Baby Maybe? A Focus on Preconception Healthcare to Improve the Health of Childbearing Women and Pregnancy Outcomes

By

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ABSTRACT

The health of childbearing women has been a longstanding focus in the United States. Though we are a well developed, industrialized country, we rank poorly when compared against similar countries in the rest of the world for the rate of infant mortality. Therefore, it remains a major public health issue. When searching for causes for infant mortality, there has previously been a focus on obtaining early and continuous prenatal care\(^1\). Studies have supported this theory, showing a much higher rate of infant mortality for those who never obtained prenatal care during their pregnancy, and also proportionally higher rates of infant mortality depending upon how late in the pregnancy prenatal care was initiated. Although this was supported as one cause for infant mortality and could also predicate pregnancy complications, many in public health suspected that this was not the entire picture. There were many women becoming pregnant who were unprepared for the experience, both physically and mentally. Although there was widespread availability of contraception, statistics showed that even those who were not planning a pregnancy were also not using contraception, at an alarming rate\(^2\). Therefore, a strong argument could be made for going back in time to prepare a woman for pregnancy - from the very beginning of the time that she was able to conceive. Focusing on preconception health meant focusing on the health of all women of childbearing age, from 15-44 years old. This meant that education and information would start being disseminated in adolescence, in a school health class or from a healthcare provider. That information would be augmented as the woman became older and sexually active, to incorporate ways to use contraception effectively to be sure that she could plan her pregnancies according to her life goals, if she wanted to conceive at all. If a woman could be assessed and screened early and regularly during her
reproductive years, she may be less likely to have an unplanned pregnancy and she may also be able to obtain treatment interventions for any medical issues that she manages before she conceives, in order to reduce the possibility of pregnancy complications or a poor birth outcome. By controlling for these risk factors with consistent preconception health care, the goal is that the health of women of childbearing age across the nation will consistently improve. This paper will support the increase and widespread practice of preconception health and healthcare for the population of childbearing or reproductive age (15-44) by all healthcare providers at every clinical contact. The formalized recommendations that were published on the topic by the CDC in 2006 will be discussed in detail, as well as a sample of individual state efforts to meet those recommendations. Separately, this paper will discuss the state of preconception health in North Carolina, and a sample of programming efforts that are in place to improve birth outcomes by increasing this type of care. Funding sources will be addressed as parts of preconception health care are considered to be preventive care, while some interventions fall under the umbrella of clinical care. Lastly, we will look at the direction of preconception care at this time, looking forward to where it may lead in the future.

PUBLIC HEALTH ISSUE

The statistic of infant mortality is defined as the number of infants that die before reaching one year of age, per 1,000 births. Although the United States is a leading industrialized, technologically advanced country, it ranked next to last (28th) among similar nations in this category. In 2009, the rate for 2005 was reported to be 6.9 per 1,000 live births, in contrast to the lowest rate in Singapore at 2.1 per 1,000 births. Various hypotheses exist as to the reasons for this problem, but some are statistically supported, such as an elevated rate
of preterm births, which reached a 12.7% peak in 2007, reflecting a 20% increase from 1990-2004\(^4\). The definition of preterm birth is delivery of an infant occurring at less than 37 weeks gestation. The prevalence of preterm birth is 1 in 8 in the U.S., which demonstrates a recent decline\(^5\). Most of the increase seen in recent decades has been seen in late preterm births (34-36 weeks)\(^6\). Preterm births related to induced labor increased 7.5% to 17.3% between 1990 and 2006, and late preterm births delivered by c-section rose by 46% - from 28.5% to 34.3%\(^7\). Preterm related deaths account for more than 1/3 of all infant deaths during the first year of life and account for the most common reason of death than any other during this time period\(^8\).

Preterm birth also has cost implications that impact the parents, the infant, the health care system and therefore society as a whole. The overall cost of prematurity is estimated to be $26 billion or $51,500 for each infant in the U.S. for 2005. The breakdown of this figure is estimated to be:

\[
\begin{align*}
$16.9 \text{ billion} & \quad (65\%) \text{ for medical care} \\
$5.7 \text{ billion} & \quad (22\%) \text{ for lost household and labor market productivity} \\
$1.9 \text{ billion} & \quad (7\%) \text{ for maternal delivery} \\
$1.1 \text{ billion} & \quad (4\%) \text{ for special education services} \\
$611 \text{ million} & \quad (2\%) \text{ for early intervention services}\end{align*}
\]

The costs of a preterm birth can be 10 times as high as a healthy full term infant in 2007. For mom and baby, costs were estimated to be 4 times as high. Infants who were delivered prematurely had an average length of stay in the hospital of 14.2 days vs. 2.3 days average length of stay for a healthy full term infant. Lost productivity related to a preterm birth is estimated at $2,766 per employee\(^9, pg.2\), seemingly involving an extended hospital stay for the infant and follow up medical care that may be necessary due to health complications. The
additional educational costs for children who are born prematurely are related to four primary conditions – cerebral palsy, mental retardation, vision impairment, and hearing loss (all of which may vary in severity). Complications for infants may include an increased incidence of respiratory distress, intense and prolonged hospitalization for various conditions, increased risk of brain injury which may result in long-term neuro-developmental problems, and an increased risk of death within the first year (infant mortality)\textsuperscript{9,p.3}. Long term medical issues may include physical/learning disabilities, ADHD, vision/hearing loss or apnea/chronic lung problems. Estimates are that 25\% of infants leave the neonatal intensive care unit (NICU) with chronic health issues\textsuperscript{9,p.4}.

**DISPARITIES**

Disparities exist for both infant mortality in general (2.4 times higher in non-Hispanic black infants) and for preterm deliveries (59\% higher for non-Hispanic black infants than non-Hispanic white infants)\textsuperscript{10}. There is also a higher percentage of LBW (low birth weight) and VLBW (very low birth weight) babies born to black women than white women\textsuperscript{11}. LBW is defined as infant weight of less than 2500 grams, regardless of gestational age. VLBW is defined as infant weight of less than 1500 grams. If these conditions are present, it could indicate lack of or poor health care, or maternal risk factors or “ill health” during the pregnancy. Birth weight is considered to be an indicator for newborn health and survival\textsuperscript{12}. Possible causes come to light when one starts to examine the disparities that emerge statistically for health and social conditions that put black non-Hispanic women at higher risk for poor birth outcomes. In N.C., there is a higher rate of poverty in the black population, as only 42.8\% of women of
childbearing age were living at 200% of the poverty level or above, compared to 66.3% of white women. Black women are less likely to have health coverage prior to their pregnancy, and more likely to have less than an 18 month interval of spacing between their pregnancies which is the recommended guideline. Black women have a much higher rate of unintended pregnancy in N.C., with only 31% of pregnancies intended, compared to 64% intended pregnancies for white women. This may not allow them to plan appropriately, financially or physically, to be ready to have another baby again so soon, which may contribute to poor outcomes. Black women in this age group in N.C. are also more likely to smoke – behavior that might contribute to pregnancy complications. Black women also have a rate of obesity/overweight (defined as a BMI of >25 for overweight or >30 or obesity) that is 73.6%, compared to 52.9% in white women. Contributing factors may be that black women 18-44 in N.C. report a higher percentage of domestic abuse than their white counterparts, and when asked if they had adequate social and emotional support, only 67% responded that they did, while 80.3% of white women in the same circumstances reported the same. Finally, black women of childbearing age in N.C. are more likely to have the chronic diseases of diabetes mellitus, hypertension, and asthma.

**MATERNAL HEALTH RISKS**

According to the literature, many different maternal health issues and behaviors can result in problems for the infant. Abnormalities in the uterus, cervix, or placenta of the mother, such as an incompetent cervix may result in a preterm birth. Infection, particularly in the uterus, may also cause an early delivery. Presence of a birth defect in a developing baby may
also result in prematurity. If an expectant mother has hypertension, diabetes mellitus, heart/lung issues, or kidney problems, this may result in a low birth weight baby. If a woman smokes while pregnant, this could cause slow fetal growth with an increased risk of preterm birth (2 times more likely to be LBW). No amount of alcohol is considered to be safe while pregnant, and illicit drugs in any amount pose a risk to the developing baby. This may limit fetal growth, or cause birth defects. Drugs such as cocaine can result in preterm birth. Any viral parasitic infection (including cytomegalovirus), rubella, varicella, or toxoplasmosis in the mother can cause birth defects. It is thought that low birth weight (LBW) can contribute to chronic health conditions in adulthood. It’s possible that the growth restriction before birth causes lasting changes in certain insulin-sensitive organs like the liver, skeletal muscle, and pancreas. Before birth, these changes may help a malnourished baby use all available nutrients. But after birth, the changes may contribute to health issues such as hypertension, type 2 diabetes, and cardiac disease. When they occur together, this is called metabolic syndrome. Another issue that is a growing concern is the complications that are possible due to maternal obesity. One study estimated the incidence of obesity in pregnant women to be 8.5-38.3%, resulting in a 1.8 to 6.5 times greater risk for gestational diabetes mellitus and a 2.2-21.4 times greater risk for hypertension disorders as well as an increased risk for cesarean deliveries, and an increased rate of anesthesia and post-op complications. Infants of obese mothers are at risk for decreased Apgar scores, macrosomia, shoulder dystocia, a 1.8-3 times increase in Neural Tube Defects (depending on degree), and development of obesity themselves. In this study, hospital costs were found to be 5 times higher for women that were overweight before pregnancy due to longer postpartum stays, cesarean deliveries, and
endometriosis. The percentage of infants requiring admission to the neonatal ICU was 3.5 times higher in cases of maternal obesity. The conclusion of the study recommends preconception counseling with prenatal monitoring of weight gain and long term follow-up to minimize social and/or economic consequences.

As part of the overall effort to provide more holistic health care to women throughout all the periods of their life, instead of the fragmented care that sometimes results during the childbearing years, the Maternal/Child Health (MCH) care providers are shifting to what is being called a “life course perspective” or a “lifespan approach” to care. The woman will be cared for from birth to death, consisting of integrated, continuous, comprehensive healthcare. Preconception and interconception care will be part of this continuum, and will involve primary care, specialists, dental, and mental health. The thought process is that birth outcomes are a result of the entire life course of the mother leading up to pregnancy (biological, behavioral, psychological, social) – both protective and risk factors. The emphasis is on the woman first, rather than her reproductive status. There is a focus on health promotion, with primary and secondary disease prevention. The health of the mother prior to pregnancy is an important factor for a healthy birth outcome. There is a realization within the MCH community that it will take time to equalize the birth disparities, and that changes will need to be made in clinical practice and policy. Social determinants of health such as resources available and individual stressors will need to be integrated into clinical practice elements whenever possible. The Healthy Start program has filled a niche role for interconception care. Interventions have been put in place to modify risks to women’s health or pregnancy outcome through prevention/management from the conception of one pregnancy to the conception of next
pregnancy. This is a critical time to address issues that could affect infant mortality. Goals of the program are to decrease infant mortality and LBW infants, increase women’s access to healthcare, and to decrease racial/ethnic disparities in mother/infant outcomes. The national Healthy Start program includes interconception care as one of 9 core competencies for eliminating disparities. The performance measures that they have put in place are:

- By 2013, decrease infant mortality rate to 4.28/1,000 live births for Healthy Start program clients (2004-7.65/1,000)
- By 2013, decrease neonatal mortality rate for Healthy Start program clients to 2.70/1,000 live births (2004-4.83/1,000)
- By 2013, decrease post-natal mortality rate for Healthy Start program clients to 1.58/1,000 live births (2004-2.82/1,000)
- Decrease annually the percentage of low birth weight infants born to Healthy Start clients 25

Interconception care fits into a case management model as “aftercare”. There is a need to address risk factors identified in last pregnancy that are related to lifelong health status, and/or the potential impact on any future pregnancy. Talking should begin during the third trimester of pregnancy and participants should continue discussion before ending services (such as with a postpartum visit). Outcome of a pregnancy may ultimately be determined by a combination of genetics, prenatal care, embryonic/fetal development, and the health status and exposures of the mother. The risk assessment is done initially, followed by a reproductive life plan (RLP) developed based on this. This can be followed by teaching/health promotion and clinical interventions if necessary. Medical problems during pregnancy (hypertension, diabetes mellitus, under/overweight, etc.) should be treated for optimal control. Post-GDM (gestational diabetes mellitus) testing should take place at the postpartum visit as these women are at greater risk for glucose intolerance. Psychiatric (smoking/alcohol/drugs) and socioeconomic
interventions would also be appropriate at this time to address these very serious risks to pregnancy and attempt should be made to eliminate them before conception occurs. It would also be helpful to involve the male partner of the couple. If there was a previous pregnancy that ended with a poor outcome (stillbirth, preterm labor/birth, low birth weight, fetal death, birth defect), the mother may need referral to a specialist after delivery.26

PRECONCEPTION HEALTH

According to the Institute of Medicine (IOM), a significant protective measure to prevent low birth weight and preterm births (which both can potentially result in poor birth outcomes up to and including infant mortality), is the practice of preconception care (that also encompasses interconception care) to prepare for pregnancy. This allows for women to be assessed for and modify any risk factor that could affect her pregnancy and avoid a poor outcome.27 According to the Centers for Disease Control (CDC), Preconception Health is defined as “interventions that aim to identify and modify biomedical, behavioral and social risks to a woman’s health or pregnancy outcome through prevention and management, emphasizing those factors which must be acted upon before conception or early in pregnancy to have maximal impact”28. It would optimally begin before the first pregnancy, with actions such as reproductive life planning beginning in adolescence at the onset of childbearing ability and would include such assessment and intervention between pregnancies (known as interconception care). Preconception care can include women, men, and couples and affects families and society as a whole, which will be illustrated further in this paper. Preconception care has the potential to change the nation’s current status within the international community
as a country with an infant mortality rate that does not reflect the advanced nature of its medical care and system. The rate of low birth rate infants born and the rate of prematurity in the U.S. contribute significantly to this poor statistic and will also be examined briefly. Efforts have been made over the last several decades to improve /expand the access to prenatal care as early as possible in pregnancy. Although delayed prenatal care did prove to be a contributing factor to poor birth outcomes, and greater access did improve the statistics somewhat, it has not solved the entire issue. Beginning in 1979, the concept of “Prepregnancy Care” started to appear in the medical literature, and by 1985 the topic was being recognized by the IOM, the AAP (American Academy of Pediatrics), ACOG (American College of Obstetrics and Gynecology), and the March of Dimes. The latter three organizations collaborated to publish Guidelines for Perinatal Care in 1983, which discussed physical and mental preparation for parenthood, and comprehensive medical, social, and environmental risk screenings. The Healthy People 2000 public health guidelines included an objective, published in 1990 that read:

- Increase to at least 60% the proportion of primary care providers who provide age appropriate preconception care and counseling

The accompanying rationale added that women and men need to be at their optimal level of health before conception, to prevent poor birth outcomes. Although there were efforts to establish standards and objectives for preconception health and healthcare that continued at this time, this specific objective was dropped from the Healthy People 2010 update. Other
objectives remain at both the national and the N.C state level of Healthy People guidelines with regard to decreasing the rate of premature births and the rate of unintended pregnancies.\textsuperscript{33, 34}

Individual organizations have published guidelines for preconception care to assist healthcare practitioners. These include the AAP/ACOG \textit{Guidelines for Prenatal Care}\textsuperscript{35}, who came together to group preconception guidelines together under four categories – maternal assessment, vaccinations, screening, and counseling (with examples of each)\textsuperscript{36}. The American College of Nurse Midwives (ACNM) who included preconception topics as part of their core competencies\textsuperscript{37}, and the Council on Resident Education in Obstetrics and Gynecology (CREOG)\textsuperscript{31}. Another organization that has been at the forefront of providing materials and products for healthcare providers that address the preconception topics is the March of Dimes. With a focus on preventing birth defects and preterm birth, they started a national campaign to promote folic acid supplementation for every woman of childbearing/reproductive age to prevent neural tube defects (NTD’s), understanding that many pregnancies in the U.S. are still unplanned\textsuperscript{38}. Studies have shown support for the recommendation of daily intake of a vitamin with at least 400 mcg of folic acid. A subsequent study in Hungary showed results from groups that received the supplement compared to those that received a pill containing only trace minerals. The rates of NTD were 13.2 per 1000 in the group that took 800 mcg of folic acid vs. 22.9 per 1000 in the group that took only trace minerals\textsuperscript{39}. More recently, a study in China attempted to show a reduction in the rate of NTD’s in two different geographical areas – one in the North and one in the South (the Northern region having a higher rate to begin with). After supplementation with 400 mcg of folic acid prior to pregnancy, this study was able to show a decrease in the rate of NTD’s by as much as 40-85% (depending on region), even if the vitamin
supplement was only taken 80% of the days preceding and during the pregnancy. The researchers further stratified their data for socioeconomic status and the number of previous pregnancies of the women, and this did not change the study results\textsuperscript{40}. Unfortunately, many women have previously not taken a vitamin that contained this supplement until they received a positive pregnancy test result, which for some infants may be too late to prevent a defect. Neural tube development occurs during the first 28 days of fetal development after conception, before many women are even aware that they are pregnant. Over the last five years, for which statistics are available, the percentage of women of childbearing age in N.C. that take a vitamin containing folic acid reached a peak in 2005 of 32.1%, but in 2008 (the last year that figures were available) the percentage was back down to 28.4\%\textsuperscript{41}, far from the Healthy People 2010 target of 80% despite receiving information about this recommendation from their healthcare provider\textsuperscript{41}. Other risks to the developing fetus may also occur at this time if preconception counseling education to increase awareness of risks has not been provided. These might include exposure to harmful medications (either prescription, over-the-counter, or “street” drugs), alcohol consumption, smoking, or exposure to sexually transmitted diseases (STD’s).

Therefore, a very important component of preconception health involves planning for reproduction, in order to be the most prepared possible for each pregnancy, and in the best possible health before conceiving. Yet many of live births are still a result of unintended pregnancies – 45% in the state of N.C.\textsuperscript{16} and 47% in the U.S.\textsuperscript{42}. Surprisingly, many women will admit that although they were not intending to conceive at the time they became pregnant, they also were not using any form of birth control method to prevent the conception, nor were their sexual partners\textsuperscript{2}. There may be many reasons for this – ranging from sexual coercion to
lack of access to medical care or the financial resources to pay for the most effective/efficient birth control method for their individual circumstances.

**CDC GUIDELINES**

In 2006, the CDC released guidelines for preconception health and healthcare in an effort to improve the health of women men and couples before conceiving a pregnancy\(^28\). This was a continuing effort to positively influence birth outcomes, taking action prior to prenatal care and knowledge of a positive pregnancy test, when some outcomes may already have influenced by health conditions of the mother or medications/other environmental exposures that might have had a teratogenic effect on the earliest stages of fetal development. The recommendations are broad in scope, ranging from encouragement of personal responsibility on the part of the perspective parents to advocating for policy change at the highest levels of our government structure to indentifying and resolving barriers to preconception counseling and intervention. An important component of the document addressed the opportunity for assessment and intervention that exists between the conception of one pregnancy and the conception of the next pregnancy. This is referred to an interconception care. The overall goal would be an integrated, coordinated plan of care among all providers caring for each woman of childbearing (or reproductive) age (15-44) to address current medical issues that would be potential risks if that woman should conceive a pregnancy – either for the mother or for the baby. Though primary care physicians (PCP’s) and OB/GYN physicians may be a woman’s most frequent points of contact with the healthcare system, concerns could extend to specialists who deal with chronic conditions such as diabetes mellitus, thyroid issues, hypertension, obesity,
cardiovascular disease, asthma, or even acne (because of medication that is used for treatment). These recommendations were developed by reviewing current research, working with a CDC/ASTDR Preconception Care Work Group, evaluating programs that were presented at a National Summit on Preconception Care in 2005, and considering input from the Select Panel on Preconception Care which had representatives from many different specialties on the topics.

The CDC report acknowledges that prior classifications have been established by AAP and ACOG with respect to interventions and assessments. The report advised that preconception care be integrated over time in primary and preventive components of well woman visits, rather than one isolated “preconception” appointment. Reasons stated for establishing goals and recommendations for preconception health and healthcare were that women of childbearing age were dealing with chronic medical/health conditions that could result in poor birth outcomes if interventions did not occur before they conceived. Some also engaged in behaviors that would put a pregnancy outcome at high risk if they should conceive. There were also social determinants identified (access to healthcare, socioeconomic status) that could directly or indirectly affect the outcome of pregnancy, and should be addressed as early as possible. The report listed priority conditions/health issues that should be addressed with a woman of childbearing age prior to conception to reduce the risk of an adverse birth outcome.

Four overall goal goals are specified in the CDC guidelines, followed by ten recommendations. Each recommendation is followed by suggestions for action steps, which if
implemented, would help achieve positive results in 2-5 years by improving the health of women of childbearing/reproductive age and thereby improving birth outcomes.

**Recommendation 1. Individual Responsibility.**

Each woman, man, and couple should be encouraged to have a reproductive life plan (RLP)\(^2^8\).

The recommendations begin with a call for personal responsibility to establish a reproductive life plan (RLP). This involves choosing if and when one wishes to have children and how far apart those pregnancies will be timed, depending on other goals one has for their life. If one chooses to be sexually active and does not wish to conceive during that time period, there should be a focus on obtaining and utilizing the most effective, appropriate birth control method for the individual or couple.

**Recommendation 2. Consumer Awareness.**

Increase public awareness of the importance of preconception health behaviors and preconception healthcare services by using information and tools appropriate across various ages; literacy, including health literacy; and cultural/linguistic contexts\(^2^8\).

Many adults remain unaware of the factors that influence their reproductive health. Efforts will need to be made to use methods that have been successful in creating public awareness in the past (i.e. change in infant sleeping position) to promote topics that have focused on the pregnancy or health of the infant. Social marketing methods are changing rapidly with the onset of new technologies, and health promotion campaigns should be able to take advantage of the shift to promote preconception health messages to the general public.
Information should be well integrated into healthcare messages and healthcare visits for all women of childbearing age. Focus groups or advisory boards may be helpful to establish what messages are more impactful for designated age groups, since the category (menarche to menopause) is so broad. Messages that seem “catchy” for a teen may not be meaningful at all to a career woman in her late 30’s or early 40’s. Feedback on social marketing campaigns should be ongoing at the national (March of Dimes, Healthy Start, CDC), state (Division of Public Health), and local (CBO) level. Successful campaign efforts can be shared at meetings such as the National Summit for Preconception Care, to be held next in Florida in June, 2011.

**Recommendation 3. Preventative Visits.**

As part of primary care visits, provide risk assessment and educational and health promotion counseling to all women of childbearing age to reduce reproductive risks and improve pregnancy outcome\(^\text{28}\). This guideline recommends preconception screening for possible risks in the woman of childbearing age as well an intervention in the form of counseling, additional testing, brief interventions, (as in the case of smoking, alcohol use, or drugs) or referral to the care of specialist. A recent article discussed the role of family physicians with regard to the national recommendations for preconception care, and broke it down into two basic items that an M.D. could cover during each office visit – to ask if the patient is planning a pregnancy in the next year, and inform the woman that the maternal health outcomes can affect pregnancy outcomes and/or pregnancy can affect the women’s health. Whether or not the woman plans to conceive, this approach should be able to initiate the conversation about preconception
health and be sure that they have a contraception plan in place that will be most effective until they are ready to conceive, if ever. This would also be the opening opportunity to discuss any current medical conditions or medications that might put a future pregnancy at risk for the woman, if conception is desired the near future. Planning for pregnancy with the partnership of health care providers is less likely to result in a poor birth outcome\textsuperscript{43}. 

**Recommendation 4. Interventions for identified risks.**

Increase the proportion of women who receive interventions as follow-up to preconception risk screening, focusing on high priority interventions (i.e., those with evidence of effectiveness and greatest potential impact)\textsuperscript{28}.

Evidence supports that prompt intervention when health risks are identified in the preconception period can improve birth outcomes. This may include changing or discontinuing teratogenic medications, controlling chronic medical conditions (such as diabetes mellitus, hypertension, heart disease, dental disease, obesity, etc.), intervening to discontinue risk behavior (smoking/alcohol/illicit drug use), or genetic counseling. Interventions that have the strongest evidence for improving pregnancy outcomes are shown in the table below:

**Table 2. Preconception Interventions with Evidence for Improving Pregnancy Outcomes**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Proven Health Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folic acid supplementation</td>
<td>Reduces occurrence of neural tube defects by two thirds.</td>
</tr>
<tr>
<td>Rubella vaccination</td>
<td>Provides protection against congenital rubella syndrome.</td>
</tr>
<tr>
<td>Diabetes management</td>
<td>Substantially reduces the 3-fold increase in birth defects among infants of diabetic women.</td>
</tr>
<tr>
<td>Condition</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hypothyroidism management</td>
<td>Adjusting levothyroxine dosage early in pregnancy protects proper neurologic development.</td>
</tr>
<tr>
<td>Hepatitis B vaccination for at risk women</td>
<td>Prevents transmission of infection to the infant and eliminates the risk to the woman of hepatic failure, liver carcinoma, cirrhosis, and death due to HBV infection.</td>
</tr>
<tr>
<td>HIV/AIDS screening and treatment</td>
<td>Allows for timely treatment and provides women (or couples) with additional information that can influence the timing of pregnancy and treatment.</td>
</tr>
<tr>
<td>STD screening and treatment</td>
<td>Reduces the risk of ectopic pregnancy, infertility, and chronic pelvic pain associated with <em>Chlamydia trachomatis</em> and <em>Neisseria gonorrhoea</em> and reduces the possible risk to the fetus of fetal death and physical and developmental disabilities, including mental retardation and blindness.</td>
</tr>
<tr>
<td>Maternal PKU management</td>
<td>Prevents babies from being born with PKU-related mental retardation.</td>
</tr>
<tr>
<td>Oral anticoagulant use management</td>
<td>Switching women off teratogenic anticoagulants (ie, warfarin) before pregnancy avoids harmful exposure.</td>
</tr>
<tr>
<td>Antiepileptic drug use management</td>
<td>Changing to a less teratogenic treatment regimen reduced harmful exposure.</td>
</tr>
<tr>
<td>Accutane use management</td>
<td>Preventing pregnancy for women who use isotretinoin (Accutane) or ceasing isotretinoin use before conception, eliminates harmful exposure.</td>
</tr>
<tr>
<td>Smoking cessation counseling</td>
<td>Completing smoking cessation before pregnancy care can prevent smoking-associated preterm birth, low birth weight, or other adverse perinatal outcomes.</td>
</tr>
<tr>
<td>Eliminating alcohol use</td>
<td>Controlling alcohol binge drinking and/or frequent drinking before pregnancy prevents fetal alcohol syndrome and other alcohol-related birth defects.</td>
</tr>
<tr>
<td>Obesity control</td>
<td>Reaching a healthy weight before pregnancy reduces the risks of neural tube defects, preterm delivery, diabetes, cesarean section, and hypertensive and thromboembolic disease that are associated with obesity.</td>
</tr>
</tbody>
</table>

Recommendation 5. Interconception Care.

Use the interconception period to provide additional interventions to women who have had a previous pregnancy that ended in adverse outcome (i.e. infant death, fetal loss, birth defect, low birth weight, preterm birth, and stillbirth)\(^28\).

Although previous adverse outcome of pregnancy is a predictor of risk for future pregnancies, professional guidelines do not include systematic follow-up and intervention\(^44\). The postpartum visit (typically at 6-8 weeks after delivery) is a very important point of contact for clinical follow-up, yet data from HEDIS (Health Employer Data and Information Set) showed that only 80% of women with private insurance and 55% of women with Medicaid coverage come in for this appointment\(^28\). Clearly, this is an opportunity for improvement and barriers need to be identified and overcome in order to ensure that all women that all women receive this continuity of clinical care – particularly those who experienced pregnancy complications or a poor birth outcome.

Recommendation 6. Prepregnancy checkup.

Offer, as a component of maternity care, one prepregnancy visit for couples and persons planning pregnancy\(^28\).

A preconception visit has been recommended by multiple organizations (IOM, Panel on Preventing Low Birth Weight, U.S. Public Health Service Expert Panel on the Content of Prenatal Care, and the National Committee on Perinatal Health) in order to plan for optimal health before conceiving. The visit would include steps previously discussed – risk assessment, health
promotion, and interventions\textsuperscript{31}. For some women, this has not been possible because their insurance will not cover the appointment and they cannot afford to pay for the services out-of-pocket. Therefore, it would still be advisable to address the preconception questions (find out if the woman is planning pregnancy within the next year, explain implications if maternal health on pregnancy outcomes and/or pregnancy on implications on maternal health) at each clinical contact with women of childbearing age so that any eminent risks could be addressed or contraception could delay a conception if advised based on the woman’s current health status.

**Recommendation 7. Health insurance coverage for women with low incomes.**

Increase public and private health insurance coverage for women with low incomes to improve access to preventive women’s health and preconception and interconception care\textsuperscript{28}.

There are still a significant number of women of childbearing age that do not have health insurance. In N.C. in 2008, the percentage of women 18-44 that had no health insurance just prior to pregnancy was 44.5%, with rates for those women 18-24 years old at 67%. In the U.S., the number of women without health insurance is estimated to be 17 million. As mentioned previously when discussing disparities, black non-Hispanic women in this age category are less likely to have insurance than white non-Hispanic women\textsuperscript{14}. Many of these women who have low incomes and have not conceived a child will not qualify for Medicaid benefits. Part of the recommendation from the CDC is to give women in this age group priority to qualify for Medicaid coverage\textsuperscript{28}. Many states, including N.C., have used a “family planning waiver” to expand services that are available to these women. It is recommended that this
coverage be extended to include the risk screening, health promotion, and interventions that are a part of comprehensive preconception health care.  

**Recommendation 8. Public health programs and strategies.**

Integrate components of preconception health into existing local public health and related programs, including emphasis on interconception interventions for women with previous adverse outcomes.

There are currently public health programs in place that are funded by sources such as Title V (Maternal and Child Health Services Block Grant) and Title X (Family Planning) money. Title X provides contraceptive and pregnancy testing as well as family planning education. Title V provides funding for prenatal care and also for postpartum visits in maternity clinics. Another program that is federally funded is WIC (Women, Infants, Children), which provides nutritional screening and counseling, and referral for pregnant and postpartum women. Federally funded Healthy Start programs have a focus on assessment and care during the interconception period. All of these programs that are currently in place offer opportunities to integrate information about preconception health and begin interventions and/or provide referrals if necessary.

Currently, at the N.C. Department of Public Health, Women’s Health Branch, questions about a woman’s reproductive life plan (RLP) are integrated onto the “Flow Sheet” form which is used in the Family Planning (Title X) clinic. BMI is also assessed, to determine if overweight/obesity is a risk factor that needs to be addressed to improve the health of each woman (whether they are planning to conceive or not). Documentation of exposures and
history of/current behaviors that could adversely affect health is on this form also –
smoking/alcohol use/illegal drugs. Family and personal medical history, as well as social
determinants that can affect health, are also addressed in the format of a self-history form.
Clients are asked to fill this out before they see the provider during their appointment at the clinic. There are specific questions about exposure to violence and stress.

Currently, the State Coordinator for Preconception Health in North Carolina, Alvina Long-Valentin, is developing a new form for clinic charts entitled, “Healthy Living Action Plan.” The top half of the form is designed to be filled out by the practitioner, either by interview or gleaned from information previously documented in the clinical record. Having a separate
document to draw out specific clinical information that would be most pertinent to an
upcoming conception (at any time) is meant to assist healthcare providers to easily recognize medical issues that may need to be assessed by screening or may need intervention after assessment, in order to optimize the patient’s chance for a healthy pregnancy at any point during her reproductive years. The timing/intensity/choice of interventions may vary,
depending on the individual’s reproductive life plan (RLP). The bottom half of the form lists out goals for healthy living (with proposed dates to measure progress), along with action steps that the woman is willing to take toward meeting those goals. The very last section is for the provider to list any intervention(s) or step(s) that they will take next, such as screening (i.e. HIV, sickle cell, cystic fibrosis), intervention (i.e. change or discontinue medication), or referral (i.e., to specialist or for treatment of alcohol/drug use). In final form, the bottom half of the document will be available in duplicate, so that the patient will have a copy of the plan to take
after the conversation. This form will remain in the clinic record so that all healthcare providers will be aware of any preconception health issues, as well as be able to view the RLP, at a glance.


Increase the evidence base and promote the use of evidence to improve preconception health\textsuperscript{28}.

More research is needed to provide an evidence base for preconception healthcare, to document the effectiveness of interventions that have been recommended to providers. There is a cost involved whenever increased dialogue and potential clinical intervention is recommended to be included in a clinical appointment. When reimbursements for medical care are fixed, either from private or public insurers, this translates into asking healthcare providers to “do more for less”. Therefore, it will be essential to show a cost benefit for women of childbearing age in general, and for those women who had a previous poor outcome\textsuperscript{45}. Intervention research will continue to be more challenging with this population, as there are ethical concerns that arise with providing clinical interventions to some who may conceive a pregnancy and not to others, when there could be a risk of poor birth outcome for the group receiving no clinical intervention\textsuperscript{50}.


Maximize public health surveillance and related research mechanisms to monitor preconception health\textsuperscript{28}. 
The field of Maternal and Child Health monitors data from multiple sources. The Centers for Disease Control (CDC) is one public health agency that provides surveillance statistics. The North Carolina State Center for Health Statistics (SCHS) provides data that includes vital statistics, the Pregnancy Risk Assessment Monitoring System Survey (PRAMS), the Behavioral Risk Factor Surveillance System (BRFSS), the Child Health Risk Assessment and Monitoring Program (CHAMP) and others. The PRAMS survey was started in N.C. in 1997, as an initiative to reduce infant mortality and low birth weight. It contains data on the attitudes and experiences of mothers before, during, and shortly after (first few months) pregnancy. There is also a national PRAMS survey, which began in 1987. Each state samples between 1,300-2,400 women per year. There are core questions that every state uses, a bank of optional questions that each state can choose from, and then additional questions that each individual state develops. Currently, 37 U.S. states participate in the program. The BRFSS is a random telephone survey of adults 18 and older that was initially developed in the 1980’s by the CDC. All states participate in this program. N.C. has participated since 1987. The CHAMP survey examines the health of children from 0-17 years old, and N.C. has been participating since 2004. Eligible children are drawn from the BRFSS telephone survey of adults 18 and older. One child is randomly chosen from the household during the survey of the adult. The survey is done in both English and Spanish. All of this data is available to review preconception health indicators in N.C., either for a particular year, or to view trends over time. It will remain important to monitor this as part of an evaluation of the strategic planning for improvement which leaders in the state have put into place as of 2008 and will be discussed more thoroughly later in this document.
Another opportunity for surveillance when discussing adverse pregnancy outcomes is Perinatal Periods of Risk (PPOR). This tool was developed at the CDC and maps fetal loss and infant mortality according to birth weight and age at death. The definition of fetal death is “stillbirths” and infant deaths are defined babies that were born alive and died at some point during their first year of life\(^55\). For this mapping tool, fetal deaths are only included if they were greater than 24 weeks gestation. Many states do not have reporting requirements if death occurs less than 20 weeks gestation. The results of PPOR analysis can help to prioritize resources by highlighting areas where excess deaths are occurring according to a comparison population and then choosing strategies to prevent mortality during that period of highest risk.

PPOR looks at four major categories – deaths related to Maternal Health and Prematurity, Maternal Care, Newborn Care, and Infant Care. Another factor that is considered is the baby’s weight at the time of death. The rate of death is shown per 1,000 and the number of events in each category. Then the values are compared against at comparison group to look for any “excess deaths”\(^56\). In a statistical brief illustrating the PPOR for the state of N.C. for years 2000-2002, the reference group chosen was for comparison was that of white non-Hispanic women who are older than 20 and have 13 years or more of education. This group was chosen for reference because they statistically have the best birth outcomes. When compared to the reference group, the resulting numbers are determined to be “excess” (preventable) deaths. By evaluating in what time periods these numbers were highest, prevention efforts can focus on the highest period of risk and prevent losses appropriately. For this time period in N.C., it was determined that the highest number of excess deaths were in the Maternal Health and Prematurity time period, which would give credibility to efforts that advocate and/or provide
resources for preconception health, decrease unintended pregnancies, intervene for smoking/drug use before and during pregnancy and initiate interventions or provide referrals if necessary\textsuperscript{57}. If the losses were shown to have the highest excess number of deaths under the Maternal Care category, it would be appropriate to focus prevention efforts on perinatal care management, early and continuous prenatal care, and the referral of high-risk pregnancies to specialists for management of medical conditions such as diabetes mellitus, seizures, and other high-risk OB situations (such as previous adverse pregnancy outcome) would be extremely important. If excess deaths were highest in the Newborn Care category, focus would turn toward prevention and treatment of congenital anomalies, and the availability of advanced neonatal care should be assured. If Infant Health losses were examined to prevent excess deaths, the focus would be on SIDS prevention (including education about the national guidelines that have been published by physician’s professional organizations with regard to the safest sleeping position to lower infant risk of this cause of death), promotion of breastfeeding, and injury prevention\textsuperscript{56}. A visual representation of the Perinatal Periods of Risk mapping format is below:

<table>
<thead>
<tr>
<th>AGE AT BIRTH</th>
<th>MATERNAL HEALTH AND PREMATURITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEIGHT AT DELIVERY</td>
<td>MATERNAL CARE</td>
</tr>
<tr>
<td>500 - 1499 GR</td>
<td>&gt; 24 wks gestation</td>
</tr>
<tr>
<td>1500 GR</td>
<td>(neonatal)</td>
</tr>
</tbody>
</table>

The PPOR is an important tool because it does include the surveillance data of fetal deaths (instead of only infant mortality), and it uses a reference group as part of its process, which puts an emphasis on the number of deaths in each category that may be preventable, while also highlighting the disparities for any chosen population group. The data that is used to calculate PPOR at any point in time is available through Vital Records at the health department. Data needed would be fetal death certificate files (24+ weeks gestation, 500+ grams), Infant death certificate files (500+ grams), live birth files (500 + grams) and linked birth-infant death certificate files are needed to find birth information for infants who died. To be included in the compilation of data, there must be at least 60 deaths overall with at least 10 deaths in each category for each population being studied, in order for the statistical calculations to be accurate. Therefore it is possible to combine data for a period of up to five (5) years in order to reach an adequate number of occurrences (deaths) to be studied. For each infant record, there should be no more than 5-10% of key data items (birth weight, age at death) missing in order to include the record. There are guidelines in place to "impute" the data if it is missing, under certain circumstances (i.e., if birth weight was < 500 grams and gestational age was missing, one can categorize this record as GA less than 24 weeks and exclude the record from the data – since data would only be included if GA greater than 24 weeks)\textsuperscript{57}. 
Another important part of the CDC Guidelines for Preconception Health and Healthcare that were released in 2006 other than the ten recommendations were four overall goals. They summarized the most important underlying concepts that were set forth in the document to improve the health of the population who would be considering childbirth between the ages of 15-44, and set the expectation of a positive pregnancy outcome, without complications or adverse circumstances. These goals are to:

1) **Improve the knowledge and attitudes and behaviors of men and women related to preconception health.** (see recommendation #1, #2, #5, #6, #8, #9, #10)

2) **Assure that all women of childbearing age in the United States receive preconception care services (i.e., evidence-based risk screening, health promotion, and interventions) that will enable them to enter pregnancy in optimal health.** (see recommendation #1, #2, #3, #4, #5, #6, #7, #8)

3) **Reduce risk indicated by a previous adverse pregnancy outcome through interventions during the interconception period, which can prevent or minimize health problems for a mother and her future children.** (see recommendation #1, #2, #3, #4, #5, #7, #8)

4) **Reduce the disparities in adverse pregnancy outcomes.** (see recommendations #1, #2, #3, #4, #5, #6, #7, #8, #9, #10)

It is a sign of very well-written goals that they are so encompassing of the recommendations that were set forth from the CDC group. If there is a measure of success in following these recommendations, there should be a level of success that will be measureable toward reaching
the goals that have been established. Many individual states have formed their own groups to begin taking action steps on this ambitious list, and this will be the start of how “preconception health” will become a familiar term to the general public, not just to the healthcare providers who have been working tirelessly behind the scenes for decades in order to draw attention to these issues, and to shift some focus and some of the resources in maternal-child healthcare to this period of time in a lifespan that can have such a tremendous impact on the health of a woman herself and can also impact future generations who might otherwise be at risk. As of 2006, there were 42 states that had identified a Performance Measure or indicator that was related to preconception health. Nationally, there has been a group formed called the Preconception Health and Healthcare Initiative.

CALIFORNIA

In California, they have a preconception project titled “Every Woman California”. The materials that California produces are available for distribution nationwide, and materials from the National Birth Defects Prevention Networks are downloadable from the website. Within the state, they have a group that originally was named the Preconception Care Council of California (PCCC). Since 2006, the partnership has been between the March of Dimes California and the California Department of Public Health’s Maternal Child and Adolescent Health division and is now called the Preconception Health Council of California (PHCC). It is a statewide forum, and it has representatives from state and local program that are involved with it as stakeholders. They hold council meetings and have workgroup meetings for specific issues. The council has set goals and objectives and planned activities, in an effort to implement the
CDC recommendations that were released in 2006. The goals they have set are to 1) increase access to care in order to eliminate disparities, 2) promote important preconception health messages surrounding physical and psychological health, 3) develop financial and public policy in order to support and sustain the delivery of preconception care, and 4) integrate preconception health and health care into both private clinical and public health practice.59 There is a Preconception Health Coordinator position within California. Title V state priority needs are to enhance preconception care and to work toward eliminating disparities in birth outcomes. The PHCC develops provider education materials for distribution. It also collaborates with the local health officials to help develop curricula and materials. They work to educate the legislature about preconception care in order to be sure that preconception care services are integrated into any health reform packages. On the website for preconception health in California, there is a link for a several reproductive life plans (RLP), one of which was created by the state of Utah. Another is a link to a comprehensive reproductive life plan document that is published by an insurance company, Group Health Incorporated (GHI).60 Anyone could download this and fill it out, then bring it to their primary care doctor or specialist to initiate a discussion about planning to conceive, or not. There is also a section for FAQ’s – one of which is, “What should my healthcare provider be doing?” This can be helpful to start the dialogue between a woman and her doctor about her initial preconception screenings and assessment.
The state of Florida also has a well developed preconception health program for their population of reproductive age. The program is called “Every Woman Florida” and is funded in part by a community grant from the March of Dimes, stating as its goal on the website “exceptional women’s care for every patient, every time”\(^61\). The site contains information about the preconception health visit, and it also contains a comprehensive document called the Preconception Health Indicator Report. This is a document that discusses the statistics for women of childbearing age in Florida, in some cases looking at trends over time (while comparing those trends to the U.S. population in general), and in some cases looking at Florida statistics with a racial/ethnic breakdown in order to see disparities in health behaviors and/or medical risk issues that may be predictors of poor birth outcomes in certain populations\(^62\). The site also contains an interactive quiz, which allows an individual to go through and answer questions that pertain to preconception health topics. When the answer is submitted, there is a response given which is educational in nature, delivering health promotion information to those who have indicated that they may have a risk factor with their health that should be addressed prior to conception, in order to have the best opportunity for a positive birth outcome. There are also patient education sheets available on chronic diseases that can be printed off if applicable to the individual. Links to additional resources include The Family Healthline, Healthy Start, and the Department of Public Health: Family Planning and Medicaid for Pregnant Women. There is an additional section on the website with links to March of Dimes preconception resources. At the bottom of the home page of the website, there is a link for a program called “Text4Baby”. This program is designed to deliver text messages on a
woman’s cell phone during her pregnancy and throughout her baby’s first year. It is an educational program sponsored by the Healthy Mothers, Healthy Babies Coalition. There is link to register for the service, and also a link to a recent (2.7.11) article in the New York Times which detailed the success of the program. As of that date, 135,000 had signed up to receive the service, which delivers three text messages a week with information relevant to the woman’s stage of pregnancy or to the child’s developmental age.

NORTH CAROLINA

In North Carolina, there are approximately 1.8 million women of childbearing age. Improving their health can make a great impact on the financial resources and “human capital” within our state, as previously documented. The rate of preterm birth is similar in N.C. to the national average at 12.9% as of 2008, a far cry from the 2010 objective of 7.6%. The rate of low birth weight infants was 9.1% in 2008, also distant from the 2010 objective of 5.0%.

Many women report chronic health conditions or risk behaviors prior to pregnancy. More than half of N.C. women in this age category have a BMI that puts them in the overweight or obese category, and 55% do not get regular exercise. Many women also report binge drinking and/or smoking during the 3 months before pregnancy. A national survey concluded that although many women heed advice and cut down or quit substance abuse during pregnancy, there is a group that continues throughout and/or resumes use of the substance shortly after delivery.

In N.C., women also report entering pregnancy while managing hypertension (15%), diabetes (2.5%), or asthma (9.8%). Employer costs as a direct or indirect result of preterm births has already been discussed, but in N.C. the cost of care for a baby born with complications was
$643 million in 2008 - $425 million of this was associated with preterm birth. The average cost of a preterm birth was $37,173 – 25 times the cost for a healthy full term newborn. The average cost for an extremely premature newborn with respiratory distress was $114,482. North Carolina began their preconception health initiatives in the family planning clinics by using such tools as preconception health appraisals. This was followed by the development of a school health curriculum called “Healthful Living”, which linked the health habits of adolescents to the health of their future children. Topics included folic acid supplementation, prevention of sexually transmitted diseases, the use of alcohol and drugs, healthy nutrition, and the benefits of regular exercise. As of 1987, a program called “Baby Love” was initiated through DSS, which provided support services and medical care to women with low incomes. The individuals that provided this support were called “Maternity Care Coordinators” (MCC’s) until 3.2011, when the designation and funding changed. These individuals are now called “Pregnancy Care Managers” (PCM’s), and essentially perform the same function of case management during the pregnancy and up to 60 days postpartum. Medicaid-eligible pregnant women are also eligible for a home visit. This service must be given by a Registered Nurse, and is designed for follow-up, counseling, and referral if necessary. Under Medicaid, this is only allowed to be billed once per client per pregnancy, so the RN can take the opportunity to review topics for self-care and be sure that the postpartum woman understands the importance of following up with her doctor for the 6-8 week check-up. It is at this visit where reproductive life planning will be reviewed again, and a method of contraception that is most convenient and effective for the woman and her partner can be provided.
Within the state, there is also a program called “Baby Love Plus” in 14 high risk counties, which is federally funded through the Healthy Start program. These areas are mostly rural, and have a high percentage of Medicaid deliveries due to a high rate of poverty and unemployment, and the women have a high rate of risk factors for a poor pregnancy outcome. The program supplements the standard “Baby Love” program by providing transportation, depression screening, outreach, education and training, referrals, and interconception management for mothers who are considered to be high-risk. The overall goals for the program include reducing infant mortality and preterm birth, reducing disparities in birth outcomes, and assuring early and continuous prenatal care. This program has shown successful progress over the 10+ years that it has been implemented in these counties. When comparing the years of 1995-1999 vs. years 2004-2008, there has been an improvement of 9.2% in low birth weight infants, and 18.2% improvement in neonatal deaths (less than 28 days), and an 11.4% improvement in infant death (day 28-364) within the area covered by the program services. During the same time periods, the rest of the state has shown only slight or no improvement (-1.6% to 1.7%) in these same measures. It seems to be a program that should not only continue to receive funding, but should be sought to be replicated in other areas of the state or in other states that same similar concentrations of high risk women of childbearing age.

In 2008, the North Carolina Department of Public Health Women’s Health Branch, under the direction of State Preconception Health Coordinator Alvina Long-Valentin, RN, MPH was awarded a two year grant from the United States Department of Health and Human Services, Health Resources and Services Administration under the First Time Motherhood/New Parent Initiative. This grant is intended for to provide resources for this population that focus on
pre/interconception care, prenatal care, family support, and parenting skills – through the use of targeted social marketing (including advertising) and a toll-free hotline\textsuperscript{71}. The target population chosen for outreach was women and men age 15-29 who were either planning a pregnancy or who may become pregnant unexpectedly, particularly focusing on racial minorities. The geographical project areas of focus were 6 counties in Eastern N.C. where the infant mortality statistics are elevated above the state average, and where there is also a larger disparity gap in poor birth outcomes. Products were produced and distributed to the community and social marketing messages were delivered via radio spots and public service announcements. These contained information about reproductive life planning (RLP), including a pamphlet titled, “Are you ready to be a Mom (Dad)?”, which included text about thoughts to consider for reproductive life planning as well as the toll-free number for the N.C. Family Health Resource Line (now being answered by the CARE LINE from 7 am-11 pm, 7 days/week). This service offers information on preconception health, general wellness, information about the N.C. Family Planning Waiver, and resources for primary, prenatal and pediatric healthcare. Also included in the materials was a booklet titled, “Are You Ready? Sex and Your Future”, which contains assessment questions designed to be answered during the preconception period, about current health status and behaviors, to see if there are any areas that should be addressed with interventions before conceiving\textsuperscript{72}. As part of this project, there was also a curriculum developed that could be brought out and taught to different sites in the community. Topics include preconception health messages, reproductive life planning (RLP), N.C. Family Planning Waiver, folic acid supplementation and cultural competency/health literacy. Each curriculum also has a toolkit that goes along with it, so that each clinic or office that received
training in these concepts would be left with materials in order to facilitate the incorporation of the information into practice. There were training done through faith-based organizations and community health coaches trained as outreach workers to incorporate a curriculum titled, “Ready, Set, Plan” to various groups within their local sphere of influence. The UNC Cecil G. Sheps Center for Health Services Research will be doing the evaluation of this program to see if statistics improved in these geographical areas\textsuperscript{73}.

Also in 2008, after a history of being one of the leading states in the nation in the preconception care and health of their residents, the North Carolina Public Health Department released the \textit{North Carolina Preconception Health Strategic Plan: September 2008 – September 2013}. After the publication of another booklet that had compiled past and present research efforts on preconception health had been released by the UNC Center for Maternal and Infant Health (with support from the March of Dimes and the N.C. Folic Acid Campaign) in 2007\textsuperscript{69}, leaders from these groups collaborated with the N.C Department of Public Health to make decisions about the future direction of preconception health efforts in the state. Workgroups started to meet with many representatives from state, local and community based organizations, non-profits and consumers present. Guiding principles were established, and priority areas of focus were established. The vision of the group was determined to be:

\begin{quote}
This effort seeks to improve the health of childbearing age in North Carolina. Through a collaborative focus on women’s wellness, North Carolina will improve the quality of life for women as well the health of infants.
\end{quote}

The overall goals that were established were:
1) Develop partnerships and work collaboratively to integrate preconception health into existing programs and services, as well as to collectively design new interventions.

2) Advocate for change at programmatic and policy levels to create an environment that promotes the health and well-being of women of reproductive age.

3) Promote and support preconception health related research, surveillance and evaluation to monitor progress and build a strong evidence base for interventions.

4) Focus resources on partnerships, programs and services that address disparities in women’s health.64

Priority areas were established based on the qualitative and quantitative evidence that had been reviewed. From this list of priority areas, the initial areas of focus were chosen to be pregnancy intendedness and obesity and related conditions. Four workgroups were formed, each with their own goals and strategies. The workgroups that were formed were:

- **Increase Consumer and Community Awareness about Preconception Health** – led by Judy Ruffin at DPH

- **Ensure Quality Preconception Care and Practice among Health Care Providers and Community Health Workers** – led by Alvina Long-Valentin at DPH

- **Expand Access and Affordability of Preconception Care** – led by Sarah Verbiest at UNC Center for Maternal and Infant Care

- **Advocate for Environmental and Policy Changes that Support Preconception Health** – led by Anna Bess Brown at March of Dimes74

These workgroups continue to meet either in person or by conference call on a regular basis to move forward in their plan for activities as they continue to evaluate strategies that will be
effective for reaching their goals by 2013. Contact information for the leaders of these groups is available at the www.mombaby.org website, under the N.C Preconception Plan tab.

**FUNDING**

Since the CDC recommendations were released in 2006, many healthcare providers have provided feedback that they have been difficult to implement, mostly due to limited clinical time with the patient and lack of reimbursement for the time spent discussing the topics. The next section of this paper will look at various funding options for solving this issue. Some are already in place and may need to just be creatively managed, and some solutions are not yet in place but will be in the next few years. The first potential source of funding preconception health issues are the new standards that are in place (and will be put in place) as a result of the new Affordable Care Act, which was approved by the U.S. legislators in 2010\(^75\). This has now become the law of the land, and its provisions contain many new benefits for preventive care for women that may have lacked the opportunity to seek this type of care in the past. For example, if you enroll in a new health plan beginning after 9.23.10, a list of services must be covered for your care without any copayment or coinsurance or deductible that may be a real or perceived financial barrier, as long as you receive this care from a “network provider” as designated by the insurance carrier. Women can also choose any PCP, OB/GYN or pediatrician in their network or emergency care outside of their network, without the need to obtain a referral. For adults, preventive care services and their associated costs must be covered without co-pays, which include:

- alcohol misuse and counseling
• blood pressure screening
• depression screening
• cholesterol screening
• type 2 diabetes mellitus screening if you have HTN
• diet counseling for those who at higher risk for chronic disease
• HIV screening for adults at higher risk
• immunizations (Hep A/B, shingles, HPV, influenza, MMR, meningococcal, pneumonia, Tdap, Td, varicella)
• obesity screening and counseling
• STI prevention counseling for those at higher risk
• tobacco use screening and cessation interventions for users
• syphilis screening for those at higher risk

Women, including pregnant women are eligible for coverage of the following preventive care services as well:

• anemia – routine screening for pregnant women
• bacteruria – urinary tract or other infection screening for pregnant women
• breast cancer mammogram – screening every 1-2 years for women older than 40
• breast cancer chemoprevention – counseling if at higher risk
• breastfeeding – interventions to support and promote this practice
• cervical cancer – screening for sexually active women
• chlamydia – screening for younger women and other women at higher risk
• gonorrhea – screening for all women at increased risk
• syphilis – screening for all pregnant women and other women at higher risk
• hepatitis B – screening for all pregnant women at first prenatal visit
• Rh incompatibility – all pregnant women and follow-up for women at increased risk for this
• tobacco use – screening and intervention with expanded counseling for pregnant tobacco users
• folic acid – supplements for women who may become pregnant^76

Other changes that have resulted from healthcare reform are a ban on lifetime limits on insurance coverage. Right now, there is still a limit on annual coverage restricted to maximums of $750,000, but this will be phased out. Insurance coverage can no longer be cancelled due to an unintentional error on the part of the patient while filling out the application. These new rules came about as a result of patients telling their stories about chemotherapy or other treatments being discontinued abruptly because they had reached their annual or lifetime limit on their insurance policy, and stories about companies who would go back to a patient’s original application and comb through their paperwork to search for any small technicality that would allow them to cancel the policy when costs began to escalate. There were also grants made to states during health reform legislation in order to be able to review insurance premiums. The new standards will require companies to spend 80-85% (depending on the size of the insurer) of their revenue on direct medical care and efforts to improve the quality of care being delivered to the customers they enroll. If they fall short of this goal, they will have to send the money back to the policyholders. Another added benefit to the new law that has
already taken effect is that children 26 and under may remain on their parent’s insurance policy or may be added to it. This has the potential to prevent a cap in coverage for young adults who are graduating from college or otherwise transitioning into the workplace, who statistically have the highest rates of unintended pregnancy. In the past, many women have been turned down for insurance coverage based on pre-existing medical conditions. As part of healthcare reform, this will be against the law starting in 2014. Until that time, some states (including North Carolina) have developed Pre-Existing Insurance Plans for those who have a history of a condition that had been deemed “high risk” and therefore have not been able to obtain policy coverage (or the price of the policy has been cost-prohibitive). This high risk “pool” of the population in N.C. can apply through www.inclusivehealth.org/stateoption/index.htm for insurance coverage until the “pre-existing” exclusion is completely removed in 2014. Prices for this coverage are capped by the state, so they are required to stay at an affordable level, no matter what a person’s health history might be. After 2014, the income level limits to qualify for Medicaid will also be expanded to include childless adults whose income is less than 133% of FPL (Federal Poverty Level). Currently if one has no dependent children, there is only eligibility through the family planning waiver, which will cover contraception and STD testing – an important part of preconception health care. Also as of 2014, there will be sliding scale tax credits for insurance coverage for those who earn up to 400% of the federal poverty level (FPL). Another important source of funding for women’s health that can influence the ability to provide preconception and interconception healthcare is “Title V” funding, formally known as the Maternal and Child Health Services Title V Block Grant. The goal of this grant is to
improve the health of mothers and children according to objectives and goals that have been established by the United States Department of Health and Human Services. This program has been a federal and state partnership for more than 65 years. The federal government promised to support the health of mothers and children when the Social Security Act was passed in 1935. It was converted to a block grant in 1981, and starting in 1989, states were required to report on progress made toward key health indicators for these populations, and to share other information about their programs. There is a flexibility in how funds are utilized, but the goals are common for all states in that they are all working to reduce infant mortality, and to “provide and ensure access to comprehensive perinatal care for women”. Other goals are in place to ensure comprehensive care for children with special healthcare needs or those who live in low-income households. In North Carolina, the funding that is available from this block grant goes into providing services at the prenatal clinics for the care of pregnant women. Since many women go to the Family Planning clinic for their postpartum visit, there is some Title V funding that also goes to those clinics to provide these services. From a preconception health perspective, this type of funding is most crucial for the postpartum contact in the Family Planning clinics, where interconception care can begin. Conversations can begin during the third trimester of pregnancy (at the prenatal clinic) and then continue at the postpartum visit. Some of this continuity may be provided with the help of PCM’s (Pregnancy Care Managers) who help to coordinate the care of mothers who received Medicaid benefits. Important topics to address in the interconception period would be reproductive life planning (RLP), immunization status, contraception, pregnancy and/or birth complications, healthy weight, and
exposure to or testing for STD’s. Title V also provides money to Healthy Start to focus on interconception care\textsuperscript{80}.

Another type of funding that is available from federal sources which play an important role in preconception health and health care is “Title X Family Planning”, the name given to programs that began in 1970 as Title X of the Public Health Service Act. This is the only federal grant dedicated solely to providing individuals with comprehensive family planning and related services. It includes access to contraception, which is a vital aspect of reproductive life planning, and priority is given to low income individuals. This grant is processed through the Office of the Assistant Secretary for Health, Office of Population Affairs (OPA), by the Office of Family Planning (OFP). The money is distributed through community based clinics, including state and local health departments, hospitals, clinics, community health centers, and faith-based organizations. The locations include public, private, and non-profit organizations\textsuperscript{81}. The variety of settings is an important key when evaluating access to a broad group of individuals. Men, women, and couples can receive services that range from pregnancy testing to breast/cervical cancer screening, to STD testing and education\textsuperscript{82}. Preconception assessment is a natural fit for this setting as individuals are usually sexually active when they seek services. This would be an ideal time and setting to review health issues that may need to be addressed if a conception is planned in the near future. If not, it is still an ideal environment to create awareness of the concept of preconception health and the importance of optimizing personal wellness during the reproductive years. Providing these services to the general population, regardless of income level, serves a vital function by striving to improve the health of all women, and potentially improves birth outcomes for their infants.
LOOKING FORWARD

There have been two national summits on preconception health, one that was held prior to the release of the CDC guidelines and one afterward. The first one was held in 2005, resulting from the newly formed Select Panel on Preconception Care formed at the CDC and charged with developing recommendations for preconception health and health care. There were approximately 400 participants in this first summit. The Second National Summit on Preconception Health and Health was held in California in 2007. The Third National Summit for Preconception Health and Health Care will held June 12-14, 2011 in Tampa, Florida. There will be many representatives attending from North Carolina, as well as presenting information about some of our state programs at this Summit, including Alvina Long-Valentin, RN, MPH (the N.C. State Preconception Health Coordinator at the Department of Public Health) and Sarah Verbiest, DrPh, MSW, MPH (Executive Director of the UNC Center for Maternal and Infant Health). Strategies and successes will be shared from other states that have been leading preconception health efforts as well, so it should be an excellent opportunity to collaborate with colleagues and determine some best practices for the future.

The Affordable Care Act coverage will continue to expand, covering preventive care for more and more women of childbearing age, so that health related risk factors might be addressed before conception in order to avoid pregnancy complications or poor birth outcomes. In the public health arena, eligibility for Medicaid will expand soon, bringing in a whole new subset of childless adults who may have previously been unable to afford preventive care or care for interventions to address risk factors. Employers who are realizing the healthcare costs that result from preterm births and low birth weight infants due to the
complications that can arise, can begin to step in to offer services such as “health coaching” to
their employees as part of their benefit package, with the goal to keep them as healthy as
possible. Although this benefit has been offered for general health and wellness planning and
group setting, a focus on preconception health may be able to address previously mentioned
potential costs in particular for employees of childbearing age. “Reproductive life planning” is
gaining recognition as a term among both healthcare providers and consumers, as it appears on
more literature and in more training materials. This is a more comprehensive concept than just
the contraceptive emphasis of family planning. It involves the holistic approach of considering
the life goals and plans of individuals of childbearing age, and if or when having children might
fit into those plans. The opportunity for a much more extensive dialogue is on the horizon,
and this challenge can be met by many different healthcare providers along the way –
community health coaches, nurses, physician extenders, physicians, health educators, social
workers, dieticians, etc. The more dialogue there is about being prepared for conceiving a
pregnancy, the better chance that women will begin to enter pregnancy only when intended,
and when they are most physically and mentally prepared to do so.
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