

Fetal and Infant Mortality

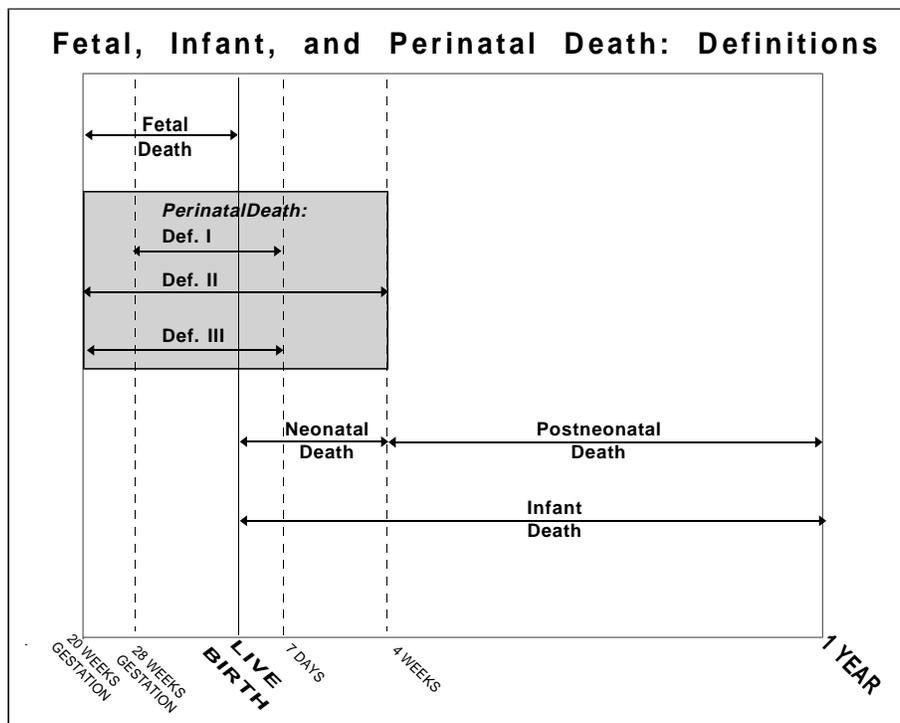
INTRODUCTION

This report presents fetal and infant mortality data spanning the period of 20 weeks gestation through one year after birth. Although fetal and infant deaths are useful in statistically describing deaths within a given time frame, their fundamental purpose is to assist in discovering and evaluating preventive strategies to improve infant health. As an aid to understanding and monitoring health trends, this report divides fetal and infant deaths into five categories, which overlap and are not necessarily mutually exclusive: (1) fetal deaths, (2) perinatal deaths, (3) infant deaths, (4) neonatal deaths and (5) postneonatal deaths, as defined by the National Center for Health Statistics (see diagram).

This report analyzes the above categories using these three databases: (1) fetal deaths, (2) infant deaths and (3) births. National publications covering the subject may use one or any combination of these databases. As a result, death rates often vary slightly depending on which cohort was used as the source of the statistical data. Throughout this report, some tables display rates and ratios based on small numbers of events; therefore, use great caution in inferring causal relationships based solely on the data contained in these tables.

DEFINITIONS AND METHODOLOGY

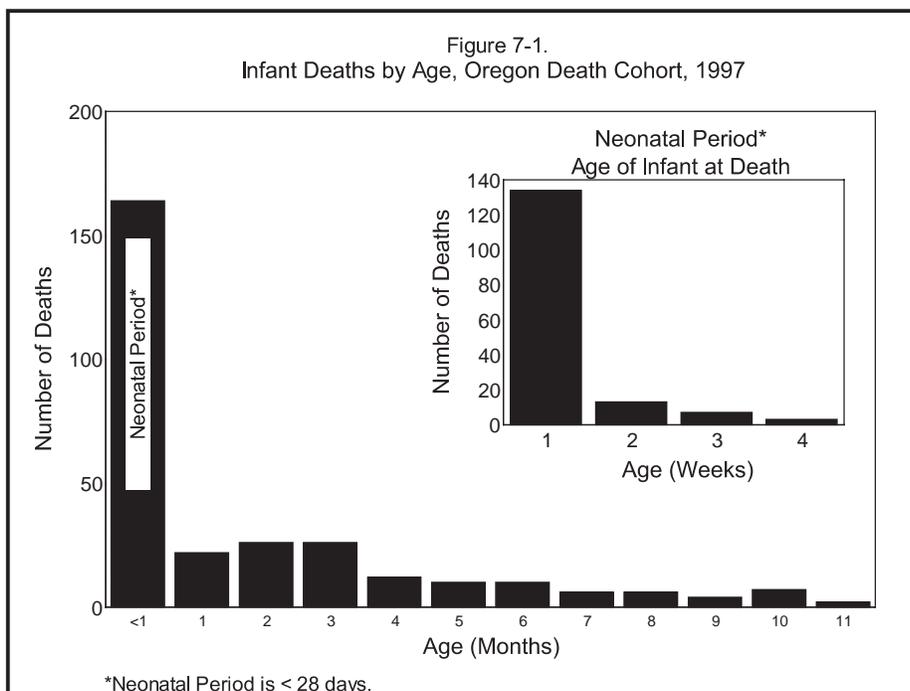
Before analyzing fetal and infant death data, it is necessary to define their different components.



- **Fetal deaths** are those that occur after 20 weeks gestation in which the developing fetus dies either in utero or upon delivery. They are classified as “early” (20-27 weeks gestation) or “late” (28 weeks gestation or more), and Oregon Public Health and Safety Laws require that they be reported.¹
- **Infant deaths** are those that occur during a child's first year (i.e., measured from birth through 364 days). Infant deaths include both neonatal and postneonatal deaths.

Neonatal deaths occur during the first 27 days of life. Neonatal deaths may be “early” (under 7 days) or “late” (7-27 days).

Postneonatal deaths occur from day 28 through day 364 after birth.
- **Perinatal deaths-definition I** includes fetal deaths at 28 weeks gestation or more, and infant deaths of less than 7 days.
- **Perinatal deaths-definition II** includes fetal deaths at 20 weeks gestation or more and deaths of infants less than 28 days.
- **Perinatal deaths-definition III** includes fetal deaths at 20 weeks gestation or more and deaths of infants less than 7 days.
- The **death cohort** for infant death includes all infant deaths that occurred in any given calendar year, regardless of birth year. In this report, the death cohort consists of those infants who died in 1997.
- The **birth cohort** for matched infant death includes all infants born in the same calendar year who die within one year of their birth. In this report, the birth cohort consists of those infants who were born in 1996, and died in either 1996 or 1997.



USE OF THE 1997 DEATH COHORT

This report uses data from the 1997 death cohort as the basis for analyzing infant deaths without maternal or birth characteristics, a standard demographic and health-status monitoring technique that yields the most timely and current information. Consistent longitudinal or historical data can be found more easily at national and local levels with a death cohort because its use does not involve matching corresponding birth records.

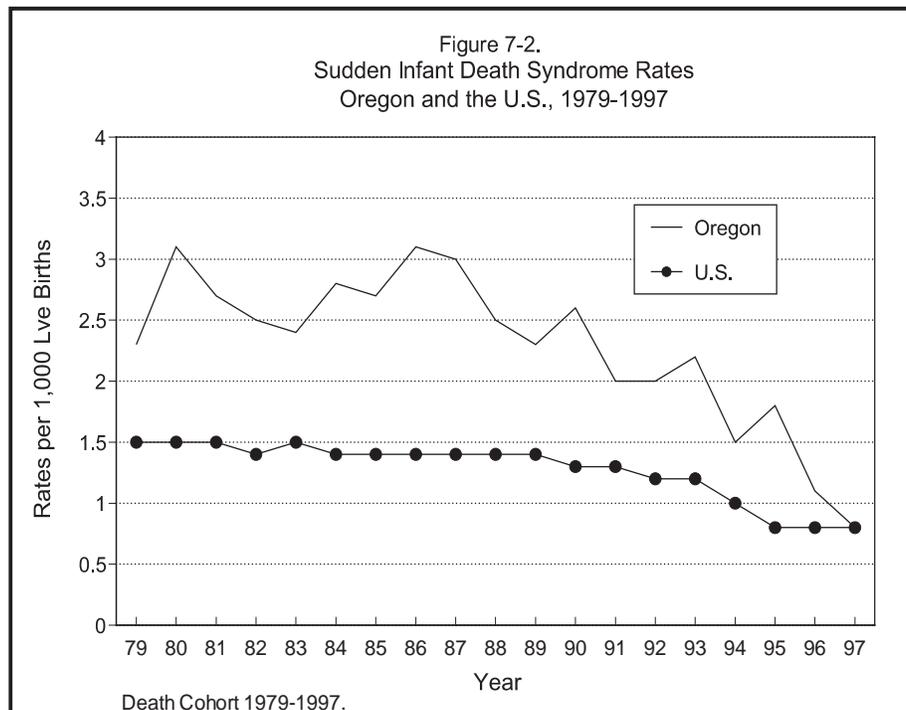
Infant characteristics at the time of death are derived from death certificates. The characteristics of most interest are age at death, county of residence at death and underlying cause of death. Total age-specific and cause-specific mortality ratios are computed by dividing the number of infant deaths in a calendar year by the number of births in the same calendar year.

INFANT DEATH: BASIC FACTS

Here are the basic statistics on infant deaths in Oregon during 1997:

- 256 infants under age one died.
- The infant death rate was 5.8 deaths per 1,000 births, an increase of 3.6% over the previous year. The increase was not statistically significant.
- Oregon's infant death rate is 19 percent lower than the 1997 U.S. rate of 7.2 per 1,000 births. [Table 5-1].

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Sudden Infant Death Syndrome

Sudden Infant Death Syndrome (SIDS) is the sudden and unexpected death of an apparently healthy infant under one year of age usually during the postneonatal period. Historically, Oregon's SIDS rate has been higher than the national rate and has been the leading cause of death among Oregon infants. [Figure 7-2].

The number of SIDS deaths dropped to 36 in 1997 from 47 deaths in 1996. In 1997, SIDS accounted for 14.1 percent of the state's total infant deaths and 34.3 percent of all postneonatal deaths. The 1997 Oregon SIDS death rate was 0.8 deaths per 1,000 live births, a 27 percent decrease from the 1996 rate of 1.1. The SIDS rate for 1997 is the lowest Oregon has recorded since the Health Division began tracking SIDS rates in 1979. [Figure 7-2].

After being 27 percent higher than the national rate in 1996, the 1997 rate of SIDS deaths in Oregon dropped to the same rate as the U.S. in 1997 (0.8 per 1,000 live births). Nationally, SIDS was responsible for 2,996 deaths in 1997 making it the third leading cause of infant mortality.² [Figure 7-2].

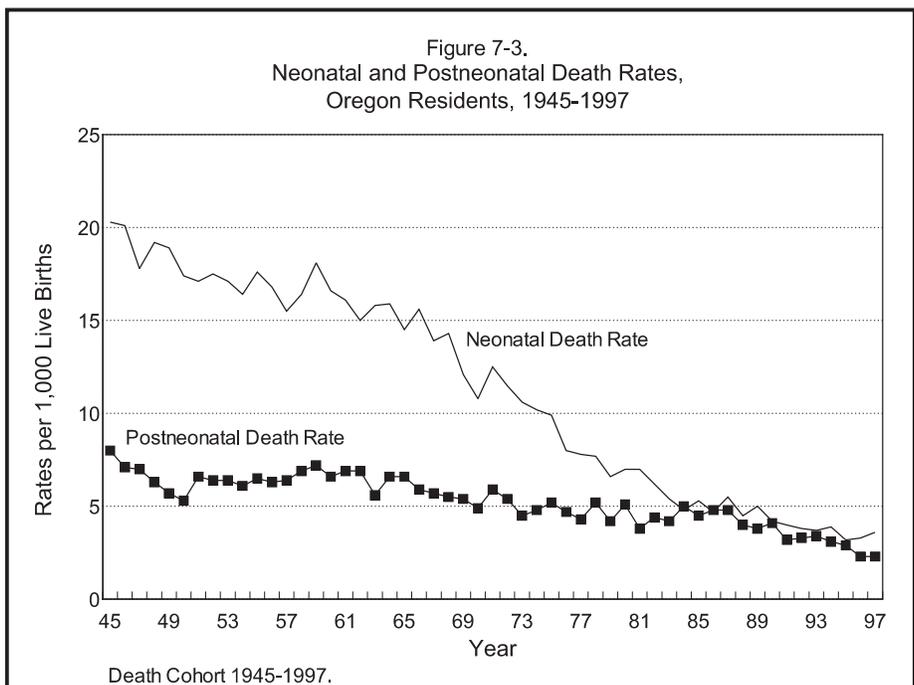
NEONATAL DEATH

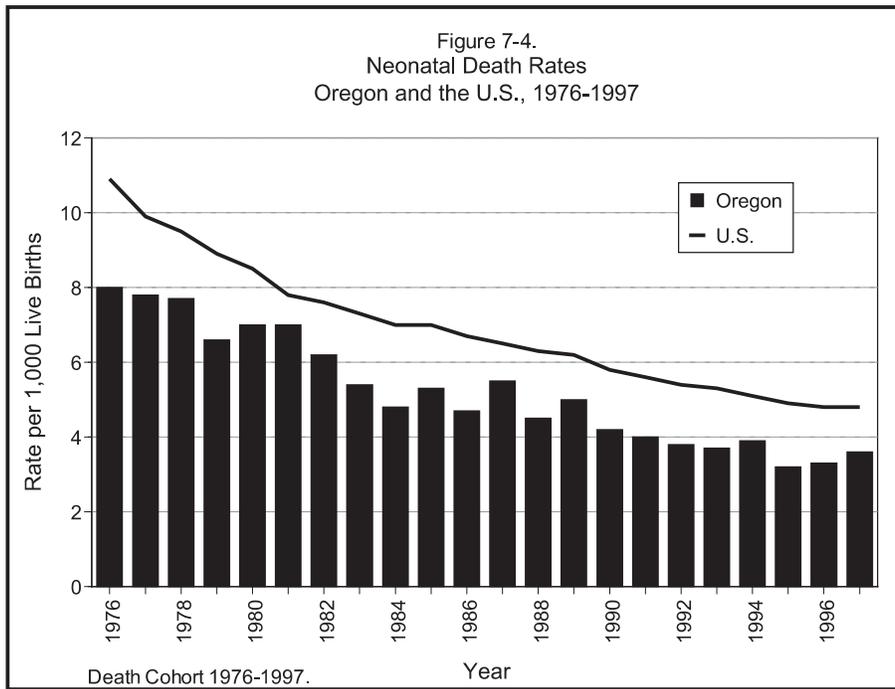
Neonatal and postneonatal death rates have been declining since 1945, when the neonatal death rate was 29.0 per 1,000 births and the postneonatal death rate was 15.0 per 1,000 births. In 1997, the neonatal death rate was 3.6 per 1,000 births and the postneonatal death rate was 2.3 per 1,000 births. [Figure 7-3].

In 1997, 157 infants died during the neonatal period, a 8.3 percent increase from the 145 deaths that occurred in 1996. Oregon's neonatal death rate has consistently been below that of the U.S. [Figure 7-4]. The 1997 rate is near Oregon's record low of 3.2 in 1995 and is 25 percent lower than the national rate of 4.8. [Tables 5-1 and 5-2]. As in previous years congenital anomalies were

Neonatal Deaths Due to Respiratory Distress Syndrome			
YEAR	NUMBER	PERCENT*	RATE **
1989	32	15.6	77.6
1990	12	6.7	28.0
1991	9	5.2	21.2
1992	7	4.1	16.7
1993	7	4.5	16.8
1994	10	6.1	23.9
1995	4	2.9	9.4
1996	5	3.4	11.5
1997	2	1.3	4.6

- Quantity is zero.
* Percent of neonatal deaths due to RDS.
** Per 100,000 live births.





responsible for more neonatal deaths (31%) than any other cause. [Table 7-2]. During the period from 1989 to 1997 the number of neonatal deaths due to Respiratory Distress Syndrome (RDS) decreased from 32 in 1989 to 2 in 1997. [Table 7-2].

POSTNEONATAL DEATH

In 1997, 99 infants died during the postneonatal period, representing 39 percent of all infant deaths. The postneonatal death rate (2.3 per 1,000 live births) is Oregon's lowest recorded rate. [Figure 7-3]. No Oregon county had a rate that was statistically significantly different from the state rate. [Table 7-1].

Oregon's postneonatal death rate has typically been higher than the U.S. rate; however, in 1997, the state rate was 4 percent lower than that of the U.S. (2.4 per 1,000 live births).³

FETAL DEATH

In 1997, there were 235 Oregon resident fetal deaths, representing a 6.9 percent decrease in the fetal death ratio from the preceding year (5.4 in 1997 versus 5.8 in 1996) (see sidebar). Fetal deaths were first reported to the Health Division in 1928, when the ratio was 29.0 for every 1,000 live births. Since then the ratio has followed a general downward trend, and has remained under 6.0 since 1992. [Figure 7-5].

Oregon's fetal death ratio has been typically lower than the U.S. ratio. In 1997, Oregon's rate was 22 percent lower than that of the U.S. (5.3 vs 6.8). [Table 5-1].

FETAL DEATH RATIOS PER 1,000 LIVE BIRTHS BY MOTHER'S AGE					
AGE	YEAR				
	1997	1996	1995	1994	1993
TOTAL	5.4	5.8	5.5	5.4	4.9
15-44	5.3	5.7	5.5	5.3	4.9
15-19	5.8	6.7	6.4	6.7	4.1
20-24	6.0	5.9	5.4	4.5	4.0
25-29	4.0	4.3	4.8	4.4	5.0
30-34	4.4	5.7	4.8	4.5	4.1
35-39	7.3	6.9	7.1	9.2	8.1
40-44	10.6	8.3	13.0	11.6	15.0

- As in previous years, most infants who died during 1997 were under 28 days old. [Figure 7-1]. More than four out of five (82%) of these neonatal deaths occurred within the first week of life.

Cause of Death

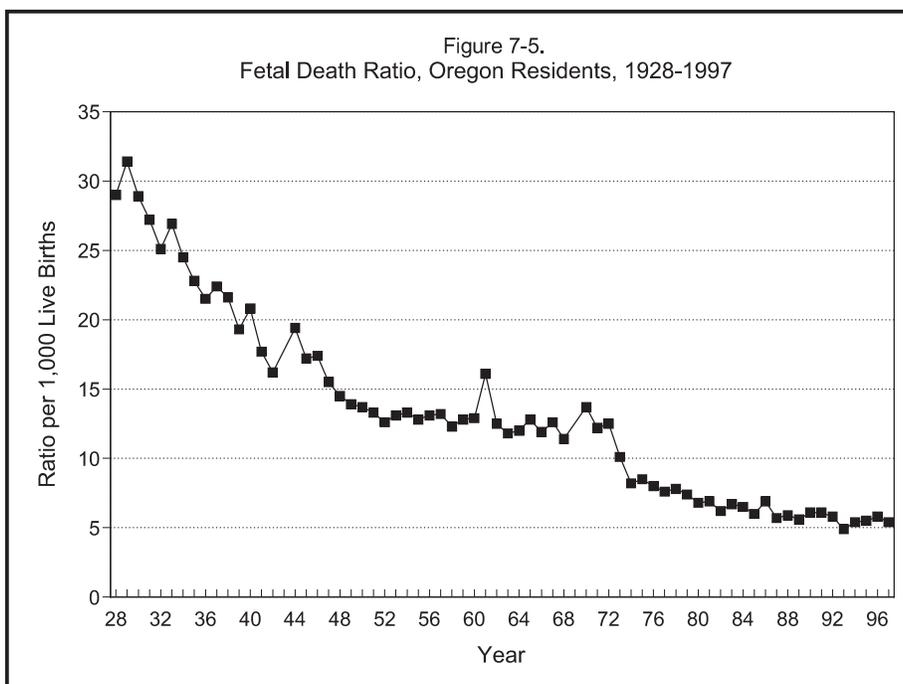
Causes of Oregon's 235 fetal deaths in 1997 are shown in table 7-4. The most frequently reported cause of fetal death in 1997 (n=104) was the residual category "other and ill defined." The second leading cause, "complications of the placenta, cord and membranes," totaled 68 deaths. Maternal complications of pregnancy with 21 deaths was third. The first three causes of death represented 82 percent of all 1997 Oregon fetal deaths. There was little change in the distribution of deaths by cause compared to previous years.

USE OF THE 1996 BIRTH COHORT

Methodology

Infant and perinatal death statistics can also be determined by use of a birth cohort, with all rates and ratios based on the number of births and fetal deaths that occurred in 1996. Because birth cohorts contain infants who die within their first year of life, some die during the following calendar year, thus requiring the inclusion of 1996 data in the 1997 report. For illustration, of the 240 deaths to infants born in 1996, 199 died in calendar year 1996 and 41 died in the calendar year 1997; only the 41 infants who died during 1997 are represented in the 1997 death cohort.

The Center for Health Statistics has produced tables containing infant and perinatal death data from the birth, fetal death, and matched infant death files. These birth cohort tables display data for infant and perinatal deaths according to several maternal risk



factors and low birthweight. Additionally, this report presents neonatal and postneonatal deaths that were matched to their corresponding birth. Thus, a birth occurring at the end of December 1996 may have a matched postneonatal death that occurred up to one year later, at the end of December 1997.

Use of a birth cohort from a matched birth and death file allows analysis of characteristics of an infant's mother during pregnancy and delivery. These are the characteristics of interest: mother's marital status, age, ethnicity, race, education, start of prenatal care, tobacco use, and alcohol use. The characteristics of the infant that are derived from the birth certificate and fetal death certificate include birthweight, gestational age, and county of residence at time of birth.

Small Numbers

Because of the small numbers of events in some of the risk-factor categories, this report uses three-year groupings of the risk characteristics to improve statistical reliability. Single-year tables displaying risk factors are also included for comparison with statistics of prior years, but the analysis of risk factors and maternal characteristics are done using only the three-year tables.

Perinatal Deaths

Beginning with data for 1979 the National Center for Health Statistics (NCHS) started publishing statistics for three perinatal definitions: Perinatal definition I, Perinatal definition II, and Perinatal definition III.³ Beginning with the birth cohort data for 1991 the Oregon Center for Health Statistics added statistics to the annual report to include the NCHS perinatal definitions. Based on feedback from Oregon physicians, Perinatal definition III was found not to be useful and was subsequently dropped from these tables. This report focuses on neonatal deaths because the relationships among the independent variables are similar to those of Perinatal definition I and postneonatal deaths. (Please refer to page 7-1 for definitions). Perinatal death statistics are included within tables 7-13 through 7-16 to assist in international comparisons of data.

NEONATAL DEATHS 1994-1996

The mothers of infants who died during the neonatal period had various characteristics that may have affected the outcome of their pregnancies. These include marital status, age, ethnicity and race, education, prenatal care, tobacco use, and alcohol use. [Table 7-16].

Birthweight

The birthweight of an infant has long been a predictor of subsequent survival. An increase in birthweight is correlated with a decrease in the risk of neonatal death. For the period 1994-1996 the neonatal death rate generally decreased by one-half or more for each subsequent 250- to 500-gram increase in weight. [Table 7-12]. Nearly all the infants weighing less than 500 grams died. The death

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rate for infants weighing less than 500 grams was 930.7 per 1,000 live births, decreasing to 1.1 per 1,000 live births for infants weighing more than 2,500 grams. [Figure 7-6].

Many of the same behavioral, social and medical conditions associated with higher rates of infant deaths are also associated with lower birthweights, and some are highly associated with one another. This report does not try to account for or hold all these variables constant in relation to each other. Instead, it presents a simple descriptive analysis. Most variables have confounding or mitigating effects on each other.

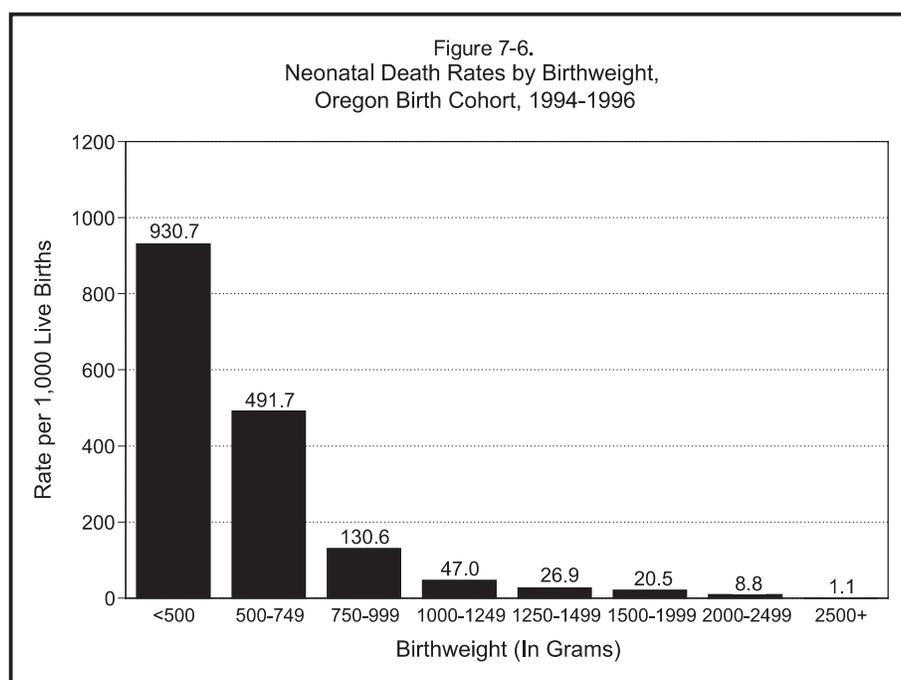
Maternal Characteristics

Though most women reported being married at the time of birth, the neonatal death rate was statistically significantly higher for unmarried women (7.6 versus 1.8 per 1,000). [Table 7-18]. Women without a high school diploma or GED had a higher neonatal death rate than women with some college (4.4 versus 2.6). [Table 7-18].

The neonatal death rate for infants of African American mothers was higher than the neonatal death rate for infants of non-African American mothers but the difference was not statistically significant (5.3 vs. 3.4 per 1,000). [Table 7-18].

Prenatal Care

Women who received any prenatal care had a statistically significantly lower neonatal death rate than women who received no prenatal care (3.3 versus 26.1 per 1,000). Among women who received prenatal care, those who began care in the first or second trimester displayed higher rates (3.3 and 3.5 per 1,000 births, respectively), than those receiving care beginning in the third trimester (2.1 per 1,000), probably due to the effect of gestational age. [Table 7-18].



Tobacco/Alcohol Use

Among women who had infants die during the neonatal period, 19 percent reported using tobacco during their pregnancy. The infants of these women had a higher neonatal death rate compared to those women who did not use tobacco (3.6 versus 3.3 per 1,000). Approximately three percent (2.9%) of the mothers whose infants died during the neonatal period reported using alcohol during their pregnancy. Women who reported using alcohol during pregnancy also had a higher neonatal death rate than women who reported no alcohol use during pregnancy (3.8 versus 3.3 per 1,000). [Table 7-18].

There may be under-reporting of alcohol and tobacco use, thereby lowering the neonatal death rates for this category by eliminating high-risk people from the analysis.

POSTNEONATAL DEATHS 1994-1996

Infants of teens 15-19 have a statistically significantly higher rate of postneonatal death than infants of women 30-34. Infants of African Americans have a statistically significantly higher rate of postneonatal death than infants of non-African American women. Infants of women who smoked during pregnancy have a statistically significantly higher rate of postneonatal death than infants of women who did not smoke. Differences in marital status and prenatal care are less disparate during the postneonatal period. [Table 7-18].

REFERENCES

- 1 Prior to November 10, 1997, fetal deaths occurring at 20 weeks of gestation or more were reported. Effective November 10, 1997, the Oregon Legislature amended ORS 423.333 to read, "Each fetal death of 350 grams or more, or, if weight is unknown, of 20 completed weeks gestation or more, calculated from the date last normal menstrual period began to the date of delivery, that occurs in this state shall be reported within 5 days after delivery to the county registrar of the county in which the fetal death occurred or to the Center for Health Statistics or as otherwise directed by the Center for Health Statistics."
- 2 Peters KD, Kochonek KD, Murphy SL. Deaths: Final Data for 1996. National Vital Statistics Reports; vol 47 no 9, supp. Hyattsville, Maryland: National Center for Health Statistics. 1998.
- 3 Hoyert, D.L. "Perinatal Mortality in the United States:1985-91." U.S. Department of Health and Human Services, Public Health Services, Centers for Disease Control and Prevention, National Center for Health Statistics, 20 (26) August 1995.