The Human and Societal Costs of
Short Term Birth Intervals

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ABSTRACT

Sadly, millions of mothers and children have lost their lives due to prior suggested birth intervals of 12-23 months. These recommended intervals no longer prove to be most advantageous for mothers and children. New studies have now determined that the healthiest birth interval for mothers and children is 36-59 months. This suggested three to five year birth interval prompted a flurry of discussion for those in the medical field, as well as those in health education programs. Dr. Agustin Conde-Agudelo’s research provided a fundamental shift in how birth intervals were viewed and has been the basis of much of the literature discussing birth intervals (Conde-Agudelo, Rosas-Bermudez, & Kafury-Goeta, 2006). The message of “Three to Five Saves Lives” is one that can be incorporated into existing patient education programs, and also shared by healthcare professionals in and around the world.

Birth spacing is a risk factor that has important public health implications not just for public health, but also for the general population (CATALYST Consortium, 2002). Birth spacing is being touted as one of the major components to consider when addressing maternal death, premature delivery and infant mortality. This paper will address the following questions:

- “How does birth spacing impact society?”
- “What factors influence birth spacing and how can they be addressed?”
- “How is North Carolina, more specifically Onslow County, uniquely affected by birth spacing issues?”

Introduction

In April 2006, Dr. Agustin Conde-Agudelo, MD, MPH, and her colleagues reported the results of a study that investigated such issues as interpregnancy interval, perinatal events and neonatal mortality. The results of the study were published in the April issue of The Journal of
the American Medical Association and sparked various discussions and studies relating the importance of birth intervals and how they impact the health and survival of mothers and children (Conde-Agudelo et al., 2006). Although there are varying opinions on the risk factors that affect long and short term birth intervals, there is agreement that the topic is one necessary for consideration. The implications are that inter-pregnancy intervals are independently associated with increased risk of adverse perinatal outcomes. “Birth spacing might be considered an intervention to prevent such outcomes,” thus making this issue relevant to public health (Conde-Agudelo et al., 2006, p. 1809).

Public health, or the health of the community, is directly affected by inadequate birth intervals, as evidenced by increasing population statistics, high infant mortality rates, and poor maternal health outcomes. Population statistics show us that the population is increasing by 200,000 people per day worldwide, which demonstrates the fact that many babies are being born (Simpson, 2007). The issue of birth spacing remains a valid subject for consideration by every childbearing female, as babies are being born at a rate of 14.18 per 1,000, children are dying at a rate of 6.3 for every 1,000, and mothers continue to have poor birth outcomes even with today's technology (CIA - The World Factbook - United States, 2008). With numbers like these, the matter of birth spacing must be attended to. How does it impact our society, what factors influence it and how can they be dealt with? Birth spacing is not only a worldwide issue, but is a topic necessary for discussion in my own state of North Carolina.

North Carolina has over 123,000 births per year and 13-15% of those are affected by prematurity and infant mortality. With a birth rate of 21.1 for the period of 2003-2007, it is important to ask how Onslow County, as well as North Carolina, is affected by birth spacing (North Carolina Community Health Assessment Initiative, [NCHAI], 2009). These questions are
important to ask in order to combat the risks and educate women on the true affects of inadequate birth spacing. The costs associated with short birth intervals affect both human health as well as society. They include poor health outcomes for the mother, as well as for children spaced too closely together. There are also financial costs associated for the immediate family related to childrearing and for society in the form of uninsured children and underemployed mothers. The costs indicate a need for society to take action to address this identified health concern.

Today there are 1.5 billion people worldwide between the reproductive ages of 10 and 25. With these excessively high numbers, it is important that the message of healthy childbearing habits, to include timing and spacing of pregnancies, be established (Health Communication Partnership [HCP], 2008). Currently four million children die in the first four weeks of life and over one quarter of these deaths are related to preterm births (Conde-Agudelo et al., 2006). If there are measures and strategies that can be taken to decrease the number of infants and children dying, action is needed to evaluate their effectiveness and thereby save hundreds of thousands of lives each year.

Risky births occurring to women who are “too young, too old, or for births that are too many or too close together,” deemed the “four too’s”, have long been addressed in public health (HCP, 2008, p 1). With an increased risk of 150% maternal mortality related to pregnancy intervals of less than 6 months and 223% increased risk of newborn death, it appears that attending to this issue promotes positive health outcomes for a significant portion of the population (HCP, 2008). Child mortality is such a vital issue that the United Nations Millennium Declaration, adopted by more than 180 nations, listed the reduction of child mortality by 2015 as one of 8 goals (Conde-Agudelo et al., 2006). This international collaboration attests to the fact
that child mortality and its contributing factors are of immediate concern to individual countries, a conglomerate of states, or an entire nation.

**Background**

Historically birth spacing decisions were made by individuals or couples and were of a somewhat private nature. There were many factors that contributed to a woman’s decision in relation to pregnancy spacing, but the choice remained that of the individual couple. Birth intervals, defined as the time from one child’s birth date to the next child’s birth date, were determined by the desire of the woman’s family or dictated by necessity. Research over the past several decades, establishing the relationship between birth spacing and adverse pregnancy outcomes, demonstrated that two years was ample time for a healthy birth interval (Conde-Agudelo et al., 2006). Women tended to agree that 12-24 months was sufficient; and many programs, physicians and healthcare professionals recommended it. It was well documented that short birth intervals could affect viability of infant survival during the first week, month and year of life, and possibly up to age five (Setty-Venugopal and Upadhyay, 2002). Two years was documented as allowing higher survival rates, less prematurity, fewer low birth weight (LBW) infant births and less malnourishment. Shorter intervals also negatively affected the mother’s health (Setty-Venugopal and Upadhyay, 2002). (Discussion follows in upcoming sections.)

When a two year interval was deemed the acceptable standard or “invisible norm” for birth intervals, it was done for a variety of reasons other than just positive health implications. The financial implications on the family, as well as the available quality time spent with the child, were encouraged as reasons to space two years between deliveries. However, over the past decade, birth intervals have drawn more attention. Proven benefits have been documented for
both mother and child that have since caused an entire shift in the message shared by health professionals (Setty-Venugopal and Upadhyay, 2002).

New studies, including the one completed by the Demographic and Health Survey Program (DHS), show that longer birth intervals offer better survival for mother and child and children born with birth intervals of 3-5 years are healthier during all stages of development and have better overall health. “Compared to children born less than 2 years after a previous birth, children born 3 to 4 years after a previous birth are:

- 1.5 times more likely to survive the first week of life;
- 2.2 times more likely to survive the first 28 days of life;
- 2.3 times more likely to survive the first year of life; and
- 2.5 times more likely to survive to age five (Setty-Venugopal and Upadhyay, 2002, p. 2).

Other benefits to children born 3-5 years after a previous birth include the probability that they are less likely to be malnourished and suffer decreased incidence of stunting and being underweight. Stunting is defined as short height for age, and underweight is defined as low weight for age (Setty-Venugopal and Upadhyay, 2002). Also noted was increased survival benefit to the prior born child when children were spaced further apart. Benefits for a 3-5 year birth interval are not only seen by infants and children. A 2000 study completed by the Latin American Center for Perinatology and Human Development supports the findings by the Demographic and Health Survey Program (DHS) that longer intervals are healthier for mothers. Longer intervals increase survival rates of the mother and decrease the instances of anemia and third trimester bleeding (Setty-Venugopal and Upadhyay, 2002).
As we explore the factors that influence birth intervals, also referred to as birth spacing, the definition of such intervals and how they are measured is of particular importance. When reviewing studies related to birth spacing, most will refer to either actual or preferred birth intervals (Setty-Venugopal and Upadhyay, 2002). Preferred birth intervals are difficult to measure because they take into account the preferences of the woman, but not those of her partner or spouse. Preferred intervals are measured by either asking women what they think is the best interval, their preference for next birth interval or their reaction to their most recent interval. Measuring birth intervals by using preference can either result in an overestimation of their true preference because they have waited longer than they planned or an underestimation because the child came earlier than they preferred.

Actual birth intervals can also be measured in three ways. One method is birth to birth intervals, the period between two consecutive live births. This method makes data collection easier, but does not allow inclusion of abortions. Intervals can be skewed by making them seem longer. The birth to conception interval is yet another method. This represents the period between a live birth or stillbirth and conception of the next pregnancy. This interval does not take into consideration prematurity so any mortality using this measurement is solely due to the shorter intervals. Lastly, the inter-pregnancy interval, the period from conception of first child to conception of the next child, is helpful when studying maternal health issues because it does not include abortion which affects maternal health (Setty-Venugopal and Upadhyay, 2002). (Note: In the majority of the studies reviewed most used the inter-pregnancy interval to assess relationships of adverse perinatal outcomes.)
Factors Influencing Birth Spacing

Discussing the factors that influence birth spacing helps to identify the impact that birth spacing has on society. There are several general factors that may be considered. Worldwide, one consideration is child care and whether it is available or affordable. Whether mom is working, plans to go back to work, or whether there is extended family to assist in childrearing, are all valid concerns when planning children. In areas where extended family, typically grandparents, are able to care for the child at no cost or limited cost, parents are more apt to decide to have their first child or make the determination to have a second pregnancy (Setty-Venugopal and Upadhyay, 2002). Currently in the United States, the average cost for one infant in fulltime care is $14,591 per year or $10,787 per year for a four year old in a center. These are some of the costs parents incur prior to age 5 at which time children may opt to begin government funded schooling (National Association of Child Care Resources & Referral Agencies, 2008).

These costs have the potential to impact whether children receive good, safe, quality childcare or whether they are placed in unlicensed facilities (National Association of Child Care Resources and Referral Agencies, 2008). This one factor has many implications, and is a real cost that families consider when determining how best to space their children. Also, some studies showed that women in Canada and other countries space children more closely together if they work outside the home. This minimizes the time out of the workforce and “compresses the economic and physical burdens of child rearing” (Setty-Venugopal and Upadhyay, 2002, p. 7).

A further consideration regarding birth spacing is the impact on the parental relationship (Setty-Venugopal and Upadhyay, 2002). If couples are newly married they may consider postponing a first pregnancy. In the past, emphasis was placed on the ability of women to avoid
unwanted births, rather than optimal spacing between births. The emphasis was focused on limiting the number of births rather than education about the need to lengthen the time between pregnancies and births. Many couples prefer to spend the initial portion of their marriage focused on strengthening their own relationship and establishing themselves financially. This has led to yet another compounding factor of married versus unmarried and how that also affects birth spacing (Auger, Daniel, Platt, Luo, Wu, & Choiniere, 2008).

Whether a woman is married or unmarried has a relational affect on birth spacing. In a study of over 98,000 live births that examined the influence of marital status and interpregnancy interval, it was concluded that “marital status should be considered in recommending particular interpregnancy intervals as an intervention to improve birth outcomes” (Auger et al., 2008). Results determined that unmarried mothers were more associated with small for gestational age (SGA) births than married women, regardless of interpregnancy interval. Also subsequent births had lower likelihoods of SGA than first births. Lastly, being unmarried with shorter interpregnancy intervals yielded increased risks of SGA, thus increasing risk of infant death (Auger et al., 2008).

**Specific Factors Influencing Birth Spacing**

**Race**

Many health related outcomes are directly linked to a person’s race. Birth intervals also are influenced by a person’s race. Blacks have a disproportionately high rate of adverse maternal and child health outcomes. The National Survey of Family Growth (NSFG), as listed on the Center for Disease Control website, along with the CSC, and NCHS, provide US data that show black females aged 15 to 44 in 1995 had a baseline of 14% of births occurring within 24 months of a previous birth. In 2002 this percentage had increased to 19% dimming the hope of 6% in
2010 for the US. With a rise overall of inadequate birth intervals, it compounds the pregnancy related concerns of black females. These females already deliver increased numbers of premature babies and have double the infant mortality rate of whites (National Survey of Family Growth [NSFG], 2009).

Educational Level

Yet another factor influencing birth spacing is one’s educational level. Lack of or decreased levels of education have been linked to unintended pregnancies and shorter birth intervals. Worldwide this is evident in less developed countries where women are uneducated and up to half of the pregnancies are unintended (Simpson, 2007). There is the suggestion of a cycle, one that includes a lower educated mother that gives birth to children with short birth intervals. These children are impacted by economic disadvantages, less access to resources and ultimately worse educational outcomes, thus repeating the cycle (Martin, 1998).

Socioeconomic Status (SES)

Education has a direct correlation to socioeconomic status. Lesser education typically yields lower SES. The economic status of a woman may dictate whether she chooses to have children, how she spaces them and whether she is able to receive appropriate prenatal care. Lower SES and shorter birth intervals have also been linked to increased child maltreatment. Although society has parents that adequately parent, never becoming involved with health and human services interventions, there are those that struggle to parent appropriately. Having a low SES can place a person at higher risk for multiple concerns. Add in shortened birth intervals and the results are higher risks associated with infant mortality due to intentional and unintentional injuries and SIDS. “Intervals less than 6 months were associated with a three fold risk in infant death due to intentional injuries, a 71 percent increased risk due to unintentional injuries and a 55
percent increased risk due to SIDS” (The University of Chicago Medical Center, 1999, p. 1). The University of Chicago Medical Center authored an article citing “short intervals may also be related to maternal stress, parental attention toward the child, a child’s developmental milestones, or the incidence of non-fatal accidents particularly since short birth spacing is more common in, and might be more taxing for disadvantaged families with fewer resources to care for their children” (The University of Chicago Medical Center, 1999, p.2).

Age

The age at which a woman decides to conceive is yet another important aspect that affects birth spacing. Teen pregnancies versus older aged pregnancies continues to be an issue in the United States and worldwide. “Several studies indicate that close birth spacing can exacerbate the social disadvantages of adolescent mothers” (Martin, 1998, p.4). According to the CDC website, the average age of conception in 2003 was 25.2 years of age for an initial pregnancy (Centers for Disease Control and Prevention, 2006). Referenced earlier was the fact that if free or affordable childcare was available, a woman might choose to have children at shorter intervals. This too is a common practice for women who begin childbearing further along in their reproductive cycle. As some women have decided to begin careers and then get married, they have chosen to delay conception and possibly decreased their fecundity and that of their partner. There is a decline in fertility as the age of the female partner increases as well as an increased risk of miscarriage. This creates a situation in which older women initiating their first pregnancy feel “pressed” for adequate time to have multiple children, which can lead to shorter birth intervals. Another alternative for some is in vitro fertilization, about which there are varying opinions, but often result in multiple conceptuses, thus creating increased health risks.
to mother and children (Advanced Fertility Center of Chicago’s IVF success rates highlighted in CDC national assisted reproductive technology report, 2008).

Although advanced age may be optimal to increase positive parenting statistics and decrease the instance of child maltreatment, it creates scenarios in which recommended birth intervals are not a priority. The potential health concerns related to intervals shorter than the suggested 3-5 years extremely important for women to understand. These will be addressed under costs to human health.

Breastfeeding practices and postpartum abstinence

Breastfeeding, as mentioned earlier, is drastically affected by birth spacing and should be considered when evaluating factors that influence birth spacing. Infants conceived within 12 months of a previous birth, especially within 6 months, often have lower birth weights because the stress on the mother’s body “retards” fetal development. Breastfeeding mothers experiencing shorter birth intervals are plagued with the issue of diminished milk production. Less milk production for the previous child can cause the child to be weaned too soon affecting their growth and potentially their health. Studies show that children weaned too soon “are more likely to suffer from diarrheal disease and skin infections” (Setty-Venugopal and Upadhyay, 2002, p.7). Appropriate birth spacing allows mothers to remain well nourished and be less likely to experience milk diminution. Also sibling rivalry affects breastfeeding mothers by not allowing them to adequately breastfeed the older sibling due to decreased milk production or greater attention to the baby. A mother’s inability to breastfeed may affect the infant, creating increased illness with declining immunity (Setty-Venugopal and Upadhyay, 2002).

Breastfeeding is unique in that it has additional benefits related to birth spacing. Breastfeeding delays the return of ovulation and menstruation after birth by lactational
amenorrhea, the physiological suppression of menstruation while nursing. This can last from a few months to a few years, but typically menstruation returns at approximately 6 months. However, during lactational amenorrhea a woman is almost fully protected from a repeat pregnancy with less than a 2% risk of becoming pregnant (World Health Organization, Maternal and Newborn Health/Safe Motherhood Unit [WHO], 1998; Martin, 1998). Lactational amenorrhea is so effective that it is a method used to avoid pregnancies is known as the Lactational Amenorrhea Method (LAM). LAM has specific criteria that must be met for it to be effective. Criteria are as follows:

- "Breastfeeding must be the infant’s only source of nutrition. Feeding formula, pumping instead of nursing, and feeding solids all reduce the effectiveness of LAM.
- Infant must be breastfed at least every 4 hours during the day and at least every 6 hours at night.
- Infants must be less than 6 months old
- Mother must not have had a period after 56 days post partum” ("Lactational amenorrhea method", 2009, Breastfeeding infertility, para.1).

Although LAM has been deemed an effective method of contraception, it may be better utilized in other parts of the world. In the United States only half of mothers breastfeed and those that do wean very early.

In essence breastfeeding helps to deter shorter birth intervals, but it is not commonly used and is even less utilized by the younger teen and early twenties population. Therefore, it is not a motivator in stressing the importance of birth spacing to this identified segment of reproductive
women. However, the Healthy People 2010 goal calls for 50 percent of mothers to exclusively breastfeed through the first 6 months postpartum (Royce, R. A., 2006).

**Access to care/Health insurance status**

Both access to care and health insurance status directly affect whether the most favorable birth intervals are followed. Access to appropriate healthcare can determine whether a woman has been informed about the importance of spacing births, the benefits and dangers of short intervals, and whether she has received the most current message of three to five saves lives. If women are unable to seek out health professionals, they tend to make uninformed decisions about their healthcare, including contraception and conception (Setty-Venugopal and Upadhyay, 2002).

Studies show that around the world there remains an unmet need for family planning, although millions of women are utilizing temporary contraceptives (Setty-Venugopal and Upadhyay, 2002). In many countries, including the US, contraceptives are used to limit births instead of space births. With the need for spacing and the need for possible contraceptives, it is simple to see how access to healthcare remains such a vital component of the birth spacing equation.

The issue of access begs the discussion of health insurance status. Realizing that access can be affected by factors other than insurance status, it remains a major contributing dynamic. In “Women’s Health USA 2007”, it is noted that uninsured women are less likely to seek preventative care than those with insurance (U.S. Department of Health and Human Services, Health Resources and Services Administration, 2007).

In 2005, 26 percent of women aged 18-24 were uninsured. The article also noted that black females aged 18-64 had the highest rate of public insurance versus private (U.S.
Department of Health and Human Services, Health Resources and Services Administration, 2007). Public insurance, typically Medicaid, pays for medical care and other related services to assist women with family planning and pregnancy (Key Medicare and Medicaid statistics, 2005).

Women need education on how to access care and on available resources as a preventative method, instead of after they have made life altering decisions. With half of all pregnancies being unintended, the question asked by Simpson in his 2007 article is, why are countries investing money in building maternity hospitals and increasing maternity programs? “It’s like saying ‘thousands of kids are dying of measles, we need more hospitals’. I say, why not just vaccinate them” (Simpson, 2007)? Preventative resources, such as health insurance and contraceptives, should be utilized to address birth spacing and other pregnancy related issues.

**Infant Death**

When we are unwilling to address birth spacing as a means to addressing the worldwide issue of mortality reduction, we neglect a strategy that helps save lives. Repeated studies, as the one in 2003 completed with women in developing countries (excluding China), show that if birth intervals were at least 3 years, an estimated “3 million deaths of children under age five could have been averted, a total of 35% of all deaths of children in this age group” (Norton, 2005). In India the infant mortality rate could drop by 29% and under five mortality rates could decrease by 35%, saving over 1,434,000 children annually, if birth intervals of 36 to 59 months were practiced. These are just a few examples of how safe birth intervals could truly impact the reduction of infant and child death. *(See Appendix 1)* In the state of North Carolina, lengthening birth intervals from 0-4 months to at least 4 months would prevent 11 percent SGA for white females and 21 percent for black females (Royce, 2006).
Leadership

Heifetz and Linsky (2002) believe that “Every day the opportunity for leadership stands before you” (Heifetz and Linsky, 2002, p. 1). This is no truer than in public health. The potential costs associated with inadequate birth spacing have provided an opportunity for individuals and the public health community. Addressing health related concerns are the premise of the core functions of public health. Thus public health leaders emerge, willing to invest their skills and passion in a cause. To adequately attend to birth spacing as a public health concern, one important aspect must be credible leadership.

Credible leadership encourages people to address current problems and involves “challenging people’s expectations of you” (Heifetz and Linsky, 2002, p. 20). Literature also states that for leadership to be credible the leader must be committed and remain true to a purpose bigger than themselves. The ramifications of inadequate birth spacing offer potential leaders multiple challenges that are inherently difficult to address, but require change. However, history has shown us that when change even appeared to be a possibility, it was due in part to the dedication of a credible leader.

Credible leadership is fundamental because it takes leadership to create change, and change is necessary to enhance the lives of people. For individuals, being a leader can provide purpose and meaning. For society is it necessary to “establish direction and “motivate and inspire” (Rabin, 2003, p. 707). To motivate, it is also important for leaders to have a vision of what they would like the future to look like. Rowitz discussed that a vision should be forward looking and include a standard of excellence. Also, he shared that vision is one of the essential keys to leadership. Leaders in public health establish visions that include protecting and improving the health of the public. (Rowitz, 2001)
In regards to birth spacing, the vision must be powerful and include the needs of the community if society is to partner in the efforts necessary for change. “Leadership in public health involves more than individual leaders or individuals in leadership positions” (Turnock, 2004, p. 243). It is due to this fact that public health emphasizes collective and individual leadership, thus supporting the idea of collaborative efforts such as coalitions. Leadership via coalitions is more efficient and allows for conservation of resources. Also, these entities are helpful change agents because they “carry greater credibility”, and are a positive resource for message distribution. To ensure that the safe birth interval message is communicated universally, leaders should be familiar with the best way to address global issues.

**Global Health Related to Birth Spacing**

In reviewing the trends of birth spacing in the United States as well as other developed and non-developed countries, there are some noticeable differences. Cultures, mentalities and motives differ in regards to this topic. Studies consistently labeled non-developed countries as having a high percentage of unmet family planning needs. There were often the same concerns regarding maternal and child health as referenced earlier. There are issues of lesser technological advances to address health concerns and in some areas qualified health professionals are unavailable or limited (Setty-Venugopal and Upadhyay, 2002).

Cultures and beliefs add to the birth spacing argument. In many areas birth spacing is acceptable. However, family planning is perceived as limiting the number of children one might have. In many parts of the world this conflicts with religious beliefs. Around the globe child bearing is viewed as an expectation that should be addressed immediately after marriage. In other areas such as Jordan, there are derogatory terms used for women with too short or long birth intervals (Setty-Venugopal and Upadhyay, 2002). Globally birth spacing has its barriers
and motivators. “Barriers include family and community pressures, desire for male heirs, late age at marriage and concerns about contraceptives” (HCP, 2008, p. 2). Motivators for birth spacing were high costs of living, time to spend with children, the health of the mother and child and quality of parental relationship (HCP, 2008, p. 2). (See Appendix #2)

Costs/Consequences

The initial questions posed as concentration areas in this paper, after identifying what factors influence birth spacing, focuses on the ability to recognize the costs both to human health and to society from inattention to birth spacing. While highlighting some of the main influences on birth spacing, several of the costs to human health have already been mentioned. Human costs include those to the mother as well as those to the child. Various health risks affecting women’s health are associated with birth spacing. Studies show that women with shorter birth intervals are more prone to third trimester bleeding, placenta previa, placental abruption, and anemia. Also noted were decreased incidences of pre-eclampsia, hypertension and gestational diabetes with more appropriate birth intervals (Setty-Venugopal and Upadhyay, 2002).

Maternal depletion syndrome has long caused inadequate time for the mother to restore her nutritional resources after childbirth and breastfeeding. Although all aspects of this syndrome are not clear, it has been identified as affecting the mother’s weight, energy and body mass index. If a mother has poor nutrition it can affect the nutrition and growth of the fetus and potentially infant survival (Setty-Venugopal and Upadhyay, 2002). Additional concerns related to prematurity rates are associated with shorter birth intervals. Prematurity can lead to smaller, lower birth weight infants that are at greater risk of dying due to fetal growth retardation and possibly failure to thrive (Setty-Venugopal and Upadhyay, 2002).
Milk diminution is another concern specific to breastfeeding and was discussed in the breastfeeding section. However, sibling rivalry does not only affect breastfeeding children. Children close in age, or in the case of multiples, the same age; compete for resources and their mother’s attention and nurturing. The competition for resources can result in decreased risk of mortality for the newborn when an older sibling dies or turns five. However, the risk of mortality for the older sibling does not change in the event of a newborn death (Setty-Venugopal and Upadhyay, 2002) Parents must consider the actual physical and emotional needs of infants and children along with all the potential costs when determining the birth interval most appropriate for them.

Societal costs are varied but also include sibling rivalry, which can lead to lifelong issues for many children, later displayed in an assortment of mental health diagnoses. A secondary concern related to short birth intervals and sibling rivalry can also be children’s developmental disabilities or their inability to reach developmental milestones at the recommended time intervals. This creates increased costs to local school systems and communities where resources are obtained. Non-fatal accidents and child maltreatment referenced earlier also plague society with additional costs. Whether through community parenting programs or the need for increased child protective services staff, communities pay for the results of short birth intervals.

Financial costs to society are ever present for children with decreased intervals resulting in increased costs to neighborhoods. Many of the families in need of these services are identified as having a lower SES and are limited in their ability to readily access and pay for services. This SES could be a result of limited education of the parents or may potentially be the outcome for children born too closely together. Studies show that short birth intervals are also related to worsened educational outcomes.
Societal and financial costs of shortened intervals are more easily identified in a 2006 article. The article focused on how birth spacing might reduce the risk of adverse outcomes and specifically identified the costs to employers. The March of Dimes compared $2,830 for the cost of a full term baby to $41,610, which was the cost of a premature delivery. Additionally noted was that 11% of babies covered by private insurance were born prematurely and that there were additional costs incurred of $2,766 for lost productivity. “In 2002 approximately $7.4 billion in hospital charges for premature infants were billed to employers and other private insurances” (National Business Group on Health, 2006, p. 2). It is clear that birth spacing is a necessity as children continue to die and human and societal costs continue to rise.

Lastly, the growth of the world’s population creates more challenges for society. Although changes in the status of women around the world have decreased fertility rates, population growth remains an essential concern for many. In “Still Ticking”, the 2007 article by Brian Simpson, editor of the Johns Hopkins Public Health Magazine, he plainly discusses why addressing population growth is necessary but sensitive. He raises questions about areas around the world for which large percentages of young people have yet to reach childbearing age. In a little over 50 years the global population has more than doubled. He cites places like Ethiopia that in just 25 years will go from a population of 75 million people to well over 140 million people. Is society prepared? Are there enough schools, housing and resources? Is there even enough food? Simpson raised an interesting point regarding the difficulty in telling parents, whose culture values children and considers them a means of support, that they should space or limit their births.

Many developing countries say “one mouth, but two hands’, in essence meaning that children produce more than they consume” (Simpson, 2007, p. 39). In The Population Bomb,
Paul Ehrlich warned that the “birthrate must be brought into balance with the death rate or mankind will breed itself into oblivion” (Simpson, 2007, p. 37). Simpson believes that birth spacing presents society with a viable option for developing countries and by encouraging increased time between births, countries might be more willing to listen. By pointing out the need to give each parent the right to make well informed reproductive decisions, society can lessen the costs and increase the likelihood of survival for mothers and children.

A great and timely example of the human, societal and financial costs associated with short birth intervals, can be noted in the case of Nadya Suleman. Ms. Suleman, better known as “Octo-Mom”, gave birth to octuplets on January 26, 2009, bringing her total number of children to 14. Although this situation has many underlying issues that are concerning, there are a few that directly support the need for birth spacing. At this time, Ms. Suleman has 14 children, all less than 7 years of age. Three of the original six children have special needs and the octuplets were born severely premature. The complete picture of their medical needs to date is unknown. However, reimbursements for hospital services have been requested from the state’s Medicaid program. This is just one of the actual “costs” that society will incur.

Ms. Suleman does not work, but rather uses disability payments received for herself and her children, along with school loans, to take care of her children. Society appears to be closely monitoring this story because it realizes the cost implications. One Los Angeles Times columnist wrote that “It appears that, in the case of the Suleman family, raising 14 children takes not only a village but the combined resources of the county, state and federal governments” (Mohajer, S.T., 2009, para 4). Food stamps in the amount of $2,900 per month, as well as at minimum $1 million in government insurance, are costs that taxpayers do not feel they should have to incur for a woman that made a private choice to have children (Mohajer, S.T., 2009).
“The fact of the matter is that decisions about reproduction and child-rearing quite properly occur in a zone of privacy. It is, however, an abuse of the mutual respect we extend to each other to behave as if decisions made in private have no impact beyond the bedroom door—or, in this case, the door of the doctor’s office” (Rutten, T, 2009, para 8).

Nadya is a prime illustration of why birth spacing is important when one considers the potential impact on mother and child and the costs to society. In this specific instance, the health of Ms. Suleman and her children is not only the business of the public, but the burden as well. The total implications of how her children will be impacted by lack of adequate birth spacing, is not yet known. However, we can at best anticipate financial constraints will play a role in their growth and development and whether they are able to further their educations, thus affecting their chances of securing stable employment. The opportunity is present to end a vicious cycle before it goes any further; there is still time to make a difference.

Utilizing the publicity of this very controversial story as a means of educating the public is one way to begin to make a difference. This well publicized situation presents a unique opportunity for society to truly see the costs incurred by short birth intervals. If every story written about this situation communicated the need for safe birth intervals, the benefits of birth spacing, or even the costs to society, unprecedented numbers could receive the message. The media has been presented with the prospect of educating the public, while promoting the recommended message for safe birth intervals.

In the January 2008 article, HCP stated that “suggested strategies to communicate appropriate birth spacing information in particular were entertainment –education such as radio and TV series, soap operas, testimonials, talk shows, and other entertainment formats” (HCP, 2008, p. 2). Espeut (2002) also discussed how communication and the promotion of safe birth
intervals are recognized as part of an action framework to address birth intervals. Education and communication are recommended strategies suggested by several of the lead organizations addressing birth spacing.

**North Carolina and Onslow County**

Birth spacing has been identified as a global issue, but sometimes things hit closer to home than you would like. North Carolina has long incurred problems related to high infant mortality rates and health disparities experienced by blacks. March of Dimes (MOD) data provided on their website [www.marchofdimes.com/peristats](http://www.marchofdimes.com/peristats), stated that the infant mortality rate for North Carolina in 2004 was 8.7, while the national average was 6.8. Prematurity rates were also 1 percent higher for NC than the national average, with a rate of 13.7 compared to 12.7. In an average week over 2,300 babies are born in NC with 217 being premature deliveries. Twenty babies die before their 1st birthday and 268 babies will be born to a teen mom aged 15-19 ([www.marchofdimes.com/peristats](http://www.marchofdimes.com/peristats)). Again these statistics represent an average week in North Carolina (NCHAI, 2009). The US 2010 objectives are a goal for the state, but upon review of current statistics, one that will take work to meet (Royce, 2006).

One county in North Carolina that has struggled with issues related to women and children, and is directly affected by the issue of birth spacing, is Onslow County. Onslow County is comprised of several small towns, but the primary city is Jacksonville, NC. Jacksonville has a population of approximately 150,000 people with at least one third serving in the military (Jacksonville, NC profile, 2009). Onslow County is known for having a very young population with a median age of 22 (Jacksonville, NC profile, 2009) and more specifically for housing one of the largest Marine Corps bases in the world, Camp Lejeune. Many of the statistics for the county are possibly skewed by the young military population that resides off
base and utilizes many community resources. For instance, the military hospital refers a substantial number of mother’s to Obstetricians/Gynecologists in town. The base hospital limits the number of deliveries they assume each month; therefore the data for Onslow includes the military population. As a result, the 3,400+ deliveries in Onslow County for the years 2003-2007, were a combined total of both military and civilian deliveries occurring between Onslow Memorial Hospital and Camp Lejeune Naval Hospital (NCHAI, 2009).

Onslow County’s aggregated data for 2002-2006 list it as ranking #7 in the state for Infant Mortality and Low Birth Weight/Preterm babies, according to the number of deaths and births (NCHAI, 2009). The pregnancy rate of 83.5 for teens aged 15-19 signifies why Onslow County is involved in initiatives to combat teen pregnancy (NCHAI, 2009). This young parenting population also relates to Onslow’s 19.1 substantiated child maltreatment rates compared to the state rate of 11.4 (Onslow County Health Department, 2008). Most recently Onslow County has been identified by the MOD as having 1,443 short interval births which translates to 14.4% of all births in the county. Per the North Carolina Health Assessment Initiative, Onslow County ranks 6th in the state in both percentage and number of short interval births. (For MOD this was defined as interval from last delivery to conception of 6 months or less.) This statistic has created some negative press for Onslow, especially in view of the fact that it contributes to 2.9% of all short interval births in NC, despite having only 1.8% of the population (NCHAI, 2009). In reviewing the data for Onslow County and its’ health issues related to prematurity, short birth intervals and teen pregnancy, it is simple to see why targeting this county regarding the necessity for optimal birth intervals would contribute to improving county and state outcomes.
### TABLE 1: Percentage of live births with short interval

Top ten counties by % of live births in which interval from last delivery to conception was six months or less (short interval) (2002-2006)

<table>
<thead>
<tr>
<th>State</th>
<th>% of total short interval births in state</th>
<th># of births</th>
<th>% of total short interval births in state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swain</td>
<td>17.6</td>
<td>104</td>
<td>0.211</td>
</tr>
<tr>
<td>Edgecombe</td>
<td>15.3</td>
<td>395</td>
<td>0.800</td>
</tr>
<tr>
<td>Gates</td>
<td>14.9</td>
<td>57</td>
<td>0.115</td>
</tr>
<tr>
<td>Martin</td>
<td>14.8</td>
<td>149</td>
<td>0.302</td>
</tr>
<tr>
<td>Jackson</td>
<td>14.6</td>
<td>177</td>
<td>0.359</td>
</tr>
<tr>
<td>Onslow</td>
<td>14.4</td>
<td>1,443</td>
<td>2.923</td>
</tr>
<tr>
<td>Ashe</td>
<td>14.4</td>
<td>120</td>
<td>0.243</td>
</tr>
<tr>
<td>Caswell</td>
<td>14.4</td>
<td>120</td>
<td>0.243</td>
</tr>
<tr>
<td>Hertford</td>
<td>14.3</td>
<td>137</td>
<td>0.278</td>
</tr>
<tr>
<td>Wayne</td>
<td>14.2</td>
<td>840</td>
<td>1.702</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3,542</td>
<td>7.176%</td>
</tr>
</tbody>
</table>

### TABLE 2: Number of live births with short interval

Top ten counties by # of live births in which interval from last delivery to conception was six months or less (short interval) (2002-2006)

<table>
<thead>
<tr>
<th></th>
<th># of births</th>
<th>% of total short interval births in state</th>
<th>% of total short interval births in county</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mecklenburg</td>
<td>5,311</td>
<td>10.760</td>
<td>12.2</td>
</tr>
<tr>
<td>Wake</td>
<td>4,627</td>
<td>9.374</td>
<td>11.9</td>
</tr>
<tr>
<td>Guilford</td>
<td>2,898</td>
<td>5.871</td>
<td>14</td>
</tr>
<tr>
<td>Cumberland</td>
<td>2,285</td>
<td>4.629</td>
<td>13.1</td>
</tr>
<tr>
<td>Forsyth</td>
<td>1,852</td>
<td>3.752</td>
<td>11.6</td>
</tr>
<tr>
<td>Onslow</td>
<td>1,443</td>
<td>2.923</td>
<td>14.4</td>
</tr>
<tr>
<td>Durham</td>
<td>1,218</td>
<td>2.468</td>
<td>9.5</td>
</tr>
<tr>
<td>Gaston</td>
<td>1,160</td>
<td>2.350</td>
<td>13</td>
</tr>
<tr>
<td>Union</td>
<td>1,053</td>
<td>2.133</td>
<td>12.2</td>
</tr>
<tr>
<td>Johnston</td>
<td>960</td>
<td>1.945</td>
<td>12.6</td>
</tr>
<tr>
<td>Total</td>
<td>22,807</td>
<td>46.205%</td>
<td></td>
</tr>
</tbody>
</table>

(NCHAI, 2009)

**Finding/Results**
It is evident from the literature and studies referenced evaluating healthy birth intervals that “Three to Five Saves Lives”. The article by the same name based on research conducted by Agustin Conde- Agudelo, determined that it was the healthiest and safest birth interval (Conde-Agudelo et al., 2006). The United States Agency for International Development (USAID) recommended birth intervals of three years or longer, in a recently published article “Birth Spacing: A Call to Action”. This article discusses further actions society must take in recognizing the need to promote longer birth intervals. Summary of what we know:

1) The previously recommended 24 month birth spacing interval no longer provides the best results for the health of mother or child

2) The new norm and recommendation is 3 to 5 year intervals between births; “birth intervals of three or more years are associated with reductions in neonatal, infant, child and under-five mortality” (USAID, 2002, p. 5).

3) Birth intervals of longer than 60 months may cause adverse perinatal outcomes due to loss of protective benefits for mothers

4) Breastfeeding is and should continue to be a protective measure that supports the concept of birth spacing and is viewed as a benefit from an adequate birth interval

5) Women in the US and around the world would prefer longer birth intervals, but are not educated on and lack the resources for suitable family planning methods

6) Inadequate birth spacing can be linked to one of the major causes of infant death...Prematurity and low birth weight

7) More studies are necessary to examine the relationship between birth spacing and adverse health outcomes for both mother and children
8) Birth spacing is a public health issue that impacts private individuals, as well as society. To adequately address this issue, it must be viewed in this manner.

9) Few governments around the world employ birth spacing policies or programs.

10) There is a need to further understand the institutional, structural, cultural and social influences surrounding the subject of birth spacing (CATALYST Consortium, 2004).

11) There is a need for further research regarding the adverse affects of birth intervals.

As with any public health concern, awareness of the problem is an important aspect, but solutions are vital. Solutions that include credible leadership, that are comprised of multifaceted approaches and are endorsed by community partnerships, offer the best probability of success. To take what we know and incorporate into practice will take individual leadership, by health care professionals, along with a plan of incorporating the message and benefits of birth spacing into their regular clinical programs. If public health leaders are to identify escalating public health issues and guide or mediate action to avoid crisis levels, this would be the time for public health leaders to emerge. The need is evident regarding the significance of attending to this health concern. For leadership to address this health concern, it will require an ability to articulately define the problem and pose possible solutions for society. It will take a core group of individuals or agencies willing to take action and bring change to a population; a population that lacks awareness, rather than employs apathy, a culture that makes individual decisions, but impact whole societies.

Leadership is fundamental in our ability to proceed and translate the upcoming recommendations into viable options. It must recognize the scope of the problem and be willing to facilitate practical solutions to meet the true health needs of women and children. For those leading the cause for change it is essential that they foster cooperation of various disciplines,
promote policy development, and utilize resources; to include tangible and personnel. One of the primary strategies suggested to inform the public of the three to five message is via education.

To utilize education as a method of addressing birth spacing in our society leaders must utilize health education principles. Training staff to promote the recommended birth interval as part of established curriculums, women are offered education and information. Quality leaders realize the value of assessing the community and evaluating established resources prior to creating systems changes. Communicating positive health messages that integrate the social, as well as health benefits, may elicit interest. Recognizing past trends and maintaining a current knowledge of the benefits of birth spacing; provide scenarios for leaders to forecast future planning needs.

Establishing a vision for effective intervention strategies and identifying the essential partners will prove indispensible for leaders involved in altering societal views on birth spacing. Where there is no vision, the people perish is a commonly used scripture that surmises the current state of birth spacing and the demand for the emergence of leadership to champion this cause. There are those who have already assumed their leadership role. “USAID and CATALYST Consortium have led the effort to revisit and revive birth spacing as a key reproductive health and comprehensive health concept, and one that has the potential to significantly improve the well being of women, men, families and communities worldwide. The Optimal Birth Spacing Institute (OBSI) is a bridge between child survival and reproductive health and family planning programs” (CATALYST Consortium, 2002, p. 1).

With a mission to raise awareness of infant mortality and the realization that inadequate birth spacing is a contributor, well respected organizations have also presented birth spacing as a principal agenda item. Organizations such as the March of Dimes, Kate B. Reynolds Charitable
Trust, the Duke Endowment, and the NC Healthy Start Foundation are already established public health leaders. These entities understand collaboration, partnership and the benefits to society of keeping mothers and children healthy. They recognize that no matter the method, sharing the message of the recommended optimal birth interval of three to five years is crucial.

Conclusions/Recommendations

The “Three to Five Saves Lives” campaign is a crucial method supported by research and experts. At this time, individuals have the right to make their own reproductive decisions, but those decisions yield results that produce both human and societal costs that affect others. Similarly to other health related concerns, parents should be able to base their decisions on accurate information. The opportunity to receive information that explains the potential consequences of short birth intervals exists, but is not always utilized by practitioners or clinicians. However, we do “recognize that knowledge about the benefits of birth spacing, or even the desire to space, rarely translates into practice” (Espeut, 2002).

The health of mothers and children are compromised and societal and financial costs are incurred due to shortened birth intervals. There appears to be a failure to successfully address teen pregnancy and prematurity rates, which ultimately may be a direct result of compromised birth spacing. The potential for birth spacing to effectively impact the infant mortality rates of counties like Onslow, states similar to North Carolina and countries such as the United States, is significant if the potential is emphasized.

To effectively address health concerns in the US, Healthy People (HP) 2010 was developed. HP 2010 is a national health objective focused on identifying significant preventable threats to health. National goals were established to reduce those threats and were divided into two major goal areas:
1) Improve the quality and years of healthy life, and

2) Eliminate health disparities

The purposes of identifying areas of improvement were to focus energies in specific health areas and to implement positive changes in health status where possible.

HP 2010 has several focus areas, however the maternal and child health category, as well as its subgroups, correlates well with several of the key health concerns identified regarding short birth intervals. The table below includes statistical information Onslow County, North Carolina and the Nation, all potential consequences of inadequate birth spacing. (The HP 2010 goal has also been included.)

**Table 3: Rates affecting Birth Spacing**

<table>
<thead>
<tr>
<th></th>
<th>Infant Mortality rates for /1,000</th>
<th>Prematurity rates per 1,000</th>
<th>Birth Rates 2005</th>
<th>Teen Pregnancy Rates/1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onslow County</td>
<td>7.9</td>
<td>8.1</td>
<td>20.2</td>
<td>83.5</td>
</tr>
<tr>
<td>North Carolina</td>
<td>8.7</td>
<td>13.7</td>
<td>14.2</td>
<td>62.5</td>
</tr>
<tr>
<td>US-National</td>
<td>6.8</td>
<td>12.7</td>
<td>14.0</td>
<td>40.5</td>
</tr>
<tr>
<td>Healthy People 2010 Goal</td>
<td>Goal of 4.1</td>
<td>Goal of 7.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(National Center for Health Statistics, 2009), (North Carolina Community Health Assessment Initiative, 2009), & (Centers for Disease Control and Prevention, 2006).

The areas of concern translate into a more direct financial cost to society. For example, low birth weight infants can be a direct result of inadequate birth spacing and prematurity. The costs of these are captured below:
Table 4: Financial Costs Associated with Birth Spacing

<table>
<thead>
<tr>
<th>Financial Costs</th>
<th>Onslow County</th>
<th>North Carolina</th>
<th>United States-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prematurity Costs</td>
<td>Aggregated data for 2003-2007</td>
<td>~$5.8 billion for the almost 11,300 preterm babies delivered + early care (NCHAI, 2009).</td>
<td>~$26.2 billion or $51,600 per infant born preterm ~ $16.9 billion in medical care services ~$1.9 billion Maternal delivery costs ~$611 million in early intervention services ~ $1.1 billion for special education services (cerebral palsy, mental retardation, vision impairment, and hearing loss) ~$5.7 billion in lost household and labor market productivity associated with preterm birth disabilities (Institute of Medicine, 2006, p. 2).</td>
</tr>
<tr>
<td></td>
<td>~485 births to teens with average cost of $2,685 (Strategic Plan for Children &amp; Families in Onslow County, 2007)</td>
<td>~$1,503 for older teens ~$3,868 for younger teens ~Total cost average of $9.1 billion per year for teen mother, their partner and children born to teen moms (NCPTP, 2006, p. 3).</td>
<td>~414,593 total teen births ~Total at average costs ~ over $1.1 billion (Lowen, L., 2009)</td>
</tr>
</tbody>
</table>

North Carolina spent approximately $5 billion on LBW or preterm infants and early childhood costs according to the MOD statistics referenced earlier. Also stated were the teen pregnancy and birth rates for Onslow County, which are above the state and national average.
These equate to significant economic and societal costs to local communities, as well as the overall society in its entirety.

It appears that establishing a new birth spacing norm of three to five years, would not only improve the health and well being of mothers and children, but also support attempts to meet the HP 2010 objectives. Teen pregnancies could also be reduced with increased family planning efforts. Encouraging adequate space between children may also reduce the number of children being born prematurely, as well as the number of children dying during infancy. The birth rate could be affected by both decreased teen births and adherence to suggested birth intervals. North Carolina, like the nation, continues to focus attention on addressing health concerns by promoting regular medical visits for preventive care, advocating for increased access to care for women and overall better opportunities for persons to be insured.

**Recommendations for Future Interventions**

A variety of suggestions have been made regarding the best way to combat shortened birth intervals. Birth spacing is mentioned as a strategy for reducing child mortality in the United Nations Millennium Declaration (Joyce, H. P., 2006). In December 2007 participants from Kenya, Geneva, Uganda and the United States took part in a global video conference held on changing norms regarding health spacing and pregnancy. Open dialogue about differing cultures helped to influence suggested practices.

Fundamentally there has to be a shift in strategies. We must begin with the core element when planning future strategies:

1) The message that “three to five saves lives” along with the message of “for the health of your children...use a family planning method for 2 years after your last birth” must be share with society
2) The benefits of breastfeeding and the LAM must be marketed as tools for a healthier child, as well as a possible family planning method.

3) Women must have increased access to care and an improved health status which will ultimately affect infant health. Healthier lifestyles must be encouraged in schools, communities and by healthcare systems so that young people are motivated to make healthier choices.

In *Spacing Births, Saving Lives*, recommendations are spelled out easily and clearly.

"Engage women, men, families, providers, and community leaders in dialogue. Educate them on the benefits of three-year birth spacing and the great risks of rapid childbearing, as well as on ways to access information/services; work with health planners and providers to ensure that services are client-centered and of high quality; and educate policy makers and planners about the potential for MCH and nutritional impact if more families chose to space births three years apart" (Espeut, 2002, p. 3). Also in this article, five principles were given to follow when developing birth spacing strategies:

1. "Understand the context of fertility behavior and sexual decision making"

2. Involve household and community "power brokers" and decision makers

3. Close the gap between the desire to space and reality by addressing the precursors to change

4. Integrate birth spacing with other activities

5. Measure what is being done and use the information to improve programming"

(Espeut, 2002, p. 4).
Although many would like for the onus of strategy shifting to fall solely on health professionals in the community, the government also has the obligation of recognizing the costs to its society and encourage appropriate birth intervals.

4) Partnerships with insurance companies to facilitate access to family planning resources that are economically feasible may ultimately impact the length of birth intervals. (As suggested in upcoming “What Employers Can Do section”) The government also has the ability to affect how those persons utilizing governmental insurance, such as Medicaid, follow through on family planning efforts and/or space their births. If society is going to continue to assume some of the costs, there may be an inherent right to develop policies that correlate with healthy birth norms and limit those costs.

5) Assessment of community and societal resources, assets and structures that exist and could be complimented by other partnerships. Development of needed resources that are not available that support efforts to promote adequate birth intervals.

6) Other recommendations center around keeping data on births that occur earlier than the suggested 3-5 year interval and to develop educational materials for distribution related to the 3 to 5 birth spacing message. Programmatic actions to include advocacy, policy revisions, community outreach and continued research are all necessary to move from recommendations to program implementation. Partnering with private foundations and organizations such as those mentioned earlier may help garner support and raise awareness.

7) Continued research efforts by reputable organizations such at USAID, CATALYST consortium and others, surrounding the topic of adverse affects of birth intervals will
provide increased knowledge and influence planning methods. Also action must be
taken once knowledge is gained for to see actual benefits.

Planning must include evaluating the role of various community partners. For instance,
employers incur a cost and also have a vested interest in adequate birth spacing. In reference to
the costs incurred by employers, they too have the ability to help. National Business Group on
Health made suggestions for employers in their article entitled: *Spacing Births Appropriately
May Reduce Risk of Adverse Outcomes.* (Excerpt below)

**“What Can Employers Do**

Employers can play a significant role in reducing the number of premature births and the costs
associated with prematurity by improving maternal health.

Employers should be supported in their efforts to:

- Provide coverage for all FDA-approved contraceptives so that women are able to
  appropriately space their pregnancies.

- Provide adequate healthcare coverage to ensure that all women have access to
  preconception, prenatal, and post-partum care. Examples include:
    - Assessment/risk-appraisal (e.g., clinician review of pregnancy history; use of
      medications that could affect the fetus; and tobacco, alcohol, and or drug use)
    - Immunizations (e.g., rubella, tetanus, influenza)
    - Pharmacy services (e.g., prenatal vitamins, folic acid supplements)
    - Preventive counseling services (e.g., counseling to prevent alcohol misuse,
      counseling to promote breastfeeding)
    - Screening services (e.g., to detect Rh (D) incompatibility, pre-eclampsia, Down
      syndrome and other fetal anomalies)
Treatment of preexisting medical conditions

- Offer access to, and encourage the use of, employee assistance and health promotion programs that address pregnancy (nutrition, prenatal care, alcohol-use, smoking, etc)
  - Integrate preconception education into other health promotion campaigns (i.e. smoking, obesity)
  - Offer incentives for participation in EAP and health promotion programs that address preconception care.

- Provide employees with free educational materials relating to pregnancy, childbirth, and infant care.
  - Develop and distribute health education materials on preconception risks (biological, behavioral, social)
  - Develop reproductive planning tools for women and men, taking age, health literacy, and cultural competency into consideration
  - Educate employees on the importance of preventive services (screenings, immunizations)” (National Business Group on Health, 2008).

What Can Communities/Society Do

In support of the recommendations put forth, one strategic method the community might utilize is the incorporation of Mobilizing for Action through Planning and Partnerships better known as MAPP. The premise of MAPP was one much discussed in the public health leadership program. The concept of coalitions or collaborative community partnerships composed of those affected by, involved with and interested in improving the lives of mothers and children, could be where communities start to develop change. Coalitions can be a strong, viable means of
tackling community or societal concerns. The topic of birth spacing lends to a variety of partners, from differing backgrounds, all affected by a common concern. Communities affected directly by increased infant mortality and/or preterm deliveries, may develop a coalition to determine how best to keep mothers and children safe and healthy.

Once these partnerships are developed, the community is tasked with assessing their strengths, and community assets. It is also important to be knowledgeable about community perceptions regarding the quality of life in their area. In conjunction the community may conduct a “community health status assessment, which assesses health status, quality of life and risk factor data” (Gilmore & Campbell, 2005, p. 136). In reference to birth spacing, the risk factor data will be essential in comprehending what planning steps need to be taken. Other assessments that may be undertaken by the community, and referenced in Gilmore & Campbell, are those of the local public health system and one identifying what forces impact the community. Employing these MAPP concepts will offer opportunities for program evaluation and development, create a shared vision, and help structure community objectives.

There are also recommendations in the USAID article Birth Spacing: A Call to Action, that address what tasks specific service programs should undertake. These could benefit newly created or already existing programs. This article also has suggested questions that programmers should be asking when developing new programs to include new initiatives. These are listed in Appendix 3 and 4. Community programs are essential in combating any health concern. The environment, both physical and cultural, plays a role in how suggested intervals are perceived.

Additional thoughts regarding ways to incorporate changes that impact birth spacing include community leaders and policy makers. They have the ability to increase awareness of
the health and social consequences related to inadequate birth intervals that may influence policy decisions. Each state determines how their Medicaid dollars are spent, while communities are accountable for their own allocations. Determining funding priorities and evaluating existing programs, as well as new program initiatives, are all ways in which the community acts as a leader in reducing the community costs associated with adverse health outcomes of mothers and children.

As Woodrow Wilson once said “the ear of the leader must ring with the voices of the people”. The ability of professionals, community leaders and policy makers to adequately lead an effective change regarding the perceptions surrounding birth spacing, corresponds with their understanding of the cultures and perceptions of the public. Leaders must understand the “culture” of the society, its’ principles and values, and balance that understanding with effective decision making, ultimately ensuring the protection of that society and its’ members.

In the end, we must determine the best course of action needed to produce healthy infants and children. Short birth intervals have obvious costs, but more than the billions of dollars being spent, there are innocent lives being lost or compromised. Society can no longer afford to neglect inexpensive birth spacing recommendations. If recognized these recommendations could potentially impact not only the health and well being of our local communities, but the progress that we make as a nation towards bettering the lives of children and families.
Figure 1:
Under-Five Mortality According to Length of Preceding Birth Interval

Adapted from Rutstein (2000)
Appendix # 2

Figure 1: Three Year Birth Intervals, or Longer, are Associated with Lowest Mortality Levels
### Appendix 3

<table>
<thead>
<tr>
<th>Considerations for Action: Service Programs</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family Planning/Reproductive Health Service Delivery</strong></td>
<td>Include counseling on birth spacing benefits, risks and service choices in all contacts; Monitor continuation rates of methods used for intervals; Initiate postpartum counseling/LAM</td>
</tr>
<tr>
<td><strong>IMCI/IMCH</strong></td>
<td>Incorporate spacing messages in all EPI and well-baby visits; Increase community attention to breastfeeding and spacing</td>
</tr>
<tr>
<td><strong>Maternal/Neonatal Health</strong></td>
<td>Develop and implement spacing messages for antenatal and postpartum counseling</td>
</tr>
<tr>
<td><strong>HIV/AIDS/Infectious Disease</strong></td>
<td>Include messages on spacing for maternal health and recovery as well as spacing and dual protection messages in STI/HIV prevention programs</td>
</tr>
<tr>
<td><strong>Post Abortion Care</strong></td>
<td>Include pregnancy spacing messages and methods</td>
</tr>
</tbody>
</table>

### Support Programs

| **Communication and Behavior Change** | Initiate community mobilization, including outreach and inclusion of male partners and community leaders, in support of informed choice and healthy spacing norms |
| **Research** | Undertake operations/applied research on effective counseling approaches, including antenatal/postpartum programs; Evaluate impact of birth spacing counseling on knowledge, use and continuation |
| **Training** | Prepare curricula, protocols and job aids for birth spacing counseling and services; Train all health and family planning personnel in effective practices |
| **Policy/Advocacy** | Sensitize policy-makers to ensure that health and fertility benefits of three-year birth intervals are included in MCH/FP policy initiatives |
### What questions should program planners ask?

<table>
<thead>
<tr>
<th>Magnitude of the Problem</th>
<th>What percent of births are &lt; 24 months? &lt;36 months?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>What percent of women -- especially young, low-parity women -- and their families, know that spacing births at three year intervals reduces the risk of mortality and morbidity? What intervals do women want?</td>
</tr>
<tr>
<td>Counseling/Program Linkages</td>
<td>Do counseling and education programs for family planning, post-abortion care, STI, HIV, immunization, safe motherhood, postpartum, antenatal care, MCH, nutrition, child survival and outreach (male, youth and married adolescents) currently inform everyone of the health advantages of three year intervals and risk of rapid child bearing?</td>
</tr>
<tr>
<td>Education and Training Programs</td>
<td>What messages on birth spacing are included in medical and public health curricula, and other education, mass media and training programs?</td>
</tr>
<tr>
<td>Use by Low-parity Women</td>
<td>What percent of low-parity women use/do not use family planning?</td>
</tr>
<tr>
<td>Continuation Rates</td>
<td>What are contraceptive use/discontinuation rates for low-parity women?</td>
</tr>
<tr>
<td>Method Mix</td>
<td>Is method mix conducive to achieving desired spacing (i.e., good availability of pills, condoms, injectables, IUDs, LAM, etc.)?</td>
</tr>
<tr>
<td>Estimates of Potential Impact</td>
<td>Have host country analyses been undertaken to estimate infant/child mortality reductions (estimated annual percentage mortality reductions and numbers of deaths averted) if birth intervals were lengthened?</td>
</tr>
<tr>
<td>Policymakers’ Awareness</td>
<td>Are policymakers and program planners aware of the magnitude of potential reductions in infant/child/maternal deaths in their country if more births were spaced at three-year intervals?</td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>To what extent do planners monitor key outcome, knowledge or behavioral indicators?</td>
</tr>
</tbody>
</table>

(USAID: Birth Spacing: A Call To Action, 2002)
References


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