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Preface

The state of a community's overall health can be determined by the tender measure of the health and well-being of its infants. Infant mortality is one of the most important indicators of the health of a state, as it is associated with a variety of factors such as maternal health, quality and access to medical care, socioeconomic conditions, and public health practices. In 2011, Virginia's infant mortality rate was 6.7 infant deaths per 1,000 live births; this was a significant decrease from 7.7 infant deaths per 1,000 live births in 2007. Virginia's overall rate of infant mortality has declined by 13.0% from 2007 to 2011. (See Appendix A: Figure 1- Current Status Overview: Infant Mortality Trend Data)

While significant improvement has been made, the Virginia infant mortality rate remains above the national rate of 6.1 infant deaths per 1,000 live births for 2011. When infant mortality rates are compared across states, Virginia ranks twenty-third highest among all states.

When the Virginia infant mortality rate is examined by race and ethnicity significant disparities are apparent. (See Appendix A: Figure 2-Resident Infant Death Rates by Race/Ethnicity) Infant mortality rates for White non-Hispanic and other race non-Hispanic populations are well below the overall state IMR for 2001 – 2011. While the IMR among Black Non-Hispanics is higher, being two to three times greater than White infants. In addition, the IMR among Hispanics have been substantially lower than the overall Virginia rate; however beginning in 2007, the group's rate increased significantly and remained close to the overall Virginia rate. These differences in IMR suggest racial disparity is a key health outcome but represents an opportunity to make improvements. (See Appendix A: Figure 2-Resident Infant Death Rates by Race/Ethnicity)

The Virginia Department Health is dedicated to further reducing the Infant Mortality rate. In 2012, VDH began a strategic planning process to evaluate current practices, explore new and innovative approaches, build public and private partnerships throughout the state and identify and mobilize resources to effectively focus efforts on infant mortality reduction. The overarching mission is to (1) reduce Infant Mortality to 5.7 deaths/1000 live births by 2018 and (2) reduce African-American/White Infant Mortality gap to zero by 2018.

VDH adopted an iterative strategic planning process which included a comprehensive review of all related available data, a critical review of current VDH Maternal Child Health programs, and a meta-analysis of best practices in current research. Five planning meetings with key stakeholders were held from across the state requesting their expertise and knowledge on how to reduce the infant mortality rate and to inform the objectives and strategies of the plan. Over 65 individuals representing practitioners of obstetrical and women's health care, leadership from state and private agencies, non-profits, educational research institutions and community organizations attended these meetings. As a result, five priority goals were identified:

- Goal 1: To improve the knowledge, attitudes and behaviors of reproductive age women related to preconception health across the Commonwealth.
- Goal 2: To reduce premature births across the Commonwealth
- Goal 3: To improve interconception care and family planning across the Commonwealth
- Goal 4: To improve injury prevention and positive parenting efforts within Virginia
- Goal 5: To improve the collection, analysis, dissemination, and evaluation of perinatal factors which influence infant mortality

Each goal has two to three defined objectives with two to three strategies. These key strategies have been identified for each objective based upon the stakeholder discussions and analysis of feasibility. The planning groups were charged to be innovative and develop strategies that are currently not being employed or need to be

expanded. Once this Plan is finalized by VDH staff and the stakeholders, a detailed implementation plan will be developed including specific action steps, timeframes and designated lead staff or organizations. This process will occur in cooperation with the various stakeholder groups.

It is recognized that resources may not be immediately available to pursue these strategies, In collaboration with the stakeholder groups, VDH will seek partnerships with the other state and private agencies, education research institutions and community organizations to implement the Plan.

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Chapter One

Strategic Goal 1: To improve the knowledge, attitudes and behaviors of reproductive age women related to preconception health across the Commonwealth.

Background

Many women and men do not currently benefit from clinical and community preventive services that could improve their health for a lifetime and help them have healthy babies when, and if they choose to do so. Diabetes, hypertension, obesity, depression and sexually transmitted diseases are among the medical conditions that can cause adverse pregnancy outcomes among women and men of reproductive age. Moreover, without understanding the risks, women can use prescription medications, alcohol, tobacco, and other substances that are associated with birth defects, preterm births, miscarriage, and other adverse pregnancy outcomes. Preconception health is also important for men. All of these risk factors and conditions are modifiable, if identified during the preconception period by health screenings and addressed with evidence-based interventions. (PCHHC, 2012)

Preconception health incorporates several aspects to improve pregnancy outcomes by improving the health of women and mitigating risk factors prior to pregnancy. The main goal of preconception care is to provide health promotion, screening and interventions for women of reproductive age to reduce risk factors that might affect future pregnancies. Preconception care is defined as a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management (CDC, 2006) By identifying risk factors and offering public health interventions, women can have a healthier pregnancy and a decreased risk for adverse birth outcomes (Gardiner et al., 2013). Preconception care is part of a larger health care model that results in healthier women, infants and families. (CDC, 2006)

Preconception Health and Health Equity: There are many factors that affect access and knowledge of preconception health including education level, income, socio-economic status, religion, and cultural beliefs. These elements provide additional challenges in reducing infant mortality. Understanding and addressing these challenges among different racial and ethnic groups will aid in reducing the health disparities gap present across the Commonwealth in infant mortality. (Arbour, Corwin, Salsberry, & Atkins, 2012; Dunlop, Logue, Thorne, & Badal, 2013)

Preconception Health Critical Issue for Infant Mortality: For more than 20 years, preconception health (e.g., being healthy before becoming pregnant) has been discussed as an important factor in decreasing infant mortality. Despite broad interest, there has been only modest progress implementing these concepts into clinical practice. Although most women understand the importance of optimizing their health before pregnancy and most physicians think preconception health is important, few healthcare providers provide comprehensive preconception care to their patients. Preconception health is a building block and foundation to preventing infant mortality.

For this five-year plan, three specific objectives have been defined under the topic of preconception to guide strategies and have the greatest impact on infant mortality:

- Objective 1: Establish baseline measure for the inclusion of preconception health assessment into the routine care of all women across the Commonwealth by adding a question on the Virginia Behavioral Risk Factor Surveillance System by 2018.
- Objective 2: Decrease the percentage of women of reproductive age who have a Body Mass Index (BMI) greater than 30 from 25% to 22.5% (10%) by 2018.
- Objective 3: Increase access to oral health services for women of reproductive age from 79.1% to 87.0% (10%) by 2018.

Objective 1: Establish baseline measure for the inclusion of preconception health assessment into the routine care of all men and women across the Commonwealth by adding a question on the Virginia Behavioral Risk Factor Surveillance System (BRFSS) by 2018.

Strategy 1: Provide a promising practices/best evidence toolbox with resources for healthcare providers promoting the importance of preconception health among women and men of reproductive age.

Many resources are available to provide information, support or additional resources within local communities surrounding preconception health, but it is unlikely all these resources exist in one location. Some of these resources are designed to relate to younger men and women in the reproductive age range; while others are more desired by the women in the latter childbearing years. CDC has been the leader in providing the resources but many of these resources are not being utilized due to lack of knowledge that these resources exist by providers and citizens.

Adapting the already existing CDC toolbox of preconception resources, VDH will provide a link on their website providing a central location for numerous resources. Separate links will be developed for healthcare providers and consumers, including local resources as well. The available information will ensure current messages and promotion methods surrounding preconception health.

Strategy 2: Improve the use of health care visits to promote preconception health by including questions during health care encounters.

As a part of primary care visits, providing a risk assessment and educational and health promotion counseling to all women of reproductive age will improve pregnancy outcomes. The integration of preconception components into primary care can better serve women across their lifespan and at various levels of risk. (Dunlop, Dretler, Badal & Logue, 2013) Currently, there is no database to provide this information but staff could pursue adding a question on the Virginia BRFSS or opportunities may arise with the implementation of electronic health records.

Preconception care is more than a single visit to a health-care provider. Increasing the proportion of women who receive interventions for preconception risk screenings and findings, such as diabetes, high blood pressure, obesity and/or asthma, will improve preconception health and pregnancy outcomes. Changes in the knowledge, attitudes, and behaviors related to reproductive health among women need to be made to improve preconception health. The majority of adults are not aware of how these and other health lifestyle factors influence reproductive health and childbearing. (Dunlop, Logue, Thorne & Badal, 2013; Squires et al., 2013) Educating

the public about lifestyle risks and directing them to seek a primary care provider would improve preconception health.

Many topics fall under preconception care to improve a woman's chance of having a healthy pregnancy: folic acid intake, smoking cessation, maintaining a healthy weight, prevent or properly monitoring chronic diseases, good oral health, drug and alcohol abstinence, sexually transmitted infection prevention, domestic violence prevention, mental health and family planning. (CDC, 2006) These are all essential areas under women's health during the reproductive years to improve the outcomes of a healthy pregnancy when the woman is ready. The changes in the health care system through the Affordable Care Act are yet to be determined; however, a main focus is to increase use of health care visits to promote preconception health among men and women.

Strategy 3: Promote having a reproductive life plan for every women and men of reproductive age.

Every man and woman should be encouraged to have a reproductive life plan. A lifespan approach can be used to focus individual attention on reproductive health to reduce unintended pregnancies, age-related infertility, fetal exposure to teratogens, and to improve men and women's health and pregnancy outcomes. The CDC (2006) recommends developing a reproductive health life plan for young men and women when they enter their reproductive years. (See Appendix B: Reproductive Life Plan)

Increasing public awareness surrounding the importance of preconception health behaviors and services by using information and tools appropriate across various ages, literacy levels, including health literacy and cultural/linguistic contexts is critical. Consumer-friendly tools can help men and women self-assess risks, make plans and take actions that will improve their health and that of their children. (Gardiner et al., 2013; King, Freimuth, Lee & Johnson-Turbes, 2013) The CDC has also developed the Tool for Health Professionals to guide their patients in developing their reproductive life plan. (See Appendix B: Tool for Health Professionals)

“Show Your Love” is a national campaign designed by the CDC, to encourage all men and women of reproductive age to take steps to improve their health *before* getting pregnant. Almost half (42%) of all Virginia pregnancies are unintended; it is essential to urge women of reproductive age to take steps to improve their general health before conception. (Virginia PRAMS, 2010) By addressing health conditions and risk factors before pregnancy, women can improve their likelihood of a healthy pregnancy and baby. (CDC, 2013)

The campaign's main goal is to increase the proportion of women who plan their pregnancies and engage in healthy behaviors before becoming pregnant. Some members of this campaign include: the March of Dimes Birth Defects Foundation, National Healthy Mothers, Healthy Babies Coalition, and National Healthy Start Association.

The campaign targets two main audiences: women 18-44 who are currently planning a pregnancy in the next year, and women 18-44 who are not currently planning to become pregnant due to having children and not wanting anymore, or those who do not want a pregnancy in the next year. Research has shown that these two audiences are quite different and so there are separate products, messages and communication strategies based on the audience.

The CDC launched this campaign in February 2013 including press releases, talking points, E-Cards, posters, PSAs, videos, and checklists; all of which would be available for use in Virginia.

Strategy 4: Develop fact sheets to increase knowledge and awareness among policy makers and state leaders.

In general, policy makers, health professionals, and the general public do not have the awareness about the importance of preconception care and its relationship to infant mortality. State leaders that are in positions of making decisions about agency policies, legislation or guidelines could benefit from concise fact sheets. Providing fact sheets will ensure policy makers and state leaders receive essential information pertaining to infant mortality and data informed/evidence based interventions that could be implemented across the Commonwealth.

VDH’s role to improve access to preconception health services across the Commonwealth:

1. Develop a promising practice/best evidence toolbox of preconception resources across the state.
2. Provide access to the toolbox through the Internet to external stakeholders and healthcare providers.
3. Promote the implementation and benefits of a PCMH across the Commonwealth.
4. Adopt a reproductive health life plan template and encourage the use of the plan among partners and healthcare providers.
5. Develop a fact sheet for policy makers and state leaders on preconception health.

External Stakeholder’s role to improve access to preconception health services across the Commonwealth:

1. Collaborate with VDH to provide promising practice/best evidence toolbox of preconception resources across the state.
2. Promote and use the online toolbox of preconception resources.
3. Implement a PCMH in local hospitals, doctor’s offices and health clinics.
4. Promote the use of a reproductive health life plan among all men and women ages 15-44 years old.
5. Collaborate with VDH to develop and distribute fact sheets for policy makers and state leaders on preconception health.

Proposed Success Indicators for Objective 1

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of healthcare providers trained about the importance of preconception health among women of reproductive age
- Number of perinatal health professionals educated about the importance of oral health in women of reproductive age
- Number of women and families trained about the importance of preconception health
- Number of facts sheets created and distributed to policy makers and state leaders

Objective 2: Decrease the percentage of women of reproductive age who have a Body Mass Index (BMI) greater than 30 from 25% to 22.5% (10%) by 2018.

Strategy 1: Provide promising practices/best evidence research to healthcare providers about the significance of a healthy BMI among women of reproductive age.

Overweight and obesity continue to be leading public health concerns in the United States. With the rise of obesity rates in Virginia, obesity during pregnancy is now a common high-risk obstetrical condition affecting about one in four women who give birth. (PRAMS, 2010) Obesity also affects the outcome of pregnancy in the mother and her fetus. A higher prevalence of gestational diabetes, impaired glucose tolerance, hypertension, thromboembolism, preeclampsia, sleep apnea, cesarean section, preterm delivery and postpartum weight retention are associated with maternal obesity. (ACOG, 2013; Alletto, 2012)

The population demographics of women who become pregnant have changed dramatically over the past decade; more women are overweight or obese at conception. (ACOG, 2013) In 2010, twenty-five percent of Virginia women who gave birth were obese (BMI > 30) just before becoming pregnant. (Virginia PRAMS) According to Virginia BRFSS survey results in 2011, 28.3 percent of Virginia women, 18 and older, self-reported they were obese. Both surveys confirm a significant number of women are not at a healthy weight prior to pregnancy and suggest interventions regarding physical activity and healthy food choices would be effective. Investing \$10 per person/year in community-based disease prevention, could save more than \$16 billion annually within five years in the United States. (Alletto, 2012)

Ideally, women should delay conception until they have achieved a healthy weight, according to the BMI scale, to improve their pregnancy outcomes. (ACOG, 2013)

Strategy 2: Promote the benefits of a healthy BMI among women of reproductive age.

The Virginia Department of Health (VDH), Healthy Eating and Active Living program works to prevent and control obesity and chronic diseases by: 1) promoting healthy eating and active living; 2) fostering evidence-based strategies, systems and environmental changes which support health; 3) compiling and disseminating evidence-based and/or evidence-informed interventions which support health; and 4) developing partnerships and community led initiatives throughout Virginia. VDH works with local health districts, community organizations, stakeholders, and local coalitions to assist Virginians in making healthy choices where they live, learn, work and play through evidence-based interventions.

VDH currently supports seven local health districts in implementing evidence-based healthy eating and active living strategies to prevent obesity in their respective communities. By expanding funding to additional health districts these evidenced based living strategies would be promoted to a larger portion of the state, thus assisting in the prevention of obesity among women of reproductive age.

VDH supports the development of healthy communities. VDH is currently funding eight health districts and state agencies, including five **A**ction **C**ommunities for **H**ealth, **I**nnovation, and **E**nvironmental **C**hange (ACHIEVE) communities, to implement evidence-based strategies aimed at promoting physical activity, healthful nutrition and environmental systems changes to support healthy lifestyles at their community level. VDH also works with community health coalitions throughout Virginia to provide technical assistance in program planning, implementation and evaluation.

Strategy 3: Update the inventory completed as part of the CHAMPION project to reflect effective weight reduction and healthy weight programs promoting healthy eating and exercise habits across the Commonwealth.

The Commonwealth's Healthy Approach and Mobilization Plan for Inactivity, Obesity and Nutrition (CHAMPION) was a five-year project that represented the collaborative effort to put forth recommendations targeting obesity issues identified through the Commonwealth. Through focus groups and identified themes contributing to obesity throughout the state, an Obesity Prevention Team identified programs and processes that were consistent with those themes. VDH released the CHAMPION Obesity Prevention Plan, which consisted of a repository of local, state, and national tools and programs to decrease obesity. Community groups statewide were encouraged to implement programs based upon CHAMPION recommendations and compete for grants from the health department to fund their programs. The CHAMPION effort developed a statewide approach to reducing obesity and overweight conditions among children and adults but ended after five years once funding ceased. VDH continues efforts to address obesity in the state.

VDH's role to decrease the number of women of reproductive age who have a BMI > 30 across the Commonwealth:

1. Develop a promising practice/best evidence toolbox of healthy BMI resources to healthcare providers.
2. Promote the benefits of a healthy BMI
3. Inventory healthy weight programs across the Commonwealth

External Stakeholder's role to decrease the number of women of reproductive age who have a BMI > 30 across the Commonwealth:

1. Promote and utilize the toolbox of healthy BMI resources within local communities.
2. Promote the benefits of a healthy BMI within local communities
3. Collaborate with VDH to develop an inventory of healthy weight programs within local communities

Proposed Success Indicators for Objective 2

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of women who have and maintain a BMI between 18.5-24.9
- Number of women who have a BMI between 25-29.9
- Number of women who have a BMI > 30
- Number of women who returned to their pre-pregnancy weight prior to another pregnancy
- Number of women who were diagnosed by a healthcare provider with gestational diabetes
- Number of health care providers who promote the importance of a healthy BMI to patients
- Number of current programs promoting healthy eating habits and exercise by region

Objective 3: Increase the use of oral health screening questions among women of reproductive age from 45.0% to 49.5% (10%) by 2018.

Strategy 1: Provide training to health professionals regarding the importance and safety of oral health care for women of reproductive age.

Preconception counseling by health care professionals should integrate oral health as a core intervention for a healthy pregnancy. Research suggests that initiating dental care during pregnancy may be too late to intervene as a means of reducing periodontal disease that has been related to adverse birth outcomes (Goldenberg, 2006). However, providing dental care throughout pregnancy is safe and effective. The consequences of neglecting to treat infection during pregnancy outweigh the possible risks presented by dental treatment (Moore, 1998). Pregnancy by itself is not a reason to defer routine dental care and necessary treatment for oral health problems (NYSDOH, 2006).

Dental and obstetric teams can be influential in helping women initiate and maintain oral health care during pregnancy to improve lifelong oral hygiene habits and dietary behavior for women and their families. Most obstetricians and dentist agreed that pregnant women should undergo dental services but many dentists were concerned about the safety of dental procedures and medications during pregnancy (ACOG, 2013). Additional training and awareness about the significance of oral health in the preconception phase is essential to improving oral health among women.

The Dental Health Program (DHP) at VDH currently provides education programs targeting perinatal providers and pregnant women. This program provides oral health training to existing perinatal partners whose target audience is preconceptual, pregnant, and postpartum women. Trainings are already done for the Resource Mothers Program, Head Start and Early Head Start staff, and WIC staff. Expanding trainings to include additional home visiting programs and other interested partners, would improve knowledge about oral health care during the preconception phase.

Strategy 2: Support the efforts of the Virginia Oral Health Coalition in the development of pregnancy oral health guidelines providing the guidance on oral health care for women of reproductive age.

Poor oral health is identified as a risk indicator of poor pregnancy outcomes, it is important that women improve their oral health status prior to pregnancy. Other states such as New York and California have developed pregnancy oral health guidelines to assist all women's health care providers to provide primary prevention, early detection, and referrals to improve oral health. Virginia Oral Health Coalition in partnership with VDH is developing and implementing a program to increase awareness among dental and medical providers of the importance of optimal oral health prior to and during pregnancy. It will be imperative that accurate and consistent oral health messages are being provided to this population.

Pregnancy is a "teachable" moment when women are motivated to adopt healthy behavior. For women of lower socioeconomic status, pregnancy provides a unique opportunity to obtain dental care because of Medicaid insurance assistance with prenatal medical and dental coverage (ACOG, 2013). Advising women that oral health care improves a woman's general health through her lifespan can impact her oral health decisions for the future of herself and child.

VDH's role to increase access to oral health services for women before and during pregnancy:

1. Develop training for health professionals regarding the importance and safety of oral health care for women before and during pregnancy.
2. Collaborate with Virginia Oral Health Coalition to develop guidelines for pregnant women and early childhood oral health.
3. Collaborate with DMAS to expand Medicaid benefits to include adult dental benefits before and during pregnancy.

External Stakeholder’s role to increase access to oral health services for women before and during pregnancy:

1. Promote training for health professionals regarding the importance and safety of oral health care for women before and during pregnancy.
2. Collaborate with Virginia Oral Health Coalition to develop guidelines for pregnant women and early childhood oral health.
3. Collaborate with DMAS to expand Medicaid benefits to include adult dental benefits before and during pregnancy.

Proposed Success Indicators for Objective 3

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of healthcare providers trained about the importance of oral health in women of reproductive age,
- Percent of women who received dental benefits,
- Percent of women who received extended dental coverage for six months after pregnancy,
- Percent of women who received at least one dental services visit during pregnancy,
- Percent of pregnant women receiving care in local health departments that receive preventive services during pregnancy.

In summary, it is clear that being healthy *before* pregnancy and making healthy lifestyle choices increases the chances for a healthy pregnancy and healthy infant. This preconception health stage also sets the foundation for establishing continuity of care through a medical home and dental home, maintaining healthy behaviors throughout life such as healthy eating, maintaining a healthy weight and avoiding tobacco and alcohol.

Chapter Two

Strategic Goal 2: To reduce premature births across the Commonwealth.

Background

The U.S. preterm birth rate (infants born at 34-36 full weeks of pregnancy) rose 20% from 1990 to 2006, but has declined every year since 2006. Virginia has mirrored that trend, declining each year, following a peak in 2006. The incidence of prematurity is of great concern because preterm infants are at increased risk of life-long disability and early death compared with infants born later in pregnancy and while the downward trend is promising, more needs to be done. In 2011, 9.5% of Virginia's infants were born premature compared to 11.7% nationally (Virginia Health Statistics) (See Appendix A; Figure 4: Resident Infant Mortality Rates by Prematurity).

The earlier a baby is born the more likely his health problems will be severe and require greater interventions (Martin, Osterman, & Sutton, 2010). Much of the previous literature and studies use birth weight under 3,500 grams as an indication of prematurity. Therefore, studies report pregnancy outcomes associated with low weight infants and do not differentiate between low weight birth (LBW) and prematurity. Birth weight is an important determinant of infant health and survival. Infants born LBW (<2500 grams) are at an increased risk for immediate health problems, such as respiratory problems due to underdeveloped lungs, and long-term problems. In 2009, 8.4% of births in Virginia were LBW infants, which represented an 18% increase from 1990 (7.1% LBW). In 2007-09, LBW infants had a mortality rate that was almost 20 times higher than that of normal weight infants. Virginia must continue to work to meet the Healthy People 2020 goal to reduce LBW to 7.8% of all live births across the Commonwealth. Although very low birth weight infants (VLBW <1500 grams) only represented 1.6% of all live births in 2009, Virginia has not met the Healthy People 2020 goal to reduce VLBW births to no more than 1.4% of all live births. From 2007 to 2009, VLBW infants had a mortality rate more than 15 times higher than that of infants who were between 1,500 and 2,499 grams and more than 83 times higher than normal birth weight infants (Virginia Health Equity Report, 2012).

Health Equity among Premature Births:

Like infant mortality, racial disparities/inequities exist for premature births. From 2007 to 2009, the low birth weight rate for non-Hispanic Black infants (13.1%) was almost double the rate for non-Hispanic White and Hispanic infants (7.2% and 6.3%, respectively). Further, the Black-White low birth weight ratio among singleton live births has remained at or above 2.0 since 1990. Rates for low birth weight infants were higher among teens (10.7%), women with advanced maternal age (22.0%), women with a high school education or less (9.5%, 9.6%, respectively), unmarried women (10.6%), smokers (13.6%), or women on Medicaid at delivery (10.6%) (Virginia Health Equity Report, 2012).

The report reflects that the Healthy People 2020 goals to reduce infant mortality and premature infants have not been met, and there are persistent disparities/inequities causing non-Hispanic Black women to be disproportionately affected by poor birth outcomes. Infants born to non-Hispanic Black women were twice as likely to die before their first birthday or born low birth weight compared to infants born to non-Hispanic White women.

Infant mortality rates and percentages of prematurity are strongly associated with socioeconomic status (e.g. education and insurance). In addition, disparities/inequities affecting babies born to black women are dramatic, with the risk of infant death consistently twice as high. This inequity can be attributed to the near three-fold increased rates of very low birth weight and very preterm births among Black infants. Outcomes are similar, although not as dramatic, among women living in communities with limited resources and access to health care. Black women are more likely to live in such communities as well (Virginia Health Equity Report, 2012).

A reduction in the overall rate of infant mortality will be best achieved by eliminating disparities between Black, American Indian, Hispanic and Asian infants with those of white infants, such that their trend lines converge. Medical interventions alone will not reduce disparities until we commit to finding interventions that accelerate convergence by supporting women, infants, and their families seamlessly in clinical and community settings. (Rowley & Hogan, 2012)

Premature Birth Critical Issue for Infant Mortality:

Although babies born very preterm are a small percentage of all births, these very preterm infants account for a large proportion of infant deaths. More infants die from preterm-related problems than from any other single cause. (CDC, 2012) In Virginia, the infant mortality rate is substantially higher among infants born premature (<37 weeks gestation) than among infants born at full term (> 37 weeks gestation) (VDH, Health Statistics, 2011). Prematurity is the leading cause of infant death in the United States and in Virginia (VDH, Health Statistics, 2011). (See Appendix C: Causes of Infant Death in Virginia)

For those babies born preterm that survive because of excellent care and intervention, early and fragile births are a major cause of devastating consequences, such as a higher rate of birth defects, autism, learning disabilities, and chronic health problems. The complications of being born even four to six weeks premature are also significant, since one third of the brain growth and development occurs in the last five weeks of pregnancy. Late preterm infants born four to six weeks early are more likely than term infants to have significant long-term deficits such as school learning problems, disabilities and lower rates of college education and lower net salaries (March of Dimes, 2010).

Preterm birth is a complex set of problems with a multitude of contributing factors. There is no one specific cause or clinical test that would predict when a mother will have a preterm infant. Some of those factors are truly medical conditions, but many times the behavioral and psychosocial factors, neighborhood, environmental exposures, infertility treatments or genetic factors, only to name a few, are associated with early labor and delivery. Lack of prenatal care, smoking and low socio-economic status are a few modifiable risk factors that can result in a preterm birth. Women who have had a previous preterm birth are at the greatest risk to have another preterm infant. Research is ongoing in this area to understand the complexity of preterm births.

There are several programs which have reported to improve birth outcome and lower infant mortality rates, such as Nurse-Family Partnership, Resource Mothers Program and the Healthy Start Initiative. These programs include community outreach activities to get women at risk for poor pregnancy outcomes into care. Increasing women's access to health care, including prenatal care, and access to smoking cessation services—along with support for additional research and data collection—will help prevent preterm birth. (Alletto, 2012)

To provide strategies for this five-year plan, four specific objectives have been defined under the topic of prematurity (preterm birth) that have the greatest impact on infant mortality:

- Objective 1: Improve birth outcomes in Virginia by increasing the number of women receiving evidence-based, high quality maternity care via a pregnancy medical home, from 77% to 85% (10%) by 2018.
- Objective 2: Reduce the ratio between White, non-Hispanic and other racial/ethnic groups in accessing prenatal care in the first trimester from 1.1 to 1.0 (10%) by 2018.
- Objective 3: Increase abstinence from tobacco among pregnant women of reproductive age from 91% to 96% (5%) by 2018
- Objective 4: Increase the number of education and programs that include paternal involvement across the Commonwealth by 10% based upon the baseline developed by a statewide inventory by 2018.

Objective 1: Improve birth outcomes in Virginia by increasing the number of women receiving evidence-based, high quality maternity care via a pregnancy medical home, from 77% to 85% (10%) by 2018. (*Evidence-based, high-quality maternal care via a pregnancy medical home is being defined as the Adequate and Adequate Plus score on the Kotelchuck Index using the 2011 birth data as the baseline*)

Strategy 1: Standardize initial risk screening for all OB patients.

Standardized formats for capturing, recording and appropriately sharing patient information are a necessary component of a universal risk assessment. When the same assessment methodology is applied, a standard “language” for assessment and communication of health and health risks is created, and enables faster more accurate transmission of information with less investment of administrative time. (Secretary of Health and Human Resources, 2004) ACOG and AAP have published the *Guidelines for Perinatal Care* which is updated every few years and outlines what screening and assessments are recommended during pregnancy. The main focus of this publication has been on assessment of medical risk, early detection and intervention. In 2000, under the MCH Providers Partnership Project of the federal Maternal and Child Health Bureau, ACOG published a report encouraging the screening of psychosocial risks and collaborating with community partners in order to link women to other enhancement services. (ACOG, 2000) Even though the relationship between psychosocial problems and poor birth outcomes was previously recognized, this was the first acknowledgement by a national professional group to recommend universal screening.

Other states have coordinated the development of a standardized risk assessment tool to detect risk factors and intervene early with the hopes of mitigating complications. The underlying assumption regarding prenatal care is that early detection and intervention during pregnancy can improve birth outcomes for mother and baby.

Following a recommendation in the *Report of the Governor’s Work Group on Rural Obstetrical Care, House Document No. 52* an interagency workgroup comprised of representatives from DMAS, DBHDD, and VDH developed a standard assessment tool for the key psychosocial risks including domestic violence, substance use and abuse, and perinatal depression. Research has identified these risk factors to be associated with preterm births. This tool can be used by any provider; however, those providers serving Medicaid patients can obtain

reimbursement during the pregnancy and in the first year following delivery. (Appendix D: Behavior Risk Screening Tool)

As stated before, the most significant risk factor associated with preterm birth is history of a previous spontaneous premature birth. One clinical trial reported a promising preventive intervention for recurrence of preterm births that rely on a derivative of the hormone progesterone. The incidence of preterm labor and delivery among women who had a previous preterm birth was reduced by over 30% in subjects receiving weekly injections of the compound 17-hydroxyprogesterone (17 HP) compared to the women who were given a placebo. A 2005 study to examine the potential impact of this new therapy found nearly 10,000 preterm births could have been prevented in 2002, if all pregnant women at high risk for a premature baby and eligible for weekly injections of a derivative of the hormone progesterone had received them. (Petrini, et al., 2005) There are some unresolved issues around the safety and effectiveness of this practice but assessment for a consideration of its use should be a part of comprehensive prenatal care.

Strategy 2: Work with community partners and health care providers to promote the benefits of prenatal care beginning in the first trimester.

Evidence shows that comprehensive prenatal care is associated with reduced incidence of low birthweight and infant mortality. Prenatal care aims to improve outcomes for both pregnant women and their babies by identifying risks early in the pregnancy. (Alletto, 2012) As a whole, Black women are three times as likely as Caucasian women to begin prenatal care in the third trimester or not at all during their pregnancy. (Johnson, et al., 2011) In Virginia, 83.4% of black mothers and 76.5% of Hispanic mothers entered prenatal care in the first trimester, as compared to 89.7% of White, non-Hispanic mothers. (See Appendix A: Figure 5-Perinatal Data) Women who enter prenatal care later in pregnancy (third trimester) or not at all, have had higher infant mortality rates than women who received prenatal care earlier in pregnancy (first or second trimester). In 2010 in Virginia, 6.0 women per 1,000 live births who entered care in the first trimester experienced an infant death compared to 17.0 for those women entering prenatal care in the third trimester. Therefore, many risk factors are not addressed or it is too late in the pregnancy to prevent possible complications due to the lack of prenatal care. Promoting the benefits of early prenatal care and improving access to prenatal care will ensure that babies are born later in pregnancy and healthier.

Strategy 3: Work with insurance companies and health care providers to reduce elective deliveries less than 39 weeks of gestation.

ACOG guidelines emphasize that deliveries prior to 39 weeks should only be done with an appropriate medical indication. Research has shown that early elective delivery without medical or obstetrical indication is linked to neonatal morbidities with no benefit to the mother or infant. Elective deliveries prior to 39 weeks have had a part in the rising rates of preterm birth, Cesarean rates and represent preventable prematurity. (Mandujano, Waters, & Myers, 2013) Nationally, efforts to change hospital policies that disallow elective delivery prior to 39 weeks gestation and public awareness campaigns have attributed to the reduction in Cesarean rates among births at 38 weeks gestation. (CDC, 2013)

Many hospitals in Virginia have changed their policies regarding elective deliveries as part of their internal quality improvement programs. The Virginia Hospital and Healthcare Association has initiated the Preventing

Early Elective Delivery Project (EED) to increase policy changes and awareness statewide. Hospitals have been asked to pledge to decrease the rate of early elective deliveries without a medical or obstetrical indication by 50%. The Virginia EED Advisory Council has oversight of this project with representation from all the major health care systems within the state that provide obstetrical services. The hospitals will be submitting data regarding their elective deliveries, reviewing their policies, and implementing training for staff, families and the communities they serve.

VDH's role to improve birth outcomes by providing evidence-based, high quality maternity care via a pregnancy medical home to women and families:

1. Develop and implement policies to decrease rates of elective deliveries prior to 39 weeks in all birthing hospitals.
2. Promote and distribute the standardized assessment tool approved by Medicaid for reimbursement to healthcare providers.
3. Collaborate with community partners to promote the benefits of prenatal care in the first trimester.

External Stakeholder's role to improve birth outcomes by providing evidence-based, high quality maternity care via a pregnancy medical home to women and families:

1. Collaborate with VDH to develop and implement policies to decrease rates of elective deliveries prior to 39 weeks in all birthing hospitals.
2. Promote and distribute the standardize assessment tool approved by Medicaid for reimbursement to healthcare providers.
3. Collaborate with community partners to promote the benefits of prenatal care in the first trimester.

Proposed Success Indicators for Objective 1

**** These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of women and families who are using a pregnancy medical home model
- Number of health care providers/hospitals who are using a pregnancy medical home model
- Percent of Virginia hospitals that provide obstetrical services with policies regarding EED
- Number of healthcare providers educated and are using the standardized initial screening assessment
- Number of Medicaid claims for reimbursement for using the Behavioral Health Risk Screening Tool.
- Number of women who were offered 17 HP during pregnancy
- Number of eligible women for 17 HP who received the drug during pregnancy

Objective 2: Reduce the ratio between White, NH and Other Racial/Ethnic groups in accessing prenatal care in the first trimester from 1.1 to 1.0 (10%) by 2018.

Strategy 1: Promote the use of telemedicine to patients in remote and underserved areas to increase access to prenatal care.

A significant racial/ethnic disparity in the initiation of prenatal care exists in Virginia. In 2011, 89.7% of White, NH; 87.6% of Other Race, NH; compared to 76.5 of Hispanic and 82.4% of Black, NH accessed prenatal care in the first trimester of pregnancy. Geographic access to care is a significant barrier for women in rural and underserved areas receiving adequate prenatal care. Telemedicine can increase efficiency and access to care and long-term can reduce costs. For patients it can reduce travel times and costs, reduce time off from work, and increase satisfaction with their healthcare. Even though there are many potential positive outcomes, a recent meta-analysis of the literature concluded that the use of telemedicine obstetrics does not have adverse effects, but the benefits have not been thoroughly realized. (Magann, McKelvery, Hitt, et al, 2011) There have been efforts in Virginia to establish telemedicine projects using grant funds but further exploration is needed.

Both Arkansas and Tennessee who were concerned about their infant mortality rates initiated telemedicine projects to increase access to perinatal care to rural or remote locations. The projects included real-time consultation services including diagnostic tests such as Level II ultrasounds, extensive education components, development of statewide obstetrical and neonatal evidence-based guidelines and appropriate maternal and neonatal transports. These two projects showed success in reducing the delivery of low birth weight and preterm infants and improved the ability of high-risk obstetrical patients to receive appropriate care. There are now multiple sites across the country that use telemedicine as a tool to manage a variety of conditions including psychiatric care, management of diabetes, cardiac follow-up, and dermatology.

Strategy 2: Expand the number of evidenced-based or promising practice home visiting programs that serve pregnant women and new parents.

The Nurse-Family Partnership program an evidence-based model of the Maternal Infant Early Childhood Home Visiting grants in Virginia provides low-income mothers of any age with home visitation services from public health nurses. The nurses work intensely with pregnant or newly parenting women in five areas of health (both physical and mental), home and neighborhood environment, family and friend support, parental roles, and dealing with major life events such as pregnancy, education and/or employment. The goal is to assist the woman to become self-reliant and have a positive impact on her pregnancy and children. The program has demonstrated many benefits to both mother and infant.

The goal of the Virginia Resource Mothers Program is to improve birth outcomes for teen mothers and their infants and to decrease infant mortality. The program provides intensive home visiting services through trained lay mentors during the prenatal months through the infant's first birthday. The goals are to decrease infant mortality and morbidity, to decrease the rate of low birth weight babies born each year, and to prevent repeat pregnancy in the teen years. Currently, VDH has contracted with the University of Virginia to study the effectiveness of this program to improve birth outcomes. Key factors such as birth weight, child abuse, rapid repeat pregnancy, maternal well-being, and parental stress which contribute to infant mortality are all being examined.

The National Healthy Start grant project has the goal to eliminate the racial/ethnic disparities in infant mortality and morbidity. The Virginia Healthy Start Initiative/Loving Steps Program administered by VDH in three communities addresses significant disparities in perinatal health including disparities experienced by Hispanics,

blacks, and immigrant populations in order to reduce the rate of infant mortality and improve perinatal outcomes. The Richmond City Healthy Start has a separate grant but the same goals. Both grants accomplish their goals through services to individuals as well as work to enhance the capacity of the community's perinatal and women's health service systems.

An important component of quality prenatal care is the education of the pregnant women, their partners and families regarding healthy behaviors and care during the pregnancy. CenteringPregnancy® is an evidence based model of group healthcare, which incorporates three major components (assessment, education, and support) into a unified program within a group setting. Centering also promotes individual health empowerment and community building. Improved health outcomes for mothers and their infants have been published, supporting the effectiveness of this group prenatal care approach. (Ickovics, Kershaw, Westdahl et. al., 2007; Picklesimer, Billings, Hale, et. al., 2012; Herrman, Rogers, & Ehrenthal, 2012)

Baby Basics is an evidence-informed low literacy educational booklet for pregnant women. It is intended to be used by the woman during pregnancy with their provider to review pregnancy and preparation for parenting. The Baby Basics Mom's Clubs are group meetings of 6-12 women and their partners, if available, and include mothers that would not be attending the more traditional childbirth education classes like Lamaze.

Currently there are sixteen Resource Mothers Programs that are funded using state general funds and MCH Maternal Child Block Grant funds and serve about 2,000 pregnant teens per year. In 2011, there were 9,635 teen births which represent a significantly larger number of teens that could benefit from these services. There are three relatively new Nurse-Family Partnership sites in Virginia which are at various stages in being able to serve women. These projects are fully funded by two federal grants. There are three state Healthy Start sites administered by the VDH and one site administered by Department of Social Services (DSS) in Richmond City. The number of at risk pregnant women that could benefit from these services outnumbers the capacity of these programs to serve them.

VDH's role to:

1. Collaborate with community partners to promote the benefits of prenatal care in the first trimester.
2. Partner with UVA to promote and expand the use of telemedicine.
3. Collaborate with community partners to expand the home visiting programs to additional areas in need of programs.

External Stakeholder's role to:

1. Collaborate with community partners to promote the benefits of prenatal care in the first trimester.
2. Partner with UVA to promote and expand the use of telemedicine.
3. Collaborate with VDH to expand the home visiting programs to additional areas in need of programs.

Proposed Success Indicators for Objective 2

**** These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of patients served through telemedicine by a primary care provider
- Number of patients served through telemedicine by an OB provider
- Number of pregnant women served in a home visiting program
- Number of women who have delivered a baby in the past year being served in a home visiting program
- Number of women who are receiving prenatal care in the first trimester

Objective 3: Increase abstinence from tobacco among pregnant women from 91% to 96% (5%) by 2018.

Strategy 1: Promote awareness the Quit Now Virginia hotline to pregnant women across the Commonwealth.

Maternal smoking is one of the most prevalent modifiable risk factors for poor birth outcomes. Twenty percent of Virginia women who gave birth in 2010, self-reported they smoked 3-months prior to their pregnancy (PRAMS). Approximately 9% of women in Virginia reported that they smoked during the last 3 months of their pregnancy (PRAMS, 2010). Smoking increases the risk of adverse perinatal outcomes. Smoking during pregnancy is associated with fetal growth restrictions, preterm delivery, placental complications, Sudden Infant Death Syndrome (SIDS), and certain birth defects (CDC, 2012). Non-combusted tobacco products, such as chewing tobacco, snuff, moist snuff, dissolvable tobacco strips, and electronic cigarettes, also contain nicotine, are addictive, and have serious health implications for pregnant women and their fetuses (Fiore et al., 2008). Nicotine levels can also be higher for a fetus than for the mother and can adversely impact fetal lung development. Furthermore, nicotine and carbon monoxide in smokeless tobacco products may be responsible for severe adverse pregnancy outcomes, such as preterm birth (HHS, 2010).

Effective cessation programs have the potential to realize significant cost savings for families, employers, insurers, and local, state, and federal governments. An annual reduction of smoking prevalence of 1 percent can save more than \$20 million in direct medical costs by the end of the first year and more than \$570 million over seven years, nationwide. Research shows savings up to \$8 million annually in direct neonatal inpatient costs given the cost of an intervention (\$24-\$34) versus the costs saved (\$881) for each woman who quits smoking during pregnancy. Estimated infant healthcare costs attributable to maternal smoking have declined from \$366 million per year in 1996 to \$122 million in 2004 as fewer women are smoking during pregnancy. (Adams et al., 2011)

Quit Now Virginia is a free, evidence based tobacco cessation treatment program that targets pregnant smokers. This program offers pregnant smokers greater intensity of behavioral support compared to similar programs. The treatment plan is tailored to meet the individual's needs, and for those who quit it offers additional postpartum contact to prevent relapse. A specially trained group of Pregnancy Quit Coaches use protocols developed specifically for this program to address the health risks of continued smoking and emphasize the health benefits of quitting for both the mother and fetus. There is an emphasis on the importance of remaining tobacco free after delivery and the program includes at least two postpartum interventions. For those women unwilling or unable to quit, it can validate their efforts to cut down while continuing to emphasize complete abstinence as the ultimate goal. The Coaches are supportive and empathetic with a pregnant smoker. The program also provides information about pharmacotherapy options specific to pregnant women and encourages a meaningful discussion with the woman's physician about the pros and cons of using medications. The kit

materials are tailored to pregnant smokers and the literacy needs of the caller. The pregnancy program provides pregnant smokers the resources they need to be successful in quitting tobacco. It incorporates best practices for helping pregnant smokers to quit and is consistent with the existing scientific evidence-base. (Quit Now Virginia, 2013).

Strategy 2: Promote smoking cessation specific to the Medicaid population within Virginia.

Medicaid is one of the largest providers of prenatal care, covering approximately 40% of Virginia's births (PRAMS, 2010). Consequently, a significant portion of the costs of adverse smoking related pregnancy outcomes are likely to fall on the state Medicaid program (Kaiser Foundation, 2013). In 2007, a study found that Medicaid cost could be lowered by 5.6 percent (cost savings of \$10 billion, nationwide) if all Medicaid enrollees in the United States were to quit smoking (American Legacy Foundation, 2012).

Research shows that for \$1 spent on the tobacco-prevention program, Massachusetts saved \$2 in smoking-related healthcare costs. Since July 2006, MassHealth (insurance used in Massachusetts for Medicaid) has provided comprehensive cessation coverage. A study of the costs and savings of the program found that for every \$1 spent in the program costs there were \$3.12 (range \$3 to \$3.25) in medical savings and \$2.12 (range \$2 to \$2.25) return on investment to the Medicaid program (Richard, West, & Ku, 2012). In addition, the California Department of Public Health's tobacco control program, reduced state healthcare costs by more than \$100 million in its first seven years by reducing the number of smoking caused low birth weight babies. More than \$11 million in savings were seen in the first two years of the program (California Department of Public Health, 2009). Therefore, implementing tobacco cessation strategies targeting pregnant women resulted in an overall reduction in healthcare costs in these states.

VDH's role to increase abstinence from tobacco among pregnant women:

1. Collaborate with smoking cessation programs to promote the benefits of smoking cessation among pregnant women.
2. Promote smoking cessation programs and work with DMAS partners areas across the Commonwealth.
3. Promote the benefits of smoking cessation during prenatal visits.

External Stakeholder's role to increase abstinence from tobacco among pregnant women:

1. Collaborate with smoking cessation programs to promote the benefits of smoking cessation among pregnant women.
2. Identify underrepresented areas across the Commonwealth that would benefit from smoking cessation programs.
3. Promote smoking cessation programs within local communities and organizations.

Proposed Success Indicators for Objective 3

****These are suggested indicators, which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of pregnant women who quit smoking

- Number of pregnant women who decreased their smoking
- Number of pregnant women who called the Quit Now Virginia hotline
- Number of women enrolled in Quit Now Virginia

Objective 4: Increase the number of education and programs that include paternal involvement across the Commonwealth by 10% based upon the baseline to be developed by a statewide inventory by 2018.

Strategy 1: Inventory current programs and resources that promote and encourage positive father involvement during pregnancy.

The lack of paternal involvement is an important potentially modifiable risk factor for infant mortality. According to a study conducted in Florida, the neonatal mortality rate of infants born to women with absent fathers was nearly four times that of their counterparts with involved fathers. Further, this difference not only persists between racial-ethnic subpopulations, but also within each racial ethnic group. When compared to white women with involved fathers, black women with involved fathers have a two-fold increased risk of infant mortality whereas infants born to black women with absent fathers are seven times more likely to die during infancy. (Alio, Mbah, Kornosky, Wathington, Marty, & Salihu, 2011)

Paternal involvement may promote healthy pregnancy behaviors thereby decreasing the likelihood of an adverse pregnancy outcome. Women with absent paternal involvement have a higher prevalence of maternal obstetric complications, are less likely to get adequate prenatal care and are more likely to smoke and experience increased stress during pregnancy. (Alio, Mbah, Kornosky, Wathington, Marty, & Salihu, 2011)

Strategy 2: Educate men and families about the importance of positive father involvement during pregnancy.

Current research has established associations between father involvement and a host of child outcomes including early learning capacities, academic achievement, psychological outcomes, and behavior. Although fathers have traditionally been seen primarily as financial providers, it is clear that they also serve in numerous other capacities including caregiver, playmate, teacher and role model. In addition to being actively involved in children's lives, fathers also provide significant resources and emotional support to mothers, which is particularly beneficial during the prenatal period. (Martin, McNamara, Milot, Halle, & Hair, 2007)

Few studies have evaluated the role of paternal involvement as it is associated with infant mortality, but those that did noted higher infant mortality rates among those infants with absent fathers, as measured by missing paternal information on birth vital statistics records. Paternal support may play an important role not only in improving maternal health behaviors, but may also reduce maternal stress by providing both emotional and financial support. A better understanding of the degree to which lack of paternal involvement contributes to infant mortality may lead to enhanced intervention programs aimed at improving paternal involvement during the perinatal period. (Alio, Mbah, Kornosky, Wathington, Marty, & Salihu, 2011)

VDH's role to increase the number of services, education, and programs that include paternal involvement:

1. Develop a partnership with education programs, employment offices, and VDSS to promote father involvement in pregnancy and parenting.
2. Partner with educational programs, employment related services, and legal and social services for males to promote healthy baby messages.
3. Collaborate with churches, universities and media to take leadership roles in the fatherhood movement
4. Inventory programs and resources that promote positive father involvement and make the inventory available to external stakeholders

External Stakeholder's role to increase the number of services, education, and programs that include paternal involvement:

1. Increase and/or develop prenatal and parenting classes and information for fathers.
2. Increase the use of male trainers and role models in parenting classes
3. Assist VDH to inventory programs promoting positive father involvement within your local communities and organizations.

Proposed Success Indicators for Objective 4

**** These are suggested indicators, which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of fathers who attend prenatal and parenting classes
- Number of male trainers and role models in parenting classes
- Number of churches, universities and media that promote father involvement in pregnancy and parenting.

Chapter Three

Strategic Goal 3: To improve interconception care and family planning across the Commonwealth.

Background

The interconception period, or the time between the end of a woman's pregnancy to the beginning of her next pregnancy, is a critical time to modify risk factors regarding disease conditions, health behaviors, and environmental hazards that are causally associated with infant mortality and other adverse pregnancy outcomes. Clinical care and support services effectively provided to women during the interconception period may reduce risks, address complications from a recent pregnancy and prevent the development of a new health problem (obesity, diabetes, depression, and hypertension). (Badura, Johnson, Hench, & Reyes, 2008)

A Healthy People objective since 1980 is to reduce the proportion of births that are unintended, and the use of effective contraception is a major factor in a woman's ability to plan her pregnancies, that is, to "achieve desired birth spacing and family size". With an increasing array of available contraceptives for men and women, there are still several barriers that limit access to all men and women. Some of these include, limited economic resources, residential location, ability to pay (including limited insurance), religion or cultural norms, whether the contraceptive method is available only through a medical professional or over the counter in stores. (Jones, Mosher, & Daniels, 2012) Family planning is an essential tool to promote healthy birth spacing and intended pregnancies, thus preventing infant mortality.

Interconception Care and Family Planning and Health Equity: Unfortunately, the causes of racial disparities in birth outcomes are largely unexplained. While most studies focus on differential exposures to risk and protective factors during pregnancy, such as maternal behaviors, prenatal care utilization, and psychosocial stress or infections, there is a lack of information that can fully account for the racial gap in birth outcomes. (VA Health Equity Report, 2012)

Besides the language and cultural barriers faced by racial and ethnic minorities, women also face socioeconomic risks that may foster unhealthy life styles and hinder good decision-making regarding future pregnancies. As the focus on relationships and social and economic conditions and their effects on the health and well being of the mother and the infant is prioritized, we may begin to develop a better understanding of infant mortality inequities. This approach is grounded in the social determinants of health theory: women and their babies must be viewed not only as individuals, but as members of families, communities, and larger systems that have either positive or negative impacts upon their psychological and physical states. The social economic and environmental influences, as well as other risk and protective factors within women's places of residence, work, and leisure must all be considered as factors that influence birth outcomes. (VA Health Equity Report, 2012)

Interconception Care and Family Planning is a Critical Issue for Infant Mortality: The leading causes of infant mortality and long term disability in Virginia are preterm birth (birth of an infant before 37 weeks gestation) and low birth weight (weighing less than <2,500 grams at birth). Experiencing a preterm birth in a previous pregnancy is the strongest predictor of subsequent preterm birth. Thus, because women with prior adverse

pregnancy outcomes can be readily identified, targeted interventions in the interconception period have the potential to decrease preterm births and reduce infant mortality. Additionally, interconception care provides an opportunity to reduce or eliminate risks before future pregnancies occur to ensure healthier mothers and infants. (Badura, Johnson, Hensch, & Reyes, 2008)

Family planning services are a cost effective strategy. For every \$1.00 spent on publicly funded family planning services, Medicaid can save \$3.74 that otherwise would be needed for prenatal care subsequent to unintended pregnancies. In addition, every \$1.00 spent on Medicaid family planning expansions saves nearly \$6 for taxpayers. This does not account for the lost wages, emotional and family stresses associated with unintended and unplanned pregnancies. (NFPRHA, 2013)

Three specific objectives have been defined under the topic of interconception care and family planning, which will likely have the most impact on infant mortality:

- Objective 1: Reduce the rate of unintended pregnancies among women of reproductive age, from 42% to 35.7% (15%) by 2018.
- Objective 2: Increase the percentage of women who have an interval from birth to subsequent birth of at least 24 months from 23.2% to 25.5% (10%) by 2018.
- Objective 3: Increase utilization of WIC services among eligible women of reproductive age from 80% to 90% (12.5%) by 2018.

Objective 1: Reduce the rate of unintended pregnancies among women of reproductive age, from 42% to 35.7% (15%) by 2018.

Strategy 1: Increase access to family planning services for men and women of reproductive age.

Decreasing unintended pregnancy can result in healthier women and babies. Unintended pregnancy is associated with detrimental behaviors in pregnancy, such as smoking and alcohol use, and poor perinatal health outcomes, including preterm delivery and low birth weight. (Phares, Cui, & Baldwin, 2012) However, unintended pregnancy continues to occur at a high rate in Virginia, where 42% of all pregnancies are unintended across the Commonwealth. Of these unintended pregnancies, 31% were mistimed (women who reported they wanted to be pregnant later) and 11% were unwanted (women who reported they either didn't want the pregnancy then or in the future) (VA PRAMS, 2010).

Rates of unintended pregnancy in Virginia continue to increase despite widespread contraceptive use among sexually active women. Over half the women in Commonwealth (56%), who had an unintended pregnancy were using contraception at the time of pregnancy. Unintended pregnancy is defined by Virginia PRAMS (Pregnancy Risk Assessment Monitoring System) (2010), as women reporting either the pregnancy was wanted at a later time or not wanted at all. However, contraceptives are often used inconsistently or less effectively and the risk of failure varies by socioeconomic characteristics and type of method used. For all methods, failure rates are highest among women who are low income, younger than 30, unmarried and of Black or Hispanic ethnicity. (Phares, Cui, & Baldwin, 2012)

Virginia has modest resources for family planning services. In fact, the Alan Guttmacher Institute ranked Virginia 41st among states for availability of family planning services (based on the most current data available in 2005). According to estimates provided by the Guttmacher Institute, there are 375,540 women in Virginia in need of publicly funded contraceptive services and supplies. (Guttmacher, 2006) In 2011, Virginia Department of Health Family Planning program (VFPP) served 72,352 or 19% of the unmet need. (Virginia Family Planning Annual Report, 2012) An additional 56,863 (15.1%) women were provided publicly funded family planning services through Federally Qualified Health Centers, Planned Parenthood health centers and private providers accepting Medicaid. (Virginia Family Planning Needs Assessment, 2012) While academic health centers, rural health centers and free clinics may serve an additional number of uninsured, low-income women, the VFPP program estimates that there are an additional 246,325 (65.6%) women needing publically funded family planning.

Even though males are eligible for VFPP services, in 2012, only 7050 males were seen in the VDH clinics. An additional 9,000 males were enrolled in Plan First as of May 2013. Historically, men have not been targeted regarding family planning services.

Plan First is the Medicaid program that covers family planning services for men and women of any age who are not eligible for a full-benefit covered group under Medicaid or FAMIS. It is administered by the Department of Medical Assistance Services (DMAS) and covers regular family planning and screening services including birth control methods. As of May 2013, Plan First has had a 63 percent increase enrollment since the same time last year to over 38,000 women and men (enrollment doesn't reflect the utilization of family planning services). This is a promising occurrence because Medicaid has long been the primary payer of publicly funded family planning care, and its importance will continue to grow to the extent that implementation of the Affordable Care Act (ACA) leads to expansion of Medicaid programs. These programs will be offered to Americans with incomes up to 133% of the federal poverty level (FPL) in 2014. Studies have shown that family planning health centers in states with Medicaid family planning expansions serve one-third more women in need of care, compared to health centers in other states. In 2006, family planning health centers in states with income-based Medicaid family planning expansions served 48% of women in need, compared to 36% of women in need in other states.

The health reform experience in Massachusetts shows that even with universal coverage, there will be gaps in family planning access. Following health reform in Massachusetts, visits to safety-net health centers, such as public hospitals and community health centers, grew by 31% between 2006-2009. Some of the individuals seeking care were uninsured, while others with insurance reported preferring the health care they received in safety-net settings. (NFPRHA, 2013) Health care reform including the expansion of Medicaid and the creation of health insurance exchanges, will impact family planning services in Virginia. Virginia will phase out the existence of the Medicaid Plan First Program by July 1, 2014 but full expansion for individuals up to 133% of poverty in Virginia remains under consideration. Even with expansion, it is estimated that the participation rate for the ACA's Medicaid expansion will be 57%, meaning that roughly 43% of those eligible for full-benefit coverage under Medicaid will not be enrolled.

Strategy 2: Educate men and women about the importance of family planning

Higher rates of contraceptive risk taking are reported among women with incorrect fertility knowledge, as well as those with previous births and younger, Black or Hispanic women. It follows that identifying those at greatest risk for contraceptive failure, misuse, or nonuse is essential in decreasing unintended pregnancies. (Phares, Cui, & Baldwin, 2012)

Currently, most education regarding family planning, birth control and birth spacing is conducted between men and women and their health care provider. While this education is important and needs to be supported, it is also important to support community education in non-clinical settings. The VFPP provides community education through the local health district and their community partners. Community education content is very diverse, culturally informed, and age appropriate. In many localities, the public health nurses provide the reproductive section of the Family Life Curriculum in the local high schools. In 2011, there were over 100 events that reached 18,535 participants in partnership with 130 partners. Partners included schools, community colleges, other state agencies and local community groups such as the Nottoway Indian Circle, 4-H clubs and domestic violence shelters. Several of the health districts provide health education on a continuing basis, including reproductive health, to youth in juvenile detention centers and adults prior to release from local jail facilities. Many districts provide reproductive health and health promotion information at faith based community health fairs and community sponsored events. In 2012, community education increased to 190 partnerships; which provided 190 events and reached 21,477. These efforts are commendable but are not reaching the entire population.

Targeting teens requires different strategies to provide community based pregnancy prevention education. Nine health districts with higher than state averages of teen pregnancy/STD rates and at risk youth provide Comprehensive Abstinence education programs. These programs provide mentorship, life skills along with critical relationship skills aimed to prevent pregnancy amongst the middle school aged youth. In addition, many local health districts have teen prevention coalitions and advisory councils as well as teen health services. One of the most successful strategies in reducing teen pregnancy rates within a Virginia community (in West Piedmont) with teen pregnancy rates well above the national average has been the establishment of a weekly family planning teen clinic within the local high school. The school noted a decline in teen pregnancies among students in 2010 during the first year of operation and in successive years.

Strategy 3: Promote the use of long acting birth control devices (long acting reversible contraceptive (LARC), such as an intrauterine device (IUD) and contraceptive implants) among women of reproductive age to reduce the risk of an unplanned pregnancy or facilitate a healthy spaced pregnancy.

Long-acting reversible contraception (LARC, such as IUDs and contraceptive implants) are safe and highly beneficial when started immediately post-partum. Providing women with easy access to LARC methods, including immediately post-partum, greatly reduces the risk of unplanned pregnancies, and improves the health of newborns and mothers by facilitating healthy spacing between pregnancies.

Currently, the most significant barriers to providing post-partum Medicaid LARC in Virginia are related to billing and reimbursement policies. Throughout the strategic planning process, a Scientific and Technical

Advisory Group (SaTAG) was convened in 2012, with representation from academic universities, as well as the obstetrical and pediatric professional groups across the Commonwealth. The SaTAG group reported difficulty in reimbursement for postpartum LARC insertion. At present time, most state Medicaid programs pay for all labor and delivery services using a single Diagnosis Related Group (DRG) code that does not allow for reimbursement of individual procedures, drugs or devices provided immediately post-partum on a fee-for-service basis. Given the high up-front cost of LARC devices (approximately \$400-\$1,000), many providers and health facilities will not provide LARC at the time of delivery without reimbursement for these methods. Although insertion may occur at a later post-partum clinic visit, the likelihood of a new mother receiving this service falls dramatically, if it is delayed.

If these issues are addressed, there is an opportunity to increase the use of the most effective contraceptive methods among women for whom a rapid repeat and unintended pregnancy holds extraordinary risk, thus improving health outcomes.

The CDC conducted an analysis of contraceptive use among post-partum teens that shows significant increases in use of the most effective methods between 2007 and 2010. Additional vital statistic data indicate a national decrease in repeat births to teens by 6.2 percent during the same time period. Among the sixteen states included in the CDC report, Colorado has the highest post-partum LARC use among teens, attributed to the work being done by the Colorado Initiative to Reduce Unintended Pregnancy. According to a press release by the Colorado Department of Public Health and Environment accompanying the CDC report, the number of repeat births to teens in Colorado decreased 45 percent in 4 years, from 1,183 teens experiencing a second birth in 2008, to only 653 repeat births in 2012. (CDC MMWR, 2013) The only identifiable reason for this dramatic shift is the increase in LARC use resulting from efforts of the Colorado Initiative to Reduce Unintended Pregnancy. The CDC report clearly outlines the benefits of incentivizing patients and providers, and removing barriers that will allow Medicaid programs to adopt initiatives and policies similar to South Carolina and Colorado. There is little or no data about this vulnerable postpartum population and LARC use in Virginia.

VDH's role to reduce unintended pregnancies across the Commonwealth:

1. Collaborate with DMAS to increase access to family planning services for men and women of reproductive ages.
2. Develop training both online and pamphlets that inform individuals about the importance of family planning.
3. Promote the use of long acting birth control devices.

External Stakeholder's role to reduce unintended pregnancies across the Commonwealth:

1. Provide resources and assistance to VDH to increase access to family planning services for men and women of reproductive ages.
2. Promote the online training and distribution of pamphlets about the importance of family planning.
3. Collaborate with VDH to help promote the use of long acting birth control devices.

Proposed Success Indicators for Objective 1

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Percentage of women who had an unwanted pregnancy
- Percentage of women who had a mistimed pregnancy
- Percentage of women reporting having an unintended pregnancy
- Number of men and women receiving family planning services
- Percent of childbearing women using a form of family planning
- Percent of women who use LARC as a form of family planning
- Number of women who receive a LARC immediately postpartum

Objective 2: Increase the percentage of women who have an interval from birth to subsequent birth of at least 24 months from 23.3% to 25.5% (10%) by 2018.

Strategy 1: Work with healthcare providers and community partners to promote healthy birth spacing and interconception care.

The recommended birth interval is 18 months between a live birth and the next pregnancy. The result is the reduced risk of adverse maternal, perinatal and infant outcomes. Birth intervals of three to five years could increase the chances of infant and maternal survival 2.5 times more when compared to children born at intervals of 18 months or less. (Sebastian, Khan, & Roychowdhury, 2010) Based upon the examination of the Virginia data, birth interval in Virginia mirrors that same significant reduction in infant mortality when there is a birth interval of at least 18 months. (See Appendix A: Figure 6-Infant Mortality Rate by Preceding Birth Interval) Because conception is difficult to measure, this objective will use a 24 month interval from birth to birth to include the months of pregnancy.

Interconception care is a recommended public health strategy to reduce infant mortality. A component of interconception care is the provision of education and counseling services to aid women in determining appropriate pregnancy spacing for optimal birth outcomes. (Salihu, et al., 2012) By including healthcare providers and community partners in the promotion and education supporting healthy birth spacing and interconception care, women and families will receive consistent messages from sources that they trust. Studies conducted during the past three decades show that a healthcare providers' ability to explain, listen and empathize can have a profound effect on biological and functional health outcomes as well as patient satisfaction and experience of care. (Institute for Healthcare Communication, 2013)

Strategy 2: Promote the utilization of text4baby and 2-1-1 Virginia by reproductive age families.

Text4baby, an educational program of the National Healthy Mothers, Healthy Babies Coalition (HMHB), is a free mobile information service that provides critical health and resource information during pregnancy and the first year of the infant's life. Women who voluntarily register receive three text messages per week timed to their due

date or the baby's age from birth. Texts contain nationally approved medical and resource information ranging from health and safety topics conveyed in simple messages.

Even though education cannot solve the entire problem of poor birth outcome, research supports that increasing knowledge around health can help people stay healthier. Information is readily available through providers, Web sites, baby books and family but many low-income women do not have access to some of these resources. It is reported that 90 percent of Americans have cell phones and that in 2009 over 1.5 trillion text messages were sent in the United States. (Blumberg & Luke, 2008) It is the preferred form of communication for much of the reproductive age population and growing. (Jordan, Ray, Johnson, & Evans, 2011)

Virginia has participated in text4baby since the national program's launch in February 2010. Since that time the Commonwealth has had 11,151 total active enrollees. There are reports in the literature of the use of mobile text messaging as a way to influence behavior. There are six national evaluation projects in progress but the preliminary results are promising. In one study, over 64 percent of participating women reported that text4baby helped them remember an appointment or immunization, 75 percent reported they felt better informed on medical warning signs, 71 percent said they talked with their provider about a topic that they read on the service and 39 percent reported they called a service or phone number in response to a text4baby message. Also, women of all economic levels in both rural and urban areas are using text4baby. (San Diego Research Team, 2011) As of 2012 in Virginia, over 21,000 have enrolled in text4baby with 5,967 individuals currently using the service (VDH, text4baby enrollment data, 2012).

In the spring of 2013, VDH partnered with HMHB and Voxiva, the company that provides the technology platform for the program, to customize the service to provide Virginia specific referral and resource information. Projected to be available in July 2013, VDH staff will have access to de-identified data about users in the Commonwealth, which will provide an opportunity to further evaluate usefulness of this program. Promotion of this service has been limited to informal activities conducted by a voluntary implementation team led by VDH. Representatives from VDH in collaboration with DMAS, DSS, professional groups, and community partners utilized newsletters, posters and referral cards developed by the HMHB, Medicaid enrollment letters, billboards and a variety of mechanisms to market the product to pregnant and newly parenting women. Once customization is completed, it will be important to enhance these promotion efforts to further increase utilization of this service.

The 2-1-1 VIRGINIA system is designed to provide the citizens of Virginia with an easy to remember phone number and web address to connect people with free information concerning available community services 24 hours a day, 365 days a year. 2-1-1 VIRGINIA is a service of the Virginia Department of Social Services provided in partnership with the Council of Community Services, the Family Resource and Referral Center, CrisisLink, The Planning Council, the United Way of Central Virginia, and the United Way of Greater Richmond & Petersburg. The Title V Maternal and Child Health Block Grant administered by VDH provides supplemental funding for DSS to support the 2-1-1 VIRGINIA and therefore, monitors the number and types of calls to this system through this arrangement with DSS. When dialing the 2-1-1 VIRGINIA telephone number, citizens speak to a trained professional that listens to the situation and suggests sources of help using one of the largest databases of health and human services in Virginia and surrounding states. All referrals are confidential.

Women seeking information pertaining to pregnancy have access to the information either by a trained professional or the website. When using the website, the woman inserts her zip code, selects need of “Healthcare” from the dropdown box, selects “Pregnancy Services” and resources are provided, including the following information: name of organization, contact information including website, and direction link with miles from zip code. This contact information is important for women seeking pregnancy care, adoption or abortion information, family planning services, and other maternal and child health resources.

Strategy 3: Develop a social marketing campaign to promote healthy birth spacing and the importance of interconception care.

Mass social marketing campaigns have long been a tool for promoting public health to expose high proportions of large populations to messages through routine uses of existing media, such as television, radio, and newspapers (Noar, 2006). Communication campaigns involving diverse topics and target audiences have been conducted for decades. Mass social marketing campaigns have generally aimed primarily to change knowledge, awareness and attitudes, contributing to the goal of changing behavior. There has not normally been a high expectation that such campaigns on their own would change people’s behavior. Theory suggests that, as with other preventive health efforts, mass social marketing campaigns are most likely to reduce unhealthy attitudes if their messages are reinforced by other efforts. (Institute of Health Communications, 2013)

Several studies have been conducted that show exposure to social marketing campaigns increased inter-personal communication about contraceptive use, thereby increasing positive attitudes towards family planning. To devise suitable communications strategies and messages for the diverse audiences, it is important to understand the similarities and differences in the beliefs and attitudes of young women, elder women and men. Existing theories and experiences play a critical role in developing effective health communication tools and messages. In addition the number and types of communication channels and messages were seen to influence interpersonal communication, attitude change and contraceptive use. (Storey, Boulay, Karki, Heckert, & Karmacharya, 1999) Development of culturally acceptable and targeted messages regarding birth spacing will be important and need to be linked with the educational efforts around preconception care and reproductive life planning discussed in Chapter One.

VDH’s role to increase the interval from birth to conception of at least 24 months:

1. Collaborate with stakeholders and healthcare providers to promote healthy birth spacing and interconception care
2. Promote the use of text4baby and 2-1-1 Virginia
3. Develop a social marketing campaign to promote healthy birth spacing and the importance of interconception care
4. Partner with Universities within Virginia to promote and bring awareness to healthy birth spacing and family planning.

External Stakeholder’s role to increase the interval from birth to conception of at least 24 months:

1. Collaborate with VDH to promote healthy birth spacing and interconception care
2. Promote the use of text4baby and 2-1-1 Virginia

3. Promote VDH's social marketing campaign about healthy birth spacing and the importance of interconception care
4. Partner with VDH to promote and bring awareness to healthy birth spacing and family planning.

Proposed Success Indicators for Objective 2

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change]*

- Number of months between pregnancies as reported on the birth certificate
- Number of providers educated on the importance of birth spacing
- Number of reproductive age women who receive education about birth spacing
- Number of Virginia enrollees in text4baby
- Number of MCH related calls to 2-1-1 Virginia
- Number of health districts that participated in social marketing campaign to promote healthy birth spacing and interconception care

Objective 3: Increase utilization of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) services among eligible women of reproductive age from 80% to 90% (12.5%) by 2018

Strategy 1: Examine the barriers and challenges for participating in WIC services across the Commonwealth, among women who qualify for WIC services.

Altarum, the company conducting the research for VDH to identify barriers and challenges, will be contacting individuals who are eligible for WIC but are not participating to examine the barriers and challenges of eligible participants across the Commonwealth. Altarum will use SNAP (Supplemental Nutrition Assistance Program, formerly food stamps) participants and compare to WIC enrollees. This study will provide an understanding of the barriers and challenges that are perceived by individuals who are eligible for WIC services but do not participate. The results will be used to develop interventions to increase the utilization of WIC services by reducing barriers. Currently, most participants in WIC are children so targeting the women during this interconception period is reasonable.

Strategy 2: Promote availability of WIC services through a social marketing campaign.

VDH will be sponsoring a 9-5-2-1-0 for Health™ media campaign which started August 26, 2013. The 9-5-2-1-0 for Health™ media campaign will use TV/radio, Facebook, and physician offices to spread the message of: nine hours of sleep, five servings of vegetables and fruits daily, limit screen time to no more than two hours each day, get at least one hour of physical activity each day, and no sugary drinks. The Facebook ads will target women of reproductive ages. As part of the campaign, posters, prescription tear pads (in English and Spanish), brochures and resource kits will be provided to family care physicians, pediatricians, OBGYN's, health clinics and local health districts in health regions 3, 4, 5.

The Virginia WIC Program will begin providing food benefits via an electronic benefit card (EBT), replacing the paper food instruments. A social marketing campaign will introduce these cards to the public. While one purpose is to educate current participants about the upcoming change, it is expected to attract the attention of many potential eligible participants as well. It is hoped with the stigma of presenting a paper food instrument to the store's cashier being removed, there will be an increase in the number potential eligible seeking WIC services.

Strategy 3: Use WIC services to promote interconception care and family planning resources and services

The WIC Program is administered by the U.S. Department of Agriculture Food and Nutrition Service with the purpose to provide nutritional food and general nutrition education as well as referrals to other health and social service organizations at no cost to clients. Eligibility criteria to enroll in WIC include the following: (1) be a pregnant, postpartum, or breast-feeding woman; (2) have a household income at or below 185% of the federal poverty level; and (3) have a positive determination of nutritional risk.

WIC has been shown to improve birth outcomes by reducing the risk factors associated with poor nutrition, increasing the use of prenatal care and subsequently preventing premature birth and low birth weight. (Khanani, Elam, Hearn, Jones & Maseru, 2010) WIC also provides nutrition education and provides foods rich in the necessary nutrients for pregnancy such as Vitamins A and C, calcium, iron, and protein. During prenatal clinics, screenings for maternal weight gain; dietary intake, and identification of nutrition health risks provide an opportunity for interventions and/or referrals to other appropriate health care professionals. For instance in Virginia, the need for substance abuse counseling, dental care, or smoking cessation is screened and referred for appropriate services.

The Virginia WIC Program has served the women, infants and children for more than 35 years. Currently, the WIC Program serves an average of 127,132 participants across the state and includes 20,383 pregnant women. (WIC data, 2012) The Virginia WIC Program has the capacity to serve more pregnant women and in the past few years has undertaken projects to increase the awareness of WIC with private providers and educate them on how they can assist pregnant women obtain these services.

WIC serves a comparatively high proportion of clients who belong to racial and ethnic minority groups. Increasing the utilization of interconception care and family planning services within a WIC population and setting could greatly increase the likelihood of impacting a high-risk population of women and increase the number of women who are educated about these resources. (Dunlop A. L., Dretler, Badal, & Logue, 2013)

VDH's role to increase the use of WIC services among individuals who are eligible for services:

1. Identify the barriers and challenges to participating in WIC services across the Commonwealth, among women who are eligible for services.
2. Develop a social marketing campaign to promote the availability of WIC services
3. Collaborate with WIC services to provide interconception care and family planning resources and services through the WIC offices in the health districts

External Stakeholder's role to increase the use of WIC services among individuals who are eligible for services:

1. Assist VDH to identify the barriers and challenges to participating in WIC services across the Commonwealth, among women who are eligible for services.
2. Promote the availability of WIC services through a social marketing campaign.
3. Promote the availability of interconception care and family planning resources and services through the WIC offices in the health districts

Proposed Success Indicators for Objective 3

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of women receiving WIC services
- Percent of women who are enrolled in WIC services versus those who are qualified
- Identification of barriers and challenges of women to participate in WIC services
- Number of health districts that participated in social marketing campaign to promote WIC services

Chapter Four

Strategic Goal 4: To improve injury prevention and positive parenting efforts within Virginia.

Background

Infant mortality can be a direct result of injury from an unsafe physical, as well as, an unhealthy emotional environment. Therefore, it is important to recognize the significant role that injury prevention and positive parenting have on child development from infancy through childhood and adolescence. This is most apparent during the earliest phase of development when an infant depends solely on a parent to provide their basic needs, which includes: food, shelter, clothes, and a safe, nurturing environment. Critical to child development is the healthy development of the infant brain, which is dependent on being free from injury and nurtured to stimulate growth as the human brain is not fully developed at birth. During the prenatal period, most brain development occurs in the brain stem, which controls basic functions such as breathing, grasping, crying, sleeping and feeding. The parts of the brain which control more complex functions such as sight, hearing, tasting and emotions are responsible for the infant being able to sense and interact with the world but these senses are primitive at birth and develop more fully as the infant grows. Research has demonstrated the interaction that occurs between the genetic composition, the environment and parental decisions on how they feed, nurture, and provide care for their infant will impact how the brain grows and develops. (Shonkoff, 2000)

Epidemiologic studies have shown that the causes of injuries to infants are predictable and preventable and not randomly occurring accidents. Injuries can be prevented through potentially modifiable factors, which affect the occurrence and severity of injury, such as behavior change, policy environment and the use of safety devices. Infants are especially susceptible to serious injury that can often result in death. Infants are more at high risk for injury primarily related to the fact that they are still physically and mentally developing. This makes the injury risks associated with an infant very different than those of an older child.

Given how multi-faceted addressing injury prevention and positive parenting can be, five specific variables have been identified to address as part of this plan: (1) Positive parenting and life skill programs, (2) Maternal depression, (3) Breastfeeding, (4) Sudden Unexpected Infant Death (SUID), and (5) Shaken Baby Syndrome (SBS). This chapter describes the risk, intervention and opportunities to support the development of children through injury prevention and positive parenting efforts in Virginia.

1. **Parenting Skills:** Positive parenting and life skills programs promote child health and safety by impacting norms and encouraging community action that support families. All parents would benefit from some education — though some will need minimum assistance while others need significant help. These programs teach parents how to give calm and consistent feedback and assertive discipline that's based on reasonable expectations for a child's age and focus on removing the stigma often associated with receiving parenting education.

2. **Maternal Depression:** Depression is a general term used to describe a broad range of physical and emotional struggles that many men and women face. When a key number of these symptoms are combined, then a clinical diagnosis of depression is made. Maternal depression takes a particularly large toll on women who are pregnant or postpartum because it affects their children, partners, and other family members as well. It is the most common complication of pregnancy. (Goodman, 2010) According to the PRAMS survey, 14% of women delivering in Virginia report symptoms of postpartum depression. (Virginia PRAMS, 2010) Studies indicate that many women are undiagnosed with maternal depression, both during and after pregnancy (Everest & Nutt, 2007). A healthy mother-child relationship is critical to the physical, social and emotional development of a child. The absence of a strong healthy, emotional bond between mother and child poses a great risk to a child's development (Cohen, Onunaku, Clothier, & Poppe, 2005). These infants are at an increased for not receiving the preventive health care recommended or not being in a safe environment to thrive.
3. **Breastfeeding:** Breastfeeding allows a mother to provide a nurturing environment and food to an infant at the same time, while providing many other additional benefits. Breastfeeding is the nutritional standard for infant and young child feeding as recognized by scientific and health organizations worldwide (American Academy of Pediatrics Section on Breastfeeding, 2012). In fact, full term infants who are not breastfed, as compared with infants that have been exclusively breastfed for about six months are at 257% increased risk of hospitalization for lower respiratory tract diseases, 178% increased risk for diarrhea and vomiting, 100% increased risk for acute ear infections, 64% increased risk of type II diabetes mellitus, 56% increased risk of Sudden Infant Death Syndrome, 35% increased risk of developing asthma, and 32% increased risk of obesity (Bartrick and Heinhold, 2010).
4. **Sudden Unexpected Infant Death:** Sudden Unexpected Infant Death (SUID) is used to describe any sudden and unexpected death, whether explained or unexplained that occurs during infancy. After case investigation, SUID can be attributed to suffocation asphyxia, entrapment, infection, ingestions, metabolic diseases, cardiac (heart) abnormalities, or trauma (accidental or non-accidental) (Task Force on Sudden Infant Death Syndrome, 2011). The most common forms of SUID are those related to Sudden Infant Death Syndrome (SIDS) defined as the sudden death of an infant that remains unexplained after thorough investigation, including autopsy, death scene investigation, and review of the infant's clinical history (Willinger et al., 2010) and suffocation asphyxia due to an unsafe sleep environment. According to the PRAMS, 74% of women delivering in Virginia report placing their infants on their backs to sleep (Virginia PRAMS, 2010). Over the past few years there has been much discussion among experts that many cases of suffocation asphyxia among infants due to an improper sleeping environment may be reported as SIDS. One issue is co-sleeping or the placing of the baby in a bed with the adults to sleep. In Virginia, only 35% of women report never putting their infant in the bed with them to sleep; meaning that 65% are placing the infant in bed at least at some time. SUID are often very hard to accurately diagnose as the cases are emotionally charged and it is often challenging to gain a clear understanding of the situation and circumstances leading up to the death. Many of the prevention strategies for both SIDS and suffocation asphyxia are the same. Therefore, it has become commonplace to discuss the prevention of both events through safe sleep environments in an effort to prevent the majority of post-neonatal deaths.

5. Shaken Baby Syndrome: Traumatic brain injury affects patients of all ages and there are many potential causes, but children are particularly vulnerable to brain injuries because their brains are still developing. The age group that experiences the most abuse is children under the age of one. Shaken Baby Syndrome (SBS) is a form of abusive head trauma that results from violent shaking of an infant or small child, whether this shaking is intentional or unintentional. All brains are soft; however a baby's brain is extremely soft and has been described as being like unset gelatin. When sudden movement occurs, there can be a great deal of movement by the brain within the skull and especially in babies, within the brain itself. Because a baby's brain is still developing, damage to brain tissue can have a very negative impact on healthy brain development. Certain types of movement, such as the back-and-forth movement from shaking appear to cause more serious injury.

The Centers for Disease Control and Prevention (CDC) identifies Shaken Baby Syndrome (SBS) as a leading cause of child abuse deaths in the United States. SBS may be misdiagnosed in its milder form and under-diagnosed in its most serious form. According to available Virginia data for the last ten years, SBS ranks as the sixth leading cause of hospitalizations for infants from birth to one year of age. A primary trigger for SBS is often the inconsolable crying of an infant. In many cases, education and parent awareness of the impact of their behavior could have prevented this trauma.

Injury Prevention and Positive Parenting and Health Equity:

Unfortunately, the causes of racial disparities in birth outcomes are largely unexplained, because most studies focus on differential exposures to risk and protective factors during pregnancy, such as maternal behaviors, prenatal care utilization, and psychosocial stress or infections, there is not an adequate amount of information that can accurately account for the racial gap in birth outcomes.

If we begin to focus on relationships and social and economic conditions and their effects on the health and well-being of the mother and the infant, we may begin to develop a better understanding of infant mortality inequities. This approach is grounded in the social determinants of health theory: women and their babies must be viewed not only as individuals, but as members of families, communities, and larger systems that have either positive or negative impacts upon their psychological and physical states. The social economic and environmental influences, as well as other risk and protective factors within women's places of residence, work, and leisure must all be considered as factors that influence birth outcomes.

Injury Prevention and Positive Parenting is a Critical Issue for Infant Mortality:

Relationships with the primary caregiver are especially important for development in the first years of life because the child's primary caregivers structure the experiences and shape the environments within which early development unfolds. Babies and young children need to have the opportunity to develop a close, trusting relationship or secure attachment with at least one special person. The ability to attach to a significant adult allows young children to become trusting, confident, and capable of regulating stress and managing distress. Those who develop a secure attachment with a primary caregiver during the early years of life are more likely to later have positive relationships with peers, be liked by their teachers, perform better in school, and respond with resilience in the face of adversity as they grow and become preschoolers and older students. (Cohen,

Onunaku, Clothier, & Poppe, 2005)

As a parent trying to provide the basic needs and deal with the many decisions parents must make can be challenging especially when complicated with limited resources, lack of knowledge about parenting, unrealistic expectations of infants due to a lack of knowledge about child development, mental health issues and barriers to accessing programs and resources that are available. These key challenges are the cornerstone of the objectives chosen to address and reduce injuries and improve positive parenting during the infant's first year of life.

Five specific objectives have been defined under the topic of injury prevention and positive parenting, which will likely have the most impact on infant mortality:

- Objective 1: Increase the percentage of appropriate VDH programs that incorporate positive parenting and life skill concepts for parents to 100% by 2018.
- Objective 2: Increase the screening for maternal depression by health care providers from 80% to 88% (10%) by 2018.
- Objective 3: Increase the proportion of infant's breastfeeding at six months of age from 48% to 52% (8%) by 2018.
- Objective 4: Decrease the incidence of Sudden Unexpected Infant Death (SUID) among infants by 10% based upon the baseline developed by using the standard language decided upon in Strategy 2.
- Objective 5: Decrease the incidence of Shaken Baby Syndrome among infants from 4.0 per 100,000 to 2.0 per 100,000 (50%) by 2018.

Objective 1: Increase the percentage of appropriate VDH programs that incorporate positive parenting and life skill concepts for parents in Virginia to 100% by 2018

Strategy 1: Inventory all positive parenting and life skill programs in Virginia.

Evidence is emerging that positive interventions in those early years may not only have immediate benefits but also have the potential to improve health status into adulthood. (Haflon, Russ, & Regaldo, 2005) Programs which educate parents on how to assist their baby to experience, manage and express a full range of positive and negative emotions; develop close satisfying relationship with their primary caregivers; and actively and safely explore their environment can be seen as promoting early childhood mental health, or infant mental health. Positive parenting practices which include responsive caregiving, age appropriate discipline and limit setting, supports for language development and learning, and playful interactions promote healthy social and emotional health. Parent knowledge and mental wellness are both essential in providing a safe and nurturing environment for healthy infant development. (National Conference of State Legislatures, 2005)

A variety of programs are available that can promote positive parent-infant health and mental health including home visiting, child protective services, family leave policies, or nutrition programs. These programs promote healthy development in a number of ways by teaching families about early infant development and ways to enhance the parent-child relationship, increasing awareness and use of community resources, or removing the barriers to food security, quality housing, or father involvement. There are also major federal programs and funding resources available in all states such as Medicaid (including Early and Periodic Screening, Diagnosis,

and Treatment), Head Start and Early Head Start, Part B of IDEA (Individuals with Disabilities Education Act ages 3-12 years old): Preschool Special Education Program, Part C of IDEA (Individuals with Disabilities Education Act ages birth to 2 years old): Early Intervention, Child Care and Development Fund and the Title V Maternal and Child Health Services Block Grant. These programs have the goal to support parents in obtaining health and healthy development of their children. In Virginia, there are over eight home visiting programs that use home visiting as a major strategy to improve birth outcomes and child well-being and preparation for entry in to school. These programs are in over 107 localities of the 135 Virginia localities but most of the programs do not have the resources to serve all the families in need. Healthy Start, Resource Mothers Program, Healthy Families Virginia, CHIP (Comprehensive Health Investment Project) of Virginia, Parents as Teachers, Nurse Family Partnership, BabyCare, and Project Link are all programs that specifically focus on improving birth outcomes and address health issues in the first year of life.

Providers of obstetrical and pediatric care are critical gatekeepers to inform parents about these programs and play an important role in disseminating education materials to the parents and the communities these providers serve. Having an accurate inventory of all positive parenting and life skill programs across the Commonwealth will help health care providers provide up-to-date and accurate information to parents.

Strategy 2: Identify best practices contributing to effective positive parenting programs and place on centralized website for parent use.

There has already been much effort dedicated to identifying programs in Virginia that support families and are effective in contributing to positive parenting. The Smart Beginnings of the Virginia Early Childhood Foundation has defined and identified those programs that are evidence-based and have differentiated those programs that are evidenced-informed. (Virginia Early Childhood Foundation, 2012) The focus of this work has primarily been on the early childhood period rather than infancy, even though services are delivered to families with infants. Evidenced-based programs and practices are strategies that have been thoroughly tested for effectiveness. Healthy Families Virginia and Nurse-Family Partnership are examples of evidenced-based programs that serve pregnant and newly parenting families. Evidence-informed programs and practices are those that have used the available research and have based approaches upon sound theory with some evaluation documenting positive results. Resource Mothers Program, CHIP of Virginia, and the Virginia Healthy Start projects are examples of evidenced-informed programs. Having a centralized website where these programs can be described, identified whether they are evidenced-based or evidenced-informed, and evaluated as to whether they are useful in reducing infant mortality would provide direction as to future policy decisions and funding. There has not been a coordinated effort to identify programs that are effective in reducing infant mortality.

Strategy 3: Expand the availability of home visiting and other effective programs that provide family education or support during the infant's first year.

Research has shown that high-quality home visiting programs have positive impacts on the outcomes for children and families. A recent meta-analysis reviewed over 5,000 studies regarding home visiting programs. Only 55 programs provided sufficient quality information to be reviewed in detail. The findings were that programs that focused on a particular aspect of birth outcomes or early childhood development were more successful in demonstrating effectiveness. These findings were promising but identified there are opportunities

for more studies that address the relationship between program or service characteristics and outcomes for families and children. (The PEW Charitable Trusts, 2013) Those programs with demonstrated effectiveness in improving birth outcomes should be expanded. There is opportunity for researchers in the state to address some of these issues.

VDH's role to increase the capacity of positive parenting and life skills programs:

1. Conduct inventory of all positive parenting and life skill programs
2. Develop in collaboration with appropriate partners a set of criteria to assess programs that can reduce infant mortality.
3. Develop in collaboration with appropriate partners a centralized website for parents to access resources and program information within their local communities.
4. Expand the availability of home visiting programs across the Commonwealth by collaborating with stakeholders to tap into resources that would provide for the expansion.

External Stakeholder's role to increase the capacity of positive parenting and life skills programs:

1. Stakeholders can provide information regarding the positive parenting and life skill programs being administered by their agency or organization.
2. Stakeholders will provide input into the development of criteria to assess community-based programs that are being used to promote positive parenting in infants and reducing infant mortality.
3. Stakeholders can assist in developing a centralized website for parents by providing information and resources within local communities across the Commonwealth
4. Stakeholders can assist in the expansion of home visiting programs by sharing resources and/or promoting the benefits to the community by supporting home visiting programs.

Proposed Success Indicators for Objective 1

**** These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of positive parenting and life skills programs in Virginia
- Percent of parenting programs that are designated effective based upon best practices and criteria of evidenced-based or evidence-informed.

Objective 2: Increase the screening for maternal depression by health care providers from 80% to 88% (10%) by 2018.

Strategy 1: Increase the screening of pregnant and postpartum women for maternal depression.

Virginia has a long-standing commitment to promoting the behavioral health and mental health of mothers and infants. Over the past decade, Virginia established an expert panel on maternal depression and established widespread provider education and evaluation. These efforts have given Virginia recognition at the forefront of developing evidence-based systems of care around maternal depression, which are vital to promoting pregnancy

and postpartum health. (Miller, Gupta, & Scremin, 2011; Price, Corder-Mabe, & Austin, 2012) Specifically, efforts on enhancing the mental, emotional and behavioral health of mothers and infants throughout Virginia by identification, intervention and mental health promotion should be increased in order to develop a coordinated statewide response to women's behavioral health.

Identification of behavioral health risk factors among pregnant and postpartum women is a priority. Virginia adapted the Institute for Health and Recovery (IHR) "Behavioral Health Risks Screening Tool" as a primary method for providers to identify areas of potential behavioral health risk in a way that leads them through brief identification, patient education and linkage to treatment. Through collaborating efforts of DBHDS (Department of Behavioral Health and Development Services), DMAS (Department of Medical Assistance Services), and VDH, the Behavioral Health Risk Screening tool is available to health care providers for identification and brief intervention services. (Appendix D: Behavioral Health Risks Assessment Tool) This tool is utilized by providers within VDH's Maternal Health clinics, as well as, by home visitation programs, and is being implemented as a component of centralized intake for pregnant and parenting mothers through Maternal, Infant and Early Childhood (MIECHV) home visitation expansion funding.

Maternal depression resources and access to screening is an important area for potential expansion in Virginia. With advances in the identification of risk factors, more women who have identified mental and behavioral health risk, but who do not meet criteria for community mental health services could receive services. Several of the home visiting programs are partnering to consider ways to infuse mental health in their services, either in cooperative arrangements with the CSB (as supported through several MIECHV expansion projects) or by infusing mental health into their existing services; a successful and cost-effective pilot study of a brief, mental health infused intervention was recently completed within one home visiting program. A number of DBHDS's Crisis Stabilization Units (CSUs) already accept pregnant women who require short term intermediate care for maternal depression, while others have been encouraged to develop necessary policies and procedures so that they may also admit pregnant women. A future goal is to collaborate with existing behavioral health, mental health and maternal and child health providers, as well as, the Virginia Association for Infant Mental Health to create a continuum of care across these areas of identification, intervention, and mental health promotion for mothers and infants.

Strategy 2: Improve education and resources about maternal depression to healthcare providers and childbearing families.

The term maternal depression is used in this document and can be mild, moderate or severe and can occur during pregnancy or within a year after the end of your pregnancy. Without treatment, symptoms may last a few weeks, months, or even years. In rare cases, the symptoms are severe and indicate potential danger to the mother and baby. More than 80% of all women who deliver experience a sense of let-down or have depressive symptoms a few days or weeks following delivery which is called the "Baby Blues." Symptoms include crying, worrying, sadness, anxiety, mood swings, trouble concentrating, difficulty sleeping, and not feeling yourself. The "Baby Blues" is not the same as maternal depression and does not require medical attention. With time, patience, and the support of family and friends, symptoms linked with the Baby Blues will usually disappear within a few days or within 1 to 2 weeks. (HRSA, 2006)

Often maternal depression is unrecognized and untreated. This illness is widespread across class and race, and has been linked to genetic composition, situational risk factors and circumstances and environmental gene interaction (Isaacs, 2004). Even though most perinatal providers support the concept that screening during pregnancy and throughout the first year after delivery, significant gaps exist in how frequently this screening is actually occurring. (Price, Corder-Mabe, & Austin, 2012)

Mothers in need of referrals to a mental health specialist may be too embarrassed or afraid to reveal their depressive symptoms or troubled relationships with their newborns to health practitioners. Some women may be in denial about the existence or severity of a mental health problem and believe that the problem can undoubtedly be handled without treatment. (Everest & Nutt, 2007) Other factors, such as cultural beliefs, may influence how families seek and receive mental health services for mother and child. Parents from cultural backgrounds that differ from those of the mental healthcare provider may not understand or agree with the information that is communicated to them (Belden, Russonello, & Stewart, 2003). Education about these variances in perception of treatment services across cultural groups is needed for perinatal providers.

VDH's role to increase the identification and access to mental health services for pregnant and postpartum women:

1. Collaborate with DMAS and DBHDD to improve screening of pregnant and postpartum women for perinatal depression by providing access to a universal screening tool.
2. Develop in collaboration with DMAS and DBHDD an online training module on the use of the Behavioral Health Risks Screening Tool.
3. Provide training for external stakeholders about perinatal depression and make resources accessible through 2-1-1

External Stakeholder's role to increase the identification and access to mental health services for pregnant and postpartum women:

1. Collaborate with VDH by providing training to healthcare providers on how to use the universal screening tool and make the tool accessible.
2. Promote the use of the online training module for the Behavioral Health Risks Screening Tool.
3. Attend training about perinatal depression and use the resources accessible through 2-1-1

Proposed Success Indicators for Objective 2

**** These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of Medicaid reimbursements for perinatal depression screening
- Number of providers trained on Behavioral Health Risks Screening Tool

Objective 3: Increase the proportion of infant's breastfeeding at six months of age from 48.2% to 52.0% (8%) by 2018 throughout the Commonwealth.

Strategy 1: Support the efforts of maternity care facilities in Virginia that are implementing part or all of the 10 Steps to Successful Breastfeeding as part of the Baby-Friendly Hospital Initiative.

The Baby-Friendly Hospital Initiative® (BFHI) was jointly sponsored by the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) in 1991 to recognize birthing facilities that offer the optimal level of care in infant feeding. Baby-Friendly® designation is awarded to facilities that have implemented the 10 Steps to Successful Breastfeeding. These 10 Steps are:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants.
6. Give newborn infants no food or drink other than breastmilk, unless *medically* indicated.
7. Practice “rooming in”-- allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no pacifiers or artificial nipples to breastfeeding infants in the first 7 days of life.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic

Research indicates that early and exclusive breastfeeding rates are higher among Baby-Friendly® designated facilities (Venancio et al, 2012). It has also been shown that the more Steps that a mother experiences in a birthing facility, the greater the likelihood of continuation of breastfeeding at and beyond 6 weeks postpartum (Venancio et al, 2012). Birthing facilities desire Baby-Friendly® designation for numerous reasons such as many of the ten steps are easily adaptable as quality improvement projects, cost containment, public relations/marketing, and/or prestige. In 2012, the National Initiative for Children’s Healthcare Quality (NICHQ) received \$8 million in federal funding to help 89 U.S. maternity care facilities move toward Baby-Friendly designation. Five (5) maternity care facilities in Virginia were recipients of NICHQ Best Fed Beginnings which will begin a 22- month learning collaborative with other participating hospitals to make system-level changes in order to become Baby-Friendly. The NICHQ will be providing technical support as these hospitals gradually assume implementing steps in reaching Baby Friendly designation and will seek designation by September 2014.

Strategy 2: Develop programs to increase the continuity of care available to educate and support breastfeeding families (U.S. Surgeon General’s Call to Action to Support Breastfeeding, 2011) by 2015.

Breastfeeding families can easily succeed at meeting their goals when they are surrounded by a supportive environment. Too often mothers are unable to find and receive breastfeeding support after the birth. Many communities lack systems to help connect mothers to breastfeeding support services. All women should be offered continued support to breastfeed as a part of the continuity of care in the community. Continued care and support is vital in helping breastfeeding families succeed. Reactive care, where the mother initiates the contact based on problems or questions can be offered by a WIC breastfeeding peer counselor, a mother-to-mother support group, or an International Board Certified Lactation Consultant® (IBCLC). In light of today’s

technological advances, breastfeeding care and support is being offered in a variety of ways in order to meet the mother's needs. Breastfeeding advocates now use mobile devices, Internet programs, and social media to offer support; however recent research indicates that support is likely to be more effective when it is offered by means of face-to-face contact (Renfrew, 2012). Regardless of the means, breastfeeding care and support should be tailored to the needs of individual families and settings. Research indicates that care and support, whether offered from a breastfeeding peer counselor, an IBCLC, another healthcare professional, or the mother's own family and friends, has positive impacts on both breastfeeding duration and exclusivity (Renfrew, 2012). Health care systems can ensure that their patients are informed about resources for breastfeeding care and support and can facilitate connections to these resources (U.S. Surgeon General's Call to Action to Support Breastfeeding, 2011).

VDH's role to increase the percentage of women breastfeeding at six months following delivery:

1. Promote the use of the WIC website that supports breastfeeding (Health Bites)
2. Monitor the progress of hospitals in adopting the Baby Friendly practices.

External Stakeholder's role to increase the percentage of women breastfeeding at six months following delivery:

1. The VDH Breastfeeding Advisory Committee and the Virginia Breastfeeding Task Force develops a plan to increase the rate of breastfeeding at six months.
2. Stakeholders provide input and support on the plans to increase breastfeeding in the Commonwealth.

Proposed Success Indicators for Objective 3

**** These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of Virginia hospitals that are designated Baby Friendly
- Number of Virginia hospitals that meet the criteria for Best Fed Beginnings
- Number of Virginia hospitals that have at least 5 steps completed toward becoming Baby Friendly
- Percent of infants being breastfed at hospital discharge and to at least 6 months of age
- Number of hits on the WIC Health Bites website on breastfeeding.

Objective 4: Decrease the incidence of Sudden Unexpected Infant Death (SUID) among infants by 10% based upon the baseline developed by using the standard language decided upon in Strategy 2.

Strategy 1: Inventory current practices and promote the Safe to Sleep Campaign across the Commonwealth.

The American Academy of Pediatrics (AAP) is expanding recommendations from focusing only on SIDS ("back to sleep" campaign) to focusing on a safe sleep environment ("safe sleep" campaign) that can reduce the risk of all sleep-related infant deaths, including Sudden Infant Death Syndrome (SIDS). The recommendations described in a policy statement published by AAP includes supine positioning, use of a firm sleep surface, breastfeeding, room-sharing without bed sharing, routine immunizations, consideration of using a pacifier, and avoidance of soft

bedding, overheating, and exposure to tobacco smoke, alcohol and illicit drugs. (Task Force on Sudden Infant Death Syndrome, 2011)

The Safe to Sleep campaign is an initiative of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development and is an expansion of the previous Back to Sleep campaign to reduce the risk of SIDS. Since the launch of the Back to Sleep campaign nationally in 1994, the SIDS rate has dropped by more than 50 percent across all populations; however the rate has since recently plateau. (National Institute of Health, 2013) The new Safe to Sleep campaign aims to expand upon the success of the previous Back to Sleep campaign by reducing the risk of SIDS and all sleep-related causes of infant death. This campaign incorporates the most up-to-date recommendations from the AAP on safe infant sleep practices. It will also provide education for parents and caregivers on ways to help reduce the risk of SUID and sleep related infant deaths within their communities and homes. The campaign has developed materials that are culturally appropriate.

Strategy 2: Develop and implement standard definitions for SIDS, SUID, and accidental suffocations.

Prior to the 1980s, infant deaths without the presence of illness or injury were often classified as SIDS with little or no death investigation. In other words, infant deaths were attributed to SIDS when other causes of death were excluded. In the late 1980s and 1990s, improved child death scene investigation and use of protocols began to highlight the significance of unsafe sleep environments, particularly putting infants to sleep on their stomachs. Back to Sleep campaigns throughout the U.S. and Virginia in the 1990s suggested that at least some of the deaths attributed to SIDS were not natural deaths related to a syndrome, but rather preventable deaths linked to environmentally modifiable factors in an infant's sleep environment. National research since that time has demonstrated a host of other risk factors in these sleep-related deaths: prematurity, wedging and strangulation suffocation related to sleeping in adult beds or on furniture not intended for infant sleep, exposure to smoke, overheating, soft bedding, and co-sleeping, particularly with persons who smoke, use alcohol or illegal or prescription drugs.

These developments have and continue to impact the theory and practice of infant death investigation, contributing to a diagnostic shift among medical examiners and coroners, away from SIDS in favor of SUID and asphyxia/suffocation deaths. A SUID cause of death on a death certificate is now much more common than SIDS. (OCME, 2013)

Through this initiative, the Virginia Department of Health Office of the Chief Medical Examiner will conduct scene investigations and scene re-enactments in all relevant infant death cases and will develop and implement clear criteria for assigning deaths to SIDS, SUID, or asphyxiation related to unsafe sleep environments.

Strategy 3: Standardize and use consistent messages on Safe to Sleep across the state.

There are many campaigns that have promoted messages on safe sleep practices, with the most recent being "Safe to Sleep" campaign promoted by the American Academy of Pediatrics (AAP) (2011). This new campaign is an updated and improved version of the "Back to Sleep" campaign from 1994 that the AAP promoted. However, through commercials for baby products by retail stores for infant sleep aids, parents

receive mixed messages on which guidelines they should be following. Then to add even more confusion, NICUs and hospitals place infants in many different sleeping positions, often contradictory to the “Safe to Sleep” guidelines.

A recent study of NICUs confirmed that the incorporation of SIDS risk-reduction strategies into the hospital nursing routine can positively affect parental post discharge practices. Sleep position and environment are emphasized as crucial modifiable risk factors for SIDS. Parental knowledge and acceptance of safe sleep practices (SSPs) are key to decreasing the risk of unexpected deaths. SSPs and SIDS-reduction strategies are typically introduced to parents by bedside nurses before discharge. In its updated recommendations from 2011, the American Academy of Pediatrics (AAP) stressed that neonatal intensive care units (NICUs) should endorse and model SIDS risk-reduction recommendations significantly before the infant's anticipated discharge. However, full implementation of the AAP guidelines in SSPs is challenging in the NICU environment.

Research has shown that there is a significant knowledge gap in SIDS-prevention measures and implementation among NICU nurses who discharge infants. The aims of the project described in this article were to develop a safe sleep educational and modeling program for the NICU, to develop a process to identify which infants are ready to begin SSPs in the NICU, to increase the percentage of eligible infants following SSPs before discharge, and to determine if improving compliance in the unit influences parental choices at home. (Gelfer, Cameron, Masters, & al, 2013)

The VDH has experience in conducting similar training. In 2009, VDH received funding from the CJ Foundation for SIDS to conduct seven train-the-trainer workshops for nurses employed in well-baby and NICU nurseries in Virginia. There were 119 participants representing 51 of the 61 birth hospitals in the state. Overall, the participants demonstrated an increase in knowledge of SIDS, risk reduction recommendations for SIDS, and how to communicate the recommendations to parents and caregivers. This training was done prior to the new Safe to Sleep Campaign but could be repeated using the same model with the most current information available.

VDH’s role to decrease the incidence of sudden unexpected infant death (SUID):

1. Identify and engage stakeholders who can link resources with this campaign
2. Provide educational materials for Safe to Sleep campaign
3. Develop a short training module for providers on Safe to Sleep
4. Educate OCME professionals who are involved in the investigation and diagnosis of SUID to use standardized language.

External Stakeholder’s role to decrease the incidence of sudden unexpected infant death (SUID):

1. Promote and distribute materials for Safe to Sleep campaign within local communities across the Commonwealth
2. Distribute and assist in training providers/lay workers on the Safe to Sleep recommendations.

Proposed Success Indicators for Objective 4

*** *These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Number of infants with a diagnosis of sudden unexpected infant death
- Percent of infants who die from SUID
- Number of print materials regarding Safe to Sleep campaign distributed
- Number of hits on the VDH website regarding Safe to Sleep campaign

Objective 5: Decrease the incidence of Shaken Baby Syndrome among infants from 4.0 per 100,000 to 3.6 per 100,000 (10%) by 2018.

Strategy 1: Convene a task force to evaluate current practices and research supporting promising practices and evidence based programs.

While there are a number of SBS related resources in Virginia, there are no apparent coordinated statewide efforts to implement evidence based programs. There has been interest from the Virginia General Assembly and the Joint Commission on Health Care in this topic. The following legislative actions have occurred:

- HJR 632 (2011) directed the Joint Commission on Health Care “to study the cost of Shaken Baby Syndrome and abusive head trauma in Virginia and identify best practices in reducing the incidence” of this type of intentional injury to children.
- HB 411 (2010), referred to as Jared’s Law, requires the Department of Social Services to make information about SBS available in a printable and audiovisual format on its website.
- SB 1296 (2005) required hospitals and midwives providing maternity care to make available to patients, family members and other caregivers, “information” to increase awareness of SBS.

The SBS of Virginia, is a nonprofit organization that promotes awareness and presentation through attendance at conferences, presentations at hospitals and universities and leads advocacy efforts in the state. SBS of Virginia advocates that Virginia implement a statewide SBS prevention program that would include the creation of a state-specific version of *The Dias* “*Portrait of Promise*” DVD, a letter of promise and plan of action for parents/caregivers. This group also calls for an evaluation plan of follow-up calls to determine effectiveness. However, *The Dias* is only one model to educate caregivers about SBS, several organizations and military bases across the state use The Period of PURPLE as their preferred model to educate families within their communities.

Convening a task force of subject matter experts to evaluate current state practices and research supporting promising practices and evidence based programs will assist organizations and communities in developing and implementing resources and educational programs into their SBS programs, ensuring that the best information is provided to families and caregivers.

Strategy 2: Develop a standard definition to identify the incidence of Shaken Baby Syndrome within Virginia and begin data collecting going forward.

Current statewide data available from the Virginia Departments of Health, Social Services, and Medical Assistance Services may not provide sufficient accuracy for calculation of a reliable SBS incidence. The Virginia Department of Health (VDH) collects Virginia's SBS incidence data via Virginia Health Information (VHI) hospital discharge data, using ICD-9 code (international classification of disease, ninth revision) – 995.55. From 2004 - 2008, VDH reported 98 children under the age of four were coded as shaken baby syndrome. The Office of the Chief Medical Examiner (OCME) of Virginia reported 26 SBS deaths for a similar period of time (2004-2007) (Virginia Department of Health, 2010). More recently, VDH data for March 1, 2008 through December 21, 2009 (2010 data unavailable), showed an incidence of 23 SBS cases, with a death rate of 10 infants (43.5%); 87% of Virginia's SBS cases were under the age of one.

Interestingly, the Virginia Department of Social Services Child Protective Services (CPS) Division reported more than twice the number reported by VDH (50 cases), with 16 deaths (32%) from 03/01/08 – 02/28/10 (Goldschmidt, 2011). The true incidence may be higher than either figure; the Fourth National Incidence Study of Child Abuse and Neglect (NIS-4), estimated that only 30% of Harm Standard Physical Abuse – Serious Severity cases were investigated by Child Protective Services, subsequently, a closer approximation of Virginia's incidence for this two year period may be as many as 167 cases (Fourth National incidence Study of Child Abuse and Neglect, 2010).

The discrepancy between VDH and CPS data for Virginia's SBS incidence may be reflective of VDH's use of ICD-9 hospital discharge codes as an incidence calculation tool; ICD-9 code 995.55 is thought to be specific, but not sensitive (Wirtz, 2008). Cases that were not correctly coded or were non-hospitalized fatality cases were not included in VHI data sets. The use of SBS fatality data from Virginia's OCME may capture the "missed" non-hospitalized SBS case fatalities, but it may also "double-count" those SBS cases which were hospitalized prior to death. Lastly, VDH data relies on the valid and accurate use of hospitals' ICD-9 coding (Virginia Department of Health, 2010).

The Virginia Department of Medical Assistance Services (DMAS) reported a total of 92 children received SBS related (out-patient or long-term) medical care from 03/01/2008 – 02/28/2010; while this figure cannot be utilized as an incidence indicator (a portion of these cases were likely diagnosed prior to March 1, 2008), it may prove helpful in understanding the scope of Virginia's SBS incidence and costs (Goldschmidt, 2011). Therefore, in order to better describe the scope of SBS, VDH, DSS and DMAS need to determine if a standard definition is possible and develop plans to implement the use of that definition.

Strategy 3: Based on current practices and research; select a standard program to support and use across the Commonwealth.

All SBS related interventions and prevention programs that have been evaluated and found to be effective involve parent education at the time of birth, using video and printed materials, as well as a conversation with a nurse, about preventing Shaken Baby Syndrome. Three critical components of all SBS education include informing parents that inconsolable crying is a normal part of development for a baby; making parents aware of signs of frustration in themselves and other caretakers and teaching parents strategies to de-escalate those feelings.

As part of CDC funded research, Dr. Desmond K. Runyan of The Kempe Children's Centre in Colorado is testing the Period of PURPLE Crying in North Carolina. This statewide program educates parents about normal infant crying patterns, how to respond to crying, and the dangers of shaking. New parents, following delivery in hospitals, receive the information through written materials, a DVD and a discussion with a nurse. The program is available in ten languages and is presented at a Grade 3 language level.

Using these venues, Dr. Runyan has found that the Period of PURPLE messaging is being received by 84% of new parents of babies in North Carolina. Results related to message dissemination at sick and well baby visits in the first month of life were determined to be not as universal as hospital-based education, but is a reasonable strategy for reinforcement. However, a survey examining the incidence rate in North Carolina over the last 21 months has not been promising as SBS rate remains unchanged. Whether this indicates a lack of impact of the program or reflects the national upward trend of SBS cases is unclear.

The DIAS Model is a comprehensive hospital-based program centered on parent education at the time of birth. The program was developed by Dr. Mark Dias, a Pediatric Neurosurgeon. SBS education is presented to new parents through a video "*Portrait of Promise: Preventing Shaken Baby Syndrome*" which focuses on the danger and consequences of shaking, review of a brochure, a 5-10 minute conversation with a nurse and the signing of a commitment statement. The materials are available in English, Hmong, Somali and Spanish.

The DIAS model has been implemented in Arizona, Connecticut, Pennsylvania, Massachusetts, Michigan, and New York. Five year implementation of the program (1998-2003) in Upstate New York, evidenced a 47% decline in SBS/AHT incidence, with another 10% incident decrease with the addition of education provided by pediatricians at first check-up. Philadelphia is attempting implementation with additional non-repetitive reminder education at 2, 4, and 6-month immunization visits. Recent evaluation data released at the 12th International Conference on Shaken Baby Syndrome/Abusive Head Trauma, October 2012 indicate that the preliminary results of implementation in Philadelphia have not been nearly as promising as results in New York.

By using a task force of subject matter experts, the group can establish a universal model based on current practices and research supporting promising practices and evidence-based programs, thus ensuring caregivers and families are receiving one clear message to prevent SBS.

VDH's role to decrease the incidence of Shaken Baby Syndrome:

1. Convene a group of experts from across the State to evaluate and discuss current evidence and best practices surrounding SBS
2. Work with other appropriate agencies to create a standard definition for SBS to begin data collection
3. Convene a group of experts from across the State to select a standard program to support and use across the Commonwealth.

External Stakeholder's role to decrease the incidence of Shaken Baby Syndrome:

1. Stakeholders will participate in the SBS Task Force to determine best practices needed to be implemented to reduce SBS

2. Stakeholders will participate to create a standard definition for SBS to begin data collection
3. Stakeholders will adopt evidence-based practices at hospitals, in prenatal/childbirth classes and pediatric offices to reduce the incidence of SBS.

Proposed Success Indicators for Objective 5

****These are suggested indicators which will be reviewed, collected if possible, or a process created to be used in the development of the implementation and evaluation plan for each objective; these indicators are subject to change*

- Percent of families and/or caregivers educated on prevention of Shaken Baby Syndrome by hospital
- Rate of hospital emergency department visits for Shaken Baby Syndrome for infants birth to 12 months
- Number of infants who die or are hospitalized as a result of Shaken Baby Syndrome

Chapter Five

Strategic Goal 5: To improve the collection, analysis, dissemination, and evaluation of perinatal factors which influence infant mortality.

Background

The methods in which data are collected, analyzed, and disseminated ultimately determine their ability to inform and influence programs and policies. Data on perinatal factors which influence infant mortality are collected, analyzed, and disseminated autonomously by numerous state agencies such as the Virginia Department of Health (VDH), Department of Social Services (DSS), and Department of Medical Assistance Services (DMAS), as well as academic institutions, national organizations (e.g., March of Dimes), health plans, health care systems, providers and community stakeholders. Often, this is done without standard definitions or methods. Data system interoperability and data sharing is limited and unknown because of the current autonomous nature of data collection. Additionally, gaps in data can develop when data is produced autonomously by independent agencies and stakeholders, and this can blur the impact of some perinatal factors on infant mortality. Datasets can be joined at the individual level through linkages between data producing entities but when unlinked, analyses are limited to the Commonwealth aggregate level. The issue of infant mortality poses a unique opportunity for state agencies and community stakeholders to work together to discuss and develop a systematic data collection, analysis, and dissemination strategy.

Data collection, Analysis and Dissemination of Perinatal Factors are a Critical Issue for Infant Mortality:

Evidence based decisions will more effectively address the challenges infant mortality poses. The best available evidence is produced through developing communication, sharing, and linkages between data producers to harness the full value of joined information systems and resulting statistics. Three Virginia state agencies (VDH, DMAS, DSS) involved in preventing infant mortality all report to the Secretary for Health and Human Resources, increasing the potential for collaboration and a unified vision and mission. Each of the three agencies brings key data elements to the discussion on preventing/reducing infant mortality in the Commonwealth. Through collaboration and continued partnership it is possible to harness the collective effort that will provide the best available data collection, analysis and dissemination to prevent infant mortality.

Data collection, Analysis and Dissemination of Perinatal Factors and Health Equity:

In spite of significant improvements in maternal and infant health outcomes, certain populations continue to experience wide inequities, resulting in poorer outcomes for many infants. Offices within state agencies, such as the VDH's Office of Minority Health and Health Equity, and other entities contribute to the development of health policy through a wide range of analyses and research on quality of health, accessibility of healthcare, and the magnitude and distribution of health inequities in the Commonwealth. The course of health equity is championed by identifying health inequities, assessing their root causes, and addressing them by promoting social justice, influencing policy, establishing partnerships, providing resources, and educating the public. Work focuses on characterizing inequities in health and healthcare and how such disparities are distributed across the Commonwealth. By analyzing health and healthcare at the community level, from neighborhoods to rural and inner city areas, social and environmental determinants of health are understood. Maternal and infant health disparities are more distinct in racial and ethnic communities due to a wide range of social determinants of health which are linked to the same inequities that racial and ethnic communities experience in the larger social

framework. Racial and ethnic minorities suffer a disproportionately high burden of diseases and experience higher rates of mortality. Despite the extensive analysis to address the Health Equity in regards to infant mortality and low birth weight, additional information is needed on health insurance status, socioeconomic status (SES) and the biologic and genetic characteristics of the mother to help understand or address the issue of infant mortality. Finally, meaningfully engaging with the social determinants of health is a critical component of any comprehensive health equity strategy to improve birth outcomes and the health of everyone in Virginia.

Four specific objectives have been defined under the topic of data collection, analysis, dissemination, and evaluation of perinatal factors, which impact infant mortality:

- Objective 1: Identify gaps and opportunities in data, standardize and enhance reporting on factors associated with infant mortality by 2018.
- Objective 2: Use statistical modeling to inform infant mortality prevention, program planning and evaluation by 2018.
- Objective 3: Create a perinatal data dissemination plan by 2018.
- Objective 4: Identify gaps in the current evaluation process for all strategies and develop an evaluation plan for the identified gaps

Objective 1: Identify gaps and opportunities in data, standardize and enhance reporting on factors associated with infant mortality by 2018.

Strategy 1: Inventory current data sources within Virginia Department of Health (VDH) and across stakeholders noting gaps in needed data.

There are several data sources that are available to provide information on perinatal factors that influence infant mortality. Many of the data sources are designed to collect data specific to program participants or subset of the general population, or for a particular purpose. An inventory of data sources can be compiled to describe the multiple data systems and their ability to capture elements identified in the scientific literature that contribute to infant mortality. For each element that contributes to infant mortality, it is important to inventory data systems that collect that element and describe how and on whom they were collected. Gaps in data may appear, and can inform planning to obtain complete data.

Strategy 2: Standardize data definitions and create reporting standards.

There is potential for differences in the way data elements are defined and collected among the data producers that collect information on perinatal factors that influence infant mortality. As a result of differences in these definitions, different data reporting methodologies may be necessary. As a part of the data sources inventorying process, the specific definition of data elements will be investigated across contributors using a collaborative approach. Through integrating the feedback of end users and collaborators, a standard data definition will be developed where possible. Once standard data definitions are established, standard reporting methodologies that address other components such as geographic level analysis, small cell size data suppression rules, standard racial/ethnic categories, and other additional criteria can also be developed.

Strategy 3: Identify data linkage opportunities within VDH and across other stakeholders.

Through inventorying existing data sources and establishing standardized data definitions, linkage opportunities can be identified. The data source inventory can act as a roadmap of potential opportunities to link existing data. The gaps in existing data that were identified through the data inventorying process will also be useful as areas where additional investments could be made to bridge the gaps through data linkage. The establishment of standardized data definitions and reporting methodology will assist in identifying appropriate data linkage opportunities and streamline the linkage process by facilitating data integrity and consistency.

Throughout the data linkage process all activities will be conducted in accordance and compliance with the Code of Virginia (COV), the Health Insurance Portability and Accountability Act (HIPAA) and agency Institutional Review Boards. Additionally, any data linkage procedures that are developed through this strategic plan will be developed ensuring patient/entity privacy and confidentiality.

VDH's role to identify gaps and opportunities in data reporting and analysis:

1. VDH will coordinate efforts to inventory data sources.
2. VDH, working with partners, will identify gaps in suspected data elements that contribute to infant mortality.
3. VDH will coordinate efforts to standardize data field definitions and create data standards.
4. VDH will coordinate linkage opportunities.

External stakeholder's role to identify gaps and opportunities in data reporting and analysis:

1. Partners will contribute to the data element inventory.
2. Partners will contribute to data element standardization and creation of reporting standards.
3. Partners will contribute to data sharing when the data is amenable to a linkage and allowed by state and federal laws and regulations.

Objective 2: Use statistical modeling to inform infant mortality prevention, program planning and evaluation by 2018.

Strategy 1: Quantify the relative importance of multiple factors that contribute to infant mortality.

Life events are often influenced by many factors and infant mortality is no exception. The statistical methodology chosen to help explain infant mortality should be compatible with the multiple influences that impact life events. A statistical modeling process, called regression modeling, can quantify the relative importance of multiple factors that contribute to infant mortality. Examples of multiple factors that potentially contribute include prenatal care and local medical resources, birth spacing, education, chronic health conditions, population demographics, health insurance, assisted reproductive technology, geography, and other known risk factors.

The causes of infant death will be separated into multiple models to evaluate infant mortality by infant age (neonatal and post-neonatal) and by cause of death (birth defects/congenital anomalies, disorders related to short gestation, and injuries). Determining the relative burden attributable to birth defects/congenital anomalies and preventable conditions will help focus intervention and identify realistic goals.

The utility of regression models depends on the quality and types of data sources that inform the model. VDH has vital statistics data in addition to environmental population information such as the area of residence: percent poverty, urban/rural designation, number of medical providers, and other population demographics. Linkages to data sources owned by other organizations (such as Medicaid, Health plans, Electronic Health Records, domestic violence) can help create a better model that more accurately explains variations in infant mortality rates and helps to approach the full potential of statistical possibility.

Strategy 2: Identify the different risk factors associated with infant mortality across the geographic areas within the Commonwealth.

Infant mortality varies by geographic area. Geographic analysis utilizes statistical methods and then plot results on a map to show differences across the Commonwealth. Geographic analysis can identify areas with greatest need, define clusters of infant mortality, or show areas with geographic access problems to help decision makers create a strategy for intervention. Policy makers will be able to evaluate the spatial relationship between infant mortality and social determinants of health.

The need for a proactive assessment methodology that identifies areas where public health interventions can be most effectively and efficiently applied was the stimulus for High Priority Target Areas (HPTA) concept/methodology developed by Office of Minority and Health Equity within VDH. It was realized that community interventions, whether they were concerned with designation of medically underserved areas/health professional shortage areas or support of community efforts to improve health outcomes, required the ability to prioritize and discern where interventions were most needed and where they could be most profitably applied.

HPTA research evaluates “spatial dependency” and emphasizes that the level of aggregation of data can have a significant impact on understanding health issues within communities. For example, clusters or “hot spots” of infant deaths are not confined to jurisdictions and can cross many cities/counties—e.g., Henrico and Richmond City. Analysis that is conducted at the county or health district level may miss some of these relationships. Therefore HPTA analysis begins at the Census block group level, a small geographic unit that typically contains 300 or fewer individuals, and aggregates to higher optimum contours of like concentrations of infant deaths. For example, the HPTA methodology techniques can help to identify areas where the worst disparities in birth outcomes are clustered, or highlight communities with low poverty rates where infant mortality is unexpectedly high. The HPTA methodology will help to progress from the direct symbolic display of data on maps to using spatial variables in epidemiological models.

Strategy 3: Collaborate with institutions of higher education and the Scientific and Technical Advisory Group (SaTAG) to develop a research agenda relating to infant mortality prevention.

As part of the process in developing the Infant Mortality Prevention Strategic Plan, a group of experts in the field of perinatal health in the Commonwealth were convened to discuss the key causes of infant mortality and identify the emerging clinical issues. Leaders from the professional obstetrical, pediatric and emergency medicine provider organizations joined key researchers and practitioners from the academic and research institutions to explore interventions that would reduce the infant mortality in the state. These representatives agreed to become

the Scientific and Technical Advisor Group for the Strategic Plan. They all expressed commitment to partner with VDH in this endeavor and were interested in developing an overarching research agenda around infant mortality.

A research agenda will contain guiding principles for investigation of short and long term questions. The collective experience of the research agenda stakeholder group and additional knowledge gained from investigating scientific literature can be used to identify practical problems to address across the Commonwealth, build on past successes, and challenge current circumstances.

VDH's role in using statistical modeling to inform infant mortality prevention, program planning and evaluation:

1. VDH will initiate quantifying the relative importance of multiple factors that contribute to infant mortality.
2. VDH will use the high priority target area methodology to help identify risk areas and geographies for intervention.

External stakeholder's role in using statistical modeling to inform infant mortality prevention, program planning and evaluation:

1. Stakeholders will help identify geographies of interest and utilize subsequent reports for targeting interventions to needy areas.
2. Stakeholders can provide input on statistical models and advances in scientific literature to help guide development.

Objective 3: Create a perinatal data dissemination plan by 2018.

Strategy 1: Develop standardized reports that are user friendly across all stakeholders.

Standardized data reporting is an essential component of an effective dissemination plan. In the case of Virginia's perinatal data, stakeholders include constituents, healthcare recipients, local health district staff and administration, community members, legislators, non-governmental organizations, healthcare providers, and many others. The variety of data consumers makes it particularly critical to have clear, standardized reports that are easily understood by a wide-ranging audience.

Virginia will develop standardized reporting mechanisms (e.g., fact sheets, tables, figures, text reports, etc.) suitable for distribution to the general public. The reports will target key topic areas addressed in the four preceding chapters of this VA Infant Mortality Strategic Plan: pre-conception health, prematurity and preterm birth, interconception health, and injury prevention and positive parenting. These documents will be published in a timely and predictable fashion to ensure that stakeholders have updated and relevant information to inform decision-making.

Strategy 2: Create a publicly available central web-based reporting tool related to infant mortality.

The Commonwealth of Virginia has a wealth of perinatal health data available to the public and government stakeholders. As the Commonwealth continues to strengthen its data collection procedures, making this data more

readily accessible to all stakeholders is a key step in the dissemination plan. Virginia stakeholders have a need for a centralized system designed to provide end-users a center for up-to-date perinatal data.

An ideal publicly-accessible data clearinghouse will have 2 key elements: a web-based reporting tool for data and reports, and links to other data sources as available. This website would allow users to perform queries on key indicators related to infant mortality in the Commonwealth. The system would also include geographic distributions, local data, and data linked with external data sources and programs (e.g., DMAS, education, criminal justice). The website would also be unified source for publicly-available factsheets, maps, presentations, and reports. Such a website would also allow data producers to provide training and technical support on utilizing data to develop and improve programming.

Strategy 3: Centralize a mechanism to respond to perinatal data requests related to infant mortality.

In the past decade, public health efforts to address perinatal health have dramatically increased, along with a growing number of external stakeholders. As prevention efforts have expanded throughout the Commonwealth, the demand for high-quality data related to perinatal health indicators has increased as well. Community stakeholders have many wide-ranging data needs. They report using perinatal data to support grant applications, evaluate programs, compare their regions to other areas, and identify areas to target with additional assessment or intervention. For all of these purposes, stakeholders may need to request data from multiple data producers.

The high volume of perinatal data requests has highlighted the need for a centralized mechanism to triage and respond to these requests. Through the proposed website, requestors could create a web submittal which will be routed directly to VDH, who, working directly with multiple data producers will route the request appropriately. Such a request mechanism would provide stakeholders with an easy-to-use online tool and a specific place to direct requests. This system would increase efficiency by eliminating duplication and effectively routing requests to the appropriate personnel and data sources to meet requestor needs in the most efficient, timely, and responsive manner. It would also allow tracking and quantifying these requests.

VDH's role in creating a perinatal data dissemination plan:

1. VDH will coordinate efforts to standardize reports for dissemination.
2. VDH will explore hosting the publicly-accessible data clearinghouse.
3. VDH will develop a request form and mechanism for triaging data requests.

External stakeholder's role in creating a perinatal data dissemination plan

1. Partners will report to VDH the available reports for dissemination so the links can be included in the clearinghouse.
2. To facilitate fulfilling data requests, partners need to communicate to VDH a contact person for fulfilling data requests.

Objective 4: Develop an evaluation plan that assesses the extent to which the strategies have positively impacted infant mortality.

It is important to measure programs and strategies collectively and individually to assess progress at decreasing infant mortality in the Commonwealth. Evaluation findings will be used to measure the extent to which progress is made towards achieving the strategic goals.

Infant Mortality Strategic Goals

- Goal 1** To improve the knowledge, attitudes and behaviors of reproductive age women related to preconception health across the Commonwealth.
- Goal 2** To reduce premature births across the Commonwealth
- Goal 3** To improve inter-conception care and family planning across the Commonwealth
- Goal 4** To improve injury prevention and positive parenting efforts within Virginia
- Goal 5** To improve the collection, analysis, dissemination, and evaluation of peri-natal factors which influence infant mortality

In the past, evaluating infant mortality prevention strategies was not done in a systematic way, and was mostly limited to reporting on process measures. Over the next five years, greater emphasis will be placed on 1) strengthening the evaluation readiness of stakeholders internal and external to VDH, 2) developing well informed evaluation designs/ or measures which have been accepted by all those involved and/or impacted by evaluation findings, and 3) implementing systems to ensure quality evaluation data is obtained, and that this information is used to inform program design.

Strategy 1: Engage infant mortality stakeholders (internal staff, external partners) using principles of participatory evaluation to develop the evaluation implementation plan.

Involving key leaders and partners in evaluation planning increases the likelihood of findings being accepted and used, as key leaders and partners have a sense of ownership of the results, rather than feeling that project improvement plans are dictated to them. Participatory evaluation can also be used to develop stakeholder capacity to conduct future evaluations teaching a range of skills useful in evaluation (e.g., data management, survey design). Building this capacity at a local level helps to ensure that sound evaluation processes are integrated throughout efforts to reduce infant mortality.

In developing an evaluation implementation plan, VDH will work to incorporate the evaluation plans for current programs when they exist. The overall infant mortality evaluation plan will seek to build upon the work and capacity that is already in place, rather than recreating it.

Strategy 2: Utilize an evaluation design/focus which is understood by all stakeholders, systematically updated, and measures process, impact, and outcome metrics (where feasible).

Ideally, the evaluation design/focus will include language that is easily understood by all stakeholders involved in implementing strategies, as partners from various sectors will not likely speak the same technical language. Also, the design/focus of the evaluation will be reviewed and updated at regular intervals based upon the most recent evaluation findings.

Last, designing evaluations which assess process, impact, and outcome measures enables programs to 1) assure that programs are being implemented as intended, are having the desired reach, can identify contextual factors that may impact results; 2) if short-term activities are leading to the desired intermediate accomplishments; and 3) the extent to which the desired long-term changes are occurring. The latter depends upon the prior two levels of evaluation, so it is important to plan evaluation components prior to beginning strategic intervention. Where feasible, VDH will utilize a scientific evaluation design to assess the dosage of strategies used in singular, or in unison with other strategies, and to make comparisons between geographic locations.

Process measures will be used to measure:

Context – aspects of the social, political, and economic environment that may influence implementation of any of the proposed infant mortality strategies

Reach – the number of people touched by program interventions (e.g., proportion of the mothers aged between 18-44 who participated in the “Show Your Love” campaign)

Fidelity – extent to which strategies to reduce premature births, or improve inter-conception care and family planning are delivered as planned

Impact measures will be used to measure changes in knowledge, attitudes, beliefs, behaviors, practices, and policies. An example of an impact measure is the percentage of expectant mothers who understand the harmful effects of smoking during pregnancy. It can also be the number of expectant mothers who receive their prenatal care at an established medical home.

Outcomes measures will be used to measure the ultimate goal of the objective. Measures such as the number of women of child bearing age who abstain from tobacco use, or changes in the rates of unintended pregnancy are examples of outcome measures.

Strategy 3: Develop, implement, and evaluate data analysis and sharing plan for internal and external audiences.

For programs and strategies to remain relevant, effective and efficient, VDH will continually analyze data to provide timely information for program planning. Further, a process of continual review will be built into programs and strategies, and opportunities for sharing and learning from evaluation findings will be routine in nature.

Moving forward, VDH will ensure that evaluation results are used to inform program design and policies. To do this, VDH will ensure that capacity exists internally and externally to learn from evaluation activities. A potential method for sharing evaluation results with a wide range of stakeholders is developing a common Website site for displaying evaluation success stories/best practices from within VDH, and among partner organizations. This site could be used to share timely, succinct data with senior management and elected officials about strategies to address infant mortality in the Commonwealth.

These efforts exist along a continuum, and begin while engaging stakeholders. Stakeholders will be used to develop and prioritize all evaluation questions, and in determining potential uses of data when prioritizing questions. Other activities to encourage the use of evaluation findings includes providing resources to help staff

members use evaluation data, and understanding what information is desired by stakeholders, and how this information will be used. Last, continually reviewing the goal of the evaluation and determining if findings are yielding information to answer this goal will help to limit the amount of undesired information being collected, thus increasing the likelihood that findings will be used.

VDH's role to develop an evaluation plan:

1. VDH will lead development of an evaluation plan which measure infant mortality intervention strategies

External Stakeholder's role to develop an evaluation plan:

1. VDH partners will assist in developing the infant mortality evaluation plan.

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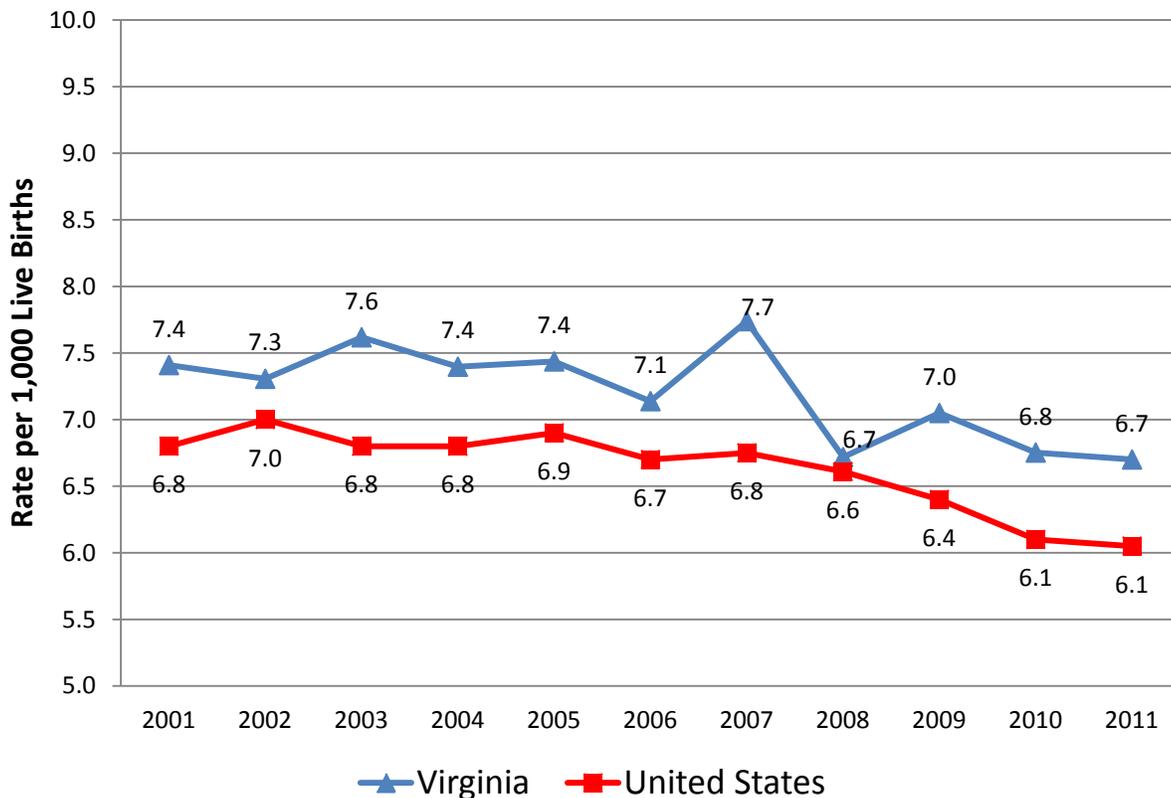
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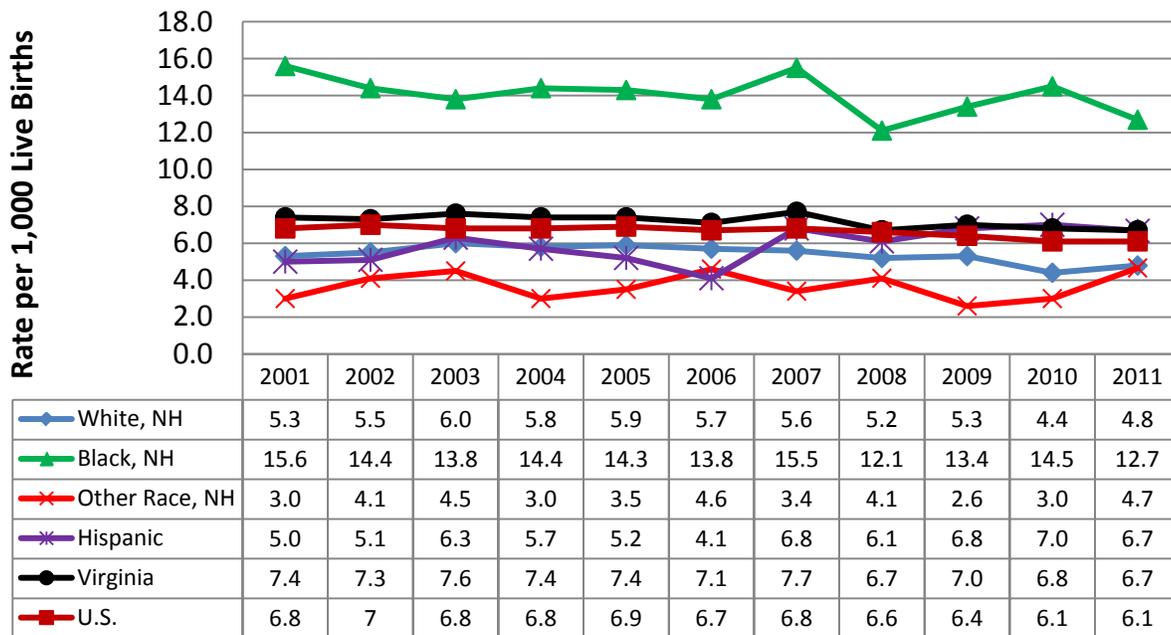
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APPENDIX A



Source: VDH Division of Health Statistics, compiled by the Division of Policy & Evaluation, Office of Family Health Services

Figure 1. Resident Infant (<1 year of age) Death Rates by Virginia and U.S. Rate, 2001-2011.



Source: VDH Division of Health Statistics, compiled by the Division of Policy & Evaluation, Office of Family Health Services

Figure 2. Resident Infant (<1 Year of Age) Death Rates by Race/Ethnicity, (NH=non-Hispanic)

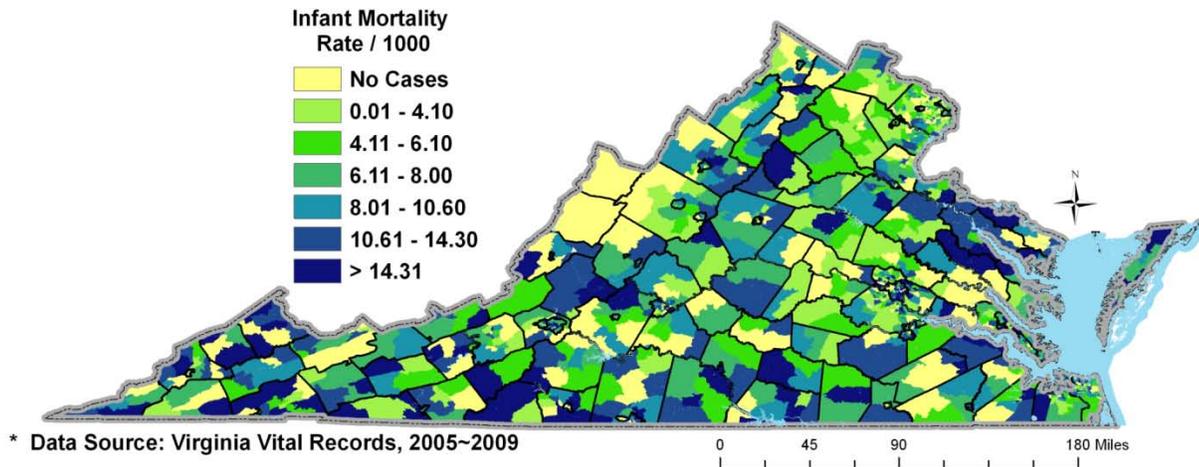
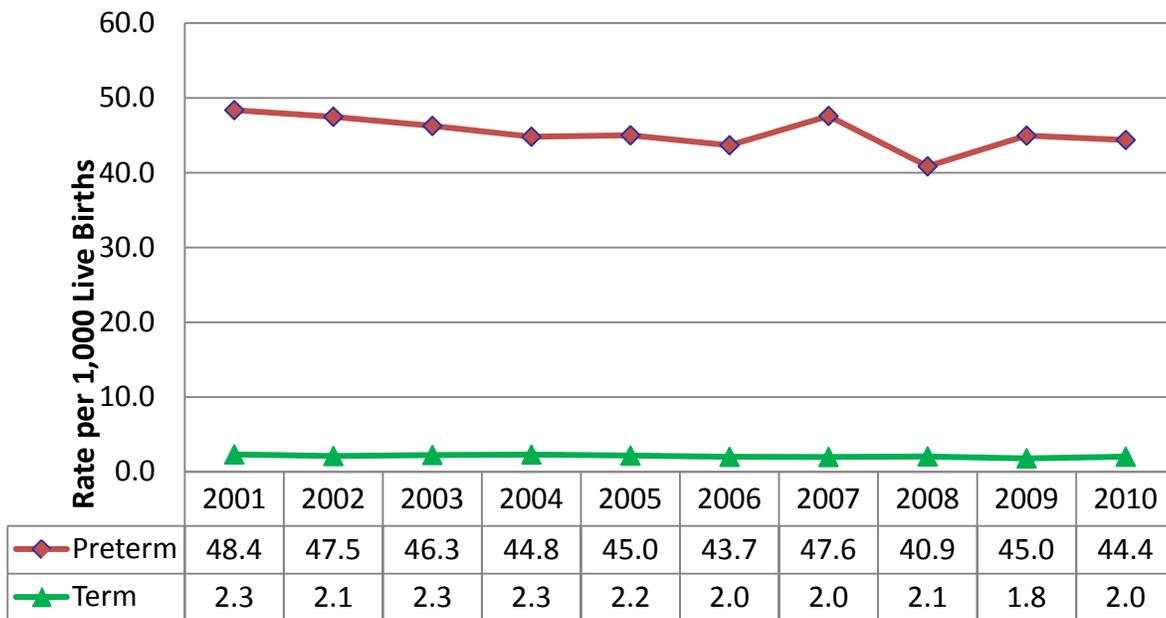
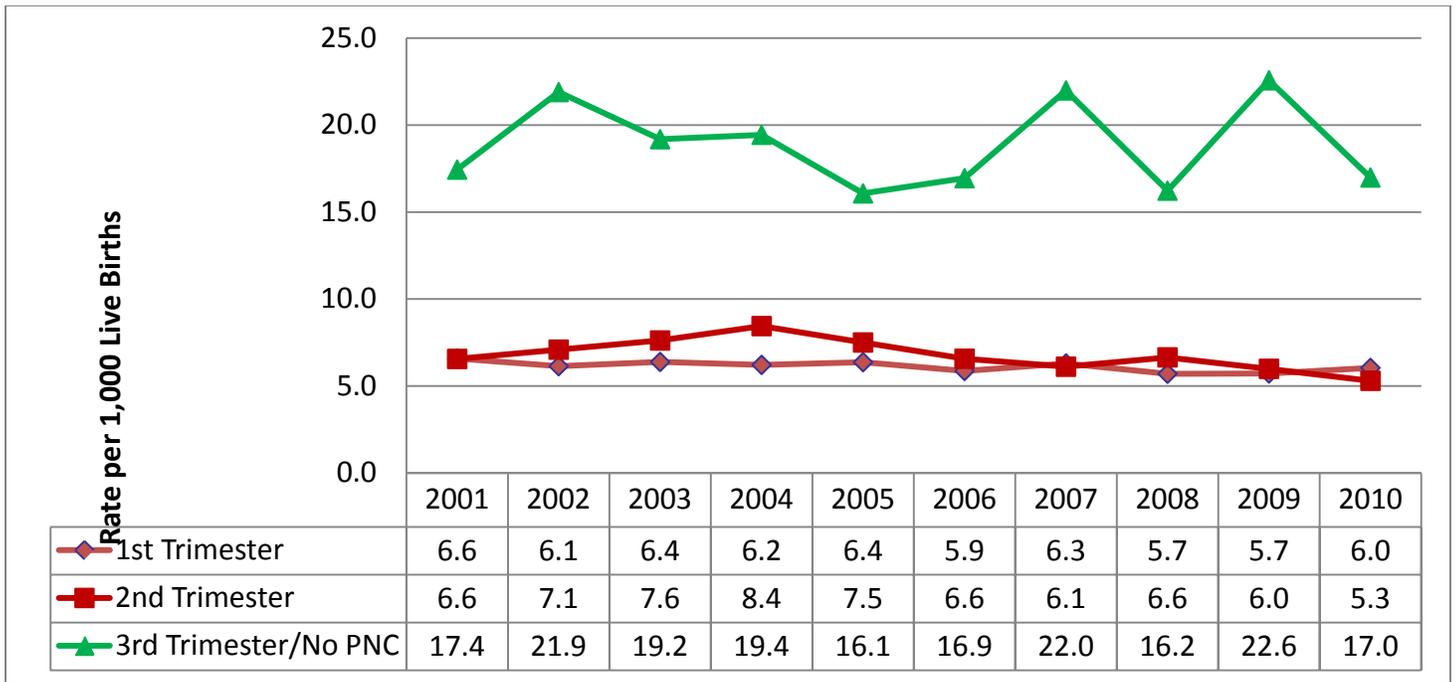


Figure 3. Infant Mortality Rate (per 1,000 live births) by Census Tract, Virginia 2005-2009.



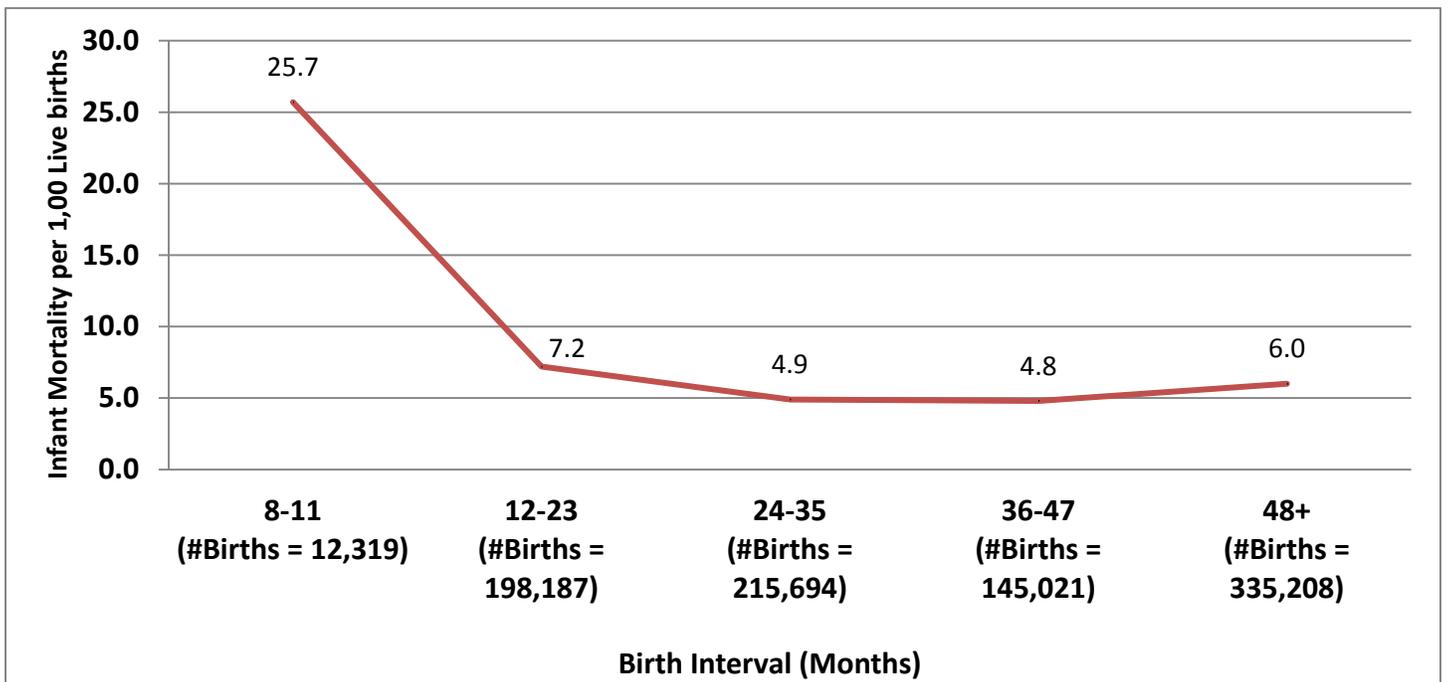
Source: VDH Division of Health Statistics, compiled by the Division of Policy & Evaluation, Office of Family Health Services

Figure 4. Resident Infant Mortality Rates by Prematurity (< 37 Weeks Gestation).



Source: VDH Division of Health Statistics Resident Live Birth, Fetal Death, and Induced Terminations of Pregnancy Certificates 1999-2011, compiled by the Division of Policy & Evaluation, Office of Family Health Services

Figure 5. Infant Mortality Rate per 1,000 Live Births by Trimester Prenatal Care began, Virginia 2001-2010.



Source: VDH Division of Health Statistics Resident Live Birth, Fetal Death, and Induced Terminations of Pregnancy Certificates 1999-2011, compiled by the Division of Policy & Evaluation, Office of Family Health Services

Figure 6. Infant Mortality Rate by Preceding Birth Interval, Virginia 1993-2009.

APPENDIX B

Preconception Health and Health Care

My Reproductive Life Plan

Thinking about your goals for having or not having children and how to achieve those goals is called a *reproductive life plan*. There are many kinds of reproductive life plans. Your plan will depend on your personal goals and dreams.



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How to Make a Plan

First, think about your goals for school, for your job or career, and for other important things in your life. Then, think about how having children fits in with those goals.

If you do want to have children one day, think about when and under what conditions you want to become pregnant. This can help ensure that you and your partner are healthy and ready when you choose to have a baby. If you do not want to have children (now or ever), think about how you will prevent pregnancy and what steps you can take to be as healthy as possible.

Try to include as many details as possible in your plan. Some people find it helpful to write their plan down on a piece of paper or in a journal. Be sure to talk with your health care professionals. Doctors and counselors can help you make your plan and achieve your goals.

Questions to Get Started

When making a reproductive life plan, the following questions might be helpful. These are probably not all of the questions that you will want to ask yourself, but they will help you to get started.

If you **DO NOT** want to have children, you might ask yourself:

- How do I plan to prevent pregnancy? Am I sure that I or my partner will be able to use the method chosen without any problems?
- What will I do if I or my partner becomes pregnant by accident?
- What steps can I take to be as healthy as possible?
- What medical conditions (such as diabetes, obesity, and high blood pressure) or other concerns (such as smoking, drinking alcohol, and using drugs) do I need to talk about with my doctor?
- Is it possible I could ever change my mind and want to have children one day?

If you **DO** want to have children one day:

- How old do I want to be when I start and when I stop having children?
- How many children do I want to have?
- How many years do I want between my children?
- What method do I plan to use to prevent pregnancy until I'm ready to have children? Am I sure that I or my partner will be able to use this method without any problems?
- What, if anything, do I want to change about my health, relationships, home, school, work, finances, or other parts of my life to get ready to have children?
- What steps can I take to be as healthy as possible, even if I'm not ready to have children yet?
- What medical conditions (such as diabetes, obesity, and high blood pressure) or other concerns (such as smoking, drinking alcohol, and using drugs) do I need to talk about with my doctor?

Examples of Plans

Following are some examples of reproductive life plans:

- I've decided that I don't want to have any children. I will find a good birth control method. Even though I don't want to have children, I will talk to my doctor about how I can be healthier.
- I'm not ready to have children now because I want to finish school first. I'll make sure I use effective birth control and protect myself from sexually transmitted diseases every time I have sex. Some day, I think I'd like to have two or three children about 2 years apart. Before I get pregnant, I will talk to my doctor about losing weight and eating healthy.
- I want to have children when I've saved some money. My partner has diabetes so, when it's time, I'll encourage her to see her doctor to make sure her body is ready for pregnancy. In the meantime, we're taking really good care of ourselves just for us.
- I might want to have children one day, but I'm not sure right now. For now I'm not going to have sex. Even though I'm not ready to have kids yet, I'm going to talk with my doctor about how I can be as healthy as possible.
- I am in a good relationship and I'm pretty healthy. I want to stop using birth control and try to get pregnant. I'm going to talk to my doctor to find out what I can do to have a healthy pregnancy.
- I've had two kids, and they were only a year apart. Both times, it just happened. I want to have another kid before I turn 36, but I want to wait at least 2 years. I'll talk to my doctor about birth control. This time, I'm going to make sure I get pregnant only when I want to.
- I'm going to let pregnancy just happen whenever it happens. Because I don't know when that will be, I'm making sure that I'm in the best health now, just in case!
- My partner and I are ready to have a child, but we'll need to use a sperm bank or fertility service to get pregnant. I'll make sure I'm in good health and financially stable before we use those services.

Take Action

Once you have a plan, take action. For example, if you've decided to use condoms to prevent pregnancy, be sure to use them every time you have sex. Or, if you've decided to quit smoking, follow through and get help if needed.

Keep in mind that your plan doesn't have to be set in stone. Life is unpredictable! So, make a plan today, give it some thought each year, and expect to make changes along the way.

For more information please visit: www.cdc.gov/preconception

This Reproductive Life Plan was developed in partnership with Merry-K Moos, RN, FNP, MPH, FAAN, Department of Obstetrics and Gynecology, University of North Carolina at Chapel Hill and is based on her webinar, "Reproductive Life Plans" (February 25, 2010) available at <http://www.beforeandbeyond.org/?page=cme-modules>.



Preconception Health and Health Care Reproductive Life Plan Tool For Health Professionals



Health care providers can encourage patients (women, men, and couples) to consider a *reproductive life plan* and educate patients about how their reproductive life plan impacts contraceptive and medical decision-making.



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Do you plan to have any (more) children at any time in your future? *(Open ended and allows branching.)*

IF YES:

- How many children would you like to have? *(Encourages the person to consider that there is a choice about the number of children one has.)*
- How long would you like to wait until you or your partner becomes pregnant? *(Encourages the person to vision their own future.)*

Studies have shown an association between shorter birth intervals (less than 6 months between giving birth and conception), and several adverse fetal outcomes, including low birth weight, preterm birth, and small for gestational age. Intervals of 60 months or longer had higher risks for preterm birth and very small for gestational age.^{i,ii}

Many women are waiting until their 30s and 40s to have children. About one-third of couples in which the woman is older than 35 years have fertility problems.ⁱⁱⁱ

- What family planning method do you plan to use until you or your partner are ready to become pregnant? *(Gives the patient an opportunity to formulate and communicate a personal strategy.)*

About half of all pregnancies in the United States are unplanned. Slightly more than half of unintended pregnancies occur among women who were not using any method of contraception in the month they conceived.^{iv}

- How sure are you that you will be able to use this method without any problems? *(Encourages the patient to recognize that methods can have problems and to consider matching method choice to personal circumstances.)*

Contraception is highly effective; however, no method, including permanent sterilization, is perfect. In addition to nonuse of contraception, unintended pregnancies occur due to imperfect use of contraception (43%), and method failure (5%).^v

IF NO:

- **What family planning method will you use to avoid pregnancy?**
(Gives an opportunity to formulate and communicate a personal strategy to achieve plan.)

About half of all pregnancies in the United States are unplanned. Slightly more than half of unintended pregnancies occur among women who were not using any method of contraception in the month they conceived.^{iv}

- **How sure are you that you will be able to use this method without any problems?**
(Encourages recognition that methods can have problems and to consider matching method choice to personal circumstances.)

Contraception is highly effective; however, no method, including permanent sterilization, is perfect. In addition to nonuse of contraception, unintended pregnancies occur due to imperfect use of contraception (43%), and method failure (5%).^{iv}

- **People's plans change. Is it possible you or your partner could ever decide to become pregnant?**
(Relays the message that plans can change and that it is okay, but deliberate decisions about becoming pregnant are possible and desirable.)

Action Steps

Once your patient has a plan—encourage her or him to take action. For example, if she's decided to use the pill, ask her if she has thought about how to take the pill the same time every day; if his plan is to use condoms, ask if he has thought about how to have a useable condom available whenever needed.

Remind patients that the plan doesn't have to be set in stone. Life is unpredictable! So, encourage people to make a plan today, give it some thought each year, and expect to make changes along the way.

For more information please visit: www.cdc.gov/preconception

References:

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- iv. Frost JJ, Darroch JE and Remez L. Improving Contraceptive Use in the United States, In Brief, New York: Guttmacher Institute, 2008, No.1.

This Reproductive Life Plan was developed in partnership with Merry-K Moos, RN, FNP, MPH, FAAN, Department of Obstetrics and Gynecology, University of North Carolina at Chapel Hill and is based on her webinar, "Reproductive Life Plans" (February 25, 2010) available at <http://www.beforeandbeyond.org/?page=sme-modules>.



APPENDIX C

Table 1

Causes of Neonatal (<28 day of age) Mortality By Race/Ethnicity, Virginia 2006-2010

| Rank | White, NH | Black, NH | Other Race, NH | Hispanic |
|------|---|---|----------------|---|
| 1 | Disorders Related to Short Gestation and Low Birth Weight | Disorders Related to Short Gestation and Low Birth Weight | ~ | Disorders Related to Short Gestation and Low Birth Weight |
| 2 | Congenital Malformations, Deformations, and Chromosomal Abnormalities | Newborn Affected By Maternal Complications of Pregnancy | ~ | Newborn Affected By Maternal Complications of Pregnancy |
| 3 | Newborn Affected By Maternal Complications of Pregnancy | Congenital Malformations, Deformations, and Chromosomal Abnormalities | ~ | Congenital Malformations, Deformations, and Chromosomal Abnormalities |
| 4 | Other Conditions in the Perinatal Period | Other Conditions in the Perinatal Period | ~ | Other Conditions in the Perinatal Period |
| 5 | Newborn Affected By Complications of Placenta, Cord, and Membranes | Newborn Affected By Complications of Placenta, Cord, and Membranes | ~ | Newborn Affected By Complications of Placenta, Cord, and Membranes |

Source: VDH Division of Health Statistics, compiled by the Division of Policy & Evaluation, Office of Family Health Services

APPENDIX D

APPENDIX D

Patient/Client Name: _____
 Reviewed by Qualified Provider: _____

Date: _____
 Date: _____

Behavioral Health Risks Screening Tool *for Pregnant Women and Women of Childbearing Age* Patient/Client Tool

Women and their children's health can be affected by emotional problems, alcohol, tobacco, other drug use and violence. Women and their children's health are also affected when these same problems are present in people who are close to them. Alcohol includes beer, wine, wine coolers, liquor and spirits. Tobacco products include cigarettes, cigars, snuff and chewing tobacco.

| | | | | | |
|---|------------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|
| 1. Have you smoked any cigarettes or used any tobacco products in the past three months? | | YES <input type="checkbox"/> | | | NO <input type="checkbox"/> |
| 2. Did any of your parents have a problem with alcohol or other drug use? | YES <input type="checkbox"/> | | | | NO <input type="checkbox"/> |
| 3. Do any of your friends have a problem with alcohol or other drug use? | YES <input type="checkbox"/> | | | | NO <input type="checkbox"/> |
| 4. Does your partner have a problem with alcohol or other drug use? | | YES <input type="checkbox"/> | | | NO <input type="checkbox"/> |
| 5. In the past, have you had difficulties in your life due to alcohol or other drugs, including prescription medications? | | YES <input type="checkbox"/> | | | NO <input type="checkbox"/> |
| 6. Check YES if you agree with any of these statements. In the past month, have you drunk any alcohol or used other drugs? - How many days per month do you drink? _____ - How many drinks on any given day ? _____ - How often did you have 4 or more drinks per day in the last month ? _____ | | YES <input type="checkbox"/> | | | NO <input type="checkbox"/> |
| 7. Check YES if you agree with any of these statements. In the past 7 days, have you: - Blamed yourself unnecessarily when things went wrong? - Been anxious or worried for no good reason? - Felt scared or panicky for no good reason? | | | | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 8. Are you currently or have you ever been in a relationship where you were physically hurt, choked, threatened, controlled, or made to feel afraid? | | | YES <input type="checkbox"/> | | NO <input type="checkbox"/> |

