomes.

Home Visiting Improves Prenatal and Birth Outcomes

In addition to improving prenatal care (Issel, Forrestal, Slaughter, Wiencrot, & Handler, 2011), home visiting, social support, education, and labor support can improve birth outcomes (Sweet & Appelbaum, 2004; Peacock, Konrad, Watson, Nickel, & Muhajarine, 2013; National Conference of State Legislatures, 2017). Women are more likely to access health care during their pregnancy than any other time, creating a tremendous opportunity for education and the early detection of any problems (SAMHSA & Women, Co-Occurring Disorders and Violence Study, 2015). Ideally, all pregnant women receiving home visiting services will be screened for mental health problems such as depression as well as physical health issues such as anemia so that poor outcomes can be reduced or eliminated (American Academy of Pediatrics, 2016).

Home visitors can play a pivotal role in improving prenatal and birth outcomes. The use of a written curriculum or protocol supports the home visitor by providing a planned sequence of critical topics that are essential in achieving desired changes in behavior and, eventually, program goals. Our own research on home visiting has shown that what a home visitor talks about during visits is critical because the content of the home visit directly correlates with program outcomes. For example, the more our home visitors used the information in the curriculum to talk about smoking cessation with pregnant women who smoked, the more their babies weighed at birth. The more times the home visitor talked about breastfeeding, the longer the mother breastfed. The more often emotional and family support issues were discussed with the mothers, the more likely they were to have higher self-esteem (Stabile et al., 1999). But even more importantly, home visiting programs such as Early Head Start, Healthy Start, Healthy Families, Health Departments, that use the *Partners* curriculum have achieved positive outcomes with their expectant families. Results reported by programs using the *Partners* curriculum include increased number of women reporting they did not smoke during pregnancy and had birth intervals of at least 12 months (Tennessee Department of Health, Maternal and Child Health, 2011);

reduced rates of maternal depression, higher than expected breastfeeding initiation rates, and higher rates of safe sleep practices (Perry, Hadley, & Mogul, 2014); fewer small for gestational age babies and low birth weight deliveries (Lee et al., 2009; Virginia Department of Health, 2008); fewer repeat pregnancies; greater intervals between pregnancies; reduced rates of physical abuse and neglect; increased rates of up-to-date immunizations and enrollment in a medical home; a significantly greater likelihood that mothers will read to their children (Williams, Stern & Associates, 2005); improved child development outcomes (York, Sparling, & Ramey, 2001); and increased maternal responsiveness of adolescent mothers (Deutscher, Fewell, & Gross, 2006). In summary, we know that home visiting programs using a curriculum that is grounded in the latest scientific research can significantly improve birth outcomes and the baby's trajectory throughout the lifecycle.

Literature Review by Categories

The *Partners* curriculum, *Before Baby Arrives*, is organized into four major Categories, each with a set of key Topics derived from the research on optimizing birth outcomes, strengthening families, and overcoming the effects of poverty and social determinants of health. Additional Topics were generated by focus groups with families and home visitors. Categories and Topics include:

Family Development: *Empowerment; Relationships & Support; Fatherhood; and Career Development & Finances*

Maternal & Family Health: *Alcohol, Drugs, & Tobacco; Sex, STIs, & Family Planning; Family Health Care & Safety; Nutrition & Exercise; Pregnancy & Interconception Care; and Emotional Health*

Preparing for Baby: *Nutrition & Feeding; Health & Safety; and Daily Care Routines*

Baby's Development: *Fetal Development*

A brief summary of the literature is provided below for each Category and Topic found in *Before Baby Arrives*.

Family Development

The *Partners* curriculum is unique in its focus on strengthening the overall well-being of the family. Family Systems Theory guides our belief that children benefit the most when their families have healthy self-esteem, positive relationships, a strong circle of support, a solid education, and adequate finances. As Winnicott (1964) reminds us, “there is no such thing as a baby; there is a baby and someone.” It is the network of family, friends, and community that nurtures and supports the expectant family and ultimately the unborn baby's healthy development. The content in Family Development is based on the literature about strengthening families during the critical prenatal period and the compelling research documenting how supportive relationships impact healthy birth outcomes. The information in this Category is intended to help home visitors empower families so they can move out of poverty; reduce the likelihood of abuse by increasing parental resilience and the ability to cope; support the expectant family's healthy relationships and expand their network of support; encourage and support the father's involvement prenatally and afterwards; and work with families to stabilize their financial situation, take advantage of educational opportunities, and enhance their career options. This Category is organized into the Topics of *Empowerment, Relationships & Support, Fatherhood, and Career Development & Finances*. A brief summary of the literature for each Topic follows.

Empowerment. *Partners* uses a hybrid approach to empowerment starting with basic needs and social determinants of health, while supporting families through the process of building resiliency and managing life changes. A key to promoting stable families is ensuring their basic needs are met. This rationale goes back to Maslow's Hierarchy of Needs (Maslow, 1943), which postulates that all needs become secondary until the most basic and instinctive biological and physiological needs are met. Home visitors know firsthand that ensuring families' basic needs are met is essential before they can begin helping families identify and reach their goals. For some families, this can be particularly challenging because they often feel powerless and have little hope that the future can be different. Inner strength and confidence is often a first step as documented from the World Bank's Moving Out of Poverty project aimed at understanding the ladder from poverty to prosperity (Narayan, Pritchett, & Kapoor, 2009).

Pregnancy can be a strong incentive for self-improvement and positive life changes. The information in this Topic inspires families to have goals and dreams for a better life—starting with having a healthy baby. The content in this Topic is intended to help expectant families identify changes needed in all aspects of their life—their relationships, life-style, diet, career, and finances. A mentor or other supportive person who fosters trust—often a primary function of the home visitor—can provide the encouragement needed to make major life changes. In order to successfully support a family through change a home visitor must first understand their readiness for change and then tailor interventions across the continuum of readiness (Cardona, Mobley, & Schwab-Zabin, 2007).

Information in this Topic serves to support families as they move through the process of change—overcoming obstacles, making good decisions, building support networks, and feeling empowered by their progress.

The curriculum also emphasizes the individual, family, and community influences on resiliency. Many of the original keys to resilience such as optimism, altruism, and social supports (Rosenbaum & Covino, 2005) are addressed as well as the multidisciplinary approaches of how broader social, psychological, biological and physical factors work together in resilience (Henry, Morris, & Harrist, 2015). Resilience is viewed as a process rather than a single event. Information in this Topic enhances the family's resilience and ability to cope in an effort to mitigate the negative effects of stress and other risk factors. A social determinants perspective on resilience and mental health is emphasized (Khanlou & Wray, 2014).

Relationships & Support. Home visitors help expectant families expand their social supports because having a network of friends, family, and neighbors is a key factor in reducing parenting stress (Maguire-Jack & Wang, 2016) and the risk of adverse pregnancy outcomes (Eapen, 2016). Surrounding the mother-to-be with supportive relationships is especially important during pregnancy for promoting a healthy lifestyle, increasing the likelihood she will attend prenatal appointments and childbirth classes, ensuring she'll have coaching support through labor and delivery, making sure she has help after the baby arrives, and providing overall support as she moves into her new maternal role (Orr, 2004).

Strong social-support networks are especially important to successful single parenting and first-time mothers (Shenk et al., 2017), while low social supports have adverse effects on pregnancy outcomes including lower birth weight and preterm births (Elsenbrunch et al., 2007). Depressed women who rated their partners as less supportive had babies who were born earlier and had lower Apgar scores than depressed mothers with higher perceived partner support (Nylen, O'Hara, & Engeldinger, 2013). Expectant women with absent partners were more likely to have emotional stress, smoke, and exhibit other unhealthy behaviors during pregnancy, and have a higher risk of obstetric complications like anemia, high blood pressure, placental abruption, and eclampsia (Pope et al., 1993). Conversely, support from the father of the baby is associated with reduced negative health behaviors especially smoking, alcohol use, and inadequate prenatal care visits, as well as more preterm births and low birth weight babies, and higher rates of infant mortality up to one year after birth (Alio et al., 2011). Father involvement is also attributed to more positive maternal childrearing attitudes and lower rates of postpartum depression, and was particularly important in increasing birth weight among black single women (Furr, 2017). Higher levels of support during pregnancy and postpartum are also associated with lower rates of infant colic (Alexander, Zhu, Paul, & Kjerulff, 2017). Father involvement is especially beneficial for teen mothers in reducing low birth weight deliveries and adverse birth outcomes (Shah, Gee, & Theall, 2014), especially among African American teenagers. Increasing social supports should be a major strategy for decreasing the racial disparities in infant morbidities and mortalities (Alio, Mbah, Grunsten, & Salihu, 2011; Furr, 2017).

The availability of social support also promotes resilience while preventing isolation—a common issue with intimate partner violence (IPV). Pregnancy is often a time when women are more vulnerable, which makes it especially critical to have a solid network of support. Support from respected elders and faith leaders, and other church based social support such as transportation, help with chores, and financial assistance is particularly important to African American women (Taylor et al., 2017).

The strength and resilience provided by multi-generational bonds are especially important for younger generations of mothers. Having a grandmother residing in the home has been associated with healthier pregnancy outcomes including a reduction in the number of low birth weight deliveries (Colen, Geronimus, Bound, & James, 2006). Co-residing grandmothers provide child care and financial assistance to teen moms resulting in increased educational attainment. On the other hand, living together increases conflicts about parenting and this older generation may have outdated ideas and believe in “old wives tales” that perpetuate myths and unhealthy practices. Home visitors must develop trusting relationships with extended family members so they can enlist their help in providing accurate information for supporting a healthy lifestyle during pregnancy.

Relationships can also be a major source of stress for the expectant mom. Family members and/or partners may try to influence her decision to have the baby, terminate the pregnancy, place the baby for adoption, or marry the father. Teens and single mothers may be particularly impacted by unsupportive reactions to their pregnancies. The Association of Women's Health, Obstetric, and Neonatal Nurses, and numerous other medical groups recommend pregnancy options counseling. This is a type of psychological counseling in which a health care professional provides medically accurate and factual information, in an unbiased, non-judgmental way, about the continuum of choices regarding the continuation of the pregnancy. If the expectant mother chooses to continue the pregnancy, the family's response to her decision can impact how she takes care of herself and her baby throughout the pregnancy (Solchany, 2013).

The goal of the *Relationships & Support* Topic is to ensure that the expectant family learns how they can build a network of support, strengthen their relationships, and, when necessary, identify and get out of unhealthy relationships. The relationship the home visitor creates with the family can serve as the basis for demonstrating a pattern of healthy, helpful support.

Fatherhood. There is compelling research that demonstrates short and long-term benefits from the father's involvement early on and throughout the pregnancy. The father's presence during the pregnancy can positively impact fetal development and birth outcomes (Alio, Kornosky, Mbah, Marty, & Salihu, 2010). The father's presence and support promoted a healthier prenatal lifestyle in which mothers were less stressed, had lower blood pressure, and were less likely to smoke. Conversely, when fathers were not involved, there was a greater incidence of preterm births and low birth weight babies. The absence of a father also raises the risk of premature death due to obstetric complications such as anemia, placental abruption, and eclampsia. Babies whose fathers were absent during pregnancy were four times more likely to die in their first year of life—regardless of the mother's race, ethnicity or socioeconomic status—than were babies whose fathers were present during the pregnancy. African American infants whose fathers were not involved were seven times more likely to die than infants born to Hispanic and white women in similar situations. Babies would be born healthier, a significant number of infant deaths could be prevented, and racial disparities in infant mortality and morbidity could be reduced with increased father involvement throughout the pregnancy (Pope et al., 1993; Ghosh, Wilhelm, Dunkel-Schetter, Lombardi, & Ritz, 2010; Ngui, Cortright, & Blair, 2009; Alio et al., 2010).

Father's involvement during pregnancy also provides an opportunity for the development of an attachment with his baby, which is critical because it is predictive of later positive relationships. There is substantial evidence demonstrating long-term benefits on a wide range of both child development and social outcomes when fathers are actively involved in their young children's lives. Children with involved, loving fathers are significantly more likely to do well in school, have healthy self-esteem, exhibit empathy and pro-social behavior, and avoid high-risk behaviors such as drug use, truancy, and criminal behavior (National Responsible Fatherhood Clearinghouse, 2017).

Because of the father's significant influence, the *Partners* curriculum emphasizes the importance of “male involvement”—whether it is the father of the baby or a reliable father figure. This Topic addresses ways to help engage males to psychologically prepare for fatherhood. Knowing the long-term importance of the relationship, not merely the father's presence in the home, content in this Topic addresses the importance of encouraging opportunities for the expectant fathers' early bonding and attachment such as going to prenatal appointments, watching the ultrasound, listening to baby's heartbeat, and how to be a nurturing father. Also included in this Topic are strategies to help fathers support the expectant mother through the physical and emotional changes of pregnancy, and the stress of labor and delivery. Recommendations are provided for dealing with a newborn, knowing what to expect after the baby is born, and how to support mom if she experiences the baby blues or other postpartum issues. Additionally, suggestions are provided that help fathers stay connected and maintain frequent contact with their children—even if deployed in the military or away in prison.

Career Development & Finances. Having a baby has an impact on the family's finances and can interfere with work and school. Pregnancy is all too often associated with increases in school drop-out rates. This can affect multiple generations as the mother's education level is one of the strongest predictors of her child's IQ and academic success (Dubow, Boxer, & Huesmann, 2009). The content in this Topic serves to encourage the expectant mom to plan ahead of time how to handle missing school when the baby is born and for a period of time afterwards, and to have a timeline for when she will return to school. Also addressed are issues related to the pregnant teen, with an emphasis on the importance of staying in school.

Socioeconomic status and education are well known predictors of a child's academic success and other child outcomes (Çiftçi & Cin, 2017). Because many women continue to work throughout pregnancy the content in *Career Development & Finances* serves to encourage expectant mothers to request that accommodations are made at work to decrease the stressful situations (e.g., standing too long) that are associated with premature labor. Also addressed is the importance of planning ahead for maternity leave and returning to work.

Economic pressure causes stress and can negatively impact family stability. To address that pressure this Topic includes content that provides the family with effective money management techniques such as tracking their bills and expenditures and making a realistic budget. The content in this Topic also addresses the importance of getting a good job; planning their career; financially preparing for maternity leave and the expenses of a new baby; and strategies for balancing work and family demands.

Maternal & Family Health

Research has substantiated that the development that occurs in utero is more rapid and extensive than previously realized and much more vulnerable to environmental influence than ever suspected (O'Donnell, Reissland, & Glover, 2017). Both positive experiences such as exposure to healthy nurturing relationships and negative influences such as prolonged stress, environmental toxins, or nutritional deficits can chemically change the genetic structure of the fetus resulting in either temporary or permanent problems. In fact, the science of “fetal programming” shows evidence that developmental programming in utero predetermines health and disease in adulthood (Rakers et al., 2017). For example, children who were prenatally exposed to famine in utero were studied six decades later with findings of heart disease and schizophrenia, diseases associated with early gestational exposure to famine (Heijmans et al., 2008).

Evidence shows that when a pregnant woman is stressed, the toxins from the stress hormones can cross the placenta into the umbilical cord increasing the risk for a spectrum of health outcomes, depending on the timing of exposure (Sandman & Davis, 2012). Babies of stressed or anxious mothers are more likely to be born prematurely and low birth weight (Guardino et al., 2016). Prolonged stress during pregnancy or early childhood can be particularly toxic and, in the absence of protective factors, may result in permanent epigenetic changes in brain cells altering response to adversity through the lifespan (National Scientific Council on the Developing Child, 2010).

Maternal health during pregnancy can be further compromised when there are higher rates of alcoholism, addiction (Keegan, Parva, Finnegan, Gerson, & Belden, 2010), obesity (Kapoor & Kean, 2017), mental health problems, poor diet and nutrition, STDs (Centers for Disease Control and Prevention, 2015), unintended pregnancies (Abajobir, Maravilla, Alati, & Najman, 2010), maternal depression (Surkan, Shivani, & Rahman, 2016), and family violence (Aizer & Currie, 2014). Poverty exacerbates all these health risks with worse outcomes on almost every measure of health than higher income families (American Academy of Pediatrics, 2016; Egen, Beatty, Blackley, Brown, & Wykoff, 2017).

A study of paraprofessional home visitors found that although they received extensive training in mental health, substance abuse, and domestic violence, they needed more guidance in addressing the issues, particularly in how to initiate conversations about these difficult topics (Tandon, Mercer, Saylor, & Duggan, 2008). To address this need, the *Partners* curriculum provides prompts, or actual words a home visitor might use to initiate the conversation about many of these more difficult topics. Additional background information is provided for home visitors so they can be better prepared to discuss the topic. It is also suggested that home visitors know when to seek the advice and support of their supervisor, nurse consultant, or mental health consultant. Studies showed that home visitors were able to assess the need for mental health, domestic violence and substance abuse services but were not effective in ensuring the mothers received the needed services (Tandon, Parillo, Jenkins, & Duggan, 2006). The *Partners* curriculum offers repeated opportunities for the home visitor to follow up across topics and services.

Our understanding of how baby's development is influenced by both the emotional and physical health of the mother (Center on the Developing Child, 2010) and the potential permanent detrimental effect upon the baby (Child Welfare Information Gateway, 2009) should accelerate renewed efforts to improve the health and well-being of pregnant women. Information in the Maternal & Family Health Category serves to support healthy behaviors during pregnancy and includes the following Topics: *Alcohol, Drugs, & Tobacco; Sex, STIs, & Family Planning; Family Health Care & Safety; Nutrition & Exercise; Pregnancy & Interconception Care; and Emotional Health*. A brief summary of the literature for each Topic is provided below.

Alcohol, Drugs, & Tobacco. Our understanding of maternal addictions and substance use disorders has vastly increased over the past decade so that home visitors and other health care providers can be most effective in helping pregnant women have a healthy baby. Pregnancy can be a primary motivation for entering treatment or a deterrent to seeking care, especially in areas where substance use during pregnancy is criminalized (The Coordinating Center of the SAMHSA Women, Co-Occurring Disorders and Violence Study, 2015). Pregnancy is a time when women are strongly motivated to stop alcohol, drug use, and smoking. Pregnant women were more than four times as likely as non-pregnant women to express greater motivation for treatment (Mitchell, Severtson, & Latimer, 2008). A study conducted on prenatal substance use documented successful cessation during pregnancy in which 96% of women with heavy drinking, 78% of women with marijuana use, 73% of women with cocaine use, and 32% of cigarette smokers succeeded in achieving abstinence during pregnancy. Alarmingly, the study showed substantial relapse from 6 to 12 months postpartum in 58% of abstinent smokers, 51% of abstinent women who used alcohol, 41% of abstinent women who used marijuana, and 27% of abstinent women who used cocaine in the 3 months following delivery (Forray et al., 2016). The timing

of the postpartum relapse can significantly impair the mother's capacity to parent and decrease maternal infant bonding. Home visitors play a pivotal role in supporting women to address substance use disorders during pregnancy to improve the likelihood of a healthy baby, but are also critical in postpartum supports to prevent relapse and improve the capacity to effectively parent.

Our increasing understanding of addictions has revealed a high correlation between exposure to trauma and Adverse Childhood Experiences (ACEs). A higher number of ACEs can predict initiation of drug use as well as later substance use disorders. When compared with people with no ACEs, people with five or more ACEs were twice as likely to be smokers (Anda et al., 1999) and 7 to 10 times more likely to report illicit drug use, addiction, and intravenous drug use (Dube, Felitte, Dong, Chapman, Giles, & Anda, 2003). Childhood sexual abuse is strongly associated with drug or alcohol dependence. Women who experienced any type of sexual abuse in childhood were almost three times more likely than non-abused girls to report drug dependence as adults (Greenfield, Beck, Lawson, & Brady, 2010). It is estimated that as many as 75% to 90% of women in treatment for substance use disorders have a history of sexual abuse or assault (Kendler et al., 2000). Understanding these contributing factors and utilizing trauma informed practices in working with maternal addictions is paramount to effective home visiting.

The harmful maternal and fetal risks of prenatal exposure to alcohol, drugs, and tobacco has long been documented (Mei-Dan et al., 2014; Centers for Disease Control & Prevention, 2017). The most frequently used substance in pregnancy is tobacco, followed by alcohol, cannabis, and other illicit substances (Forray, 2016). According to a national survey, 5.9% of pregnant women use illicit drugs, 8.5% drink alcohol, and 15.9% smoke cigarettes (National Survey on Drug Use and Health, 2012), resulting in over 380,000 offspring exposed to illicit substances, over 550,000 exposed to alcohol, and over one million exposed to tobacco in utero. Numbers continue to increase as indicated by soaring numbers of substance exposed babies (Forray, 2016).

Women using one substance are more likely to use others during pregnancy (Passey et al., 2014), which can compound negative birth outcomes. Polysubstance use is as high as 50% in some studies (Forray, 2016). Polysubstance use is the most potent predictor of severity of neonatal abstinence syndrome, a broad category describing the withdrawal symptoms of infants exposed to tobacco, alcohol, prescription medications, and illicit substances (Jansson et al., 2017).

Smoking during pregnancy is one of the most harmful toxins to the developing fetus, increasing risk of miscarriage, stillbirth, preterm delivery, and low birth weight (Mei-Dan et al., 2014). Tobacco smoking during pregnancy narrows the blood vessels and cuts off oxygen carrying blood to the baby's organs including the brain, which slows down prenatal neuron growth and alters the biochemistry of the developing brain. Smoking rates are highest among adults with low educational levels, low incomes, and mental health disorders (U.S. Department of Health and Human Services, 2014). Similarly, the women most likely to continue smoking during pregnancy are young, low income, single, and those getting Medicaid funded prenatal care (Flick et al., 2006; Goodwin, Keyes, & Simuro, 2007). Smoking is the main behavior through which adverse childhood experiences in the mother affect birth outcomes (Smith, Gotman, & Yonkers, 2016). Despite a decline in overall smoking, 8-10% of women continue to smoke during pregnancy (Child Trends Databank, 2015). According to the American Academy of Pediatrics (2011), one-third of SIDS deaths could be prevented if all mothers didn't smoke during pregnancy.

Prenatal exposure to active or passive maternal tobacco smoking has been associated in some studies with lower pulmonary function, increased risk of asthma (Wang & Pinkerton, 2008), cancer (Filippini, Farinotti & Ferrarini, 2000), obesity (Sharma, Cogswell, & Li, 2008), and low birth weight, which is associated with coronary heart disease, obesity, and type 2 diabetes (Hofhuis, de Jongste, & Merkus, 2003). Risks can cross generations. Grandmaternal smoking during the mother's fetal period was associated with a greater risk of asthma in the grandchildren, independent of maternal smoking. Risk was further increased if both the grandmother and the mother smoked during pregnancy (Li, Langholz, Salam, & Gilliland, 2005).

Secondhand smoke can be as harmful as actually smoking (Centers for Disease Control and Prevention, 2016). Mothers exposed to environmental tobacco smoke were more likely to deliver infants who were low birth weight or small-for-gestational age than mothers who were not exposed (Khader, Al-Akour, Alzubi, & Lataifeh, 2011). Secondhand smoking is also harmful after birth. A California Environmental Protection Agency estimates a high number of sudden infant death syndrome (SIDS) deaths annually associated with secondhand smoke exposure. Home visitors can play a powerful role in helping expectant and new families understand the dangers of smoking and quit smoking utilizing evidence-based guidelines created by the American College of Obstetricians and Gynecologists (2017).

Prenatal exposure to alcohol is one of the leading preventable causes of neurodevelopmental abnormalities and birth defects in the United States today (National Institute on Alcohol Abuse and Alcoholism, 2015). According to the Centers for Disease Control and

Prevention (2017), 1 in 10 pregnant women use alcohol, despite evidence that consumption of even low levels of alcohol during pregnancy can affect fetal brain development (National Scientific Council on the Developing Child, 2008). Although there is no safe time to drink alcohol during pregnancy, the first trimester is the period when the most severe damage can occur (Shea, 2017). Alcohol can damage fetal development in a variety of ways. Without a fully formed liver the fetus cannot process alcohol, which can damage the heart and lungs, and impair brain formation (Behnke, Smith, Committee on Substance Abuse, & Committee on Fetus and Newborn, 2013). The brain is particularly susceptible to damage throughout pregnancy because it is one of the first organs to begin developing and the last to complete developing. The timing and amount of alcohol exposure impacts development. The blood alcohol level, rather than the amount of alcohol consumed causes fetal damage, which is why binge drinking is generally regarded as more damaging than drinking the same amount of alcohol over a longer period (Guerri, 2002). Prenatal exposure to alcohol can cause birth complications including a two to three-fold increased risk of prematurity (Mullally et al., 2011).

Prenatal substance abuse is a growing crisis in the United States, exacerbated by legalization of marijuana and over prescribing of opioids resulting in opioid use disorder during pregnancy (Forray, 2016; Desai, 2014). Women using one substance are more likely to use others during pregnancy (Passey et al., 2014) with polysubstance use estimates as high as 50% in some studies (Forray, 2016). Clustering of risks such as domestic violence and poverty are common in families with maternal substance abuse (FSU Center for Prevention, 2015). Drug use during pregnancy is likely to lead to smoking, depression, and other risk factors (Haller, Knisely, Dawson, & Schnoll, 1993). Continued drug dependence during pregnancy may lead to complications for the fetus, for the newborn, and later in childhood (Behnke, Smith, & Committee on Substance Abuse, and Committee on Fetus and Newborn, 2013). Complications for the fetus include preterm delivery, spontaneous abortion, restricted fetal growth, and compromised fetal well-being (e.g., low birth weight, postnatal growth deficiency, microcephaly, neurobehavioral problems, and drug withdrawal syndrome) (National Institute on Drug Abuse, 2016) as well as self-regulation, behavioral and cognitive problems for the child later in life (Ross, Graham, Money, & Standwood, 2015).

Research continues to evolve in informing treatment of pregnant women with substance dependency to reduce the potentially negative health consequences for mother, fetus, and baby (Klaman et al., 2017). While well-intentioned efforts require pregnant women to undergo withdrawal from opioids, studies show the effects of withdrawal pose high risks of fetal death. A widely accepted clinical alternative is the perinatal use of medication-assisted treatment such as methadone and buprenorphine to help opioid withdrawal within a comprehensive treatment plan. These alternatives are underutilized because they contribute to Neonatal Abstinence Syndrome (NAS), a broad term assigned to signs of physiologic withdrawal from tobacco, alcohol, prescription medications, and illicit substances in the newborn. Neonatal Opioid Withdrawal Syndrome (NOWS) is becoming widely used to more accurately capture the numbers of infants experiencing withdrawal from opioid exposure in utero. The utility of specifying opioid dependency may lead to specific screening and treatment protocols to promote the best outcomes for these infants, whereas infants not exposed to opioids may require different assessment and management. It's important to remember that substance-exposed infants are typically exposed to multiple substances (Klaman et al., 2017). More research is needed to determine best options for ensuring safety and benefits for both the pregnant women and their unborn babies, including optimal dosing to minimize maternal/fetal withdrawal as well as decreasing NAS effects on the baby (McCarthy, 2017).

Treatment for drug dependent pregnant women needs to be highly specialized to address concurrent complications: history of sexual abuse (Greenfield., Beck, Lawson, & Brady, 2010), high rates of sexually transmitted diseases (Cavanaugh, Hedden, & Latimer, 2010), mental health problems and histories of violence and trauma (Center on Addiction and Substance Abuse, 1996), heavy smoking (Smith, Gotman, & Yonkers, 2016) mood disorders (Fitzsimons, Tuten, & Jones, 2007), housing instability, and high rates of suicide attempts and psychological impairments (Copersino, Jones, & Tuten, 2007). Research suggests that treatment should address the woman's relationship with her partner, especially when substance abuse and violence issues are present (Tuten, Jones, Tran, & Svikis, 2004). Pregnant women with a drug-using partner can be five times more likely to use drugs than women whose partners are drug-free. Targeting the drug-using partner is critical to successful treatment of the pregnant woman (Tuten & Jones, 2003). Lack of housing can be both an indicator for poor treatment prognosis and an incentive to seek treatment for drug abusing pregnant women. Homeless pregnant women have higher rates of drug use, medical problems, psychiatric problems, and physical, emotional, and sexual abuse; more family/social difficulties; and lower rates of treatment retention than women with housing. Successful treatment of pregnant drug using women requires that their housing needs and psychiatric and medical needs addressed (Tuten, Jones, & Svikis, 2003). Heroin abusers who participated in reinforcement-based therapy (i.e., an array of incentives including rent payment for recovery housing, recreational activities, and employment skills training) experienced 12 months of abstinence. These results are remarkable given that the relapse rate is typically 65-80% within a month of treatment

(Jones, Wong, Tuten, & Stitzer, 2005).

The content in the *Alcohol, Drugs, & Tobacco* Topic provides guidance to help home visitors deal with the array of issues facing prenatal substance use. The information in this Topic addresses the related and underlying concerns of substance abuse including trauma, sexually transmitted diseases, smoking, alcohol use, nutritional deficits, depression and other mental health issues, violence, and relationship issues. The *Partners* curriculum provides numerous strategies for home visitors to address each of these issues as well as guidance for helping women successfully achieve abstinence during pregnancy such as smoking cessation methods, information about the negative effects of secondhand smoke, addressing trauma, healthy relationships, bonding in utero, and strategies for decreasing stress and supporting emotional health.

Sex, STIs, & Family Planning. Compared with higher-income women, poor women are more likely to have an abortion, unintended pregnancy, and unintended birth. In 2011, the unintended pregnancy rate was 45%, a decline from 51% in 2008. Despite this decline, women below the federal poverty level are five times more likely to have an unintended pregnancy (Finer & Zolna, 2016). Researchers found that lower proportions of low-income women chose to end their unintended pregnancy by abortion, resulting in a relatively high unintended birth rate (Finer & Zolna, 2016).

Data on the linkage between contraceptive use and unplanned pregnancies has led to a growing recognition of the need to expand access to contraceptive services for all women, but especially for low-income women. This increased access would have the potential to considerably reduce the rate of unplanned pregnancy and abortion (Peipert, Madden, Allsworth, & Secura, 2012). Sexually transmitted diseases are also higher for those living in poverty, for racial and ethnic minorities, and for those who have limited access to health care (Centers for Disease Control and Prevention, 2016).

In 2014, the American Academy of Pediatrics recommended that the first-line contraceptive choice for adolescents who choose not to be abstinent is a Long Acting Reversible Contraceptive (LARC). LARCs provide 3-10 years of contraception and are safe for adolescents. A key factor in ensuring successful contraceptive use for family planning, particularly in ambivalent populations such as teens (Stevens-Simon, Kelly, & Singer, 1999), is to bridge where they are now and where they want to be. Researchers used an adaptation of the Stages of Change theory called Stages of Readiness to determine a woman's readiness to use a method of contraception and then tailored the counseling on contraceptive methods to reach women where they were on that developmental continuum of readiness. Researchers found that the best way to reach adolescent clients was through teen-friendly technology (e.g., text messaging, cell phone, Facebook, email) and by making information appropriate to both their developmental stage and ability to process complex information (Boydell et al., 2014).

Researchers have also examined ways to successfully engage young men in reproductive health interventions (Marcell, Jagers, Mayden, & Mobley, 2010). Strategies include having women take a more active role in encouraging their partners and sons to make joint appointments with health clinics and to utilize family planning methods (Marcell, Howard, Plowden, & Watson, 2009).

Information in this section of the curriculum helps home visitors discuss the intimate subjects of safe sex practices, pregnancy spacing, family planning, and the prevention of sexual transmitted diseases. Also included are handouts with the latest family planning options and frequent reminders to encourage the expectant mother and/or her partner to decide on a method of family planning to use after the baby is born.

Family Health Care & Safety. Early prenatal care provides health professionals with opportunities to identify medical, nutritional, educational, or psychosocial risks and provide interventions that can promote positive pregnancy outcomes (U.S. Department of Health and Human Services, Office on Women's Health, 2012). According to U.S. Department of Health & Human Services (2013), 73.7% of women giving birth received prenatal care in the first trimester; however, for mothers without a high school diploma the rate was 58%, and for American Indian, Alaska Native, and Pacific Islander mothers the rate was between 55.7% and 59%. Those who are most likely to benefit from early prenatal care because of their higher risk of poor birth outcomes include teens, blacks, and those who are unmarried and have less education. Sadly, this is the population that is less likely to receive early prenatal care (Child Trends Databank, 2015). Numerous economic, demographic, medical, psychosocial, and behavioral factors affect the timing of prenatal care initiation. One-third of the women who started prenatal care late said they would have started earlier if they had known they were pregnant (U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. (2013). Those who are at significant risk for initiating prenatal care late or not at all include women who have less than a high school education; lack health insurance; are young, poor, unmarried, unemployed, or have other children (Child Trends Databank, 2015). Barriers to obtaining prenatal care included structural barriers such as transportation

and insurance, negative attitudes towards prenatal care, perceived poor quality of care, unintended pregnancy, and psychosocial stressors such as overall life stress and chaos (Mazul, Ward, & Ngui, 2017).

The content in the Topic *Family Health Care & Safety* serves to help home visitors ensure pregnant women understand the importance of early and continuous prenatal care, what to expect at prenatal visits in each trimester, how to talk with health care providers to get the care they need, healthy practices to follow during pregnancy, and about the ultrasound and other common tests conducted during pregnancy.

Nutrition & Exercise. Research has given the field a better understanding of how fetal development is influenced by the mother's diet and nutrition. Fetal brain development starts as early as two weeks after conception. Malnutrition during pregnancy can stunt early brain growth (Prado & Dewey, 2014) and have long-term negative consequences on behavior and intelligence (Monk, Georgieff, & Osterholm, 2013). Foods rich in folic acid are critical to development of the fetus' brain and other neurological structures. All women of childbearing age should be eating diets rich in folic acid to help prepare their bodies for pregnancy. Anemia, or iron deficiency, is the most common form of malnutrition in the United States and can cause cognitive and motor delays, anxiety, depression, and attention problems (Radlowsk & Johnson, 2013).

A diet that does not include nutritious foods can also result in obesity, a growing concern for pregnant women (American College of Obstetricians and Gynecologists, 2013). Obesity increases the risk for gestational diabetes, pre-eclampsia, cesarean delivery, and infectious morbidity. Obese women are more likely to be admitted earlier in labor, need labor induction, require more oxytocin, have longer labor, and have double to quadruple the risk for stillbirth (American College of Obstetricians and Gynecologists, 2016).

Obesity is seen at disproportionate rates among the poor (Rogers et al., 2015). A healthy diet costs more and takes nutritional knowledge and organizational skills to plan and prepare especially in poor neighborhoods that tend to have fewer supermarkets and more expensive convenience stores (Hilmers, Hilmers, & Dave, 2012). Diet quality for low-income women may be reduced due to limited ability to purchase nutrient-rich foods. Some researchers have suggested that stress may alter metabolic pathways and lead to obesity, increasing obesity-related health problems (Scott, Melhorn, & Sakai, 2012).

Information found in the *Nutrition & Exercise* Topic includes helping mother-to-be learn how to keep a food diary and track weight gain; maintain a healthy diet to ensure sufficient folic acid and other essential vitamins; read food labels and prepare nutritious foods; increase intake of fresh fruits and vegetables; and avoid certain foods and drinks during pregnancy.

Three out of four pregnant women in the U.S. do not get enough exercise (Evenson & Wen, 2010). Researchers found that women engage in more moderate to vigorous exercise during their first trimester than they do during their third trimester, but only 23% engaged in as much physical activity as is recommended. The American College of Obstetricians and Gynecologists recommends at least 30 minutes a day of moderate exercise for women with uncomplicated pregnancies. The Department of Health and Human Services recommends at least 150 minutes of moderate aerobic activity each week during pregnancy. Studies suggest that women who exercise regularly during pregnancy experience a reduction in C-section rates, appropriate maternal and fetal weight gain, and are better able to manage gestational diabetes (Hinman, Smith, Quillen, Smith, 2015).

The information in the Topic *Nutrition & Exercise* provides suggestions for safe exercising during pregnancy as well as ideas for fun, practical ways for the whole family to exercise. This Topic serves to reinforce the value of exercising to maintain an ideal weight during pregnancy, improve mood and energy levels, and help get more sleep at night.

Pregnancy & Interconception Care. Pregnancy is a time of significant change for women—physical and emotional changes, changes in lifestyle, changes in relationships, and changes in self-image. Nowhere is change more apparent than in the physical transformation of a woman's body. Some of these physical changes are temporary (e.g., enlargement of belly and breasts) and some may be permanent (e.g., stretch marks, hemorrhoids). These physical changes may be new and exciting or unwelcomed. Some women who have not yet accepted their pregnancy may disguise the physical changes by continuing to wear tight jeans. Others welcome the opportunity to show off their growing belly. These physical changes also force women to begin to deal with the psychological and emotional changes she'll experience as she prepares for motherhood (Solchany, 2013). Information in this Topic includes helping pregnant women understand the physical changes during each trimester and healthy ways to manage the discomforts.

According to the Centers for Disease Control and Prevention (2015), C-sections account for 32% of deliveries in the U.S. This record high rate can be attributed to a rise in C-sections for first-time mothers as well as a decline in the rate of vaginal births

after cesarean. Reasons for C-sections include simple convenience and scheduling, avoidance of the pain of childbirth, and life-threatening emergencies. C-section surgery has multiple risks including infection, increased bleeding, reactions to medications, surgical injury to nearby organs, surgical injury to the baby, and possible breathing issues for the baby (Mayo Clinic, 2015).

The American College of Obstetricians and Gynecologists now advises doctors and patients to carefully weigh the benefits and risks associated with both cesarean and vaginal deliveries on a case-by-case basis. The World Health Organization continues to work to lower the C-section rate in developed countries to between 10%-15%, citing those levels as optimal for the best outcomes for mothers and babies, and to use the option of a C-section only when medically necessary (WHO, 2015).

The *Pregnancy & Interconception Care* Topic includes information to educate women about what to expect during labor and delivery, encourage them to talk with their health care provider about delivery options, and encourage the expectant mom and her partner to enroll in childbirth education classes. Also included is information that helps expectant mothers consider what to include when creating a birth plan such as having a supportive partner throughout labor, think about options for relieving pain during labor, including an epidural, and think about what she wants to take to the hospital.

Preterm labor occurs before 37 weeks of pregnancy and is a serious health risk affecting about 1 out of 10 deliveries in the U.S. (Centers for Disease Control and Prevention, 2016). Babies who are born preterm are at higher risk of needing hospitalization, having long-term health problems, and of dying than babies born at full term. Women who have had a previous preterm birth; are pregnant with twins, triplets or more; and have certain uterine or cervical abnormalities are at greatest risk of preterm labor and birth. Preterm labor can sometimes be stopped with a combination of medication and rest. More often, birth can be delayed just long enough to transport the woman to a hospital that has a neonatal intensive care unit and to give her a drug to help speed up her baby's lung development. Treatment with a form of the hormone progesterone may help prevent premature birth in some women who have already had a premature baby (March of Dimes, 2014). The content in the *Pregnancy & Interconception Care* Topic provides information on teaching the expectant mother how to recognize the signs of preterm labor and know what to do.

The postpartum period is an important time of healing and replenishment for the mother. It can also be a time of unintended pregnancy. In the postpartum period, use of contraception may improve birth outcomes by increasing the time between pregnancies. The interpregnancy interval is calculated as the number of months between the date the last pregnancy ended and the date of the last menstrual period (Copen, Thoma, & Kirmeyer, 2015). Studies show that short interpregnancy intervals, ranging from less than 3-18 months, are associated with a higher risk of poor birth outcomes including low birth weight (Zhu, 2005), preterm birth, small for gestational age (Fuentes-Afflick & Hessol, 2000), neonatal death, and infant mortality (Kallan, 1997). Reasons for these poor birth outcomes include postpartum stress and maternal nutrient depletion (King, 2003).

In order to increase interpregnancy intervals, the expectant mother needs to decide on a method of family planning prior to delivery. The expectant woman needs factual information about the different types of family planning methods available so she can select one that is tailored to her individual needs, easy to use, and affordable (Gavin & Moskosky, 2014). She also needs factual information about using breastfeeding as a method of birth control. Information in the *Pregnancy & Interconception Care* Topic supports the home visitor's efforts to help mother-to-be know what to expect after the baby is born; why the postpartum checkup is important; why it is best to wait to have intercourse until after she heals; and how to engage her partner in choosing a method of family planning that is tailored to their needs.

Emotional Health. The influence of the mother's emotional health on her baby's development has been clearly documented (Glover, 2014) as has the fact that the fetus is much more vulnerable to environmental influence than ever suspected (National Scientific Council on the Developing Child, 2010). Emotional problems experienced by the expectant mother that are known to adversely impact birth outcomes include pervasive stress, untreated depression, trauma, substance abuse, and domestic violence (Solchany, 2013). Stress, one of the most profound influences on pregnancy, can be brought on by fear or anxiety about the upcoming birth, lack of support, poor maternal self-identity, and negative beliefs about childbirth (Teixeira, Fisk, & Glover, 1999). This stress can manifest itself in maternal health problems such as high blood pressure or excessive weight gain, which can lead to more serious obstetrical problems (Perkin, Bland, Peacock, & Anderson, 1993).

Research in epigenetics provides evidence that factors such as prolonged stress can chemically change the egg or sperm cells in the fetus during pregnancy and can alter the DNA inherited by future generations. Prolonged stress during pregnancy or early childhood can be particularly toxic. In the absence of protective factors, prolonged exposure to stress may result in permanent epigenetic changes in brain cells altering responses to adversity through the lifespan (Cao-Lei et al., 2017). Toxins and the stress

hormone, cortisol, cross the placenta into the umbilical cord (Balakrishnan, Henare, Thorstensen, Ponnampalam, & Mitchell, 2010). Babies of stressed or anxious mothers are more likely to be premature and low birth weight (AAP, 2016).

Neuroscience substantiates evidence that the fetus is highly vulnerable to environmental influences (Kolb, 1989; Sale, Cenni, Putignano, Chierzi, & Maffei, 2007). Prolonged elevation of stress hormones can lead to abnormal brain development resulting in extreme anxiety, depression, or the inability to form healthy attachments (Gunnar, Brodersen, Krueger, & Rigatuso, 1996). Chronic activation of certain parts of the brain involved in dealing with stress and fear response can wear out other parts of the brain such as the hippocampus, which is involved in cognition and memory (Perry, 2000). Increasing evidence suggests that the brain's reaction to prolonged abuse and stressful experiences may be the root origin of aggression. If the stress continues or the newborn experiences prolonged exposure to abuse or neglect, it can lead to a lack of critical nurturing and may alter the developing central nervous system. This sets up a predisposition for the child becoming a more impulsive, reactive, and violent individual (Perry, 1995).

Although pregnancy can be a time of joyful anticipation, an estimated 10-25% of expectant mothers experience symptoms of depression (Bennett, Einarson, Taddio, Koren, & Einarson, 2004)—sleep disturbances, appetite changes, lack of physical activity, and isolation—all known to impact fetal development. When a pregnant woman is depressed she is more likely to use alcohol, tobacco, or other harmful substances, less likely to take prenatal vitamins, less likely to attend regular obstetric visits, and less likely to comply with prenatal advice (Zuckerman, Amaro, Bauchner, & Cabral, 1989; Burt & Stein, 2002; Nonacs & Cohen, 2002)—all of which are associated with poor birth outcomes. Untreated depression during pregnancy (Wisner et al., 2000) has also been linked to other poor outcomes such as spontaneous abortion (Sugiura-Ogasawara et al., 2002), small head circumference, low APGAR scores, the need for special neonatal care, neonatal growth retardation, preterm delivery, increased risk of preeclampsia (Kurki, Hiilesmaa, Raitasalo, Mattila, & Ylikorkala, 2000) and babies with high cortisol levels at birth (Steer, Scholl, Hediger, & Fischer, 1992; Bowlby, 1982; Zuckerman, Amaro, Bauchner, & Cabral, 1989). The options for treating maternal depression are weighed with the risks to the fetus. An expectant mother who experiences depression during her pregnancy is more likely to experience postpartum depression and attachment problems with her baby and demonstrate poor maternal capabilities (Bosquet & Egeland, 2001).

Pregnancy loss is also a major emotional issue for expectant families. A study of women who miscarried identified six common experiences (Swanson, 1999). *Getting to know* was the process of dealing with the loss of their pregnancy. *Losing and gaining* was the woman's search for making meaning out of what was lost or gained due to the miscarriage. *Sharing the loss* was the support of other important people in her life to realize the loss was significant. *Going public* was the process of re-entry into everyday life and sharing the grief with others. *Getting through* was the process of working through the grief and loss until eventually there were more happy moments than sad ones. *Trying again* was the decision of whether to attempt to get pregnant again while acknowledging the fears of possibly another unsuccessful pregnancy. Elisabeth Kübler-Ross' classic stages of death and dying (Kubler-Ross, 1969) are also commonly used as the basis for helping expectant families deal with miscarriage, stillbirth, or other pregnancy related loss. This type of loss can be equally devastating to the father of the baby. Several things have been shown to help families heal after miscarriage (Swanson, 1999)—time, being emotionally available, and therapeutic caring from others (Swanson, 1999).

Having a premature baby or an infant with special needs can also be emotionally overwhelming. Research has shown that when premature babies are breastfed and held they gain weight faster and go home earlier from the hospital (Zaichkin, 2009). Information in this Topic includes strategies home visitors can use for helping families cope such as encouraging them to hold their baby and to breastfeed when possible.

The National Violence Against Women Survey documents that one in four women are raped and/or physically assaulted by a current or former spouse or partner at some point in their lifetime (Tjaden & Thoennes, 2000). Pregnant women also experience intimate partner violence. It is estimated that 3-19% of women report being abused during the childbearing year—the year before, during, or after a pregnancy (Campbell, Garcia-Moreno, & Sharps, 2004; Sharps & Laughon, 2007). Reported rates of abuse vary depending on how women are asked, the setting in which they are asked, and at what point in the pregnancy they are asked (Sharps, Campbell, Baty, Walker, & Bair-Merritt, 2008). Exposure to violence among drug-dependent pregnant women is even higher—40.9% for emotional abuse, 20% for physical abuse, and 7% for sexual abuse during the pregnancy (Velez et al., 2006).

Violence, trauma, and drug use are inextricably related (Gill, Page, Sharps, & Campbell, 2008). Women who are abused during pregnancy are more likely to use alcohol and drugs than non-abused women (Martin, English, Clark, Cilenti, & Kupper, 1996). Alcohol and drug abuse among women and their partners increases the risk for intimate partner violence (IPV) (Campbell et

al., 2008). IPV during pregnancy has been associated with poor health outcomes for the mother, the fetus, and the neonate. Poor maternal outcomes include late entry into or no prenatal care, poor maternal weight gain, sexually transmitted diseases, urinary tract infections, smoking, psychiatric problems, and traumatic injuries that may cause premature termination of the pregnancy (Tuten, Jones, Tran, & Svikis, 2004). Similar to abused, non-pregnant women, abused pregnant women experience poor mental health including low self-esteem, substance abuse, depression, and PTSD (Bullock, Mears, Woodcock, & Record, 2001). Poor fetal outcomes from IPV include preterm delivery and low birth weight (Murphy, Schei, Myhr, & Du Mont, 2001). Violence is a particularly toxic stressor to both the expectant mother and the fetus. Epigenetic research has found permanent and extensive damage can occur when toxic stress crosses the placenta altering the DNA and brain cells (Balakrishnan et al., 2010).

Extensive research has been conducted to understand IPV and to implement effective home interventions. Understanding the cultural context may be helpful to treatment (Campbell et al., 2008). According to a national survey African American women experience significantly more abuse than do white or Hispanic women, even when controlling for SES (Tjaden & Thoennes, 2000). However, African American women are less likely to report abuse or seek treatment and often have the resiliency to restore their own self-esteem—often without professional intervention (Campbell et al., 2008). Supports from respected elders, faith leaders and other church based social support such as transportation, help with chores, and financial assistance is particularly important to African American women (Taylor et al., 2017).

Research has also examined maternal depression and effective treatment options (Beeber et al., 2013; Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010) especially for women who have low grade symptoms of depression. One encouraging treatment is the use of cognitive behavioral therapy. The intervention consists of three main components: modification of negative dysfunctional thoughts; increasing pleasant activities; and decreasing behaviors leading to low mood (Ammerman et al., 2013). Information in the curriculum serves to reinforce this successful intervention with purposes and handouts that encourage the use of positive affirmations during pregnancy and labor; provide suggestions/strategies for overcoming feelings of powerlessness; suggest ideas for coping with stress; and offer recommendations for low-cost, pleasant activities aimed at improving mood.

Much content is provided in this Topic to support the emotional health of the expectant mother and her entire family. Numerous handouts provide strategies to help the expectant mother learn ways to cope with the stress typically experienced during pregnancy. Suggestions are provided for the home visitor on how to approach sensitive topics such as intimate partner violence. Also included for the home visitor are strategies for recognizing trauma, depression, and other mental health issues and recommendations for when to seek safety and professional help. Information is intended to help families understand the adverse impact of stress, addictions, violence, depression, and other influences on the emotional well-being of the expectant mother and her unborn child.

Preparing for Baby

Pregnancy is a time for making preparations for the new baby both psychologically and within the home. Often expectant families must deal with the acceptance of the pregnancy and all the emotional preparations before they are able to start other more concrete types of preparations like identifying a safe place for the baby to sleep, deciding whether to use cloth or disposable diapers, and whether to breastfeed or bottle feed. Some expectant mothers intentionally wait to prepare for the baby until they can be sure of not having a miscarriage or pregnancy loss.

Most first-time families don't feel adequately prepared nor feel like they have enough knowledge about parenting skills (Council on Community Pediatrics, 2009). The content in each of three Topics in this Category—*Nutrition & Feeding*; *Health & Safety*; and *Daily Care Routines*—are intended to help the home visitor support the expectant parents as they begin to learn basic parenting skills. A brief summary of the literature for each Topic follows.

Nutrition & Feeding. One of the major decisions a family faces during pregnancy is whether to breastfeed or use formula. There are many cultural issues and age preferences that impact this decision. For example, teens typically preferring bottle feeding. Extensive research shows the epidemiologic, physiologic, and psychological benefits of breastfeeding (Dieterich, Felice, O'Sullivan, & Rasmussen, 2013). There is no consensus about management of the breastfeeding mother on medication, especially for mothers with depression and other mental health problems. There is still much investigation of infectious disease transmission through breast milk. However, for the majority of mothers, there is substantial support for the benefits of breastfeeding and many resources available to support breastfeeding mothers. Information provided for the home visitor in this Topic serves to encourage the expectant mother to thoughtfully consider the benefits of breastfeeding for herself and her baby, help her understand the basics of breastfeeding, and learn how to deal with any challenges she might face while breastfeeding. Additionally, there is content that

provides the home visitor with information to support the expectant mother who makes the decision to use formula including how to choose the right formula for her and her baby, and how to make and safely store bottles of formula.

Health & Safety. Pregnancy is the time to help families learn about health and safety issues related to caring for young infants. Providing a safe home environment is critical as accidents are a leading cause of emergency room visits and death of young children (National Center for Injury Prevention and Control, 2015). One of the most important health and safety related choices during pregnancy is deciding where the baby will sleep. There are many cultural influences that support having an infant co-sleep with mother and/or father. However, the American Academy of Pediatrics and the CDC, among others, warn parents not to place their infants to sleep in adult beds because of the risk of suffocation and strangulation. Extensive research has been conducted regarding Sudden Infant Death Syndrome (SIDS). Babies are more likely to die from SIDS when they are placed on their stomach to sleep, on a soft bed covered with a quilt or blanket (American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome, 2016). Infants of mothers who smoked during pregnancy were three times more likely to die of SIDS than those whose mothers did not smoke, and exposure to secondhand smoke doubles a baby's risk of SIDS. Researchers speculate that smoking might affect the central nervous system, starting prenatally and continuing after birth, which could put the baby at increased risk of SIDS (Centers for Disease Control and Prevention, n.d).

Unexplained cultural disparities persist, as African American babies are twice as likely to die from SIDS and American Indian babies are nearly three times more likely to die of SIDS than white babies (National Institutes of Health, National Institutes of Child Health and Human Development, 2010). In 1994, the American Academy of Pediatrics started the Back to Sleep campaign, an effort to educate the public about reducing the risk of SIDS by placing babies to sleep on their backs. Since that time, the number of SIDS deaths has dropped by 50%. New research suggests that many babies who die from SIDS are born with an abnormality in a network of neurons in the brainstem that are involved in controlling blood pressure and breathing, temperature regulation, and sleep and waking. Although this brain defect may not be the sole cause for SIDS, research suggests that stomach sleeping and soft bedding increase an infant's risk of re-breathing his or her own exhaled air. When an infant is sleeping on its stomach, the exhaled carbon dioxide may get trapped between the infant's face and the bedding. When the infant breathes exhaled air, the oxygen level in the baby's body drops and the carbon dioxide level rises, which may lead to SIDS. If a baby is re-breathing exhaled air and not getting enough oxygen, the brain usually triggers the baby to wake up and cry, changing the baby's breathing and heart rate to compensate for the lack of oxygen. Babies with brainstem abnormalities lack this "over-ride protection" and seem to be at greater risk for SIDS. Babies born with defects in other parts of their brains or bodies may also be at greater risk for SIDS. These defects might be the result of prenatal exposure to a toxic substance. For example, smoking during pregnancy can reduce the amount of oxygen the growing baby receives, making it more susceptible to conditions of low oxygen later in life (National Institutes of Health, National Institutes of Child Health and Human Development, 2010).

Information provided in the *Health & Safety* Topic helps the home visitor ensure expectant families have set up a safe sleep environment for their infant before the baby is born, know how to prevent SIDS, know how to properly install an infant car seat, and have the basic supplies needed to care for their baby.

Daily Care Routines. Child development specialists agree that babies thrive on routines (Brazelton & Sparrow, 2006). The consistency of routines help babies feel more secure because of the predictability of knowing what will happen next. When families provide such predictability, routine, and consistency they lay the foundation for trust, security, and healthy attachment. Some families lack even the basic routines for sleeping and eating. Information in this Topic helps families prepare for the newborn.

Baby's Development

The *Baby's Development* Category in *Before Baby Arrives* includes the Topic *Fetal Development*. A brief summary of the literature for the Topic follows.

Fetal Development. Research has substantiated that the growth and development that occurs in utero is more rapid and extensive than previously realized (Kolb, 1989). Within the first month of conception, the heart begins to beat and by the 10th week, the fetus takes its first breath. In the second trimester, the baby's essential body parts and organs are beginning to function with the ability to hear, taste, grasp, suck, squint, and swallow. The beginning of the third trimester often is the point of viability—when the baby can survive, with or without medical help, outside of the womb. However, preterm delivery deprives the fetus of the time needed for organ maturation.

Fetal development in utero is much more vulnerable to environmental influence than ever suspected (National Scientific Council on the Developing Child, 2010). Research shows evidence of toxins and the stress hormone, cortisol, crossing the placenta into the umbilical cord (Balakrishnan et al., 2010). Research has long shown that fetal development can be compromised from higher rates of alcoholism, addictions (Centers for Disease Control and Prevention, 2006), obesity (Stafford et al., 2007; Womersley, 2009), mental health problems, poor diet and nutrition, STDs (Gold, 2006), unintended pregnancies (Finer & Henshaw, 2006), maternal depression (Bosquet & Egeland, 2001), and family violence (National Research Council and Institute of Medicine, 2000). Babies of stressed or anxious mothers are more likely to be premature and low birth weight (Wadhwa, Sandman, Porto, Dunkel-Schetter, & Garite, 1993; DeMuylder, 1989). In one study, the magnitude of the effect of stress on birth weight was similar to that found in the babies of mothers who smoked (Lou et al., 1994). These negative outcomes are often further exacerbated by poverty (Brooks-Gunn & Duncan, 1997).

The new cutting-edge research in epigenetics provides evidence that changes in egg or sperm cells in the fetus during pregnancy can alter the DNA inherited by future generations (Champagne, 2010). This latest research has shown that negative influences such as prolonged stress, environmental toxics, or nutritional deficits can actually chemically alter genes in the fetus (Das, Hampton, & Jirtle, 2009). Prolonged stress during pregnancy can be particularly toxic and, in the absence of protective factors including nurturing relationships, may result in permanent epigenetic changes in brain cells altering response to adversity through the lifespan (Shonkoff, Boyce, & McEwen, 2009). Experiences that change the epigenome during critical periods when the specialized cells of organs such as the brain, heart, or kidney are developing can have a substantial impact on physical and mental health for a lifetime (National Scientific Council on the Developing Child, 2010).

Research has shown that increased understanding of the baby's development helps expectant mothers choose healthier lifestyles during pregnancy (Kohn, Nelson, & Weiner, 1980) and has been associated with improved cognitive outcomes for children (Wacharasin, Barnard, & Spieker, 2003). To help parents understand and support this crucial time of growth and development, information in this Topic includes handouts describing fetal development throughout the pregnancy.

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