January 1996
Vol. 2, No. 1

Family Health Dataline

IN THIS ISSUE:

- Women who gave birth to an infant who died during 1992-94 had less prenatal care than the overall population of women giving birth in Alaska during 1992.
- Among women who gave birth to an infant who died, the highest rates of inadequate prenatal care were identified in young mothers and those with chart documentation of prepregnancy alcohol drinking.
- The infant mortality rate due to extreme prematurity or low birthweight declined 52% from 1979-80 to 1991-92.
- All of the decrease in mortality due to extreme prematurity or low birthweight occurred because of increased survival of premature or low birthweight infants rather than a decrease in the premature or low birthweight birth rate.
- Alaska Natives, blacks, and teenage mothers have significantly higher mortality rates due to extreme prematurity or low birthweight because of higher premature or low birthweight birth rates.

In this issue we present a description of the Alaska Maternal-Infant Mortality Review (MIMR) Process and an evaluation of data from this project regarding pregnancy related risk factors and prematurity.

The MIMR Process

The MIMR review team

The MIMR review team consists of representatives from the Section of Maternal, Child, and Family Health (MCFH), the Bureau of Vital Statistics, and the Division of Family and Youth Services; private physicians, nurses, and other medical providers; and medical and programmatic staff from the Alaska Area Native Health Service (Indian Health Service) and the Regional Native Health Corporations.

Identification of an infant death

The MIMR review team attempts to identify infant deaths through several sources.

- Deaths occurring outside the hospital and of questionable etiology are referred to one of the state coroners. The state coroners in turn call an Infant Death Hotline located at MCFH.
- The Bureau of Vital Statistics matches the death and birth certificates for any infant under one year of age and sends this information to the MIMR program.
- MIMR staff read the newspaper obituaries section to identify infant deaths.

Collecting data for each infant death

Multiple data sources are used to create a complete picture of the circumstances leading to an infant's death.

- **Birth and death certificates.** We collect information from matched birth and death certificates including date and time of death, number of prenatal visits, trimester prenatal care began, birthweight, and APGAR scores.
- **Infant medical records.** A standard abstraction tool is used to collect information from hospital and clinic records on the immediate neonatal circumstances as well as subsequent illnesses, clinic or emergency room visits, hospitalizations, treatments and immunizations, and a clinical summary of events immediately preceding death.
- **Maternal medical records.** A standard abstraction tool is used to collect information on the mother's medical history, previous pregnancy history, and prenatal course. If the number of prenatal care visits or the trimester prenatal care visits were initiated is not available from the birth certificate, this information is collected from the maternal medical record.
- **Autopsies.** Infants who die outside of the hospital usually have an autopsy. Autopsies are performed on infants who die in the hospital less frequently. A standard abstraction tool is used to collect information on the gross anatomic, organ specific, and microscopic findings.

- **Family interviews.** MIMR staff offer a home interview, administered by a public health nurse, to the familes of infants who died outside of the hospital. Information collected through the home interview includes family demographic data, maternal reproductive history and pregnancy planning, prenatal care and delivery history (including payment methods for these services), family life circumstances, infant health care, and the immediate circumstances of the infant's death.

The review process

Three steps constitute the review process.

- **Monthly mortality reviews.** Each month, a representative sample of committee members from various disciplines, including physicians, nurses, administrative staff, and public health program managers meet to review the information collected for each infant. The committee determines a consensus cause of death and identifies potentially modifiable contributing factors to the infant's death.

- **Data entry and analysis.** Information from the various sources, including the monthly mortality reviews, is entered into a computerized database and analyzed by the MIMR chairman and a pediatric epidemiologist.

- **Yearly MIMR committee meetings.** Once each year, committee members meet to discuss findings, identify problems with the review process and develop consensus recommendations.

Findings and Recommendations

General

The MIMR committee has reviewed 121 deaths: we reviewed 43 of 92 deaths which occurred during 1992, 45 of 90 deaths which occurred during 1993, and 33 of an unknown number of deaths which occurred during 1994. During 1992, we included only deaths which occurred from June forward. Failure to review a death was most commonly due to lacking complete records for a particular infant. This in turn usually resulted from a failure to obtain maternal prenatal records from the Alaska Native Health Service: 96%, 97%, and 66% of incomplete charts during 1992, 1993, and 1994, respectively, were for Alaska Native children. Home interviews were offered only for children who died outside of the hospital setting. To date, 24 interviews have been completed, 8 women declined an interview, 8 women have moved and could not be located, and 44 interviews are pending.

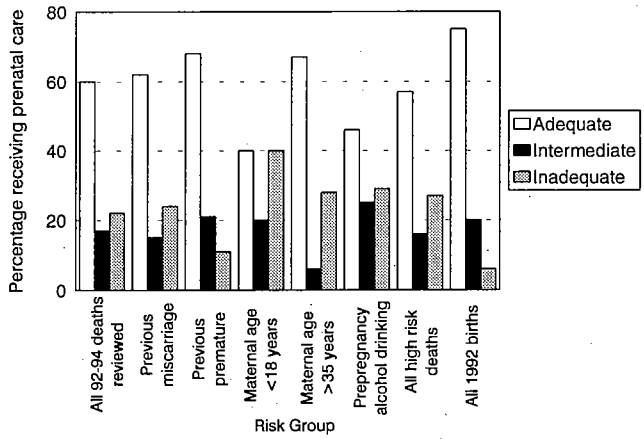
Pregnancy related risk factors

Findings

Among the cohort of mothers who gave birth to the 121 infants who died, 20% had chart documented evidence of alcohol consumption during the three months before pregnancy, 4% were younger than 18 years and 9% were older than 35 years, 16% had at least one previous preterm birth, 28% had at least one previous miscarriage, and 55% had at least one of these risk factors.

We used the Kessner Index to define adequacy of prenatal care. Women who gave birth to an infant who died during 1992-94 had less prenatal care than the overall population of women giving birth in Alaska during 1992 (Figure 1), particularly in the inadequate prenatal care category. Women in our study with risk factors identifiable before pregnancy - such as maternal age, substance use history, and previous adverse pregnancy outcomes - received no greater prenatal care than the general cohort of women. The highest rates of inadequate prenatal care were identified among young mothers and those with chart documentation of prepregnancy alcohol drinking.

Figure 1. Adequacy of prenatal care for 121 infants who died during 1992-94 by various risk groups; for comparison adequacy of prenatal care for all 1992 births is also included.



Recommendations

Identification of women with a high risk of adverse pregnancy outcomes and enrollment of these women into prenatal care programs theoretically contributes to lower rates of premature delivery and hence lower infant mortality rates[1]. Unfortunately, research has failed to document the effectiveness of this approach[2,3]. Researchers may have failed to document the efficacy of prenatal care because they measured the quantity rather than the quality of prenatal services. For example, prenatal care programs connected with substance use, nutrition, domestic violence, and financial assistance services may more effectively decrease adverse pregnancy outcomes than prenatal care programs which focus only on the physical aspect of pregnancy. Additionally, recent research indicates that identification and treatment of bacterial vaginosis during pregnancy may reduce the incidence of preterm delivery[4]. Finally, recent

research suggests that premature birth clusters in families[5], a finding supported by our data. This emphasizes the importance of early identification and monitoring of women who have had previous preterm births or who were born preterm themselves.

Based on our findings, the MIMR committee recommends:

- **Encouraging innovative approaches designed to increase prenatal care and to link prenatal care with other services. Health care providers should identify pregnant women at high risk for domestic violence, substance abuse, poverty, and pregnancy related infections AND refer them for appropriate services.**
- **Identifying and closely monitoring women who have had a previous preterm birth or who were born prematurely themselves.**
- **Using the Pregnancy Risk Assessment Monitoring System (PRAMS)[6] to determine barriers to prenatal care.**

Prematurity and Low Birthweight

Findings

From 1979-80 to 1991-92, the infant mortality rate due to extreme prematurity or low birthweight (defined as an infant born at less than 1000 g or less than 28 weeks gestation, who dies before 28 days of life, and who did not die of SIDS, trauma, congenital anomalies [except pulmonary hypoplasia], or cancer) declined from 2.9 to 1.7 per 1000 live births per year (chi-square for trend = 9.6, p=0.002) a decline of 52% (Figure 2).

A decline in mortality rate due to low birthweight or prematurity can occur for two reasons: a decline in the proportion of infants born with extreme prematurity/low birthweight or a decrease in the proportion of infants born with extreme prematurity/low birthweight who die. The proportion of infants born with extreme prematurity/low birthweight who died decreased from 44% during 1979-80 to 26% during 1991-92 (chi-square for trend, 9.1; p=0.003) (Figure 3). During the same time period, the rate of extremely premature/low birthweight births did not change.

Compared to whites, the risk ratio for mortality due to extreme prematurity/low birthweight among Alaska Natives was 1.23 (95% confidence interval [CI], 0.95 to 1.58) and among blacks was 2.96 (95% CI, 2.09 to 4.21). All of the increase in mortality for Alaska Natives and blacks resulted from higher extreme prematurity/low birthweight birth rates. Compared to whites, Alaska Natives had a risk ratio of 1.62 (95% CI, 1.42, 1.86) and blacks had a risk ratio of 3.31 (95% CI, 2.72 to 4.04) for delivering an extremely premature or low birthweight infant.

Compared to mothers 20-29 years of age, the risk ratio for mortality due to extreme prematurity/low birthweight among mothers less than 20 years of age was 1.84 (95% CI, 1.37 to 2.47) and among mothers 30 years or older was 1.09 (95% CI, 0.86 to 1.39). All of the increased risk for younger mothers occurred because of an increase in the extreme prematurity/low birthweight birth rate: compared to mothers 20-29 years of age, mothers less than 20 years had a risk ratio of 1.84 (95% CI, 1.37 to 2.47).

Figure 2. Mortality rate due to extreme prematurity or low birthweight; Alaska, 1979-92

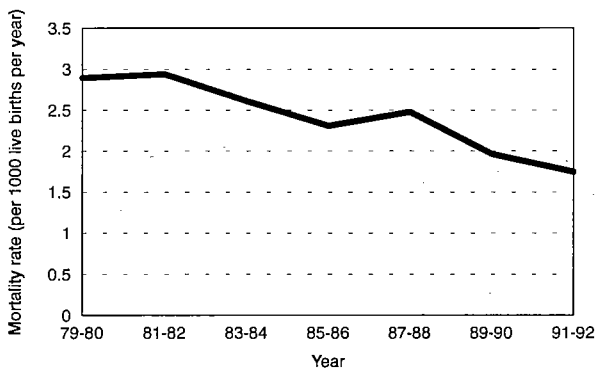
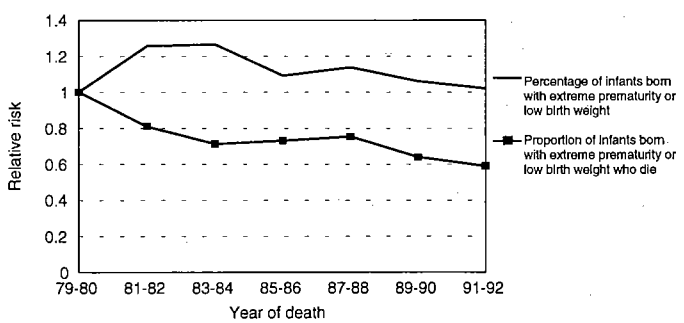


Figure 3. Using 1979-80 data as baseline, the relative risk by year for the percentage of infants born with extreme prematurity or low birth weight, and the proportion of infants born with extreme prematurity or low birthweight who die; Alaska, 1979-92



Recommendations

The cause of prematurity and low birthweight remains one of the most perplexing problems of medical research. As indicated by our data, advances have occurred in the survival of babies born with extreme prematurity or low birthweight, primarily through technology advances such as mechanical ventilation, surfactant therapy, nutritional and fluid support, and infection control. Unfortunately, no improvement has occurred in decreasing the number of children born with

prematurity or low birthweight, a trend found throughout the country[7]. Thus prematurity and low birthweight continue to cause a disproportionate amount of neonatal mortality in the U.S.[8].

In Alaska distinct racial differences exist among mortality rates due to extreme prematurity/low birthweight. These differences reflect differences in the rate of premature delivery rather than differences in survival. Similar to findings in the rest of the United States, blacks had increased rates of extreme premature/low birthweight delivery. Additionally, younger mothers had increased rates of extreme premature/low birthweight births, a result recently documented in Utah[9].

Based on our findings, the MIMR Committee recommends:

- **Directing efforts primarily toward decreasing the rate of preterm/low birthweight birth, rather than emphasizing postnatal care.**
- **Focusing efforts to decrease the rate of preterm/low birthweight birth on specific high risk groups such as blacks, Alaska Natives, and teenage mothers.**

Submitted by:
Bradford D. Gessner, M.D.

References

1. Kiely JL, Kogan MD. Prenatal care. In: Wilcox LS, Marks JS eds. From data to action: CDC's Public Health Surveillance for Women, Infants, and Children. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, 1995:105-118.
2. Bryce, R. The epidemiology of preterm birth. In: Kiely, M ed. Reproductive and Perinatal Epidemiology. Boca Raton, FL: CRC Press, 1991:437-444.
3. Rowley DL. Framing the debate: can prenatal care help to reduce the black-white disparity in infant mortality? JAMWA 1995;50:187-193.
4. Hauth JC, Goldenberg RL, Andrews WW, DuBard MB, Copper RL. Reduced incidence of preterm delivery with metronidazole and erythromycin in women with bacterial vaginosis. N Eng J Med 1995;333:1732-6.
5. Wang X, Zuckerman B, Coffman GA, Corwin MJ. Familial aggregation of low birth weight among whites and blacks in the United States. N Eng J Med 1995;333:1744-49.
6. Family Health Dataline, Section of Maternal, Child, and Family Health, Alaska Division of Public Health. May, 1995; Vol 1, No 2.
7. National Center for Health Statistics. Health, United States, 1992. Hyatsville, MD: Public Health Service. 1993.
8. Wise PH, Wampler N, Barfield W. The importance of extreme prematurity and low birthweight to US neonatal mortality patterns: implications for prenatal care and women's health. JAMWA 1995;50:152-55.
9. Fraser AM, Brockert JE, Ward RH. Association of young maternal age with adverse reproductive outcomes. N Eng J Med 1995;332:1113-7.

Family Health Dataline **is a monthly publication of the Alaska Department of Health and Social Services; Division of Public Health; Section of Maternal, Child, and Family Health, 1231 Gambell Street, Anchorage, AK 99501, (907) 274-7626 (fax) 277-6814.**

Section Chief ..... Karen Pearson
Editor/Unit Manager ..... Brad Gessner
Staff ..... Kathy Perham-Hester
Design/Layout ..... Kaye Saxon
Printing ..... Continuous Printing of Alaska

Vol. 2, No. 1

Family Health Dataline
State of Alaska, MCFH
1231 Gambell Street
Anchorage, Alaska 99501

Address Correction Requested

BULK RATE
U.S. POSTAGE
PAID
ANCHORAGE, AK
PERMIT NO. 297