

Preventing Preterm Birth/Improving Pregnancy Outcomes—Role of the Local Health
Department

By

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Abstract

Preterm birth and poor pregnancy outcomes have been recognized as public health issues for decades and public health has provided leadership for improving pregnancy outcomes. Preterm birth is the most prevalent among the three major conditions considered to be poor pregnancy outcomes: preterm birth, low birth weight and congenital anomalies. Despite intensive and expensive prevention efforts, the prevalence of preterm birth in the United States has increased since the 1980's. Secondary and tertiary prevention efforts have made significant improvements in the intact survival of prematurely born infants, but the numbers of these infants have continued to increase. Annual costs of prematurity in the United States are conservatively estimated at \$26 billion. Access to and improved utilization of prenatal care has been the focus of prevention efforts of the decades during which the prevalence of prematurity has continued to increase. Far too many women lack adequate health care prior to pregnancy and enter pregnancy with existing risks for poor outcomes. A change in the focus on care during the reproductive years to preconception and interconception care is needed so that women are in better physical and mental health as they begin pregnancy.

Public Health Interest in Preterm Birth

Poor pregnancy outcomes, especially preterm birth, have been recognized as a public health issue in the United States for decades. Public health took the lead in addressing infant mortality related to preterm birth in the 1920s. In 1928, in response to a call to reduce premature birth-specific infant mortality public health organizations, led by the Chicago Department of Health and the New York City Health Department, became involved in the medical management of newborn infants.¹ These community-based programs were responsible for the development of premature nurseries, infant transport, regionalization of care and public financing for newborn care from the 1930s through the 1960s. As newborn intensive care became more of a medical subspecialty, the public health role in direct care for premature infants declined. Since the 1970s public health has been at the forefront of interventions on behalf of improved pregnancy outcomes by helping to develop programs and policies to make prenatal care for pregnant women more accessible. These public health efforts have helped to improve the outcomes for infants born prematurely and have improved the access to and utilization of medical care for pregnant women, but none of the efforts has reduced the prevalence of preterm birth in the United States.

The problem of preterm birth and its consequences

Preterm birth is the most prevalent of the three major conditions considered to be poor pregnancy outcomes: preterm birth, low birth weight, and congenital anomalies. Preterm birth is defined as delivery of a live born infant prior to 37 completed weeks gestation.^{2 p7} Rates of preterm birth range from 5% to 15 % depending on the

population.³ In the United States the proportion of infants born preterm has been steadily increasing since the 1980s.^{4,5} Between 1980 and 1984 the rate of preterm birth was 9.1%. By the period 1990 to 1994 the rate had increased to 10.6% and in 2004, the most recent year for which there is complete data, the rate was 12.5%. This represents an increase of 33% over two decades.^{6 p 21} In contrast, the prevalence of low birth weight (weight under 2500 grams) was 8.1% in 2004.^{6 p 23} Congenital anomalies occur in about 2% of births.^{2 p 456}

In the United States there is considerable geographic and racial-ethnic variability in the rates of preterm birth. The highest rates are concentrated in the Southeast, and the lowest are in the West and Northwest. Rates of preterm birth are greatest among black mothers and lowest among Asia-Pacific Islanders.^{6 p 22} Rates for Hispanic mothers and non-Hispanic whites are intermediate, between these groups (Table 1).

Table 1. Racial variability in preterm birth

Racial/Ethnic group	% preterm, 2004
Black	17.9
Hispanic	12.0
Non-Hispanic White	11.5
Asia-Pacific Islander	10

Data from Martin⁶

The consequences of preterm birth are many at both the population and individual levels. These consequences include: (1) increased neonatal mortality; (2) increased infant mortality; (3) acute medical conditions related to prematurity; (4) chronic health conditions such as chronic lung disease; and (5) neurodevelopmental disorders.

Sixty five percent of infant deaths occur in preterm infants.^{7 p} After steady declines in the infant mortality rate in the United States, in 2002 the rate increased for the

first time since 1958.⁴ A recent study of the contribution of preterm birth to infant mortality in the United States concluded that “efforts to reduce infant mortality must focus on preterm birth.”^{7 p 1573}

Among the survivors there are both acute and chronic health consequences of preterm birth resulting from developmental immaturity of many of the organ systems required to support extrauterine life. The acute complications or consequences include neonatal respiratory distress syndrome due to developmental immaturity of the lungs; brain hemorrhage due to immaturity of brain structure; bacterial and fungal infection resulting from immaturity of the immune system coupled with multiple invasive procedures required to support fragile preterm infants; injury and inflammation of the gastrointestinal system leading to perforations and/or necrotizing enterocolitis; visual impairment; hearing impairment and disorders of the cardiovascular and hematological systems.

Chronic complications include chronic lung disease and significant neurodevelopmental disorders. With the exception of some recent evidence of improvements in the rates of cerebral palsy,⁹ the rates of chronic complications, especially among very preterm infants, have not improved despite improvements in neonatal intensive care.¹⁰ The numbers of children with chronic impairments and health conditions has increased as overall survival of preterms has increased.

Neurodevelopmental disorders include the major motor and cognitive disorders of cerebral palsy and mental retardation as well as learning disabilities, speech-language disorders, attention deficit disorder, behavioral and emotional disorders and impairments of vision or hearing. Cerebral palsy is not a condition confined to children who were

born preterm, but preterm children are over-represented among those with this condition. Cognitive problems among children born prematurely include lower scores on IQ tests and other tests of cognitive function, and more problems with memory, language, learning, and attention than their full term peers.

The financial costs of preterm birth and its consequences are substantial. Most cost analyses have been limited to the costs of hospitalization for preterm infants.^{11 p 329, 12 p 155} Median treatment cost is estimated to be about \$50,000 per infant.^{11 p 333} A recent report by the Institute of Medicine (IOM)^{13 p329-354} uses data from Intermountain Health Care (IHC) Health Plans of Utah to present a new and unique analysis of the costs associated with prematurity. The IOM analysis considers a much broader spectrum of the costs of prematurity, including inpatient and outpatient care through age seven years. The analysis also considers lifetime medical care costs beyond age five for four major disabling conditions associated with prematurity: cerebral palsy, mental retardation, visual impairment and hearing loss. Special education costs and lost household and labor market productivity are included as well.^{13 p 331} Applying the IHC data to all preterm infants born in 2005, the IOM estimates the total cost of premature birth in the United States to be \$26.2 billion or \$51,600 per infant.^{13 p 329} The largest share of the costs, \$16.9 billion, is for medical care services. Maternal medical care associated with delivery, but not including prenatal care, cost an estimated \$1.9 billion. Early intervention and special education costs were \$611 million and \$1.1 billion respectively, and costs associated lost household and labor market productivity were estimated at \$5.7 billion. As these estimates only include those infants with significant

disabling conditions and not those with lesser degrees of disability, they are considered minimum estimates.

Prevention efforts, past and present

Programs and interventions to prevent health problems are divided into primary, secondary and tertiary interventions, depending on their focus. Primary prevention focuses on preventing the disease itself by reducing risk factors or exposures. The focus of secondary prevention is the identification and mitigation of disease in its early, frequently asymptomatic, stage. Tertiary prevention is aimed at morbidity and mortality reduction of an established disease or condition. Most of the interventions concerning preterm birth in the past 70 years have been at the tertiary level and have been focused on improving the outcomes of infants born prematurely. There is ample evidence that these efforts have been successful in the improved outcomes of preterm infants, including improved survival^{12 p 155, 14 p 893} and a reduction in the survival threshold.^{14 p 897} In a classic and frequently quoted study on improved survival of preterm infants between 1989 and 1995, two thirds of the observed 50% decline in mortality was attributed to improvements in neonatal care.^{14 p 898} The great improvement in infant mortality over the last thirty years has been in gestational age or birth weight specific mortality, not in the overall distribution of gestational ages of live-born infants.^{14 p 893} While the mortality of preterm infants has been decreasing, their numbers and proportion among live births in the United States have been increasing. These improvements in outcomes have come at a great expense through the development of highly sophisticated centers for newborn intensive care.

Both tertiary and secondary efforts at prevention of preterm birth have focused on pregnant women. Tertiary efforts have dealt with the treatment of preterm labor, and secondary efforts have dealt with identification of risks of preterm and reduction of risk during pregnancy. Most prominent among these prevention efforts has been the provision of adequate prenatal care to all pregnant women. The lack of prenatal care was clearly identified as a risk for preterm birth. A 1985 report from the Institute of Medicine on the prevention of low birth weight helped to establish prenatal care as the main public health intervention for the prevention of prematurity and low birth weight.^{13 p 35} Expansions in Medicaid coverage for low income pregnant women and streamlining the process of enrollment for pregnant women as soon as their pregnancy is diagnosed led to greater access to prenatal care, especially for “high risk” groups. Ironically, expanding the availability and utilization of prenatal care has not resulted in reduced preterm births.^{15, 16 p 309} An analysis of birth outcomes and adequacy of prenatal care between 1981 and 1995 (Table 2) showed that levels of adequate prenatal care increased during that time period and overall infant mortality decreased, but the percentages of both preterm birth and low birth weight increased.^{16 p 309} These efforts are secondary because they involve an already established pregnancy.

Table 2. Prenatal care, preterm birth, low birth weight and infant mortality, U.S. 1981-1995.

Year	Percent with inadequate prenatal care	Percent preterm	Percent low birth weight	Infant mortality rate
1981	13.5	9.4	6.8	11.0
1985	12.4	10.0	6.8	10.6
1991	11.6	10.7	7.1	8.9
1995	9.0	11.0	7.3	7.6

Adapted from Alexander and Kotelchuck¹⁶

Other secondary efforts have been directed toward the identification and modification of risk factors for preterm birth during a pregnancy. Over decades of study, a large number of risk factors for preterm delivery have been identified (Table 3). Most of these risk factors are identified in women who are pregnant and apply to the current pregnancy. Despite this delineation of risk factors, the identification of individual women who are at risk for preterm delivery has been less successful.^{17 p 364} Less successful still have been interventions aimed at prevention of preterm birth in women for whom risk factors have been identified.

Table 3: Identified risk factors for preterm delivery

No or inadequate prenatal care utilization
Maternal smoking
Substance abuse
Maternal weight gain
Occupational exposures
Employment-related physical activity
Low pre-pregnancy weight or BMI
Maternal short stature
Maternal age
Pre-eclampsia
Urogenital infection
Previous preterm birth
Multiple second trimester spontaneous abortions
History of past first trimester abortions
History of infertility
Nulliparity
Placental abnormalities
Gestational bleeding
Intrauterine growth restriction
Multiple gestation

Data adapted from Behrman¹⁵

In a detailed review of the evidence supporting interventions to prevent preterm birth and the success of these interventions, Lu et al (*J Matern Fetal Neonatal Med.* 2003; 13:362-380) found low predictive value for various risk assessments, only fair or poor evidence to support many interventions to prevent preterm delivery and little benefit for primary or secondary prevention efforts in the prevention of preterm birth.^{17 p 366} For example, a study of graded risk assessment using a risk scoring system based on over 100 maternal characteristics and clinical risk factors had a positive predictive value of only about 30%. Lu showed that commonly used components of prenatal care such as risk scoring, measurement of biochemical markers, nutritional interventions and medical interventions had only fair or poor evidence for effectiveness and a small, zero or negative benefit.^{17 p 365} None of the interventions in established

pregnancies and/or established preterm labor appreciably reduced the percentage of preterm births.^{17p 370} A similar analysis by Alexander and Kotelchuck^{16 p 314} concluded that preterm birth is not effectively prevented by prenatal care in its present form. Both authors conclude that much needs to be done to study and revise the content of prenatal care, continuing the emphasis on secondary and tertiary prevention measures.

Primary prevention through preconception care

While continued access to and utilization of prenatal care services is of critical importance, more attention needs to be paid to primary prevention. Reviews of risks for poor pregnancy outcome have shown that a large portion of women enter pregnancy with pre-existing risks.^{18 p S102} Recently the emphasis has started to shift from care and interventions once a pregnancy is established to identifying risks and improving women's health before and between pregnancies. Termed "preconception care," this primary prevention effort focuses on pregnancy planning and health improvements to help create the best possible environment for a health pregnancy. It is best defined as a "window of opportunity"^{19 p S138} for identifying risks and recommending interventions to improve the likelihood of optimal pregnancy outcomes. The concept has been promoted by the March of Dimes, a non-governmental organization dedicated to improving birth outcomes.²⁰ It has gained currency within the public health establishment and in 2005 the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) held a summit on preconception care.²¹ Preconception care, as defined by the summit, is "a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome

through prevention and management, emphasizing those factors that must be acted on before conception or early in pregnancy to have maximal impact.”^{21 p 3} This definition implies ongoing care over a woman’s reproductive life. The concept is different from simply providing optimal primary care to maintain health because it has as a specific goal-- healthy pregnancy outcomes for both mother and infant. In this way preconception care is true primary prevention, with interventions implemented before the start of pregnancy.^{22 p 198}

Local Health Department Leadership

Primary prevention through preconception care is an area where the local health department can provide leadership and potentially have great impact on preterm births and pregnancy outcomes. Before presenting the issues and proposals for this new concept in care to the community, local health departments will need to evaluate their own readiness for a new initiative. Health department leaders will need to assure that the program fits with the mission and values of their organization and those of any governing body such as a local board of health. Staff education and training will help build support for programs within the health department as will soliciting the input of key decision makers among the health department staff. Before programs can be designed and implemented, it will be important for health department leaders to make sure that the funding structure supports a new initiative. If not, additional sources of funding must be sought.

Once these criteria have been met it will be important to engage the community in the process of exploring the concept of preconception care. Identification of key

stakeholders, both those who may be supportive and those who may not, should take place before moving the idea for preconception care into the community. Importantly, stakeholders must include those who will be the beneficiaries of new prevention programs, women of childbearing age. Health departments should build on existing relationships with community partners, including the medical community, politicians and the media.

The ten recommendations of the CDC/ATSDR report can be grouped into the three primary areas of public health; assessment, policy development, and assurance. Assessment will provide the basis for policy development. Assurance will put policy into action through program development. The cycle then repeats as assessment is used to evaluate program outcomes which will drive further policy development.

Assessment

Recommendations of the CDC/ATSDR report included improvements in monitoring. These recommendations include improved surveillance for risk conditions in women of childbearing age and improved performance measures related to women's health care and birth outcomes.

Policy Development

Recommendations related to policy development include: (1) promotion of preventive visits for all women of childbearing age; (2) promotion of pre-pregnancy check ups; (3) health insurance coverage for low income women; and (4) research in order to develop evidence-based interventions.

Assurance

Recommendations related to the assurance role include: (1) integration of preconception care into existing public health programs; (2) development and provision of interventions for identified risks; (3) interconception care for women who have had previous poor pregnancy outcomes; (4) consumer awareness of the importance of preconception health behaviors and health care; and (5) individual responsibility across the lifespan, including development of a reproductive life plan.

There are four major roles for local health departments in leading the change toward preconception care and improving birth outcomes in the community. These are areas where public health has expertise and provides leadership on a wide variety of health issues. The first is the surveillance for risk conditions and monitoring of outcomes in the community. The second is the use of community health education and social marketing to promote the concept of preconception care in the community. Thirdly, public health can apply its leadership role in promoting policy changes at the local, state and national level. Finally, a majority of health departments can promote preconception care through the provision of direct care services in family planning clinics.

Assessment

One of the most important first steps, for both community education and for monitoring of outcomes will be to define the extent of the problem of poor birth outcomes, particularly preterm birth, in the community. In order to develop programs and interventions appropriate to the community an assessment should also include steps to define the prevalence of risks conditions in the community. An evaluation of health

care resources and health care coverage available to women in the community must be included as well. Any assessment should also include an inventory of existing programs for women's health care and related issues.

Existing data bases of health statistics can be used to define the extent of the problem of poor birth outcomes for the community. Preterm birth data is available at the local (city, county) level through data collected on birth certificates. Two data sections, the date of the mother's last menstrual period and the obstetrician's clinical estimation of gestational age, can be used to determine and report gestational age. State vital statistics offices collect and report this data to the National Center for Health Statistics. (See Birth Certificate, Appendix A).

Risk condition data can be extracted from existing survey sources such as the Behavioral Risk Factor Surveillance System (BRFSS) and the National Health and Nutrition Examination Survey (NHANES) data. BRFSS data is collected on a statistical sample of the United States population by telephone survey.²³ Using age and gender to identify a subgroup of respondents, information about specific conditions can be extracted for women of childbearing age. As an example of how BRFSS data can be used, Anderson, et al^{18 p S104} used 2002 and 2004 data to determine the prevalence of 21 risk indicators in women ages 18-44 that were in the "preconception period". These individuals reported wanting to have a baby in the next 12 months, were not sterile or using contraception and were not already pregnant. Owens, et al^{19 p S137} reported NHANES data that estimated the prevalence of diabetes and abnormal glucose tolerance in a population of women of reproductive age. Results of both studies show a high

prevalence of potentially modifiable risks in women who are considering pregnancy (Table 4).

Table 4. Prevalence of risk conditions for poor pregnancy outcomes among women of child-bearing age.

Risk indicator¹⁸	Percent reporting
Poor/fair general health	8.3%
No health plan	18.8%
Told had diabetes	2%
Frequent drinking/binging	12.9%
Current smoker	19.4%
Overweight BMI>25	46%
Obese BMI \geq 30	22.4%
Do not know about folic acid for birth defects prevention	46.1%
Any three risks	54.5%
Any three risks among those with no health insurance	63.4%
Diabetes and abnormal glucose tolerance¹⁹	
Mexican American	27.6%
African American	22.4%
Non-Hispanic white	10.1%
Suboptimal glucose control among diabetics of childbearing age	60%

Data from Anderson, Ebrahim, Floyd and Atrash¹⁸ and from Owens, Kieffer, and Chowdhury¹⁹

These surveys and other surveillance systems, such as the Pregnancy Risk Assessment Monitoring System (PRAMS) and Perinatal Periods of Risk, may need to be modified to include more data specific to preconception health.^{21p15} Assessment of the

prevalence of risk conditions in a local community may require the use of locally administered surveys as part of overall community health assessments. As with any assessment of community health issues it is vital to engage the community in the assessment process. Including a wide variety of public, private, professional and non-professional individuals and organizations in the process can help to fully define the issues and may help to overcome barriers as programs are developed and implemented.

Data regarding health care resources and insurance coverage are available through the City and County Data Books compiled by the US Census bureau.²⁴ This data updated only on the ten year census cycle, however. More current data can be obtained through annual data bases developed by the Agency for Health Care Research and Quality (AHRQ).²⁵

Policy Development

Data developed from assessment of the extent of the problem of poor birth outcomes in the community, the prevalence of risk factors and the availability of community resources will drive policy development and advocacy. Other pregnancy related health issues, such as teen pregnancy, have been successfully addressed by community coalitions and partnerships.²⁶ Preconception care can be approached in much the same way by providing scientifically based information to key community stakeholders to gain their support for the development of preconception care services in the community. Engaging a wide variety of individuals and organizations, including those groups or individuals who may have opposing views, can help build policies and programs that meet community needs and are consistent with community values.

It is important that preconception care be viewed as a process that occurs throughout a woman's reproductive life. There may be a significant number of barriers to developing this view in the community. Preconception care is a new concept in women's health care and the community may not be ready for a change. Implementing a new form of care may be perceived as criticism of existing programs for prenatal care and infant care especially if there has been strong community support for building and funding these programs. The idea of building preconception care into all health care for women could spark territorial disputes between specialists and generalists. It will be important to stress that preconception care is not a replacement for prenatal care but rather a way of helping to assure that women are as healthy as possible when entering into pregnancy.

As with all other aspects of medical care, the question of who will pay for it arises. Women of reproductive age are not well covered by health insurance for their reproductive needs. Health surveys of women of reproductive age show that almost 20% have no health coverage.^{18 p S104} In the same survey, 63% of those without health insurance had three or more risk conditions for poor pregnancy outcome. Most commercial health insurance plans do not pay for family planning services other than prescription coverage for contraceptives. In general, non-pregnant women are not eligible for Medicaid benefits. In 2001 the states were allowed to expand Medicaid programs to include family planning services under a family planning "waiver".²⁷ Eligibility for the program lasts for one to five years, depending on the state.²⁸ The program covers family planning services such as contraception and cervical cancer screening but specifically excludes care for any medical conditions (primary care). In

general, women find themselves either covered for primary care services or family planning services, but not both. There are no comprehensive programs addressing all of women's health care needs, including preconception care.

Local health departments can recommend and support public policy options that provide a package of preconception care services to women of childbearing age. There are currently no cost estimates for comprehensive preconception care, but such care is likely to be less expensive than the estimated \$26 billion in annual costs of preterm births in the US. This position can be supported by data demonstrating the prevalence of poor pregnancy outcomes in a given community and the prevalence of risk conditions among women of childbearing age. It can also be supported by providing evidence of improved outcomes following preconception health interventions. Assessment of outcomes at the local level can feed in to policy development at the state and national level.

As is discussed below, there are currently a number of evidence-based interventions for improving pregnancy outcomes. Widespread acceptance of preconception care depends on the development of practice guidelines based on evidence and a demonstration of improved outcomes when the evidence-based practices are applied to populations of women of childbearing age. Local health departments should promote public policy that leads to continued research into the best practices in preconception care. Toward that same end, local health departments should participate in clinical research efforts and data collection that can show evidence for improved outcomes.

Assurance

Preconception care is not a new idea, but applying the concept universally to women across their reproductive lifespan is. Gynecologists have been encouraged to include primary care into their practices^{29,30} but there has not been much patient or community education on the importance of preconception care.³¹ Prue and Daniel (*Matern Child Health J* 2006; 10:S79-84) in an analysis of the social marketing strategies for preconception care note the approach to marketing preconception care in the community must set up a situation so that future parents and health care providers can support a common goal of “healthy women, healthy pregnancies and healthy babies.” Key elements of meeting this goal are having a well-defined service to provide and an understanding of what women and couples want and value in preconception care. This may be different for different populations and will require developing ways to assess current knowledge as well as health needs in the community.

The ecologic model for health education and behavior change predicts that development and acceptance of preconception care in the community will require engagement not just at the individual patient level, but at the levels of family, community and health care institutions. As pregnancy outcomes are a public health interest as well as an individual interest, it is important that public health takes the lead in promoting this type of care in the community. Health departments can take advantage of opportunities such as the annual release of pregnancy and birth statistics to promote preconception care and improved birth outcomes.

According to the Office of Population Affairs (OPA) of US Department of Health and Human Services (HHS), family planning clinics are the entry point into the health care system and the only source of ongoing health care for many women, especially low income and uninsured women.³² In the 2005 National Profile of Local Health Departments published by the National Association of County and City Health Officials (NACCHO), 58% of all responding local health departments indicated that they provide family planning services. In general, the percentage of health departments offering family planning services increases with increased size of the population served: 74% of local health departments serving populations of 500,000 or greater offering family planning services.³³

About half of all pregnancies in the United States are unplanned,³⁴ indicating a great need for health assessments and health care throughout a woman's reproductive life. The local health department clinics provide an opportunity for trained clinic staff to help women or couples develop a reproductive life plan, including timing and spacing of pregnancies. This is an important first step that can then pave the way for assessing risks and providing interventions to reduce risks that can lead to poor pregnancy outcomes. Health professionals who attended the CDC/ATSDR summit on preconception health care and health suggested that the provision of preconception care should follow the well established model of anticipatory guidance in pediatric care.^{22 p S199} Structured programs and standardized tools similar to the ones developed for pediatric practices³⁵ can assist clinicians in setting priorities for identifying and addressing prevention topics for individual patients. Patient encounter/data forms can be coupled with patient education materials and recommendations that are customized or specific to an individual patient.

Materials should be appropriate to the individual's stage of planning. Materials and interventions should also be culturally and ethnically relevant, and appropriate to the individual patient's literacy level. As noted by Posner, et al²² p S200 individualized screening, health education, and interventions are more likely to yield better outcomes.

The March of Dimes defines fourteen areas for which there is evidence that medical or behavioral risk interventions prior to conception can potentially improve pregnancy outcomes. The goal of these evidence-based interventions is to prevent preterm birth, low birth weight and congenital anomalies. These fourteen areas can form the core of "anticipatory guidance" for preconception care. The interventions aimed at preventing birth defects reduce exposure to known teratogens, such as anti-epileptic drugs, Accutane, maternal phenylketonuria, oral anticoagulant medications and folic acid deficiency. Other interventions aim to prevent the transmission of infectious disease, including rubella, HIV infection, hepatitis B and other sexually transmitted diseases from mother to infant. The remaining conditions include diabetes, hypothyroidism, obesity, smoking and alcohol use. These conditions are more general and involve screening followed by medical or behavioral interventions. The March of Dimes has published a screening tool that can be easily adapted for use in identifying risks and then developing interventions (Appendix B).

Conclusion

Preterm birth and poor pregnancy outcomes have been recognized as public health issues for decades. Despite intensive and expensive prevention efforts, the

prevalence of preterm birth in the United States has increased since the 1980's. Secondary and tertiary prevention efforts have made significant improvements in the intact survival of prematurely born infants, but the numbers of these infants have continued to increase. Annual costs of prematurity in the United States are conservatively estimated at \$26 billion. The increasing prevalence of prematurity and its associated costs were the subject of a comprehensive review by the Institute of Medicine, published in 2006.^{13 p1-609} The report made numerous recommendations regarding research into the causes and prevention of prematurity. Among the recommendations was research into the content and provision of prenatal care. However, access to and improved utilization of prenatal care has been the focus of prevention efforts of the decades during which the prevalence of prematurity has continued to increase. Far too many women lack adequate health care prior to pregnancy and enter pregnancy with existing risks for poor outcomes. A change in the focus on care during the reproductive years to preconception and interconception care is needed so that women in better physical and mental health as they begin pregnancy.

Preconception care applied universally to all women of childbearing age is a new and untried strategy. Estimates from the CDC/ATSDR summit are that development of programs and diffusion into the medical care community will take two to five years. Local health departments are in an ideal position to lead this change. Through the well-established public health functions of assessment, policy development, and assurance local health departments can define the extent of the issue for their communities and make sound, evidence-driven recommendations for changes in care. These changes in care will have to be closely monitored with evaluation of outcomes to determine if this

change in focus is the right one for prevention of preterm birth and other poor pregnancy outcomes.

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U.S. STANDARD CERTIFICATE OF LIVE BIRTH

LOCAL FILE NO.

BIRTH NUMBER:

C H I L D	1. CHILD'S NAME (First, Middle, Last, Suffix)		2. TIME OF BIRTH (24hr)	3. SEX	4. DATE OF BIRTH (Mo/Day/Yr)
	5. FACILITY NAME (If not institution, give street and number)		6. CITY, TOWN, OR LOCATION OF BIRTH		7. COUNTY OF BIRTH
M O T H E R	8a. MOTHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)			8b. DATE OF BIRTH (Mo/Day/Yr)	
	8c. MOTHER'S NAME PRIOR TO FIRST MARRIAGE (First, Middle, Last, Suffix)			8d. BIRTHPLACE (State, Territory, or Foreign Country)	
	9a. RESIDENCE OF MOTHER-STATE	9b. COUNTY	9c. CITY, TOWN, OR LOCATION		
	9d. STREET AND NUMBER		9e. APT. NO.	9f. ZIP CODE	9g. INSIDE CITY LIMITS? • Yes • No
F A T H E R	10a. FATHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)		10b. DATE OF BIRTH (Mo/Day/Yr)	10c. BIRTHPLACE (State, Territory, or Foreign Country)	
	11. CERTIFIER'S NAME: TITLE: • MD • DO • HOSPITAL ADMIN. • CNM/CM • OTHER MIDWIFE • OTHER (Specify) _____		12. DATE CERTIFIED ____/____/____	13. DATE FILED BY REGISTRAR ____/____/____	
M O T H E R	INFORMATION FOR ADMINISTRATIVE USE				
	14. MOTHER'S MAILING ADDRESS: • Same as residence, or: State: _____ City, Town, or Location: _____ Street & Number: _____ Apartment No.: _____ Zip Code: _____				
	15. MOTHER MARRIED? (At birth, conception, or any time between) • Yes • No IF NO, HAS PATERNITY ACKNOWLEDGMENT BEEN SIGNED IN THE HOSPITAL? • Yes • No		16. SOCIAL SECURITY NUMBER REQUESTED FOR CHILD? • Yes • No		17. FACILITY ID. (NPI)
	18. MOTHER'S SOCIAL SECURITY NUMBER: _____		19. FATHER'S SOCIAL SECURITY NUMBER: _____		
M O T H E R	INFORMATION FOR MEDICAL AND HEALTH PURPOSES ONLY				
	20. MOTHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery) • 8th grade or less • 9th - 12th grade, no diploma • High school graduate or GED completed • Some college credit but no degree • Associate degree (e.g., AA, AS) • Bachelor's degree (e.g., BA, AB, BS) • Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA) • Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)	21. MOTHER OF HISPANIC ORIGIN? (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "No" box if mother is not Spanish/Hispanic/Latina) • No, not Spanish/Hispanic/Latina • Yes, Mexican, Mexican American, Chicana • Yes, Puerto Rican • Yes, Cuban • Yes, other Spanish/Hispanic/Latina (Specify) _____	22. MOTHER'S RACE (Check one or more races to indicate what the mother considers herself to be) • White • Black or African American • American Indian or Alaska Native (Name of the enrolled or principal tribe) _____ • Asian Indian • Chinese • Filipino • Japanese • Korean • Vietnamese • Other Asian (Specify) _____ • Native Hawaiian • Guamanian or Chamorro • Samoan • Other Pacific Islander (Specify) _____ • Other (Specify) _____		
	23. FATHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery) • 8th grade or less • 9th - 12th grade, no diploma • High school graduate or GED completed • Some college credit but no degree • Associate degree (e.g., AA, AS) • Bachelor's degree (e.g., BA, AB, BS) • Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA) • Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)	24. FATHER OF HISPANIC ORIGIN? (Check the box that best describes whether the father is Spanish/Hispanic/Latino. Check the "No" box if father is not Spanish/Hispanic/Latino) • No, not Spanish/Hispanic/Latino • Yes, Mexican, Mexican American, Chicano • Yes, Puerto Rican • Yes, Cuban • Yes, other Spanish/Hispanic/Latino (Specify) _____	25. FATHER'S RACE (Check one or more races to indicate what the father considers himself to be) • White • Black or African American • American Indian or Alaska Native (Name of the enrolled or principal tribe) _____ • Asian Indian • Chinese • Filipino • Japanese • Korean • Vietnamese • Other Asian (Specify) _____ • Native Hawaiian • Guamanian or Chamorro • Samoan • Other Pacific Islander (Specify) _____ • Other (Specify) _____		
26. PLACE WHERE BIRTH OCCURRED (Check one) • Hospital • Freestanding birthing center • Home Birth: Planned to deliver at home? • Yes • No • Clinic/Doctor's office • Other (Specify) _____	27. ATTENDANT'S NAME, TITLE, AND NPI NAME: _____ NPI: _____ TITLE: • MD • DO • CNM/CM • OTHER MIDWIFE • OTHER (Specify) _____		28. MOTHER TRANSFERRED FOR MATERNAL MEDICAL OR FETAL INDICATIONS FOR DELIVERY? • Yes • No IF YES, ENTER NAME OF FACILITY MOTHER TRANSFERRED FROM: _____		

Mother's Name _____

Mother's Medical Record No. _____

MOTHER	29a. DATE OF FIRST PRENATAL CARE VISIT MM / DD / YYYY *No Prenatal Care		29b. DATE OF LAST PRENATAL CARE VISIT MM / DD / YYYY		30. TOTAL NUMBER OF PRENATAL VISITS FOR THIS PREGNANCY _____ (If none, enter "0".)		
	31. MOTHER'S HEIGHT _____ (feet/inches)		32. MOTHER'S PREPREGNANCY WEIGHT _____ (pounds)		33. MOTHER'S WEIGHT AT DELIVERY _____ (pounds)		
35. NUMBER OF PREVIOUS LIVE BIRTHS (Do not include this child)		36. NUMBER OF OTHER PREGNANCY OUTCOMES (spontaneous or induced losses or ectopic pregnancies)		37. CIGARETTE SMOKING BEFORE AND DURING PREGNANCY For each time period, enter either the number of cigarettes or the number of packs of cigarettes smoked. IF NONE, ENTER "0". Average number of cigarettes or packs of cigarettes smoked per day.		38. PRINCIPAL SOURCE OF PAYMENT FOR THIS DELIVERY	
35a. Now Living Number _____ •None		35b. Now Dead Number _____ •None		36a. Other Outcomes Number _____ •None		<input type="checkbox"/> Private Insurance <input type="checkbox"/> Medicaid <input type="checkbox"/> Self-pay <input type="checkbox"/> Other (Specify) _____	
35c. DATE OF LAST LIVE BIRTH MM / DD / YYYY		36b. DATE OF LAST OTHER PREGNANCY OUTCOME MM / DD / YYYY		39. DATE LAST NORMAL MENSES BEGAN MM / DD / YYYY		40. MOTHER'S MEDICAL RECORD NUMBER	

MEDICAL AND HEALTH INFORMATION	41. RISK FACTORS IN THIS PREGNANCY (Check all that apply)		43. OBSTETRIC PROCEDURES (Check all that apply)		46. METHOD OF DELIVERY		
	Diabetes <input type="checkbox"/> Prepregnancy (Diagnosis prior to this pregnancy) <input type="checkbox"/> Gestational (Diagnosis in this pregnancy) Hypertension <input type="checkbox"/> Prepregnancy (Chronic) <input type="checkbox"/> Gestational (PIH, preeclampsia) <input type="checkbox"/> Eclampsia <input type="checkbox"/> Previous preterm birth <input type="checkbox"/> Other previous poor pregnancy outcome (Includes perinatal death, small-for-gestational age/intrauterine growth restricted birth) <input type="checkbox"/> Pregnancy resulted from infertility treatment-If yes, check all that apply: <input type="checkbox"/> Fertility-enhancing drugs, Artificial insemination or Intrauterine insemination <input type="checkbox"/> Assisted reproductive technology (e.g., in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT)) <input type="checkbox"/> Mother had a previous cesarean delivery If yes, how many _____ <input type="checkbox"/> None of the above		<input type="checkbox"/> Cervical cerclage <input type="checkbox"/> Tocolysis External cephalic version: <input type="checkbox"/> Successful <input type="checkbox"/> Failed <input type="checkbox"/> None of the above		A. Was delivery with forceps attempted but unsuccessful? <input type="checkbox"/> Yes <input type="checkbox"/> No B. Was delivery with vacuum extraction attempted but unsuccessful? <input type="checkbox"/> Yes <input type="checkbox"/> No C. Fetal presentation at birth <input type="checkbox"/> Cephalic <input type="checkbox"/> Breech <input type="checkbox"/> Other D. Final route and method of delivery (Check one) <input type="checkbox"/> Vaginal/Spontaneous <input type="checkbox"/> Vaginal/Forceps <input type="checkbox"/> Vaginal/Vacuum <input type="checkbox"/> Cesarean If cesarean, was a trial of labor attempted? <input type="checkbox"/> Yes <input type="checkbox"/> No		
42. INFECTIONS PRESENT AND/OR TREATED DURING THIS PREGNANCY (Check all that apply)		44. ONSET OF LABOR (Check all that apply)		45. CHARACTERISTICS OF LABOR AND DELIVERY (Check all that apply)		47. MATERNAL MORBIDITY (Check all that apply) (Complications associated with labor and delivery)	
<input type="checkbox"/> Gonorrhea <input type="checkbox"/> Syphilis <input type="checkbox"/> Chlamydia <input type="checkbox"/> Hepatitis B <input type="checkbox"/> Hepatitis C <input type="checkbox"/> None of the above		<input type="checkbox"/> Premature Rupture of the Membranes (prolonged, ≥12 hrs.) <input type="checkbox"/> Precipitous Labor (<3 hrs.) <input type="checkbox"/> Prolonged Labor (≥20 hrs.) <input type="checkbox"/> None of the above		<input type="checkbox"/> Induction of labor <input type="checkbox"/> Augmentation of labor <input type="checkbox"/> Non-vertex presentation <input type="checkbox"/> Steroids (glucocorticoids) for fetal lung maturation received by the mother prior to delivery <input type="checkbox"/> Antibiotics received by the mother during labor <input type="checkbox"/> Clinical chorioamnionitis diagnosed during labor or maternal temperature ≥38°C (100.4°F) <input type="checkbox"/> Moderate/heavy meconium staining of the amniotic fluid <input type="checkbox"/> Fetal intolerance of labor such that one or more of the following actions was taken: in-utero resuscitative measures, further fetal assessment, or operative delivery <input type="checkbox"/> Epidural or spinal anesthesia during labor <input type="checkbox"/> None of the above		<input type="checkbox"/> Maternal transfusion <input type="checkbox"/> Third or fourth degree perineal laceration <input type="checkbox"/> Ruptured uterus <input type="checkbox"/> Unplanned hysterectomy <input type="checkbox"/> Admission to intensive care unit <input type="checkbox"/> Unplanned operating room procedure following delivery <input type="checkbox"/> None of the above	

NEWBORN	48. NEWBORN MEDICAL RECORD NUMBER:		54. ABNORMAL CONDITIONS OF THE NEWBORN (Check all that apply)		55. CONGENITAL ANOMALIES OF THE NEWBORN (Check all that apply)		
	49. BIRTHWEIGHT (grams preferred, specify unit) _____ grams • 1b/oz		<input type="checkbox"/> Assisted ventilation required immediately following delivery <input type="checkbox"/> Assisted ventilation required for more than six hours <input type="checkbox"/> NICU admission <input type="checkbox"/> Newborn given surfactant replacement therapy <input type="checkbox"/> Antibiotics received by the newborn for suspected neonatal sepsis <input type="checkbox"/> Seizure or serious neurologic dysfunction		<input type="checkbox"/> Anencephaly <input type="checkbox"/> Meningocele/Spina bifida <input type="checkbox"/> Cyanotic congenital heart disease <input type="checkbox"/> Congenital diaphragmatic hernia <input type="checkbox"/> Omphalocele <input type="checkbox"/> Gastroschisis <input type="checkbox"/> Limb reduction defect (excluding congenital amputation and dwarfing syndromes) <input type="checkbox"/> Cleft Lip with or without Cleft Palate <input type="checkbox"/> Cleft Palate alone <input type="checkbox"/> Down Syndrome <input type="checkbox"/> Karyotype confirmed <input type="checkbox"/> Karyotype pending <input type="checkbox"/> Suspected chromosomal disorder <input type="checkbox"/> Karyotype confirmed <input type="checkbox"/> Karyotype pending <input type="checkbox"/> Hypospadias <input type="checkbox"/> None of the anomalies listed above		
50. OBSTETRIC ESTIMATE OF GESTATION: _____ (completed weeks)		51. APGAR SCORE: Score at 5 minutes: _____ If 5 minute score is less than 6, Score at 10 minutes: _____		52. PLURALITY - Single, Twin, Triplet, etc. (Specify) _____		53. IF NOT SINGLE BIRTH - Born First, Second, Third, etc. (Specify) _____	
56. WAS INFANT TRANSFERRED WITHIN 24 HOURS OF DELIVERY? <input type="checkbox"/> Yes <input type="checkbox"/> No IF YES, NAME OF FACILITY INFANT TRANSFERRED TO: _____		57. IS INFANT LIVING AT TIME OF REPORT? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Infant transferred, status unknown		58. IS THE INFANT BEING BREASTFED AT DISCHARGE? <input type="checkbox"/> Yes <input type="checkbox"/> No			

REV. 11/2003

NOTE: This recommended standard birth certificate is the result of an extensive evaluation process. Information on the process and resulting recommendations as well as plans for future activities is available on the Internet at: http://www.cdc.gov/nchs/vital_certs_rev.htm.



PRECONCEPTION SCREENING AND COUNSELING CHECKLIST



NAME	BIRTHPLACE	AGE
DATE: / /		ARE YOU PLANNING TO GET PREGNANT IN THE NEXT SIX MONTHS? <u> </u> Y <u> </u> N
IF YOUR ANSWER TO A QUESTION IS YES, PUT A CHECK MARK ON THE LINE IN FRONT OF THE QUESTION. FILL IN OTHER INFORMATION THAT APPLIES TO YOU		

DIET & EXERCISE

What do you consider a healthy weight for you? _____

Do you eat three meals a day?

Do you follow a special diet (vegetarian, diabetic, other)?

Which do you drink (coffee tea cola milk water other soda/pop other _____)?

Do you eat raw or undercooked food (meat, other)?

Do you take folic acid?

Do you take other vitamins daily (multivitamin vitamin A other)?

Do you take dietary supplements (black cohosh pennyroyal other)?

Do you have current/past problems with eating disorders?

Do you exercise? Type/frequency: _____

Notes: _____

LIFESTYLE

Do you smoke cigarettes or use other tobacco products?

How many cigarettes/packs a day? _____

Are you exposed to second-hand smoke?

Do you drink alcohol?

What kind? _____ How often? _____ How much? _____

Do you use recreational drugs (cocaine, heroin, ecstasy, meth/ice, other)?

List: _____

Do you see a dentist regularly?

What kind of work do you do? _____

Do you work or live near possible hazards (chemicals, x-ray or other radiation, lead)? List: _____

Do you use saunas or hot tubs?

NOTES: _____

MEDICATION/DRUGS

Are you taking prescribed drugs (Accutane, valproic acid, blood thinners)? List them _____

Are you taking non-prescribed drugs?

List them: _____

Are you using birth control pills?

Do you get injectable contraceptives or shots for birth control?

Do you use any herbal remedies or alternative medicine?

List: _____

NOTES: _____

MEDICAL/FAMILY HISTORY

Do you have or have you ever had:

Epilepsy?

Diabetes?

Asthma?

High blood pressure?

Heart disease?

Anemia?

Kidney or bladder disorders?

Thyroid disease?

Chickenpox?

Hepatitis C?

Digestive problems?

Depression or other mental health problem?

Surgeries?

Lupus?

Scleroderma?

Other conditions?

Have you ever been vaccinated for:

Measles, mumps, rubella?

Hepatitis B?

Chickenpox?

NOTES: _____

WOMEN'S HEALTH

Do you have any problems with your menstrual cycle?

How many times have you been pregnant?

What was/were the outcomes(s)? _____

Did you have difficulty getting pregnant last time?

Have you been treated for infertility?

Have you had surgery on your uterus, cervix, ovaries or tubes?

Did you mother take the hormone DES during pregnancy?

Have you ever had HPV, genital warts or chlamydia?

Have you ever been treated for a sexually transmitted infection (genital herpes, gonorrhea, syphilis, HIV/AIDS, other)? List: _____

NOTES: _____

GENETICS

Does your family have a history of _____ or _____ your partner's family

Hemophilia? _____

Other bleeding disorders? _____

Tay-Sachs disease? _____

Blood diseases (sickle cell, thalassemia, other)? _____

Muscular dystrophy? _____

Down syndrome/Mental retardation? _____

Cystic fibrosis? _____

Birth defects (spine/heart/kidney)? _____

Your ethnic background is: _____

Your partner's ethnic background is: _____

NOTES: _____

HOME ENVIRONMENT

Do you feel emotionally supported at home?

Do you have help from relatives or friends if needed?

Do you feel you have serious money/financial worries?

Are you in a stable relationship?

Do you feel safe at home?

Does anyone threaten or physically hurt you?

Do you have pets (cats, rodents, exotic animals)? List: _____

Do you have any contact with soil, cat litter or sandboxes?

Baby preparation (if planning pregnancy):

Do you have a place for a baby to sleep?

Do you need any baby items?

NOTES: _____

OTHER

IS THERE ANYTHING ELSE YOU'D LIKE ME TO KNOW?

ARE THERE ANY QUESTIONS YOU'D LIKE TO ASK ME?