Pregnancy PREP:  
An Educational Curriculum for New Parents

By

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INTRODUCTION

As of 2005, North Carolina had the seventh highest infant mortality rate among US states.\(^1\) In 2009, prematurity and low birth weight was the leading cause of infant mortality in North Carolina, accounting for 23.3\% of deaths.\(^2\) Though all of these cases are not preventable, it may be possible to decrease this number through comprehensive education. Furthermore, at a national level, Healthy People 2020 contains several objectives to improve maternal and child health.\(^3\) At a local level, North Carolina and Orange County specifically have also prioritized child health and the importance of obtaining prenatal care.\(^4\), \(^5\), \(^6\)

I created Pregnancy PREP (Providing Resources for Educating Parents) in 2010 as an educational curriculum for new parents in North Carolina. I realized the need for such a program after working on a joint effort to build collaboration among various organizations that deliver important perinatal and neonatal health messages to new parents in North Carolina. This effort included stakeholders who were leading educational campaigns on topics such as smoking cessation, safe sleep, breast-feeding, pre-term birth prevention and shaken baby syndrome. Examples of these health messages include the importance of smoking cessation during and after pregnancy, and infant safe sleep techniques to decrease SIDS and preventable deaths among infants. These health messages may be effective in preventing adverse health outcomes. The 2009 North Carolina Infant Mortality Report identifies risk factors and their prevalence. Approximately 13.2\% of live births in 2009 were prior to 37 weeks.\(^2\) Certainly, some of these early births were unavoidable; however, with proper education about the importance of avoiding delivery before 39 weeks, perhaps we could improve this statistic. This report also identifies the prevalence of smoking among mothers in NC; 10.2\% of live births were to mothers who smoked.\(^2\) It is imperative to reach out to these mothers and inform them of the dangers of
smoking while pregnant and after delivery. As another example, 9.7% and 2.8% of 2009 NC infant deaths were caused by SIDS and unintentional injuries/accidents, respectively; Pregnancy PREP will offer education about SIDS, and techniques to decrease the risk of SIDS and preventable injuries.  

As I was working with the leaders of these various health education campaigns, I learned about the challenges they face in disseminating best practice messages to new parents and health care providers. All of the stakeholders agreed that there are many key messages that new parents need to hear, and also concurred that there is a core group of health care providers that deliver all of these messages. While the different organizations do not want to overwhelm parents or providers, there is concern that the key screenings, resources, information and even behavior modeling are not being routinely delivered to parents. Further, while the messages may seem simple, the effort to teach and change behavior does take time and resources to work with parents and providers.

While interviewing stakeholders, I learned about the various challenges that they face, in delivering these important messages. Group members rely on various funding sources for their work; most of these sources are earmarked for targeted health issues. Often, criteria are based on topic-specific deliverables; this makes it difficult to expand and integrate other health messages. The groups target their messages to clinic and hospital-based providers and thus, face the same challenges in vying for providers’ limited time and attention.

In addition to these stakeholder concerns, there is some evidence that parents feel that opportunities for prenatal education are lacking. Parents are interested in a broad offering of courses throughout pregnancy and the postpartum period. Though parents do enjoy the traditional prenatal class lecture-style format, they also desire a format that utilizes small groups
and offers time to practice hands-on skills. This is certainly an area that could benefit from further research; there is very limited information available, regarding parental preferences for prenatal education.

Pregnancy PREP was mainly based on my reflections following my time with these public health leaders, along with a systematic review of comprehensive educational offerings for new parents. The stakeholders collaborated to create an educational timeline for new parents. This timeline consisted of key points before, during and after pregnancy when specific messages should be delivered. They agreed that, though there are many important messages, they do not all need to be delivered at the same time. They also expressed concern that the existing body of research is not definitive; there are gaps, especially in regards to the most effective methods of message delivery. There was a strong collaborative spirit among the various stakeholders, and there was agreement that working together would help to move their messages forward.

The goal of Pregnancy PREP is to provide parents with a broad education on all of the vital health topics that are important at each stage of pregnancy and the postpartum period. If the program is proven to be successful, not only will parents demonstrate increased knowledge, but measurable behavior changes and health outcomes will also improve. For example, as new parents learn about alternative methods to calm their baby, it is possible that we may decrease the prevalence of shaken baby syndrome. Thus, Pregnancy PREP should ultimately improve maternal and neonatal health in Chapel Hill, North Carolina.

The first section of this paper is a systematic literature review of comprehensive educational programs for new parents. The goal of the literature search is to determine what offerings are available, and what techniques have proven to be successful in improving knowledge and health outcomes. The next section of the paper is a detailed program plan; this
section contains an overview of Pregnancy PREP and a context for how the program fits with current local and national priorities and the current political environment. This section also describes the program goals, theoretical models and a description of how it could be implemented. The section also contains strategies to ensure sustainability. The third section of the paper comprises an evaluation plan for Pregnancy PREP. As with any program, the curriculum should be examined to determine whether it is meeting goals of improving education and health outcomes. Thus, it is important to specify how the program will be monitored for ongoing success. The fourth and final section of the paper is a discussion about the future of Pregnancy PREP.
SYSTEMATIC REVIEW

Introduction

The intention of this literature review is to identify existing comprehensive, integrated programs that educate new parents about various messages essential to maternal and infant health. The goal is to learn from programs similar to Pregnancy PREP, and to incorporate elements proven to be successful. The programs identified by this literature review share certain features with Pregnancy PREP:

1) Target population is pregnant women and new parents.
2) Mission is to educate new parents and to disseminate important health information.
3) Various messages are integrated, including but not limited to, the benefits of breastfeeding, safe sleep techniques, smoking cessation, the period of purple crying, decreasing elective deliveries and decreasing SIDS risk.
4) Educates participants over a period of time.

Once identified, I will analyze these programs to determine the strengths and weaknesses of their interventions, as well as the impact on relevant outcomes.

Methods

Research Question: I conducted this literature review with the following research question:
What can be learned from existing programs and incorporated into Pregnancy PREP, an evidence-based curriculum to educate new parents?

Search Strategy: I searched multiple databases to identify potential programs, including PubMed, ERIC, CINAHL and ISI Web of Science. Each database is indexed differently, so I first searched for interventions that addressed only one health message (i.e. – smoking cessation during pregnancy, infant safe sleep). This allowed me to determine the correct index terms for
each database. I then used multiple combinations of search terms to identify comprehensive programs, as described below. I searched the PubMed online database, using the terms “Health Education” [MeSH] AND “Perinatal Care” [MeSH], and “Perinatal Care/organization and administration” [MeSH] AND “maternal health services” [MeSH]. I searched the CINAHL online database, using the terms “perinatal AND health education”, “family-centered AND perinatal” and “childbirth education AND family-centered care”. I used these same terms when searching the ERIC online database, in addition to “parenthood education AND intervention”. I also used these same terms in my search of the ISI Web of Science database, as well as “perinatal AND health education AND intervention” and “prenatal information AND health education AND intervention”. In addition to this systematic searching of terms, I also performed hand searches of reference lists, in order to identify additional articles. In order to develop a comprehensive search strategy, I met with a librarian at the UNC Health Sciences Library.

I first reviewed titles to determine relevance. I then reviewed abstracts to determine whether the program met the following inclusion criteria:

1) The article is in English.
2) The article describes a program that has been implemented in the United States.
3) The program shares key features of Pregnancy PREP.

Four programs met inclusion criteria and are summarized and analyzed below, as well as in Table 1.

Summary of Programs

Centering Pregnancy

The Centering Pregnancy program was developed by a nurse midwife, as an alternative to traditional prenatal care. The program is a response to a 1989 report by the US Public Health
Service Expert Panel on Prenatal Care, to build on education provided to pregnant women. The program incorporates ten rules created by the Institute of Medicine in 2001 to guide the development of prenatal care programs.

The model for the program is multiple group sessions of prenatal care. More specifically, there are ten 2-hour sessions; the first session is held between 12 to 16 weeks of pregnancy and the last one takes place during the postpartum period. During these sessions, the group leader provides some information through lecture, but the emphasis is on group discussion. Participants take turns speaking, and they are encouraged to support each other, and to engage in group problem solving. Each group is composed of 8 to 12 women with similar due dates. Before starting these sessions, participants undergo a prenatal assessment, complete with standard laboratory testing.

During the sessions, women are led in discussion by a care provider, who functions as a group leader. The function of the group leader is to facilitate the flow, but the focus is on group discussion itself. All group leaders complete training developed by the Centering Pregnancy program and Parenting Association. Participants complete self-assessment forms for each session, and the results of these assessments are incorporated into the session topics. In this manner, the focus of each session is tailored to the needs and desires of the participants. The general topics of these sessions include pregnancy concerns, nutrition, substance abuse, common gestational changes, preparation for birth and subsequent parenting, infant feeding, and postpartum issues. Each group collectively decides who can join the sessions; participants may be allowed to invite their family members, partners or friends.

In addition to the discussion and educational components of the program, women also receive their regular prenatal care during these group sessions; participants receive an evaluation
by the care provider. In addition to standard testing and medical evaluation, they are also encouraged to become active participants in their health and thus, are taught self-assessment skills; they are shown how to measure their blood pressure and weight, and to perform testing on their own urine. If any medical problems or personal issues emerge, participants are scheduled for individual appointments. Since participants are receiving medical care, their visits are reimbursed through insurance; this eliminates one of the challenges associated with obtaining prenatal education.

The first cohort of 111 participants was enrolled in 1993. In comparison to “a similar group who received traditional [prenatal care] from the same clinic”, participants had fewer trips to the emergency room during their third trimester. In addition, the vast majority of the participants (96%) reported that they preferred to receive group prenatal care. Other outcomes were not significantly different between participants and the similar group, including low-birth weight, preterm delivery, length of labor, analgesia use, cesarean rates and Apgar scores. Analysis of this initial cohort was very limited, due to the small sample size and the fact that participants were neither randomized, nor matched to a control group.

Two subsequent non-randomized studies have shown mixed results; one reported that infants born to participants had lower incidence of low birth weight and preterm births. The other study reported that benefits such as a longer gestational period and were increased birth weights were limited to preterm babies. In contrast, term babies born to participants had no difference in outcomes, in comparison to women who received traditional care. Both of these studies had small sample sizes, and the groups may not have been matched well.

A larger study, and the first randomized controlled trial, showed promising results. Participants randomly assigned to the centering pregnancy program were less likely to have
preterm births (9.8% of infants), in comparison with participants assigned to receive standard care (13.8% of infants). In addition, they were less likely to have suboptimal care, reported higher satisfaction with their care, had better knowledge and were subjectively more ready for labor.\textsuperscript{12}

One of the weaknesses of the Centering Pregnancy program is the lack of evaluation. The results from various trials have been funded and published by outside evaluators. The program would benefit from a built-in evaluation that assesses knowledge, in comparison to a group that receives standard prenatal care, as well as long-term outcomes, such as smoking cessation during pregnancy and beyond, rates of infant death, breastfeeding initiation and continuation and rates of elective deliveries before 39 weeks. Another important consideration is the cost-effectiveness of such an intervention; it seems likely that group prenatal care could decrease health care spending, but this has not been examined in the evaluations.

The strengths of this program are numerous. First, bringing participants together fosters a sense of community, and creates a support system of sorts. This setting builds trust in the facilitator and in other participants, and thus women may feel empowered to discuss their problems and concerns. Second, the program uses interactive small groups to educate women on a variety of health issues over time, allowing for participants to absorb and process information, and to follow-up on questions or uncertainties. In addition, this model can be (and has been) adapted to special circumstances, such as providing care for teenagers and military families.\textsuperscript{12}

\textbf{Comprehensive perinatal courses at Kennestone Hospital}\textsuperscript{13}

In 1997, Kennestone Hospital in Atlanta, part of WellStar Health System, revised their perinatal education system. Prior to this change, their program included seven two-hour classes and did not meet standards for quality childbirth education. There was no limit on the number of
participants, the classes were not standardized and they did not collect feedback to make changes.

Their revised educational program is based on specified Principles of Family-Centered Maternity Care, as well as published recommendations from various organizations. Classes feature topics that are relevant to early pregnancy, mid-pregnancy, late pregnancy, the postpartum period and parenting topics. In addition, there is one class designed specifically for fathers. Like the Centering Pregnancy program, interactive small group sessions are utilized, to facilitate learning. The focus is on group discussions; however, certain sessions focus on manual skills and include time for hands-on practice with infant mannequins. In addition, the Lamaze classes incorporate specific instruction on skills such as relaxation, massage, breathing and positioning.

Potential participants are introduced to the program via a “Perinatal Information Notebook”. This notebook includes promotional materials for the curriculum and other information. They are distributed to physicians’ offices and doctors present the notebook to women at their first or second prenatal care visit. In addition to this notebook, there is also a workbook for the series and each class has standard handouts.

Class size is limited to 10 to 12 couples, to allow for maximal interaction. Courses are offered on a continuous basis, so that women can join at any time. Classes are offered at various locations, so that participants can find one close to them. Classes, and all distributed materials, are available in Spanish, to meet the needs of a culturally diverse audience. In addition, families who speak other languages can participate in classes by using a headset for translation.

In order to continuously improve the curriculum, parents are surveyed for feedback. These suggestions are analyzed by the coordinator, who then utilizes the feedback to inform
changes. This is one strength of the program, and allows for continuous improvement and responsiveness to participants’ needs and concerns. However, the authors do not provide any details about the feedback that they have received. In addition, there is no other data on outcomes. At the time of publication, the authors noted that they intended to start collecting outcomes data, but I was unable to find it during my literature search.

Like the Centering Pregnancy program, Pregnancy PREP would benefit from an integrated program evaluation, to determine whether the program is meeting stated goals.

**Augmented prenatal care for high-risk African-American women**

This educational program was just one component of a larger intervention to determine if augmented care improved outcomes for high-risk African-American women in Jefferson County, Alabama. Pregnant women were randomly assigned to augmented care or traditional care. Group educational sessions on five pregnancy-related topics were offered only to the augmented care group. These 40-minute sessions were offered at each prenatal visit that participants attended. There were 2 sessions each on the following topics: nutrition, smoking and general substance abuse, stress reduction and labor and delivery. These sessions emphasized lectures and a presentation-based teaching style, with less of a focus on discussion than the aforementioned programs.

In addition to these educational sessions, women in the augmented care group received detailed information about their risk conditions, as well as techniques and suggestions to reduce their risk. Smokers were referred to a smoking cessation program and also received personalized follow-up to reinforce the message. Participants in the intervention group met with a social worker. They also had more frequent prenatal care appointments, and were guaranteed to be
seen within five minutes of their scheduled visit. They were offered transportation to prenatal visits, if necessary, and they had access to on-site child care.

Data was collected from participant interviews, and from clinic records, to determine if augmented care improved participants’ perceptions of care, knowledge of personal risks and subsequent behavioral change, smoking cessation rates and pregnancy outcomes such as birth weight, gestational age, low Apgar scores, maternal weight gain, and cesarean section rates.

Study results showed that women who received augmented care were more satisfied with their care and reported spending more time with their nurse. The intervention group attended more prenatal visits than did the control group. In addition, multiparous women in the augmented care group felt their care was superior to the care they received with their previous pregnancy.

There was no statistically significant difference between the two groups in regards to the percent of women who reported awareness of their risks, nor was there a difference in the percent of women who stopped smoking. There were also no differences in birth weight, gestational age or maternal birthing outcomes. This may be due to the small sample sizes (318 women in the intervention group and 301 women in the traditional care group); the authors report that they would have needed a cohort five times larger, in order to show such differences.

It is difficult to draw conclusions from this study, since they implemented a multifaceted intervention. Participants in the intervention group received multiple benefits, in addition to the educational curriculum that is the focus of this paper. In addition, this study focused on women with high-risk pregnancies, a specific segment of the population. Therefore, the findings may not be relevant, in creating a general educational curriculum for all women.
However, there are multiple lessons that can be learned from this program. One of the strengths is the provision of transportation and on-site childcare. Such features address the challenges that pregnant women may face, in committing to a long-term educational curriculum. Another strength is that the women received counseling on their specific pregnancy risks and information on evidence-based strategies to decrease their risk. Though Pregnancy PREP will not focus on high-risk women, this personalization of information is critical to making an impact on participants.

**Comprehensive Pregnancy Program**

The University of Michigan created the Comprehensive Pregnancy Program (CPP) in 1996, in hopes of implementing an integrated and competency-based educational curriculum for new parents. They based this program on recommendations from “Public Health Service guidelines, as well as standard texts of obstetrics and gynecology.”

The authors describe three major competencies, or areas of focus, for their educational curriculum: creating a safe environment, changes in lifestyle and other adaptations to pregnancy and emotional attachments. However, they do not provide details about the curriculum, and I was unable to locate any more information through literature and internet searches.

The authors do provide an example of a resource that is distributed to pregnant women, as part of the program. This chart lists various important topics in each of the above three areas. For example, the section on lifestyle changes includes topics such as nutritional needs, physical changes, exercise, preparing for labor and birth, learning to breast-feed and caring for yourself after delivery. The chart also includes details of when these various topics should be discussed (i.e. – early, mid- or late pregnancy or early adulthood). For each topic, parents are able to note whether they have already received information or would like to receive information. Though
the authors do not discuss this resource in detail, it is presumably provided to patients, so that they can chart their progress through the educational curriculum.

The authors conducted a cohort study to compare women who received care through CPP to women who received care prior to implementation of CPP, to determine if CPP improved outcomes. Data was collected from the hospital’s database, and from a survey sent to all study patients in both groups. The results showed that the CPP participants had a 56% decrease in maternal and infant length of hospitalization, in comparison to the control group (1.63 days vs. 2.19 days for maternal hospitalization and 1.66 vs. 2.01 days for infant hospitalization); this difference was statistically significant, but perhaps not clinically significant. The intervention group also had a statistically significant decrease in hospital costs for mother and baby, in comparison with the control group ($2253 vs. $3206 for maternal costs and $1558 vs. 1742 for infant costs). There was no statistically significant difference between the two groups in maternal emergency room visits or readmissions for mother or baby. Patient satisfaction was high in both groups.

This program is also very difficult to evaluate, since the authors provided little information about the intervention.

Analysis

The four programs included in this literature review provide some interesting points for analysis. Three of the four programs offered a series of sessions for new parents, and covered a variety of topics, spanning from early pregnancy through the postpartum period. The fourth program may have similar features, but the authors did not provide specific details. All of the programs were created with the belief that the existing form of prenatal care could be improved,
to become more comprehensive and outcome-driven. All of the programs are based in principles, recommendations or standards created by outside organizations.

All of the programs had a goal of creating a standardized system of education. Multiple programs required that their staff and educators completed training. Standardized program materials were created and distributed to participants. These handouts seem to be a helpful tool for participants, allowing them to track their progress through the educational sessions and providing extra information about various topics. Centering Pregnancy and the program at Kennestone Hospital limit class sizes, and group participants based on due dates. The other programs did not mention any efforts to standardize participants in this manner. Though it is important to tailor sessions to the specific participants, incorporating some form of standardization is important for a program, especially for evaluation purposes. It also ensures that all participants have a similar experience, and thus, equal opportunity for similar positive outcomes.

Three of the four programs collect information from participants, to determine their satisfaction with their experience. Though Centering Pregnancy, as described in these articles, does not include surveys as a program component, outside studies have assessed participants’ satisfaction. Of the programs, only the one at Kennestone Hospital actually utilizes participant feedback to improve and revise educational sessions. This is an important aspect of quality improvement, and more programs should consider implementing a similar policy.

In regards to data collection and analysis, Centering Pregnancy and the perinatal courses at Kennestone Hospital were not created with an evaluation plan. In contrast, the Comprehensive Pregnancy Program and the augmented care plan for high-risk women extracted data from medical records, to determine whether the interventions achieved specified goals.
Similarly, Pregnancy PREP will have a pre-specified evaluation plan; in fact, this plan will inform program development and planning. An important point to keep in mind is that although some programs showed benefits such as increased satisfaction with prenatal services, decreased costs and slightly decreased hospital stays, these programs did not affect all outcomes. Specifically, infant health outcomes and maternal birthing outcomes were not different between the group who received care under the new system and the traditional care group.

Conclusions

This literature review focused on four programs that attempt to educate new parents, mainly through informational group sessions. These programs have many similar features to Pregnancy PREP. There are lessons to be learned, both from their successes and their weaknesses.

In conducting this literature review, I found very few suitable programs for comparison. There are certainly a large number of prenatal education programs in existence, throughout the country. However, many such programs are not published. It is possible that other research techniques, such as working with experts in the field and reviewing national conferences, may have yielded more programs. Centering Pregnancy is an example of a program that has been studied extensively. Though one can access a wealth of information on Centering Pregnancy, there is very limited published information about other models of comprehensive perinatal care. This gap in the literature certainly represents an opportunity to impact the field of perinatal education and make a lasting contribution.
PROGRAM PLAN

Overview

Pregnancy PREP (Providing Resources for Educating Parents) is a program to teach new parents about various topics of importance for maternal health, as well as for infant health and safety. This will be an alternative to the current approach, in which individual stakeholders educate new parents only about their individual message. I seek to develop a cohesive program that incorporates education about multiple issues, such as smoking cessation during pregnancy, decreasing rates of elective deliveries before thirty-nine weeks, breastfeeding, the period of purple crying and safe sleep techniques for infants.

For this program, I will focus on pregnant women seeking prenatal care and education at UNC-Chapel Hill, in the resident, midwifery and faculty practices. Chapel Hill is a relatively small city, with a limited number of prenatal care providers; it may be easier to implement and evaluate a program in such a location. In addition, Chapel Hill is an urban area, with a free transportation system. As such, some of the barriers are removed for potential participants. However, this may limit the external validity of this program; the results may not be replicable in more rural settings. In addition, UNC-Chapel Hill treats more high-risk patients than community practices; this is another potential problem associated with choosing an academic facility, and may be a confounding factor for the program. I hope that Pregnancy PREP can eventually be extended to women throughout Orange County, and subsequently, the entire state of North Carolina. However, I believe that my program should be implemented on a small scale initially, in order to evaluate efficacy.
Program Context

I had to take into account several considerations, in creating the program plan for Pregnancy PREP. In this next section, I will discuss these considerations, along with obstacles and potential strategies to address them.

Consistency with local, state and national priorities

On a national level, Healthy People 2020 recognizes the importance of maternal and infant health programming in decreasing maternal and infant mortality. Specific objectives from Healthy People 2020 fall in line with the health messages that are central to Pregnancy PREP. One such objective relating to infant health is MICH-1.8, to decrease the infant death rate due to Sudden Infant Death Syndrome (SIDS) from 0.55 to 0.50 deaths per 1,000 live births. Another objective is MICH-1.9, to decrease the total rate of unexpected infant deaths from 0.93 to 0.84 deaths per 1,000 live births. Teaching new parents about healthy sleep techniques is crucial to achieving both of these objectives. Another example is the objective MICH-9, with the goal of reducing preterm births. In 2007, 12.7% of live births were preterm; Healthy People 2020 seeks a 10% improvement in this rate. Again, this falls in line with the health message of decreasing elective deliveries before 39 weeks gestation. Other examples of Healthy People 2020 objectives related to Pregnancy PREP are MICH-21 (to increase the proportion of infants who are breastfed) and MICH-23 (to reduce the proportion of breastfed newborns who receive formula supplementation within the first 2 days of life).

Healthy People 2020 also takes a stand on issues affecting maternal health. For example, objective MICH-11.3 is to increase the percent of females abstaining from smoking cigarettes during pregnancy from 89.6% to 98.6%. In addition, MICH-18 specifies a goal of reducing postpartum smoking relapse among women who were able to quit during pregnancy.
The national emphasis on maternal and infant health problems is also reflected in local county and state programming. A 2010 Orange County report identified Child Health as a top priority. Two programs in Orange County focus on increasing awareness of Shaken Baby Syndrome, with the intent of decreasing infant injuries. Real Men Rock is a program that provides information about age-appropriate behavior and techniques to console infants. The Period of Purple Crying educates parents about infant crying; it also provides training for healthcare and child care providers. In addition, a 2007 Orange County Community Health Assessment identified the importance of obtaining prenatal care by setting a goal to increase the proportion of pregnant women who receive care in their first trimester to 90%. The state of North Carolina echoes these initiatives, with goals of reducing neonatal mortality and cigarette smoking and increasing prenatal care. These are especially important initiatives for the state, since NC usually has a relatively high infant death rate, in comparison with many other states.

Pregnancy PREP is also in alignment with the goals of the North Carolina Child Fatality Task Force. This state-mandated task force is composed of representatives from the North Carolina legislature and government, as well as community leaders and others. The goal of the task force is to issue and implement recommendations for various policies to support healthy development of infants and children in North Carolina. The Perinatal Health Committee, one of three task force committees, is focused specifically on infant mortality. One of the committee’s current goals is to examine North Carolina’s perinatal health infrastructure and devise ways to improve and/or rebuild it. As such, Pregnancy PREP is perfectly timed and poised to inform the recommendations of the committee and to change the way in which perinatal health education is delivered in North Carolina.
The political environment

Programming to improve the health and wellness of women and children is usually not controversial. These two populations are considered vulnerable, and thus tend to receive bipartisan support. At this current time, there is a local and national emphasis on maternal and child health, as evidenced by the Healthy People 2020 initiatives and Orange County health assessments previously discussed.

Acceptability to providers and recipients

Creating an integrated, comprehensive curriculum will likely be viewed favorably by providers and recipients. Health care providers, such as nurses and physicians, are currently responsible for educating new parents about multiple health issues. Their specific responsibilities vary between health systems. Each individual health message is publicized and chaired by a different organization; this amounts to multiple trainings for providers, and multiple resources to track and distribute to patients. In comparison, an integrated approach such as that used by Pregnancy PREP would simplify the educational process for providers. A comprehensive timeline will be included, spanning from prenatal visits all the way through postpartum visits for mothers and pediatrician visits for infants. Integrated promotional and educational materials would be utilized. In addition, there would be no need for multiple trainings from various organizations. Despite these benefits for providers, they may be somewhat hesitant in the beginning. Providers are responsible for their clinical duties, in addition to the extra tasks of education. Providers are often overworked. To this end, a crucial component of creating this program is the interviews with the staff members who currently deliver these messages to new parents. It is crucial to discuss the challenges they face and to integrate their suggestions into the program plan. This will show providers that they are valued
collaborators and will help them to become invested in Pregnancy PREP. Another potential solution is to structure our provider training so that they may receive Continuing Medical Education (CME) credits. This will provide a benefit for participating providers, and may make them more likely to attend and contribute.

Recipients would also benefit from an integrated curriculum. Currently, new parents are sent home from the hospital with various materials and messages about various health topics; this can be overwhelming. The creation of a unified curriculum will help to organize these messages and allow for the most effective and timely delivery. In addition, Pregnancy PREP will standardize the education that parents receive and decrease or eliminate educational disparities between patients.

Possible financial resources

Pregnancy PREP would likely be funded through grant support. Another idea is to create classes that are reimbursed through insurance companies, which would bring a sustainable source of income for the program.

Technical feasibility

There are multiple methods for educating new parents. Currently, certain organizations print educational materials for parents to read; others utilize electronic media such as CDs to deliver their messages. As part of the program plan, I will conduct research to determine which format is the most effective.

The target audience for the intervention is pregnant women and new parents at UNC-Chapel Hill. The choice of one health system, in one city, will simplify the initial program plan; it will limit the number of health care providers, and thus, limit the amount of training necessary.
Stakeholders and other factors

Parents are one of the key groups to consider, in designing Pregnancy PREP. As they will be the participants, their needs and concerns will drive program development and revision. Parents may face many challenges in becoming involved with this type of intervention. New parents, and even expecting parents, have many demands on their time and competing priorities. In addition, there are other programs that aim to address some of these same problems, so it will be necessary to attract participants’ attention.

In addition, the key stakeholders for Pregnancy PREP are the organizations that currently deliver these crucial health messages. Though it may be in the best interests of patients to integrate these messages into one unified curriculum, there may be resistance from these individual stakeholders. They have been delivering their individual messages for some time, and it may be challenging to change the methods of their programming, to operate in a more collaborative fashion. In addition, there may also be some “turf issues” that will have to be addressed. However, all of these organizations are centered around improving maternal and infant health. Therefore, if an integrated curriculum proves to be more effective in educating new parents, and is shown to improve outcomes, stakeholders will likely be supportive. As with the integration of health care providers, it will be crucial to seek out these stakeholders and interview them, to learn how their individual programs run. This information will be integral in developing the program plan, in order to build on their successes and learn from their mistakes. Seeking their input will also motivate stakeholders to participate in this intervention.
Goals and Objectives

Program Goals:

- To improve the perinatal and neonatal health of mothers and infants seeking care at UNC-Chapel Hill in North Carolina
- To improve perinatal and neonatal health knowledge of families in Chapel Hill
- Pregnancy PREP will start in June 2011

Program Objectives:

- Short-term objectives:
  - By June 2012, 95% of Pregnancy PREP staff will have participated in training on the relevant health issues, and on techniques for educating new parents.
  - By June 2012, Pregnancy PREP staff will inform all of the perinatal and neonatal care providers at UNC-Chapel Hill about the program for referral.
  - By June 2014, 75% of the parents who complete Pregnancy PREP will demonstrate increased knowledge of the subjects taught in the program.

- Long-term objectives:
  - By June 2015, 75% of the prenatal care providers at UNC-Chapel Hill will refer appropriate patients to Pregnancy PREP.
  - By June 2015, 50% of mothers seeking prenatal care at UNC-Chapel Hill will participate in Pregnancy PREP.
  - By June 2015, among families participating in Pregnancy PREP, there will be an increase in the proportion of infants who are breastfed, in comparison to the infants in Chapel Hill whose families did not participate in the program.
By June 2015, 98% of women participating in Pregnancy PREP will abstain from smoking cigarettes during and after pregnancy.

**Theoretical Model**

There are two target audiences for Pregnancy PREP; thus, multiple theories should be considered to guide the intervention and evaluation design. The first target audience is the health care professionals who will actually conduct and coordinate the program. For this target audience, the community organization theory will be most useful to guide the program activities; the community of health care professionals at UNC-Chapel Hill will be using this integrated approach to educate new parents.\(^{17}\) Thus, these individuals will be instrumental in shaping the curriculum. We will conduct interviews with members of organizations that are in charge of delivering health messages to new parents; it will be crucial to gain information from their experiences and to determine their views on successful strategies. In addition, by seeking their opinions, we will empower this community to help new parents and encourage their participation in the intervention.

The second target audience is the new parents who will be learning from Pregnancy PREP. As such, the health belief model will be important, as will the precaution adoption process model.\(^{17}\) The health belief model is relevant because it will address new parents’ motivations and challenges in participating in the curriculum. Identifying the susceptibility and severity of various infant health problems will allow us to determine the need for an intervention. Learning about the perceived benefits, cues to action and self-efficacy will enable us to attract new parents. Once we determine potential participants’ motivations, and determine what they hope to get out of the intervention, we can structure our activities accordingly. For example, if parents are interested in gaining hands-on experience in creating a safe sleep environment for
infants, we can model these techniques in one of the program sessions. Finally, investigating the costs of this intervention will allow us to determine solutions to avoid these potential barriers.

The precaution adoption process model will also help to guide the program plan. Many new parents may be unaware of the important health messages that will be contained in the curriculum. Thus, it is very important to determine an individual’s awareness, along the spectrum and to develop strategies that take this information into account.

**Implementation**

There are many considerations in developing an implementation plan for Pregnancy PREP. Though it will start as a demonstration project, if it is determined to be effective in meeting short and long-term objectives, perhaps there is a possibility for integration into routine prenatal care. In this manner, it may eventually be eligible for reimbursement through insurance.

Like many other perinatal education programs, participants will complete classes over the course of their pregnancy, and even after delivery. The focus will be on small groups and classes will follow a discussion-based model. The activities necessary for implementation of Pregnancy PREP fall into five categories: recruitment and training of staff and leaders, development of the educational curriculum, recruitment of participants, conducting the classes and collecting post-intervention data.

**Recruitment and training of staff and leaders**

The first activity will be the recruitment of the program staff. We will need to hire at least two health educators to develop and implement the curriculum, and one administrative staff member to coordinate program activities. The health educators should be experienced perinatal nurses who have experience with educating new parents about health topics. These educators should also be familiar with the area and, ideally, some of the care providers in Chapel Hill.
Though the administrative staff member may need to be full-time, the health educators will only be funded part-time.

All three staff members will need to be trained on health topics that are important for new parents, including the benefits of breastfeeding, safe sleep techniques and environment, strategies to prevent shaken baby syndrome, smoking cessation and the importance of decreasing elective deliveries. The training should be conducted by the experts on these topics, which are the key organizations that currently deliver perinatal and neonatal health messages to providers and parents. These organizations include the stakeholder organizations that participated in the joint effort that preceded this project. Many of these organizations currently train healthcare staff; as they train the program staff, we will need to consider how to adapt these messages for delivery to new parents.

Development of the educational curriculum

Pregnancy PREP will cover topics relevant to each part of pregnancy. During the first trimester, participants will learn about healthy eating habits and nutritional needs, the importance of smoking cessation, the dangers of substance abuse, and the harms of elective deliveries prior to 39 weeks of gestation. During the second trimester, the same messages will be echoed; participants will also learn how to structure a safe sleeping environment for the infant and how to decrease the risk of SIDS and preventable death. In the third trimester, the curriculum will incorporate information about breastfeeding. Participants will also receive education about shaken baby syndrome, and will be given tools to decrease risk, such as learning techniques to console crying infants. Patients are exposed to this information at the hospital, during and after labor. By educating participants throughout the course of the pregnancy, the information will not be new to them, and they are less likely to feel overwhelmed or stressed. The classes after
delivery will focus on many of the same topics, such as breastfeeding, education to prevent shaken baby syndrome, and continued follow-up about the harms associated with substance abuse. There will also be education about postpartum depression. Participants will learn about family planning and contraception, to lengthen birth intervals. Participants will be able to discuss challenges with their peers, and collectively determine solutions.

Though this timeline serves as a template, it will be very important for program staff to conduct interviews with key stakeholders, such as parents, members of perinatal health organizations and local care providers, to hone the curriculum. Parents can provide information on desirable intervention details; organizations and professionals can provide their expertise and guidance. This will allow us to tailor the program to the needs of the target population.

Another important component of curriculum development is the creation of a handbook for participants. This handbook will contain information on the full curriculum, as well as handouts for each class. There will also be a comprehensive list of topics, so that participants can track what they have learned.

**Participant recruitment**

Program staff will reach out to all of the prenatal care providers at UNC-Chapel Hill, and will provide them with information about Pregnancy PREP. Care providers will pass the information along to all patients; interested patients will contact the program to learn more about participation. The first cohort of patients will be 8 to 12 pregnant women who are all within the first trimester of their pregnancy.

**Conducting the classes**

Program staff will schedule and conduct ten classes, based on the finalized curriculum. Before each class, participants will take a pre-test, to determine their level of baseline
knowledge. After each class, participants will complete a post-test, to determine whether they have learned the information presented.

Though the health educators will lead and facilitate the classes, the emphasis will be on group discussion. Educators will announce the topics for the day and will ensure that the relevant information is discussed, but participants will guide the discussion. In this manner, we will ensure that participants’ concerns are addressed and that their needs are met. After each class, participants will provide feedback, and the health educators will consider this feedback and, whenever possible, incorporate it into future classes.

**Collecting post-intervention data**

In order for the program to be considered effective, we must collect data from and about the participants. One source of data will be the pre- and post-test scores; analyzing these will allow us to determine whether the participants mastered the topics presented. We will also conduct a follow-up survey to gather information on various outcomes, such as initiation and duration of breastfeeding and smoking cessation rates.

**Strategies for sustainability**

Pregnancy PREP should be implemented with a foundation to preserve longevity over the years. If proven to be effective, the program may become a permanent component of prenatal care at UNC-Chapel Hill. Initially, it is reasonable to strive for a low level of sustainability; however, if the data demonstrate that the program is effective, this will give the program credibility and we can strive for a higher level of sustainability.¹⁸
Vision

It is important for all stakeholders to share the mission of Pregnancy PREP. By seeking their guidance and involving them in the planning stages of the program, we will help to ensure that we share a common vision and similar goals.

Results orientation

Pregnancy PREP will be developed and implemented with a focus on obtaining the desired results. The data on participants’ knowledge and resulting outcomes, relative to non-participants, will allow us to determine whether the program is effective and has accomplished its goals of increasing knowledge of vital health messages and decreasing perinatal and neonatal morbidity and mortality.

Broad-based community support and key champions

As discussed previously, we will seek out stakeholders and involve them in the planning and implementation phases. This will help to ensure community support.18 We will also reach out to all prenatal care providers, so they will also be informed of the program and will, in turn, inform their patients.
EVALUATION PLAN

Rationale for Evaluation

Pregnancy PREP must be evaluated, to determine the success of the implementation, and the strength of the outcomes produced. Evaluation would be beneficial for a variety of reasons. The purpose of the program is to enhance participants’ knowledge of various perinatal and infant health messages. Data collection and analysis is necessary, in order to ensure that the program is meeting its goals of increasing awareness of critical perinatal and neonatal health messages.\(^\text{19}\)

In addition, it will be important to evaluate outcomes, to determine if this type of prenatal program is more effective than other types of educational programs for new parents. If so, that may inform future designation of resources and funding for perinatal education. However, if Pregnancy PREP is not effective, and does not achieve better outcomes than traditional prenatal programs, it would be unwise to continue to devote funding and resources to such a program.

Approach to the Evaluation

Ideally, Pregnancy PREP would use an internal evaluator, as well as an external evaluator. An internal evaluator, especially one who is employed as an educator, can provide an insider’s perspective on the activities that are working, and how participants are experiencing the curriculum and classes. However, an internal evaluator’s perspective may be somewhat biased, since they will likely be evaluating their own work. Therefore, it would also be beneficial to work with an external evaluator, who can provide a more objective perspective and a different level of expertise.\(^\text{20}\)

For both types of evaluators, the most important skill is the ability to listen. During the process of soliciting feedback from program staff, program participants and key stakeholders, evaluators should be able to separate their own beliefs and opinions and absorb others’
perspectives. In addition, the evaluators should be flexible. It is possible that changes will be made to the educational curriculum, and the program may undergo revisions. Evaluators may need to adapt to new circumstances.20

All of the key stakeholders should be involved in the evaluation process; this includes program staff and members of the target population, as well as representatives from various organizations that deliver maternal and infant health messages. It is important to seek multiple opinions and perspectives, especially in the beginning stages of creating evaluation questions.20 It seems likely that the health organizations will be concerned with the delivery of the messages that they are individually engaged with. For example, representatives from smoking cessation organizations will be interested in the pre- and post-program smoking rates, to determine whether the intervention has caused a change in participants’ habits and behavior.

One of the potential challenges of the evaluation process will be overcoming each organization’s commitment to the delivery of its specific message; instead, stakeholders must be committed to improving overall health of mothers and infants in Chapel Hill.

Another potential challenge is difficulty in recruiting stakeholders to participate in the evaluation process. With the exception of program staff, stakeholders may not have the time to commit to this process. Parents may not be interested enough to participate in the process.

**Evaluation Study Design**

The program evaluation will utilize a quasi-experimental design; it will incorporate a combination of techniques such as document review, interviews, surveys and analyzing differences between pre- and post-test scores to assess implementation fidelity.19 The evaluation will also utilize epidemiological data, to measure progress toward program outcomes.
Ideally, Pregnancy PREP should be tested in an experimental study, in which pregnant women are randomly assigned to participate in either the curriculum or standard prenatal education. However, it will be difficult to recruit initial participants to a randomized trial. In addition, such an experiment would require extra funding and logistical support. Although this may be a consideration at a later time, it will be necessary to first pilot the curriculum, in order to ensure that it is a valuable program and can contribute to maternal and infant health.

**Evaluation Methods**

In order to determine whether program activities were carried out as planned, data collectors will rely heavily on staff interviews and program records to gather information on initial start-up activities, such as trainings, outreach to local providers and participant recruitment. Document review will also be important to track the number of participants, as well as their characteristics. Interviews and surveys will be utilized to determine whether staff members felt they learned from trainings and whether participants felt they learned from the curriculum. These methods will also be important to identify problems with program activities and opportunities for improvement.

Quantitative data will also be collected to assess achievement of outcomes; pre-intervention and post-intervention testing will be administered to program participants. This will help evaluation staff determine objectively whether participants learned key concepts from the curriculum. In addition, epidemiological data will be used to compare outcomes between the program participants and the general population.
### Evaluation Planning Tables

#### Short Term Objectives

**Short Term Objective 1:** By June 2012, 95% of program staff will have participated in training on the relevant health issues, and on techniques for educating new parents.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were 95% of program staff trained on health issues by June 2012?</td>
<td>Program coordinator</td>
<td>Document review (program records)</td>
</tr>
<tr>
<td>Were 95% of program staff trained on educational techniques by June 2012?</td>
<td>Program coordinator</td>
<td>Document review (program records)</td>
</tr>
<tr>
<td>Did staff demonstrate increased knowledge of health issues after training?</td>
<td>Program coordinator</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Staff members</td>
<td>Pre and post-test</td>
</tr>
<tr>
<td>Did staff demonstrate increased proficiency regarding educational techniques after training?</td>
<td>Program coordinator</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Staff members</td>
<td>Post-training survey</td>
</tr>
<tr>
<td>Did staff feel confident in their ability to educate new parents on relevant health issues?</td>
<td>Staff members</td>
<td>Post-training survey</td>
</tr>
<tr>
<td>Are there any important problems or questions that the training did not address?</td>
<td>Program coordinator</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Staff members</td>
<td>Post-training survey</td>
</tr>
<tr>
<td>In what ways can staff training be improved?</td>
<td>Program coordinator</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Staff members</td>
<td>Post-training survey</td>
</tr>
</tbody>
</table>

**Short Term Objective 2:** By June 2012, program staff will inform all of the perinatal and neonatal care providers at UNC-Chapel Hill about the program for referral.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was program staff able to inform all of the perinatal and neonatal care providers at UNC-Chapel Hill about the program by June 2012?</td>
<td>Program coordinator</td>
<td>Document review (program records)</td>
</tr>
<tr>
<td>What problems did staff experience in publicizing the program? How can it be improved?</td>
<td>Program coordinator</td>
<td>Document review (program records)</td>
</tr>
<tr>
<td></td>
<td>Staff members</td>
<td>Survey</td>
</tr>
<tr>
<td>Were providers at UNC-Chapel Hill interested in the program? Why or why not?</td>
<td>Staff members</td>
<td>Survey</td>
</tr>
</tbody>
</table>
Short Term Objective 3: By June 2014, 75% of the parents who complete Pregnancy PREP will demonstrate increased knowledge of the subjects taught in the program.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were 75% of program staff who completed training able to demonstrate increased knowledge of the subjects taught by June 2014?</td>
<td>Health educators</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Participants</td>
<td>Pre and post-test</td>
</tr>
<tr>
<td>How many people have participated in the program?</td>
<td>Program coordinator</td>
<td>Document review (program records)</td>
</tr>
<tr>
<td>Did participants feel confident in their ability to apply knowledge and skills learned to their lives?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>Are there any important problems or questions that the program did not address?</td>
<td>Health educators</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>In what ways can the program be improved, in regards to educating parents?</td>
<td>Health educators</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
</tbody>
</table>

Long Term Objectives

Long Term Objective 1: By June 2015, 75% of the prenatal care providers at UNC-Chapel Hill will refer appropriate patients to Pregnancy PREP.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did 75% of providers at UNC-Chapel Hill refer appropriate patients to the program by June 2015?</td>
<td>Program coordinator</td>
<td>Document review (program records)</td>
</tr>
<tr>
<td>What percentage of patients was deemed appropriate for referral?</td>
<td>Chapel Hill providers</td>
<td>Survey</td>
</tr>
<tr>
<td>What problems or obstacles did UNC-Chapel Hill providers face during the referral process?</td>
<td>Chapel Hill providers</td>
<td>Survey</td>
</tr>
<tr>
<td>How can the referral process be improved, to facilitate enrollment?</td>
<td>Program coordinator</td>
<td>Interview</td>
</tr>
<tr>
<td></td>
<td>Chapel Hill providers</td>
<td>Survey</td>
</tr>
</tbody>
</table>

Long Term Objective 2: By June 2015, 50% of mothers seeking prenatal care at UNC-Chapel Hill will participate in Pregnancy PREP.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did 50% of mothers seeking prenatal care at UNC-Chapel Hill participate in Pregnancy PREP by June 2015?</td>
<td>Program coordinator</td>
<td>1 - Document review (program records)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – Review of</td>
</tr>
</tbody>
</table>
Long Term Objective 3: By June 2015, among families participating in Pregnancy PREP, there will be an increase in the proportion of infants who are breastfed, in comparison to the infants in Chapel Hill whose families did not participate in Pregnancy PREP.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was there an increase in the proportion of infants who were breastfed among families participating in Pregnancy PREP, in comparison to infants whose families did not participate, by June 2015?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td></td>
<td>Program coordinator</td>
<td>Epidemiological data (rate of breast-feeding in Chapel Hill)</td>
</tr>
<tr>
<td>How many participants choose to breastfeed their infants?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>What barriers do participants encounter, in relation to breastfeeding?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>How can the program better support women who want to breastfeed?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td></td>
<td>Health educators</td>
<td>Interview</td>
</tr>
</tbody>
</table>

Long Term Objective 4: By June 2015, 98% of women participating in Pregnancy PREP will abstain from smoking cigarettes during pregnancy.

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Participant</th>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did 98% of women participating Pregnancy PREP abstain from smoking cigarettes during pregnancy by June 2015?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>How many previous smokers chose to stop smoking?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>What barriers do participants encounter, in relation to smoking cessation?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td>How can the program better support women who want to stop smoking?</td>
<td>Participants</td>
<td>Post-program survey</td>
</tr>
<tr>
<td></td>
<td>Health educators</td>
<td>Interview</td>
</tr>
</tbody>
</table>
Dissemination Plan

An important component of the evaluation plan is the dissemination plan; determining how the data will be used is helpful in ensuring that the pertinent data are collected throughout the process. During the evaluation, it will be important to regularly update key stakeholders and project staff on progress and findings. Not only is this crucial to discuss any issues that arise, but also to ensure that people are involved and motivated. This will likely take the form of informal monthly meetings.

After all of the data has been collected and analyzed, a final report will be distributed to the project staff, funders and to relevant stakeholders. This report will describe the evaluation methods and results; it will also discuss conclusions and recommendations stemming from the project. In addition, project staff will likely need to conduct presentations for local organizations, community groups and stakeholders.
DISCUSSION

North Carolina consistently has high rates of infant mortality, in comparison with other states. Though the ranking has improved since 1998, when North Carolina had the highest rate in the entire nation, there is a long way to go. In considering the causes of infant deaths, it is even more evident that there is room for improvement. Prematurity, low birth weight, SIDS and unintentional injuries are all prevalent causes of death, and will all be addressed during Pregnancy PREP.

The scarcity of comprehensive educational programs was revealed through the systematic review I conducted for this paper; few examples of such programs are published in medical, nursing or allied health literature. Of the curriculums that I reviewed, there was a focus on creating a standardized system of education including materials and handouts for patients and training for staff members and educators. These types of principles are crucial for many reasons. First, standardizing a program allows for duplication for future programs, as well as evaluation of the program. Training for program staff is another method of standardization, to ensure that all patients receive the same education; training also incorporates evidence-based messages, thus improving the quality of education provided. Pregnancy PREP incorporates both of these principles; program objectives include requirements for staff training. In addition, during the process of curriculum development, program staff will solicit input from key stakeholders as to specific topics to be addressed; in this manner, we will create a standardized evidence-based program, and a handbook to go along with it.

Another important lesson from the systematic review is the importance of surveying participants, to determine their satisfaction with the educational offerings and the program in general. This is another element that Pregnancy PREP will incorporate, especially during the
evaluation phase. Both staff members and participants will be queried about their experience with Pregnancy PREP, and asked to provide suggestions for improvement. In this manner, the program can be improved upon.

One notable detail from the review of comparable programs is the lack of evaluation plans. It is extremely important to study and document the successes and failures of any program that seeks to affect change; thus, Pregnancy PREP has a built-in evaluation plan. The evaluation planning tables detail the outcomes on which the program will be evaluated, and the methods that will be utilized to gather evaluation data. The program will rely heavily on document review, interviews with staff and surveys of both staff and participants. This evaluation plan can easily be modified if necessary, based on feedback from program staff and stakeholders, but is provided as a foundation.

It may be difficult to prove the effectiveness of Pregnancy PREP. First, as the program is not a randomized controlled trial, there is no way to determine causality of any changes observed. If health outcomes improve, we could not determine whether Pregnancy PREP had any impact on these changes. Second, though data collected through document review, interviews and surveys will be available shortly after the end of the program, it is extremely unlikely that we will see any impact on the epidemiologic data. As we are starting with one city in North Carolina, and a small group of participants, it will be impossible to change the statewide infant mortality rate, and we are also unlikely to change statewide breast-feeding or smoking cessation rates. But perhaps, the program may change local rates; we may decrease the number of infant deaths in Chapel Hill.

However, Pregnancy PREP does have the ability to educate new parents on how to better care for their children, and thus, create opportunities for better outcomes.
ACKNOWLEDGMENTS

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Pam Dickens
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Anita Farel
Bailey Goldman
Rebecca Sink
REFERENCES


5. Orange County Health Department, Healthy Carolinians of Orange County. Orange County Community Health Assessment, 2007.


## TABLE 1 – SUMMARY OF STUDIES WITH SIMILARITIES TO PREGNANCY PREP

<table>
<thead>
<tr>
<th>Program</th>
<th>Goal(s)</th>
<th>Shared elements</th>
<th>Implementation</th>
<th>Evaluation</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Centering Pregnancy                          | • To revolutionize traditional models of prenatal care, in order to optimize outcomes | 1, 2, 3, 4      | • 20 hours of group prenatal care  
• 8-12 women with similar due dates  
• Starting at 12-16 weeks of pregnancy and continuing through early postpartum period | • None built into the program, however multiple outside studies have been conducted | • Reported from outside studies, in comparison to individual care  
• Participants significantly less likely to have preterm births and improved rates of breastfeeding initiation  
• Also had more prenatal care knowledge  
• Also less likely to have inadequate care and more likely to report higher satisfaction with prenatal care |
| Comprehensive perinatal courses at Kennestone Hospital | • To revise the hospital’s existing perinatal education program in accordance with standards | 1, 2, 3, 4      | • 10 group classes on perinatal education topics, including 12 hours of Lamaze instruction  
• Classes cover early, mid- and late pregnancy, and postpartum information | • Feedback obtained from all participants; used to revise curriculum | • No outcomes data reported  
• Plans in progress to collect and analyze pregnancy, birth and postpartum outcomes |
| Augmented prenatal care for high-risk, African-American women | • To determine if educational classes, and other interventions, improved outcomes for high-risk women | 1, 2, 3, 4      | • 10 group classes on five topics related to pregnancy  
• Classes are part of multifaceted intervention that also includes more frequent prenatal visits, special arrangements, counseling on risk and risk modification, and the opportunity to meet with a social worker | • Extracted and analyzed clinic records to determine outcomes  
• Also interviewed participants to determine satisfaction | • Women in the augmented care group were more satisfied with their care and attended more prenatal visits than women in the usual care group  
• In comparison with usual care, there were no differences in risk awareness, smoking cessation, infant outcomes or maternal birthing outcomes |
| Comprehensive Pregnancy Program              | • To implement an integrated and competency-based educational curriculum for new parents | 1, 2, 3 only    | • Content focused on creating a safe environment, changes in lifestyle and other adaptations to pregnancy and emotional attachments  
• Specific details unknown | • Extracted outcomes data from hospital database  
• Surveyed patients to determine satisfaction | • Program decreased costs maternal and infant length of hospitalization  
• In comparison to previous system of prenatal care, there were no differences in emergency room visits or readmissions |

*Shared elements with Pregnancy PREP:
1) Target audience is pregnant women or new families.
2) Mission is to educate new parents and to disseminate important health information
3) Various messages are integrated
4) Educates participants over a period of time.*
Figure 1 – Pregnancy PREP Logic Model

**RESOURCES**

In order to accomplish our set of activities, we will need the following:

- Program staff
- Financial backing
- A location in which to hold classes
- Recruitment materials for parents
- A database to track participants
- Collaboration with various stakeholders to shape the curriculum
- Research on which to base program

**ACTIVITIES**

In order to address our problem, we will conduct the following activities:

- Create a curriculum for educational classes for new parents
- Recruit local perinatal and neonatal health care providers as a referral source for participants
- Advertise the program to pregnant women and new parents
- Conduct classes, spanning from prenatal period to postpartum visits and well-child checks
- Provide training for program staff, related to various health messages and techniques for education

**OUTPUTS**

We expect that once completed or underway, these activities will produce the following evidence of service delivery:

- Evidence-based curriculum of important topics for new parents
- Parents are educated on various health messages
- Program staff are also educated on various health messages

**SHORT-TERM OUTCOMES**

We expect that if completed or ongoing, these activities will lead to the following changes in 1-3 years:

- Local perinatal and neonatal service providers will be informed of our program
- Parents are educated on various health messages
- Program staff are also educated on various health messages

**LONG-TERM OUTCOMES**

We expect that if completed or ongoing, these activities will lead to the following changes in 4-6 years:

- 75% of care providers will refer appropriate patients to the program
- 75% of parents who complete the training will demonstrate increased knowledge of the subjects taught in the program
- 95% of program staff will have participated in training
- 98% of mothers in the program will abstain from smoking during pregnancy

**IMPACTS**

We expect that if completed, these activities will lead to the following changes in 7–10 years:

- Decrease in perinatal morbidity and mortality in Chapel Hill
- Half of all mothers seeking prenatal care will participate in the program
- An increase in the proportion of breastfed infants among program participants
- Increase in parents who are well-informed on important maternal and infant health problems