

## **Perinatal Periods of Risk in Wisconsin: 2002-2004**

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### **Introduction**

Racial and ethnic disparity in infant mortality is a persistent problem in Wisconsin, particularly when comparing infants of African American women with infants of white women. African Americans living in Wisconsin have one of the highest infant mortality rates in the nation, and during the past 20 years, Wisconsin's African American infant mortality rate has not shown any reduction.<sup>1-3</sup> Success in eliminating this health disparity depends, in part, on how program and intervention activities address the complex social, psychological, environmental, and biological factors that contribute to poor birth outcomes.

Infant deaths are typically measured using a rate calculation, where the number of deaths during a calendar year is divided by the number of live births reported in the same year, expressed as the number of infant deaths per 1,000 live births. The Perinatal Periods of Risk (PPOR) model is another approach to measuring infant deaths. This model differs from the infant mortality rate because it includes selected infant and fetal deaths, and based on weight and age at death, calculates a fetal-infant mortality rate. Combining these parameters in the PPOR model allows PPOR to link deaths to four primary prevention areas of Maternal Health/Prematurity, Maternal Care, Newborn Care, and Infant Health. Using this framework to examine excess deaths may inform program and other intervention activities, assure that these activities continue to meet the needs of the population, and ensure that resource investments are targeted specifically toward disparity reduction.

### **Methodology**

The PPOR model was used to map fetal and infant mortality in Wisconsin for the 3-year period, 2002-2004. The study population was constructed using a "birth cohort," meaning birth certificates from a given year were directly linked with the corresponding death certificate, so the death could occur up to a year after giving birth. Construction of the 3-year birth cohort identified 1,709 fetal and infant deaths for analysis.

This analysis consists of 2 parts: (1) calculation of PPOR for both the City of Milwaukee and for Wisconsin for the major racial and ethnic populations; and (2) using a comparison group (Wisconsin white non-Hispanic mothers, 20 years or older, with 13+ years of education) to calculate excess deaths for each category within the PPOR model.

The PPOR model includes live births and infant deaths with a birth weight  $\geq 500$  grams and fetal deaths  $\geq 24$  weeks gestation and  $\geq 500$  grams. The rate calculation was accomplished by assigning numbers of fetal and infant deaths to PPOR prevention areas based on birth weight and age, and used the sum of births and fetal deaths as the denominator. Subtracting the reference rate from the population of interest rate yields the excess fetal-infant mortality rate for the population of interest, from which the number of excess deaths was calculated. This was done in accordance with the PPOR protocol for

all major racial and ethnic groups in Wisconsin and the City of Milwaukee with sufficient sample size.<sup>4</sup>

## Results

The total fetal-infant mortality rate for the Wisconsin reference population is 4.7 deaths per 1,000. Compared to the Wisconsin reference population, total excess fetal-infant mortality rate is 2.3 in the white population, 3.2 in the Hispanic/Latina population, and 12.9 in the African American population. Among African Americans, the highest rate of excess deaths can be attributed to Maternal Health/Prematurity (6.4), suggesting primary prevention activities such as pre- and inter- conception health, access to high quality perinatal care, and promoting healthy behaviors would have the greatest impact in reducing disparities. The second highest rate of African American excess deaths can be attributed to Infant Health (3.3), where the prevention approaches include promoting safe sleep, breastfeeding, and injury prevention. Among Hispanic/Latinas, Maternal Care has the highest excess rate (1.9), indicating a preventative emphasis on issues related to prenatal care, high risk referral, and obstetric care. Within the City of Milwaukee, African Americans represent the only measurable racial/ethnic sub-population, and the PPOR model is similar to that of Wisconsin African American model.

## Conclusion

The four periods of risk represent potential gaps in the maternal and child health systems that lead to fetal-infant mortality, and can therefore serve as a basis for action. Difficult decisions must be made when determining how to best direct precious resources, and the PPOR model is one approach that can identify promising interventions based on where excess risk is most apparent. As Wisconsin works to eliminate racial and ethnic disparities, employing the PPOR method to carefully examine where excess fetal-infant deaths occur can help determine how to focus resources and maximize results.

## References

1. Wisconsin Department of Health and Family Services, Division of Public Health, Bureau of Health Information and Policy. Wisconsin Interactive Statistics on Health (WISH) data query system, <http://dhfs.wisconsin.gov/wish/index.htm>, Infant Mortality Module, accessed 1/08/2007.
2. National Center for Health Statistics. Health, United States, 2006: With Chartbook on Trends in the Health of Americans. Hyattsville, MD: 2006; 184-186. <http://www.cdc.gov/nchs/hus.htm>, accessed 1/8/2007.
3. Wisconsin Health Facts: Racial and Ethnic Disparities in Infant Mortality. Department of Health and Family Services. <http://dhfs.wisconsin.gov/healthybirths/data.htm>, accessed 1/8/2007.
4. Burns, PG. Reducing Infant Mortality Rates Using the Perinatal Periods of Risk Model. *Public Health Nursing*. 2005;22(1):2-7.

## Acknowledgements

A data use agreement for Wisconsin vital records data was submitted and approved by the State Registrar of Wisconsin; funding for the data was provided through the Minority Health Program in the Wisconsin Department of Health and Family Services.

[PPOR Summary Data Sheet](#) (PDF, 41 KB)

[PPOR PowerPoint Presentation](#) (PPT, 442 KB)

**PPOR in the literature:**

Besculides M, Laraque F. Racial and Ethnic Disparities in Perinatal Mortality: Applying the Perinatal Periods of Risk Model to Identify Areas for Intervention. Journal of the National Medical Association. 2005;97(8):1128-32.

Cai J, et al. Perinatal periods of risk: analysis of fetal-infant mortality rates in Kansas City, Missouri. Maternal Child Health Journal. 2005;9(2):199-205.

Cai J, et al. Perinatal periods of risk analysis of fetal-infant mortality in Jackson County, Missouri. Journal of Public Health Management and Practice. 2007;13(3):270-7.

**More information, including detailed PPOR methodology, can be found at:**

- City MaTCh website (<http://www.citymatch.org/>) and click on “Perinatal Periods of Risk.”
- PPOR methods PowerPoint (from the March of Dimes June 2005 Summit) ([http://www.marchofdimes.com/files/PR\\_Johnson.ppt](http://www.marchofdimes.com/files/PR_Johnson.ppt))

**Other examples of PPOR being used to inform public health practice:**

- [MCH Surveillance PowerPoint](#)
- [Six Basic Steps of the Perinatal Periods of Risk Approach](#)
- [Disparities in Perinatal Outcomes using PPOR: Results for the Bay Area Collaborative](#)
- [Perinatal Periods of Risk Approach: The U.S. Urban Experience](#)
- [Perinatal Periods of Risk: An Assessment Approach to Understanding Fetal and Infant Deaths in Florida, 1995-1998](#)
- [Perinatal Periods of Risk Analysis: Multnomah County, 1997-2001](#)
- [Perinatal Periods of Risk in Louisiana, 1997-1999](#)
- [Perinatal Periods of Risk \(PPOR\): A Useful Tool for Analyzing Fetal and Infant Mortality](#)
- [Perinatal Periods of Risk: A District-Level Analysis in Georgia](#)
- [Bexar County \(San Antonio\) Perinatal Periods Of Risk](#)
- [Perinatal Periods of Risk Model: An Examination of Infant Mortality Disparities in the Twin Cities 1990 – 1998](#)