

Increase in the Infant Mortality Rate in New Mexico, 2012

Since 1980, the New Mexico infant mortality rate has generally tracked below the national rate. In 2012, however, the state rate of 6.9 exceeded the most recent national rate of 6.05 (2011)¹, and was a sharp increase over the New Mexico rates of the last decade (Figure 1). This report will address whether random variation or some anomalies in the 2012 data account for the increase in the infant mortality rate in 2012.

Methods

Data from death certificates of decedents aged less than one year in 2009-2012 were linked to data from the corresponding birth certificate. Of 186 infant deaths in 2012, 183 were able to be linked back to the birth certificate, and for 443 infant deaths in 2009-2011, 432 were linked. The period infant mortality rate (IMR) is the ratio of the number of infants dying before their first birthday during a given year to the number of live births during the same year, expressed per 1,000 live births. The neonatal mortality rate (NMR) is the number of deaths that occur under 28 days of age divided by the number of live births, and the postneonatal mortality rate (PNMR) is calculated as deaths at age 28 days or greater but less than one year divided by the number of live births. The mortality rate of live born infants who survived less than one day was also calculated.

To identify specific population subgroups for which there was an increase in the IMR, NMR, or PNMR in 2012, the rates were stratified by maternal and birth characteristics available on the birth and death certificates and compared to the average annual rate for the prior three-year period (2009-2011). Incidence rate ratios (IRRs) with exact 95% confidence intervals were calculated for 2012 compared to 2009-2011 within each subgroup. The number of excess deaths for each subgroup was calculated as the number of deaths observed minus the number expected, which was calculated by multiplying the average annual rate in 2009-

Mary Shepherd, Ph.D., M.S.

Public Health Division

Camille Palmerino Clifford

Epidemiology and Response Division

New Mexico Department of Health

2011 by the number of births in 2012 and dividing by 1,000.

Results

The infant mortality rate in 2012 was 6.9 per 1,000 live births, based on 186 infant deaths and 26,992 live births. The 2012 rate was a statistically significant increase of 31% from the average annual rate of 5.3 for the prior three-year period ($p=.003$), and represents an excess of 44 infant deaths. Most of the increase occurred among infants who died before 28 days of life. The neonatal mortality rate was 4.7 per 1,000 live births in 2012, an increase of 46% from the average annual rate during 2009-2011 of 3.2 ($p<.001$), representing 40 excess deaths. Infants who survived less than one day had the largest percentage increase across the two periods. The mortality rate for neonates under one day was 2.7 per 1,000 live births, an increase of 52% from the average annual rate during 2009-2011 of 1.8 ($p=.003$), representing 26 excess deaths. The postneonatal mortality rate in 2012 was similar to that in 2009-2011, 2.2 and 2.1, respectively ($p=.64$).

The leading causes of infant death in 2012 were birth defects (25.8%), disorders related to preterm birth and low birth weight (19.4%), and undetermined and sudden unexpected infant death (16.1%). Each of these causes had an increase in 2012 compared to the prior three years. Among neonates in 2012, birth defects and disorders related to preterm birth and low birth weight each accounted for 28.6% of deaths compared to the 2009-2011 period when birth defects caused 28.3% of neonatal deaths and disorders related to preterm birth and low birth weight accounted for 22.3%.

Changes in the 2012 Birth Population

The NM birth rate has steadily declined since 2008, resulting in a changing birth population. We found the following statistically significant differences in the general birth population in 2012 compared to 2009-2011: fewer births to teenage mothers and an increase in births to mothers aged 30-34 years, fewer births to foreign-born women, an increase in births to residents of the Southeast region of the state, an increase in pre-conception and first trimester alcohol use, an increase in births to mothers with chronic conditions (hypertension, gestational diabetes, renal disease), an increase in births to women with previous poor pregnancy outcomes (preterm birth, intrauterine growth restriction, prior cesarean delivery), and an increase in mothers infected with chlamydia and Hepatitis C. Among birth outcomes during the 2012 period there was an increase in use of fertility enhancing drugs, cesarean deliveries, NICU admissions, extremely low birth weights (under 500g), and an increase in very low 5 minute Apgar scores (under 3).

Stratification by Maternal/Birth Characteristics

Demographics. By maternal age, the greatest increase in both infant and neonatal mortality in 2012 was found among teenage mothers and mothers 30-34 years of age. The IMR increased from 5.5 in 2009-2011 to 11.5 in 2012 for infants born to mothers under 18 years of age, and from 6.0 to 9.3 among infants of mothers 18-19 years of age. Thirteen excess deaths occurred among infants of teenage mothers. A larger number of excess infant deaths occurred among infants born to mothers aged 30-34 years: 18 of 44 excess deaths occurred in this age group, with the IMR increasing from 5.3 in 2009-2011 to 8.6 in 2012. Stratification by maternal race/ethnicity showed that only infants of Hispanic and White non-Hispanic women had an increase in the IMR in 2012. Hispanics had a statistically significant increase in the NMR and no increase in PNMR, while White non-Hispanics had a smaller increase in NMR and larger increase in PNMR. Nearly 90% of the excess neonatal deaths in 2012 occurred among infants of Hispanic mothers.

NM counties had a statistically significant increase in the 2012 IMR compared to 2009-2011. Bernalillo County residents had a 42% increase, from 4.8 in 2009-2011 to 6.8 in 2012, and Lea County residents had a 185% increase from 3.9 to 11.2. For deaths during the neonatal period, residents of Lea County had a statisti-

cally significant 6-fold increase in the NMR in 2012 compared to 2009-2011. The infants of women who were born outside the U.S. had a doubling of the NMR in 2012 from 2.4 to 4.7, and accounted for 10 of the 40 excess neonatal deaths.

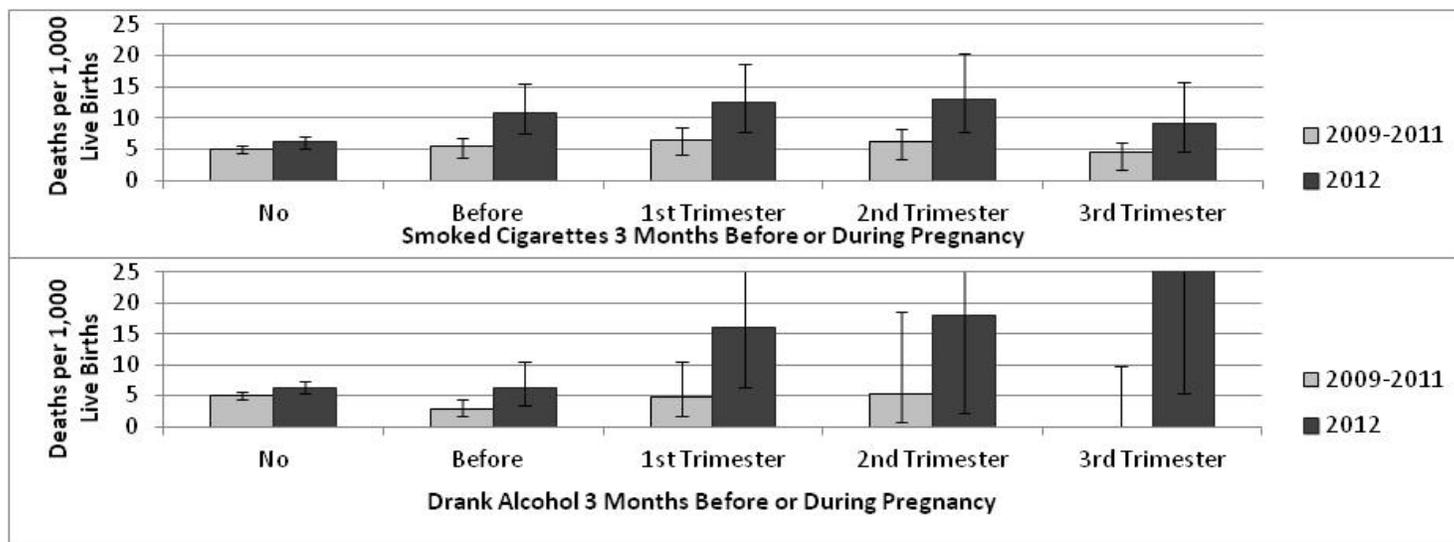
Maternal Risk Factors. Infants born to women with a low pre-pregnancy weight and those with a high pre-pregnancy weight had a statistically significant increase in the IMR in 2012. Women weighing 125 pounds or less had an 85% increase in IMR and a 130% increase in NMR. Women weighing 175 pounds or more had a 49% increase in the IMR. There was a statistically significant increase in the IMR among infants of women who consumed alcohol in the three months prior to or during pregnancy (Figure 2). There was a statistically significant 2-fold increase in the IMR among offspring of women who smoked cigarettes in the three months prior to or during pregnancy.

Prenatal Care and Pregnancy Risk Factors. Infants born to women with no prenatal care had a significant increase in the IMR in 2012 from 19.7 to 46.9, as did those with a low level of prenatal care as measured by the Kessner Index (from 13.3 to 20.4). There was a 7-fold increase in the IMR for live births in which hydramnios (excess amniotic fluid) was diagnosed during pregnancy. The IMR was 32.8 per 1,000 live births reporting hydramnios in 2009-2011 and 238.0 per 1,000 live births reporting hydramnios in 2012. Causes of hydramnios include multiple births, birth defects of the brain or spinal column, blockages of the digestive system, and chromosomal abnormalities.

Labor & Delivery. Babies presenting in the breech position at the time of delivery had twice the NMR in 2012 compared to 2009-2011, a finding consistent with extremely premature delivery. Mothers administered tocolytic drugs to suppress premature labor had a 9-fold increase in NMR from 6.3 to 55.6, while the overall proportion of deliveries where tocolysis use was reported declined 10-fold from 2.8% of all births in 2009-2011 to 0.2% of births in 2012.

Newborn Characteristics. Male infants had a significant 63% increase in IMR in 2012, a finding consistent with premature birth, for which male infants are at increased risk. Twins/triplets had a 2.2-fold increase in the IMR, and a 2.9-fold increase in the NMR. Significant increases in the rate of infant mortality in 2012

Figure 2. Infant Mortality Rate by Cigarette and Alcohol Consumption Before or During Pregnancy by Year, New Mexico, 2009-2011 and 2012



were found among infants born extremely preterm (gestational age less than 28 weeks) and those born early preterm (28-33 weeks). The NMR increased significantly among extremely preterm births from 285.0 per 1,000 in 2009-2011 to 430.0 in 2012. The distribution of gestational ages among those born extremely preterm shifted down in 2012, with a greater percentage (12.7%) born before 21 weeks of gestation compared to 2009-2011 (7.8%). Similarly for very low birth weight (VLBW) infants (<1500 grams), a greater percentage fell under 500g in 2012 (14.5%) compared to the prior three year period (8.2%). Of the VLBW infants born in 2012, those that died survived for a shorter length of time (median of 60 minutes) compared to VLBW infant deaths in 2009-2011 (median of 11 hours).

Discussion

The increase in infant mortality in 2012 in New Mexico appears to be the result of a combination of factors, including changing birth population and behaviors (older mothers, more chronic conditions among mothers, more substance abuse among mothers). Births to teenagers and to foreign-born women both declined, accompanied by an increase in the infant mortality rate in these subgroups. This suggests there remain pockets of high-risk individuals in these populations in need of outreach and intervention. Another factor is a changing social and medical environment that has resulted in fetuses being born alive at very low birth weights and early in pregnancy. The downward shift in weeks of gestation and birth weight among live born infants is

consistent with an increase in the IMR since these infants are born on the margins of viability and have a poor chance of survival. Excluding infants weighing <500g from the numerator and denominator of the infant mortality rate results in an adjusted rate in 2012 of 5.1 per 1,000 compared to 4.3 per 1,000 in 2009-2011, or a 17% increase rather than the observed 31% increase.² With more infants being born alive at the limit of viability but dying within minutes, hours, or days of delivery, a slight increase in the infant mortality rate should be expected, but should not be viewed as an indicator of worsening child health.^{3,4}

New Mexico participates in a federal initiative, the Collaborative Improvement and Innovation Network to Reduce Infant Mortality (CoIIN). The present analysis supports three CoIIN strategies to curb the increase in infant mortality in New Mexico: enhancing perinatal regionalization, promoting smoking cessation, and interconception care for high-risk women in Medicaid.

References

1. MacDorman MF, Hoyert DL, Mathews TJ. Recent Declines in Infant Mortality in the United States, 2005-2011. NCHS data brief, No. 120. Hyattsville, MD: NCHS. 2013.
2. Phelan ST, Goldenberg R, Alexander G, Cliver SP. Perinatal mortality and its relationship to the reporting of low-birth weight infants. *Am J Public Health.* 1998 Aug;88(8):1236-9.
3. Powell TL, Parker L, Dedrick CF, et al. Decisions and dilemmas related to resuscitation of infants born on the verge of viability, NAINR. 2012; 12 (1):27-32.
4. Lau C, Ambalavanan N, Chakraborty H, Wingate MS, Carlo WA. Extremely low birth weight and infant mortality rates in the United States. *Pediatrics.* 2013 May;131(5):855-60.

The New Mexico Epidemiology Report

Michael G. Landen, M.D., M.P.H.
State Epidemiologist & Editor

The New Mexico Epidemiology Report
(ISSN No. 87504642) is published monthly

by the

Epidemiology and Response Division
New Mexico Department of Health

1190 St. Francis Dr.

P.O. Box 26110, Santa Fe, NM 87502

24-Hour Emergency Number:
(505) 827-0006
www.health.state.nm.us

Presorted
Standard
US Postage
PAID # 390
Santa Fe, NM

Figure 1. Infant Mortality Number and Rate, New Mexico, 2001-2012

