



**HealthyWomen-HealthyBabies Roundtable**  
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## **Preconception Care Working Group White Paper**

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Infant mortality rates are a standard measure of the health of a society. In the United States our progress in this regard has fallen steadily behind most of the rest of the developed world. Currently we stand in 28<sup>th</sup> place, with a higher infant mortality rate even than Cuba. Yet these figures are only a symptom of a much larger problem: The same risk factors that lead to fetal and infant mortality also contribute to premature birth and birth defects. Stunning technological advancements in neonatal care in the U.S. have allowed us to keep ever-more premature babies alive, and we have attempted to decrease premature birth and birth defects by increasing access to early prenatal care. However, mounting evidence suggests that further improvements are best achieved or only achieved by optimizing women's health prior to pregnancy. Further we are beginning to understand which interventions have the greatest impact, and these recommendations are being formalized at the national level by the Centers for Disease Control and Prevention.

Here in Colorado, the HealthyWomen-HealthyBabies Roundtable is working toward implementing these guidelines. We are providing a venue for multiple partners to work together towards the same goal. These partners include health care providers of all persuasions, public health departments, policy makers, insurance companies, educators, and, of course, women themselves and their families. Here we discuss the data that supports establishing preconception care as a routine part of women's health care, we show why prevention may be the best or only way to intervene in women with certain poor birth outcome risk factors, and describe steps toward dissemination of this concept. The goal is to increase the awareness of healthy behaviors that benefit the infant, the mother, women in general, their families, the community as a whole, and, thereby, our entire society.

## Why is poor birth outcome a concern?

### What is “preconception care”?

### How can screening and treating women before pregnancy make a difference?

### What can be done to make preconception care available to all women?

Poor birth outcomes hurt our community at its soul....

How many of us know a family that has been impacted by a premature birth or a baby with a birth defect? Many of us have witnessed the months of eager anticipation dissolve almost in an instant with the heartbreaking realization of the battle that this tiny, developing being will have to face.

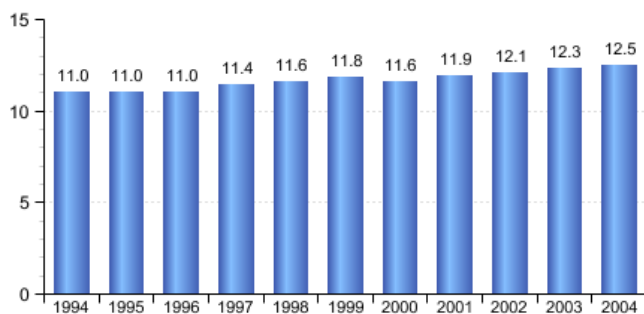
Healthy mothers and babies have been a national priority for decades and remarkable progress has been made since the turn of the 20th century, mostly due to improved sanitation and better neonatal care. Nevertheless, from 1980 to 2000, the proportion of babies born prematurely has actually risen by more than 30%<sup>1</sup>. Out of the 4 million babies born in the U.S. there are more than 500,000 premature births per year, leading to about 9500 infant deaths<sup>2</sup>. Further, 150,000 babies are born with birth defects which cause another 5600 deaths in the first year of life<sup>3</sup>. Additionally, those who survive often go on to have significant health problems such as cerebral palsy, mental retardation, respiratory and intestinal problems, and vision,

hearing, and learning disabilities. Direct and indirect costs nationally add up to more than \$26 billion annually<sup>4</sup>. Direct costs are due to the intensive medical care that is often required initially, and ongoing increased health care needs. Indirect costs include special education needs and lost labor productivity as the child grows into adulthood.

In 2004, in Colorado there were about 8400 premature babies, about 1 out of every 8 births. About 400 babies in Colorado die within the first year of life, 80 of which were born with life-threatening birth defects<sup>5</sup>.

Another equally disturbing aspect of this issue is that of stillbirth (pregnancies which have gone beyond 20 weeks, but the baby dies before birth), which occurs as frequently as infant mortality. In the U.S., there are 5 – 6 stillbirths out of every 1,000 total births<sup>6</sup>. The most prevalent risk factors include pre-pregnancy obesity, socio-economic factors, and advanced maternal age<sup>7</sup>. Other preventable factors include hypertension, diabetes, drug and toxin exposure, trauma, and certain viral and bacterial infections<sup>8</sup>.

Percent of live births



#### Preterm Births: US, 1994-2004 (Graph from MarchofDimes.com/peristats)

- In 2004, 1 in 8 babies (12.5% of live births) was born preterm in the United States.
- In 2004, there were 508,356 preterm births in the United States.

The U.S. has fallen behind most of the rest of the developed world over the last quarter century, from being a leader in low infant mortality rates, to currently standing at 28<sup>th</sup>. This is worse even than Cuba, where far less is spent on expensive technology in the neonatal period. Instead, nations such as Cuba put funds into preventative programs to improve maternal health prior to pregnancy.

Yet these numbers don't even begin to take into account the emotional toll on the family and community which must contend with the delivery of a premature baby or baby with a birth

defect. The impact extends far beyond the infant and the immediate family, as these individuals often require layers of social, emotional, educational, and occupational support.

Many maternal risk factors have been identified which contribute to fetal and infant deaths, premature birth, and chronic infant health problems. Modifiable risk factors include smoking, alcohol or drug use, inadequate folic acid intake, obesity, use of medications that cause birth defects, and certain pre-existing medical conditions. In 2003, 20% of women of child bearing age in the U.S. were obese 9. At

**Infant Mortality Rates, 2003.**

International Infant Mortality		
Rank	Country	Rate
1	Hong Kong	2.3
2	Singapore	2.5
3	Japan	3.0
4	Finland	3.1
4	Sweden	3.1
6	Norway	3.4
7	Czech Republic	3.9
8	France	3.9
8	Portugal	4.1
10	Spain	4.1
11	Germany	4.2
12	Belgium	4.3
13	Italy	4.3
14	Switzerland	4.3
14	Denmark	4.4
16	Austria	4.5
17	Australia	4.8
17	Greece	4.8
17	Netherland	4.8

International Infant Mortality		
Rank	Country	Rate
20	Israel	4.9
21	Ireland	5.1
22	Scotland	5.1
23	New Zealand	5.2
23	Northern Ireland	5.2
25	Canada	5.3
26	England and Wales	5.3
27	Cuba	6.3
<b>28</b>	<b>United States</b>	<b>6.9</b>
29	Poland	7.0
30	Hungary	7.3
31	Chile	7.8
32	Slovakia	7.9
33	Puerto Rico	9.8
34	Costa Rica	10.1
35	Bulgaria	12.0
36	Russian Federation	12.4
37	Romania	16.7

the other end of the spectrum, some women, especially young teen mothers, are underweight and do not gain enough weight during pregnancy. An additional 25% of reproductive-age women have chronic medical conditions such as asthma, cardiac disease, hypertension, diabetes, and thyroid disorders<sup>10</sup>. These conditions contribute to adverse pregnancy outcomes. If they could be identified and controlled or eliminated, significant progress could be made towards improving birth outcomes.

Unfortunately, even early prenatal care may already be too late. Dr. Hani Atrash at the CDC (Centers for Disease Control and Prevention) makes the point in the *Maternal and Child Health Journal*, 9/06, that “by the time a pregnant woman makes it to her first prenatal visit, most of the fetal organs are already formed, and many interventions to prevent birth defects or adverse maternal and infant outcomes come too late to have any effect”<sup>11</sup>. For example, a woman who conceives when she has

**Table 1. Ten Key Recommendations to Improve Preconception Health** (from ref 13, see also 15)

- 1 Individual responsibility across the life span. Encourage each woman and every couple to have a reproductive life plan.
- 2 Consumer awareness. Increase public awareness of the importance of preconception health behaviors and increase individuals’ use of preconception care services using information and tools appropriate across varying age, literacy, health literacy, and cultural/linguistic contexts.
- 3 Preventive visits. As a part of primary care visits, provide risk assessment and counseling (education and health promotion) to all women of childbearing age to reduce risks related to the outcomes of pregnancy.
- 4 Interventions for identified risks. Increase the proportion of women who receive interventions as follow up to preconception risk screening, focusing on high priority interventions (ie, those with high population impact and sufficient evidence of effectiveness).
- 5 Interconception care. Use the interconception period to provide intensive interventions to women who have had a prior pregnancy ending in adverse outcome (eg, infant death, low birthweight, or preterm birth).
- 6 Prepregnancy check ups. Offer, as a component of maternity care, one pre-pregnancy visit for couples planning pregnancy.
- 7 Health coverage for low-income women. Increase Medicaid coverage among low-income women to improve access to preventive women’s health, preconception, and interconception care.
- 8 Public health programs and strategies. Infuse and integrate components of preconception health into existing local public health and related programs, including emphasis on those with prior adverse outcomes.
- 9 Research. Augment research knowledge related to preconception health.
- 10 Monitoring improvements. Maximize public health surveillance and related research mechanisms to monitor preconception health

uncontrolled diabetes has a 14% risk of having a child with life threatening birth defects. The elevated blood sugar levels in a diabetic woman literally can deform the developing embryo. But with adequate blood sugar monitoring and control prior to conception, the risk drops to normal, about 2%<sup>12</sup>. The CDC has launched a campaign to make preconception care the next frontier in improving pregnancy outcomes. In April, 2006 they published ten recommendations (Table 1) which span clinical care strategies, promotion of healthy individual behaviors, health care policy reform, public health initiatives, and research agendas<sup>13</sup>. Because Colorado has been targeted by the CDC as a priority state, the Colorado HealthyWomen-HealthyBabies Roundtable has created a Working Group to activate these ten recommendations in our state. The goal is to increase awareness for the need for preconception care both in the health care community and the lay public, to implement evidence-based clinical practice guidelines, and to make our state a leader in the health of our next generation.

Since more than half of all pregnancies in the U.S. are unplanned, education, screening, and effective intervention must be available for all women of reproductive age, whether they are actively trying to become pregnant or not. There are many opportunities to incorporate such education and screening, such as at the post-partum visit, at the time of an annual exam or other routine health visit, during an encounter with the pediatrician, or as a part of school health education programs. Sadly, in the current climate of health care economics, private insurance and public aid tend not to reimburse prevention strategies, because financial benefits tend to be very long-term in their returns. For example, osteoporosis prevention may not reduce fracture risk until 30 years into the future. However, benefits from preconception care should be almost immediately realized. By instructing a woman to increase her folic acid intake prior to conception she may be able to prevent a “neural tube defect” or malformation of the brain or spinal cord. The neural tube

begins to develop about 2 days after the woman misses her period, when she may not yet realize that she is pregnant. To increase folic acid intake after the neural tube is formed, by 3 weeks after a missed period, is too late to be effective, again emphasizing the importance of such education before conception.

Our Working Group proposes that the initial step should be a demonstration project which confirms the improvement in birth outcomes as well as the cost savings using a multi-factorial “Reproductive Health Screen”. This screen would include the 14 specific interventions for which evidence-based clinical practice guidelines already exist (Table 2)<sup>10</sup>. The CDC is in the process of developing clinical screening tools, and seeking to implement demonstration and research projects. Colorado has already set a precedent with the success demonstrated in the Colorado Prenatal Plus program, with measurable reduction in low-birth weight babies<sup>14</sup>.

The next step should be to target high risk populations where the most impact could be made. Our state has high risk groups in the African-American, Latino, and Native American populations. Many communities are eager to incorporate an education model, and may be willing to serve in a targeted study. Marketing strategies and a certain degree of creativity may be needed to reach as much of the population as possible. As one example, a recent bill was passed requiring accurate reproductive information to be taught in public education. As a third and final phase, these interventions should be extended to the population as a whole.

As stated in the Apr., 2006 MMWR report from the CDC, “Preconception care offers health services that allow women to maintain optimal health for themselves, choose the number and spacing of their pregnancies, and when desired, prepare for a healthy baby”<sup>13</sup>. It assists in attaining that goal by emphasizing planning and personal responsibility for individual behaviors, as well as the need for

**Table 2. Preconception Interventions with Evidence for Improving Pregnancy Outcomes** (ref 11)

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

\*PKU, phenylketonuria.

adequate and respectful systems of care, and improved access to care to reduce health care disparities.

Just as we have made an impact in breast cancer awareness by advocacy and education, we can also strive to improve birth outcomes. We must be the advocates for the innocent lives that may

be harmed by preventable causes that lead to stillbirth, premature birth, and birth defects, the ripple effect of which affects our entire community. Women must be empowered with this information because the future lies within them.

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