Mortality Trends and Disparities in Piedmont North Carolina

Total Deaths, Premature Mortality and Deaths for Ten Leading Causes; 1979-2004

A Resource for Healthy Communities

Health Indicator Series - Report #2.205
June 2007

Center for Health Services Research and Development
East Carolina University

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1. Introduction

Health Indicators Series:
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Health Indicators is a series of reports describing community health at the state, regional and county level. Health Indicators supplements the Eastern North Carolina Health Care Atlas published by the Center for Health Services Research and Development at East Carolina University. These reports are intended to provide state policy makers, local health departments, hospitals, and community-based health planning groups with a wide range of information useful for diagnosing the health of North Carolina’s population and its local communities, evaluating the effectiveness of existing services, and envisioning and planning new interventions. The reports in this periodically published series can be used in conjunction with the County Health Data Book, produced by the North Carolina Office of Healthy Carolinians, as part of the Community Health Assessment Process. Individual reports in ECU’s Health Indicator Series are custom made for the counties of North Carolina. Reports in this series will describe trends in mortality, including premature mortality for all causes of death, mortality (crude) and age-adjusted mortality for leading causes of death, and measures of race disparities or inequalities in mortality rate.

Report Series #2 of the series focuses attention on the two overarching goals of Healthy People 2010, the national blueprint for health improvement. The first goal is to increase the span and quality of life and the second is to eliminate health disparities. North Carolina’s companion plan, Healthy Carolinians 2010, has also embraced these two goals.

Report Series #2 is a tool to help evaluate how well Piedmont North Carolina* is doing in relation to the goals set forth in Healthy People 2010 and Healthy Carolinians 2010 as well as important differences in life span. Using rate comparisons, this report describes the inequalities in mortality among Piedmont North Carolina and other regions, and among four demographic groups. Premature mortality, the focus of Report Series #1, is included in the death from all causes section located at the beginning of this report. The measure used to quantify premature mortality is described in more detail in the Methods and Interpretations section.

This report describes the leading contributors to mortality, provides a geographic context, and examines trends and inequalities over a 26-year period (1979 to 2004). The report begins with data highlights, provided as an introduction to the data, rather than a summary of it. Readers are encouraged to draw their own conclusions from the data and pose new questions suggested by what they see. The following section presents both the overall and five leading contributors to mortality for the state by race and gender. In this section, pie charts describe the relative contribution of each of five leading contributors to the overall, general rate. These charts also make regional and demographic comparisons. Making the area of each pie chart equivalent to the rate for the

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population group helps convey the dimension of disparity across population groups. The next section charts recent trends and disparities in mortality and provides projections to the year 2010. These charts place Piedmont North Carolina’s health status in a historical context and provide a glimpse into the future.

* The region *Piedmont North Carolina* (the “Piedmont”) is comprised of 35 counties located in the central portion of North Carolina and approximates the piedmont physiographic province of the state. This region is the most highly populated and urbanized region in the state (*viz.* the “Piedmont Urban Crescent).
2. Data Highlights

Trends and Disparities in Mortality in Piedmont North Carolina

The following highlights of mortality in Piedmont North Carolina (PNC) describe current status and trends in the causes of death from major diseases and how they vary across different population groups. The graphs, charts, and tables paint a picture of the region’s health with a broad brush. The study of mortality in populations should include consideration of time and geographic space as well as underlying demographic, political-economic, and socio-cultural conditions. Readers are encouraged to think of these factors as they consider the data presented in this report, formulate their own questions about the causes of mortality, and think about strategies to reduce mortality in the population described.

Current Disparities in Mortality by Geography, Race, and Gender

The age-adjusted mortality rate for Piedmont North Carolina is 846 deaths per 100,000. This rate is 3% lower than the state rate. The Piedmont's Non-White rate is 21% higher than the White rate. The Non-White male rate is 27% higher than the rate for White males. The Non-White female rate is 18% higher than the rate for White females. (All rates age-adjusted).


The five leading causes of death are:
1. Diseases of Heart
2. Cancer - All Sites
3. Cerebrovascular Disease
4. Chronic Lower Respiratory Diseases
5. Alzheimer’s Disease

Twenty-six Year Trends in Mortality Rates (1979-2004)

- The Piedmont has experienced the smallest percentage increase in the all-cause mortality rate (<1%), compared to 14% for ENC, and 8% for NC.
- After age-adjustment, the all-cause mortality rate in PNC is decreasing in line with ENC, NC, and US. The PNC rate is consistently 9% to 10% less than ENC region and 2% to 6% less than the state as a whole.
- Non-White male age-adjusted mortality rates are the highest of any demographic group. White males have seen the greatest percentage decrease (27%) and the trend is slowly converging on the female trends. White females have seen the least change (7% decrease).
- The non-White rate is 30% greater than the White rate in 2004 compared to 33% greater in 1979. The disparity appears to be diminishing and recent rates suggest convergence.
- The trend for racial disparities was not reliable.

All Causes of Premature Mortality (1979-2004):

- Premature mortality in the Piedmont is decreasing at a greater rate (27%), than ENC (20%) and the state as a whole (23%).

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- The age-adjusted premature mortality trend is decreasing in a similar pattern when compared to the region, state, and nation. However, the rates of decrease are much sharper for these regions compared with the rate of decrease for mortality rates. The PNC rate is 12% less than ENC in 1979; by 2004 the advantage grew to 18% less (better than) ENC.
- The non-White male rates are significantly higher than any other demographic group, and the 26-year trend line is decreasing at the highest rate compared to the other groups.
- The non-White rate is about 83% greater than the White rate in 2004, representing an 11% decrease from 1979. Projected convergence of the 26-year trends and more recent rates suggest that elimination of the non-White to White disparity is possible.
- The 26-year trend for racial disparities is not reliable.

Diseases of Heart

- All regions exhibit declining trends in heart disease mortality; comparatively, the trend for crude heart disease mortality in PNC yields the greatest percentage decrease in heart disease mortality.
- After age-adjustment, the rates for heart disease mortality with PNC are less than all other regions, but all display similar decreasing trends.
- The trends for males, both non-White and White, are converging with those of non-White and White females, with White males having the greatest decreasing rate.
- The non-White rate for heart disease mortality in PNC was 26% greater than the White rate in 2004, representing a growth in relative disparity of 50%.
- There was a 104% increase in the racial disparity, as shown with a reliable trend.

Cancer – Trachea, Bronchus, Lung

- The cancer-TBL mortality rates for all regions are increasing and diverging, but during the early to mid 1990s, there appears to be a reversal and decline in rate trends.
- Trends in age-adjusted mortality rates are all increasing in a pattern similar to the simple mortality rates.
- The mortality rates for males, both non-White and White populations are greater than that of non-White and White females. Both female groups show significantly increasing rates, however both male groups display slight, insignificant decreasing rates.
- The non-White mortality rate is 1% greater than the White mortality rate in 2004 however, both trends are increasing and converging.
- The trend for racial disparity is not reliable.

Cerebrovascular Disease

- Stroke mortality in the Piedmont is lower than both ENC and the state as a whole. In 2004, it is 7% less than the NC rate and 9% less than the ENC rate.
- The PNC age-adjusted stroke mortality rate is also decreasing and approximates the NC rate.
- Non-White males have the highest mortality rates for stroke, but with a higher rate of decrease. The convergence of non-White male rates on those of the other race-gender groups is suggested—especially with non-White females in the near future.
- The mortality rate trends for Whites and non-Whites are decreasing in a parallel pattern, but the non-White rate remains 43% higher than that of Whites in 2004, representing a relative increase of 33% in racial disparity.

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There is a 31% increase in racial disparity.

**Chronic Lower Respiratory Diseases**

- Mortality rates for CLRD in ENC, PNC, and NC are all increasing. The PNC mortality rate is 10% less than the ENC rate in 2004.
- The trends for age-adjusted CLRD mortality rates for ENC, PNC, NC, and the US are similar, with PNC, ENC, and NC adding one death per year, compared to the US rate, which adds 0.75 deaths per year.
- Non-White female and White female mortality rates are increasing by 193% and 362%, respectively, and are converging on non-White male and White male mortality, which are increasing much more slowly.
- Rates are increasing for both Whites and non-Whites however, the rate of increase for Whites is almost double that of non-Whites.
- The trend for racial disparity showed a 40% decrease favoring non-Whites.

**Alzheimer’s Disease**

- The PNC mortality rate for Alzheimer’s Disease was 56% higher than the rate for ENC in 2004. However, trends show increasing rates for both regions.
- PNC, ENC, and NC all show sharp percent increases in age-adjusted mortality for Alzheimer’s Disease. The PNC rate is 52% greater than the rate for ENC in 2004.
- White males had the largest increases in their rates, but non-White males and females exhibited the greatest rates of increase.
- In 1979 the non-White mortality rate was 17% higher than the White rate, but in 2004, the rate for non-Whites dropped to 23% below the rate for Whites.
- In a moderately reliable trend, the percentage rate difference between non-White and Whites increased by 90%.

**All Other Unintentional Injuries and Adverse Effects**

- The mortality rate for unintentional injuries in PNC was 22% less than ENC in 1979 and is 3% less than ENC in 2004; it was 9% less than NC in 1979 and is 7% less than NC in 2004. However, the trend for PNC is not reliable.
- The age-adjusted mortality rate for PNC has converged with the ENC trend and will soon converge with the trend for NC, however the trend for PNC is relatively flat and unreliable.
- The non-White male rate trend has converged on the White male trend with a 59% decrease in rates over 26 years. White females are the only group with an increasing mortality rate (57%). Trends for non-White males and White females are converging.
- Non-White rates have seen a 57% decrease and since 1999 have been diverging from White rates.
- There is a 118% decrease in racial disparity favoring non-Whites.

**Diabetes Mellitus**

- PNC diabetes mortality rate is increasing, but below that of NC as a whole and ENC.
- The age-adjusted trend in mortality is similar to the US, while remaining below the rate for ENC and the state as a whole. In 2004, it was 22% less than ENC.
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- The non-White male and non-White female mortality rates for diabetes are increasingly divergent from those of White males and White females. Non-White males exhibit the greatest increase in age-adjusted mortality rates for diabetes.
- Non-White mortality rates have increased by 95%, compared to 77% for White mortality.
- There is a 21% increase in racial disparity in a moderately reliable trend.

Pneumonia and Influenza

- PNC’s influenza and pneumonia mortality rates are below that of NC, and above that for ENC. However, the trends for ENC, PNC and NC are unreliable.
- Age-adjusted mortality rates are declining for PNC, and are converging on the ENC, NC, and the US rates.
- The mortality rates for males, both White (26%) and non-White (35%), are decreasing and converging on female rates.
- In 1979, the non-White rate was 13% greater than the White rate; it was 4% less than the White rate in 2004.
- In a moderately reliable trend, the percent difference between non-Whites and Whites racial disparity has decreased by 140%.

Unintentional Motor Vehicle Injuries

- The Piedmont’s mortality rate for motor vehicle injuries is 33% less than the ENC rate in 2004, and the trend shows a steady decline. All regions show steady, reliable decline in rates.
- There is a similar decline in all trends for PNC, ENC, NC, and the US for age-adjusted mortality.
- Mortality rate trends are significantly higher in men, both White and non-White. Non-White males have seen a 45% decrease while White males have only seen a 33% decrease over the 26-year time period.
- Both Whites and non-Whites exhibit significant decreasing trends in mortality, converging in 2005.
- In a moderately reliable trend there is an 87% decrease in racial disparity.

Cancer - Colon, Rectum, Anus

- The Cancer-CRA mortality rate for PNC is decreasing but the trend is unreliable.
- The age-adjusted mortality rates are decreasing at a higher rate of change (producing a 22% decrease) than for ENC (13%), and NC (18%).
- All demographic groups show a decrease in mortality rates, with the exception of the non-White males whose rates have become flat (trend is unreliable).
- The non-White and White mortality rates are decreasing by 13% and 24% respectively, and are increasingly divergent.
- In a moderately reliable trend, the racial disparity has increased by 72%.

Cancer - All Sites

- While cancer - all sites mortality is increasing, the Piedmont experiences the smallest rate increase (13%) when compared to ENC (33%) and NC (23%).
- All rate trends for age-adjusted mortality, with the exception of the US, are unreliable.

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In a moderately reliable trend, White males show a 7% decrease in mortality and White females show a 7% increase. The trends for non-White males and females are not reliable and relatively flat.

There is a 26% decrease in the racial disparity favoring non-Whites.

**HIV Disease**

- Mortality rates for PNC have decreased by 20% during 1998-2004 in a reliable trend. All regions show a decline in mortality.
- Age-adjusted mortality rates (1998-2004) are decreasing for all regions. The PNC trend reflects the greatest decreasing rate (16%) among all regions in a reliable trend.
- Both non-White males and non-White females experienced a 32% decrease in their rates from 1998-2004.
- PNC non-Whites experienced a 28% decrease in HIV Mortality rates from 1997-2004, while Whites experienced a 61% decrease in a moderately reliable trend.
- The relative disparity between non-Whites and Whites has decreased between 1997 and 2004, however the decrease is slight and unreliable.
3. Methods, Interpretation, and References

Data Sources
The data for mortality and premature mortality in Piedmont North Carolina were obtained from death certificate data from the North Carolina State Center for Health Statistics and population data from the North Carolina Office of State Planning. For the US, data were obtained from the Compressed Mortality File compiled by the National Center for Health Statistics.

Measures
Two types of mortality measures are covered in this report. The first, called mortality rate, is a rate based on the number of deaths per population (or, deaths normalized by the population that produced them) for a given unit area, such as the county, region, or state over a specified time interval. The mortality rate is expressed in two ways, the basic true (actual or observed) rate, and an age-adjusted rate (see below). Mortality rates are used to evaluate the impact and burden of mortality on a population and to make comparisons, where appropriate, among populations. Like the mortality rate, the second type, called premature mortality rate, is also a density measure, but instead of deaths, it is the number of person-years lost in a population before a specified age. In this report mortality rates are emphasized with premature mortality (YLL-75) shown only for the total number of deaths from all causes (general mortality). Premature mortality in detail is the focus of Report Series #1.

A simple count of deaths occurring in an area for a given time interval is useful for identifying potential problems or issues of public concern--particularly if the deaths result from a rare cause or they are believed to be an emerging problem for at-risk socio-demographic groups. In this sense, count data are used for sentinel surveillance. Because counts reveal nothing about the underlying population base from which deaths arise, the analytical or practical utility of count data is limited. The size of the underlying population will have an expected effect on the numbers of deaths that occur. Deaths measured in relation to a population, are an expression of density. When measured over a given interval of time (usually 1 to 5 years), the density is called a rate. (The rate is typically multiplied by 100,000 for ease in interpreting the usually small resultant value.) The mortality rate is an improvement over simple count data because it accounts for the relative size and effect of the underlying population. The chief advantage of the mortality rate is that it is useful for focusing attention on the burden of public health problems more rigorously than simple counts. However, the mortality rate is also affected by the age structure of the population, which can confound interpretation when making comparisons of rates among different areas.

Because aging is the greatest risk factor for death, the age structure of a population will have a substantial effect on the mortality rate. For example, two counties may have similar population sizes but one has a larger number of people over the age of 45 than the other. It is more likely that the older population will generate more deaths over an interval of time and this will be reflected in a higher mortality rate. Differing age structures among populations will confound any comparisons of mortality rates among those populations. Therefore, a method for controlling the effects of age structure on the mortality rate is required if any meaningful comparisons are to be made.

Age-adjustment to control for a population's age structure requires an external reference or standard to weight the comparison populations by age groups. Currently, the US 2000 Standard Million Population (SMP) is used as the external reference. The US 2000 SMP is divided into a number of age groups whose sizes or proportions serve as weights to be applied to the corresponding age groups of the study population. This proportional redistribution generates new numbers of expected deaths in each of the corresponding age groups of the study population. These expected deaths are the number of deaths we would expect if the study population had the same age structure as the US 2000 SMP. The
expected number of deaths are summed and normalized by the total population yielding an age-adjusted death rate. Once the effects of age structure are controlled, the way is paved for making comparisons among populations (Buescher, 1998).

The second measure, premature mortality, focuses on the burden of disease and death expressed in terms of accumulated person years lost before a benchmark age. We use 75 years of age as a benchmark because it approximates current life expectancy at birth in the United States and gives weight to deaths from chronic disease occurring in later life. It considers only deaths of people who die before age 75. To calculate the number of years lost, the mid-point age of the age group to which each decedent belongs is subtracted from 75 and the differences (the lost years) are summed. After all lost years are summed; the result is normalized by the population under age 75 and multiplied by 10,000. Premature mortality is expressed as a rate measured over a time interval, and it can also be age-adjusted.

Age-adjusted rates for both mortality and premature mortality have little intrinsic meaning, however, and can mask the burden and trends of mortality (or health event) that may be of local importance. A casual inspection of adjusted rates may divert attention from the actual health problems of a population and inappropriately guide interventions or resource allocation. Thus, it is important to consider the actual number of deaths (count data) in conjunction with the basic non-adjusted mortality rate first, and then use the adjusted rate only if one wishes to factor out age in understanding the pattern of mortality among populations and regions. For regions with larger populations the statistics presented here are for the year 2004. Smaller areas like counties will usually be aggregated into 5-year intervals (e.g., 2000 to 2004). A five-year interval is used because it provides a useful summary of the mortality experience while minimizing wide year-to-year fluctuations in the rate due to the effect of small numbers.

**Interpreting the Pie Charts**

Pie charts are provided as a visual representation of the burden of mortality. They depict the proportion of mortality accounted for by each of the leading contributors. (The leading causes of death are found in the table preceding the pie chart section.) The pie charts compare the relative levels of burden and proportions by region and demographic groups. Each regional and demographic set of pie charts is based on the observed mortality rate and the age-adjusted (expected) mortality rate. The area of each pie is based on the age-adjusted mortality rate for the year 2004--larger pie charts will represent larger mortality rates. For purposes of presentation, we set the smallest area of a circle on the lowest meaningful rate as a benchmark, the age-adjusted rate for White females in North Carolina. We then scaled up the circles for all other groups proportionately based on their rates.

The first two pie chart figures compare the proportions of leading causes of death across regions at the national, state, and regional/county level. The first figure in this set compares absolute mortality (the burden) using mortality rates, which sheds light on any differences in the burden of mortality by disease intrinsic to each region. The second figure, which is age-adjusted, allows for direct comparisons among regions. The same pattern is repeated in the following figures that show differences among demographic groups.

While comparing the pie charts, the reader should remember that the slices of the pie show differences in how much of the mortality rate (including age-adjusted) is accounted for by a specific cause. Finally, the reader will see that some pies are composed of different leading causes of mortality, so they have different colored slices. The variable sizes of pie slices demonstrate differences in the mortality patterns across populations and are of significant importance in studying inequalities and disparities in population health.
Interpreting the Trend Figures

Four types of figures are used to show trends in mortality, for all causes combined and for each of the ten leading causes in the region/county over a 26-year period. Premature mortality is described for deaths by all causes only. The first of the four types of figures depicts the observed mortality rates for the region/county and state. The second figure type shows age-adjusted mortality rates for the region/county, state, and nation allowing comparisons among geographical areas. The third figure type compares trends in age-adjusted mortality rates by race and gender. Adjustment is made for age structure differences among demographic groups, which permits observation on the effects of race and gender on these groups. The last figure type depicts racial differences (or disparities) expressed as a ratio (in percent) of age-adjusted mortality for non-Whites to the age-adjusted rates for Whites over the twenty-six year time series. Trend lines provide historical depth to mortality processes and a basis for prediction, future comparisons, and action.

The trend line concept is borrowed from statistical modeling. However, unlike true modeling, we are not assuming the statistical independence of each sequential observation (the rate at time interval \( x \)). Instead, our assumption is that each observation is dependent to some degree on previous observations, forming a trend. If the degree of dependence is high, then the observations (rates) should lie close to the trend line. If observations appear to bounce around the fitted line in a random fashion (indicating high variability), then there is less dependence and less of a trend in the observations. We use trend lines to uncover any general patterns found in the data for the purpose assisting the investigator in understanding the underlying processes which generate them.

The equation of the line is derived from a set of observation points. This line is an estimate of where each observed rate would be if the previous observation could predict with 100% accuracy the value of the next observation. In nature, this situation seldom arises and the degree to which individual observations deviate from this linear trend line is an indication of how well they “fit” or conform to the trend. The linear trend lines in the time series figures project expected rates to the year 2010 from known historical values (1979 to 2004) to provide a general idea about where mortality trends are heading.

The equation of the line allows the user to calculate an expected or fitted rate for any given year, \( x \). For example, in figure 6.4 ii the year 1990 is the 12th year in the series, so 12 would be substituted for \( x \) in the equation of the line derived from PNC’s age-adjusted mortality rate series for a selected cause of death. For chronic lower respiratory diseases (1979 to 2004), the 1990 expected or fitted age-adjusted rate is calculated to be a little more than 34 deaths per 100,000 people. The observed age-adjusted rate for 1990 is 31 deaths per 100,000 people. (The observed rates are the values found in the table that runs along the x-axis of the time series chart.) The numeric difference between the expected and observed rates for 1990 is 3—the model (the equation of the line) overestimates the observed value by 3 deaths. Each previous and subsequent year’s difference between the expected and observed rates will vary to a greater or lesser degree depending on the size of the population under study (see below). This variation can be measured to determine how well the line fits or models the observed data.

In the time series figures, the investigator will find several statistical tools to assist in the analyses of trend lines and fitted rates. These tools include the coefficient of determination, percent change values, and slope coefficients. These tools enable the investigator to form not only a mental picture of the comparative impact of mortality by cause on a region and population but to also gain insight into what the near demographic future holds for them.

Coefficients of determination (\( R^2 \)) are provided to indicate how well the fitted line predicts or explains the observed rates. When variation in the observed rates is relatively high (the fitted trend line does not correspond well to the observed trend line) \( R^2 \) approaches 0.0, when the variation...
is low, $R^2$ approaches 1.0. A low $R^2$ implies low reliability and a larger $R^2$ indicates that a greater degree of confidence can be placed in the trend line. The trend lines are generally unreliable when $R^2$ is less than 0.10, moderately reliable when $R^2$ is between 0.10 and 0.35, and most reliable when $R^2$ is equal to or greater than 0.35. Graphically, data points, data lines and trend lines are weighted according to their reliability and significance. The thinnest, dashed trend lines are for those where $R^2$ is less than 0.10 and should be considered not reliable. The thickest dotted lines are used for trends where the $R^2$ is equal to or greater than 0.35. In some cases, the trend lines do not fit the data well (i.e. small $R^2$). In other words, the presentation of a trend line does not necessarily indicate a linear trend in the data line. In several instances a non-linear trend may be present. It should be noted that the linear trend modeling undertaken here is a major simplification of real world processes. These processes are dynamical in nature and can be modeled and fitted with certain limitations and assumptions. In this series (#2), we begin to explore alternative methods for examining trends that show discontinuities and reversals within the set of time series observations, particularly within the mortality time series for HIV/AIDS.

Time series of epidemic infectious disease mortality rates typically exhibit a curvilinear pattern. A marked curvilinear pattern is seen in the mortality series for HIV/AIDS mortality, which can be approximated into one or more sequential linear segments. Each segment is joined to another in the sequence at a point in time or year. We are currently experimenting with a publicly available program, Joinpoint, which calculates these points in time points (or years) the linear segments are joined (Statistical Research and Applications Branch, National Cancer Institute, 2005). Of particular interest is objectively finding the year that marks the end of the epidemic phase—the rapid rise and fall of rates—and the beginning of the more or less linear endemic phase/segment. The last segment is projected to the year 2010 and information regarding current and future trends (equations of the line and percent decrease/increase) is also provided. Joinpoint analyses of trends for other leading causes of mortality that exhibit curvilinear reversals and discontinuities in their observed time series will be included in future editions of this series.

Percent change provides a measure of the estimated change in mortality from the beginning of the series (1979) to the last observation year. The percent value is followed by the term increase or decrease to help denote the direction of the overall trend. This information is in boldface and included with the $R^2$ value and the equation of the line. Percent change and the direction of that change is provided on the graphs for trends where $R^2$ is greater than 0.10.

Another tool is the equation of the line that fits a trend among the observed data point (the rates). The slope coefficient of this equation, $b$, is the estimated/expected number of deaths per unit of time ($x$) or the rate of change in deaths per annum. The direction of change is indicated with a negative sign preceding the $b$ and if positive, $b$ is unsigned. Visually, a negative slope shows a trend decreasing in annual rates from left to right and a positive slope will be rising (increasing) from left to right. An examination of the different slopes for regional or demographic group trends will quickly reveal that they are not equal. Visual inspection combined with slope coefficients also provides a means for making comparisons between any two trend line series in the time series figure. Trends will diverge, converge, or run parallel with one another indicating, respectively, increasing separation, decreasing separation, or very little change in rates between two trend lines. Setting two equations of the line equal to one another can yield an estimated year of convergence in the future (or the year the two trends diverged in the past). However, the investigator is cautioned to not put too much stock in the results if the forward or backward projections are very distant in time. Recent (or temporally adjacent) short term trends with good correspondence between the fitted trend line and observed trend line will be better indicators of rates in the near future or past (if historical rates are unknown).

The final tool is the pair of comparison tables located in the lower portion of the page. The tables, found in every time series figure (except the ones showing comparisons by race and disparity) are structured so that the reader can make comparisons of rates derived from the equation of the line (i.e., the fitted rates) among all regions or demographic groups portrayed in the figure. The 1979 and 2004 tables compare the fitted rates.
rates calculated for the beginning and end of the observed time series in terms of percent difference. Returning to figure 6.4 ii, PNC's age-adjusted fitted rate for chronic lower respiratory diseases in 1979 is 4% lesser than (LT) ENC's fitted rate. In 2004, PNC's fitted rate is 9% lesser than (LT) ENC's fitted rate. The tables permit a quick assessment of trends calculated from observed time series data.

The reader should notice that some data lines in the trend figures fluctuate widely. This fluctuation is due to two main factors. In a small population, the number of deaths may vary widely from year-to-year and lead to large changes in annual mortality and premature mortality rates, a phenomenon known as the effect of small numbers. In addition, because mortality is based on the age of death, any fluctuation in the distribution of deaths across age groups from year-to-year can cause rates to change dramatically. Both the number of deaths and the age of decedents influence trends in mortality. The reader should evaluate all available data carefully before drawing conclusions about current, past and future mortality patterns.

Caveats about the Concepts of Race, Gender, and Geography

Several caveats are offered about the concepts of race, gender, and geography as they apply to the analysis of mortality patterns. While we do intend to bring attention to the stark racial inequalities in mortality across North Carolina, we do not mean to imply that this is a biological phenomenon. Other factors such as differences in socioeconomic status, educational attainment, occupation, and lifestyle probably account for the large racial gaps in mortality rates. Likewise, gender inequalities may have less to do with biological differences between men and women than with socially structured gender roles, health behaviors, occupational exposures, and use of health services. Finally, it is important to consider that county borders may not always be the most appropriate way to look at specific health problems. Few of our health care problems begin or end at political boundary lines and many of our health problems in North Carolina are common to large groups of counties. Counties and larger regions composed of counties are convenient units of data collection and readers should not jump to conclusions about health problems or possible solutions based solely on the way data appear when aggregated to this level. In some cases, data at multi-county, zip code, or minor civil division levels are a better way to understand problems and solutions. Similarly, as indicated in Healthy Carolinians 2010, consideration needs to be given to whether or not a county is characterized as rural or urban, as this can be an indication to the level of development and amount of resources available in a county.
General References


Cited References


Report #2.205, June 2007
4. Current Disparities in Mortality by Geography, Race and Gender, and Race: Total and Five Leading Causes of Death in PNC
Figure 4.1 i. General leading causes of death for the Piedmont region of North Carolina (2004), NC (2004), and US (2003). Mortality rate per 100,000 population.

Piedmont North Carolina  
842 deaths/100,000  
- Diseases of Heart: 38%  
- Cancer – All Sites: 24%  
- Chronic Lower Respiratory Diseases: 7%  
- Diabetes Mellitus: 5%  
- Alzheimer’s Disease: 23%

North Carolina  
845 deaths/100,000  
- Diseases of Heart: 38%  
- Cancer – All Sites: 24%  
- Chronic Lower Respiratory Diseases: 7%  
- Diabetes Mellitus: 5%  
- Alzheimer’s Disease: 23%

United States, 2003  
773 deaths/100,000  
- Diseases of Heart: 35%  
- Cancer – All Sites: 28%  
- Chronic Lower Respiratory Diseases: 6%  
- Diabetes Mellitus: 5%  
- Alzheimer’s Disease: 23%

NC rate is <1% higher than US  
PNC rate is 9% lower than NC

Pie Charts are proportionately scaled using the NC 2004 age-adjusted mortality rate of White females (703 deaths/100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

Report #2.205, June 2007
Figure 4.1 ii. General leading causes of death for the Piedmont region of North Carolina (2004), NC (2004), and US (2003). Age-adjusted mortality rate per 100,000 population.

**Piedmont North Carolina**

- Diseases of Heart: 38%
- Cancer – All Sites: 24%
- Cerebrovascular Disease: 23%
- Chronic Lower Respiratory Diseases: 7%
- Diabetes Mellitus: 5%
- Alzheimer's Disease: 5%
- All Other Unintentional Injuries and Adverse Effects: 2%
- All Other Deaths: 2%

*833 deaths/100,000*

**North Carolina**

- Diseases of Heart: 38%
- Cancer – All Sites: 24%
- Cerebrovascular Disease: 23%
- Chronic Lower Respiratory Diseases: 7%
- Diabetes Mellitus: 5%
- Alzheimer's Disease: 5%
- All Other Unintentional Injuries and Adverse Effects: 2%
- All Other Deaths: 2%

*873 deaths/100,000*

**United States, 2003**

- Diseases of Heart: 35%
- Cancer – All Sites: 28%
- Cerebrovascular Disease: 23%
- Chronic Lower Respiratory Diseases: 6%
- Diabetes Mellitus: 5%
- Alzheimer's Disease: 5%
- All Other Unintentional Injuries and Adverse Effects: 2%
- All Other Deaths: 2%

*846 deaths/100,000*

NC rate is 5% higher than US

PNC rate is 3% lower than NC

Pie Charts are proportionately scaled using the NC 2004 age-adjusted mortality rate of White females (703 deaths/100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.
Figure 4.2 i. General leading causes of death for Piedmont North Carolina by race and gender, (2004). Mortality rate per 100,000 population.

Non-White Males
- The non-White male rate is 8% lower than the White male rate and 13% higher than non-White female rate.

Non-White Females
- The non-White female rate is 11% lower than the non-White male rate, and 23% lower than the White female rate.

White Males

White Females

Pie Charts are proportionately scaled using the NC 2004 age-adjusted mortality rate of White females (703 deaths/100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

Report #2.205, June 2007
Figure 4.2 ii. General leading causes of death for Piedmont North Carolina by race and gender, (2004).
Age-adjusted mortality rate per 100,000 population.

Pie Charts are proportionately scaled using the NC 2004 age-adjusted mortality rate of White females (703 deaths/100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

Report #2.205, June 2007
Figure 4.3 i. General leading causes of death for Piedmont North Carolina by race, (2004). Mortality rate per 100,000 population.

Non-Whites

- Diseases of Heart: 42%
- Cancer – All Sites: 22%
- Cerebrovascular Disease: 21%
- Chronic Lower Respiratory Diseases: 5%
- Diabetes Mellitus: 7%
- Nephritis, Nephrotic Syndrome, and Nephrosis: 22%
- Alzheimer’s Disease: 23%
- All Other Deaths: 36%

676 deaths/100,000

Whites

- Diseases of Heart: 36%
- Cancer – All Sites: 24%
- Cerebrovascular Disease: 6%
- Chronic Lower Respiratory Diseases: 7%
- Diabetes Mellitus: 23%
- Nephritis, Nephrotic Syndrome, and Nephrosis: 6%
- Alzheimer’s Disease: 23%
- All Other Deaths: 36%

805 deaths/100,000

The non-White rate is 16% lower than the White rate.

Pie Charts are proportionately scaled using the NC 2004 age-adjusted mortality rate of White females (703 deaths/100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

Report #2.205, June 2007
Figure 4.3 ii. General leading causes of death for Piedmont North Carolina by race, (2004). Age-adjusted mortality rate per 100,000 population.

Pie Charts are proportionately scaled using the NC 2004 age-adjusted mortality rate of White females (703 deaths/100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

977 deaths/100,000

The non-White rate is 21% higher than the White rate.

810 deaths/100,000

Report #2.205, June 2007
All Causes of Death

- The Piedmont has experienced the smallest percentage increase in the all-cause mortality rate (<1%), compared to 14% for ENC, and 8% for NC.

- After age-adjustment, the all-cause mortality rate in PNC is decreasing in line with ENC, NC, and US. The PNC rate is consistently 9% to 10% less than ENC region and 2% to 6% less than the state as a whole.

- Non-White male age-adjusted mortality rates are the highest of any demographic group. White males have seen the greatest percentage decrease (27%) and the trend is slowly converging on the female trends. White females have seen the least change (7% decrease).

- The non-White rate is 30% greater than the White rate in 2004 compared to 33% greater in 1979. The disparity appears to be diminishing and recent rates suggest convergence.

- The trend for racial disparities was not reliable.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 5.1 i. All Causes of Death:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

PNC | ENC41 | NC
---|---|---
0 | 1% GT | PNC
1% LT | 1% GT | ENC41

Comparison of Fitted Rates in 2004

PNC | ENC41 | NC
---|---|---
11% LT | 12% GT | 8% GT | PNC
8% LT | 3% LT | ENC41
8% LT | 4% GT | NC

PNC ENC41 NC
R² = 0.01 R² = 0.79 R² = 0.44
y = 0.32x + 818 y = 4.38x + 818 y = 2.67x + 828

1979 PNC rate is the same as ENC41
2004 PNC rate is 11% less than ENC41

14% increase 8% increase
Figure 5.1 ii. All Causes of Death:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

1979 PNC rate is 9% less than ENC41
2004 PNC rate is 10% less than ENC41

Comparison of Fitted Rates in 1979

Report

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Comparison of Fitted Rates in 2004

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R² = 0.93
y = -7.00x + 1,045

17% decrease

R² = 0.92
y = -7.04x + 1,146

16% decrease

R² = 0.93
y = -6.57x + 1,059

16% decrease

R² = 0.97
y = -7.78x + 1,034

18% decrease
Figure 5.1 iii. All Causes of Death:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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23% decrease  R2 = 0.64  \( y = -15.82x + 1,776 \)
27% decrease  R2 = 0.96  \( y = -14.24x + 1,353 \)
12% decrease  R2 = 0.52  \( y = -4.68x + 987 \)
7% decrease  R2 = 0.64  \( y = -1.96x + 745 \)
Figure 5.1 iv. All Causes of Death:
Trends in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

1979 Non-white rate is 33% greater than White
2004 Non-white rate is 30% greater than White

19% decrease 17% decrease
R2 = 0.66  R2 = 0.94
y = -9.76x + 1,314  y = -6.55x + 986
Figure 5.1 i. All Causes of Death:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity

R^2 = 0.03
y = -0.15x + 34
All Causes of Premature Mortality

- Premature Mortality in the Piedmont is decreasing at a greater rate (27%), than ENC (20%) and the state as a whole (23%).

- The age-adjusted premature mortality trend is decreasing in a similar pattern when compared to the region, state, and nation. However, the rates of decrease are much sharper for these regions compared with the rate of decrease for mortality rates. The PNC rate is 12% less than ENC in 1979; by 2004 the advantage grew to 18% less (better than) ENC.

- The non-White male rates are significantly higher than any other demographic group, and the 26-year trend line is decreasing at the highest rate compared to the other groups.

- The non-White rate is about 83% greater than the White rate in 2004, representing an 11% decrease from 1979. Projected convergence of the 26-year trends and more recent rates suggest that elimination of the non-White to White disparity is possible.

- The 26-year trend for racial disparities is not reliable.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 5.2 i. All Causes of Premature Mortality:
Trends in premature mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

- PNC: 27% decrease, $R^2 = 0.90$, $y = -10.88x + 1,053$
- ENC41: 20% decrease, $R^2 = 0.88$, $y = -8.82x + 1,175$
- NC: 23% decrease, $R^2 = 0.90$, $y = -9.55x + 1,081$

- 1979 PNC rate is 10% less than ENC41
- 2004 PNC rate is 18% less than ENC41

Comparison of Fitted Rates in 1979:
- PNC: 1058
- ENC41: 1227
- NC: 1106

Comparison of Fitted Rates in 2004:
- PNC: 903
- ENC41: 1042
- NC: 967

Report #2.205, June 2007
Figure 5.2 ii. All Causes of Premature Mortality: Trends in age-adjusted premature mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

1979 PNC rate is 12% less than ENC41
2004 PNC rate is 18% less than ENC41
Figure 5.2 iii. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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<td>WF</td>
<td>299%</td>
<td>95%</td>
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Report

39% decrease (R² = 0.75)
y = -37.88x + 2,503

38% decrease (R² = 0.96)
y = -18.95x + 1,282

31% decrease (R² = 0.84)
y = -14.67x + 1,221

25% decrease (R² = 0.85)
y = -5.93x + 627
Figure 5.2 iv. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race for PNC,
1979-2004 with projections to 2010

1979 Non-white rate is 92% greater than White
2004 Non-white rate is 83% greater than White
Figure 5.2 v. All Causes of Premature Mortality: Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity

R2 = 0.05
y = -0.47x + 94
Diseases of Heart

- All regions exhibit declining trends in heart disease mortality; comparatively, the trend for crude heart disease mortality in PNC yields the greatest percentage decrease in heart disease mortality.

- After age-adjustment, the rates for heart disease mortality with PNC are less than all other regions, but all display similar decreasing trends.

- The trends for males, both non-White and White, are converging with those of non-White and White females, with White males having the greatest decreasing rate.

- The non-White rate for heart disease mortality in PNC was 26% greater than the White rate in 2004, representing a growth in relative disparity of 50%.

- There was a 104% increase in the racial disparity, as shown with a reliable trend.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 6.1 i. Diseases of Heart:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

PNC
36% decrease
R² = 0.91
y = -4.41x + 319

ENC41
22% decrease
R² = 0.81
y = -2.67x + 313

NC
30% decrease
R² = 0.87
y = -3.72x + 325

1979 PNC rate is 2% greater than ENC41
2004 PNC rate is 15% less than ENC41
Figure 6.1 ii. Diseases of Heart: Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

1979 PNC rate is 8% less than ENC41
2004 PNC rate is 15% less than ENC41

Comparison of Fitted Rates in 2004

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Comparison of Fitted Rates in 1979

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Figure 6.1 iii. Diseases of Heart:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

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Comparison of Fitted Rates in 1979
- NWM: 46% decrease, $R^2 = 0.91$, $y = -10.65x + 599$
- WM: 57% decrease, $R^2 = 0.99$, $y = -12.40x + 570$
- NWF: 43% decrease, $R^2 = 0.92$, $y = -6.09x + 368$
- WF: 46% decrease, $R^2 = 0.97$, $y = -5.35x + 303$
Figure 6.1 iv. Diseases of Heart:
Trends in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

1979 Non-white rate is 13% greater than White
2004 Non-white rate is 26% greater than White

\[ y = -8.01x + 462 \]  \quad (R^2 = 0.93)

\[ y = -8.11x + 410 \]  \quad (R^2 = 0.99)
Figure 6.1 v. Diseases of Heart:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
104% increase
R² = 0.33
y = 0.48x + 12
Cancer - Trachea, Bronchus, Lung

- The cancer-TBL mortality rates for all regions are increasing and diverging, but during the early to mid 1990s, there appears to be a reversal and decline in rate trends.

- Trends in age-adjusted mortality rates are all increasing in a pattern similar to the simple mortality rates.

- The mortality rates for males, both non-White and White populations are greater than that of non-White and White females. Both female groups show significantly increasing rates, however both male groups display slight, insignificant decreasing rates.

- The non-White mortality rate is 1% greater than the White mortality rate in 2004 however, both trends are increasing and converging.

- The trend for racial disparity is not reliable.

Unless otherwise noted, trends are considered reliable if R² ≥ 0.35, moderately reliable if 0.35 > R² ≥ 0.10, and unreliable if R² < 0.10.

Report #2.205, June 2007
Figure 6.2 i. Cancer - Trachea, Bronchus, Lung:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

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<td>2004</td>
<td>60% increase</td>
<td>65% increase</td>
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Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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1979 PNC rate is 2% less than ENC41
2004 PNC rate is 12% less than ENC41
Figure 6.2 ii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US,
1979-2004 with projections to 2010
Figure 6.2 iii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

NWM  186% increase  
WM  145% increase  
NWF  R2 = 0.00  
WF  R2 = 0.05  

y = -0.11x + 107  
y = -0.21x + 93  
y = 0.97x + 14  
y = 1.05x + 19  

Comparison of Fitted Rates in 1979

<table>
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Comparison of Fitted Rates in 2004

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#2.205, June 2007
Figure 6.2 iv. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

NW
22% increase
R² = 0.24
y = 0.45x + 52

W
30% increase
R² = 0.56
y = 0.55x + 49

1979 Non-white rate is 7% greater than White
2004 Non-white rate is 1% greater than White
Mortality Trends and Disparities - Piedmont North Carolina

Figure 6.2 v. Cancer - Trachea, Bronchus, Lung:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity

\[ R^2 = 0.05 \]

\[ y = -0.22x + 6 \]
Cerebrovascular Disease

- Stroke mortality in the Piedmont is lower than both ENC and the state as a whole. In 2004, it is 7% less than the NC rate and 9% less than the ENC rate.

- The PNC age-adjusted stroke mortality rate is also decreasing and approximates the NC rate.

- Non-White males have the highest mortality rates for stroke, but with a higher rate of decrease. The convergence of non-White male rates on those of the other race-gender groups is suggested—especially with non-White females in the near future.

- The mortality rate trends for Whites and non-Whites are decreasing in a parallel pattern, but the non-White rate remains 43% higher than that of Whites in 2004, representing a relative increase of 33% in racial disparity.

- There is a 31% increase in racial disparity.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Mortality Trends and Disparities - Piedmont North Carolina

Figure 6.3 i. Cerebrovascular Disease:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

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1979 PNC rate is 6% less than ENC41
2004 PNC rate is 9% less than ENC41

PNC 23% decrease
ENC41 20% decrease
NC 18% decrease

R² = 0.69
R² = 0.64
R² = 0.61

y = -0.67x + 77
y = -0.63x + 82
y = -0.55x + 78

#2.205, June 2007
Figure 6.3 ii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US,
1979-2004 with projections to 2010

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PNC ENC41 NC US
46% decrease 49% decrease 46% decrease 42% decrease
R² = 0.90 R² = 0.92 R² = 0.91 R² = 0.85
y = -1.95x + 111 y = -2.45x + 130 y = -1.97x + 112 y = -1.56x + 90

1979 PNC rate is 14% less than ENC41
2004 PNC rate is 9% less than ENC41
Figure 6.3 iii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010
Figure 6.3 iv. Cerebrovascular Disease: Trends in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

1979 Non-white rate is 29% greater than White
2004 Non-white rate is 43% greater than White

41% decrease
$R^2 = 0.89$
y = -2.17x + 137

47% decrease
$R^2 = 0.88$
y = -1.91x + 106
Figure 6.3 v. Cerebrovascular Disease: Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
31% increase
R2 = 0.12
y = 0.37x + 31
Chronic Lower Respiratory Diseases

- Mortality rates for CLRD in ENC, PNC, and NC are all increasing. The PNC mortality rate is 10% less than the ENC rate in 2004.
- The trends for age-adjusted CLRD mortality rates for ENC, PNC, NC, and the US are similar, with PNC, ENC, and NC adding one death per year, compared to the US rate, which adds 0.75 deaths per year.
- Non-White female and White female mortality rates are increasing by 193% and 362%, respectively, and are converging on non-White male and White male mortality, which are increasing much more slowly.
- Rates are increasing for both Whites and non-Whites however, the rate of increase for Whites is almost double that of non-Whites.
- The trend for racial disparity showed a 40% decrease favoring non-Whites.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 6.4 i. Chronic Lower Respiratory Diseases:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

- **PNC**: 130% increase
  - $R^2 = 0.91$
  - $y = 0.94x + 19$
- **ENC41**: 185% increase
  - $R^2 = 0.95$
  - $y = 1.20x + 17$
- **NC**: 156% increase
  - $R^2 = 0.94$
  - $y = 1.13x + 19$

Comparison of Fitted Rates in 1979:
- **PNC**: 11% greater than ENC41
- **NC**: 10% less than ENC41

Comparison of Fitted Rates in 2004:
- **PNC**: 11% greater than ENC41
- **NC**: 1% less than ENC41
Figure 6.4 ii. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US,
1979-2004 with projections to 2010

1979 PNC rate is 4% less than ENC41
2004 PNC rate is 9% less than ENC41

Comparison of Fitted Rates in 1979

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<tr>
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<th>NC</th>
<th>US</th>
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Comparison of Fitted Rates in 2004

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<td>15% GT</td>
<td>20</td>
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Legend:
- PNC
- ENC41
- NC
- US

R² values:
- PNC: R² = 0.92
- ENC41: R² = 0.91
- NC: R² = 0.94
- US: R² = 0.95

Equations:
- PNC: y = 0.90x + 23
- ENC41: y = 1.04x + 24
- NC: y = 0.97x + 24
- US: y = 0.76x + 27
Figure 6.4 iii. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

- NWM: 59% increase
  - $R^2 = 0.62$
  - $y = 0.77x + 34$
- WM: 20% increase
  - $R^2 = 0.36$
  - $y = 0.39x + 51$
- NWF: 193% increase
  - $R^2 = 0.72$
  - $y = 0.48x + 6$
- WF: 362% increase
  - $R^2 = 0.97$
  - $y = 1.31x + 9$

Comparison of Fitted Rates in 2004

- NWM: 15% GT
  - 65% LT
  - 20% LT
- WM: 13% LT
  - 70% LT
  - 31% LT
- NWF: 189% GT
  - 233% GT
  - 131% GT
- WF: 25% GT
  - 44% GT
  - 57% LT

#2.205, June 2007
Figure 6.4 iv. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

1979 Non-white rate is 30% less than White
2004 Non-white rate is 38% less than White

NW
- 77% increase
- \( R^2 = 0.72 \)
- \( y = 0.51x + 17 \)

W
- 102% increase
- \( R^2 = 0.93 \)
- \( y = 0.97x + 25 \)
Figure 6.4 v. Chronic Lower Respiratory Diseases:
Measuring disparity in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

Disparity
40% decrease
$R^2 = 0.16$
$y = -0.71x - 47$
The PNC mortality rate for Alzheimer’s Disease was 56% higher than the rate for ENC in 2004. However, trends show increasing rates for both regions.

PNC, ENC, and NC all show sharp percent increases in age-adjusted mortality for Alzheimer’s Disease. The PNC rate is 52% greater than the rate for ENC in 2004.

White males had the largest increases in their rates, but non-White males and females exhibited the greatest rates of increase.

In 1979 the non-White mortality rate was 17% higher than the White rate, but in 2004, the rate for non-Whites dropped to 23% below the rate for Whites.

In a moderately reliable trend, the percentage rate difference between non-White and Whites increased by 90%.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 
Figure 6.5 i. Alzheimer’s Disease: Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

1979 PNC rate is 54% greater than ENC41
2004 PNC rate is 56% greater than ENC41

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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<tr>
<td>58% GT</td>
<td>51% GT</td>
<td>34% LT</td>
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R² = 0.86

y = 1.01x - 4

ENC41

660% increase

R² = 0.86

y = 0.65x - 3

NC

635% increase

R² = 0.85

y = 0.98x - 4
Figure 6.5 ii. Alzheimer’s Disease:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

- PNC: 748% increase, $y = 1.15x - 4$
- ENC41: 791% increase, $y = 0.75x - 2$
- NC: 736% increase, $y = 2.10x - 4$
- US: 946% increase, $y = 0.74x - 2$

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 1979

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<td>2004</td>
<td>0</td>
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- 1979 PNC rate is 62% greater than ENC41
- 2004 PNC rate is 52% greater than ENC41
Figure 6.5 iii. Alzheimer’s Disease:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

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Comparison of Fitted Rates in 1979

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<th>WM</th>
<th>NWF</th>
<th>WF</th>
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<td>82% GT</td>
<td>83% GT</td>
<td>NWM</td>
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Comparison of Fitted Rates in 2004

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<th>WM</th>
<th>NWF</th>
<th>WF</th>
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<tr>
<td>WF</td>
<td>42% LT</td>
<td>21% LT</td>
<td>22% LT</td>
<td>WF</td>
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R2 values for projections:
- NWM: 0.76
- WM: 0.88
- NWF: 0.82
- WF: 0.84

Projections:
y = 0.75x - 3
y = 0.91x - 1
y = 1.06x - 5
y = 1.31x - 5
Figure 6.5 iv. Alzheimer’s Disease: Trends in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

1979 Non-white rate is 17% greater than White
2004 Non-white rate is 23% less than White

NW 559% increase
R2 = 0.84
y = 0.97x - 5

W 795% increase
R2 = 0.86
y = 1.18x - 4
Figure 6.5 v. Alzheimer’s Disease:
Measuring disparity in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

Disparity
90% decrease
R² = 0.14
y = 5.13x - 149
All Other Unintentional Injuries and Adverse Effects

- The mortality rate for unintentional injuries in PNC was 22% less than ENC in 1979 and is 3% less than ENC in 2004; it was 9% less than NC in 1979 and is 7% less than NC in 2004. However, the trend for PNC is not reliable.

- The age-adjusted mortality rate for PNC has converged with the ENC trend and will soon converge with the trend for NC, however the trend for PNC is relatively flat and unreliable.

- The non-White male rate trend has converged on the White male trend with a 59% decrease in rates over 26 years. White females are the only group with an increasing mortality rate (57%). Trends for non-White males and White females are converging.

- Non-White rates have seen a 57% decrease and since 1999 have been diverging from White rates.

- There is a 118% decrease in racial disparity favoring non-Whites.

Unless otherwise noted, trends are considered reliable if R² ≥ 0.35, moderately reliable if 0.35 > R² ≥ 0.10, and unreliable if R² < 0.10.

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Figure 6.6 i. All Other Unintentional Injuries and Adverse Effects:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

PNC
ENC41
NC

R² = 0.00
R² = 0.30
R² = 0.00

y = 0.01x + 20
y = -0.20x + 26
y = -0.01x + 22

1979 PNC rate is 22% less than ENC41
2004 PNC rate is 3% less than ENC41

Comparison of Fitted Rates in 1979

Comparison of Fitted Rates in 2004

Report
Figure 6.6 ii. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US,
1979-2004 with projections to 2010

1979 PNC rate is 24% less than ENC41
2004 PNC rate is 3% less than ENC41

PNC
30% decrease
R² = 0.06
y = -0.09x + 23

ENC41
14% decrease
R² = 0.51
y = -0.35x + 30

NC
15% decrease
R² = 0.14
y = -0.14x + 25

US
R² = 0.26
y = -0.13x + 21

Comparison of Fitted Rates in 1979

Comparison of Fitted Rates in 2004

Report

Center for Health Services Research and Development, ECU
Figure 6.6 iii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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<th>WM</th>
<th>NWF</th>
<th>WF</th>
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<td>57%</td>
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<td>GT</td>
<td>115%</td>
<td>69%</td>
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Comparison of Fitted Rates in 2004

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<td>154%</td>
<td>157%</td>
<td>154%</td>
<td>199%</td>
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Figure 6.6 iv. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

NW
R2 = 0.83
y = -0.87x + 40
57% decrease

W
R2 = 0.07
y = 0.10x + 19

1979 Non-white rate is 110% greater than White
2004 Non-white rate is 16% less than White
Figure 6.6 v. All Other Unintentional Injuries and Adverse Effects: Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
118% decrease
$R^2 = 0.84$
$y = -4.64x + 102$

Report #2.205, June 2007

Center for Health Services Research and Development, ECU
Diabetes Mellitus

- PNC diabetes mortality rate is increasing, but below that of NC as a whole and ENC.

- The age-adjusted trend in mortality is similar to the US, while remaining below the rate for ENC and state as a whole. In 2004, it was 22% less than ENC.

- The non-White male and non-White female mortality rates for diabetes are increasingly divergent from those of White males and White females. Non-White males exhibit the greatest increase in age-adjusted mortality rates for diabetes.

- Non-White mortality rates have increased by 95%, compared to 77% for White mortality.

- There is a 21% increase in racial disparity in a moderately reliable trend.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 6.7 i. Diabetes Mellitus:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

1979 PNC rate is 7% greater than ENC41
2004 PNC rate is 23% less than ENC41
Figure 6.7 ii. Diabetes Mellitus:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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<td>Growth</td>
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<td>2%</td>
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Comparison of Fitted Rates in 2004

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<tr>
<td>Growth</td>
<td>5%</td>
<td>18% LT</td>
<td>9%</td>
<td>US</td>
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PNC ENC41 NC US
82% increase 119% increase 92% increase 65% increase
R² = 0.85 R² = 0.91 R² = 0.89 R² = 0.91
y = 0.48x + 15 y = 0.75x + 16 y = 0.54x + 15 y = 0.42x + 15

1979 PNC rate is 7% less than ENC41
2004 PNC rate is 22% less than ENC41

79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10
Mortality Trends and Disparities - Piedmont North Carolina

Figure 6.7 iii. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

NWM 140% increase
R2 = 0.76
y = 1.27x + 24

WM 95% increase
R2 = 0.76
y = 0.49x + 13

NWF 72% increase
R2 = 0.60
y = 0.88x + 32

WF 63% increase
R2 = 0.70
y = 0.28x + 12
Figure 6.7 iv. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

1979 Non-white rate is 132% greater than White
2004 Non-white rate is 154% greater than White

NW
95% increase
R² = 0.74
y = 1.05x + 29

W
77% increase
R² = 0.85
y = 0.37x + 12
Figure 6.7 v. Diabetes Mellitus:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
21% increase
\[ R^2 = 0.14 \]
\[ y = 1.06x + 131 \]
Pneumonia and Influenza

- PNC's influenza and pneumonia mortality rates are below that of NC, and above that for ENC. However, the trends for ENC, PNC and NC are unreliable.

- Age-adjusted mortality rates are declining for PNC, and are converging on the ENC, NC, and the US rates.

- The mortality rates for males, both White (26%) and non-White (35%), are decreasing and converging on female rates.

- In 1979, the non-White rate was 13% greater than the White rate; it was 4% less than the White rate in 2004.

- In a moderately reliable trend, the percent difference between non-Whites and Whites racial disparity has decreased by 140%.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 6.8 i. Pneumonia and Influenza:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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Figure 6.8 ii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

1979 PNC rate is 5% less than ENC41
2004 PNC rate is 1% less than ENC41

Comparison of Fitted Rates in 1979

PNC | ENC41 | NC | US
---|---|---|---
5% LT | 3% GT | 4% LT | PNC
3% LT | 2% LT | 9% LT | ENC41
4% GT | 10% GT | 8% GT | US

Comparison of Fitted Rates in 2004

PNC | ENC41 | NC | US
---|---|---|---
1% LT | 1% GT | 1% GT | 0 | PNC
1% LT | 0 | 0 | 0 | ENC41
1% LT | 0 | 0 | 0 | NC
0 | 0 | 0 | 0 | US

18% decrease: $R^2 = 0.11$, $y = -0.24x + 35$
21% decrease: $R^2 = 0.16$, $y = -0.30x + 37$
20% decrease: $R^2 = 0.14$, $y = -0.27x + 36$
20% decrease: $R^2 = 0.07$, $y = -0.17x + 33$

1979 PNC rate is 5% less than ENC41
2004 PNC rate is 1% less than ENC41
Figure 6.8 iii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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<td>GT%</td>
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- NWM: 35% decrease, \( R^2 = 0.30 \), \( y = -0.80x + 59 \)
- WM: 26% decrease, \( R^2 = 0.17 \), \( y = -0.49x + 48 \)
- NWF: 19% LT, 58% LT, 55% LT
- WF: 140% GT, 95% GT, 8% GT
Figure 6.8 iv. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

NW 29% decrease
R2 = 0.25
y = -0.43x + 39

W
R2 = 0.07
y = -0.20x + 34

1979 Non-white rate is 13% greater than White
2004 Non-white rate is 4% less than White
Figure 6.8 v. Pneumonia and Influenza: Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
140% decrease
R2 = 0.25
y = -0.86x + 16
Unintentional Motor Vehicle Injuries

- The Piedmonts mortality rate for motor vehicle injuries is 33% less than the ENC rate in 2004, and the trend shows a steady decline. All regions show steady, reliable decline in rates.
- There is a similar decline in all trends for PNC, ENC, NC, and the US for age-adjusted mortality.
- Mortality rate trends are significantly higher in men, both White and non-White. Non-White males have seen a 45% decrease while White males have only seen a 33% decrease over the 26-year time period.
- Both Whites and non-Whites exhibit significant decreasing trends in mortality, converging in 2005.
- In a moderately reliable trend there is an 87% decrease in racial disparity.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 6.9 i. Unintentional Motor Vehicle Injuries: Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

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- PNC: 34% decrease, $R^2 = 0.72$, $y = -0.32x + 24$
- ENC41: 17% decrease, $R^2 = 0.45$, $y = -0.19x + 29$
- NC: 27% decrease, $R^2 = 0.67$, $y = -0.27x + 26$

1979 PNC rate is 16% less than ENC41
2004 PNC rate is 33% less than ENC41
Figure 6.9 ii. Unintentional Motor Vehicle Injuries:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US,
1979-2004 with projections to 2010

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1979 PNC rate is 17% less than ENC41
2004 PNC rate is 32% less than ENC41

Comparison of Fitted Rates in 1979

- PNC: 29% decrease, R² = 0.66
  \[ y = -0.25x + 23 \]
- ENC41: 12% decrease, R² = 0.31
  \[ y = -0.13x + 28 \]
- NC: 22% decrease, R² = 0.61
  \[ y = -0.21x + 24 \]
- US: 32% decrease, R² = 0.83
  \[ y = -0.29x + 21 \]
Figure 6.9 iii. Unintentional Motor Vehicle Injuries:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

**NWM**
- 45% decrease
- $R^2 = 0.65$
- $y = -0.77x + 45$

**WM**
- 33% decrease
- $R^2 = 0.64$
- $y = -0.42x + 33$

**NWF**
- 15% decrease
- $R^2 = 0.00$
- $y = -0.01x + 10$

**WF**
- 26% LT
- 77% LT
- 72% LT
- 36% GT
- 69% LT
- 61% LT
- 339% GT
- 223% GT
- 25% GT
- 36% GT
- 14% GT
- 159% GT
- 134% GT
- 20% LT
- 105% GT
- 20% LT
- 10% LT

Center for Health Services Research and Development, ECU
Figure 6.9 iv. Unintentional Motor Vehicle Injuries: Trends in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

1979 Non-white rate is 16% greater than White
2004 Non-white rate is 2% greater than White

NW 36% decrease
R2 = 0.59
y = -0.36x + 26

W 27% decrease
R2 = 0.61
y = -0.24x + 22

Report #2.205, June 2007
Figure 6.9 v. Unintentional Motor Vehicle Injuries: Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
87% decrease
\[ R^2 = 0.11 \]
\[ y = -0.56x + 17 \]
Cancer - Colon, Rectum, Anus

- The Cancer-CRA mortality rate for PNC is decreasing but the trend is unreliable.
- The age-adjusted mortality rates are decreasing at a higher rate of change (producing a 22% decrease) than for ENC (13%), and State (18%).
- All demographic groups show a decrease in mortality rates, with the exception of the non-White males whose rates have become flat (trend is unreliable).
- The non-White and White mortality rates are decreasing by 13% and 24% respectively, and are increasingly divergent.
- In a moderately reliable trend, the racial disparity has increased by 72%.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

Report #2.205, June 2007
Figure 6.10 i. Cancer - Colon, Rectum, Anus: Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

- **PNC**
  - R² = 0.06
  - \( y = -0.04x + 19 \)
  - 1979 PNC rate is 13% greater than ENC41
  - 2004 PNC rate is 11% less than ENC41

- **ENC41**
  - R² = 0.37
  - \( y = 0.13x + 17 \)
  - 2004 ENC41 rate is 12% greater than PNC

- **NC**
  - R² = 0.06
  - \( y = 0.04x + 19 \)

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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Figure 6.10 ii. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1979-2004 with projections to 2010

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Report

#2.205, June 2007
Figure 6.10 iii. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

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Comparison of Fitted Rates in 2004

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- NWM: 25% decrease, $R^2 = 0.00$, $y = 0.02x + 30$
- WM: 20% decrease, $R^2 = 0.44$, $y = -0.27x + 28$
- NWF: 27% decrease, $R^2 = 0.18$, $y = -0.22x + 28$
- WF: 27% decrease, $R^2 = 0.64$, $y = -0.21x + 20$
Figure 6.10 iv. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race for PNC,
1979-2004 with projections to 2010

1979 Non-white rate is 26% greater than White
2004 Non-white rate is 44% greater than White

NW 13% decrease
R2 = 0.12
y = -0.14x + 29

W 24% decrease
R2 = 0.63
y = -0.22x + 23

Report #2.205, June 2007
Figure 6.10 v. Cancer - Colon, Rectum, Anus:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
72% increase
R² = 0.12
y = 0.71x + 25
Cancer - All Sites

- While cancer - all sites mortality is increasing, the Piedmont experiences the smallest rate increase (13%) when compared to ENC (33%) and NC (23%).
- All rate trends for age-adjusted mortality, with the exception of the US, are unreliable.
- In a moderately reliable trend, White males show a 7% decrease in mortality and White females show a 7% increase. The trends for non-White males and females are not reliable and relatively flat.
- There is a 26% decrease in the racial disparity favoring non-Whites.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$.  

Report #2.205, June 2007
Figure 7.1 i. Cancer - All Sites:
Trends in mortality rates for PNC, ENC41, and NC, 1979-2004 with projections to 2010

- **PNC**: 13% increase, $R^2 = 0.29$, $y = 0.87x + 171$
- **ENC41**: 33% increase, $R^2 = 0.75$, $y = 2.09x + 162$
- **NC**: 23% increase, $R^2 = 0.56$, $y = 1.50x + 170$

- 1979 PNC rate is 6% greater than ENC41
- 2004 PNC rate is 10% less than ENC41

Comparison of Fitted Rates in 2004

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Figure 7.1 ii. Cancer - All Sites:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US,
1979-2004 with projections to 2010

1979 PNC rate is 5% less than ENC41
2004 PNC rate is 8% less than ENC41

Comparison of Fitted Rates in 1979

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Figure 7.1 iii. Cancer - All Sites:
Trends in age-adjusted mortality rates by race and gender for PNC, 1979-2004 with projections to 2010

Comparison of Fitted Rates in 1979

<table>
<thead>
<tr>
<th>Race</th>
<th>NWM</th>
<th>WM</th>
<th>NWF</th>
<th>WF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT</td>
<td>30%</td>
<td>52%</td>
<td>60%</td>
<td>NWM</td>
</tr>
<tr>
<td>GT</td>
<td>42%</td>
<td>32%</td>
<td>44%</td>
<td>WM</td>
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</table>

Comparison of Fitted Rates in 2004

<table>
<thead>
<tr>
<th>Race</th>
<th>NWM</th>
<th>WM</th>
<th>NWF</th>
<th>WF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT</td>
<td>28%</td>
<td>46%</td>
<td>54%</td>
<td>NWM</td>
</tr>
<tr>
<td>GT</td>
<td>40%</td>
<td>25%</td>
<td>36%</td>
<td>WM</td>
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</tbody>
</table>

Report

<table>
<thead>
<tr>
<th>Race</th>
<th>NWM</th>
<th>WM</th>
<th>NWF</th>
<th>WF</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT</td>
<td>85%</td>
<td>33%</td>
<td>14%</td>
<td>NWF</td>
</tr>
<tr>
<td>GT</td>
<td>117%</td>
<td>55%</td>
<td>17%</td>
<td>WF</td>
</tr>
</tbody>
</table>
Figure 7.1 iv. Cancer - All Sites:
Trends in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

1979 Non-white rate is 34% greater than White
2004 Non-white rate is 26% greater than White
Figure 7.1 v. Cancer - All Sites:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1979-2004 with projections to 2010

Disparity
26% decrease
R² = 0.14
\[ y = -0.35x + 34 \]
HIV Disease

- Mortality rates for PNC have decreased by 20% during 1998-2004 in a reliable trend. All regions show a decline in mortality.
- Age-adjusted mortality rates (1998-2004) are decreasing for all regions. The PNC trend reflects the greatest decreasing rate (16%) among all regions in a reliable trend.
- Both non-White males and non-White females experienced a 32% decrease in their rates from 1998-2004.
- PNC non-Whites experienced a 28% decrease in HIV Mortality rates from 1997-2004, while Whites experienced a 61% decrease in a moderately reliable trend.
- The relative disparity between non-Whites and Whites has decreased between 1997 and 2004, however the decrease is slight and unreliable.

Unless otherwise noted, trends are considered reliable if $R^2 \geq 0.35$, moderately reliable if $0.35 > R^2 \geq 0.10$, and unreliable if $R^2 < 0.10$. 

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Figure 8.1 i. HIV Disease:
Trends in mortality rates for PNC, ENC41, and NC, 1998-2004 with projections to 2010

Comparison of Fitted Rates in 1998

<table>
<thead>
<tr>
<th>PNC</th>
<th>ENC41</th>
<th>NC</th>
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</thead>
<tbody>
<tr>
<td>1% LT</td>
<td>10% LT</td>
<td>PNC</td>
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</table>

Comparison of Fitted Rates in 2004

<table>
<thead>
<tr>
<th>PNC</th>
<th>ENC41</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>8% LT</td>
<td>7% LT</td>
<td>ENC41</td>
</tr>
<tr>
<td>7% GT</td>
<td>17% GT</td>
<td>NC</td>
</tr>
</tbody>
</table>

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Figure 8.1 ii. HIV Disease:
Trends in age-adjusted mortality rates for PNC, ENC41, NC, and US, 1998-2004 with projections to 2010

- **PNC**: 16% decrease
  - $R^2 = 0.77$
  - $y = -0.18x + 6.61$
  - 1998 PNC rate is 5% less than ENC41
  - 2004 PNC rate is 13% less than ENC41

- **ENC41**: 14% decrease
  - $R^2 = 0.09$
  - $y = -0.10x + 6.96$

- **NC**: 11% decrease
  - $R^2 = 0.57$
  - $y = -0.14x + 6.12$

- **US**: 11% decrease
  - $R^2 = 0.45$
  - $y = -0.16x + 5.60$

**Comparison of Fitted Rates in 1998**

<table>
<thead>
<tr>
<th></th>
<th>PNC</th>
<th>ENC41</th>
<th>NC</th>
<th>US</th>
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</thead>
<tbody>
<tr>
<td><strong>5% LT</strong></td>
<td>18%</td>
<td>12%</td>
<td>20%</td>
<td>16%</td>
</tr>
<tr>
<td><strong>8% GT</strong></td>
<td>14%</td>
<td>9%</td>
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</tr>
<tr>
<td><strong>18% GT</strong></td>
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</tbody>
</table>

**Comparison of Fitted Rates in 2004**

<table>
<thead>
<tr>
<th></th>
<th>PNC</th>
<th>ENC41</th>
<th>NC</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>15% LT</strong></td>
<td>5%</td>
<td>5%</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td><strong>13% LT</strong></td>
<td>17%</td>
<td>22%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5% GT</strong></td>
<td>21%</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12% GT</strong></td>
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<td>28%</td>
<td>6%</td>
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</table>

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Center for Health Services Research and Development, ECU
Figure 8.1 iii. HIV Disease: Trends in age-adjusted mortality rates by race and gender for PNC, 1998-2004 with projections to 2010
Figure 8.1 iv. HIV Disease:
Trends in age-adjusted mortality rates by race for PNC, 1997-2004 with projections to 2010

1997 Non-white rate is 1242% greater than White
2004 Non-white rate is 1228% greater than White

NW 28% decrease
R2 = 0.85
y = -0.85x + 24.20

W 61% decrease
R2 = 0.22
y = -0.06x + 1.81

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Figure 8.1 v. HIV Disease:
Measuring disparity in age-adjusted mortality rates by race for PNC, 1997-2004 with projections to 2010

Disparity

$R^2 = 0.00$

$y = -0.40x + 1,271$
9. Appendix

<table>
<thead>
<tr>
<th>Disease</th>
<th>ICD 10 Code</th>
<th>ICD 9 Code</th>
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<tbody>
<tr>
<td>Diseases of Heart</td>
<td>I00-I09, I10, I11, I13, I20-I51</td>
<td>390-398, 402, 404, 410-429</td>
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<tr>
<td>Cerebrovascular Disease</td>
<td>I60-169</td>
<td>430-434, 436-438</td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td>I70</td>
<td>440</td>
</tr>
<tr>
<td>Cancer - All Sites</td>
<td>C00-C97</td>
<td>140-208</td>
</tr>
<tr>
<td>Cancer - Lip, Oral Cavity, and Pharynx</td>
<td>C00-C14</td>
<td>140-149</td>
</tr>
<tr>
<td>Cancer - Stomach</td>
<td>C16</td>
<td>151</td>
</tr>
<tr>
<td>Cancer - Colon, Rectum, and Anus</td>
<td>C18-C21</td>
<td>153-154</td>
</tr>
<tr>
<td>Cancer - Liver</td>
<td>C22</td>
<td>155</td>
</tr>
<tr>
<td>Cancer - Pancreas</td>
<td>C25</td>
<td>157</td>
</tr>
<tr>
<td>Cancer - Larynx</td>
<td>C32</td>
<td>161</td>
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<tr>
<td>Cancer - Trachea, Bronchus, and Lung</td>
<td>C33-C34</td>
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<tr>
<td>Cancer - Malignant Melanoma of Skin</td>
<td>C43</td>
<td>172</td>
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<td>Cancer - Breast</td>
<td>C50</td>
<td>174-175</td>
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<td>Cancer - Cervix Uteri</td>
<td>C53</td>
<td>180</td>
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<tr>
<td>Cancer - Ovary</td>
<td>C56</td>
<td>183.0</td>
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<td>Cancer - Prostate</td>
<td>C61</td>
<td>185</td>
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<td>Cancer - Bladder</td>
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<td>188</td>
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<td>Cancer - Brain</td>
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<td>Cancer - Non-Hodgkin's Lymphoma</td>
<td>C82-C85</td>
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<td>Cancer - Leukemia</td>
<td>C91-C95</td>
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<td>B20-B24</td>
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<td>Pneumonia and Influenza</td>
<td>J10-J18</td>
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<td>Chronic Lower Respiratory Diseases</td>
<td>J40-J47</td>
<td>490-494, 496</td>
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<td>Chronic Liver Disease and Cirrhosis</td>
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<td>571</td>
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<td>Nephritis, Nephrotic Syndrome, and Nephrosis</td>
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<td>Unintentional Motor Vehicle Injuries</td>
<td>V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0, V89.2</td>
<td>E810-E825</td>
</tr>
<tr>
<td>All Other Unintentional Injuries and Adverse Effects</td>
<td>V01, V05-V06, V09.1, V09.3-V09.9, V10-V11, V15-V18, V19.3, V19.8-V19.9, V80.0-V80.2, V80.6-V80.9, V81.2-V81.9, V82.2-V82.9, V87.9, V88.9, V89.1, V89.3, V89.9, V90-V99, W00-X59, Y55, Y65, Y66</td>
<td>E800-E807, E826-E829, E830-E848, E929.0, E929.1, E850-E869, E880-E928, E929.2-E929.9</td>
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<tr>
<td>Suicide</td>
<td>X60-X84, Y87.0</td>
<td>E950-E959</td>
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<tr>
<td>Homicide</td>
<td>X85-Y09, Y87.1</td>
<td>E960-E969</td>
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<tr>
<td>Legal Intervention</td>
<td>Y35, Y89.0</td>
<td>E970-E978</td>
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<td>Alzheimer's Disease</td>
<td>G30</td>
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