Fetal and Infant Mortality

FETAL AND INFANT MORTALITY

Infant deaths and those deaths occurring in the 72-week period around the birth event are indicative of the conditions of life for a population. Fetal, infant, neonatal, and post-neonatal death rates are a reflection of a population's level of poverty, education, access to pre-natal and infant care, and appropriate nutrition. Behavioral factors, such as drug, alcohol, and tobacco use, also play in important role in fetal and infant mortality risk. Pre-natal and infant care, for the improvement of most of the factors contributing to fetal and infant deaths is inexpensive relative to other medical care expenditures.

The denominators and numerators for fetal, infant, neonatal, and post-neonatal death rates vary. Fetal death rates are calculated using the number of fetus deaths after 20 or more weeks of gestation (a 40 week period), and dividing it by the number of live births plus fetal deaths (the base population or denominator). An infant is defined as an individual who is less than one year of age. To calculate infant death rates, the base population of live births divides the number of infant deaths. Neonates are those individuals less than 28 days of age. To calculate neonatal death rates, the base population of live births divides the number of neonatal deaths. Post-neonates are those individuals who are between 28 days and one year of age. Rates for post-neonatal deaths are calculated by dividing the base population of neonate survivors into the number of post-neonate deaths. All rates are referenced to a time period (1989-1993 in general) and use a standardized population base of 1,000.

Many of the rates for fetal and infant deaths are calculated using small numbers. Although these deaths are aggregated over a five-year period for stability (with the exception of black infant deaths) care should be taken in their interpretation.

Fetal and infant death rates for the United States have decreased dramatically this century. The rates for infant and neonatal deaths in 1993 are approximately one-fourth what they were in 1950. Fetal death rates for 1993 are less than half since mid-century and post-neonatal death rates are nearly a third. The greatest amount of improvement in these rates was seen prior to the year 1980. Since that time improvements in rates have continued but more slowly and marginally. This pattern may indicate a convergence toward intrinsic rates inherent at the current level of technological development and level of social well-being.

For fetal and infant deaths a marked disparity exists between white and non-white populations. Black rates are typically double the white rates. Simply taking the ratio of the two population death rates can derive a measure of disparity (e.g., non-white:white). The following table compares the disparities between the two populations over three geographic areas: the United States, North Carolina, and the 41 county region of Eastern North Carolina.

Nonwhite to White Infant Mortality Ratios (white rates)

Region	Fetal Death Rate	Infant Death Rate	Neonatal Death Rate	Post-neonatal Death Rate
U.S.	2.10 (6.1)	2.43 (6.8)	2.13 (4.3)	2.32 (2.5)
N.C.	2.05 (6.5)	2.05 (8.0)	2.23 (5.2)	1.75 (2.8)
ENC	2.15 (6.0)	1.88 (8.5)	2.50 (5.3)	1.52 (3.1)

The above ratios are a relative measure of disparity between non-white population rates and white population rates. The table shows that with the exception of neonatal death rate, the ratios for North Carolina are smaller than the U.S. Ratios for Eastern North Carolina are smaller than both the state and nation for infant and post-neonatal death rates. The following rate tables show that the death rates for Eastern North Carolina's non-white population are lower for infant and post-neonatal mortality when compared to the state and national rates. The disparity between the non-white and white rates in Eastern North Carolina is smaller because the white rate denominator is relatively large. Eastern North Carolina white infant, neonatal, and post- neonatal mortality rates are higher than the rest of the state and nation, while rates for Eastern North Carolina non-whites are similar to the rest of the country. Infant death rates for blacks alone are higher than the state rate.

An analysis of the five total death rate maps (including black infant mortality) shows that Eastern North Carolina's rates are pronounced for infant mortality fetal, and neonatal deaths. The distribution of black infant mortality map is a result of the underlying black population distribution.

Infant mortality rates are much higher in Eastern North Carolina than rates for the state and nation. Although the infant death rates in the United States have fallen for both white and non-white populations since 1950, improvements appear to be slowing since the mid-1970s. Moreover, the disparity in rates between whites and blacks is increasing. In North Carolina black infants are 2.2 times more likely to die than whites. The following table illustrates the growing disparity for infant deaths in the North Carolina since 1980.

Infant Death Rates, North Carolina

Period	All Races	White	Black	Black:White
1981-1983	13.3	10.6	20.0	1.9
1986-1988	12.0	9.3	18.8	2.0
1991-1993	10.4	7.7	16.9	2.2

Source: Health, United States, 1995

For all races, the total 1989-93 infant mortality rate in North Carolina is 10.7 infant deaths per 1,000 live births. For the nation the rate is estimated at 8.4. In Eastern North Carolina (1991-93) the highest meaningful infant death rates are found in Pitt (19.8) and Cumberland (17.8) Counties. Much higher rates are found in the region but they are the products of small denominators and numerators. For the period 1989-93, 25 of the 41 counties in

Eastern North Carolina had a total infant mortality rate higher than the state rate. Greene County had the highest total infant mortality rate (18.9) with only 18 deaths. The highest meaningful rate is found in Scotland County (18.8). Johnston County possesses the lowest meaningful rate of 7.2.

Pre-term delivery and low birth weight are strongly associated with infant mortality. Factors that increase the risk of infant mortality are pre-term delivery and low birth weight. These factors are associated with the following characteristics: 1) the mother is under age 18 or over age 35; 2) she has less than a high school education; 3) she has had four or more previous pregnancies; 4) she has had a previous infant that died; 5) and she is unmarried.

Infant mortality has substantial economic costs, as it costs 14 times more to care for an infant born prematurely than to care for a healthy infant born at full term; infant mortality also causes tremendous emotional suffering. For these reasons, North Carolina has made a strong commitment to address its infant mortality problem, largely through the Governor's Commission on Reduction of Infant Mortality. The effort has received substantial support from the General Assembly and generous private support. Intervention strategies used by communities may include: increasing the availability and improving the content of prenatal care and well-baby care, teaching parenting skills, providing nutrition counseling, and developing case management programs. Efforts to reduce unintended pregnancies should also be incorporated. The causes of infant mortality are complex and interrelated. Improving the education level, employment, housing, and income of women is likely to have a positive effect.

HEALTHY CAROLINIANS 2000 OBJECTIVE

MATERNAL AND INFANT HEALTH PRIMARY GOALS:

Reduce total infant mortality rate by 30%. Reduce infant mortality to no more than 7.4 per 1,000 births. (Baseline: 10.6 per 1,000 live births in 1990; 8.6 per 1,000 live births projected for the year 2000)

SPECIAL POPULATION TARGET:

Reduce the nonwhite infant mortality rate by 40%. Reduce the nonwhite infant mortality rate to no more than 8.7 per 1,000 live births. (Baseline: 16.6 per 1,000 live births in 1990; 14.5 per 1,000 live births projected for the year 2000)

HEALTHY PEOPLE 2000 GOAL

HEALTH STATUS OBJECTIVE 14.1:

Reduce total infant mortality rate to no more than 7.0 per 1,000 live births. (Baseline: 10.1 per 1,000 live births in 1987)

Note: Infant mortality is deaths of infants under 1 year; neonatal mortality is deaths of infants under 28 days, and postneonatal mortality is deaths of infants aged 28 days up to 1 year.

HEALTH STATUS OBJECTIVE 14.1A:

Special Population Target: Reduce infant mortality among blacks to no more than 11.0 per 1,000 live births. (Baseline: 18.8 per 1,000 live births in 1987)

HEALTH STATUS OBJECTIVE 14.1D:

Special Population Target: Reduce neonatal mortality to no more than 4.5 per 1,000 live births. (Baseline: 6.5 per 1,000 live births in 1987)

HEALTH STATUS OBJECTIVE 14.1E:

Special Population Target: Reduce neonatal mortality among blacks to no more than 7 per 1,000 live births. (Baseline: 12.3 per 1,000 live births in 1987)

HEALTH STATUS OBJECTIVE 14.1G:

Special Population Target: Reduce post-neonatal mortality to no more than 2.5 per 1,000 live births. (Baseline: 3.6 per 1,000 live births in 1987)

HEALTH STATUS OBJECTIVE 14.1H:

Special Population Target: Reduce post-neonatal mortality among blacks to no more than 4 per 1,000 live births. (Baseline: 6.4 per 1,000 live births in 1987)

Additional Data Source: National Center for Health Statistics. *Health, United States, 1995.* Hyattsville, Maryland: Public Health Service. 1996.

Fetal Mortality
Eastern North Carolina, 1989-93

	Fetal Death Rates Per 1,000 Deliveries					
	White		Minority		Total	
County	**Fetal Deaths**	**Rate**	**Fetal Deaths**	**Rate**	**Fetal Deaths**	**Rate**
Beaufort	8	4.6	24	18.0	32	10.4
Bertie	2	5.0	19	16.9	21	13.8
Bladen	4	3.9	15	13.1	19	8.8
Brunswick	16	5.9	3	3.3	19	5.2
Camden	1	3.8	1	9.9	2	5.5
Carteret	15	4.9	5	13.2	20	5.8
Chowan	3	5.9	11	23.2	14	14.3
Columbus	14	6.9	25	14.3	39	10.3
Craven	28	5.0	28	11.4	56	7.0
Cumberland	89	5.1	147	12.7	236	8.2
Currituck	2	2.3	2	19.4	4	4.1
Dare	11	7.2	2	22.0	13	8.0
Duplin	18	9.7	16	12.3	34	10.8
Edgecombe	13	8.3	39	11.9	52	10.8
Gates	1	3.3	6	18.1	7	11.1
Greene	4	8.2	5	9.6	9	8.9
Halifax	10	6.3	36	11.5	46	9.7
Harnett	25	5.8	26	13.2	51	8.2
Hertford	10	22.0	21	15.9	31	17.5
Hoke	0	0.0	15	11.3	15	7.0
Hyde	2	9.2	1	6.5	3	8.1
Johnston	31	6.2	17	10.3	48	7.2
Jones	6	15.2	4	13.1	10	14.3
Lenoir	18	8.3	25	11.4	43	9.9
Martin	4	5.1	15	13.8	19	10.1
Nash	23	6.6	35	12.8	58	9.3
New Hanover	40	6.6	35	12.8	75	8.5
Northampton	3	7.2	11	9.8	14	9.0
Onslow	65	5.1	31	8.0	96	5.7
Pamlico	7	15.9	4	18.2	11	16.7
Pasquotank	8	6.0	11	9.8	19	7.7
Pender	9	6.6	9	11.1	18	8.3
Perquimans	6	15.9	2	6.6	8	11.8
Pitt	25	5.4	65	16.1	90	10.4
Robeson	22	8.7	80	11.0	102	10.4
Sampson	18	8.8	21	14.2	39	11.1
Scotland	11	8.8	35	20.9	46	15.7
Tyrrell	1	7.9	0	0.0	1	4.0
Washington	3	6.8	12	18.4	15	13.7
Wayne	21	4.2	49	14.7	70	8.4
Wilson	13	5.4	45	17.0	58	11.5
29 County Region	331	5.9	525	13.2	856	9.0
41 County Region	610	6.0	953	12.9	1563	8.9
North Carolina	2,278	6.5	2,225	13.3	4,503	8.7
United States		6.1[1]		12.8[1]		7.1[1]

[1] Health, United States, data 1993

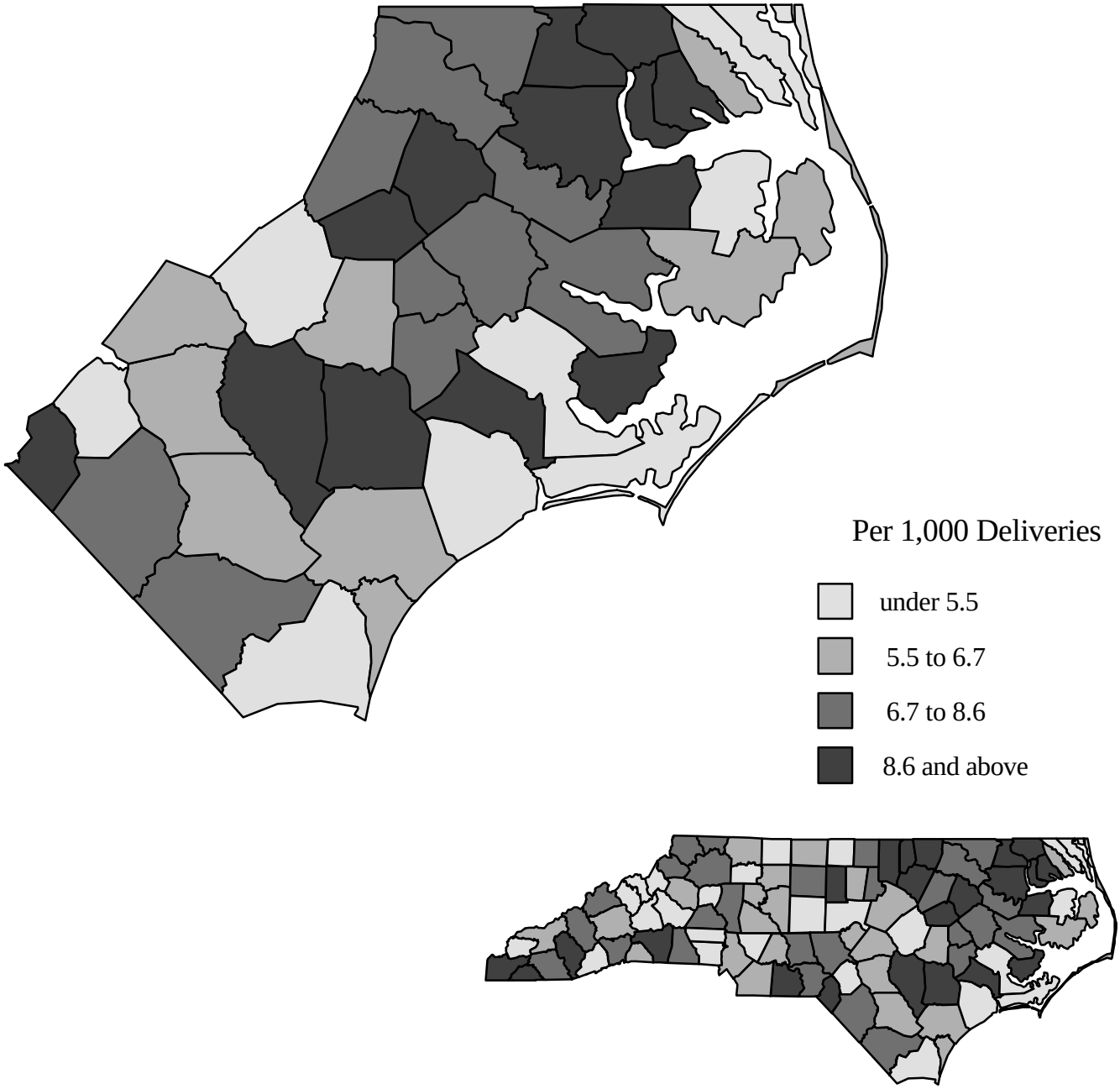
Center for Health Services Research and Development
East Carolina University

Source: County Health Data Book, July 1995

Fetal Mortality

Eastern North Carolina

Total Fetal Death Rates: 1989 - 1993



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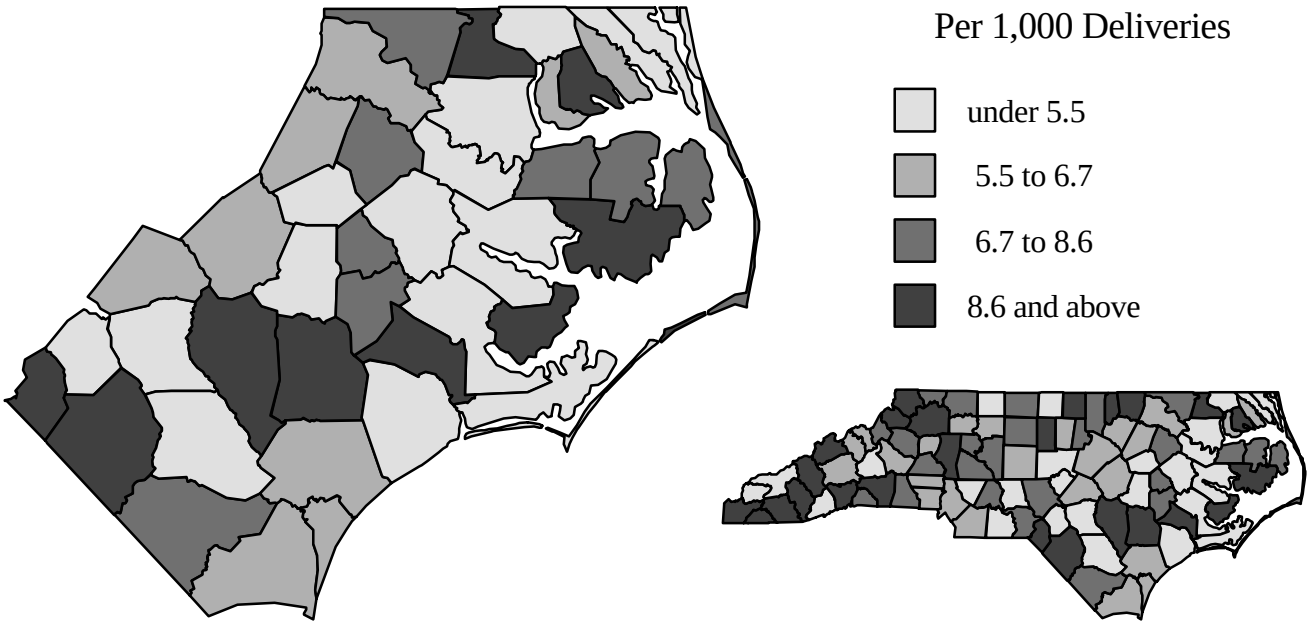
Source: County Health Data Book, July 1995

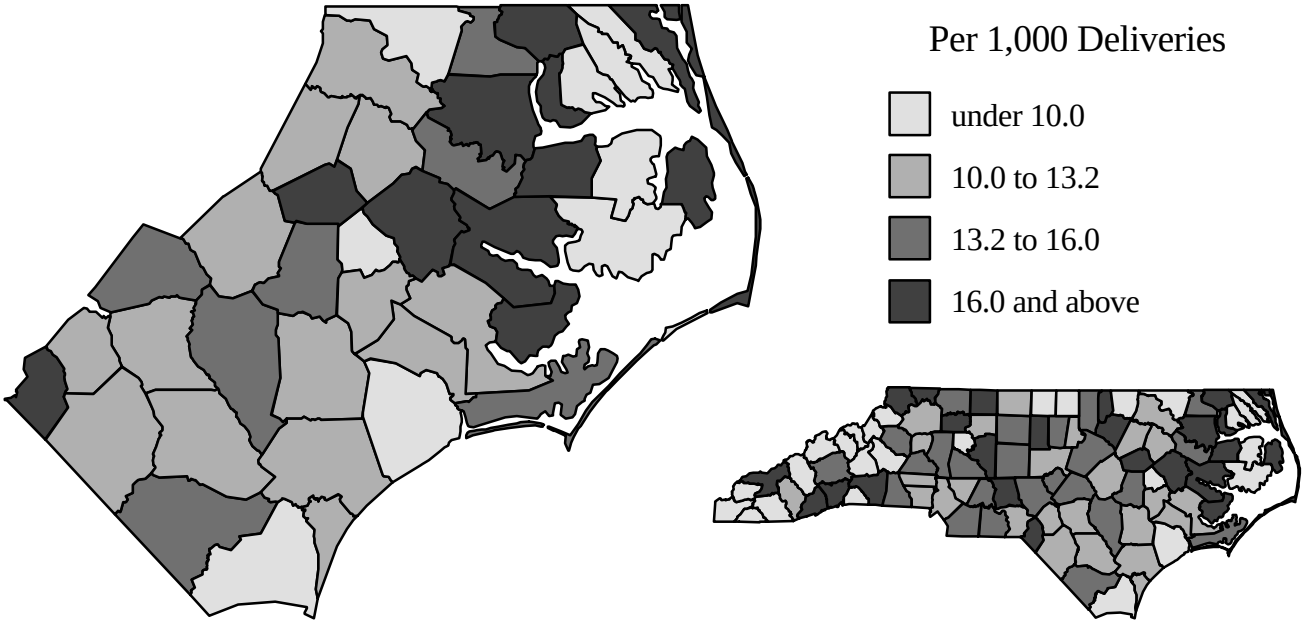
Fetal Mortality

Eastern North Carolina

White Fetal Death Rates: 1989 - 1993



Nonwhite Fetal Death Rates: 1989 - 1993



Center for Health Services Research and Development
East Carolina University

Source: County Health Data Book, July 1995

Infant Mortality
Eastern North Carolina, 1989-93

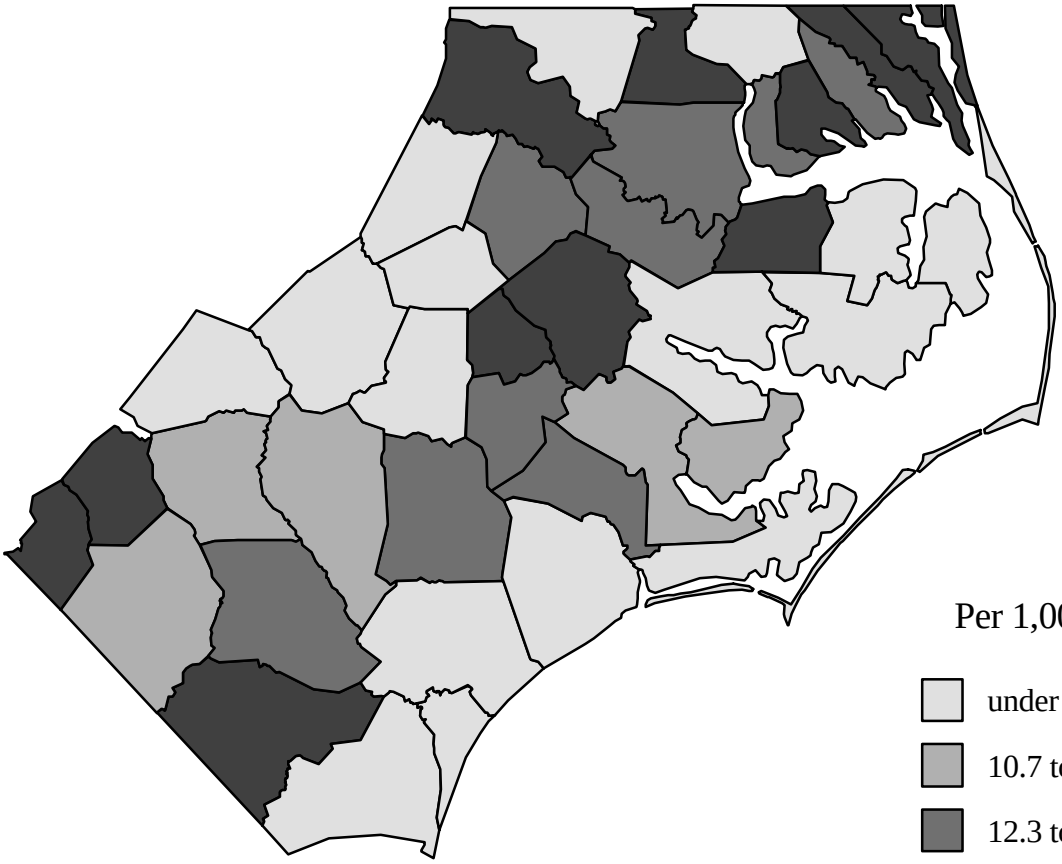
	Infant Death Rates Per 1,000 Live Births					
	White		Minority		Total	
County	**Infant Deaths**	**Rate**	**Infant Deaths**	**Rate**	**Infant Deaths**	**Rate**
Beaufort	6	3.5	22	15.2	28	8.5
Bertie	1	5.0	21	17.2	22	14.0
Bladen	13	12.7	17	15.1	30	14.0
Brunswick	22	8.5	14	15.3	36	10.2
Camden	4	15.3	2	30.0	6	19.3
Carteret	27	9.5	4	8.0	31	9.3
Chowan	6	12.0	6	12.9	12	12.4
Columbus	29	14.3	27	15.6	56	14.9
Craven	44	7.8	41	17.3	85	10.7
Cumberland	137	7.9	186	16.6	323	11.4
Currituck	9	10.4	6	59.4	15	15.5
Dare	11	7.9	1	11.2	12	8.1
Duplin	18	9.8	25	19.4	43	13.8
Edgecombe	14	8.4	57	16.4	71	13.8
Gates	3	10.0	2	9.2	5	9.6
Greene	4	8.2	14	29.0	18	18.9
Halifax	15	8.8	67	22.0	82	17.5
Harnett	35	8.5	24	12.3	59	9.7
Hertford	6	9.0	25	20.8	31	17.8
Hoke	7	7.2	28	21.4	35	15.9
Hyde	1	4.7	1	6.6	2	5.4
Johnston	33	6.8	16	8.6	49	7.2
Jones	7	18.0	5	9.9	12	14.5
Lenoir	25	11.6	38	17.1	63	14.3
Martin	5	6.3	21	19.6	26	14.0
Nash	25	8.1	31	12.2	56	9.9
New Hanover	48	8.3	30	10.7	78	9.0
Northampton	6	16.8	12	8.1	18	10.4
Onslow	108	8.4	67	16.4	175	10.2
Pamlico	4	9.2	3	13.9	7	10.8
Pasquotank	13	10.5	20	19.0	33	14.4
Pender	9	5.9	12	13.7	21	8.8
Perquimans	4	10.8	7	20.1	11	14.9
Pitt	40	8.9	86	22.9	126	15.4
Robeson	17	7.2	101	13.9	118	12.1
Sampson	16	7.9	27	17.8	43	12.0
Scotland	15	12.1	38	23.8	53	18.8
Tyrrell	1	7.9	1	7.9	2	7.9
Washington	3	4.6	15	23.5	18	15.8
Wayne	44	9.0	42	11.9	86	10.2
Wilson	19	7.5	31	11.9	50	9.8
29 County Region	473	8.7	673	16.7	1,146	12.1
41 County Region	854	8.5	1,193	16.0	2,047	11.7
North Carolina	2,778	8.0	2,698	16.4	5,476	10.7
United States		6.8[1]		16.5[1]		8.4[1]

[4] Health, United States, data 1993

Infant Mortality

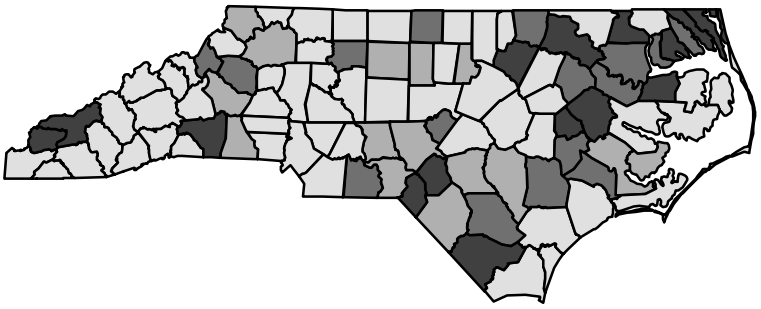
Eastern North Carolina

Total Infant Mortality Rates: 1989 - 1993



Per 1,000 Live Births

- under 10.7
- 10.7 to 12.3
- 12.3 to 14.8
- 14.8 and above



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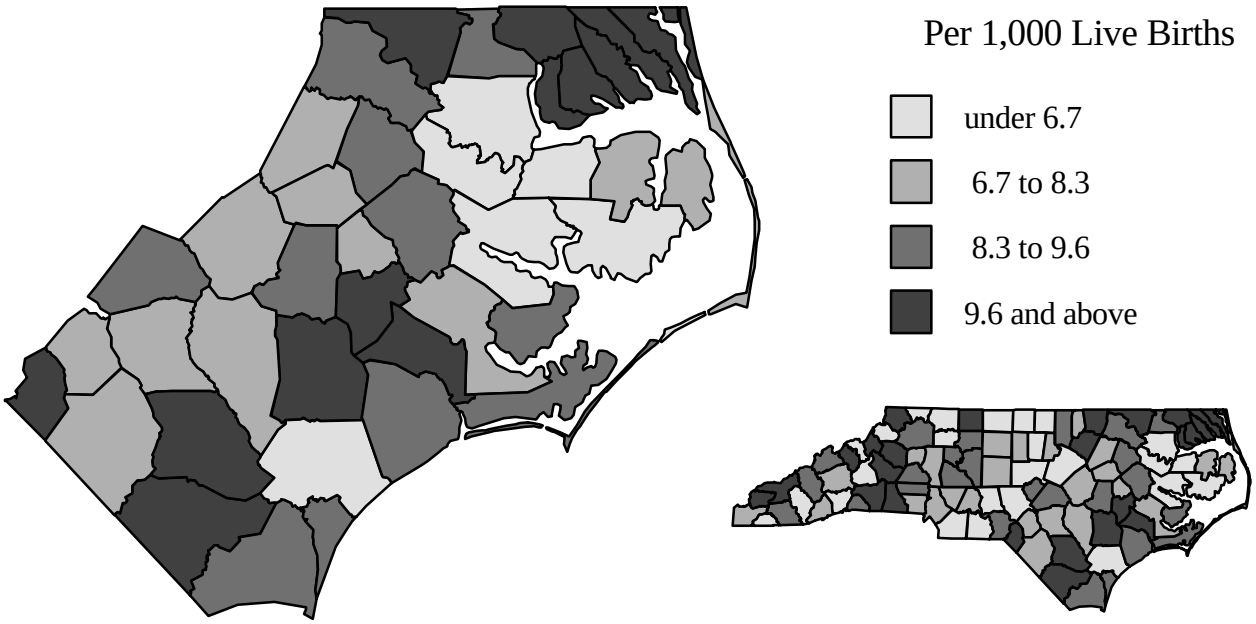
Source: County Health Data Book, July 1995

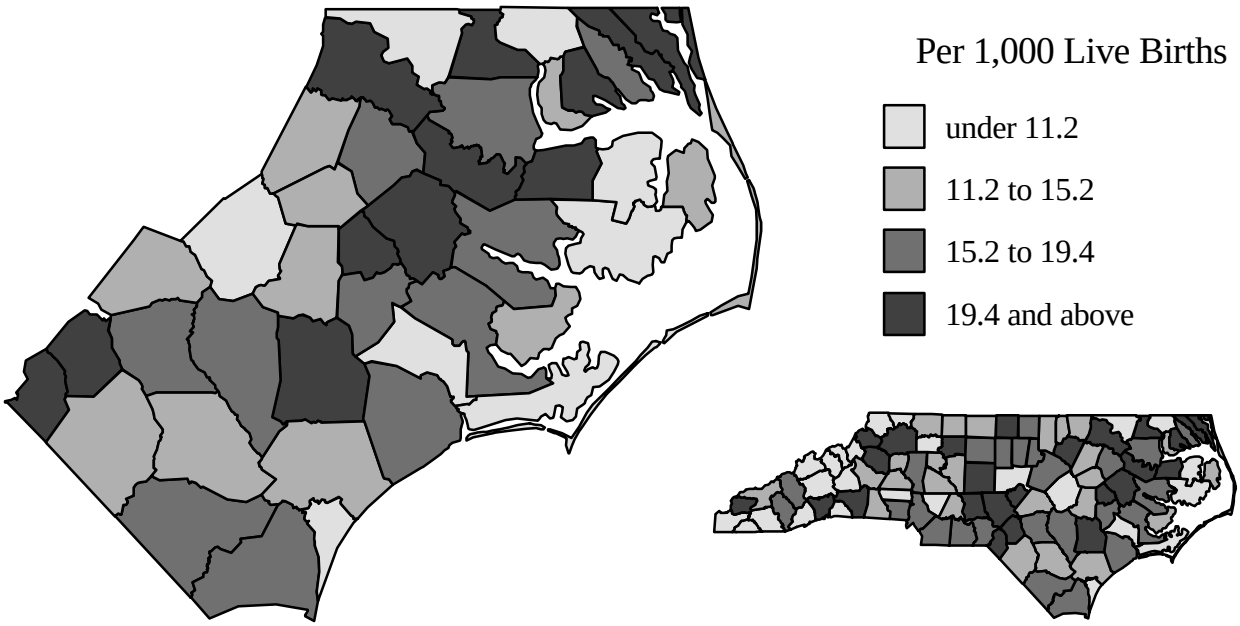
Infant Mortality

Eastern North Carolina

White Infant Mortality Rates: 1989 - 1993



Nonwhite Infant Mortality Rates: 1989 - 1993



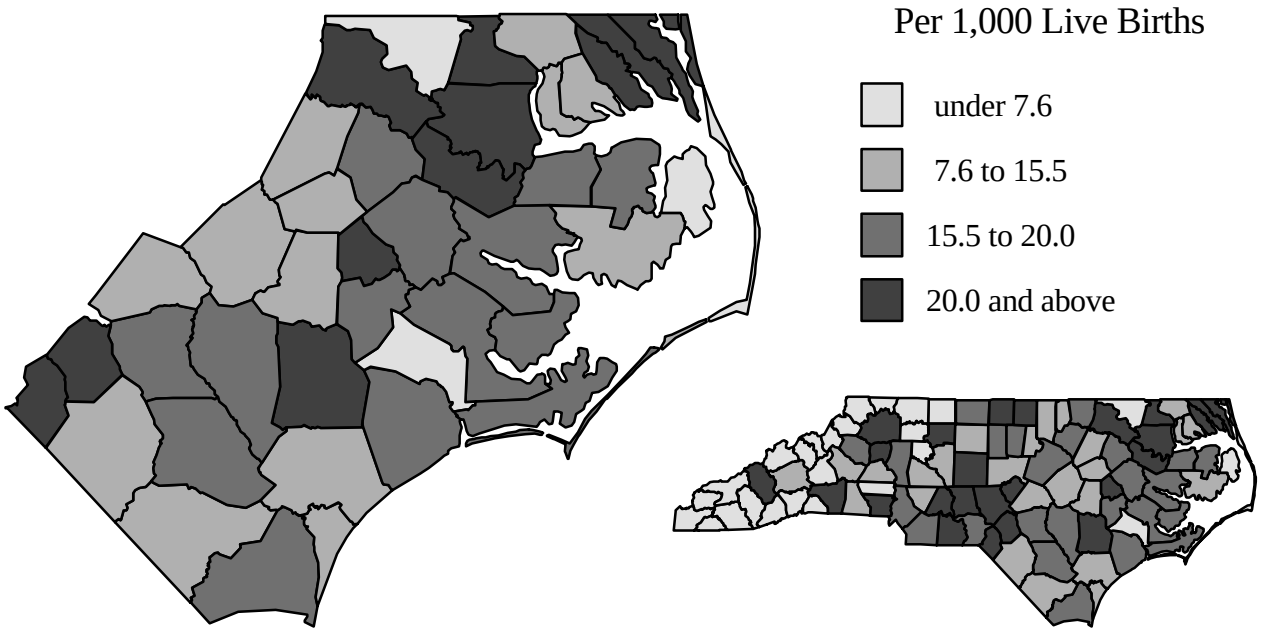
Black Infant Mortality Rate Per 1,000 Live Births
Eastern North Carolina, 1991- 1993

County	Live Births	Infant Deaths	Infant Death Rate
Beaufort	790	15	19.0
Bertie	655	15	22.9
Bladen	655	13	19.8
Brunswick	524	10	19.1
Camden	49	2	40.8
Carteret	194	3	15.5
Chowan	283	3	10.6
Columbus	915	13	14.2
Craven	1,341	26	19.4
Cumberland	6,108	109	17.8
Currituck	59	3	50.8
Dare	50	0	0.0
Duplin	738	17	23.0
Edgecombe	1,919	36	18.8
Gates	175	2	11.4
Greene	296	10	33.8
Halifax	1,719	40	23.3
Harnett	1,071	16	14.9
Hertford	754	17	22.5
Hoke	538	15	27.9
Hyde	86	1	11.6
Johnston	965	9	9.3
Jones	171	1	5.8
Lenoir	1,319	24	18.2
Martin	640	14	21.9
Nash	1,596	19	11.9
New Hanover	1,587	20	12.6
Northampton	637	4	6.3
Onslow	1,839	29	15.8
Pamlico	111	2	18.0
Pasquotank	652	16	24.5
Pender	460	7	15.2
Perquimans	157	2	12.7
Pitt	2,373	47	19.8
Robeson	1,761	25	14.2
Sampson	820	15	18.3
Scotland	802	22	27.4
Tyrrell	64	1	15.6
Washington	372	7	18.8
Wayne	1,884	21	11.1
Wilson	1,499	18	12.0
29 County Region	22,422	395	17.6
41 County Region	38,628	669	17.3
North Carolina	90,203	1,525	16.9
United States	Not Calculated		

Black Infant Mortality

Eastern North Carolina

Black Infant Mortality Rates: 1991 - 1993



Neonatal Death Rates
Eastern North Carolina, 1989-93

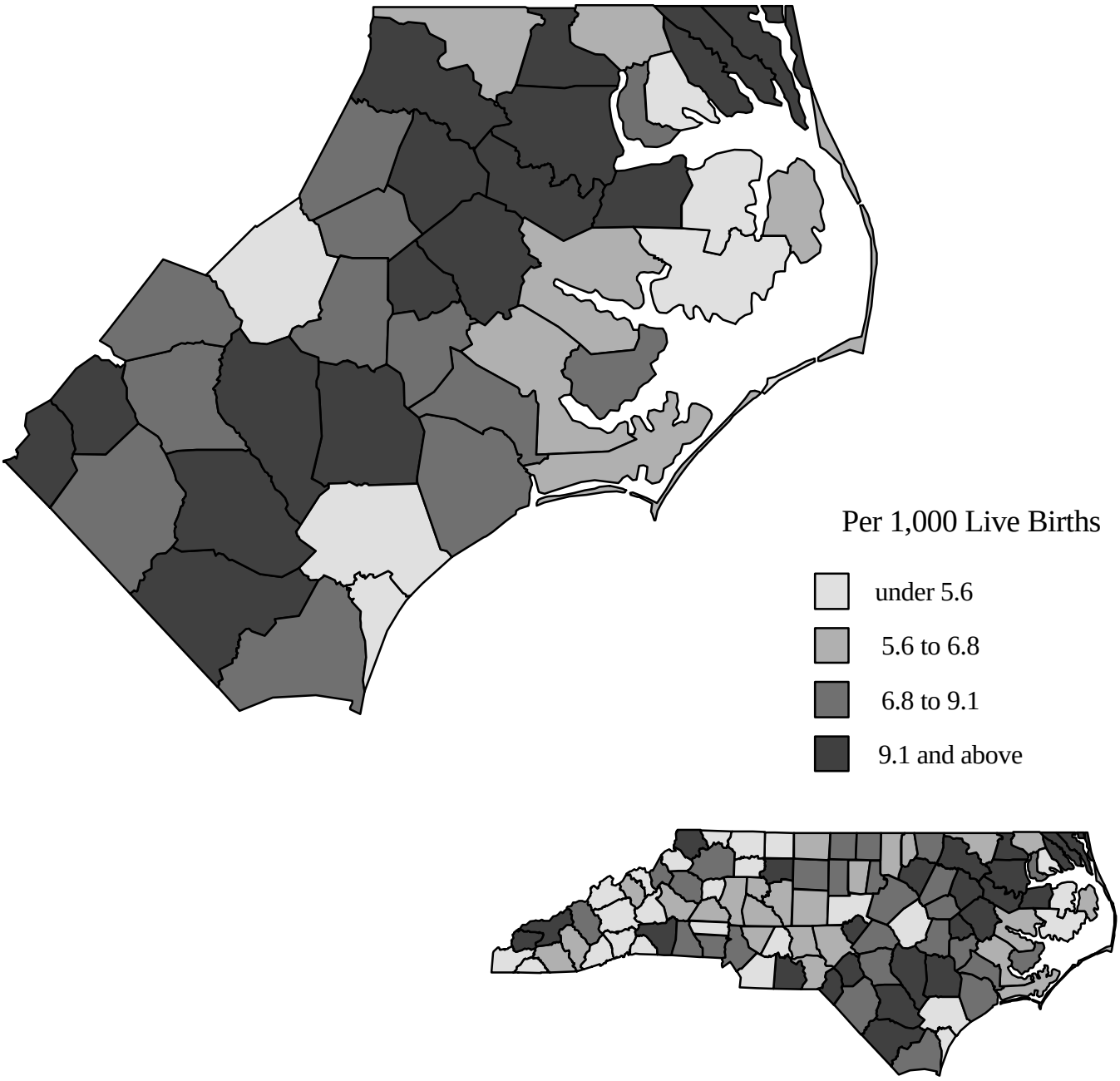
	Neonatal Death Rates Per 1,000 Live Births					
	White		Minority		Total	
County	**Neonatal Deaths**	**Rate**	**Neonatal Deaths**	**Rate**	**Neonatal Deaths**	**Rate**
Beaufort	5	2.9	17	11.4	22	6.6
Bertie	0	2.5	16	12.7	16	10.0
Bladen	9	8.8	12	10.6	21	9.8
Brunswick	15	5.9	11	12.0	26	7.5
Camden	3	11.5	2	30.0	5	16.6
Carteret	15	5.5	4	8.0	19	5.8
Chowan	3	6.0	5	10.8	8	8.3
Columbus	20	9.9	18	10.4	38	10.1
Craven	24	4.2	27	11.5	51	6.4
Cumberland	78	4.5	131	11.8	209	7.4
Currituck	7	8.1	5	49.5	12	12.4
Dare	8	5.9	0	0.0	8	5.6
Duplin	12	6.5	19	14.8	31	9.9
Edgecombe	7	3.9	42	11.8	49	9.2
Gates	2	6.7	1	6.2	3	6.4
Greene	2	4.1	10	21.3	12	13.0
Halifax	11	6.3	46	15.2	57	12.2
Harnett	26	6.3	19	9.8	45	7.4
Hertford	3	2.2	20	17.0	23	13.2
Hoke	6	6.0	20	15.3	26	11.7
Hyde	1	4.7	1	6.6	2	5.4
Johnston	22	4.6	15	7.9	37	5.4
Jones	4	10.3	4	6.6	8	8.7
Lenoir	15	7.0	25	11.1	40	9.0
Martin	4	5.1	16	14.9	20	10.8
Nash	19	6.4	18	7.4	37	6.8
New Hanover	26	4.6	15	5.2	41	4.8
Northampton	4	12.0	8	4.5	12	6.5
Onslow	66	5.1	55	13.2	121	7.0
Pamlico	2	4.6	3	13.9	5	7.7
Pasquotank	11	9.0	15	14.4	26	11.5
Pender	4	2.2	7	7.5	11	4.2
Perquimans	0	0.0	4	10.0	4	4.5
Pitt	26	5.9	66	17.8	92	11.4
Robeson	12	5.2	60	8.2	72	7.4
Sampson	11	5.4	23	15.1	34	9.5
Scotland	10	8.1	25	15.9	35	12.5
Tyrrell	0	0.0	1	7.9	1	4.0
Washington	2	2.3	10	15.6	12	10.2
Wayne	32	6.6	33	9.2	65	7.6
Wilson	14	5.4	21	8.1	35	6.8
29 County Region	302	5.4	494	12.1	796	8.4
41 County Region	541	5.3	850	11.3	1,391	7.9
North Carolina	1,805	5.2	1,901	11.6	3,706	7.3
United States		4.3[1]		10.7[1]		5.3[1]

[1] Health, United States, data 1993

Neonatal Deaths

Eastern North Carolina

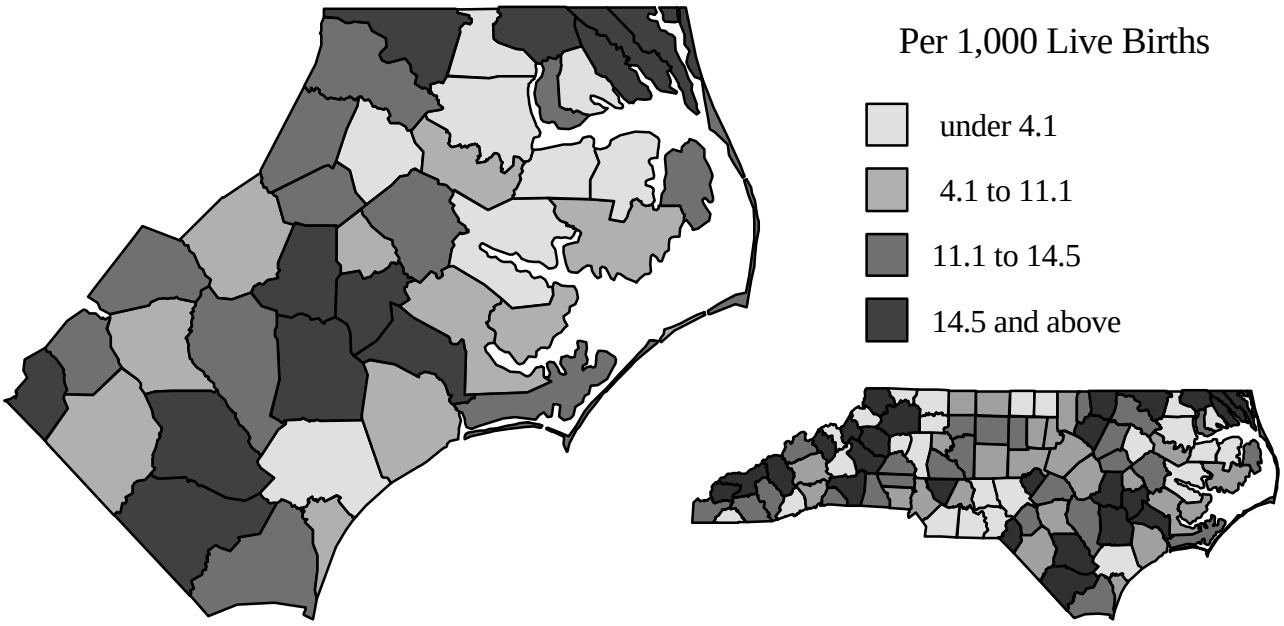
Total Neonatal Death Rates: 1989 - 1993



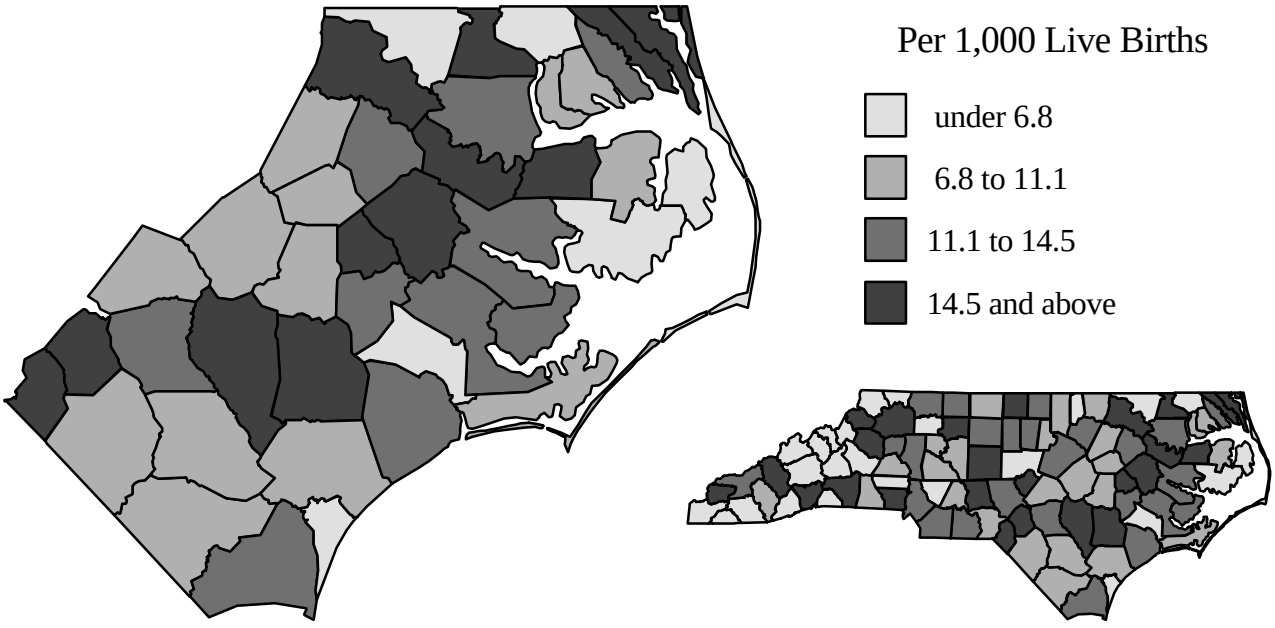
Neonatal Deaths

Eastern North Carolina

White Neonatal Death Rates: 1989 - 1993



Nonwhite Neonatal Death Rates: 1989 - 1993



Center for Health Services Research and Development
East Carolina University

Source: County Health Data Book, July 1995

Postneonatal Mortality
Eastern North Carolina, 1989-93

	Postneonatal Death Rates Per 1,000 Neonatal Survivors					
	White		Minority		Total	
County	**Postneonatal Deaths**	**Rate**	**Postneonatal Deaths**	**Rate**	**Postneonatal Deaths**	**Rate**
Beaufort	1	0.6	5	3.9	6	2.0
Bertie	1	2.5	5	4.6	6	4.0
Bladen	4	3.9	5	4.5	9	4.2
Brunswick	7	2.6	3	3.3	10	2.8
Camden	1	3.9	0	0.0	1	2.8
Carteret	12	3.9	0	0.0	12	3.5
Chowan	3	6.0	1	2.2	4	4.2
Columbus	9	4.5	9	5.3	18	4.8
Craven	20	3.6	14	5.8	34	4.3
Cumberland	59	3.4	55	4.9	114	4.0
Currituck	2	2.3	1	10.4	3	3.1
Dare	3	2.0	1	11.2	4	2.5
Duplin	6	3.3	6	4.7	12	3.9
Edgecombe	7	4.5	15	4.7	22	4.6
Gates	1	3.4	1	3.1	2	3.2
Greene	2	4.1	4	7.9	6	6.1
Halifax	4	2.5	21	6.9	25	5.4
Harnett	9	2.1	5	2.6	14	2.3
Hertford	3	6.8	5	3.9	8	4.7
Hoke	1	1.2	8	6.2	9	4.3
Hyde	0	0.0	0	0.0	0	0.0
Johnston	11	2.2	1	0.6	12	1.8
Jones	3	7.8	1	3.3	4	5.8
Lenoir	10	4.7	13	6.1	23	5.4
Martin	1	1.3	5	4.7	6	3.3
Nash	6	1.8	13	4.8	19	3.1
New Hanover	22	3.7	15	5.6	37	4.2
Northampton	2	4.9	4	3.6	6	3.9
Onslow	42	3.3	12	3.2	54	3.3
Pamlico	2	4.6	0	0.0	2	3.1
Pasquotank	2	1.5	5	4.6	7	2.9
Pender	5	3.7	5	6.3	10	4.7
Perquimans	4	10.8	3	10.1	7	10.5
Pitt	14	3.1	20	5.1	34	4.0
Robeson	5	2.0	41	5.7	46	4.8
Sampson	5	2.5	4	2.8	9	2.6
Scotland	5	4.1	13	8.1	18	6.3
Tyrrell	1	7.9	0	0.0	1	4.0
Washington	1	2.3	5	7.9	6	5.6
Wayne	12	2.4	9	2.8	21	2.6
Wilson	5	2.1	10	3.9	15	3.0
29 County Region	171	3.1	179	4.6	350	3.8
41 County Region	313	3.1	343	4.7	656	3.8
North Carolina	973	2.8	797	4.9	1,770	3.5
United States		2.5[1]		5.8[1]		3.1[1]

[1] Health, United States, data 1993

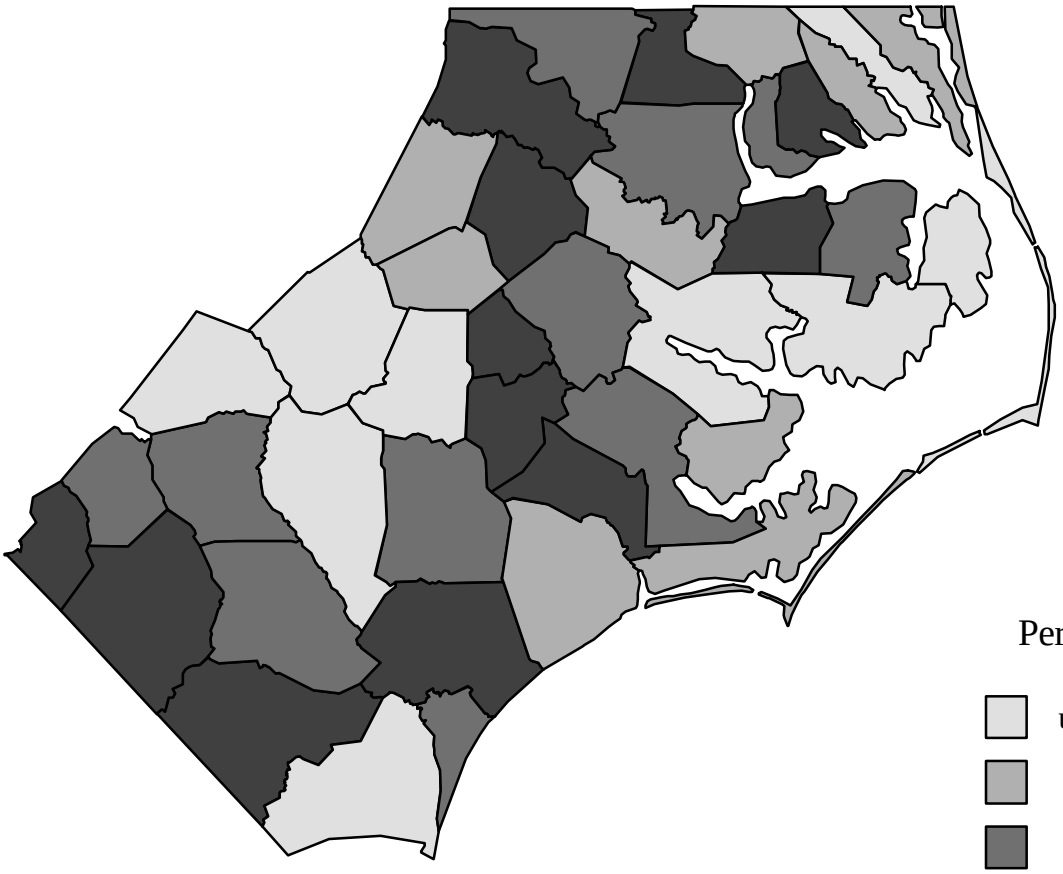
Center for Health Services Research and Development
East Carolina University

Source: County Health Data Book, July 1995

Post-Neonatal Deaths

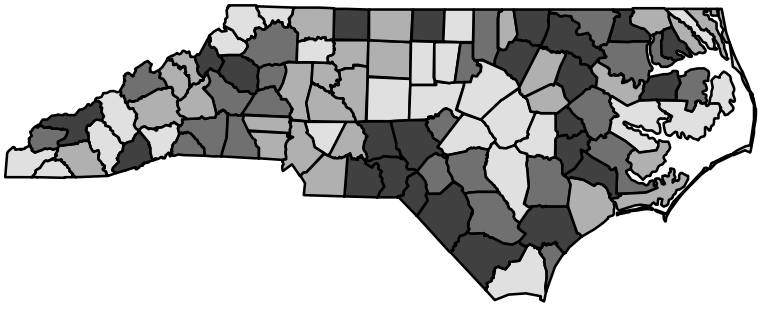
Eastern North Carolina

Total Post-Neonatal Death Rates: 1989 - 1993



Per 1,000 Live Births

- under 2.9
- 2.9 to 3.6
- 3.6 to 4.6
- 4.6 and above



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