Colorado Maternal Mortality Review Committee brief

NO. 1 AUGUST 2000

Maternal Mortality in Colorado 1990–1997

Colorado Maternal Mortality Review Committee

The Colorado Maternal Mortality Review Committee is composed of a multi-disciplinary team of professionals who review all deaths to Colorado women that occur during pregnancy or within one calendar year of the termination of pregnancy.

The goals of the committee are to:

- Identify trends and risk factors for pregnancy-related death in Colorado;
- Identify preventable risk factors;
- Develop strategies for prevention or intervention.

Maternal deaths are classified as either pregnancy-related or pregnancy-associated.

A pregnancy-related death is defined as a death resulting from:

- Complications of the pregnancy itself, or
- The chain of events initiated by the pregnancy that led to the death, or
- Aggravation of an unrelated condition by the physiologic or pharmacologic effects of pregnancy that subsequently caused the death during pregnancy or within *one calendar year of the termination of the pregnancy*, regardless of the duration or anatomical site of the pregnancy.

A pregnancy-associated death is defined as:

- Death of a woman from any cause while she is pregnant or within one calendar year of the termination of pregnancy, regardless of the duration or anatomical site of the pregnancy. In these cases, a woman dies and is coincidentally pregnant.

Only deaths determined by the Maternal Mortality Review Committee to be pregnancy-related are included in this brief.

Identification of Maternal Deaths

Maternal deaths are most frequently identified utilizing death certificate data from Health Statistics and Vital Records at the Colorado Department of Public Health and Environment. Cases are classified as maternal mortalities when the cause of death is coded with one of the appropriate pregnancy-related ICD-9 codes (630-676). This mechanism is not adequately inclusive because not all maternal deaths are identified as pregnancy-related on the death certificate. The Centers for Disease Control and Prevention (CDC) note that the number of maternal deaths attributable to pregnancy and its complications is estimated to be 1.3 to 3 times that reported in Vital Statistics records (1).

Given that the current system results in an under-reporting of maternal deaths, the CDC has

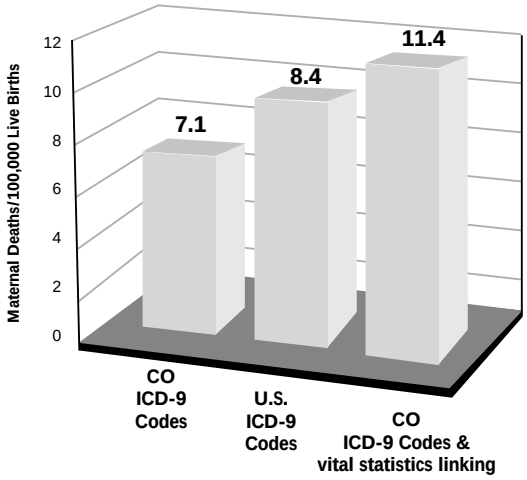
recommended expanding surveillance. The Colorado Maternal Mortality Review Commitee has done this by adopting the CDC's definition of pregnancy-related mortality, which includes deaths occurring within one calendar year of the termination of pregnancy, and employing vital statistics linking as a mechanism to increase identification of maternal mortalities. Expanding surveillance by using vital statistics linking requires matching the death certificates of all reproductive-age women, age 15–44, with birth and fetal death certificates issued for the year prior to the woman's death. In Colorado, for the years 1990–1997, expanding surveillance with vital statistics linking increased the number of pregnancy-related deaths identified by 62 percent.

Maternal Mortality Ratio/Rate

From 1990–1997, the Maternal Mortality Review Committee identified 50 pregnancy-related deaths among Colorado residents; 31 identified on death certificates via ICD-9 codes and an additional 19 identified via vital statistics linking. The average maternal mortality ratio[a] for Colorado for 1990–1997, based on death certificate identification alone, was 7.1 maternal deaths per 100,000 live births. Identification of additional cases through expanded surveillance with vital statistics linking raised the average maternal mortality ratio in Colorado to 11.4/100,000 live births for 1990–1997.

Maternal mortality rates in the United States have consistently declined until 1982, after which time the average remained at about 7.7 maternal deaths/ 100,000 live births between 1982 and 1996 (2). The 1997 U.S. maternal mortality ratio was 8.4 maternal deaths/ 100,000 live births (3). The World Health Organization (WHO) estimates that 20 countries have maternal mortality rates lower than the U.S. (4). The rates in both Colorado and the U.S. stand in stark contrast to the Healthy People 2010 goal for maternal mortality of 3.3 maternal deaths/100,000 live births.

FIGURE 1: Maternal Mortality Ratios, Colorado residents, 1990-1997 and U.S. Maternal Mortality Rates, 1997

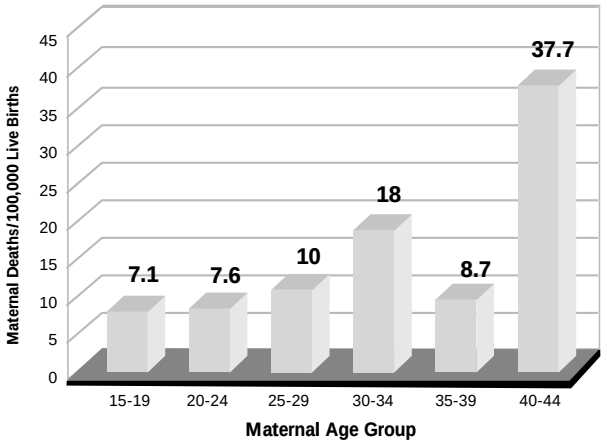


Demographic Data

Age

Figure 2 shows pregnancy-related mortality ratios by age for Colorado residents. In Colorado, mortality ratios generally increase with age with the highest ratios seen in women age 40–44.

FIGURE 2: Pregnancy-Related Mortality Ratios, by Age, Colorado Residents, 1990-1997*



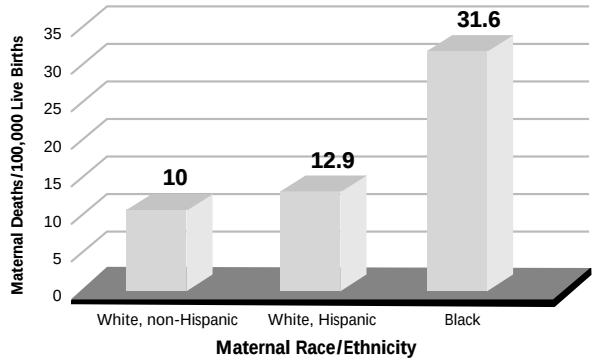
*Data includes deaths identified by ICD-9 codes and vital statistics linking.

[a]The National Center for Health Statistics uses the term maternal mortality rate. The term "ratio" is used here instead of rate because the numerator includes some maternal deaths that were not related to live births and thus were not included in the denominator.

Race/Ethnicity

Figure 3 shows pregnancy-related mortality by race/ethnicity among Colorado residents.

FIGURE 3: Pregnancy-Related Mortality Ratios, by Race/Ethnicity, Colorado Residents, 1990-1997*



*Data includes deaths identified by ICD-9 codes and vital statistics linking.

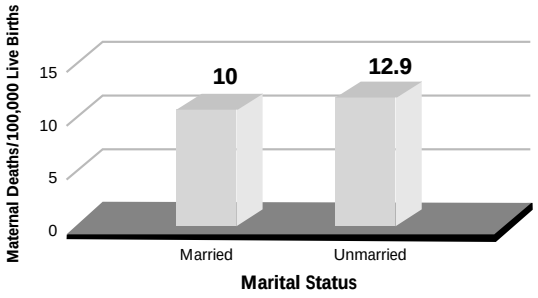
Figure 3 indicates that maternal mortality for black women is three times higher than for white, non-Hispanic women in the state. These data are consistent with national data that show an almost four-fold increase in pregnancy-related mortality among black women compared to white women (5).

In the U.S., the difference between black and white maternal mortality constitutes one of the largest racial disparities among major public health indicators. Although prenatal care decreases the risk of maternal death, issues related to health care access alone do not fully explain this disparity, as the decrease in mortality for women receiving prenatal care was greater among white than black women (5). Research has suggested that the content of prenatal care may differ for these groups of women (6, 7, 8). Black women receive "fewer services and insufficient health promotion education during their prenatal visits" (7,8). The CDC notes that further research is needed to identify key factors in black maternal mortality, because race most probably serves as a marker for social, cultural, economic and other interrelated risk factors (9).

Marital Status

The pregnancy-related mortality ratio is slightly higher for unmarried women in Colorado compared to married women, as noted in Figure 4. Nationally, the maternal death rate for unmarried women is more than two times higher than that for married women.

FIGURE 4: Marital Status, Colorado Residents, 1990-1997*

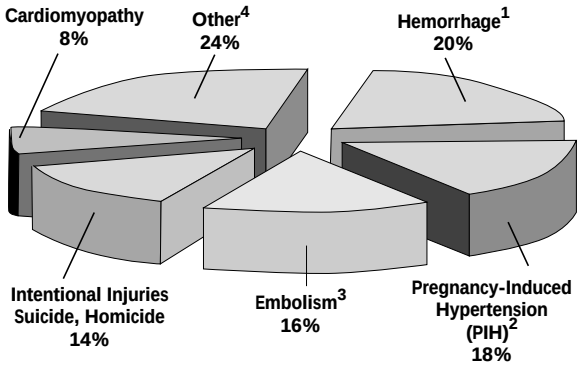


*Data includes deaths identified by ICD-9 codes and vital statistics linking.

Causes of Pregnancy-Related Mortality

Figure 5 illustrates the most common causes of pregnancy-related mortality for all pregnancy outcomes in Colorado. The top cause of pregnancy-related death in Colorado (as well as in the U.S.) is hemorrhage. Pregnancy-induced hypertension (PIH) which includes deaths due to pre-eclampsia/eclampsia and HELLP syndrome, ranks second in Colorado and third nationally. Embolism is the third most common cause in Colorado, ranking second in the United States.

FIGURE 5: Causes of Pregnancy-Related Mortality, Colorado Residents, 1990-1997†



†Data include deaths for all pregnancy outcomes, identified by ICD-9 codes and vital statistics linking.

1 includes hemorrhage from ruptured ectopic pregnancy, coagulopathies, uterine rupture, postpartum hemorrhage
2 includes pre–eclampsia, eclampsia and HELLP Syndrome
3 includes pulmonary embolism, thromboembolism and amniotic fluid embolism
4 includes cardiac disease, cancers, pulmonary disease, metabolic problems, collagen disease, infection, etc.

Interestingly, in Colorado, expanding surveillance through vital statistics linking has facilitated the identification of a number of deaths resulting from intentional injury (suicide or homicide). In each of these cases, the pregnancy was determined to have initiated the chain of events that led to the maternal death. Out of all maternal deaths due to intentional injury, five out of seven involved the use of firearms. Domestic violence was a recurrent theme, along with a history of depression and/or postpartum depression in the decedent. In the majority of these cases, based on the documentation available, it did not appear that women were consistently screened and counseled about domestic violence and generalized depression. In addition, the Colorado Maternal Mortality Review Committee was unable to determine if these women received anticipatory guidance about postpartum depression. The medical record did not consistently note whether those with a history of domestic violence or depression were referred to or were able to access mental health or counseling resources.

Similarly, for the period 1997–1998, the Colorado Pregnancy Risk Assessment Monitoring System (PRAMS)[b] noted that 5–6 percent of women experienced physical abuse from any person, including the husband or partner before pregnancy, with 3–4 percent reporting physical abuse during pregnancy. Of note, slightly under 30 percent of postpartum women, surveyed during 1997–1998, stated that their health care providers talked to them about physical abuse during the course of their prenatal care (11).

A total of 17–18 percent of PRAMS respondents reported being moderately to very depressed during the postpartum period while 1–2 percent of those were depressed enough that they "had to get help." Approximately 67 percent of respondents during the two-year period noted that their prenatal or delivery care provider discussed postpartum depression (11).

Cardiomyopathy is the fifth most common cause of pregnancy-related death in Colorado. Pregnancy-related deaths from cardiomyopathy are often not identified since half of all deaths from this cause occur after 42 days postpartum, the traditional end of the postpartum period. Use of the CDC's criteria for defining maternal death up to one year

b The Colorado Pregnancy Risk Assessment Monitoring System (PRAMS) is an on-going population-based surveillance system designed to supplement vital records data and generate state-specific data for planning and assessing perinatal health programs. Each month, a random sample of postpartum women are surveyed about a variety of perinatal health issues.

postpartum along with expanded surveillance through vital statistics linking has enabled the Colorado Maternal Mortality Review Committee to identify these deaths and include them in maternal mortality statistics for Colorado.

Preventability

The CDC estimates that over half of all maternal deaths could be prevented with existing interventions (1). Similarly, in Colorado, among those cases where also preventability could be determined, half were also considered to be preventable. The Colorado Maternal Mortality Review Committee groups prevention strategies into several broad categories: health care provider education, referral or resource issues, client or community education, systems issues, and cultural or legislative issues.

Prevention Strategies

Prevention strategies to decrease pregnancy-related death in Colorado include:

Health Care Provider Education/Resolution of Resource or Referral Issues

- Assuring that high risk conditions are promptly diagnosed and managed. In response to the number of deaths resulting from pregnancy-induced hypertension and HELLP Syndrome, the Colorado Maternal Mortality Review Committee developed an educational videotape for health care providers about HELLP Syndrome. In addition, review of several deaths resulting from breast cancer underscored the importance of assuring that all pregnant women have a thorough clinical breast exam at the initial prenatal and 4–6 week postpartum visit, even if they have had a breast exam within the last year.
- Addressing lifestyle and behavioral risks at the routine prenatal visit. Prenatal and postpartum care providers should screen all pregnant women for generalized and/or postpartum depression. Those women with a positive history should be referred to appropriate resources for mental health care/counseling. They should be followed closely to ascertain that these services have been accessed. Pregnant women should also be screened for domestic or intimate partner violence. Those women with a positive history should be referred appropriately.
- Accurate completion of the death certificate. A newsletter article has been distributed through the professional medical societies in Colorado reminding health care providers to note on the death certificate whether or not pregnancy contributed to the cause of death. National revisions of the death certificate, which should be implemented in 2003, include fields for indicating if the decedent was pregnant at the time of death or within a year prior to the death. More accurate reporting by providers along with proposed changes in the death certificate will lead to better identification of pregnancy-related mortalities in Colorado, allowing the development of strategies for prevention.

Client/Community Education

- Increasing awareness among the general population about maternal mortality. Consumers should be better informed about pregnancy-related complications such as pregnancy-induced hypertension and HELLP Syndrome as well as signs and symptoms of ectopic pregnancy. Increasing awareness among childbearing-age women, as well as the general population, about mental health issues such as depression, including postpartum depression, and domestic violence is also important.

Systems Issues

- Advocating for insurance coverage for multi-disciplinary approaches to prenatal care. Broader access to social work/mental health consultation during pregnancy and the postpartum period could assist women in dealing with domestic violence and depression. Reimbursement of services to assist women suffering from mild-moderate postpartum depression may prevent more serious sequelae.

Cultural Issues

- Identifying the reasons why maternal mortality is so high among black women in Colorado. The Colorado Department of Public Health and Environment has begun to examine health disparities among various populations in the state. Studying reasons why pregnancy-related mortality is so high among black women in Colorado is a high priority.

Summary

While maternal mortality decreased dramatically in Colorado and the nation during the 20th Century, maternal mortality ratios in Colorado and the United States continue to exceed the Healthy People 2010 goal of 3.3 maternal deaths per 100,000 live births. In Colorado, the pregnancy-related mortality ratio is 7.1 deaths per 100,000 live births using ICD-9 codes, and 11.4 using ICD-9 codes and vital statistics linking to identify maternal deaths. Older women, black women and unmarried women experience higher mortality rates than their counterparts. The most common causes of pregnancy-related death in Colorado are hemorrhage, pregnancy-induced hypertension and embolism. Expanding surveillance through Vital Statistics linking has identified a number of maternal deaths resulting from intentional injury, specifically homicide and suicide.

The Colorado Maternal Mortality Review Committee has determined that approximately half of all pregnancy-related deaths in Colorado are preventable. Health care providers, along with childbearing-age women, payors, and the community at large must join together to employ appropriate prevention strategies to decrease the incidence of maternal death in Colorado.

References

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Supported in part by Project H28-MC-00006-01 from the Maternal and Child Health Bureau (Title V, Social Security Act), Health Resources and Services Administration, Department of Health and Human Services.