

The Social Health of Nevada

Leading Indicators and Quality of Life in the Silver State

Prenatal Care and Infant Mortality in Nevada

Douglas L. Garner, University of Nevada, Las Vegas
Roger Cleveland, Eastern Kentucky University
A. Dexter Samuels, Tennessee State University
Tiffany G. Tyler, University of Nevada, Las Vegas

The U.S. outspends all other industrial countries on health care, and yet Americans hardly enjoy better health (Gorman 2010). An American baby born in 2006 can expect to live 78 years – two years less than a baby born across the Canadian border. The U.S. ranks 28th in infant mortality out of the 30 major industrial countries (Gorman 2010). A large part of the gap in infant mortality can be traced to high infant death rates in certain populations, particularly African-Americans who make up about 13% of the total population. In 2005, infant mortality for non-Hispanic blacks in the U.S. ran to 13.6 deaths per 1,000 live births compared with 5.76 deaths per 1,000 live births for non-Hispanic whites. Such disparities reflect differences in education, environment, and socioeconomic status – factors notoriously difficult to mitigate (Gorman, 2010, p. 34).

To measure the health of a nation, it is vital to evaluate maternal and child health. Multiple studies have shown that early and continuous prenatal care positively affects the mother and infants health. The United States has improved the infant mortality rate over the last century, so that over 75% of women now enter prenatal care in their first trimester. Nevada reflects this trend,

Chapter Highlights

- The three leading causes of infant mortality death in America – congenital malformations, low birth weight, sudden infant death syndrome – account for 45% of all infant deaths incidence and prevalence.
- In 1990, infant mortality rate in Nevada was 8.3 deaths per 1,000 live births, lagging behind the goals set by the Healthy People 2010.
- In 2007, 64.7% of Hispanic women received early prenatal care in Nevada, compared to 71.1% of Black women and 89.2 % of White, non-Hispanic women.

How to Cite this Report

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but we need to keep our efforts to reduce the disparities between races and ethnicities and establish a seamless system of care, including mental health and social services and increase the number of pregnant women covered financially.

Our purpose in this report is to promote the understanding that the health of mothers, infants and children is critically important, that the current health trends in the U.S. population and individual states predict the health patterns in the coming generation. After reviewing the national and local trends, we discuss the various factors affecting infant mortality and prenatal care and offer recommendations on how to decrease infant mortality and improve prenatal care in the Silver State.

National Picture

Rates, Incidence, Prevalence

The infant mortality rate is the number of deaths of infants under one year of age per 1,000 live births in a given population. The infant mortality rate in the U.S. was 6.75 infant deaths per 1,000 live births in 2007, not significantly different than the rate of 6.68 in 2006. Infant mortality rates ranged from 4.57 per 1,000 live births for mothers of Central and South American origin to 13.31 for non-Hispanic black mother (Mathews & MacDorman 2011). The rates were higher for the infants born in multiple deliveries, for the infants born to unmarried mothers, and for the infants whose mothers were born in the 50 States or the District of Columbia. Infant mortality was also higher for male infants and infants born preterm or at low birth weight.

The neonatal mortality rate was essentially unchanged from 2006 (4.46) to 2007 (4.42). The postneonatal mortality rate increased 5% in relation to overall U.S. infant mortality. Thus, more than one-half of all infant deaths in the U.S. in 2007 (54%) occurred to the 2% of infants born very prematurely (less than 32 weeks of gestation). Still, infant mortality rates for late term preterm infants (34-36 weeks of gestation) were 3.6 times, and those for early term (37-38 weeks) infants were 1.5 times, those for infants born at 39-41 weeks of gestation – the gestation age with the lowest infant mortality rate.

The three leading causes of infant mortality death in the U.S. were congenital malformations, low birth weight, and sudden infant death syndrome – these causes accounted for 45% of all infant deaths. The percentage of infant deaths that were “preterm-related” was 36.0 percent in 2007. The problem-related infant mortality rate for non-Hispanic black mothers was 3-4 times higher, and the rate for Puerto Rican mothers was 71% higher than for non-Hispanic white mothers (Mathews & MacDorman 2007).

The infant mortality rate in our country is of serious concern because the United States has fallen to the twenty-second place among industrialized nations in infant mortality rankings. This is why healthcare professionals and the public have stressed the need for better pre-natal care, coordination of health services, and the provision of comprehensive maternal-child services. Infant mortality rates have been typically highest for the babies of adolescent mothers and lowest for mothers in their 20's and

early 30's. The rates have also been high for women in their forties or older. In general, infant mortality rate decrease with increasing maternal educational levels. The infant mortality rate for unmarried mothers is often more than 8.3% higher than the mortality rate for married women. Likewise, the mortality rate is characteristically higher for infants whose mothers smoke.

Infant Mortality in Nevada

In 1991, the Nevada State Health Division, partnered with other public and private organizations to tackle the infant mortality rate and improve access to prenatal care. Outreach programs like the “Baby Your Baby” encourage women to obtain early and continuous prenatal care. The program evolved over time into the Maternal & Child Health program, and it now provides a safety net for mothers who do not have health care insurance and do not qualify for financial assistance from other programs. Thanks to these and other efforts Nevada’s infant mortality rate has been significantly reduced in the past decade. Currently Nevada ranks 12 with a value of 5.9 deaths per 1,000 live births (America’s Health Rankings 2011).

Table 1: Nevada Infant Mortality, by Maternal Race, 2007

Infant Deaths			Neonatal Deaths		
Total	White	Black	Total	White	Black
6.36	6.03	12.35	4.03	3.81	8.15

Data provided by: National Vital Statistics 2012

In 1990, infant mortality rate in Nevada was 8.3 deaths per 1,000 live births; by 1991 the number increased to 9 per 1,000 births; it is currently below the overall United States rate, although it continues to fall behind the Healthy People 2010 goal. Early access to prenatal care has been identified as critical to reduce infant mortality and improving pregnancy outcomes. Babies born to mothers with no prenatal care are more likely to be low birth-weight and having higher infant mortality rates than those who receive adequate care. In Nevada County, 22.9% of births were identified as having late or no prenatal care, in comparison 17.2% in California as a whole (see appendix D). Both of these rates are much higher than the Healthy People 2010 goal of having less than 10% of women fail to enter prenatal care during their first trimester.

Women give a variety of reasons for not accessing early prenatal care. Many simply feel that obtaining early care is not necessary, others cite financial concerns, Geographic, and language and transportation barriers are also cited as reasons for not obtaining early care. In Nevada, as in the United States, although there have been improvements, the data reveals continued disparities in ethnicity and race accessing early prenatal care.

Low health care utilization may also reflect lack of health insurance. Nevada ranks high among states in the percentage of the population lacking health insurance. There is the compounding difficulty in the Silver State posed by rapid population growth relative to the number of medical providers. There are also considerable racial/ethnic disparity, age and geographic distinctions, with Clark County showing lower scores on early and adequate care than Nevada statewide average.

In the United States, there are two different criteria used nationally to define whether or not prenatal care was adequate, one is known as Kessner Index (see Appendix B) and another as Kotelchuck Index (see Appendix C). The Kessner index identifies the criteria for adequacy of prenatal care based on the gestational age of the fetus and the number of prenatal visits made by the mother. The Kotelchuck index, which is also known as The Adequacy of Prenatal Care Utilization (APNCU) index, uses two elements obtained from birth certificate data-the initiation of prenatal care and the number of prenatal visits from the beginning of prenatal care until delivery.

Causes of Infant Mortality

Leading causes of infant mortality is congenital malformations, deformation and chromosomal abnormalities with a rate of 20.2%. Disorders related to short gestation and low birth weight was the second leading cause of death for all infants at 16.4% of all deaths. Sudden infant death syndrome (SIDS) is the third leading cause of infant death. The SIDS incidence decreased by about 9% since 1988. The fourth leading cause of death comes under the heading of newborn affected by maternal complications of pregnancy.

In 2008, data from 1990-2008 on planned home VBAC were analyzed by sociodemographic and medical characteristics for the 25 states reporting this information compared with hospital VBAC data. In 2008, there were approximately 42,000 hospital VBAC's in the United States, up from 664 in 2003 and 656 in 1990. The percentage of home births that were VBAC's increased from less than 1% in 1996 to 4% in 2008, whereas the percentage of hospital births that were VBAC's decreased from 3% in 1996 to 1% in 2008. Planned home VBAC's had a lower risk than hospital VBAC's with fewer births to teenagers, unmarried women or smokers, fewer preterm or low-birth-weight deliveries, and higher maternal education levels (MacDorman, Declercq, Mathews & Stotland 2008).

There is a difference in mortality rates amongst racial groups. The rate for blacks is 14.2 and the rate for whites is 5.8. Experts associate this difference with the minorities' access to prenatal care. Such care is expensive, and over 40 million Americans do not have health insurance. The mother's socioeconomic status is a possible contributing factor because the leading cause of death was related to congenital malformations, which in some cases can be eliminated with appropriate nutritional intake and prenatal vitamins. Lack of prenatal care is also a contributing cause of infant death (Mathews & MacDorman 2011).

Recent data showed good news for parents of teenagers. The teen birth rate declined by 30% over the past decade to historic low and the rate for black teens was down by more than 40%. For young black teens (15-17 years) the results were even more striking, as the rate was cut in half since 1991. The average age at first birth was 25.1 years in 2002, an all-time high in the United States. Birth rates for women 35-39 (41 births per 1,000 women) and 40-44 (eight per 1,000) were the highest in more than three decades. The rate for women ages 20-24 was 104 births per 1,000 women. In contrast, the rate for teens was 43 per 1,000. It is notable, also, that just over one in ten women smoked

during pregnancy in 2002, a decline of 42 percent since 1989.

Ethnic Disparities in Infant Mortality and Use of Prenatal Care

There are major disparities between races in infant death rates. The Infant Mortality Statistics from the 2007 Period Linked Birth/Infant Death Data Set provides the following data for the United States:

- In the year 2007, the overall mortality rate for all races in the U.S. was 6.75 deaths per 1,000 live births.
- African American had an infant mortality rate of 13.8.
- The American Indian infant mortality was 8.6
- Non-Hispanic Whites had an infant mortality rate of 5.8.
- Hispanics (all origins) had an infant mortality rate of 5.6.
- The Asian/Pacific Islander infant mortality rate was 4.7.

There has been a narrowing of racial disparities in early and adequate prenatal care in the United States over the past thirteen years, yet the disparities still exist (see Appendix E). A study published in the *American Journal of Public Health*, “Racial Differences in Prenatal Care Use in the United States: Are Disparities Decreasing?,” reports that the reduction in the disparities is due to a national policy’s emphasis on and commitment to the reduction of racial disparities in health outcomes and efforts to promote more culturally competent care. In an effort to promote the engagement and delivery of culturally responsive care. Tools such as the Cultural Competency Domains Model (Wakefield, Garner, Pehrsson & Tyler, 2010) can be utilized to assess levels of culturally competent health care practices.

Women give a variety of reason for not accessing early prenatal care. Many simply feel that obtaining early care is not necessary; others cite financial concerns. Geographic, language and transportation barriers are cited as reasons for not obtaining early care. In Nevada, as in the United States, the 2007 data reveals continued disparities in ethnicity and race in accessing early prenatal care, even though there are signs that the situation is improving.

- 64.7% of Hispanic women received early prenatal care in Nevada, compared to 71.1% of Black women and 89.2 % of White, non-Hispanic women.

This data is particularly noteworthy since Hispanics represent over one-third of total live births in Nevada.

Table 2: Infant Mortality (deaths per 1,000 live births)

2004	2005	2006	2007	2008
5.9	5.8	6.1	6.1	6.1

Data provided by: Center for Business and Economic Research, 2012.

Table 5: Infant Mortality

All races	White	Black
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2009	2010	2009	2010	2009	2010
6.39	6.14	5.30	5.19	12.64	11.61

Data provided by: National Vital Statistics 2012

Young maternal age has also been associated with a number of poor pregnancy outcomes including low birth weight, prematurity, and perinatal mortality. Poverty, minority status, suboptimal prenatal care, poor education, and unmarried status are more common in teenaged women compared to older mothers and are all risk factors that cause low-birth weight babies. Black race is highly correlated with morbidity and mortality among American infants. The greatest improvements in pregnancy outcomes occur when at-risk or high-risk mothers receive adequate prenatal care: however adolescents are more likely to enroll late for prenatal care and make fewer visits before delivery than mature women (see Appendix D).

Table 4: Births to Teens by Mother’s Race/Ethnicity (Percent)

Race	2004	2005	2006	2007	2008
Hispanic	49.4%	49.9%	50.6%	52.8%	51.0%
White	32.9%	30.5%	29.7%	28.3%	29.2%
Black (African American)	11.5%	12.8%	11.9%	12.8%	13.9%
Asian	3.7%	3.2%	2.3%	3.3%	3.0%
Native American	1.5%	1.7%	1.5%	1.7%	1.4%
Other/Unknown	1.0%	1.7%	4.1%	1.2%	1.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Data provided by: Center for Business and Economic Research, 2012.

Table 3: Births to Teens by Mother’s Race/Ethnicity (Number)

Race	2004	2005	2006	2007	2008
Hispanic	1,905	1,923	2,123	2,300	2,137
White	1,269	1,176	1,250	1,231	1,224
Black (African American)	444	493	500	555	581
Asian	143	124	98	143	126
Native American	56	67	63	72	60
Other/Unknown	38	67	171	53	64
Total	3,855	3,850	4,214	4,354	4,192

Prenatal Care

In the United States, there are a variety of sources that suggest a standard of practice for prenatal care delivery. The American College of Obstetrics and Gynecologists (ACOG), publishes guidelines for obstetrical care, which are accepted as the standard of practice for physicians. The American College of Nurse-Mid-wives also publish position statements regarding obstetrical care. Most of these guidelines, or protocols, are similar, and are geared toward their respective peers.

Regardless of the health care provider’s status, all have the same goal in delivering prenatal care to ensure the best care possible for both mother and babies. In the

National Collaboration Centre for Women's and Children's Health publication, Antenatal Care, routine care for the healthy pregnant woman, recommendations include:

- Pregnant women should be offered opportunities to attend antepartum classes and have written information about their care.
- At the first contact, pregnant women should be informed about the pregnancy-care services and options available, lifestyle considerations, including dietary information, as well as screening.
- Pregnant women should be informed about the purpose of any screening test before it is performed; the right of women to accept or decline a test must be made clear.
- Pregnant women should be offered evidence based information to allow them to make informed decisions, including detailed information on where they will be seen, who will provide their care, and how alternative choices are addressed.
- At each prenatal appointment mid-wives and doctors should offer consistent information along with clear explanations and an opportunity for pregnant women to discuss issues and ask questions.
- A system of clear referral paths should be established so that pregnant women requiring additional care are managed and treated by appropriate specialist teams when problems arise.
- Antenatal care should be provided by small group of care givers with whom the women feel comfortable, with the continuity of care maintained throughout the antenatal period.

As stated, it is ideal to have women begin prenatal care in her first trimester, and continue her prenatal care on a regular basis until delivery. A typical schedule for prenatal visits to a health care provider includes visits: (1) about once each month during the first six months of pregnancy, then (2) every two weeks during the next two months, and then, (3) weekly until delivery date.

The goal of prenatal care is not only to provide the best care for the pregnant woman and the unborn child, but also to prepare the mother-to-be for the delivery of a healthy baby. During the prenatal visits, tests are performed on both mother and the baby to assess any potential risks, to treat any maternal or fetal complications, and to monitor the growth and development of the fetus. In addition, counseling and guidance are provided regarding various aspects of pregnancy, including weight gain, exercise, nutrition and overall health. A typical prenatal visit may include any or all of the following:

- Weight measurement
- Blood pressure measurement
- Measurement of the uterus to check for proper growth of the fetus
- Physical examination of the mother to identify problems or discomforts (i.e., swelling of the hands and feet)
- Urine test to measure sugar and protein levels, which can indicate diabetes or preeclampsia (a condition characterized by pregnancy-induced high blood pressure, protein in the urine, and swelling due to fluid retention)
- Fetal heart rate measurement
- Prenatal screening tests (i.e., blood tests to check anemia)

In addition to these tests at each prenatal visit, additional screening tests are performed at various times during the pregnancy to rule out a variety of possible problems.

Reducing Infant Mortality and Improving Prenatal Care

The healthy People 2010 report set the following goals for standards of prenatal care and live births:

- 90% entry into prenatal care in the first trimester and early and continuous prenatal care.
- The infant mortality rate goal is 4.5 per 1,00 live births

There are several reasons why Nevada failed to meet the standards set by the Healthy People 2010, including language barriers, Geography, and transportation. Other barriers to early and continuous prenatal include educational disparities in learning about the importance of care, shortage of obstetrical providers, and unequal access to health insurance (see Appendix A). We should also mention cultural differences and perinatal depression.

There are several things that health providers and state governments can do to lower these barriers. Offering to mature or married minors confidential prenatal care, including medical visits and routine services for labor and delivery, is one sure pathway to improving prenatal healthcare delivery (Guttmacher Institute, 2012). In addition to:

- Public Education programs delivered through various mass media outlets can help women and families to understand the benefits of early and continuous prenatal care.

- Prenatal care providers should work to improve their cultural competency.
- Increasing the number of bilingual health care providers will enhance the quality of prenatal care.
- A more positive litigation and practice insurance environment must be created to reassure health care providers.
- Expanded Medicare coverage will improve the quality of care among at-risk groups.
- Positive outcomes will also increase with screening for a variety of social and mental health needs, including perinatal depression, domestic violence, transportation needs, drug/alcohol/tobacco use, and family support.
- All providers, including hospital staff, should emphasize the importance of breastfeeding for positive prenatal care outcomes.
- Nutritional counseling is one more step known to improve the quality of prenatal care.

The 2000-2007 plateaus in the U.S. infant mortality rate represents the first period of sustained lack of decline in the U.S. rate since the 1950's (see Appendix A). Although there have been positive changes in both outcomes over the past decade or so, a lot of work still lies ahead. Nevada must continue its efforts to meet the Healthy People 2010 goals. The Healthy People 2010 target goal for the U.S. infant mortality rate is 4.5 infant deaths per 1,000 live births. The current U.S. rate is 50% higher than this goal (U.S. Department of Health and Human Services, Healthy People 2010). The situation is likely to improve as collaboration between agencies increases and the public becomes more educated about the benefits of early and continuous prenatal care. While prenatal care is critical for early risk assessment, intervention, and monitoring among those at risk for adverse birth outcomes, African Americans and American Indians continue to have higher rates of infant mortality regardless of timing of initiation or prenatal care.

Policy Recommendations

The continuum of maternal and child health services from preconception through the postpartum period should be expanded. As Nevada continues to grow more ethnically and racially diverse, it is essential that health care providers receive training in, and increase their sensitivity to, cultural differences affecting the delivery of culturally competent services and practices (Garner 2011). Collaboration with managed care organizations will also help pregnant women and ensure that infants are not "lost" in systems of care.

State, county, and local governments must address mental health and social services needs of women and children. Although these needs are diverse, long term effective interventions must be identified and instituted to create a successful environment where

women are empowered to seek and obtain necessary interventions that make their lives and those of their children better.

Strategies to reduce IMRs and eliminate disparities among racial/ethnic populations should be sensitive to social factors that vary according to race/ethnicity. Such factors might include infant age at death, cause of death, mother's age and health, multiple births, low birth weight, premature births, assisted reproductive technology, prenatal visits, and access to healthcare services. To help identify root causes of high IMRs and develop new strategies for reducing IMRs, a State Infant Mortality Collaborative was formed in 2004. It includes CDC, the Association of Maternal and Child Health Programs, and teams from five states (Mathews & Keppel 2005, p. 556).

Part of the issue here is that by ascribing the problem as originating elsewhere, the majority population can excuse itself from the responsibility for finding a viable solution. In their role of responsible care providers, public health professionals must be conscious of segregation by priority and proactive in integrating the concerns of minorities into a total picture of American health. Regarding minority women's health, these responsibilities include making sure that all pregnant women receive prenatal and delivery services in adequate facilities, that all women are provided education and services to avoid unintended pregnancies, and that the causes of all preterm deliveries are discovered (Hoag & Vasquez 2002, p. 553).

Proportionally, births from unintended pregnancy decrease with increasing education. With all the attention going to adolescent pregnancy prevention, one might neglect unintended pregnancies among adults (Hogue & Vasquez 2002). Yet teenage pregnancies are only the tip of the iceberg for unintended pregnancies and not even the tip for unwanted pregnancies. About 75% of unintended pregnancies and 86% of unwanted pregnancies occur among adults (Hoag & Vasquez, 2002, p. 554).

As a part of the effort to reduce adverse birth outcomes research must be an ongoing and continuous strategy. Health and Human Services supports a wide range of medical research to prevent and treat birth defects, premature births, SIDS and other life-threatening conditions. For example: The wider use of antenatal corticosteroids to prevent premature labor and promote lung maturation-clinical practice endorsed by the National Institutes of health (NIH) Consensus Development Conference. Treatment with surfactant, discovered and developed through research supported by the National Institute of Child Health and Human Development (NICHD) and National Heart, Lung and Blood Institute (NHILBI), has also reduced deaths of premature infants from respiratory distress syndrome. NLHBI, with input from NICHD, is developing and enhanced research agenda to address key issues regarding hypertensive disorders of pregnancy, such as preeclampsia, characterized as an abnormal increase in blood pressure during pregnancy that affects 5 percent to 8 percent of pregnancies and contributes to maternal, fetal and infant morbidity and mortality. The CDC is also examining sociocultural, behavioral and environmental factors, including stress and social support, related to preterm birth among African-American women in Harlem, New York, and Los Angeles, California.

Conclusion

As MacDorman & Mathews (2009) argue, infant mortality is an important indicator of the health of a nation because it encompasses a wide range of factors such as maternal health, quality and access to medical care, socioeconomic conditions, and public health practices. While the U.S. infant mortality rate declined throughout the 20th century, more recent data shows a temporary halt in this decline in the first few years of the 21st century. The percentage of infants born prematurely and at a low birth weight continues to increase, and because infants born too small or too soon have higher mortality rates, this is bound to affect infant mortality. Large differences in infant mortality rates among racial/ethnic groups have persisted and even increased, suggesting that not all groups have benefited equally from social and medical advances (MacDorman & Mathews, 2009, p. 671).

Factors frequently mentioned as contributing to racial/ethnic differences in infant mortality include differences in maternal preconception health, infection, income, access to quality health care, stress, racism, and social and cultural factors (MacDorman & Mathews 2009). However, the influence of individual risk factors (e.g., maternal age or income) vary considerably by race/ethnicity, suggesting different disease pathways and life experiences for women of different racial/ethnic groups (MacDorma & Mathews, 2009, p. 672).

The international standing of the United States (see Appendix F) on infant mortality stems in large part from the substantial racial (Black/White) disparity in infant survival and associated socioeconomic inequality that have existed in the country for a long period (Singh & Yu 1995). Substantial differences in infant mortality among Whites, Blacks, and other racial/ethnic groups have been well documented. Considerable differences in infant mortality have also been noted in terms of such important socioeconomic variables as education and family income. Furthermore, long-term trends in U.S. infant mortality decline have not been uniform for various socioeconomic and demographic subgroups of the population and causes of infant death (Sing & Yu, 1995, p.957).

Consequently, differences in income and access to health care among racial/ethnic groups may also contribute to differences in infant mortality (MacDorman & Mathews 2009). In 2005, nearly three times as many black, American Indian, and Hispanic children as non-Hispanic white children (under 18 years of age) lived in families with incomes below the poverty level. To compound the challenge children of black, American Indian, and the Hispanic families were also much less likely than non-Hispanic white children to have health insurance (MacDorman & Mathews, 2009, p. 672).

Data Sources and Suggested Readings

American College of Obstetrics and Gynecology (ACOG), <http://www.acog.org>

American College of Nurses and Mid-Wives, <http://www.acnm.org/about.cfm>

Association of Maternal & Child Health Programs, (January 2005), *Building State Partnerships to Improve Birth Outcomes*.

CIA, The World Factbook, available at: <https://www.cia.gov/library/publications/the-world-factbook/>.

Gorman, C. (2010). "Closing the health gap." *Scientific American*, 303(4), 34-36.

Garner, D. L. (2011) Student narratives on the acquisition and practice of cultural competency: A phenomenological inquiry of counselor education students, Dissertation Study University of Nevada Las Vegas.

Guttmacher Institute (2012). *State policies in brief: Minors' access to prenatal care*. New York: Author.

Healthy People 2010, Maternal, Infant and Child Health, Centers for Disease Control and Prevention.

Kids Count Data Center/Nevada (2012). The Annie E. Casey Foundation: Data provided by the Center for Business and Economic Research.

Kessner, D. M., J. Singer, J., Kalk, C. E., Schlesinger, E. R. *Infant Death: An Analysis by Maternal Risks and Health Care*. Washington, DC: Institute of Medicine and National Academy of Sciences; 1973: Chap 2.

Kotelchuck, M. the adequacy of Prenatal Care Utilization Index: its US distribution and association with low birthweight. *Am J Public Health*. 1994 Sep; 84 (9): 1486-1489. [PMC free article] [PubMed]

UNdata: infant mortality rate (per 1000 births).

UNICEF, State of the World's Children 2003 infant mortality table.

United Health Foundation; America's Health Rankings, Nevada Infant Mortality (2011), <http://www.americashealthrankings.org/NV//MR>

U.S. Department of Health and Human Services. *Healthy People 2010*, 2nd ed. With Understanding and Improving Health and Objectives for Improving Health, 2 vols. Washington, DC: U.S Government Printing Office.

- U. S. Department of Health and Human Services, Maternal and Child Health Bureau, A *Healthy Start, Begin Before Baby's Born Website*, <http://www.mnch.hrsa.gov/programs/womeninfants/prenatal.htm>
- National Collaboration Centre for Women's and Children's Health. (Oct. 2003), *Antenatal care: routine care for the healthy pregnant woman*.
- Nevada State Health Division, Bureau of Health Planning and Statistics, 2005.
- Shi, L., Stevens, G. D., Wulu, J. T., Politzer, R. M., & Xu, J. (2004). America's Health Centers: reducing racial and ethnic disparities in perinatal care and birth outcomes. *Health Services Research*, 39(6p1), 1891-1902.
- Singh, G. K., & Yu, S. M. (1995). Infant mortality in the United States: Trends, differentials, and projections, 1950 through 2010. *American Journal of Public Health*, 85(7), 957-964.
- Mathews, T. J., & MacDorman, M.F., (2011) Infant mortality statistics from the 2007 period linked birth/infant death data set. Division of Vital Statistics, U.S. Department of Health and Human Services. Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, Hyattsville, MD.
- Mathews, T.J., et al Infant Mortality Statistics from 2007 Period Linked Birth/Infant Death Data Set Division of Vital Statistics. National Vital Statistics Report, Vol 59, No 6, June 29, 2011. Available at http://www.cdc.gov/nchs/data/nvsr/59/nvsr59_06.pdf
- MacDorman, M.F. & Mathews, T. J. (2009) The challenge of infant mortality: Have we reached a plateau? *Public Health Reports (1974-)* , 124 (5), 670-681 .
- MacDorman, M.F. Declercq, E., Mathews, T. J. & Stotland, N. (2012) "Trends and characteristics of home vaginal birth after cesarean delivery in the United States and selected states." *Obstetrics Gynecological*, April 119(4)737-44. PMID 22433337 [Pub-Med – in process].
- Rowland Hogue, C. J., & Vasquez, C. (2002). Toward a strategic approach for reducing disparities in infant mortality. *American Journal of Public Health*, 92(4), 553-556.
- Wakefield, M. A., Garner, D. L., Tyler, T., & Pehrsson, D. E. (2010). A Model for Analyzing Critical Cultural Domains in Counselor Development. *Vistas*:

Community Resources

Clark County Health District provides a variety of public health clinics throughout Clark County. Their main offices are located at 625 Shadow Lane, Las Vegas, NV. Te. 702 759-0708, <http://www.cchd.org>.

Women's Resource Center provides education and counseling to pregnant women. 2915 W. Charleston Blvd., Las Vegas, NV, 89102. Tel. 702-366-1247, www.lvwomensctr.org.

Huntridge Teen Clinic provides family planning services. 2100 S. Maryland Pkwy #5, Las Vegas, NV. Tel. 702-732-8776.

North Las Vegas Family Health Center provides Family Medicine, Women's Health, Pediatrics, D.O.T. Physicals, Occupational Health, STD/HIV Education, Family Planning, Periodic Screenings for Kids & Adults, Well-Child Care and Immunizations, Prenatal and Newborn Care, Chronic Illness Management, Health Education. 2031 McDaniel, Suite 210 , NLV, NV 89030. Tel. 702-214-5948, <http://www.nvrhc.org/northlv.htm>.

Martin L. King Family Health Center provides Family Medicine, Women's Health, Pediatrics, D.O.T. Physicals, Occupational Health, STD/HIV Education & Screening, Family Planning, Periodic Screenings for Kids & Adults, Well-Child Care and Immunizations, Prenatal and Newborn Care, Chronic Illness Management, Health Education. 1700 Wheeler Peak, Las Vegas, NV, 89106. Tel. 702-383-1961, <http://www.nvrhc.org/lasvegas.htm>.

Cambridge Family Health Center provides Family Medicine, Women's Health, Pediatrics, D.O.T. Physicals, Occupational Health, STD/HIV Education & Screening, Family Planning, Periodic Screenings for Kids & Adults, Well-Child Care and Immunizations, Prenatal and Newborn Care, Chronic Illness Management, Health Education. 3900 Cambridge Ave. #102, Las Vegas, NV 89109. Tel. 702-307-5415, <http://www.nvrhc.org/cambridge.htm>.

Prenatal Health Services

Baby Steps (University Medical Center) is a comprehensive program that provides health care for moms and their babies. Obstetricians, pediatricians, family practice doctors and certified nurse midwives are available to work with clients so both mother and baby get the care needed. 1120 Shadow Lane, Las Vegas, NV. Tel. 702-383-2229, http://www.umc-cares.org/med_serv/familyresource/babysteps.asp.

North Vista Hospital Pregnancy Center provides full obstetrical and infant care. 1409 E. Lake Mead Blvd, NLV, NV. Tel. 702-657-5510, www.northvistahospital.com.

Sunrise Pregnancy Center provides referrals to physicians and full obstetrical and infant care. 3101 S. Maryland Pkwy #315, Las Vegas, NV. Tel. 702-735-2229, www.sunrisehospital.com.

Saint Rose Dominican Hospital provides referrals to physicians and full obstetrical and infant care. 102 E. Lake Mead Dr., Henderson, NV. Tel. 702-616-4508, www.strosehospitals.org.

Babies are Beautiful is a program providing help to pregnant women who do not have health care coverage. Prenatal care, childbirth classes, referrals to community agencies and other services are provided. 700 Shadow Lane #455A, Las Vegas, NV. Tel. 702-671-8501, <http://www.valleyhospital.net/p711.html>.

University Women's Center provides prenatal care services. 2231 W. Charleston Blvd., Las Vegas, NV. Tel. 702-383-2403.

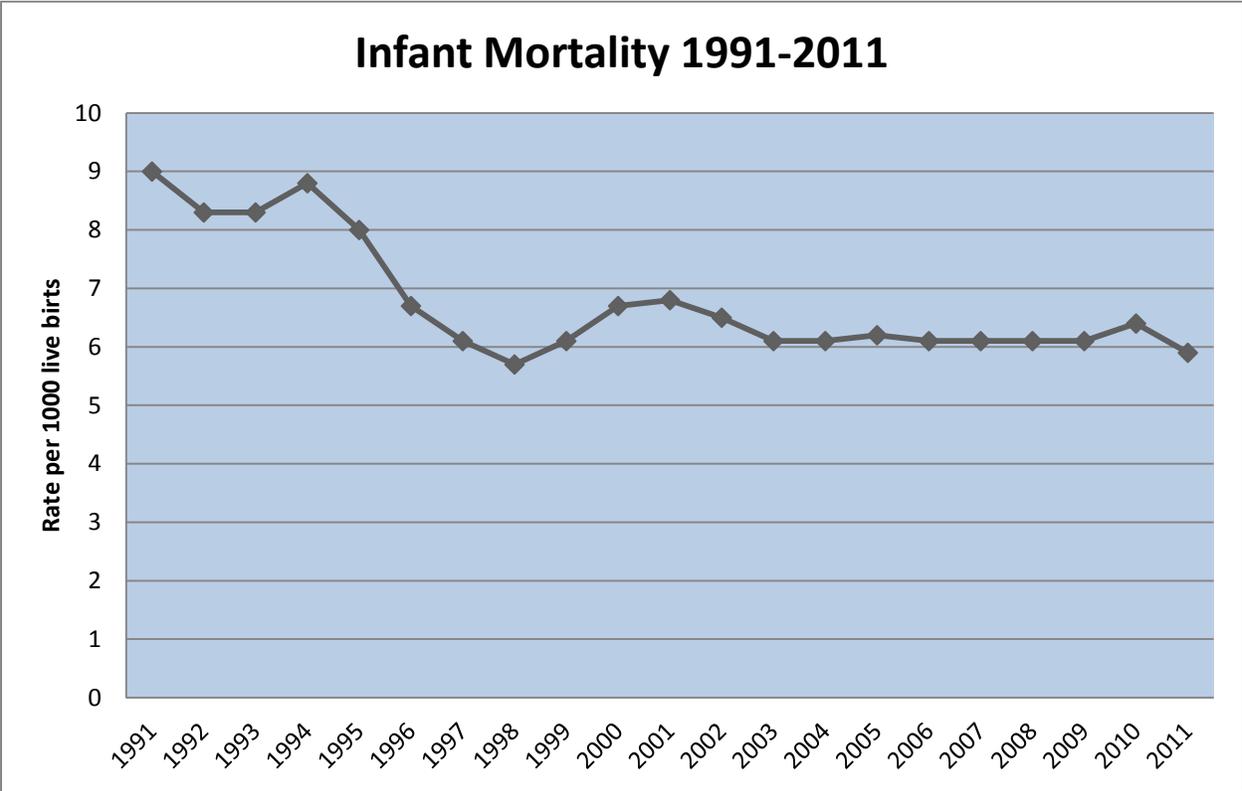
Washoe Pregnancy Center provides obstetrical care to low-income pregnant women. 975 Ryland, Suite 105, Reno, NV. Tel. 775-982-5640.

Saint Mary's Nell J. Redfield Center provides obstetrical care to low-income pregnant women. 3915 Neil Road, Reno. Tel. 775-623-5222.

HumboldtGeneralHospital, provides discounted services to low-income women. 118 E. Haskell St., Winnemucca, NV. Tel. 775-623-5222, <http://www.hghospital.ws>.

Appendices

Appendix A



Appendix B

KESSNER INDEX

ADEQUACY OF PRENATAL CARE DEFINED IN TERMS OF TIMING AND QUANTITY OF PRENATAL VISITS, ADJUSTED FOR GESTATION LENGTH

Adequacy of Number of
Prenatal Care Gestation (Weeks) Prenatal
Visits

Adequate 13 or less and 1 or more or not stated

14-17 and 2 or more

18-21 and 3 or more

22-25 and 4 or more

26-29 and 5 or more

30-31 and 6 or more

32-33 and 7 or more

34-35 and 8 or more

36 or more and 9 or more

Inadequate 14-21 and 0 or not stated

22-29 and 1 or less or not stated

30-31 and 2 or less or not stated

32-33 and 3 or less or not stated

34 or more and 4 or less or not stated

Intermediate Combinations other than those specified above or those
specified as having no care. No care Both number of
prenatal visits and month care began indicate no prenatal care.

a. In addition to the specific number of visits indicated for adequate care, the
interval to the first prenatal visit had to be 13 weeks or less (first trimester).

b. In addition to the specific number of visits indicated for inadequate care, all
women who started their care during the third trimester (28 weeks or later)
were considered to have received inadequate care.

c. For this gestation group, care was considered inadequate if the time of the first
visit was not stated.

d. When month and year are specified but day is missing, impute 15 for day.

Source: Institute of Medicine, National Academy of Sciences: Infant Deaths, An
Analysis by Maternal Risk and Health Care. In: Contrasts in Health Status, Vol.
I, 1973. Based on: The American College of Obstetricians and Gynecologists:

Standards for Obstetric-Gynecologic Services. Chicago, 1974. Internal modifications have been
made to differentiate those having "no care" from those having "inadequate" or "intermediate
care."

Appendix C

The Kotelchuck Index, also called the Adequacy of Prenatal Care Utilization (APNCU) Index, uses two crucial elements obtained from birth certificate data-when prenatal care began (initiation) and the number of prenatal visits from when prenatal care began until delivery (received services). The Kotelchuck index classifies the adequacy of initiation as follows:

- pregnancy months 1 and 2,
- months 3 and 4,
- months 5 and 6,
- and months 7 to 9,

An underlying assumption of the Kotelchuck Index is that the earlier prenatal care begins the better. To classify the adequacy of received services, the number of prenatal visits is compared to the expected number of visits for the period between when care began and the delivery date. The expected number of visits is based on the American College of Obstetricians and Gynecologists prenatal care standards for uncomplicated pregnancies and is adjusted for the gestational age when care began and for the gestational age at delivery.

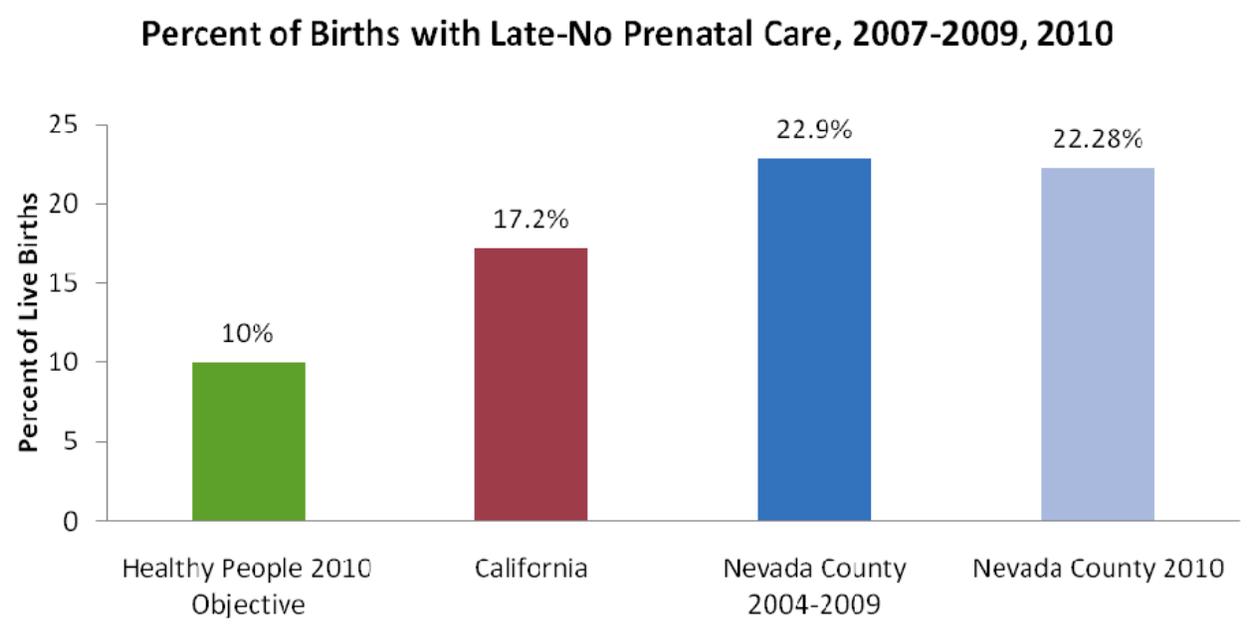
A ratio of observed to expected visits is calculated and grouped into four categories:

1. Inadequate (received less than 50% of expected visits),
2. Intermediate (50%-79%),
3. Adequate (80%-109%),
4. Adequate Plus (110% or more).

The final Kotelchuck index measure combines these two dimensions into a single summary score. The profiles define adequate prenatal care as a score of 80% or greater on the Kotelchuck Index, or the sum of the Adequate and Adequate Plus categories.

The Kotelchuck Index does not measure the quality of prenatal care. It also depends on the accuracy of the patient or health care provider's recall of the timing of the first visit and the number of subsequent visits. The Kotelchuck Index uses recommendations for low-risk pregnancies, and may not measure the adequacy of care for high-risk women. The Kotelchuck Index is preferable to other indices because it includes a category for women who receive more than the recommended amount of care (adequate plus, or intensive utilization).

Appendix D



Appendix E

Infant and Neonatal Mortality, by State and Maternal Race, 2007

State	Infant Deaths			Neonatal Deaths		
	Total (All Races)	White (Includes Hispanic)	Black (Includes Hispanic)	Total (All Races)	White (Includes Hispanic)	Black (Includes Hispanic)
Alabama	9.89	7.98	14.35	6.27	4.90	9.5
Alaska	6.51	5.20	n/a	3.17	3.03	n/a
Arizona	6.83	6.49	14.95	4.69	4.53	10.12
Arkansas	7.66	6.47	13.17	4.33	3.38	8.61
California	5.20	4.89	12.35	3.55	3.34	7.98
Colorado	6.12	5.85	13.16	4.17	4.01	8.19
Connecticut	6.63	5.90	12.07	5.06	4.46	9.41
Delaware	7.48	6.12	11.84	5.34	4.32	8.80
District of Columbia	13.09	8.52	16.61	9.70	5.87	12.60
Florida	7.05	5.52	12.21	4.42	3.53	7.47
Georgia	7.98	5.56	12.77	5.07	3.58	7.90
Hawaii	6.48	6.11	n/a	4.23	3.59	n/a
Idaho	6.75	6.59	n/a	4.52	4.46	n/a
Illinois	6.73	5.22	14.16	4.78	3.84	9.46
Indiana	7.58	6.61	15.99	4.79	4.13	10.40
Iowa	5.50	5.34	11.58	3.30	3.27	n/a
Kansas	7.93	7.03	18.98	5.00	4.49	11.63
Kentucky	6.69	6.01	12.69	4.06	3.73	7.58
Louisiana	9.17	6.14	14.08	5.35	3.49	8.37
Maine	6.30	6.33	n/a	4.46	4.54	n/a
Maryland	8.00	4.79	13.63	5.80	3.54	9.67
Massachusetts	4.93	4.54	8.76	3.42	3.11	6.12
Michigan	7.94	6.11	16.39	5.56	4.37	11.12
Minnesota	5.55	4.69	11.70	3.80	3.28	7.13
Mississippi	10.04	6.65	13.87	5.89	3.83	8.37
Missouri	7.48	5.89	16.48	4.99	3.77	11.69
Montana	6.35	5.94	n/a	3.62	3.49	n/a
Nebraska	6.76	6.12	14.04	4.86	4.38	10.53
Nevada	6.36	6.03	12.35	4.03	3.81	8.15
New Hampshire	5.36	5.34	n/a	3.25	3.31	n/a

Infant and Neonatal Mortality, by State and Maternal Race, 2007

State	Infant Deaths			Neonatal Deaths		
	Total (All Races)	White (Includes Hispanic)	Black (Includes Hispanic)	Total (All Races)	White (Includes Hispanic)	Black (Includes Hispanic)
New Jersey	5.18	4.13	11.02	3.44	2.86	6.87
New Mexico	6.27	5.99	n/a	3.89	3.88	n/a
New York	5.57	4.95	8.82	3.70	3.27	5.95
North Carolina	8.49	6.35	15.14	5.70	4.24	10.28
North Dakota	7.47	6.80	n/a	4.86	5.07	n/a
Ohio	7.69	6.34	14.81	5.18	4.21	10.20
Oklahoma	8.52	7.25	18.03	4.78	4.16	10.82
Oregon	5.75	5.70	n/a	3.95	3.93	n/a
Pennsylvania	7.56	6.12	15.07	4.98	4.12	9.45
Rhode Island	7.35	6.52	16.00	5.41	4.79	n/a
South Carolina	8.57	6.03	13.69	5.66	3.93	9.13
South Dakota	6.44	5.55	n/a	4.16	4.01	n/a
Tennessee	8.31	6.44	15.74	5.19	3.91	10.19
Texas	6.29	5.68	11.51	3.86	3.43	7.37
Utah	5.08	4.98	n/a	3.39	3.35	n/a
Vermont	5.07	4.76	n/a	3.07	n/a	n/a
Virginia	7.79	5.80	15.41	5.35	3.76	11.26
Washington	4.82	4.33	10.28	2.85	2.63	5.55
West Virginia	7.46	6.95	n/a	4.68	4.33	n/a
Wisconsin	6.46	5.37	15.18	4.03	3.56	8.34
Wyoming	7.35	6.65	n/a	3.67	3.66	n/a

*Mortality figures are presented as number of deaths per 1,000 live births. Infant mortality is defined as death during the first year of life, neonatal mortality is death during the first 28 days of life.↑

N/A: Figure does not meet standards of reliability or precision

[Source II.1: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.](#)

Appendix F

Infant Mortality Rate (Total Deaths per 1,000 Live Births) 2011

Global	41.61	
1	Angola	175.90
2	Afghanistan	149.20
3	Niger	112.22
4	Mali	111.35
5	Somalia	105.56
6	Central African Republic	99.38
7	Guinea-Bissau	96.23
8	Chad	95.31
9	Nigeria	91.54
10	Burkina Faso	81.40
11	Malawi	81.04
12	Mozambique	78.95
13	Congo (Dem. Republic of)	78.43
14	Sierra Leone	78.38
15	Equatorial Guinea	77.30
16	Ethiopia	77.12
17	Congo	76.05
18	Liberia	74.52
19	Gambia	71.67
20	Sudan	68.07
21	Tanzania (United Rep. of)	66.93
22	Zambia	66.60

Global	41.61	
23	Cote d'Ivoire	64.78
24	Rwanda	64.04
25	Pakistan	63.26
26	Swaziland	63.09
27	Comoros	62.63
28	Uganda	62.47
29	Burundi	61.82
30	Benin	61.56
31	Guinea	61.03
32	Cameroon	60.91
33	Western Sahara	60.44
34	Mauritania	60.42
35	Lao People's Democratic Rep.	59.46
36	Senegal	56.42
37	Cambodia	55.49
38	Yemen	55.11
39	Lesotho	55.04
40	Djibouti	54.94
41	Haiti	54.02
42	Sao Tome and Principe	53.21
43	Kenya	52.29
44	Togo	51.48
45	Madagascar	51.45
46	Azerbaijan	51.08
47	Bangladesh	50.73
48	Gabon	49.95

Global	41.61	
49	Myanmar	49.23
50	Ghana	48.55
51	India	47.57
52	Vanuatu	46.85
53	Namibia	45.59
54	Nepal	44.54
55	Bhutan	44.48
56	Papua New Guinea	43.29
57	South Africa	43.20
58	Turkmenistan	42.34
59	Iran (Islamic Republic of)	42.26
60	Bolivia	42.16
61	Iraq	41.68
62	Eritrea	41.33
63	Kiribati	38.89
64	Tajikistan	38.54
65	Timor Leste	38.01
66	Mongolia	37.26
67	Guyana	36.76
68	Tuvalu	34.52
69	Zimbabwe	29.50
70	Kyrgyzstan	29.27
71	Indonesia	27.95
72	Trinidad and Tobago	27.69
73	Morocco	27.53
74	Maldives	27.45

Global	41.61	
75	Korea (Dem. Peo. Rep. of)	27.11
76	Cape Verde	26.94
77	Guatemala	26.02
78	Tunisia	25.92
79	Algeria	25.81
80	Egypt	25.20
81	Micronesia (Federated States of)	24.34
82	Kazakhstan	24.15
83	Turkey	23.94
84	Marshall Islands	23.74
85	Paraguay	23.02
86	Samoa	22.74
87	Nicaragua	22.64
88	Dominican Republic	22.22
89	Peru	22.18
90	Belize	21.95
91	Uzbekistan	21.92
92	Brazil	21.17
93	Viet Nam	20.90
94	Venezuela	20.62
95	Honduras	20.44
96	El Salvador	20.30
97	Libyan Arab Jamahiriya	20.09
98	Ecuador	19.65
99	Philippines	19.34
100	Armenia	18.85

Global	41.61	
101	Solomon Islands	17.82
102	Suriname	17.61
103	Mexico	17.29
104	West Bank and Gaza	17.12
105	Bulgaria	16.68
106	Jordan	16.42
107	Colombia	16.39
107	Thailand	16.39
108	Saint Helena	16.38
109	Saudi Arabia	16.16
110	China	16.06
111	Lebanon	15.85
112	Cook Islands	15.81
113	Syrian Arab Republic	15.62
114	Oman	15.47
115	Montserrat	15.23
116	Georgia	15.17
117	Malaysia	15.02
118	Antigua and Barbuda	14.63
119	Albania	14.61
120	Jamaica	14.60
121	Saint Vincent and the Grenadines	14.27
122	Tonga	13.65
123	British Virgin Islands	13.63
124	Bahamas	13.49
125	Aruba	12.92

Global	41.61	
126	Dominica	12.78
127	Saint Lucia	12.72
128	Moldova (Republic of)	12.43
128	Palau	12.43
129	Qatar	12.05
130	Turks and Caicos Island	11.97
131	United Arab Emirates	11.94
132	Barbados	11.86
133	Seychelles	11.66
134	Panama	11.64
135	Mauritius	11.52
136	Brunei Darussalam	11.51
137	Grenada	11.43
138	Botswana	11.14
139	Romania	11.02
140	Fiji	11.00
141	Argentina	10.81
142	Bahrain	10.43
143	Russian Federation	10.08
144	Greenland	10.05
145	Sri Lanka	9.70
146	Uruguay	9.69
147	American Samoa	9.66
147	Saint Kitts and Nevis	9.66
148	Costa Rica	9.45
149	Cyprus	9.38

Global	41.61	
150	Bosnia and Herzegovina	8.67
151	Nauru	8.66
152	Macedonia (The former Yugoslav Republic of)	8.54
152	Ukraine	8.54
153	Latvia	8.42
154	Kuwait	8.07
154	Puerto Rico	8.07
155	Chile	7.34
156	French Polynesia	7.27
157	Virgin Islands (U.S.)	7.24
158	Estonia	7.06
159	Gibraltar	6.69
160	Cayman Islands	6.63
161	Slovakia	6.59
162	Poland	6.54
163	Serbia	6.52
164	Lithuania	6.27
165	Belarus	6.25
166	Croatia	6.16
167	Faeroe Islands	6.06
167	United States of America	6.06
168	Guam	5.83
169	Northern Mariana Islands	5.79
170	New Caledonia	5.71
171	Hungary	5.31

Global	41.61	
172	Greece	5.00
173	Canada	4.92
174	Cuba	4.90
175	New Zealand	4.78
176	San Marino	4.72
177	Wallis and Futuna Islands	4.67
178	Portugal	4.66
179	United Kingdom	4.62
180	Australia	4.61
181	Netherlands	4.59
182	Luxembourg	4.44
183	Belgium	4.33
184	Austria	4.32
185	Denmark	4.24
186	Slovenia	4.17
187	Korea (Republic of)	4.16
188	Liechtenstein	4.15
189	Israel	4.12
190	Switzerland	4.08
191	Ireland	3.85
192	Andorra	3.80
193	Czech Republic	3.73
194	Malta	3.69
195	Germany	3.54
196	Norway	3.52
197	Anguilla	3.47

Global	41.61	
198	Finland	3.43
199	Spain	3.39
200	Italy	3.38
201	France	3.29
202	Iceland	3.20
203	Japan	2.78
204	Sweden	2.74
205	Bermuda	2.47
206	Singapore	2.32
207	Monaco	1.79
208	Bouvet Island	(NA)
208	British Indian Ocean Territory	(NA)
208	Christmas Island	(NA)
208	Cocos (Keeling Islands)	(NA)
208	Falkland Islands (Malvinas)	(NA)
208	French Guiana	(NA)
208	French Southern Territories and Antarctic Lands	(NA)
208	Guadeloupe	(NA)
208	Heard Island and McDonald Islands	(NA)
208	Johnston Atoll	(NA)
208	Martinique	(NA)
208	Mayotte	(NA)
208	Midway	(NA)
208	Montenegro	(NA)
208	Netherlands Antilles	(NA)

Global	41.61	
208	Niue	(NA)
208	Norfolk Island	(NA)
208	Pitcairn Island	(NA)
208	Reunion	(NA)
208	Svalbard and Jan Mayen Islands	(NA)
208	Tokelau	(NA)
208	Wake Island	(NA)

Notes: A combined estimate is not available for West Bank and Gaza. West Bank's infant mortality rate is 14.92 deaths per 1,000 live births; Gaza's infant mortality rate is 17.12 deaths per 1,000 live births.

Definitions: Infant Mortality Rate: The number of infant deaths in a given year divided by the number of live births in the same year. It is expressed per 1,000 live births. Infants are defined as less than one year of age.

Sources: CIA, The World Factbook, available at: <https://www.cia.gov/library/publications/the-world-factbook/>.