Perinatal Periods of Risk - Sonoma County: 2007-2011 Birth Cohort

What is Perinatal Periods of Risk (PPOR)?

PPOR provides structured way to explore the complex issues that contribute to perinatal loss. It provides a way to use data to better understand and address the root causes of fetal and infant mortality problems within a community. By comparing birth outcomes for a selected population (e.g. women whose birth is funded by Medi-Cal) to an internal reference group who has the best outcomes (e.g. White, non-Hispanic women, privately insured), the rate of "excess mortality or preventable deaths" can be measured. This approach makes the assumption that health disparities are preventable. If one population group can have low mortality rates, other groups can reach that goal.

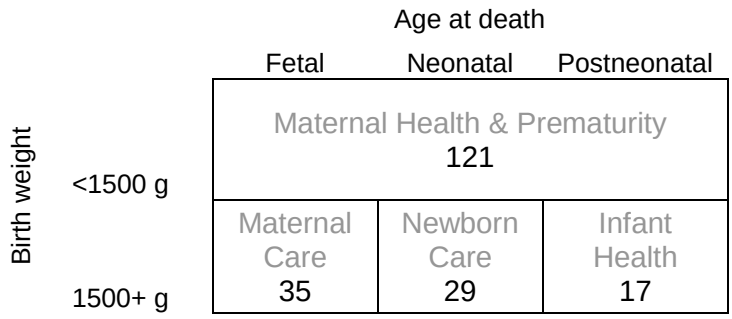
The PPOR framework divides fetal and infant deaths into the four periods of risk according to their birth weight and age at death. This is useful because these periods tend to have different mechanisms or reasons for excess mortality as well as different interventions to address the problem. The four periods are:

- *Maternal Health and Prematurity* group is perinatal deaths of **fetuses and infants born between 500 to 1499 grams**. Prevention efforts may need to focus on preconception health, unintended pregnancy, smoking, drug abuse, and specialized perinatal care.
- *Maternal Care* are deaths to **fetuses with weights of 1500 grams and greater**. Prevention in these cases might need to focus on early continuous prenatal care, referral of high risk pregnancies and good medical management of diabetes, seizures, post maturity or other medical problems.
- *Newborn Care* are **neonatal deaths of infants with birth weights of 1500 grams and greater**. The focus may need to be advanced neonatal care and treatment of congenital anomalies.
- *Infant Health* group includes **postneonatal deaths of infants which weighed 1500 grams or more at birth**. Communities may need to focus on SIDS prevention like sleep position or breast feeding, access to a medical home and/or injury prevention to prevent these deaths.

Sonoma County Findings

This analysis is limited to the first phase of PPOR in which fetal infant deaths are mapped by birth weight and age at death to determine where excess deaths are occurring. The 2007-2011 birth cohort experienced 202 fetal and infant deaths for an overall fetal infant mortality rate of 8.8/1,000 live births + fetal deaths.[1] The majority of deaths (60%) fell under the Maternal Health and Prematurity area (Figure 1).

Figure 1. Fetal Infant Deaths by Birth Weight and Age at Death, Sonoma County Birth Cohort 2007-2011



Source: CDPH, Birth Cohort Files, 2007-2011

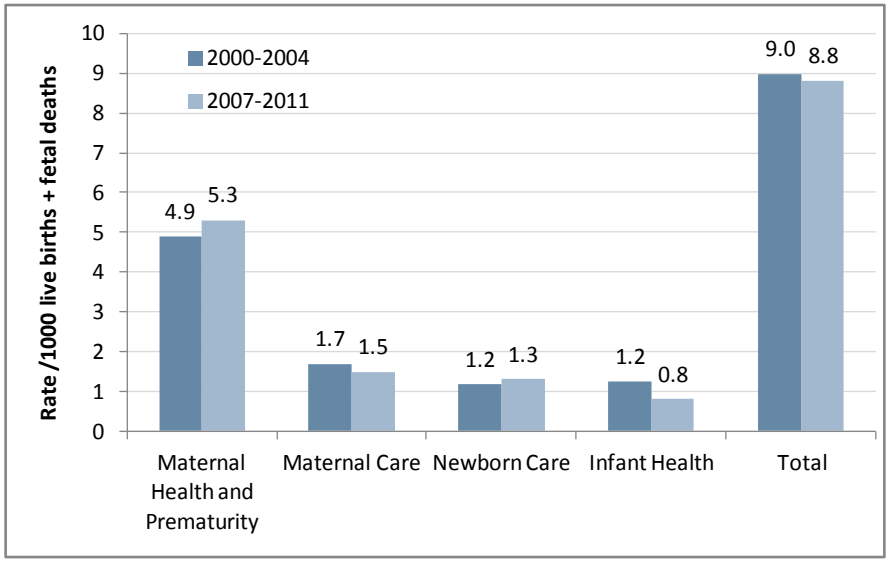
[1] Deaths calculated using the 2007-2011 birth cohort and limited to fetal deaths with gestational age (using LMP estimation) greater than or equal to 20 weeks and fetal and infant deaths born weighing 500 grams or more.

Prepared by Jenny Mercado, Epidemiologist, Sonoma County Department of Health Services; Maternal, Child & Adolescent Health Program; June 2014

Trend

The Sonoma County fetal-infant mortality rate decreased slightly from 2000-2004 to 2007-2011. This decrease was due primarily to a decrease in the Infant Health death rate (from 1.2/1000 to 0.8/1000). The death rate for Maternal Health and Prematurity increased significantly from 4.9/1000 in 2000-2004 to 5.3/1000 in 2007-2011. Deaths in the Maternal Health and Prematurity area remain a concern in Sonoma County as they are responsible for more than 1 of every 2 fetal-infant deaths (Figure 2).

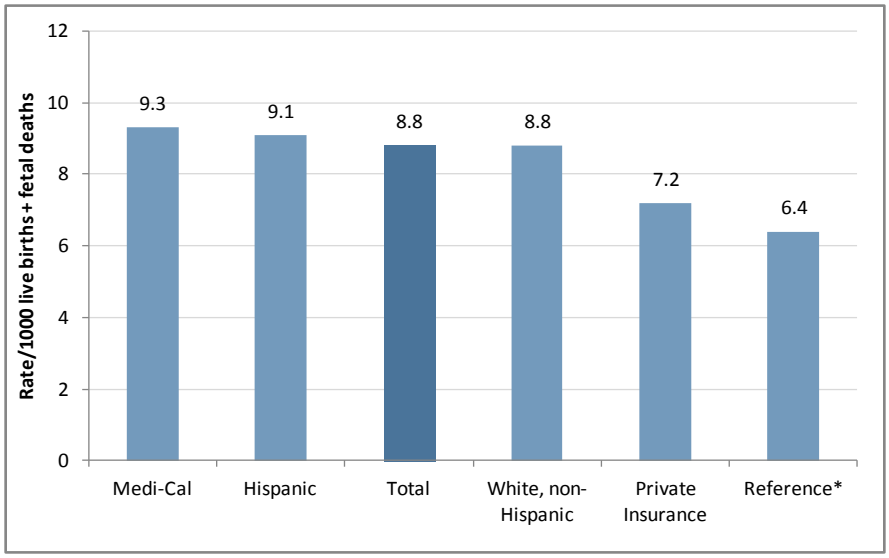
Figure 2. Trend in Fetal-Infant Mortality Rate per 1000 Live Births and Fetal Deaths by PPOR Prevention Categories, Sonoma County Birth Cohort 2000-2004 and 2007-2011



Comparison

The maternal characteristics that were examined for comparison against a reference group were race/ethnicity (White or Hispanic) and pay source for delivery (Private insurance or Medi-Cal). Fetal-infant mortality rates were calculated by PPOR category (Figure 3). The rate was also calculated for a reference group selected because of its low rate of fetal-infant death, a rate that should be attainable for all comparison groups in Sonoma County. The reference group was limited to White, non-Hispanic mothers with private insurance-funded births. The overall fetal-infant mortality rate for the reference group was 38% less than the mortality rate for the total population (6.4/1000 compared to 8.8/1000).

Figure 3. Total Fetal-Infant Mortality Rate per 1,000 Live Births and Fetal Deaths, Sonoma County Birth Cohort 2007-2011



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Fetal-infant mortality rates were highest among deliveries to Hispanic mothers and Medi-Cal-funded deliveries, up to 6% higher than the overall fetal infant mortality rate and 45% higher than the rate for the reference group. These two groups have continued to have the highest fetal-infant mortality rates since PPOR was first used to examine fetal infant death in Sonoma County using the 1998-2002 birth cohort (Figure 3).

Table 1. Fetal Infant Mortality Rates per 1000 Live Births and Fetal Deaths by Maternal Characteristics and PPOR Prevention Areas, Sonoma County Birth Cohort 2007-2011

	Maternal Health & Prematurity	Maternal Care	Newborn Care	Infant Health	Total Fetal Infant Mortality
Total	5.3	1.5	1.3	0.7	8.8
Hispanic	5.7	1.6	1.3	0.5	9.1
White, non-Hispanic	5.4	1.6	0.9	1.0	8.8
Medi-Cal delivery	5.6	1.7	1.1	1.0	9.3
Private insurance delivery	4.1	1.3	1.3	0.5	7.2
Reference group*	3.7	1.3	0.7	0.7	6.4

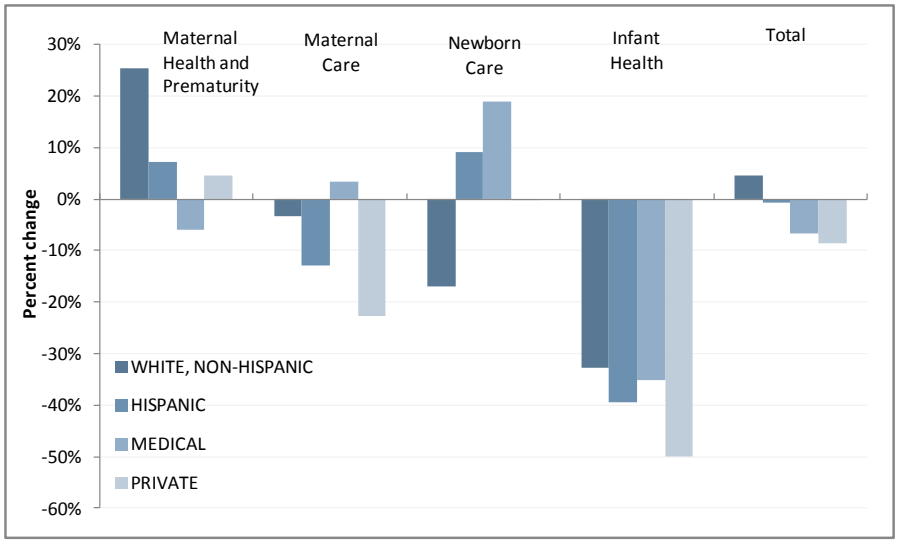
***** Internal reference group = White, non-Hispanic mothers with private insurance-funded births

While all comparison groups have the highest fetal-infant mortality rates in the Maternal Health and Prematurity prevention area, rates in this area were highest among deliveries to Hispanic mothers and Medi-Cal-funded deliveries (Table 1). These two groups also had higher rate in the Newborn Care prevention area. Fetal-infant mortality rates in the Infant Health area were highest among White, non-Hispanic mothers and Medi-Cal funded deliveries.

Overall the fetal infant mortality rate decreased from 2000-2004 to 2007-2011. However, the decrease was not seen equally among all comparison groups and in all PPOR prevention areas (Figure 4). The most notable changes include:

- The mortality rate in the Maternal Health and Prematurity area increased by over 25% for White, non-Hispanics. There was also a slight increase in the overall mortality rate for this population but this increase was tempered by significant decreases in mortality in the Newborn Care and Infant Health areas.
- Among Hispanic births the mortality rate for the Newborn Care increased by almost 20%.
- Mortality rates decreased for deliveries funded by private insurance overall and in the Maternal Care and Infant Health areas.
- Mortality rates for all comparison groups decreased in the Infant Health area from 30 – 60%.

Figure 4. Percent Change in Fetal Infant Mortality Rate by PPOR Prevention Areas, Sonoma County Birth Cohort 2000-2004 to 2007-2011



Excess Rates

By subtracting the fetal-infant death rate for the reference population from each comparison group rate, excess rates were calculated for overall fetal-infant mortality as well as by PPOR prevention area. Excess rates are those that are higher than expected given the best possible outcomes (in the reference group).

For all comparison groups the greatest excess rates were in the Maternal Health and Prematurity prevention area (Table 2). Within this area, rates were highest among deliveries to Hispanic mothers and Medi-Cal funded deliveries.

Table 2. Excess Fetal-infant Mortality Rates per 1000 Live Births and Fetal Deaths
Sonoma County Birth Cohort 2007-2011

	Maternal Health & Prematurity	Maternal Care	Newborn Care	Infant Health	Total Fetal Infant Mortality
Total	1.6	0.2	0.6	0.1	2.4
Hispanic	2.0	0.3	0.6	-0.2	2.7
White, non-Hispanic	1.6	0.3	0.2	0.3	2.4
Medi-Cal delivery	1.8	0.4	0.4	0.3	3.0
Private insurance delivery	0.4	0.0	0.6	-0.2	0.8

Other excess rates of note include:

- Maternal Care among Medi-Cal-funded deliveries, and
- Infant Health among White, non-Hispanic mothers and Medi-Cal-funded deliveries.