31. Lambert, D. A.: Unlinked death certificates from the National Infant Mortality Surveillance project. Master of Science Thesis, University of Massachusetts, May 1986. 92 pp.
32. Lambert, D. A., and Strauss, L. T.: Analysis of unlinked infant death certificates from the NIMS project. Public Health Rep 102: 200-204, March-April 1987.
33. Wilson, A. L., Fenton, L. J., and Munson, D. P.: States reporting of live births of newborns weighing less than 500 grams: Impact on neonatal mortality rates. Pediatrics 78: 850-854 (1986).
34. Friede, A. M., et al.: Young maternal age and infant mortality: the role of low birth weight. Public Health Rep 102: 192-199, March-April 1987.
35. Allen, D. A., et al.: Regional differences in birth weight-specific infant mortality, 1980. Public Health Rep 102: 138-145, March-April 1987.
36. Buehler, J. W., Strauss, L. T., Hogue, C. J. R., and Smith, J. C.: Birth weight-specific causes of infant mortality, United States, 1980. Public Health Rep 102: 162-171, March-April 1987.
37. Berry, R. J., et al.: Birth weight-specific infant mortality due to congenital anomalies, 1960 and 1980. Public Health Rep 102: 171-181, March-April 1987.
38. Buehler, J. W., et al.: Birth weight-specific infant mortality, United States, 1960 and 1980. Public Health Rep 102: 151-161, March-April 1987.
39. Marks, J. S., et al.: Variation in State-specific infant mortality risks. Public Health Rep 102: 146-151, March-April 1987.
40. McCarthy, B. J., et al.: The underregistration of neonatal deaths: Georgia 1974-77. Am J Public Health 72: 734-736 (1982).
41. Frost, F., and Kirkwood, K. S.: Racial differences between linked birth and infant death records in Washington State. Am J Public Health 70: 974-976, September 1980.
42. Centers for Disease Control: Birth weight-specific neonatal mortality rates—Kentucky. MMWR 34: 487-488, August 9, 1985.
43. Zahniser, C., Halpin, G., Hollinshead, W., Kessel, S., and Koontz, A.: Using linked birth and infant death files for program planning and evaluation: NIMS workshop lessons. Public Health Rep 102: 211-216, March-April 1987.

Regional Differences in Birth Weight-Specific Infant Mortality, United States, 1980

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Synopsis

To describe regional differences in birth weight-specific infant mortality in the United States, we used data from the National Infant Mortality Surveillance project. The infant mortality risk (IMR) for the nation was 11.0 deaths per 1,000 live births. The risk (with 95 percent confidence intervals [CI]) for the four U.S. Census regions were West 9.9 (9.7 to 10.1), Northeast 10.4 (10.1 to 10.6), North Central 10.8 (10.6 to 11.0), and South 12.1 (11.9 to 12.3).

In all regions, the IMR for blacks was approximately twice that of whites. Seventy-two percent of the higher IMR in the South was due to a higher proportion of black births compared with the remainder of the nation, reflecting the higher mortality rates suffered by black infants, and 28 percent to higher mortality among southern whites.

The IMR for whites in the South was significantly higher than in the remainder of the nation: 9.8 versus 9.1 (relative risk = 1.09, CI = 1.06 to 1.11). Thirty-six percent of this excess in IMR was due to a higher frequency of low birth weight (less than 2,500 grams), 18 percent was due to higher IMR in infants with birth weight less than 2,500 grams, and 46 percent due to higher IMR in infants with birth weights of 2,500 g or more.

Black infants born in the West had a lower risk of death than black infants in the other regions.

When compared with the Northeast and South, 36 percent of the lower risk in the West among black infants was due to a lower frequency of low birth weight, 38 percent due to lower IMR in infants with birth weight less than 2,500 g, and 26 percent to lower IMR in infants with birth weight of 2,500 g or more.

THE RISK OF INFANT MORTALITY varies among regions in the United States (*1*), but reasons for these differences are not fully understood. Regional analyses of low birth weight and infant mortality can guide health planners and public health officials in targeting, developing, and assessing strategies to lower infant mortality. For example, recognition that the highest risk of infant death is in the southeastern United States prompted the Southern Governors Association to address the problem of infant mortality on a region-wide basis (*2*).

The 1980 National Infant Mortality Surveillance (NIMS) project provided an opportunity to investigate differences in infant mortality among regions in the United States. This paper describes regional differences in total and birth weight-specific infant mortality risks by race, in the racial and birth weight distribution of births, and in the causes of infant deaths. In addition, we explore possible reasons for significant differences in race-specific mortality risks in three regions compared with the remainder of the nation.

Methods

The methods of NIMS, including data collection and evaluation, are described in detail elsewhere (*3–5*). In brief, 53 vital statistics reporting areas participated in the project: 50 States, New York City, the District of Columbia, and Puerto Rico. These national level tabulations do not include Puerto Rico. All 53 reporting areas (subsequently referred to as "States") linked birth and death certificates for infants who were born alive in 1980 and who died within the first year of life in 1980 or 1981. The completeness of birth and death certificate linkage is estimated to be approximately 95 percent (*3,5*). States provided the Centers for Disease Control (CDC) with the number of infant deaths by birth weight, age at death, and other infant and maternal characteristics. CDC generated corresponding numbers of births from the computer tape of 1980 natality records produced by the National Center for Health Statistics (NCHS), with exceptions for Maine and New Mexico as previously described (*3*). State of residence was defined as State of mother's residence at time of infant's birth; race of infant was based on the race of both parents, using the NCHS algorithm (*6*). For logistic reasons, we limited categories for race of infant to white, black, and all races combined.

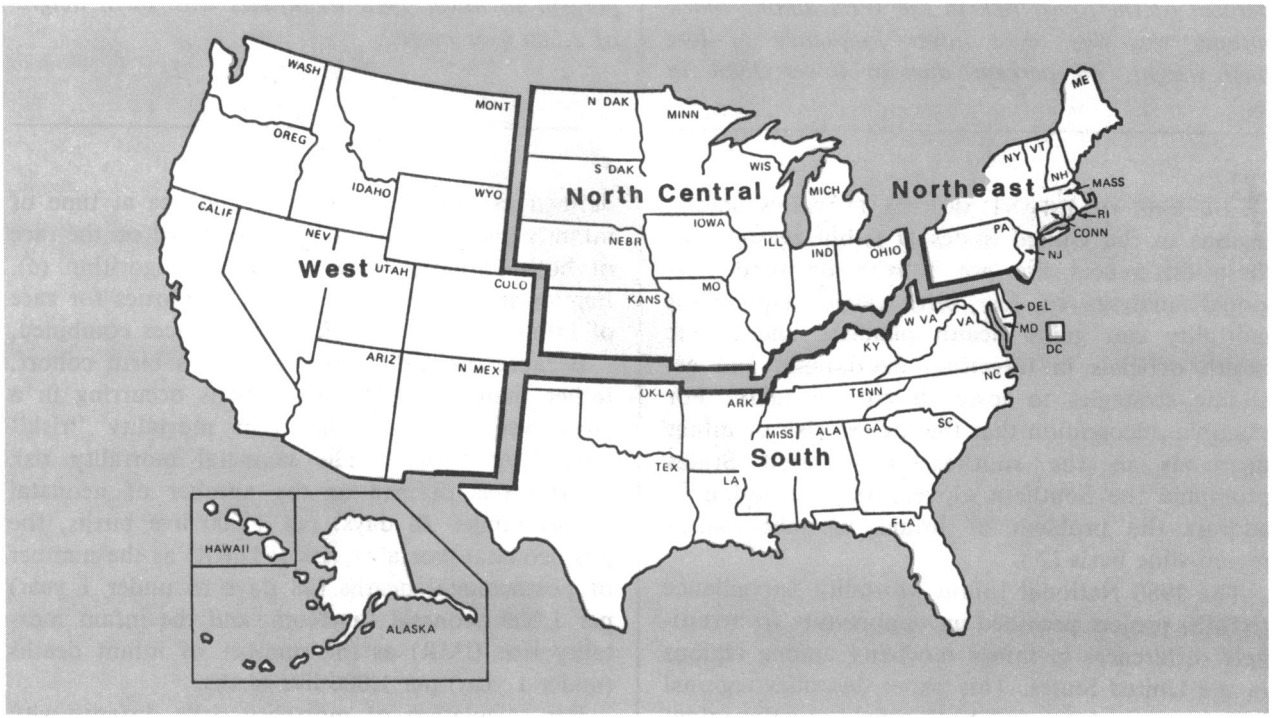
Because the NIMS data are for a birth cohort, rather than for births and deaths occurring in a given year, we use the term mortality "risk" instead of "rate." The neonatal mortality risk (NMR) was defined as the number of neonatal deaths (under 28 days) per 1,000 live births, the postneonatal mortality risk (PNMR) as the number of postneonatal deaths (28 days to under 1 year) per 1,000 neonatal survivors, and the infant mortality risk (IMR) as the number of infant deaths (under 1 year) per 1,000 live births.

For calculation of mortality risks, infants with unknown birth weight (0.2 percent of births and 3.3 percent of infant deaths) were assigned to birth weight categories according to the proportion with known birth weight (*3*). The data in this report will be restricted to single-delivery infants. Individual birth weight categories ranged from 227 to 500 grams to 4,500 to 8,165 g and were divided into 500-g intervals for infants weighing from 500 to 4,499 g.

Each State provided tabulations of the number of deaths of single-delivery infants by individual four-digit codes from the International Classification of Diseases, Ninth Revision (ICD-9) (*7*). This was done for the underlying cause of death as assigned and coded by the State from the causes of death specified on death certificates. ICD-9 codes for underlying causes of death were aggregated into the following categories, by using a modification of previously described classification schemes (*8–10*): prematurity-low birth weight (LBW) and respiratory distress syndrome (RDS) as one group; other perinatal respiratory conditions; birth trauma-hypoxia-asphyxia; other perinatal conditions; infections; congenital anomalies; injuries; sudden infant death syndrome (SIDS); cardiac or respiratory arrest and other nonspecific and unknown causes; and all other known causes. The ICD-9 codes used in each of these categories are described in the NIMS report (*3*).

Individual States were combined to form the

Figure 1. Bureau of the Census geographic regions of the United States



four regions as defined by the Bureau of the U.S. Census (*11*): Northeast, North Central, South, and West (fig. 1). To identify possible reasons for differences in IMR between regions, we characterized infant mortality by several components, including racial distribution of births, birth weight distribution of births, and birth weight-specific mortality. Because of regional differences, we examined the latter two components separately for white and black infants.

We used an equation described by Fleiss (*12*) to make two determinations. First, what percentage of the difference in IMR between one region and the remainder of the nation was due to the racial distribution of births versus the mortality risk within race groups; second, what percentage of the difference in race-specific IMR between comparison regions was due to the birth weight distribution of births versus birth weight-specific mortality risks. For these comparisons we included only white and black infants, who represented 97 percent of U.S. births in 1980.

$$\text{Difference in mortality risks} = \Sigma_i [([P_a + P_b] \div 2) \times (R_b - R_a) + ([R_a + R_b] \div 2) \times (P_b - P_a)]_i$$

P = Proportion of total births in birth weight group i

R = Infant mortality rate for birth weight group i

a = Region of interest

b = All other regions

Results

Total infant mortality risk. Table 1 shows the total and race-specific IMRs for the four regions. For all races combined, the IMR was highest in the South, 12.1 deaths per 1,000 live births, and comparatively lower in the other three regions, ranging from 9.9 (West) to 10.8 (North Central). A similar regional mortality pattern was observed for white infants. In contrast, for blacks, the IMR was significantly lower in the West and higher in the North Central compared with the remainder of the nation.

Race distribution. More than one-third of all births, and more than half of all black births, occurred in the South (table 1). In addition, the South has a higher proportion of black births than the other regions (25 percent versus 12 percent).

Birth weight distribution. Table 2 gives the distribution of births in five birth weight categories by region. Compared with the other regions, the South has a higher percentage of infants with both very low birth weight (less than 1,500 g) and intermediate low birth weight (1,500 to 2,499 g)

Table 1. Infant mortality risk, by race and region, single-delivery infants, 1980 U.S. birth cohort

Region	All races		White		Black	
	Number of births	IMR	Number of births	IMR	Number of births	IMR
Northeast	643,327	10.4	529,765	8.8	97,860	19.0
North Central	937,091	10.8	799,471	9.2	119,649	20.7
South	1,208,121	12.1	881,681	9.8	305,197	18.6
West	754,456	9.9	634,940	9.1	52,600	16.5
United States	3,542,995	11.0	2,845,857	9.3	575,306	18.9

NOTE: IMR infant mortality risk = deaths per 1,000 live births.

for all races combined and for whites, but not for blacks. The lowest frequencies of very low and intermediate low birth weight among blacks were observed in the West. Compared with whites, black infants have an increased relative risk of birth weights less than 1,500 g, which ranged from 2.7 (South) to 3.1 (North Central). Black infants have a risk of birth weights less than 2,500 g ranging from 2.2 (South) to 2.6 (North Central). There was little regional difference in the percentage of infants with birth weights of less than 500 g for whites (0.05 to 0.06 percent), and for blacks (0.18 to 0.22 percent).

Birth weight-specific mortality. Figures 2 and 3 present birth weight-specific infant mortality risks for white and black infants, by region. Although mortality in all regions decreases markedly with increasing birth weight, except for increases for very heavy infants, there are differences among regions throughout the birth weight spectrum that contribute to differences in the total IMR. For whites, there were few differences between regions in the IMR of infants with birth weights of less than 2,500 g, but at higher birth weights the Northeast had lower, and the South a comparatively higher IMR. For blacks, there was more regional variation at each birth weight stratum. Small differences in mortality among infants with birth weights of 2,500 g or more constitute a large contribution to total mortality differentials, since the vast majority of births occur in this group.

Cause of death. Table 3 gives the cause-specific mortality risk by region and race. Prematurity-LBW-RDS, congenital anomalies, and SIDS cause a major proportion of all infant deaths in all regions. The South, however, has higher cause-specific mortality risks attributed to seven categories: prematurity-LBW-RDS, birth trauma-hypoxia-asphyxia, infections, congenital anomalies, injuries, cardiac or respiratory arrest and other nonspecific and unknown causes, and all other known causes.

Figure 2. Infant mortality risk by birth weight and region, single-delivery white infants, 1980 U.S. birth cohort

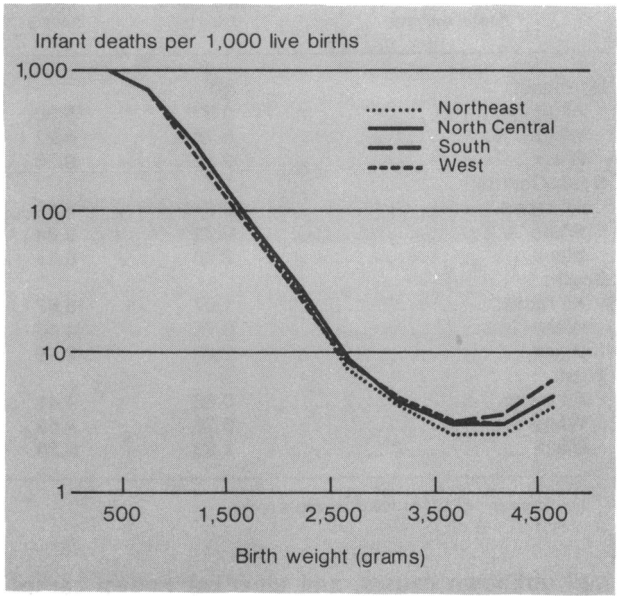
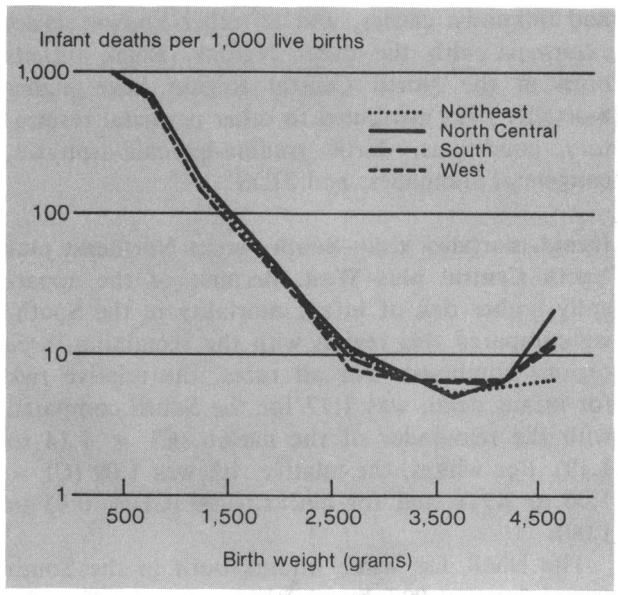


Figure 3. Infant mortality risk by birth weight and region, single-delivery black infants, 1980 U.S. birth cohort



Compared with other regions, white infants born in the South have higher risks of death attributed to prematurity-LBW-RDS, birth trauma-hypoxia-asphyxia, infections, congenital anomalies, injuries, cardiac or respiratory arrest and other nonspecific

Table 2. Percentage distribution of births, by birth weight, region, and race, single-delivery infants, 1980 U.S. birth cohort

Region and race	Less than 1,500 g	1,500–2,499 g	2,500–3,999 g	4,000 g or more	Unknown	Total [1]
Northeast:						
All races	0.97	5.00	83.67	10.24	0.12	100.00
White	0.75	4.22	83.66	11.27	0.11	100.00
Black	2.18	9.20	83.08	5.37	0.18	100.00
North Central:						
All races	0.91	4.58	82.16	12.01	0.34	100.00
White	0.72	3.84	81.98	13.13	0.33	100.00
Black	2.25	9.44	82.94	4.99	0.39	100.00
South:						
All races	1.07	5.67	83.00	10.15	0.11	100.00
White	0.75	4.46	82.73	11.97	0.09	100.00
Black	2.03	9.19	83.63	5.01	0.14	100.00
West:						
All races	0.80	4.41	83.31	11.17	0.31	100.00
White	0.70	4.03	83.02	11.96	0.29	100.00
Black	1.93	8.36	83.04	6.32	0.35	100.00

[1]Percents may not add to 100.00 due to rounding.

and unknown causes, and all other known causes.

Black infants born in the West have a lower risk of death attributed to prematurity-LBW-RDS, other perinatal respiratory conditions, infections, cardiac or respiratory arrest and other nonspecific and unknown causes, and all other known causes compared with the other regions. Black infants born in the North Central Region have higher mortality risks attributed to other perinatal respiratory conditions, birth trauma-hypoxia-asphyxia, congenital anomalies, and SIDS.

Infant mortality risk—South versus Northeast plus North Central plus West. Because of the apparently higher risk of infant mortality in the South, we compared this region with the remaining three regions combined. For all races, the relative risk for infant death was 1.17 for the South compared with the remainder of the nation (CI = 1.14 to 1.19). For whites, the relative risk was 1.09 (CI = 1.06 to 1.11), and for blacks, 0.96 (CI = 0.93 to 1.00).

The NMR for white infants born in the South was 6.6 per 1,000 live births versus 6.1 for the remainder of the nation (RR = 1.09, CI = 1.06 to 1.11). The PNMR was 3.2 per 1,000 neonatal survivors in the South compared to 3.0 in the remainder of the nation (RR = 1.07, CI = 1.02 to 1.12).

Using the partitioning formula, we found that 72 percent of the higher IMR in the South was due to a higher proportion of black births, reflecting the higher mortality rates suffered by black infants, and the remainder was due to higher mortality among southern whites. The IMR for southern blacks was lower than the remainder of the nation. Restricting this analysis to white infants born in the South compared to the remainder of the nation, we found that 36 percent of the elevated infant mortality risk was due to a higher frequency of low birth weight births, 18 percent was due to higher mortality in infants with birth weights less than 2,500 g, and 46 percent due to higher mortality in infants with birth weights of 2,500 g or more.

White infants with birth weights of 2,500 g or more born in the South had significantly higher cause-specific mortality associated with birth trauma-hypoxia-asphyxia (RR = 1.31, CI = 1.12 to 1.54), other perinatal conditions (RR = 1.30, CI = 1.08 to 1.57), infection (RR = 1.37, CI = 1.22 to 1.53), congenital anomalies (RR = 1.10, CI = 1.03 to 1.17), injuries (RR = 1.28, CI = 1.10 to 1.48), and cardiac or respiratory arrest and other unknown causes (RR = 1.57, CI = 1.21 to 2.02).

Infant mortality risk—black infants. Black infants in the West and North Central had IMRs that differed significantly from the other two regions, the Northeast and South (table 1). To identify reasons for these differences we compared the West and North Central to the Northeast and South combined.

West versus Northeast plus South. The risk of death for black infants born in the West was 16.5 per 1,000 live births versus 18.7 for the Northeast

Table 3. Infant mortality risk[1], by region, cause, and race, single-delivery infants, 1980 U.S. birth cohort

Cause and race	Cause-specific deaths per 1,000 live births			
	Northeast	North Central	South	West
Prematurity-low birth weight-respiratory distress syndrome:				
All races	2.75	2.60	3.08	2.12
White	2.18	2.16	2.25	1.89
Black	5.87	5.49	5.49	4.70
Other perinatal respiratory conditions:				
All races	0.62	0.72	0.64	0.46
White	0.51	0.54	0.49	0.43
Black	1.23	1.90	1.08	0.57
Birth trauma-hypoxia-asphyxia:				
All races	0.50	0.58	0.72	0.58
White	0.45	0.50	0.61	0.54
Black	0.77	1.11	1.01	0.95
Other perinatal conditions:				
All races	1.25	1.12	1.19	0.97
White	1.00	0.90	0.89	0.85
Black	2.60	2.52	2.09	2.13
Infections:				
All races	0.73	0.71	1.09	0.69
White	0.57	0.57	0.84	0.60
Black	1.59	1.53	1.83	1.22
Congenital anomalies:				
All races	2.31	2.44	2.54	2.43
White	2.32	2.34	2.55	2.35
Black	2.22	2.90	2.47	2.47
Injuries:				
All races	0.25	0.33	0.41	0.33
White	0.19	0.29	0.34	0.30
Black	0.57	0.61	0.61	0.57
Sudden infant death syndrome:				
All races	1.18	1.49	1.38	1.64
White	0.89	1.20	1.07	1.52
Black	2.72	3.28	2.22	2.95
Cardiac or respiratory arrest and other nonspecific and unknown causes:				
All races	0.16	0.13	0.23	0.07
White	0.12	0.12	0.16	0.06
Black	0.34	0.23	0.43	0.08
All other known causes:				
All races	0.65	0.67	0.82	0.58
White	0.57	0.60	0.64	0.54
Black	1.13	1.13	1.34	0.93

[1]Infant mortality risk = deaths per 1,000 live births.

and South combined (RR = 0.89, CI = 0.83 to 0.95). The NMR for black infants born in the West was 10.7 per 1,000 live births versus 12.4 for the Northeast and South (RR = 0.86, CI = 0.79 to 0.93). The PNMR was 5.9 per 1,000 neonatal survivors versus 6.3 in the other two regions (RR = 0.94, CI = 0.84 to 1.06).

With partitioning, 36 percent of the lower mortality among blacks in the West was due to a lower frequency of low birth weight births, 38 percent was due to a lower IMR in infants with birth weights less than 2,500 g, and 26 percent to a lower IMR in infants with birth weights of 2,500 g or more.

Black infants born in the West compared with the Northeast and South had a significantly lower risk of death attributed to prematurity-LBW-RDS (RR = 0.84, CI = 0.74 to 0.96), other perinatal respiratory conditions (RR = 0.51, CI = 0.36 to 0.73), infections (RR = 0.69, CI = 0.53 to 0.88), cardiac or respiratory arrest and other nonspecific and unknown causes (RR = 0.19, CI = 0.08 to 0.45), and all other known causes (RR = 0.72, CI = 0.54 to 0.97). Black infants born in the West also had a lower risk of death attributed to other perinatal conditions and injuries. These differences were not statistically significant, however.

North Central versus Northeast plus South. The risk of death for black infants born in the North

'Black infants in the West, however, have a significantly lower risk for infant death compared with black infants born in the other regions. This lower risk is due to both a lower frequency of low birth-weight infants and lower birth weight-specific mortality.'

Table 4. Neonatal and postneonatal mortality risk, by race and region, single-delivery infants, 1980 U.S. birth cohort

Region	All races		White		Black	
	NMR	PNMR	NMR	PNMR	NMR	PNMR
Northeast.....	7.2	3.2	6.2	2.6	12.5	6.6
North Central .	7.2	3.6	6.2	3.0	13.7	7.1
South	8.1	4.0	6.6	3.2	12.4	6.2
West.....	6.3	3.6	5.8	3.3	10.7	5.9
United States .	7.3	3.7	6.2	3.1	12.5	6.5

NOTE: NMR neonatal mortality risk = deaths per 1,000 live births; PNMR postnatal mortality risk = deaths per 1,000 neonatal survivors.

Central was 20.7 per 1,000 live births versus 18.7 in the Northeast and South combined (RR = 1.11, CI = 1.06 to 1.16). The NMR for black infants born in the North Central was 13.7 per 1,000 live births versus 12.4 in the Northeast and South (RR = 1.10, CI = 1.04 to 1.16). The PNMR was 7.1 per 1,000 neonatal survivors versus 6.3 in the Northeast and South (RR = 1.13, CI = 1.04 to 1.22).

With partitioning, 44 percent of the higher IMR among black infants born in the North Central was due to a higher frequency of low birth weight infants, 9 percent due to higher mortality in infants with birth weights less than 1,500 g, 14 percent due to higher mortality in infants with birth weights of 1,500 to 2,499 g, and 33 percent due to higher mortality in infants with birth weights of 2,500 g or more.

Black infants with birth weights of 2,500 g or more born in the North Central had significantly higher cause-specific mortality associated with SIDS (RR = 1.45, CI = 1.27 to 1.66). In addition, this group of black infants had a higher risk of death attributed to other perinatal respiratory conditions, birth trauma and asphyxia, congenital anomalies, and injuries. However, these differences were not statistically significant.

Infant mortality risk—black versus white infants. A consistent finding in all regions was that the IMR of black infants was approximately twice that of whites (table 1). The relative risk of infant death for black versus white infants ranged from 1.82 (West) to 2.25 (North Central). The NMR and PNMR by region and race are shown in table 4. The relative risk of neonatal death ranged from 1.85 (West) to 2.20 (North Central), and of postneonatal death from 1.78 (West) to 2.56 (Northeast).

Discussion

In this description of regional infant mortality, we observed differences in the birth weight distribution of births, racial distribution of births, and birth weight-specific mortality that contributed to variations in the risk for infant death. We cannot exclude the possibility that part of these differences reflect variations in data quality among regions. For example, States may have differed in the classification of race for members of various ethnic groups. A discussion of the limitations of NIMS data is included in this issue (*4*).

We considered two measures of data quality, and neither appeared to vary in a manner that would affect our main findings. First, differences in the percentage of infants with unknown birth weights may affect birth weight-specific mortality risks because the number of births and deaths with unknown birth weights was distributed into known values. Blacks generally had a higher frequency of unknown birth weights compared with whites. Secondly, approximately 95 percent of all deaths occurring among the 1980 birth cohort were linked and reported to NIMS (*4*), and we estimate that the completeness of linkage was 93 percent in the Northeast, 96 percent in the North Central, 95 percent in the South, and 97 percent in the West.

These data confirm prior studies of regional differences in infant mortality that identified an elevated risk for infant death in the South (*1*), a finding that has recently attracted considerable attention (*2*).

Almost three-fourths of the elevated mortality risk in the South was due to an increased proportion of black births. When race is considered, however, the major reason for overall increased infant mortality in the South compared with the

remainder of the nation is higher mortality among whites. This finding is due in large part to the percentage of infants with low birth weight and mortality among infants with a birth weight 2,500 g or more, two components which require different intervention strategies.

Low birth weight is a major determinant of infant mortality in the United States, and small infants suffer the highest infant mortality rates. A recent report by the Institute of Medicine has concluded that efforts to reduce the nation's incidence of low birth weight must include a commitment to enrolling all pregnant women in prenatal care (*13*).

For white infants in the South with birth weights of 2,500 g or more, elevated death rates due to birth trauma-hypoxia-asphyxia may indicate a need for improving primary obstetric services, since in this group relatively low mortality rates are expected. In addition, white infants born in the South have higher death rates attributable to causes such as prematurity-LBW-RDS, injuries, congenital anomalies, and infections. These findings suggest that the South needs improvements in basic prenatal, perinatal, and infant care in all birth weight categories.

The reduction of the twofold increased risk of death in black compared with white infants is a major public health objective, and this problem is considered in greater detail in the accompanying articles describing different aspects of the NIMS project. Black infants in the West, however, have a significantly lower risk for infant death compared with black infants born in the other regions. This lower risk is due to both a lower frequency of low birth weight infants and lower birth weight-specific mortality. Birth weight-specific mortality rates are affected not only by maternal and infant characteristics but also by the quality and availability of medical care (*14,15*). Comparison of the West to other regions suggests that improvements in the mortality of black infants are achievable. If all black infants born in 1980 had experienced the same IMR of black infants in the West, there would have been 1,364 fewer deaths of single-delivery black infants, representing a 13 percent drop in the black IMR. Health planners and public health officials should focus future efforts on ways to attain this measurable improvement.

References

1. National Center for Health Statistics: Vital statistics of the United States, 1980, vol. 2, pt b, DHHS Publication No. (PHS) 84-1101. U. S. Government Printing Office, Washington, DC, 1985.
2. Wadley, F.: Southern regional task force on infant mortality. J Tenn Med Assoc 78:164–165, March 1985.
3. Centers for Disease Control: National infant mortality surveillance report, 1980, Atlanta, GA. In press.
4. Hogue, C. J. R., Buehler, J. W., Strauss, L. T., and Smith, J. C.: Overview of the National Infant Mortality Surveillance (NIMS) project–design, methods, results. Public Health Rep 102: 126–138, March-April 1987.
5. Lambert, D. A., and Strauss, L. T.: Analysis of unlinked infant death certificates from the NIMS project. Public Health Rep 102: 200–204, March-April 1987.
6. National Center for Health Statistics: Public use data tape documentation, 1980 natality detail. Public Health Service, Hyattsville, MD, December 1982.
7. International classification of diseases. 9th revision, clinical modification, vol. 1. Commission on Professional and Hospital Activities, Ann Arbor, MI, 1978.
8. Wigglesworth, J. S.: Monitoring perinatal mortality: a pathophysiological approach. Lancet No. 8196:684–686, Sept. 27, 1980.
9. Brann, A. W., et al.: Unintended pregnancy, infant mortality and morbidity: strategies for closing the gap. Paper presented at the National Health Policy Consultation, held Nov. 26–28, 1984, at the Carter Center, Emery University, Atlanta, GA.
10. Buehler, J. W., McCarthy, B. J., Holloway, J. T., and Sikes, R. K.: Infant mortality in a rural health district in Georgia, 1975–1981. South Med J 79: 449–450, April 1986.
11. Nogara, A. J.: Geographic divisions used in census reports. Bureau of the Census memorandum, Oct. 27, 1952, *cited in* Census regions and census divisions. Memorandum for the record from D. Hirschfeld. Bureau of the Census, June 5, 1981.
12. Fleiss, J. L.: Statistical methods for rates and proportions. John Wiley and Sons, New York, 1973, p. 213.
13. Institute of Medicine: Preventing low birthweight. National Academy Press, Washington, DC, 1985, p.5.
14. Williams, R. L., and Chen, P. M.: Identifying the sources of the recent decline in perinatal mortality rates in California. N Engl J Med 306: 207–214, Jan. 28, 1982.
15. David, R. J., and Siegal, E.: Decline in neonatal mortality, 1968 to 1977; better babies or better care? Pediatrics 71: 531–540, April 1983.