



**Testimony before the
Subcommittee on Health
Committee on Energy and Commerce
United States House of Representatives**

**Prematurity and Infant Mortality: What Happens
When Babies Are Born Too Early?”**

Statement of

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Introduction

Mr. Chairman, Mr. Shimkus, and distinguished members of the Subcommittee, thank you for the opportunity to participate in this hearing. I am Dr. William Callaghan, Acting Chief of the Maternal and Infant Health Branch in the Division of Reproductive Health, Centers for Disease Control and Prevention (CDC), an agency of the Department of Health and Human Services (HHS). I am also board certified in obstetrics and gynecology and general preventive medicine. Prior to making the transition to public health in 2001, I spent 14 years caring for thousands of women during their pregnancies. I am pleased to be here today to participate in discussions of the challenges around the issues of preterm birth and infant mortality. It is difficult to speak about infant mortality without also speaking about preterm birth. However, as I hope to make clear, preterm birth carries risks over and above the risk of infant death and hence, it is one of the most important health issues facing women, children, and families in America today. I will briefly outline the burden of disease in the nation due to preterm birth and summarize current prevention and research activities and challenges. I will close with outlining plans for continuing activities as we work together to decrease the burden of preterm birth and infant mortality.

Background

Preterm birth is defined as being born at less than 37 weeks gestation, that is, at least three weeks before the predicted due date for the pregnancy. Throughout the 1990s and the early years of the 21st century, preterm births have steadily increased from just over 9 percent of all births in the early 1980s peaking at nearly 13 percent in 2006. Now, more than a half a million babies are born preterm each year in the United States.¹ Healthy People, a science-based, 10-year set of national objectives for promoting health and preventing disease, includes an objective to reduce pre-term births. The Healthy People 2010 Midcourse Review found that pre-term births between 32-36 weeks of gestation and less than 37 weeks of gestation moved away from their target improvement goals. The rate for pre-term births at less than 32 weeks of gestation did not change by the time of the Midcourse Review. The objective to reduce pre-term births will also be included in

Healthy People 2020 which will be launched in Fall 2010. Although a recent CDC report shows a welcome small decline in the preterm birth rate for 2007 and 2008, levels remain higher than at any point in the 1980s and 1990s. Most of this increase has been among late preterm births (34 - 36 weeks).² Many factors have likely contributed to the rise in the late preterm birth rate. One factor may be that the way pregnancy is managed has changed over this period, that is, there may be a lower threshold to induce labor or deliver by cesarean section at 34 - 36 weeks of gestation in recent times. While such intervention is often necessary for the health of both the mother and her infant, little is known about how case-by-case decisions regarding interventions are made.

Preterm birth is an important risk for mortality and short- and long-term disease and disability. Two-thirds of the approximately 28,000 infants who die each year are born preterm, although we cannot always say that being preterm was the direct cause of death. However, even when we use conservative assumptions from death certificate information, more than one-third of infant deaths can be directly attributed to preterm birth; more infants die as a direct result of being born too early than of any other cause.³ This preterm-associated risk is strongly related to how far into pregnancy the birth occurs. Those babies born at the early limits of living outside their mothers' wombs have a poor chance of surviving the first year, and these smallest and earliest babies, while accounting for only two percent of all births, bear the greatest mortality risk.⁴ Little progress has been made in reducing infant mortality in recent years and little progress has been made in reducing the fraction of births at the earliest gestations (less than 32 weeks gestation). Moreover, approximately eight percent of preterm births or about 40,000 preterm births also have a major birth defect.⁵ Until we can reduce the occurrence of preterm birth and major birth defects, it will be very difficult to see any dramatic reduction in the U.S. infant mortality rate.

The issue of preterm birth as it relates to infant mortality is at crisis proportions for African Americans. African-American women are one and one-half times more likely to deliver a preterm infant compared to white women; they are more than twice as likely to deliver a very preterm infant (less than 32 weeks gestation) compared to white

women.¹The infant mortality rate for black infants is more than twice that of white infants,² and the infant mortality rate due to major birth defects is approximately 40 percent higher in African Americans than in non-Hispanic white women.⁶

The death of an infant is a tragedy. Deaths are relatively easy to measure. Hence, we put a lot of emphasis on the outcome of infant mortality. However, while most infant deaths have at least an association with being born preterm, most preterm infants do not die. One reason for this is the great strides that have been made in the intensive care of these smallest of newborns. Another reason, not wholly unrelated, is that most preterm infants are born at the high end of the preterm gestational age range, i.e., late preterm. Although these infants have a higher infant mortality rate than term infants, deaths during the first year of life are much lower than those born earlier in pregnancy. Hence, we need to think beyond infant mortality when we discuss prematurity as a public health problem. Preterm birth is a leading cause of neurological disability, such as cerebral palsy and intellectual disabilities, in children. It can also result in blindness and chronic lung problems.⁷ We are only now beginning to understand the lifelong impact that being born too small and too early has on the individual and their families. Premature births exact a huge financial toll on our healthcare resources – in 2005 it was estimated that medical care, early intervention services, special education services and lost productivity associated with preterm birth cost \$26.2 billion.⁷ There is also an emotional toll. Taken together, it is clear that preterm delivery is a public health priority.

During my years as a practicing obstetrician, all too often my patients and I were faced with the unexpected situation of preterm delivery. Although women who have pre-existing medical conditions such as hypertension or who have pregnancies with impaired fetal growth are at risk for early delivery because of concerns for the health of the mother or fetus, it is difficult to predict the spontaneous occurrence of preterm labor. Women who had a preterm birth in the past are a notable exception. Weekly injections of 17-hydroxyprogesterone caproate (17-P) have been shown to reduce the risk of preterm birth among women who had a preterm birth in the past,⁸ and this treatment is important in this subgroup of women. The estimated reduction in the preterm birth rate from universal

usage of this medication in the United States has been estimated to be about two percent,⁹ and it is important that this treatment be used for women who had a prior preterm birth. However treatment alone with 17-P will not eliminate preterm births. Hence, we are left with unacceptably high rates of death and disability due to preterm birth. It is clear that solutions to the challenge of preterm delivery must come through better understanding of causes and applying that understanding to develop effective interventions.

Current Research and Challenges

Preterm birth is not a new challenge and it has not gone unaddressed. We must continue working toward the goal of predicting preterm birth and developing rational interventions to prevent it. At CDC, our work addresses preterm delivery by monitoring trends, sponsoring and conducting research and sponsoring programs, all of which attempt to address the social and biomedical factors that affect preterm risk. We achieve this through three basic mechanisms: surveillance, research, and capacity-building of states and communities.

Surveillance:

Surveillance is the core of CDC's work; we monitor how many infants are born prematurely, analyze trends, define risk factors, and target prevention programs, based on these data and analyses. Surveillance is our early warning system. It tells us if there is a new emerging health threat and if our programs are effective. There are several important surveillance systems that we use.

The first is through collection of birth certificates and death certificates by CDC's National Center for Health Statistics (NCHS). For prematurity, this is the backbone of health surveillance – all of the national statistics for prematurity rates are compiled from information on the birth certificate. We are also able to use birth certificate information to evaluate factors such as mother's education, tobacco use, race, and the infant's birthweight. It allows us to follow trends, risk factors, and identify variations in rates of preterm births at the state and county levels. When birth certificate information is linked to information on death certificates, we are able to look at causes of death for those

babies who died during their first year of life. Using data from this linked file, we were able to demonstrate the strong relationship between preterm birth and infant mortality. Each year, NCHS reports in detail on preterm birth rates across the country and on “preterm-related” infant mortality, and released new data on this earlier this week.

CDC has on-going projects to evaluate and improve the quality of the data from these new systems, but support to develop effective training for hospital personnel to thoroughly and accurately report gestational age and other vital statistics information is needed. CDC has also conceived a project to develop standards and pilot studies for the collection of selected vital records data such as gestational age via the use of the new electronic health records; we expect that this new approach will greatly enhance the timeliness and quality of gestational age data. The FY 2011 Budget requests additional resources to modernize vital records received from States and other jurisdictions to increase their timeliness and accuracy by implementing electronic birth registration, and phasing in electronic death registration through a 50-50 match. This will allow all states to have implemented EBRs or be in the process of developing by FY 2011. CDC’s second large surveillance system on maternal and infant health is called PRAMS – the Pregnancy Risk Assessment Monitoring System. PRAMS is an ongoing, state-specific, population-based surveillance system designed to identify and monitor selected maternal behaviors and experiences before, during, and after pregnancy. Through this system, we have been able to better understand issues such as prenatal care, folic acid to prevent birth defects, obesity, pregnancy weight gain, stressful life events, and physical abuse. For example, an analysis of PRAMS data showed that very low weight gain during pregnancy increases the risk of preterm birth, regardless of prepregnancy body mass index.¹⁰ PRAMS has served to expand the capacity of 37 states and New York City to define and address their health needs, and this unique surveillance system is now representative of approximately 75 percent of all births in the United States. It has provided vital information to program managers and decision-makers for development of policy and programs in maternal and infant health. For example, information from PRAMS is used in states as part of the criteria for distribution of Title V Maternal and Child Health block grants.

In addition, CDC provides resources to assist states in conducting surveillance of major birth defects, including the collection of data on the gestational age at delivery of infants with major birth defects. Data from the surveillance systems have allowed CDC to develop national prevalence estimates, study the association between preterm birth and major birth defects, and identify risk factors for birth defects including smoking in early pregnancy and pre-pregnancy obesity.

In addition to these large surveillance systems, CDC also uses more focused surveillance to address specific health issues. Under Congressional mandate, CDC collects and analyzes data from all clinics that use infertility treatment called ART or Assisted Reproductive Technology. We have identified how this technology is associated with elevated low birth weight and prematurity, but there is still much that we could learn through expanding this work. For example, linking ART surveillance data with birth and death files in states will provide a population-based database to examine maternal and infant health outcomes associated with this technology.¹¹ Although recent research has indicated that ART is not the primary driving force for preterm delivery in the U.S., it is important to continue to monitor its impact on preterm delivery. For example, we know that twins, triplets and higher order multiple births are at greater risk of delivering preterm, and ART surveillance data helps us understand how ART procedures contribute to increases in multiple births.

Research:

A complex array of factors interferes with healthy pregnancy outcomes and racial disparities. Decades of research at NIH suggests that treatment of infections may not be successful in preventing preterm delivery. Perhaps the body's inflammatory response to infection, and not the infection itself, is damaging to the pregnancy. There are damaging by-products of inflammation that spread throughout the body and result in increased risk of premature birth. We know that tobacco use and psychological stress from living in poor neighborhoods create the same damaging chemicals in the body as infection. The same inflammatory factors have been identified in heart disease.⁷ We are currently

working with partners to try to understand some of the biology associated with the inflammatory response among women who delivered early preterm. One focus of these investigations is to understand how variations in genes that govern the human inflammatory response might predispose to preterm birth, and how these variations interact with maternal race and ethnicity as well as social and economic exposures for the woman. Such lines of inquiry will likely generate more questions than answers, but they are questions that must be pursued if we are to make progress.

We know little about why late preterm births, births occurring between 34 and 36 weeks gestation, increased and drove the overall preterm birth rate during the last several decades. We are currently involved in a small study in metropolitan Atlanta to identify late preterm births and review the medical records of these women and infants in order to discover if it is feasible to expect that the answer as to why and how the birth occurred can be found in the medical records.

Public Health Capacity:

In the area of capacity-building, CDC has 23 federal staff assigned to state health departments, providing technical support for epidemiological research, public health surveillance, state-based programs, and one of the Indian Health Service's epidemiology centers.

Despite the complexities of preventing preterm delivery, there are ways we build public health capacity and act now. Tobacco use, for example, remains a significant preventable cause of low birth weight, preterm birth and of some major birth defects. CDC has responded by working with state health departments to assist with smoking cessation programs during pregnancy.

The Path Forward

We will continue to work with federal, state and academic partners to address the public health challenges of preterm birth and infant mortality. The information in vital statistics is the foundation for understanding where we are and measuring progress and we will be

investigating how the quality of that information can be improved and used to inform programs and public health practice. Along these lines, we will continue to enhance the capacity of states to use their vital statistics and PRAMS data for action. A society measures what it values, and we will strive to improve the core public health function of surveillance.

As new ideas emerge about the reasons for preterm birth, potential predictors and possible prevention interventions, we will continue to synthesize evidence and attempt to fill in knowledge gaps. Moreover, we will use our ability to convene partners in efforts to bring together the most recent thinking so that research and practice might be thoughtful and evidence-based. Although progress in improving preterm birth and infant mortality rates might not be as rapid as we would all hope, and racial disparities continue, bringing the best minds together to address these challenges is an important step forward.

We will continue to press forward with our work in the area of understanding late preterm birth, as this group continues comprise the largest proportion of preterm births. It is likely that this will involve new techniques such as qualitative research involving key informant interviews and focus groups to better understand how decisions are made regarding when and how delivery should occur.

Conclusion

Prevention of preterm birth is an important public health priority. Back in 1917, Dr. Grace Meigs who was in charge of the hygiene division for the Children's Bureau was tasked with investigating the reasons for high infant mortality rates. The findings of her investigation led her to conclude that the problem of infant mortality is inextricably tied to the health of women. We can say the same today, nearly a century later. As we learn more about causes and prevention, we hope the result will be more healthy babies and healthy families.

Thank you for the opportunity to speak to you about preterm birth. At this time, I would be happy to answer your questions.

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