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## Rural Life Census Data Center Newsletter: Birth and Infant Mortality in South Dakota

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RURAL LIFE CENSUS DATA CENTER  
NEWSLETTER



## Birth and Infant Mortality in South Dakota

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### INTRODUCTION

The joy of birth and the sorrow of losing a newborn are profoundly personal experiences. Still, to some extent, both infant births and deaths are associated with numerous social and environmental factors. These factors include maternal health and level of access to, and quality of, health care (MacDorman and Mathews 2008). Moreover, infant mortality has been recognized as a relatively reliable marker of societal well-being (Gortmaker and Wise 1997). Therefore, it is important that we examine infant mortality rates throughout the state of South Dakota.

### SOUTH DAKOTA RESIDENTS' BIRTHS

Table 1 shows the number and percentage of live births by race in South Dakota. In 2005, there were 11,466 births in South Dakota. This was an increase of 1.1 percent from 2004. Overall, births in South Dakota increased by 4.4 percent from 1990 to 2005. In 2005, 78.3 percent of births were to whites, 18.8 percent to American Indians, and 2.8 percent to other races (percentages do not total 100 due to rounding). From 1990 to 2005, births to white women decreased 6.67 percent; births to American Indians have increased 29.2 percent; and births to other races increased 109.1 percent (table 1).

**Table 1.** South Dakota resident live births by race, 1990–2005

Year	All Births	White Births		American Indian Births		Other Births	
	Total	Total	% of S.D. births	Total	% of S.D. births	Total	% of S.D. births
1990	10,987	9,615	83.4	1,668	15.2	154	1.2
1991	10,930	9,068	83.0	1,665	15.2	132	1.4
1992	11,007	9,090	82.6	1,739	15.8	159	1.4
1993	10,718	8,822	82.3	1,720	16.0	173	1.6
1994	10,504	8,771	83.5	1,533	14.6	197	1.9
1995	10,470	8,684	82.9	1,564	14.9	221	2.1
1996	10,469	8,655	82.7	1,632	15.6	181	1.7
1997	10,168	8,412	82.7	1,538	15.1	218	2.1
1998	10,281	8,383	81.5	1,716	16.7	181	1.8
1999	10,516	8,658	82.3	1,665	15.8	192	1.8
2000	10,346	8,416	81.3	1,682	16.3	245	2.4
2001	10,475	8,469	80.8	1,770	17.0	233	2.2
2002	10,698	8,648	80.8	1,805	16.9	244	2.3
2003	11,022	8,642	78.4	2,091	19.0	289	2.6
2004	11,339	8,924	78.7	2,100	18.5	313	2.8
2005	11,466	8,974	78.3	2,155	18.8	322	2.8

Sources: South Dakota Vital Statistics and Health Status: 1990; South Dakota Vital Statistics and Health Status: 1995; South Dakota Vital Statistics and Health Status: 2000; 2005 South Dakota Vital Statistics Report.

**Table 2.** South Dakota counties with greatest number of births in 1990, 1995, 2000, and 2005

1990		1995		2000		2005	
Rank	County	Rank	County	Rank	County	Rank	County
1	Minnehaha	1	Minnehaha	1	Minnehaha	1	Minnehaha
2	Pennington	2	Pennington	2	Pennington	2	Pennington
3	Brown	3	Brown	3	Brown	3	Lincoln
4	Meade	4	Meade	4	Codington	4	Meade
5	Codington	5	Codington	5	Lincoln	5	Codington
6	Shannon	6	Shannon	6	Shannon	6	Brown
7	Brookings	7	Brookings	7	Brookings	7	Shannon
8	Yankton	8	Todd	8	Meade	8	Brookings
9	Todd	9	Yankton	9	Davison	9	Davison
10	Lawrence	10	Lincoln	10	Todd	10	Todd

Sources: South Dakota Vital Statistics and Health Status: 1990; South Dakota Vital Statistics and Health Status: 1995; South Dakota Vital Statistics and Health Status: 2000; 2005 South Dakota Vital Statistics Report.

Table 2 shows that every five years from 1990 until 2005, two counties, Minnehaha and Pennington, ranked 1st and 2nd, respectively, in the number of births. Table 2 also demonstrates that there was little variation in the rankings of the top 10 counties during the years examined.

### EXAMINING INFANT MORTALITY

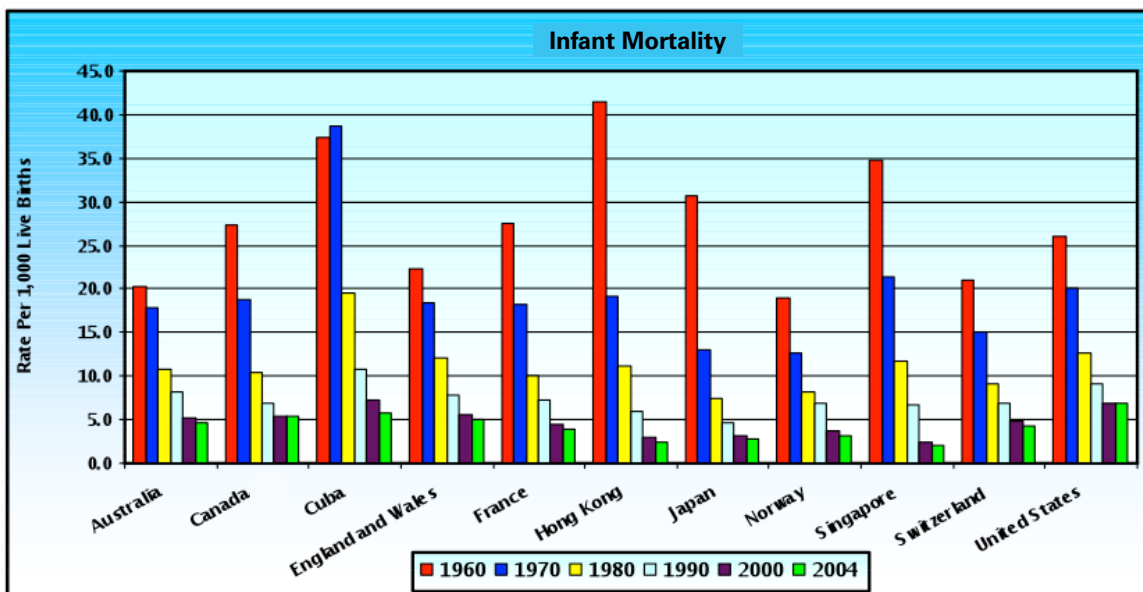
Infant mortality is defined as the death of an infant during the first year of life (Weeks 2008). A common demographic measure of this is infant mortality rate (IMR). This rate is the number of deaths of infants less than 1 year old divided by the number of live births occurring in that year. Typically, the resulting quotient is multiplied by 1,000 (Weeks 2008). Infant mortality rates have significantly declined in both the United States and in other countries since 1960 (fig. 1). Reasons

for the declines include technological advances and the availability of more sophisticated medical interventions (CBO 1992).

### INFANT MORTALITY IN THE UNITED STATES AND OTHER SELECTED COUNTRIES

Over time, infant mortality has declined dramatically in the United States and other countries. Unfortunately, the infant mortality rate in the United States still exceeds that of other countries (fig. 1). In fact, figure 1 illustrates that in the year 2004, Cuba had a lower reported infant mortality rate than the United States. The rate of infant mortality was 5.8 in Cuba, compared to 6.8 in the United States (National Center for Health Statistics 2007).

The infant mortality rate in the United States increased from 6.8 in 2001 to 7.0 in 2002 (National



**Figure 1.** Infant mortality rates of selected countries for selected years

Center for Health Statistics 2007). A Centers for Disease Control report identifies three factors that contributed to this increase; these factors were birth defects, low birth-weight, and sudden infant death syndrome (National Center for Health Statistics 2007). Together, the three factors accounted for 45 percent of all infant deaths during this time (Mathews et al. 2004).

Even though infant mortality has declined, the international rank of the United States fell from 12th in 1960, to 23rd in 1990, to 29th in 2004, with higher rankings indicating higher infant mortality rates (MacDorman and Mathews 2008). MacDorman and Mathews (2008) also recognize that there is an increasing gap between the U.S. infant mortality rate and the lower infant mortality rates for other countries. However, the United States fares better in comparison to other countries in terms of low infant birth weight. This is the primary risk factor for infant mortality.

### INFANT MORTALITY NATIONWIDE AND IN STATES NEIGHBORING SOUTH DAKOTA

Comparing South Dakota’s infant mortality rate with neighboring states reveals that there has been a substantial decline in infant mortality rates overall. However, South Dakota had a comparatively higher rate of infant mortality in 2005 than was the case for neighboring states (fig. 2). Figure 2 shows that, of the states examined, South Dakota actually had the lowest infant mortality rate in 2000, followed by Minnesota and Montana. Minnesota had the lowest infant mortality rate in 2005, followed by Iowa and Nebraska.

### DIFFERENCES IN INFANT MORTALITY BY RACE IN SOUTH DAKOTA

The infant mortality rate in South Dakota declined from 9.5 in 2004 to 7.3 in 2005 (fig. 3). Despite the dramatic drop in infant mortality overall, there are disparities in infant mortality rates between Whites and American Indians in South Dakota as can be seen in figure 3.

Between 1990 and 2005, infant mortality rates decreased from 8.4 to 6.1 for whites and 19.8 to 11.6 for American Indians (fig. 3). Unfortunately, as of 2005 South Dakota’s overall infant mortality rate of 7.3 still failed to attain the Healthy People ideal of 4.7 (MacDorman and Mathews 2008).

The differences in infant mortality rates between whites and American Indians could be due to environmental and/or socioeconomic factors. Additional risk factors such as preterm births, low birth weight, and Sudden Infant Death Syndrome (SIDS) probably account for some differences (MacDorman and Mathews 2008). In fact, national SIDS deaths among American Indians and Alaska Natives are 2.3 times the rate for non-Hispanic white mothers (Centers for Disease Control and Prevention 2007).

### EXAMINING NEONATAL MORTALITY RATES (NMR)

The IMR combines both neonatal deaths and post-neonatal infant deaths. The South Dakota Department of Health defines neonatal deaths as “deaths occurring to infants from birth through 27 days old” (South Dakota Department of Health 2005).

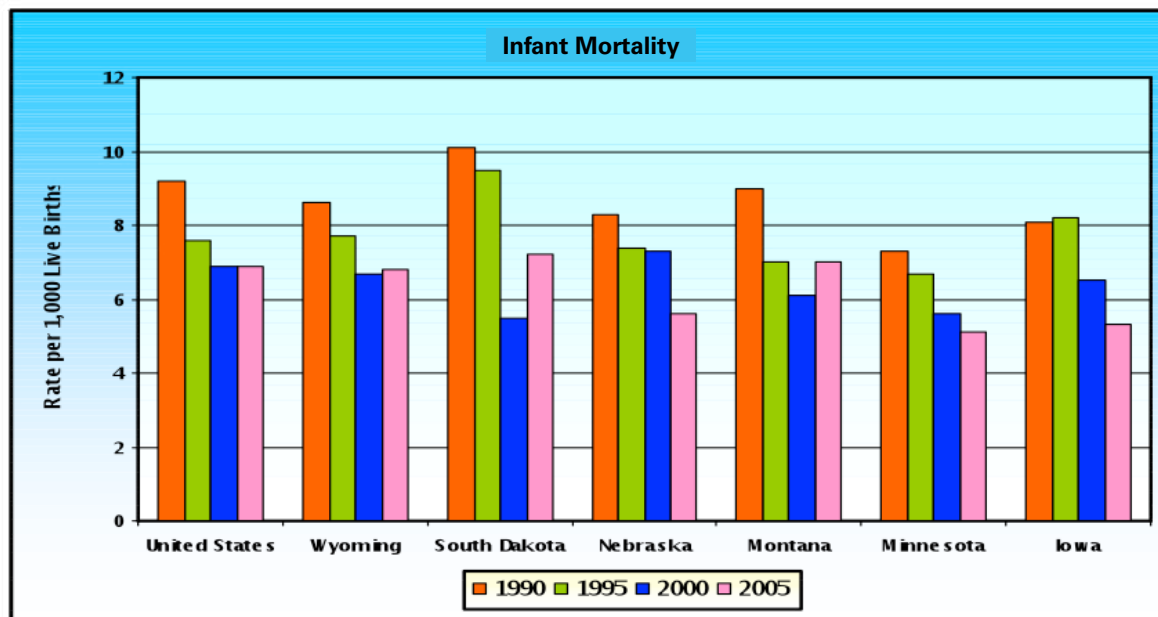


Figure 2. Infant mortality rate in the U.S., South Dakota, and neighboring states (1990–2005)

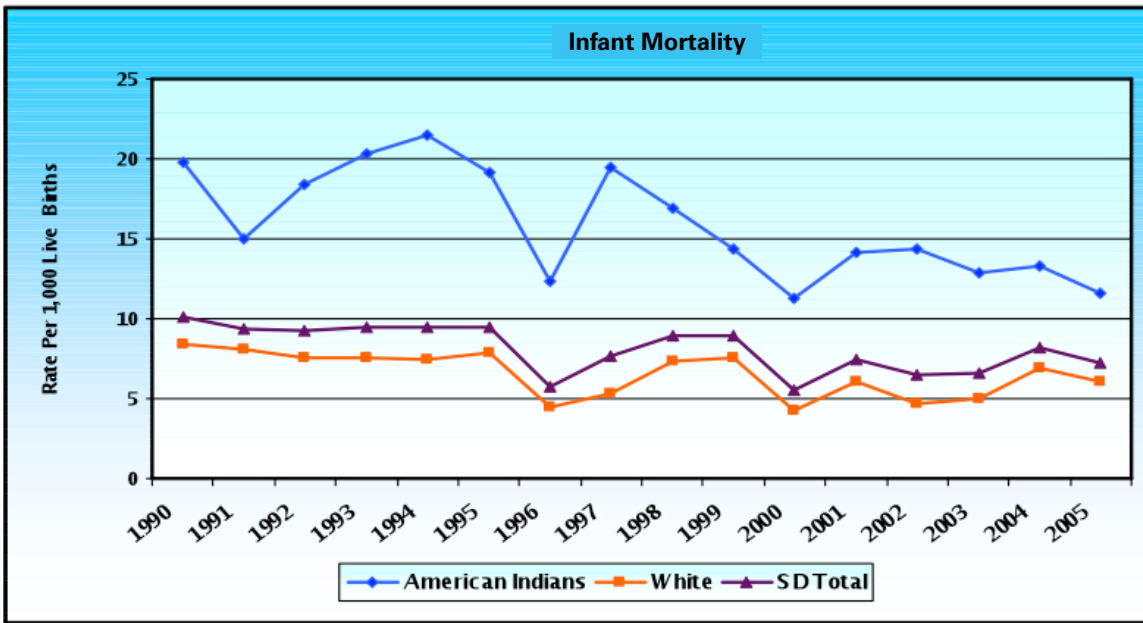


Figure 3. South Dakota infant mortality by race (1990–2005)

In the United States, neonatal deaths account for approximately two-thirds of infant deaths (Lukacs and Schoendorf 2004). Neonatal mortality primarily reflects the health status of the mother during pregnancy. A prenatal factor can be one cause of neonatal deaths (Brosco 1999). And lack of prenatal care increases the risk of neonatal deaths (Venizelos, Ananth, Smulian, Scorza, and Knuppel 2002). It's been shown that infants born to mothers who lacked prenatal care were more likely to die during the neonatal time period (Venizelos et al. 2002). Studies have shown that a mother's race influences the likelihood she would receive prenatal care.

Although neonatal deaths have decreased for both whites and American Indians in South Dakota, there still seem to be considerable disparities in NMR. Research suggests that racial disparities in neonatal deaths are due to unequal distribution in health care services and quality of care received (Din-Dzietham and Hertz-Picciotto 1998).

With the exception of the year 2005, neonatal mortality rates in South Dakota have always been lower among whites (fig. 4). Overall, South Dakota's neonatal mortality rate declined slightly from 5.3 in 2004 to 4.5 in 2005.

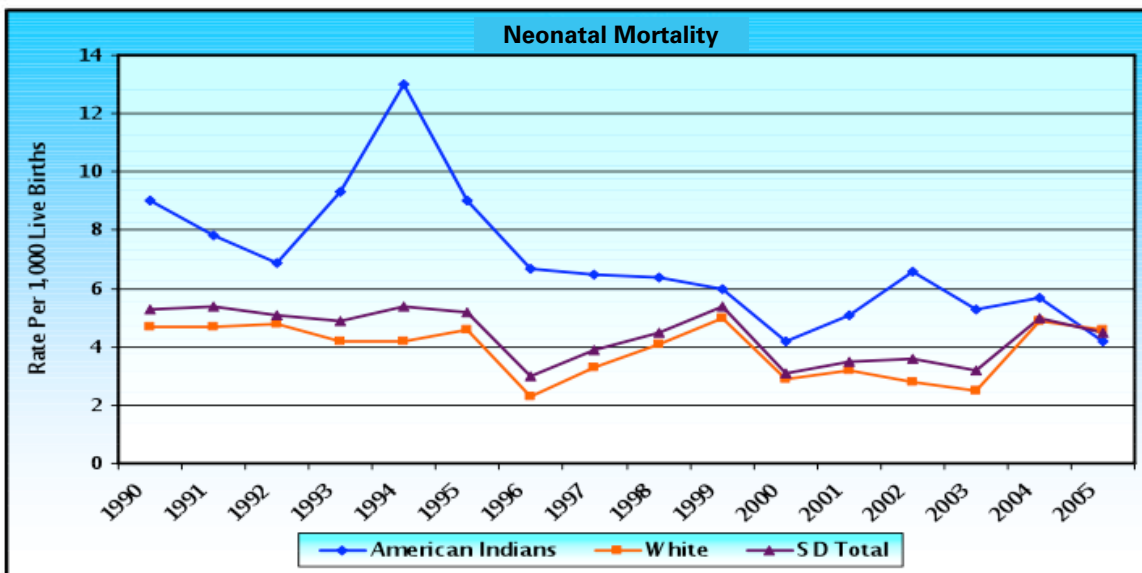


Figure 4. South Dakota neonatal mortality by race (1990–2005)

## POSTNEONATAL MORTALITY RATES (PNMR)

The South Dakota Department of Health defines postneonatal deaths as “deaths occurring to infants 28 days to 1 year of age” (South Dakota Department of Health 2005). Premature births and sudden infant death syndrome are two factors that affect the rate of postneonatal deaths (Gortmaker and Wise 2004). Moreover, multiple studies have shown racial differences in postneonatal deaths (Hessol and Fuentes-Afflick 2005; Sappenfield et al. 1987). Hessol and Fuentes-Afflick (2005) identify mother’s educational level, quality of prenatal care, and marital status as three factors, in addition to race, that affect the risk of postneonatal deaths.

In South Dakota, postneonatal deaths declined from 1990 to 2005. However, mortality statistics show that American Indian postneonatal deaths are noticeably higher than those of whites (fig. 5).

## POLICY IMPLICATIONS

Children are the future of our nation. Therefore, identifying factors affecting neonatal, postneonatal, and overall infant mortality rates is an important step that must be taken to effectively reduce the number of future adverse events. Examining sociocultural and environmental factors, including possible differences in access to good-quality medical care, pregnant women’s access to good nutrition, and social support systems between American Indians and whites might help to create more effective policies and interventions to effectively address neonatal, postneonatal, and infant mortality discrepancies.

The stark racial differences in infant mortality may also suggest a need to educate people about behaviors

that decrease the risk of infant mortality. For example, studies have shown that engaging in healthy eating behavior, such as taking folic acid and abstaining from smoking and drug use, can improve an infant’s health (O’Neill 2004).

## CONCLUSION

On the surface, births and infant deaths appear to be largely personal issues. However, each death is a result of a combination of factors, including the social, cultural, and economic conditions in which a mother and child live. Substantial declines in neonatal, postneonatal, and overall infant mortality rates in South Dakota have been observed over the past 15 years. However, this decline masks considerable disparities in rates experienced by American Indians as compared to whites. These disparities must be acknowledged through careful study and dialogue to ensure that effective steps are taken to eliminate racial differences in infant health and mortality.

If you would like more information about population trends, such as pregnancy trends, in South Dakota, contact Jacob Cummings or Mike McCurry at the Rural Life and Census Data Center. The Center’s e-mail address is [sdsudata@sdstate.edu](mailto:sdsudata@sdstate.edu), and the Center phone number is (605) 688-4899. You can also learn more by looking at our website at <http://sdrurallife.sdstate.edu/>.

A detailed description of the South Dakota Department of Health’s racial classification system can be found in their publication entitled “2005 South Dakota Vital Statistics Report: A State and County Comparison of Leading Health Indicators” (pg. 221).

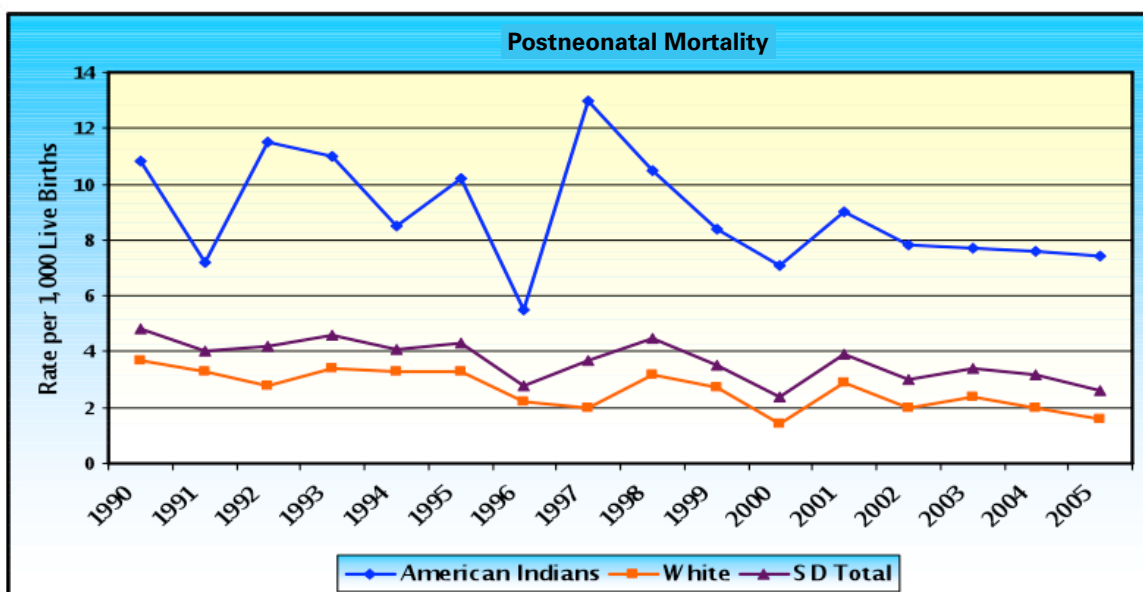


Figure 5. South Dakota post-neonatal mortality by race (1990–2005)

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**Appendix 1. Number of births and infant deaths in South Dakota counties (1990–2005)**

County	1990		1995		2000		2005	
	Total births	Number of infant deaths	Total births	Number of infant deaths	Total births	Number of infant deaths	Total births	Number of infant deaths
Aurora	32	0	26	1	33	0	24	0
Beadle	246	3	219	2	172	1	177	^
Bennett	75	0	60	0	59	0	64	^
Bon Homme	90	0	81	1	50	0	72	^
Brookings	324	1	327	0	323	1	355	^
Brown	450	4	450	3	487	3	430	4
Brule	90	0	82	1	54	0	74	0
Buffalo	42	1	43	2	29	0	55	0
Butte	111	0	128	0	128	1	118	0
Campbell	22	0	18	0	16	0	6	0
Charles Mix	162	3	192	3	142	1	154	^
Clark	53	0	63	0	40	0	36	0
Clay	137	3	153	1	175	0	139	0
Codington	340	0	398	1	370	2	387	^
Corson	83	2	59	0	97	1	93	^
Custer	65	4	74	2	51	0	85	^
Davison	254	1	245	2	246	0	293	0
Day	86	1	68	2	68	0	68	0
Deuel	64	0	52	0	44	0	51	0
Dewey	136	2	126	1	129	0	154	0
Douglas	52	1	53	0	36	0	30	^
Edmunds	53	0	50	1	36	0	42	^
Fall River	83	1	68	1	62	0	62	^
Faulk	28	0	33	0	19	0	26	0
Grant	122	1	100	2	74	2	68	0
Gregory	69	1	62	1	39	0	44	^
Haakon	22	0	37	0	22	0	20	0
Hamlin	75	0	69	0	83	0	93	0
Hand	47	0	40	0	24	0	30	^
Hanson	49	2	45	0	59	0	47	0
Harding	27	0	18	0	15	0	9	0
Hughes	241	0	243	1	197	0	227	^
Hutchinson	91	1	86	0	89	0	88	0
Hyde	25	0	19	0	18	0	15	0
Jackson	50	0	57	2	53	1	62	^
Jerauld	30	1	22	0	17	0	24	0
Jones	18	0	15	0	4	0	17	0
Kingsbury	75	0	71	0	57	0	52	0
Lake	128	4	102	2	110	0	123	0
Lawrence	280	3	249	3	214	0	239	4

Source: South Dakota Department of Health, Vital Statistics and Health Status 1990; 1995; 2000; 2005.

Note: ^ indicates less than 3 events.



**Appendix 1. (continued)**

County	1990		1995		2000		2005	
	Total births	Number of infant deaths	Total births	Number of infant deaths	Total births	Number of infant deaths	Total births	Number of infant deaths
Lincoln	212	0	252	0	367	1	687	9
Lyman	78	0	74	0	69	2	72	0
McCook	82	0	82	0	71	0	79	0
McPherson	39	0	26	1	26	0	16	0
Marshall	52	0	52	0	34	0	50	0
Meade	348	3	463	1	311	3	390	3
Mellette	44	2	45	1	29	0	40	0
Miner	40	0	31	0	34	0	31	0
Minnehaha	2,099	25	2,068	18	2,312	12	2,587	14
Moody	95	0	76	0	74	1	92	^
Pennington	1,695	14	1,325	17	1,413	14	1,564	8
Perkins	44	2	37	0	28	0	34	^
Potter	40	0	31	0	28	0	27	0
Roberts	161	1	159	1	142	0	175	0
Sanborn	36	0	30	0	30	0	21	^
Shannon	326	10	301	8	343	4	372	8
Spink	103	3	91	0	88	0	78	^
Stanley	37	1	28	1	39	0	39	^
Sully	17	0	14	0	15	0	21	^
Todd	281	2	270	7	244	1	257	^
Tripp	101	1	100	5	79	2	64	^
Turner	89	1	94	1	87	0	89	0
Union	136	0	132	1	182	0	173	^
Walworth	69	0	86	0	69	1	64	^
Yankton	292	1	256	0	240	2	242	^
Ziebach	44	3	44	2	51	1	49	^

Source: South Dakota Department of Health, Vital Statistics and Health Status 1990; 1995; 2000; 2005.

Note: ^ indicates less than 3 events.

**Appendix 2.** Birth rate, infant mortality rate, neonatal mortality rate, and post-neonatal mortality rate in South Dakota counties (2000–2005)

County	Births		Infant Deaths			
	Number	Rate	Number	Rate	Neonatal Rate	Post-neonatal Rate
Aurora	174	9.5	LNE	LNE	LNE	LNE
Beadle	1,108	10.8	5	4.5	4.5	0.0
Bennett	401	18.7	3	7.5	LNE	LNE
Bon Homme	348	8.0	3	8.6	8.6	0.0
Brookings	1,953	11.5	8	4.1	2.6	1.5
Brown	2,710	12.7	17	6.3	3.7	2.6
Brule	376	11.7	0	0	0.0	0.0
Buffalo	308	25.3	4	13	LNE	LNE
Butte	732	13.4	3	4.1	LNE	LNE
Campbell	67	6.3	0	0	0.0	0.0
Charles Mix	923	16.5	14	15.2	6.5	8.7
Clark	241	9.7	0	0	0.0	0.0
Clay	932	11.5	4	4.3	LNE	LNE
Codington	2,159	13.9	11	5.1	3.2	1.9
Corson	517	20.6	5	9.7	LNE	LNE
Custer	403	9.2	3	7.4	LNE	LNE
Davison	1,591	14.1	8	5	3.8	1.3
Day	391	10.4	4	10.2	10.2	0.0
Deuel	300	11.1	LNE	LNE	LNE	0.0
Dewey	898	25.1	11	12.2	5.6	6.7
Douglas	204	9.8	LNE	LNE	0.0	LNE
Edmunds	259	9.9	LNE	LNE	0.0	LNE
Fall River	391	8.7	LNE	LNE	LNE	LNE
Faulk	151	9.5	0	0	0.0	0.0
Grant	458	9.7	5	10.9	LNE	LNE
Gregory	243	8.5	4	16.5	LNE	LNE
Haakon	117	8.9	0	0	0.0	0.0
Hamlin	553	16.6	5	9	LNE	LNE
Hand	178	7.9	LNE	LNE	LNE	LNE
Hanson	328	17.4	LNE	LNE	0.0	LNE
Harding	77	9.5	0	0	0.0	0.0
Hughes	1,216	12.3	7	5.8	LNE	LNE
Hutchinson	504	10.4	LNE	LNE	LNE	0.0
Hyde	110	11.0	0	0	0.0	0.0
Jackson	348	19.8	5	14.4	LNE	LNE
Jerauld	132	9.6	0	0	0.0	0.0
Jones	68	9.5	0	0	0.0	0.0
Kingsbury	317	9.1	LNE	LNE	LNE	LNE
Lake	717	10.6	LNE	LNE	LNE	LNE

Source: South Dakota Department of Health, 2007. "Infant Mortality: Assessment and Strategy to Improve the Health of South Dakota Infants." Retrieved August 18, 2009, <http://doh.sd.gov/documents/SDInfantMortality.pdf>.

Note: "LNE" stands for "low number of events." This is typically used when there are less than three events of this type, because the rate or percent may be unreliable.

**Appendix 2. (continued)**

County	Births		Infant Deaths			
	Number	Rate	Number	Rate	Neonatal Rate	Post-neonatal Rate
Lawrence	1,439	11.0	11	7.6	4.9	2.8
Lincoln	3,026	20.9	17	5.6	3.6	2.0
Lyman	443	19.0	6	13.5	6.8	6.8
McCook	477	13.6	3	6.3	0.0	6.3
McPherson	141	8.1	0	0	0.0	0.0
Marshall	244	8.9	LNE	LNE	LNE	0.0
Meade	2,223	15.3	23	10.3	5.8	4.5
Mellette	211	16.9	5	23.7	LNE	LNE
Miner	167	9.7	0	0	0.0	0.0
Minnehaha	14,716	16.5	79	5.4	3.3	2.1
Moody	504	12.7	8	15.9	11.9	4.0
Pennington	8,771	16.5	71	8.1	4.2	3.9
Perkins	175	8.7	LNE	LNE	0.0	LNE
Potter	155	9.6	LNE	LNE	LNE	0.0
Roberts	910	15.1	5	5.5	LNE	LNE
Sanborn	156	9.7	LNE	LNE	LNE	0.0
Shannon	2,149	28.7	29	13.5	3.7	9.3
Spink	493	11.0	LNE	LNE	LNE	0.0
Stanley	228	13.7	LNE	LNE	LNE	LNE
Sully	122	13.1	LNE	LNE	LNE	0.0
Todd	1,548	28.5	15	9.7	2.6	7.1
Tripp	433	11.2	3	6.9	6.9	0.0
Turner	510	9.6	4	7.8	7.8	0.0
Union	1,023	13.5	5	4.9	LNE	LNE
Walworth	408	11.4	3	7.4	LNE	LNE
Yankton	1,503	11.6	10	6.7	4.0	2.7
Ziebach	268	11.7	3	11.2	LNE	LNE

Source: South Dakota Department of Health, 2007. "Infant Mortality: Assessment and Strategy to Improve the Health of South Dakota Infants." Retrieved August 18, 2009, <http://doh.sd.gov/documents/SDInfantMortality.pdf>.

Note: "LNE" stands for "low number of events." This is typically used when there are less than three events of this type, because the rate or percent may be unreliable.

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