

## **AMCHP 2007 ANNUAL CONFERENCE**

### **HEALTHY COMMUNITIES**

March 3rd to 7th, 2007

#### **Stagnant or Increasing Infant Mortality:**

#### **The MCH Director's Role in Responding**

MARY McDERMONT: Thanks, Bill. I'm pleased to be here today to talk about recent trends in infant mortality in the United States. After decades of decline, there has been little progress in lowering the U.S. infant mortality rate from 2000 to 2005. There have been some small ups and downs. Notably a spike in 2002. However, the U.S. infant mortality rate has mostly remained around 6.8 to 6.9 throughout the period. The difference between the 2000 and the 2005 infant mortality rate is not statistically significant. Data from 2000 to 2004 are from the NCHS final mortality file, while the 2005 data is provisional.

This slide shows the U.S. infant mortality rate and international ranking in various years. In 1960, the U.S. infant mortality rate was 26.0 infant deaths per 1,000 live births, and the U.S. ranked 12th in infant mortality. In 1980, the U.S. infant mortality rate was 12.6. Less than half that in 1960. However, infant mortality declined even more rapidly in many other developed countries. And the U.S. ranking slipped to 19th in 2000. I'm sorry, 19th in 1980. In 2000 and in 2003 the U.S. ranked 28th in infant mortality. The full table on which this summary slide is based is available as a handout in the back of the room. Some people have

commented that part of the reason for the relatively low position of the U.S. in the international rankings is due to differences in the reporting of infant deaths between countries. Let's do a brief sensitivity analysis to test this hypothesis. The table and the handout shows 20 countries within infant mortality rate of less than five in 2003. Some of these countries probably under-report infant deaths for infants at the limits of the viability. Yet, they would have to underreport between 41 and 200% of their infant deaths to have a true infant mortality rate equal to or higher than the U.S. rate. Then we have six more countries, including those from the United Kingdom, Canada, and New Zealand with infant mortality rates between 5.1 and 5.3. Of these countries would have to not report more than 30% of their infant deaths to have a true infant mortality rate equal to or higher than the U.S. rate. Then we have one more country, Cuba, with an infant mortality rate of 6.3. If more than 10% of its infant deaths were not reported, this would affect its international ranking relative to the U.S.

So although underreporting of infant deaths doubtless occurs in some countries, the probable impact on the U.S.'s international ranking may be less than some might think. This is because reported infant mortality rates for many developed countries are so much lower than for the U.S., thus underreporting of infant deaths would have to be very large to change most countries' international rankings relative to the U.S. Now let's look at some infant mortality and birth characteristics. Neonatal and post-neonatal mortality rates have basically not changed much from 2000 to 2004. When examined by race of mother, we see

that there is little change in the white infant mortality rate from 2000 to 2004. For black infants, the trend appears to be very slightly downward, but the change since 2000 is not statistically significant.

To look at more detailed race and ethnic data, we need to use the linked birth and infant death data set, where the most recent final data is for 2003. However, the story is the same, with a clear decline for most race and ethnic groups from 1995 to 2000 and that no decline from 2000 to 2003. In analyzing changes in infant mortality, it is useful to partition the overall infant mortality rate into two key components, the distribution of births by birth weight, and birth weight specific infant mortality rates. In other words, the mortality rate for infants at a given weight.

The same type of partitioning can be done by gestational age. To look at the distribution of births by gestational age and at gestational age specific infant mortality rates. The percent of pre-term and low birth weight births has increased steadily from 2000 to 2005. The percent of pre-term births has increased by 9%, from 11.6 to 12.7% of total births. The percent of low birth weight births has increased by 8%, from 7.6 to 8.2% of total births. Very pre-term births increased by 5% from 2000 to 2005, while very low birth weight births increased by 4%. This increase in pre-term and low birth weight births is important because infant mortality rates are much higher for infants born too small and too soon. Nearly nine out of 10 infants born weighing less than 500 grams died within the first year

of life. Mortality falls rapidly with increasing birth weight, until, for infants weighing 2500 grams or more, 2.3 per thousand die within the first year of life. Because of this huge difference in mortality, even small changes in the number of births at the lowest birth weights can have a very large impact on infant mortality.

Let's look at this comparison another way. This chart shows the distribution of live births and infant deaths by birth weight. This is from the 2003 linked file. If you add the lowest two birth weight categories together, you get the somewhat amazing statistic that nearly half, 48.7% of all infant deaths in the United States occur to the 0.8% of infants born weighing less than 1,000 grams.

If we make the parallel comparison by gestational age, we find that 55% of all infant deaths occurred to the 1.9% of infants born very pre-term, at less than 32 weeks of gestation. The percent of pre-term and low birth weight births has actually been increasing in the U.S. since the mid-19 80s. And infant mortality still fell from 1980 to 2000. This is because birth weight specific infant mortality rates fell fast enough to offset the increase in low birth weight births. But all that changed in 2000. Since 2000, or more likely since 2001, the birth weight specific infant mortality rate for very low birth weights infants has been increasing. This change is statistically significant. Again, let's review the slide we saw a few minutes ago. Fifty-five percent of all infant deaths, the three slices of the pie on the right, taken together, are among the very low birth weight infants. So an increase in the infant mortality rate for very low birth weight infants definitely will

have a major effect on the U.S. infant mortality rate. This increase is of great concern. However, of the two trends, the increase in the percent of very low birth weight births had a greater impact on the overall infant mortality rate.

A previous NCHS report examined three potential factors to explain the 2001/2002 increase in very low birth weight births. One, possible changes in reporting of births and/or fetal deaths. Reporting changed during the 1980's and 1990's. However, there was little evidence of large changes in reporting from 2001 to 2002. Two, possible changes in the risk profile of births. The increase in very low birth weight births occurred for all major race and ethnic groups. Most of the increase occurred among women, aged 20 to 34 years, an age group considered to be at lowest risk of adverse pregnancy outcomes. There were some changes in other risk factors. For example, we found that multiple births accounted for one-quarter of the increase. However, three-quarters of the increase occurred among singletons.

The third factor that we considered was possible changes in the medical management of pregnancy. Mostly changes in cesarean section and induction of labor for pre-term infants. The percent of U.S. births delivered by cesarean has been increasing rapidly since 1996. This increase has also occurred for pre-term and for very pre-term births. In 2004, 41% of pre-term births, and 51% of very pre-term births were delivered by cesarean. The revised birth certificate, which was implemented in seven states in 2004 has a question. If cesarean delivery,

was there a trial of labor? This question is important because if a cesarean is performed on a woman in labor, it probably would have little impact on the infant's gestational age at birth, because the woman was likely to deliver soon anyway. However, when a cesarean is performed on a woman not in labor, it has the potential to affect the infant's gestational age because it is unknown how much longer the pregnancy might have continued, had the cesarean not been performed.

We wanted to explore whether we could use this new item to get a better idea of the impact of medical intervention on the percent of pre-term births. Okay, in 2004, data from those seven states that had implemented the new birth certificate showed that among pre-term cesarean deliveries, 28% had a trial of labor and 72% did not. When the 72% is multiplied by the 41% of pre-term births delivered by cesarean, the result is 30% of pre-term deliveries were cesareans on women not in labor. Add in the 11% of pre-term births with induced labor who did not later delivered by cesarean, those which you could term failed inductions, and this yields an estimate of about 41% of pre-term births, where the result of medical intervention to deliver the infant early when the woman was not in labor. The purpose of this exercise was to provide a ballpark estimate of the impact of medical intervention on the percent of pre-term births.

As such, several caveats should be noted. First trial of labor is a new item and has had relatively limited validation compared with other birth certificate items.

Because hospitalists are not as familiar with the item, it's possible that it could be underreported. Second, the item is only available from seven states in 2004. Still, these seven states are from every region of the country, and taken together have similar rates of both cesarean section and pre-term birth to the U.S. total.

Regardless of the exact level, it is clear that medical intervention does have a major impact on the percent of pre-term births. Also, the trial of labor item is just one of the many new items available from the revised birth certificate. And its implementation by all states would greatly improve our understanding of a wide variety of maternal and child health issues.

This slide shows the percent of total infant deaths and infant mortality rates for the leading causes of infant deaths in 2004. This shows disorders relating to short gestation and low birth weight not elsewhere classified as the second leading cause of infant death, with 16.6% of all infant deaths. However, note that this category says not elsewhere classified, indicating that many more pre-term and low birth weight related infant deaths are actually classified under other more specific causes. A reanalysis of the U.S. cause of death data for 2002 found that even by a very conservative estimate, more than one third of infant deaths were pre-term related. And a copy of that article is available as a handout in the back of the room. The 2004 linked file report will contain further information on this analytic category.

In summary, the U.S. infant mortality rate did not decline appreciably from 2000 to 2005. The halt in the historic U.S. infant mortality decline is due primarily to increases in the percent of very pre-term and very low birth weight births. Increases in birth weight specific infant mortality rates for very low birth weight infants also played a role. Increases in the percent of very low birth weight births occurred among all race and ethnic groups, and mostly among women aged 20 to 34, a group traditionally considered to be at low risk for poor pregnancy outcome. Traditional cause of death groupings substantially underestimate the impact of pre-term birth on infant mortality rates. Increases in pre-term cesarean section and induction of labor have had a major impact on the increase in the pre-term birthrate. And finally, implementation of the revised birth certificate by all states is vital to our understanding of recent trends in infant mortality. Thank you.

Any questions?