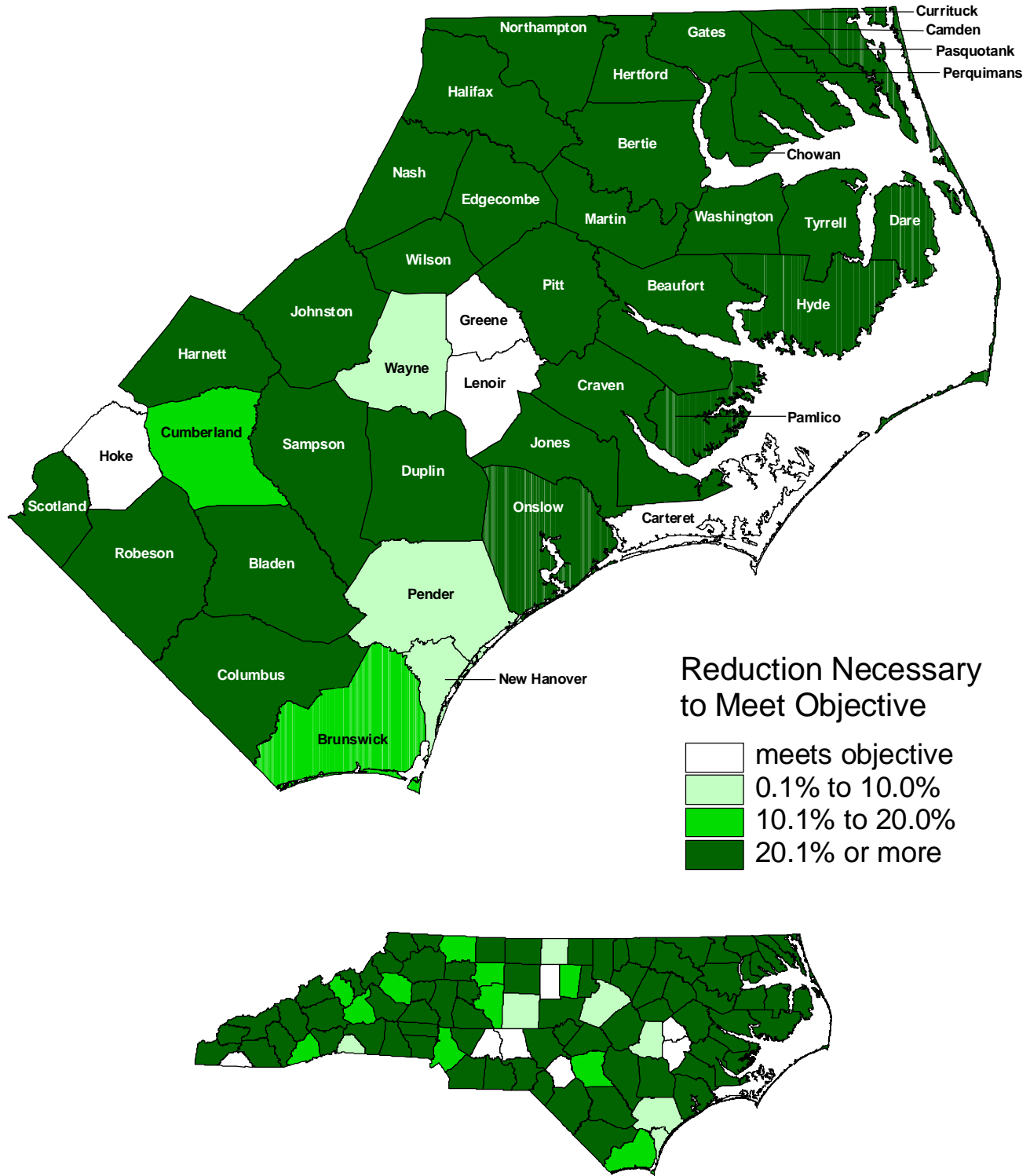


Pneumonia and Influenza

Map 12.1 Progress Towards Pneumonia and Influenza Mortality Objective



2010 Objective for Pneumonia and Influenza Mortality:
Reduce pneumonia and influenza deaths to no more than
26.6 per 100,000 population

Pneumonia and Influenza ICD-9 Codes: 480-487
Based on Five-Year Average, Age-Adjusted Rates Standardized to US 2000

Data Source: NC State Center for Health Statistics

PNEUMONIA AND INFLUENZA

The social and economic burden associated with pneumonia and influenza in the United States (US) is enormous. Recent estimates indicate that there are over 5 million cases of pneumonia annually. Each year, there are approximately 1.2 million emergency room visits, 1.2 million hospitalizations, and nearly 100 million days of restricted activity associated with pneumonia. The total costs of pneumonia exceed \$23 billion annually. Influenza affects over 100 million people each year. More than 75 million days of work are lost to influenza in a single year, and total annual costs exceed \$14 billion. Together, pneumonia and influenza are the 6th leading cause of death in the United States, accounting for approximately 91,871 deaths in 1998.

Pneumonia is a term that refers to different types of infections of the lower respiratory tract, whereas influenza is an infectious disease that can affect the lungs as well as other parts of the body. Viruses are the most common cause of pneumonia, followed by bacteria, mycoplasmas, and fungi. Viral pneumonia tends to cause less severe illness than bacterial pneumonia. Influenza is caused by the influenza virus. There are three families of influenza virus and each family includes multiple strains. The exact strain of influenza virus circulating during flu season varies from year to year, with some strains causing more severe disease than others. The influenza epidemic of 1918 killed more than 20 million people worldwide.

Certain population groups are at a higher risk for excess pneumonia and influenza morbidity. Babies and older adults are more vulnerable to complications of these conditions than healthy children and adults. Over 90% of influenza deaths occur in people 65 and older. Other at-risk groups include people with chronic illnesses, those living in institutional settings, and pregnant women. Vaccines that protect against influenza and the most common cause of bacterial pneumonia are available and recommended for those at high risk and for those who wish to avoid these illnesses. Other health behaviors that increase resistance to respiratory infection include proper nutrition and hygiene, regular physical activity, adequate rest, and abstinence from smoking. Treatments for pneumonia and influenza include antibiotics, antiviral drugs, and supportive therapies.

Healthy People 2010 does not contain an objective for pneumonia and influenza mortality. We calculated an objective based on the methods used for other conditions, and we suggest that pneumonia and influenza mortality be reduced to 26.6 deaths per 100,000 population by 2010. Currently, only four (Carteret, Greene, Hoke, and Lenoir) counties in eastern North Carolina (ENC) meet this objective. In order to reach the objective by 2010, 32 of the 41 counties in ENC will have to reduce their current rate by more than 20% (see Map 12.1).

2010 OBJECTIVE FOR PNEUMONIA AND INFLUENZA MORTALITY

Objective: Reduce pneumonia and influenza deaths to no more than 26.6 per 100,000 population

Baseline: 33.2 pneumonia and influenza deaths per 100,000 population in 1996

Currently, four counties in the region meet the objective for pneumonia and influenza mortality.

Crude Mortality Rates for Pneumonia and Influenza, 1994-1998:

The five-year average, crude mortality rate for pneumonia and influenza in ENC (30.7 per 100,000 population) is lower than the rate (35.0) for all other NC counties (ONC) and the rate (31.6) for the United States (see Table 12.1). The highest death rate for pneumonia and influenza in ENC, 75.0 deaths per 100,000 population, is found in Chowan County. The next highest rates are found in Tyrrell (70.1), Sampson (55.8), Perquimans (53.8), and Pasquotank (52.4) counties. Chowan and Tyrrell counties have mortality rates for pneumonia and influenza that are more than twice as high as the regional, state, and national rate. The highest crude mortality rates for pneumonia and influenza are located in the central and northern portions of the region (see Map 12.2).

Age-Adjusted Mortality Rates for Pneumonia and Influenza, 1994-1998:

After adjustment for variation in age, the five-year average death rate for ENC and ONC are equal (37.0), but both still exceed the rate for the nation by 11%. Dare County has the highest age-adjusted mortality rate with 65.1 deaths per 100,000. The death rate for Dare County is nearly double the rate for the region, state, and nation. Other counties with high mortality rates for pneumonia and influenza include Chowan (55.6), Sampson (52.4), Harnett (52.2), and Currituck (52.0). The geographic pattern of age-adjusted pneumonia and influenza mortality is shown in Map 12.1.

Trends in Pneumonia and Influenza Mortality, 1979-1998:

As Figure 12.1 demonstrates, pneumonia and influenza mortality trends within North Carolina have not followed the same pattern as the US. For example, the death rates for males in ENC follows the downward trend for the nation, whereas the rate in ONC has continued to rise. Among women in ENC and ONC, pneumonia and influenza mortality have risen steadily over the last 20 years, while the overall rate for US women has recently declined. In order to reach our recommended 2010 objective for pneumonia and influenza mortality, mortality rates for men in ENC will have to decline significantly, and the trend towards higher mortality rates for women in the region will have to be reversed. Currently, four counties in ENC meet the objective for pneumonia and influenza mortality. However, 32 of the 41 counties will have to reduce their current rate by more than 20% to achieve the objective by 2010.

Disparities in Pneumonia and Influenza Mortality, 1979-1998:

Figures 12.1 and Map 12.3 reveal variation in pneumonia and influenza mortality by race and gender. During the late 1980's, the racial mortality gap widened for both groups and has only recently narrowed (see Figure 12.2). In ENC, non-white males have a mortality rate 13% higher than white males, but white females die at a rate 15% greater than the rate for non-white women. The magnitude of racial disparities in mortality among men is similar in ENC, ONC, and the US. However, the mortality gap between white and non-white females is twice as large in ENC and ONC as compared to the nation as a whole. Gender disparities are also apparent in Figure 12.1. Historically, mortality rates for males in ENC are much higher than those for females. However, male death rates in ENC have been declining in recent years, while those for women have been rising.

Table 12.1 Pneumonia and Influenza Mortality in Eastern North Carolina, 1994-1998

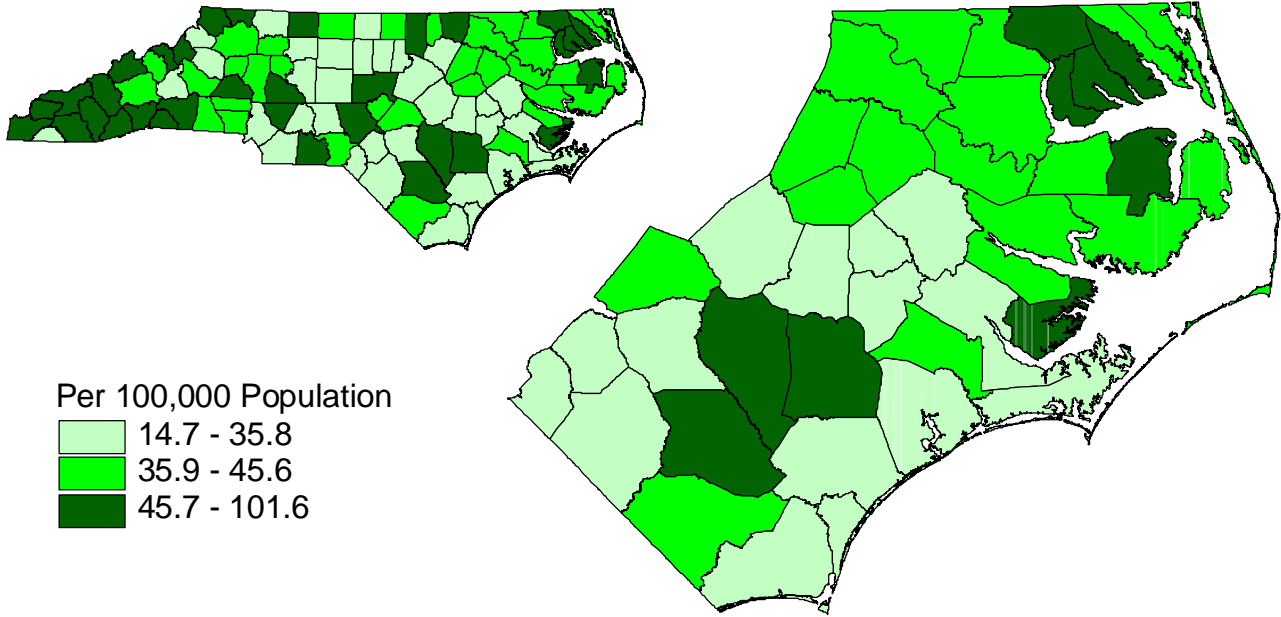
County	Totals			Race-Gender Specific Age-Adjusted Death Rates							
	Deaths	Rates		Non-White Males		Non-White Females		White Males		White Females	
		Crude	Adjusted	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Beaufort	84	38.8	33.9	13	57.0	13	26.4	28	49.0	30	24.6
Bertie	44	43.2	41.8	11	60.4	10	27.5	13	68.2	10	27.9
Bladen	77	51.2	46.3	16	71.0	20	54.1	20	57.8	21	29.9
Brunswick	88	28.0	31.4	5	31.9	8	27.7	32	29.5	43	31.7
Camden	14	44.5	50.4	0	0.0	0	0.0	6	61.7	8	56.5
Carteret	71	24.4	25.1	0	0.0	2	16.9	37	37.4	32	19.3
Chowan	53	75.0	55.6	10	114.1	7	33.0	16	66.4	20	41.9
Columbus	98	37.9	37.3	22	75.7	12	25.3	33	49.6	31	25.1
Craven	116	26.7	33.9	14	48.4	12	21.6	35	38.6	55	34.0
Cumberland	240	16.3	32.4	43	47.3	30	19.7	65	36.9	102	32.3
Currituck	34	41.9	52.0	1	27.7	4	79.0	10	58.1	19	51.5
Dare	60	45.2	65.1	2	180.7	4	140.4	20	55.9	34	61.6
Duplin	100	46.0	44.5	19	73.0	8	18.0	25	47.7	48	45.4
Edgecombe	110	39.4	42.1	28	68.7	23	27.2	26	73.8	33	31.7
Gates	23	46.7	47.9	2	33.9	6	52.3	9	74.9	6	32.4
Greene	21	24.4	25.7	2	23.1	4	22.4	3	20.2	12	31.4
Halifax	108	38.3	35.9	23	46.8	32	39.6	21	35.8	32	28.3
Harnett	177	44.7	52.2	23	89.1	17	45.2	67	75.4	70	38.0
Hertford	43	38.9	34.5	11	51.7	12	31.1	10	52.7	10	18.1
Hoke	26	18.5	25.6	10	61.3	6	18.1	5	20.2	5	15.3
Hyde	12	45.6	36.9	0	0.0	2	31.6	4	58.0	6	44.6
Johnston	168	33.9	39.2	14	58.1	9	19.1	55	45.5	90	37.3
Jones	20	43.5	43.3	3	53.7	1	7.2	6	69.3	10	54.2
Lenoir	68	23.0	22.9	8	21.6	18	24.3	17	30.5	25	19.7
Martin	58	45.1	43.2	14	69.3	8	22.5	16	73.6	20	37.1
Nash	171	39.9	45.1	29	96.4	27	43.7	40	43.8	75	38.4
New Hanover	177	24.8	26.8	15	31.3	15	19.5	68	37.4	79	21.9
Northampton	44	42.4	34.6	15	67.8	6	14.6	16	65.0	7	16.6
Onslow	109	14.7	37.7	10	58.5	7	22.8	40	44.5	52	34.9
Pamlico	31	52.0	41.2	3	54.8	2	22.0	13	84.0	13	31.8
Pasquotank	89	52.4	50.1	16	79.5	6	16.6	18	50.5	49	59.3
Pender	52	28.9	29.2	9	67.5	6	17.1	14	25.7	23	29.5
Perquimans	29	53.8	43.0	4	53.2	7	72.4	8	40.3	10	30.5
Pitt	146	24.3	34.5	17	38.4	27	29.5	38	45.8	64	31.6
Robeson	167	29.9	37.8	42	49.4	53	37.1	25	41.0	47	33.6
Sampson	144	55.8	52.4	16	51.3	21	39.2	50	78.9	57	43.4
Scotland	52	29.8	35.4	10	55.7	9	27.3	20	66.4	13	20.4
Tyrrell	13	70.1	49.4	0	0.0	2	34.7	4	60.2	7	63.4
Washington	26	38.5	36.9	3	29.6	3	20.3	13	91.1	7	21.5
Wayne	120	21.4	27.6	18	37.6	19	21.2	38	39.9	45	23.9
Wilson	132	38.6	41.1	24	61.2	16	23.8	43	62.6	49	33.7
ENC 29	1,949	32.3	37.4	300	53.8	288	27.3	573	49.0	788	32.7
ENC 41	3,415	30.7	37.0	525	53.7	494	27.7	1,027	47.7	1,369	31.9
ONC	8,894	35.0	37.0	683	56.9	564	26.3	3,445	48.3	4,202	30.6
PNC	6,089	31.1	35.5	584	54.7	496	26.0	2,228	46.4	2,781	29.4
WNC	2,805	48.0	40.5	99	75.2	68	28.7	1,217	51.9	1,421	33.3
NC	12,309	33.7	37.0	1,208	55.5	1,058	26.9	4,472	48.1	5,571	30.9
US, 1996	83,727	31.6	33.2	5,067	46.8	4,466	26.4	32,924	40.8	41,270	28.2

Pneumonia and Influenza ICD-9 Codes: 480-487
 Age-Adjusted Rates Standardized to US 2000 SM
 Total Number of Deaths and Rates for Five-Year Period, except US

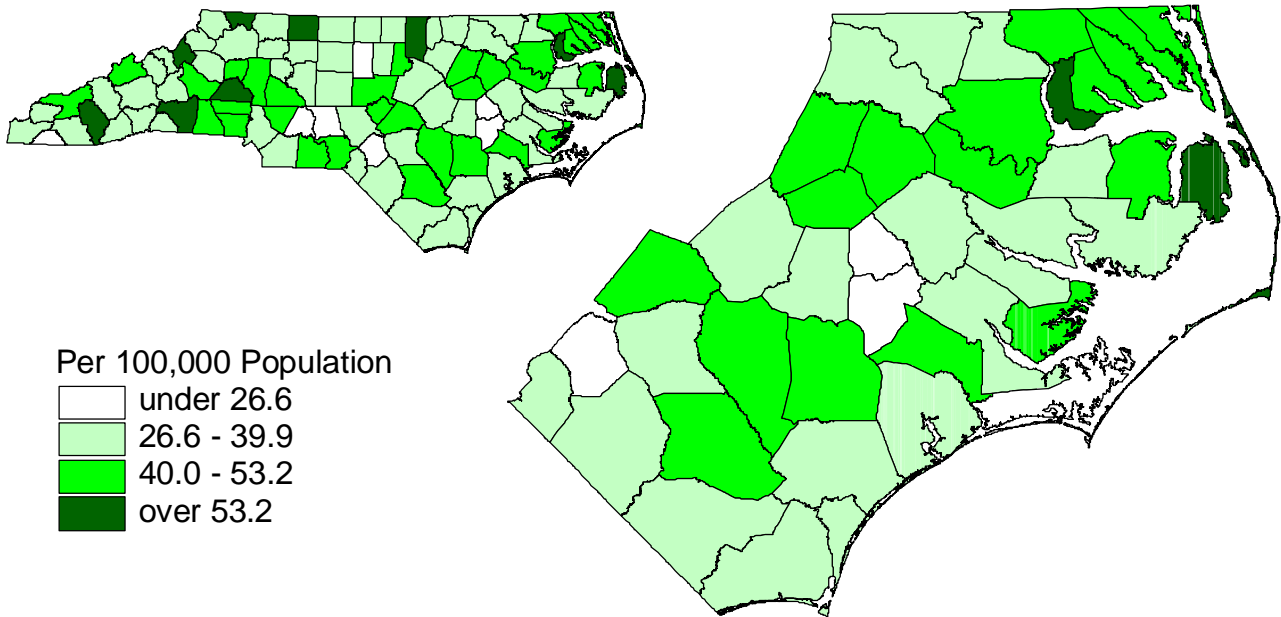
NC Data Source: NC State Center for Health Statistics
 US Data Source: National Center for Health Statistics

Map 12.2 Crude and Age-Adjusted Pneumonia and Influenza Mortality Rates: North Carolina and Eastern North Carolina, 1994-1998

Crude Rate



Age-Adjusted Rate

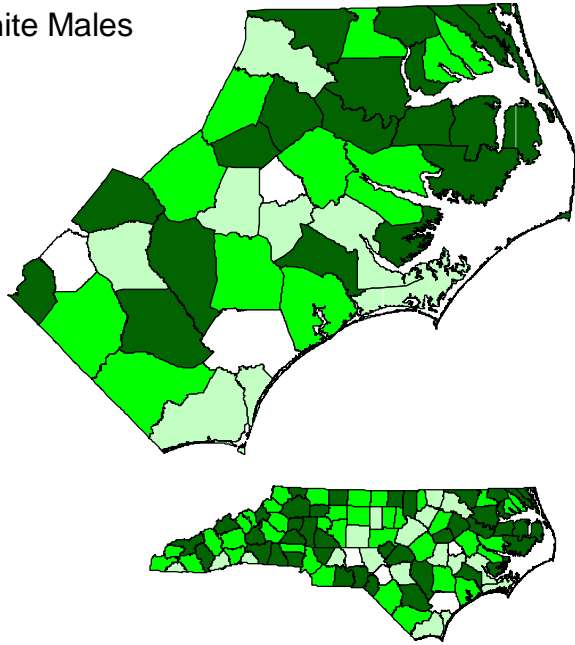


Pneumonia and Influenza ICD-9 Codes: 480-487
Five-Year Average, Age-Adjusted Rates Standardized to US 2000 SM

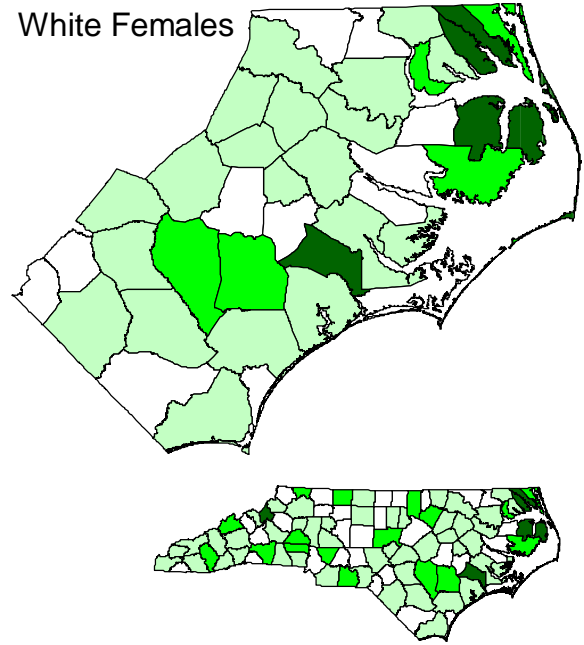
Data Source: NC State Center for Health Statistics

Map 12.3 Race-Gender Specific, Age-Adjusted Pneumonia and Influenza Mortality Rates: North Carolina and Eastern North Carolina, 1994-1998

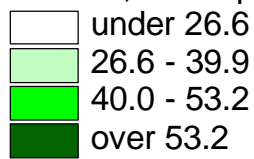
White Males



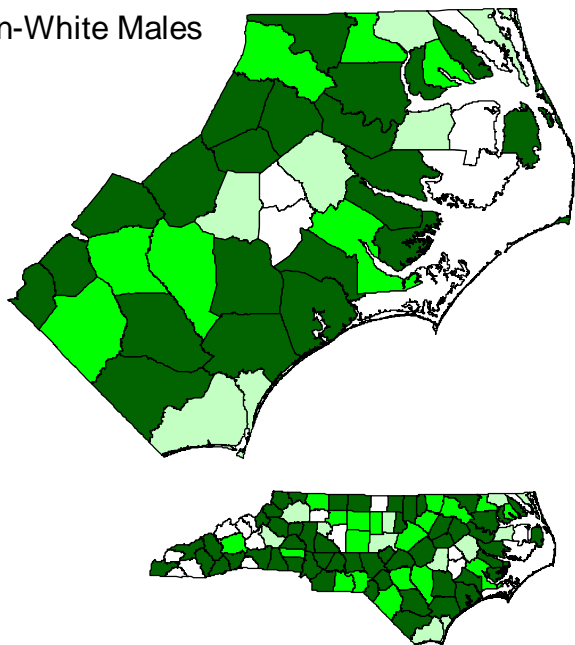
White Females



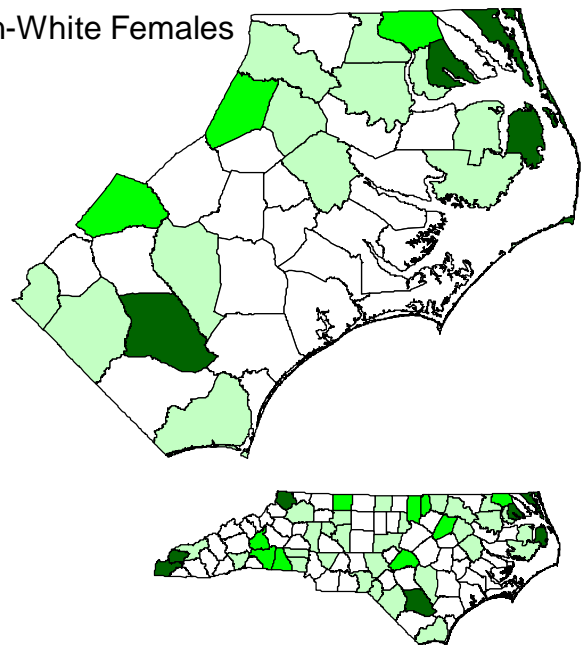
Per 100,000 Population



Non-White Males



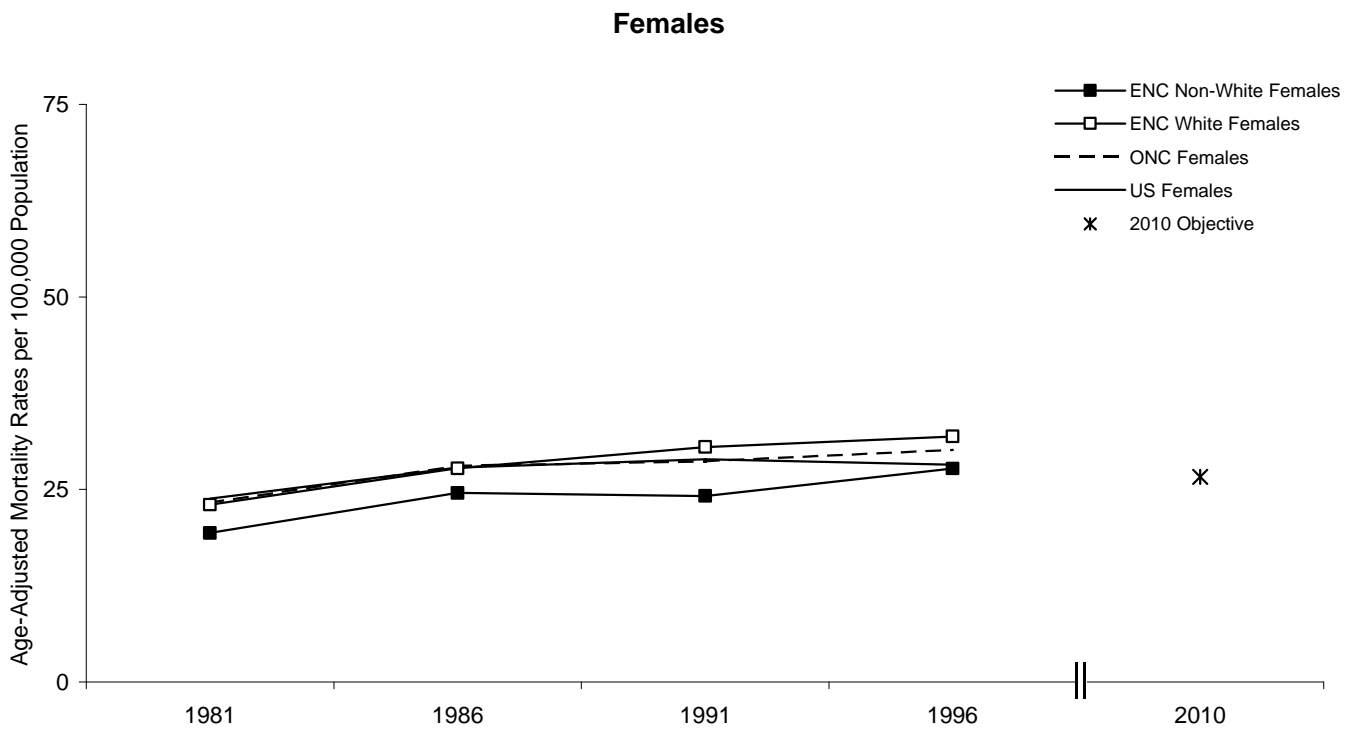
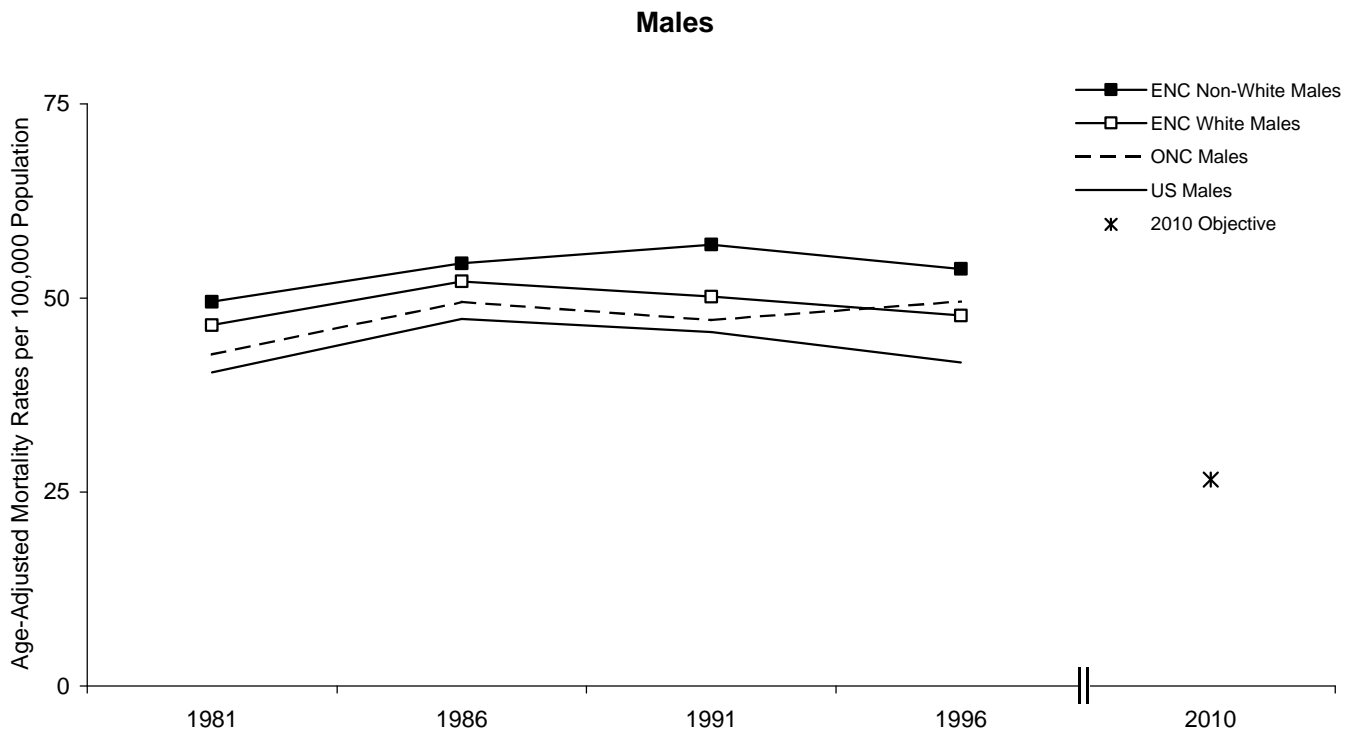
Non-White Females



Pneumonia and Influenza ICD-9 Codes: 480-487
Five-Year Average, Age-Adjusted Rates Standardized to US 2000 SM

Data Source: NC State Center for Health Statistics

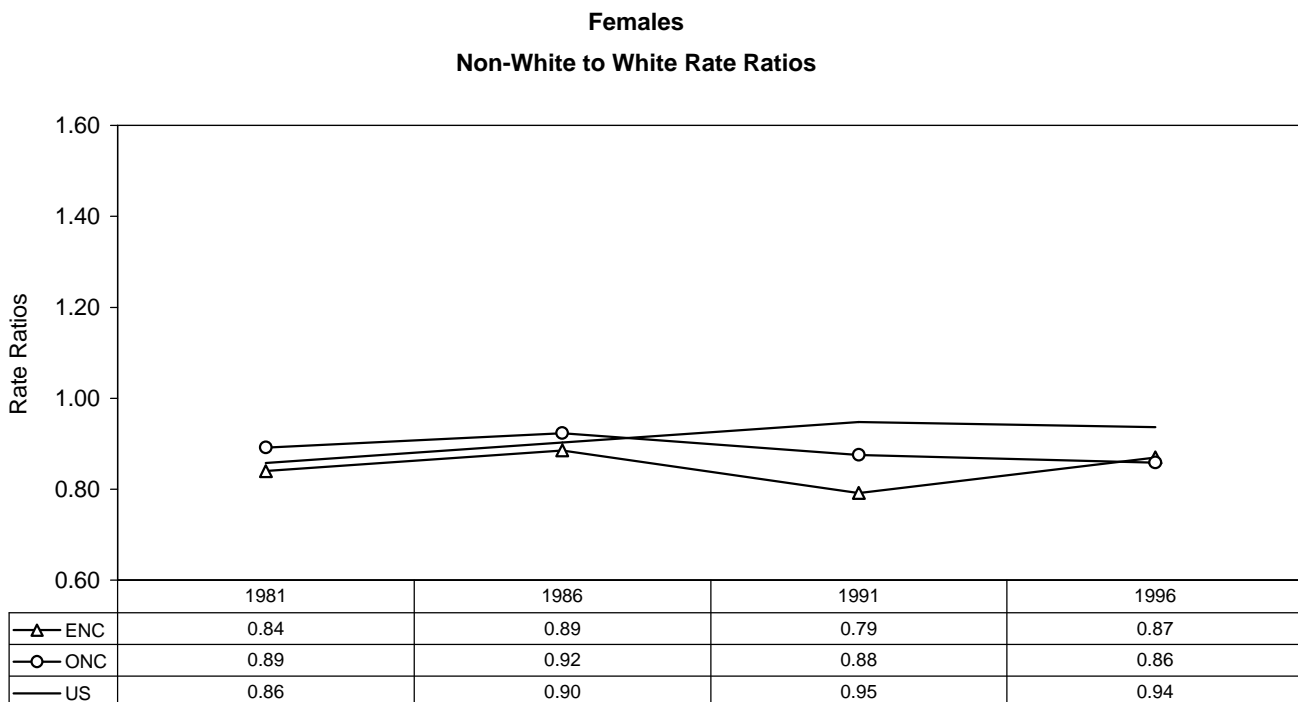
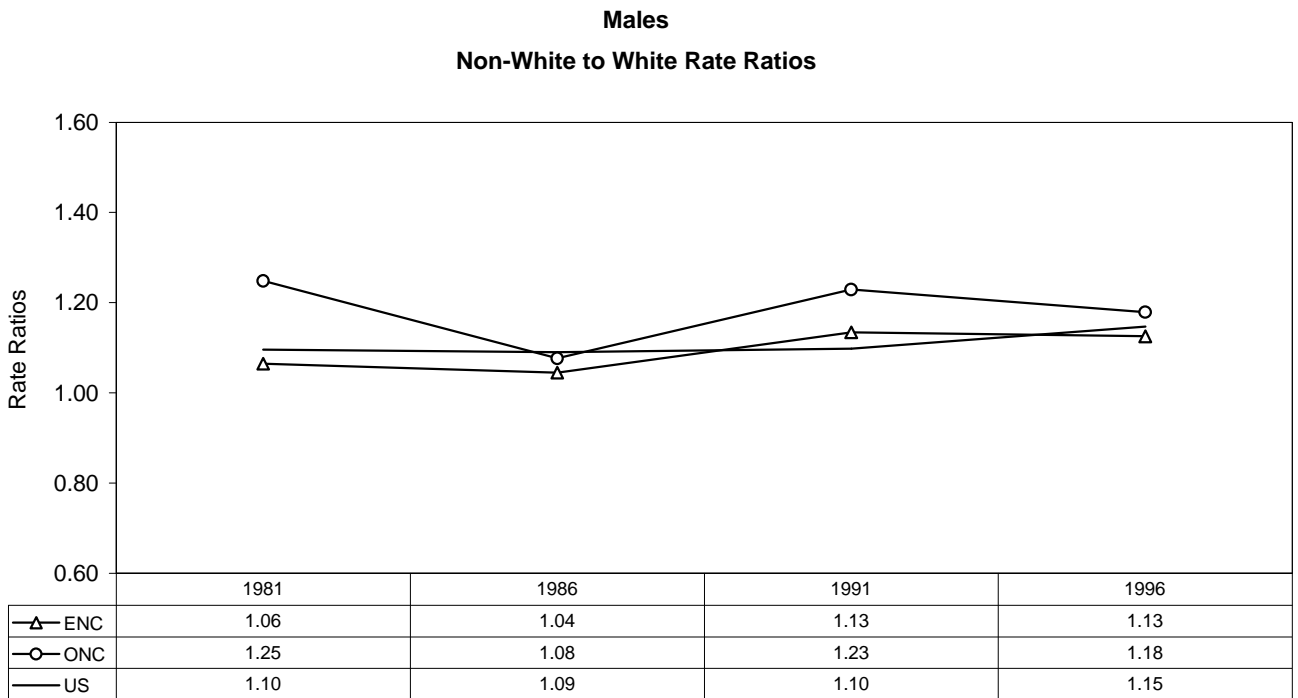
Figure 12.1 Age-Adjusted Pneumonia and Influenza Mortality Rates by Gender: Regional and National Trends, 1979-1998



Pneumonia and Influenza ICD-9 Codes: 480-487
 Five-Year Average, Age-Adjusted Rates Standardized to US 2000 SM
 US Rates for Middle Year of Five Year Periods

NC Data Source: NC State Center for Health Statistics
 US Data Source: National Center for Health Statistics

Figure 12.2 Racial Disparities in Age-Adjusted Pneumonia and Influenza Mortality Rates by Gender: Regional and National Trends, 1979-1998



Pneumonia and Influenza ICD-9 Codes: 480-487
Based on Five-Year Average, Age-Adjusted Rates Standardized to US 2000 SM
US Rates for Middle Year of Five Year Periods

NC Data Source: NC State Center for Health Statistics
US Data Source: National Center for Health Statistics

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American Lung Association
(<http://www.lungusa.org>)

Centers for Disease Control and Prevention
(<http://www.cdc.gov>)

Healthy People 2010
(<http://web.health.gov/healthypeople>)

National Center for Health Statistics
(<http://www.cdc.gov/nchs>)

National Foundation for Infectious Disease
(<http://www.nfid.org>)

National Institute for Allergy and Infectious Disease
National Institutes of Health
(<http://www.nih.gov>)

North Carolina Center for Health Statistics
(<http://www.schs.state.nc.us/SCHS>)

Appendix L

ICD-9 Codes for Pneumonia and Influenza

- 480: Viral pneumonia
- 481: Pneumococcal pneumonia
- 482: Other bacterial pneumonia
- 483: Pneumonia due to other specified organism
- 484: Pneumonia in infectious diseases classified elsewhere
- 485: Bronchopneumonia, organism unspecified
- 486: Pneumonia, organism unspecified
- 487: Influenza