

Poor Birth Outcome in the Rural United States: 1985-1987 to 1995-1997

Background

The overall infant mortality rate in the United States decreased substantially between 1960 and 1980, from about 25 infant deaths per thousand live births in 1960 to about 12 per thousand by 1980. Rural residents, however, did not benefit equally from this trend. In response, efforts were made to regionalize care for high-risk rural women and infants during the 1980s, efforts that effectively closed the overall rural/urban gap in neonatal mortality. Postneonatal mortality (death between the 29th and 365th day of life), however, remained higher among rural residents, as did rates of inadequate prenatal care. This national study examined rural/urban differences in poor birth outcome and inadequate prenatal care between 1985 and 1997. Outcomes among residents of more remote rural areas and among residents of rural persistent poverty counties were also explored.

Methods

Data from the national Linked Birth-Death Data Set were used in this study. Rates of low birthweight, neonatal mortality, postneonatal mortality (referred to collectively as “poor outcomes”), and inadequate prenatal care were evaluated and compared across the study period (1985-

1997) and across three geographic classifications: rural vs. urban, remote vs. less remote rural counties, and rural persistent poverty vs. rural nonpersistent poverty counties. Logistic regression was used to assess the independent risk of poor outcome or inadequate care associated with residence in each geographic category.

Major Findings

- In unadjusted analyses, shown in Table 1, rural residents had higher rates of postneonatal mortality and inadequate prenatal care than urban residents, although this is in the overall context of decreasing rates of poor outcome and inadequate care between 1985-1987 and 1995-1997.
- Regression results indicate that the risk associated with rural residence increased across the study period for low birthweight, infant mortality, and inadequate care (see Table 2).
- Residents of rural persistent poverty counties experienced higher risk of low birthweight and postneonatal mortality than residents of rural nonpoverty counties (see Table 3).

Table 1: Birth Outcomes and Prenatal Care—Rural and Urban Births, 1985-1987 to 1995-1997—Singletons Only

	1985-1987			1989-1991			1995-1997		
	Rural	Urban	All	Rural	Urban	All	Rural	Urban	All
Number of births	2,280,237	8,801,603	11,081,840	2,185,157	9,837,499	12,022,656	2,057,822	9,294,752	11,347,397
Outcomes									
% low birthweight	5.6	5.9	5.8	5.7	6.0	6.0	6.1	6.1	6.1
Neonatal mortality rate	5.5	5.8	5.7	4.8	5.0	5.0	4.2	4.0	4.1
Postneonatal mortality rate	3.7	3.4	3.5	3.6	3.1	3.2	2.7	2.3	2.4
Prenatal care (PNC)									
% 3 rd trimester PNC or no PNC	5.7	6.0	6.0	5.7	6.2	6.1	4.1	4.1	4.1
% inadequate PNC by Kotelchuck index	18.4	19.9	19.5	17.8	17.8	17.8	13.3	12.7	12.8

Table 2: Adjusted Odds Ratios and 95% Confidence Intervals for Risk of Poor Birth Outcome and Inadequate Prenatal Care Among Rural Residents of the United States Compared to Urban Residents

	1985-1987	1989-1991	1995-1997
Poor birth outcome			
Low birthweight*	1.002 (0.994,1.010)	1.037 (1.031,1.043)	1.089 (1.082,1.095)
Neonatal mortality*	1.018 (0.996,1.040)	1.042 (1.019,1.068)	1.174 (1.144,1.204)
Postneonatal mortality*	1.105 (1.077,1.134)	1.173 (1.143,1.203)	1.193 (1.157,1.232)
Inadequate prenatal care (PNC)			
3 rd trimester PNC or no PNC*	1.026 (1.021,1.029)	1.038 (1.034,1.042)	1.085 (1.081,1.090)
Inadequate PNC by Kotelchuck index*	1.030 (1.025,1.039)	0.956 (0.950,0.962)	1.035 (1.027,1.043)

* Control variables: maternal race (African American, Native American, other race), maternal age (under 18, over 35), parity (parity = 0, parity > 4), marital status (single), less than 12 years of education (for women over age 18), late prenatal care.

Table 3: Adjusted Odds Ratios and 95% Confidence Intervals for Risk of Poor Birth Outcome and Inadequate Prenatal Care Among Residents of Persistent Poverty Rural Counties Compared to Other Rural Counties

	1985-1987	1989-1991	1995-1997
Poor birth outcome			
Low birthweight*	1.078 (1.063,1.093)	1.095 (1.080,1.110)	1.104 (1.089,1.119)
Neonatal mortality*	0.980 (0.935,1.027)	1.039 (1.080,1.091)	1.008 (0.954,1.065)
Postneonatal mortality*	0.970 (0.919,1.025)	1.078 (1.018,1.141)	1.086 (1.016,1.161)
Inadequate prenatal care (PNC)			
3 rd trimester PNC or no PNC*	1.087 (1.076,1.101)	1.087 (1.072,1.102)	1.020 (1.002,1.038)
Inadequate PNC by Kotelchuck index*	1.193 (1.181,1.204)	1.145 (1.133,1.156)	1.073 (1.063,1.084)

* Control variables: maternal race (African American, Native American, other race), maternal age (under 18, over 35), parity (parity = 0, parity > 4), marital status (single), less than 12 years of education (for women over age 18), late prenatal care.

Conclusions

While progress was made between the 1980s and the 1990s in closing rural/urban gaps in risk of poor outcome and inadequate prenatal care, rural residence and residence in a persistent poverty county remained independent risk factors for inadequate care and some adverse birth outcomes, especially postneonatal mortality.

Policy Implications

Advances in neonatal intensive care and postneonatal trauma care have led to improvement in birth outcomes. Attentive maintenance of regionalized systems of perinatal care, and a better understanding of the nature of the risks faced by rural infants and their mothers, will be required to close the increasing gaps in the risk of poor birth outcome among rural residents.

This research was supported by the federal Office of Rural Health Policy, Health Resources and Services Administration, Department of Health and Human Services. Findings are more fully described in WWAMI RHRC Final Report #119: Larson EH, Murowchick E, Hart LG. Poor Birth Outcome in the Rural United States: 1985-1987 to 1995-1997. February 2008.