

AT A GLANCE

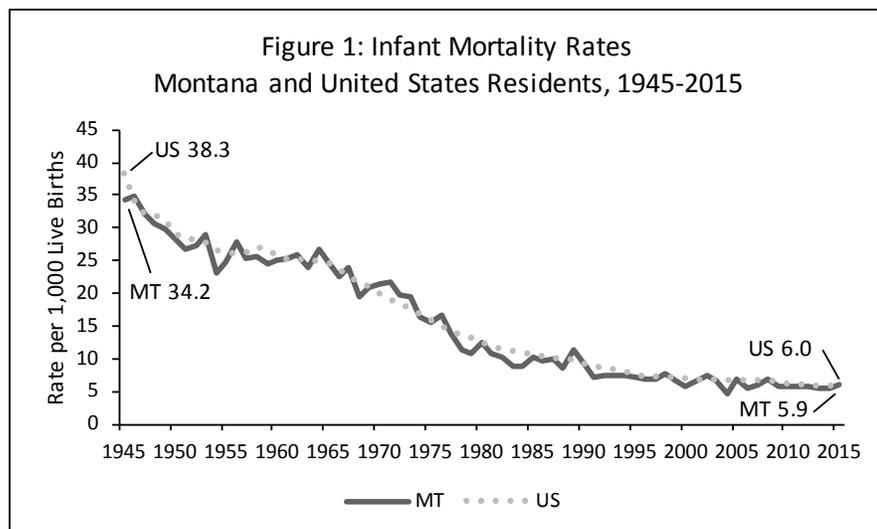
- Montana's 2011-2015 infant mortality rate was 5.7 deaths per 1,000 live births; less than the US rate of 5.9.
- The SIDS death rate was 83.0 deaths per 100,000 live births between 2011 and 2015—twice as high as the US rate of 41.7.
- Death rates from short gestation and low birthweight were 58.6 in Montana—nearly half the US rate of 104.9 deaths per 100,000 live births.

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Introduction

Infant mortality rates are defined as the number of deaths under one year of age per the number of live births in the same population. It is one of the most important measures of population health used throughout the world. Infant mortality has declined markedly since 1945 when the US and Montana infant mortality rates were 38.3 and 34.2 deaths per 1,000 live births, respectively; dropping to 5.9 and 6.0 in 2015, respectively. Despite this great achievement in public health, overall infant mortality rates have remained relatively unchanged in the past decade.¹ This report examines infant mortality and leading causes of infant death in Montana and the United States from 2006 to 2015.



Methods

Data used in this report come from the Montana death certificates collected by the Montana Office of Vital Records and were limited to Montana residents. Leading causes of death were defined using the International Classification of Diseases-10th revision with the following underlying cause of death codes: Congenital Malformations (Q00-Q99); Disorders related to short gestation and low birth weight (P07); Newborn affected by maternal complications (P01); Sudden infant death syndrome or SIDS (R95); and Accidents (V01-X59).² Rates were expressed using resident live births as the denominator and 95% confidence intervals were calculated using the Exact method for 20 or more events. United States data were obtained using CDC Wonder with its detailed mortality and birth datasets.^{3,4} These frequencies and rates may differ slightly than those obtained using CDC Wonder's Linked

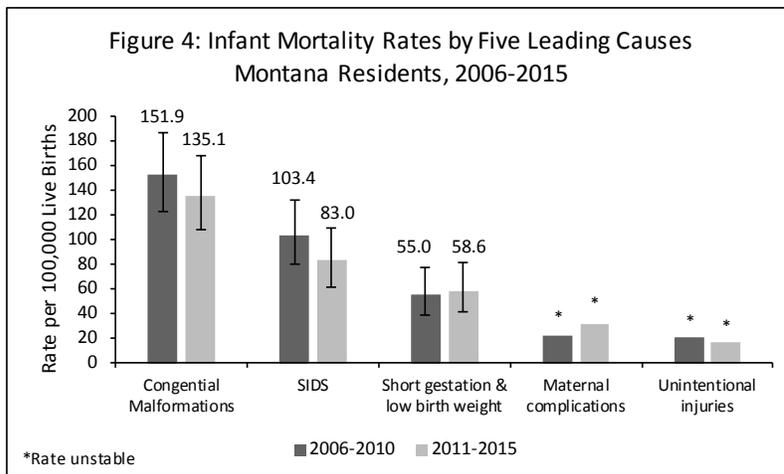
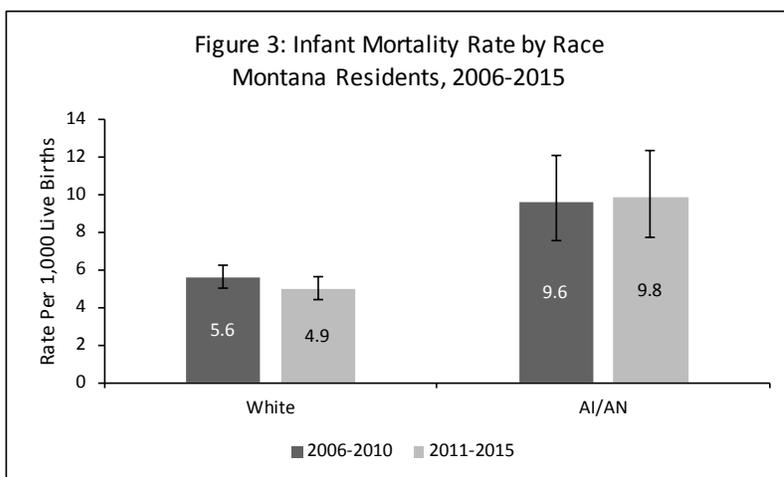
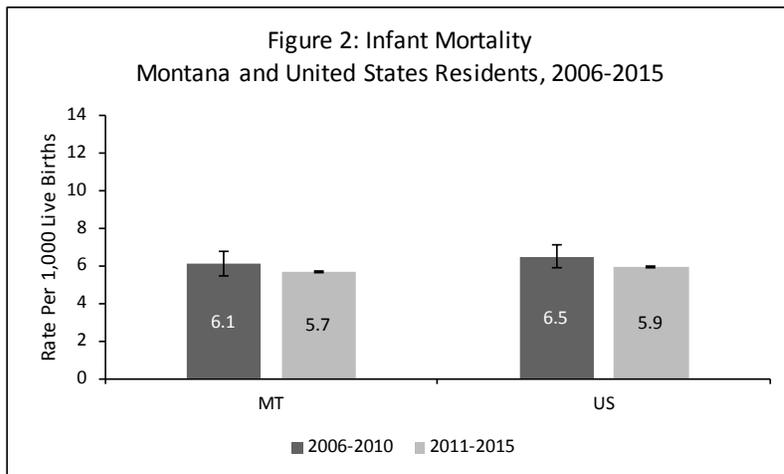
Birth/Infant death dataset. US data used to produce Figure 1 was obtained through CDC Wonder and National Center for Health Statistics publications.^{5,6}

Results

The infant mortality rate in Montana and the US both declined between 2006-2010 and 2011-2015. While the decline in deaths was greatest for the US, nine-percent compared to Montana's seven-percent, differences between the rates and year intervals were statistically the same (Figure 2).

When examining infant mortality by race, differences between whites and American Indians/Alaska Natives (AI/AN) widened slightly between time periods. Between 2011 and 2015, infant mortality was twice the rate in AI/AN compared to whites—9.8 and 4.9 deaths per 100,000 live births, respectively. While rates for both races did not differ between the time periods, infant mortality rates for AI/AN remained statistically higher during both periods of time (Figure 3).

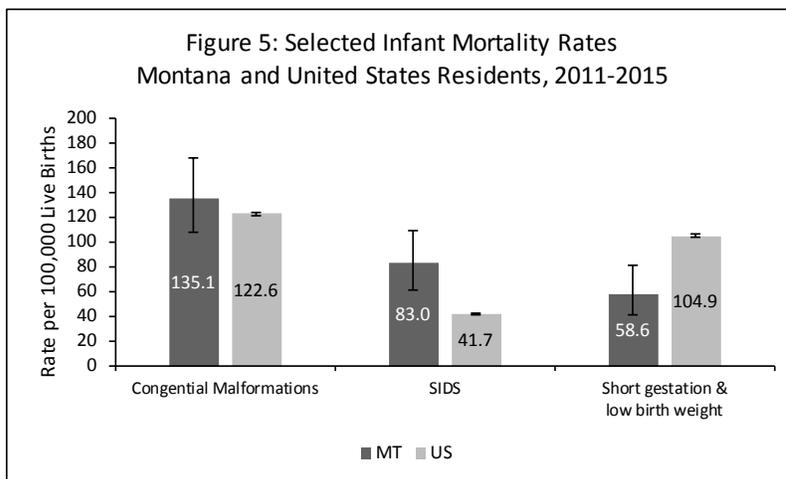
The five leading causes of infant death in Montana between 2006 and 2015 were congenital malformations (n=177), sudden infant death syndrome (n=115), short gestation and low birth weight (n=70), maternal complications (n=33), and unintentional injuries (n=23).



Trends between 2006-2010 and 2011-2015 year groups remained unchanged for congenital malformations, SIDS, short gestation and low birth weight. Rates for maternal complications and

unintentional injuries could not be calculated due to the small number of events in each year grouping (Figure 4).

When compared to national data, Montana's rate of congenital malformations was the same as the US for the most recent 2011-2015 year group, 135.1 and 122.6 deaths per 100,000 live births, respectively. The infant death rate for SIDS was 83.0 deaths per 100,000 live births in Montana and nearly twice the US rate of 41.7. Conversely, Montana's infant death rate for short gestation and low birth weight was 58.6 nearly half the US rate of 104.9 deaths per 100,000 live births (Figure 5).



Discussion

During the past decade, infant mortality rates have remained unchanged in Montana and similar to the US. The top three leading causes of infant deaths in Montana have also remained stable between 2006 and 2015 with deaths from maternal complications and unintentional injuries contribute the least to overall infant mortality. Infant deaths due to SIDS was nearly twice as high as compared to the US rate while deaths from short gestation and low birth weight were half the US rate.

Infant deaths from SIDS in Montana have remained persistently high during the 10-year study period—an average of six excess deaths per year compared to US rates. An earlier report on SIDS deaths in Montana found that bed sharing was associated with 21% of SIDS deaths. The same report also described difficulties in determining risk factors due to insufficient details in the death certificate and the absence of population level data on bed sharing in order to determine risk.⁷ Despite some of the challenges in describing the circumstances of these deaths, the US SIDS rate declined by over 50% in the decade that followed the “Back to Sleep” campaign in the mid-1990’s and has remained relatively stable since.⁸ The American Academy of Pediatrics policy statement on SIDS and other sleep-related infant deaths continues to recommend no co-sleeping, supine sleeping position for infants, cribs free of soft bedding, and firm tight fitting crib mattresses.⁹

The differences between Montana and the US for infant deaths due to short gestation and low birth weight are encouraging with Montana averaging six fewer infant deaths per year compared to the US rate. One possible explanation for these differences is that Montana has fewer births of infants with low birthweight or who are born preterm (less than 37 weeks gestation). Between 2011 and 2015, Montana's proportion of low birthweight births was 7.3% [95% confidence interval 7.06-7.49%] compared to the US rate of 8.0% [8.01-8.04%]. During the same five-year period, Montana's proportion of preterm was 9.0% [8.73-9.21%] while the US rate was 11.4% [11.42-11.45%].

Montana continues to make small reductions in infant mortality. Unfortunately significant reductions in deaths from short gestation and low birthweight are offset by equivalent increases in SIDS deaths. Further analysis utilizing linked birth/infant death certificates may be useful in determining risk and protective factors for low birthweight and preterm births in Montana.¹⁰

Public health activities in Montana to improve birth outcomes

State and local public health activities to reduce infant mortality improve birth outcomes require addressing the social, behavioral, and health risk factors that contribute to infant mortality and affect birth outcomes. These approaches include:

- Continued surveillance of maternal attitudes and experiences before, during and shortly after pregnancy through the [Montana Pregnancy Risk Assessment Monitoring System \(PRAMS\)](#).
- Investigation of fetal, infant, and child deaths by [local review teams](#). Investigation findings are used to implement evidence-based interventions to address local issues.
- Provide direct services to support health pregnancy outcomes among mothers and families through the [Healthy Montana Families](#) and the [Montana Tobacco Quit Line](#).

¹ Mathews TJ, Driscoll AK 2017. Trends in Infant Mortality in the United States , 2005 – 2014. NCHS Data Brief:1–8.

² World Health Organization. International Statistical Classification of Diseases and Related Health Problems-10th Revision 5th ed. Geneva, (CH): WHO Press; 2016.

³ Centers for Disease Control and Prevention. Underlying Cause of Death 1999-2014 on CDC WONDER Online Database; 2016 [cited July 2017]. Available from <http://wonder.cdc.gov/ucd-icd10.html>.

⁴ Centers for Disease Control and Prevention Natality public-use data 2003-2006 and 2007-2015 on CDC WONDER Online Database; 2017 [cited July 2017]. Available from <https://wonder.cdc.gov/natality.html>.

⁵ Grove RD, Hetzel AM. 1968. Vital Statistics Rates in the United States, 1940-1960. Washington DC: Public Health Service.

⁶ National Center for Health Statistics. 1993. Trends in infant Mortality by Cause of Death and Other Characteristics, 1960-88. Hyattsville.

⁷ Ballew C, Schwartz B. 2012. Sudden Infant Death Syndrome and Bed-Sharing in Montana, 2003-2010. Montana Department of Public Health and Human Services.

⁸ Carlin RF, Moon RY. 2017. Risk Factors, Protective Factors, and Current Recommendations to Reduce Sudden Infant Death Syndrome. JAMA Pediatr. 171:175–180.

⁹ APP Task Force on Sudden Infant Death Syndrome. 2016. SIDS and Other Sleep-Related Infant Deaths : Updated 2016 Recommendations for a Safe Infant Sleeping Environment. Pediatrics 138:e20162938.Death Syndrome. JAMA Pediatr. 171:175–180.

¹⁰ Buehler JW, Prager K, Hogue CJR. 2000. The Role of Linked Birth and Infant Death Certificates in Maternal and Child Health Epidemiology in the United States. Am. J. Prev. Med. 19:3–11.