Trends and Disparities in Mortality in Eastern North Carolina
Total Deaths, Premature Mortality and Deaths for Ten Leading Causes; 1979-2010

A Resource for Healthy Communities
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1. Introduction

Health Indicators Series:
A Resource for Healthy Communities
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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 Systems 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 Eastern 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 two of the overarching goals of Healthy People 2020, 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 North Carolina 2020, has also embraced these two goals. Using rate comparisons, this report describes the inequalities in mortality among Eastern 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 30-year period (1979 to 2010), as well as the most recent twelve year period (1999-2010). 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 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 2020. These charts place Eastern North Carolina’s health status in a historical context and provide a glimpse into the future.
The region *Eastern North Carolina* is comprised of 29 counties located in the extreme east of North Carolina and approximates the coastal plain physiographic province of the state. It includes the northern counties east of I-95. This region is characterized by its rurality, poverty, and some of the highest mortality rates in the nation. The name of the region is abbreviated as ENC29 or ENC. The rest of North Carolina is the remaining 71 counties; abbreviated as RNC71 or RNC.
2. Data Highlights

Trends and Disparities in Mortality in Eastern North Carolina
The following highlights of mortality in Eastern North Carolina (ENC29) 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
In 2010, age-adjusted mortality rate for Eastern North Carolina is 847 deaths per 100,000. This rate is 6% higher than the state rate. Within Eastern North Carolina, the non-White rate is 12% higher than the White rate. The non-White male rate is 21% higher than the rate for White males. The non-White female rate is 7% higher than the rate for White females.

The five general leading causes of cancer mortality in Eastern North Carolina (2010) are:
1. Diseases of Heart
2. Cancer—All Sites
3. Cerebrovascular Disease
4. Chronic Lower Respiratory Diseases
5. Diabetes Mellitus

The five general leading causes of mortality in Eastern North Carolina by race and gender (2010) are:

<table>
<thead>
<tr>
<th>Race and Gender</th>
<th>non-White Males</th>
<th>White Males</th>
<th>non-White Females</th>
<th>White Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Cancer - All Sites</td>
<td>Cancer - All Sites</td>
<td>Cancer - All Sites</td>
<td>Cancer - All Sites</td>
</tr>
<tr>
<td>2nd</td>
<td>Diseases of Heart</td>
<td>Diseases of Heart</td>
<td>Diseases of Heart</td>
<td>Diseases of Heart</td>
</tr>
<tr>
<td>3rd</td>
<td>Cerebrovascular Disease</td>
<td>Chronic Lower Respiratory Diseases</td>
<td>Cerebrovascular Disease</td>
<td>Cerebrovascular Disease</td>
</tr>
<tr>
<td>4th</td>
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</tr>
<tr>
<td>5th</td>
<td>Diabetes Mellitus</td>
<td>All Other Unintentional Injuries and Adverse Effects</td>
<td>Alzheimers Disease</td>
<td>Alzheimers Disease</td>
</tr>
</tbody>
</table>

Trends in Mortality from All Causes
- While the 30-year ENC trend line shows all-cause mortality rates are increasing and diverging from RNC and NC trends, the 12-year trend lines for each region have been decreasing. The ENC all-cause mortality rates are still diverging slightly from RNC and NC 12-year trends.
- The age-adjusted, all-cause mortality rates are decreasing for all four 30-year trends, with ENC remaining above the rest. The 12-year trends suggest convergence of RNC and NC in the future.
- The non-White male mortality rate remains higher than other demographic groups, although convergence in the future is suggested.
- The non-White all-cause mortality rate remains higher than the White rate, though 12-year trend lines suggest convergence in the future as both rates continue to decrease.
- The 12-year trend for racial disparity shows an overall decrease, which is projected to continue into the future.
Trends in Premature Mortality from All Causes (years of life lost before age 75)

- ENC’s premature mortality rate has decreased by 9% since 1999. However, this trend is diverging from both RNC and NC, which have both decreased by 12% since 1999.
- The age-adjusted premature mortality trend for ENC continues to decrease. The rate of decrease is slightly slower than RNC and NC but surpasses the US. ENC remains 19% greater than RNC in 2010.
- The non-White male rates of premature mortality are significantly higher than other demographic groups but also have the greatest rate of decrease (slope of trend). White females have the lowest rate of premature mortality.
- The non-White rate remains 80% greater than the White rate but is decreasing at a rate of 25% in the 12-year trend compared to 7% for the White 12-year trend.
- The 10-year trend for racial disparity shows a 43% decrease in a reliable trend.

Diseases of Heart

- Based on the 12-year trend line, ENC’s heart disease mortality rate is decreasing at about the same rate as RNC and NC, although ENC remains well above the others.
- ENC’s age-adjusted mortality rate for heart disease is greater than RNC and NC, but all are decreasing steadily with convergence in the future likely.
- The trends for White and non-White males are converging and the trends for White and non-White females are converging. Non-White males continue to have the highest rate of mortality out of the four demographic groups.
- The 12-year trend lines for Whites and non-Whites show a steady decrease, and are converging.
- The 12-year increasing trend line for racial disparity is unreliable.

Cancer - Trachea, Bronchus, Lung

- The 12-year trend line for ENC crude mortality due to Cancer – TBL is unreliable.
- The age-adjusted rate for ENC, RNC, NC, and US are all decreasing, with ENC decreasing at a slightly faster rate than the others. Convergence of the ENC, RNC, and NC trend lines is likely in the future.
- The age-adjusted rate trend line for non-White males is the greatest of the four, but is decreasing most rapidly. The trend for non-White males is likely to converge with the trend for White males.
- The non-White mortality rate is decreasing more rapidly than the White rate, and the two rates are diverging over the 12 year period.
- The moderately reliable trend for racial disparity has continued to decrease significantly over the 12-year period.

Cerebrovascular Disease

- ENC’s cerebrovascular disease mortality trend line is decreasing but is diverging slightly from both RNC and NC. In 2010, the ENC rate was 20% greater than RNC.
- The ENC age-adjusted cerebrovascular disease mortality rate is decreasing and converging on the RNC and NC rates. The NC rates remain above the US rates.
- Although both non-White males and non-White females continue to have the highest cerebrovascular disease mortality rates, the rates are decreasing and converging on White male and White female rates. The non-White male rate in 2010 was 63% greater than the rate for White males; the non-White female rate was 33% greater than the rate for White females.
• The cerebrovascular disease mortality rate for non-Whites is decreasing and converging with that of Whites but remains 48% greater than Whites in 2010.
• The trend for racial disparity is unreliable.

Chronic Lower Respiratory Diseases
• The 30-year CLRD mortality rate for ENC is increasing. However, the 12-year trend for ENC appears to be decreasing, in a moderately reliable trend. In 2010, the ENC rate was 4% less than RNC.
• The 12-year CLRD age-adjusted rate for ENC is decreasing and converging with the US rate. The rate for ENC remains less than the rates for NC and RNC.
• Fitted 12-year trends for White and non-White males are higher compared to White and non-White females, with White males having the greatest rate, as well as the steepest decline. The 12-year trend for non-White females is unreliable.
• The 12-year White mortality rate trend is higher than the non-White trend, although both are decreasing evenly. The non-White rate remains 45% less than the White rate in 2010.
• The trend for racial disparity is moderately reliable showing a decrease in disparity over time.

Diabetes Mellitus
• The 12-year trend for diabetes mellitus mortality is decreasing for RNC and NC. The trend for ENC is higher, and also decreasing, but is not reliable.
• The 12-year trend for age-adjusted diabetes mellitus mortality rates shows a decrease of 19% for ENC. The rates for RNC and NC have fallen below the US rate. In 2010, the ENC age-adjusted diabetes mellitus death rate remains 40% greater than the RNC rate and 32% greater than the US rate.
• The non-White male and non-White female 12-year mortality rates trends are decreasing. The White male rate is flat and the White female rate is decreasing slightly.
• The non-White mortality rate decreased 23% between 1999 and 2010 but remains 129% greater than the White rate.
• The decreasing trend for racial disparities is unreliable.

Alzheimers Disease
• The crude mortality rate trend for Alzheimer’s is increasing, showing a 76% increase over the 12-year period. However, the rates for RNC and NC are greater.
• The age-adjusted mortality rate for Alzheimer’s for ENC is lower than the rate for RNC, NC, or the US, and the 12 year trend is increasing more slowly, although all rates are increasing.
• The mortality rate for both White and non-White females are substantially greater than the mortality rates for White and non-White males. All the rates are increasing.
• The non-White mortality rate for Alzheimer’s has been increasing, but still remains less than the White rate by 20% in 2010.
• The 12 year trend for racial disparity slightly favors non-Whites.

All Other Unintentional Injuries and Adverse Effects
• Mortality from unintentional injuries and adverse effects has increased substantially in ENC (36% over the last 12 years). The ENC rate trend is similar to trends for RNC and NC.
Trends and Disparities in Mortality in Eastern North Carolina—29 Counties

- The age-adjusted 12-year trend line for ENC is slightly below the trend for RNC and NC, but all the trends are increasing.
- The non-White male rates continue to decrease at a greater rate than other demographic groups and convergence with White female rates is suggested in the future. The White male rate is now the highest rate of all demographic groups and has increased 46% over the last 12 years.
- Non-White rates have decreased by 32% over 12 years, whereas white rates have increased 62%, causing these two rates to converge in 2002. In 2010, the non-White rate is 47% less than the White rate.
- The racial disparity associated with deaths from unintentional injuries and adverse effects favors non-Whites.

Nephritis, Nephrotic Syndrome, and Nephrosis
- Mortality due to nephritis, nephrotic syndrome, and nephrosis in ENC has increased by 38% over 12 years, a rate divergent from those of RNC and NC. While these other regions have also experienced large increases, the ENC rate of increase remains the greatest.
- With age-adjustment, ENC, RNC and NC each have increased by approximately 20% over the past 12 years. All three rates remain above the US rate, but ENC is the highest.
- The 12-year trend for non-White males is the highest and is increasing the most rapidly. The trend for non-White females is unreliable.
- In 2010, the non-White rate was 133% greater than the White rate. Both the non-White and White rate are increasing.
- A moderately reliable trend shows a decrease in racial disparity over the 12-year period.

Pneumonia and Influenza
- The mortality rates for pneumonia and influenza have all been decreasing over the 1999-2010 period. ENC is decreasing less (23% over the 12-year period) and therefore diverging from RNC and NC.
- The age-adjusted mortality rates for all NC regions are decreasing at very similar rates, and all declining at a rate similar to the US rate.
- The age-adjusted mortality rates for both genders of both races appear to be decreasing, with Non-White males and White males remaining the highest. The rates for White males and White females are projected to converge.
- Non-White rates were 5% less than White rates in 2010. Both rates are declining.
- The 12-year trend in racial disparity is not reliable.

Cancer - Colon, Rectum, Anus
- The 12 year trends for colon cancer for ENC, RNC, and NC have all declined 22% over the period. In 2010, the ENC rate was 20% greater than the rate for RNC.
- The age-adjusted mortality rate for colon cancer for ENC has declined 31% over the 12 year period. The ENC rate is highest but is projected to converge with the NC and RNC rates.
- The non-White male mortality rate is the highest of the demographic groups and is decreasing the most slowly. White males and non-White females have similar rates of decline, and White females have the lowest rate trend.
- The non-White rate in 2010 is 41% greater than the White rate. Both are declining; the White rate is declining a bit faster.
- The trend for racial disparity is not reliable.

Cancer - All Sites
• The cancer – all sites mortality rate trend for ENC is higher than both RNC and NC rate trends, and decreasing more slowly. In 2010, the ENC rate was 17% greater than RNC.
• The age-adjusted cancer – all sites mortality trends for all regions are decreasing, with ENC decreasing at the fastest rate (16% over 12 years) but continuing to have the highest rate.
• The cancer – all sites mortality rates for White males and non-White males are decreasing. Non-White males have seen the greatest decrease from 1999-2010 (26% decrease). White and non-White females show slight decreases.
• Both White and non-White cancer mortality trends have been decreasing over the 12-year period (13% and 21% decreases, respectively) but the non-White rate remains 15% greater than the White rate in 2010.
• The 12-year trend for racial disparity is moderately reliable and has decreased by 44%.

HIV Disease
• According to the 12-year trend lines for HIV mortality, rates are decreasing for all regions but ENC has the smallest rate of decrease. Although the ENC rate has been decreasing, it is still 52% greater than RNC in 2010.
• The age-adjusted rates for all NC regions are similar and are decreasing. The ENC rate is 58% greater than the RNC rate.
• Non-White males continue to have the highest rates of age-adjusted mortality for all demographic groups, but also the greatest rate of decline of all groups. Convergence of the trends for White and non-White males is projected in the future.
• From 1999-2010, the non-White age-adjusted HIV mortality rate has decreased by 39% but remains significantly greater than the White rate. Age-adjusted mortality rates for Whites also decreased by 51% in a reliable trend.
• The trend in racial disparity is not reliable.
3. Methods, Interpretation, and References

Data Sources
The data for mortality and premature mortality in Eastern 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 2010. Smaller areas like counties will usually be aggregated into 5-year intervals (e.g., 2003 to 2007). 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 2010--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 30-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 30 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 of 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 2020 from known historical values (1979 to 2010) 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 2005 is the 7th year in the series, so 7 would be substituted for x in the equation of the line derived from ENC29’s age-adjusted mortality rate series for a selected cause of death. For chronic lower respiratory diseases (1979 to 2010), the 2005 expected or fitted age-adjusted rate is calculated to be a little less than 45 deaths per 100,000 people. The observed age-adjusted rate for 2005 is 48 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 2005 is 3.1—the model (the equation of the line) underestimates the observed value by 3.1 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. 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, general cancer mortality, and several others which can be approximated into at least two sequential linear segments. Each segment is joined to another in the sequence at a point in time or year. 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.

Percent change provides a measure of the estimated change in mortality over the most recent twelve year period (1999-2010). 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, especially when $R^2$ is low. 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 1999 and 2010 tables compare the fitted rates calculated for the beginning and end of the observed time series in terms of percent difference. Returning to figure 6.4 ii, ENC29’s age-adjusted fitted rate for chronic lower respiratory diseases in 1999 is 9% greater than (GT) RNC’s fitted rate. In 2010, ENC29’s fitted rate is 12% less than (LT) RNC’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, 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

4. Current Disparities in Mortality by Geography, Race and Gender, and Race: Total and Five Leading Causes of Death
Figure 4.1 i. General leading causes of death for ENC29 (2010), NC (2010), and US (2008). Mortality rate per 100,000 population.

**ENC29**
- Diseases of Heart: 23%
- Cancer - All Sites: 61%
- Cerebrovascular Disease: 3%
- Chronic Lower Respiratory Diseases: 6%
- All Other Deaths: 3%

**North Carolina**
- Diseases of Heart: 22%
- Cancer - All Sites: 23%
- Cerebrovascular Disease: 3%
- Chronic Lower Respiratory Diseases: 6%
- All Other Deaths: 5%

**United States**
- Diseases of Heart: 23%
- Cancer - All Sites: 25%
- Cerebrovascular Disease: 6%
- Chronic Lower Respiratory Diseases: 5%
- All Other Deaths: 3%

902 deaths/100,000  
824 deaths/100,000  
813 deaths/100,000

2010 NC rate is 1% higher than 2008 US rate

Pie Charts are proportionately scaled using the state age-adjusted mortality rate of white females (688 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 4.1 ii. General leading causes of death for ENC29 (2010), NC (2010), and US (2008). Age-adjusted mortality rate per 100,000 population.

<table>
<thead>
<tr>
<th></th>
<th>ENC29</th>
<th>North Carolina</th>
<th>United States</th>
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<tbody>
<tr>
<td>Total</td>
<td>847</td>
<td>803</td>
<td>759</td>
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<tr>
<td>Diseases of Heart</td>
<td>40%</td>
<td>41%</td>
<td>28%</td>
</tr>
<tr>
<td>Cancer - All Sites</td>
<td>5%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>6%</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Chronic Lower Respiratory Diseases</td>
<td>23%</td>
<td>23%</td>
<td>25%</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>23%</td>
<td>22%</td>
<td>23%</td>
</tr>
<tr>
<td>Alzheimers Disease</td>
<td>6%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>All Other Deaths</td>
<td>40%</td>
<td>23%</td>
<td>23%</td>
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2010 NC age-adjusted rate is 6% higher than 2008 US age-adjusted rate

Pie Charts are proportionately scaled using the state age-adjusted mortality rate of white females (688 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 ENC29 (2010) by race and gender. 
Mortality rate per 100,000 population.

**Non-White Males**
- Diseases of Heart: 25%
- Cancer - All Sites: 40%
- Cerebrovascular Disease: 5%
- Chronic Lower Respiratory Diseases: 5%
- Diabetes Mellitus: 5%
- Nephritis, Nephrotic Syndrome, and Nephrosis: 5%
- Alzheimers Disease: 4%
- Unintentional Motor Vehicle Injuries: 4%
- All Other Unintentional Injuries and Adverse Effects: 4%
- All Other Deaths: 5%

2010 ENC29 NWM rate is 5% lower than 2010 ENC29 WM rate

**Non-White Females**
- Diseases of Heart: 22%
- Cancer - All Sites: 40%
- Cerebrovascular Disease: 5%
- Chronic Lower Respiratory Diseases: 5%
- Diabetes Mellitus: 5%
- Nephritis, Nephrotic Syndrome, and Nephrosis: 5%
- Alzheimers Disease: 4%
- Unintentional Motor Vehicle Injuries: 4%
- All Other Unintentional Injuries and Adverse Effects: 4%
- All Other Deaths: 5%

2010 ENC29 NWF rate is 13% lower than 2010 ENC29 WF rate

**White Males**
- Diseases of Heart: 25%
- Cancer - All Sites: 36%
- Cerebrovascular Disease: 4%
- Chronic Lower Respiratory Diseases: 6%
- Diabetes Mellitus: 5%
- Nephritis, Nephrotic Syndrome, and Nephrosis: 5%
- Alzheimers Disease: 4%
- Unintentional Motor Vehicle Injuries: 5%
- All Other Unintentional Injuries and Adverse Effects: 4%
- All Other Deaths: 5%

**White Females**
- Diseases of Heart: 22%
- Cancer - All Sites: 36%
- Cerebrovascular Disease: 7%
- Chronic Lower Respiratory Diseases: 6%
- Diabetes Mellitus: 5%
- Nephritis, Nephrotic Syndrome, and Nephrosis: 5%
- Alzheimers Disease: 4%
- Unintentional Motor Vehicle Injuries: 5%
- All Other Unintentional Injuries and Adverse Effects: 7%
- All Other Deaths: 5%

Pie Charts are Proportionately scaled using the state age-adjusted mortality rate of white females (688 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 ii. General leading causes of death for ENC29 (2010) by race and gender.
Age-adjusted mortality rate per 100,000 population.

2010 ENC29 NWM age-adjusted rate is 21% higher than 2010 ENC29 WM age-adjusted rate

1173 deaths/100,000
973 deaths/100,000

2010 ENC29 NWF age-adjusted rate is 7% higher than 2010 ENC29 WF age-adjusted rate

739 deaths/100,000
688 deaths/100,000

Pie Charts are proportionately scaled using the state age-adjusted mortality rate of white females (688 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 4.3 i. General leading causes of death for ENC29 (2010) by race. Mortality rate per 100,000 population.

Non-White

847 deaths/100,000

White

930 deaths/100,000

2010 ENC29 NW rate is 9% lower than 2010 ENC29 W rate

Pie Charts are Proportionately scaled using the state age-adjusted mortality rate of white females (688 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 4.3 ii. General leading causes of death for ENC29 (2010) by race. Age-adjusted mortality rate per 100,000 population.

Pie Charts are Proportionately scaled using the state age-adjusted mortality rate of white females (688 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.
5. Trends and Disparities in Mortality in ENC29: All Causes of Death and All Causes of Premature Mortality; 1979-2010
All Causes of Death

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 5.1 i. All Causes of Death:
Trends in mortality rates for ENC29, RNC71, and NC
1979-2010 with projections to 2020

1999 ENC29 rate is 12% greater than RNC71
2010 ENC29 rate is 15% greater than RNC71

ENC29 12-yr trendline
8% decrease
R2 = 0.77
y = -6.39x + 994.84

RNC71 12-yr trendline
11% decrease
R2 = 0.76
y = -7.89x + 891.23

NC 12-yr trendline
10% decrease
R2 = 0.80
y = -7.82x + 907.79

Comparison of Fitted Rates in 1999

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Comparison of Fitted Rates in 2010

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Comparison of Fitted Rates in 1999

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Comparison of Fitted Rates in 2010

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Figure 5.1 iii. All Causes of Death:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

<table>
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<tr>
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<th>R²</th>
<th>Equation</th>
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<td>y = -36.72x + 1,622.38</td>
<td>27%</td>
<td>0.85</td>
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<td>WM</td>
<td>y = -18.46x + 1,177.79</td>
<td>19%</td>
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<td>NWF</td>
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Comparison of Fitted Rates in 2010

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<td>WF</td>
<td>y = -11.03x + 814.47</td>
<td>16%</td>
<td>0.84</td>
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Figure 5.1 iv. All Causes of Death: Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

1999 non-White rate is 28% greater than White
2010 non-White rate is 17% greater than White

NW 12-yr trendline
25% decrease
R² = 0.88
y = -25.57x + 1,242.57

W 12-yr trendline
17% decrease
R² = 0.90
y = -13.62x + 971.06


Age-adjusted mortality rate per 100,000 population
Figure 5.1 v. All Causes of Death: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity
43% decrease
$R^2 = 0.34$
$y = -1.02x + 28.46$
All Causes of Premature Mortality

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 5.2 i. All Causes of Premature Mortality:
Trends in premature mortality rates for ENC29, RNC71, and NC,
1979-2010 with projections to 2020

ENC29 12-yr trendline
9% decrease
R2 = 0.50
y = -7.31x + 1,006.03

RNC71 12-yr trendline
12% decrease
R2 = 0.77
y = -8.64x + 866.75

NC 12-yr trendline
12% decrease
R2 = 0.77
y = -8.65x + 889.06

1999 ENC29 rate is 16% greater than RNC71
2010 ENC29 rate is 20% greater than RNC71
Figure 5.2 ii. All Causes of Premature Mortality:
Figure 5.2 iii. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

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<td>71% GT</td>
<td>86% GT</td>
<td>NWF</td>
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Figure 5.2 iv. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race for ENC29, 1979-2010 with projections to 2020

1999 non-White rate is 80% greater than White
2010 non-White rate is 49% greater than White

NW 12-yr trendline
25% decrease
R² = 0.80
y = -29.69x + 1,442.90

W 12-yr trendline
7% decrease
R² = 0.30
y = -4.82x + 801.28
Figure 5.2 v. All Causes of Premature Mortality:
Measuring disparity in age-adjusted premature mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity
43% decrease
R² = 0.57
y = -2.91x + 81.18
Diseases of Heart

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 6.1 i. Diseases of Heart: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

ENC29 12-yr trendline: 27% decrease, R2 = 0.94, y = -6.31x + 279.48
RNC71 12-yr trendline: 32% decrease, R2 = 0.94, y = -6.73x + 248.92
NC 12-yr trendline: 32% decrease, R2 = 0.94, y = -6.72x + 253.81

1999 ENC29 rate is 12% greater than RNC71
2010 ENC29 rate is 20% greater than RNC71
Figure 6.1 ii. Diseases of Heart: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline
37% decrease
R2 = 0.96
y = -9.28x + 297.85

RNC71 12-yr trendline
36% decrease
R2 = 0.98
y = -7.87x + 260.30

NC 12-yr trendline
37% decrease
R2 = 0.98
y = -8.10x + 266.17

US 10-yr trendline
33% decrease
R2 = 0.99
y = -9.03x + 275.16

1999 ENC29 rate is 14% greater than RNC71
2010 ENC29 rate is 13% greater than RNC71

Comparison of Fitted Rates in 1999

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Figure 6.1 iii. Diseases of Heart:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

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<td>45% GT 46% GT</td>
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<td>WF</td>
<td>16%</td>
<td>81%</td>
<td>19% GT 14% GT</td>
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R2 = 0.79
y = -12.16x + 413.46
NWM 12-yr trendline

R2 = 0.93
y = -10.77x + 361.43
WM 12-yr trendline

R2 = 0.92
y = -9.68x + 272.60
NWF 12-yr trendline

R2 = 0.90
y = -7.54x + 228.48
WF 12-yr trendline

35% decrease
43% decrease
40% decrease

36% decrease
43% decrease
40% decrease

13% LT 34% LT 45% LT
15% GT 32% GT 40% GT
16% LT 46% GT 12% GT
19% GT 14% GT
Figure 6.1 iv. Diseases of Heart:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
39% decrease
R² = 0.91
y = -10.64x + 328.53

W 12-yr trendline
37% decrease
R² = 0.93
y = -8.84x + 285.61

1999 non-White rate is 15% greater than White
2010 non-White rate is 12% greater than White
Figure 6.1 v. Diseases of Heart:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2010 with projections to 2020

Racial Disparity

\[ R^2 = 0.02 \]
\[ y = -0.27x + 15.49 \]
Cancer - Trachea, Bronchus, Lung

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 6.2 i. Cancer - Trachea, Bronchus, Lung:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

ENC29 12-yr trendline
RNC71 12-yr trendline
NC 12-yr trendline

7% decrease 6% decrease
R2 = 0.00 R2 = 0.48 R2 = 0.39

y = 0.02x + 65.72 y = -0.33x + 60.25 y = -0.29x + 61.15

1999 ENC29 rate is 9% greater than RNC71
2010 ENC29 rate is 16% greater than RNC71
Figure 6.2 ii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline 13% decrease
R2 = 0.51
y = -0.71x + 66.95

RNC71 12-yr trendline 11% decrease
R2 = 0.68
y = -0.54x + 60.94

NC 12-yr trendline 11% decrease
R2 = 0.74
y = -0.57x + 61.90

US 10-yr trendline 13% decrease
R2 = 0.95
y = -0.72x + 57.28

1999 ENC29 rate is 10% greater than RNC71
2010 ENC29 rate is 8% greater than RNC71

Comparison of Fitted Rates in 1999

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R2 = 0.51
y = -0.71x + 66.95

R2 = 0.68
y = -0.54x + 60.94

R2 = 0.74
y = -0.57x + 61.90

R2 = 0.95
y = -0.72x + 57.28

1999 ENC29 rate is 10% greater than RNC71
2010 ENC29 rate is 8% greater than RNC71
Figure 6.2 iii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

Comparison of Fitted Rates in 2010

NWM
WM
NWF
WF

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Figure 6.2 iv. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
23% decrease
R² = 0.47
y = -1.28x + 66.37

W 12-yr trendline
9% decrease
R² = 0.32
y = -0.50x + 67.13

1999 non-White rate is 1% less than White
2010 non-White rate is 15% less than White
Figure 6.2 v. Cancer - Trachea, Bronchus, Lung: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity
3038% decrease
\( R^2 = 0.27 \)
\[ y = -1.61x - 0.63 \]
Cerebrovascular Disease

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 6.3 i. Cerebrovascular Disease:
Trends in mortality rates for ENC29, RNC71, and NC,
1979-2010 with projections to 2020

1999 ENC29 rate is 13% greater than RNC71
2010 ENC29 rate is 20% greater than RNC71

Comparison of Fitted Rates in 1999

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Comparison of Fitted Rates in 2010

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Figure 6.3 ii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline 86 82 79 75 71 68 64 60 57 53 50 46 42 39 35 31 28 24 20 17 13 9
RNC71 12-yr trendline 75 72 69 66 63 60 57 53 50 47 44 41 38 35 32 29 26 23 20 17 14 11
NC 12-yr trendline 77 73 70 67 64 61 58 55 51 48 45 42 39 36 32 29 26 23 20 17 14 10
US 10-yr trendline 63 60 58 55 53 50 47 45 42 40 37 35 32 30 27 24 22 19 17 14

ENC29 1999 rate is 15% greater than RNC71
ENC29 2010 rate is 12% greater than RNC71

Comparison of Fitted Rates in 1999
- ENC29: 13% LT
- RNC71: 11% LT
- NC: 27% LT
- US: ENC29

Comparison of Fitted Rates in 2010
- ENC29: 15% GT
- RNC71: 2% GT
- NC: 16% LT
- US: ENC29

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Center for Health Systems Research and Development, ECU
Figure 6.3 iii. Cerebrovascular Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

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Comparison of Fitted Rates in 1999

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Comparison of Fitted Rates in 2010

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Figure 6.3 iv. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
48% decrease
R2 = 0.94
y = -4.61x + 114.57

W 12-yr trendline
50% decrease
R2 = 0.89
y = -3.31x + 79.72

1999 non-White rate is 44% greater than White
2010 non-White rate is 48% greater than White
Figure 6.3 v. Cerebrovascular Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

R2 = 0.00
y = 0.16x + 44.98
Chronic Lower Respiratory Diseases

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 6.4 i. Chronic Lower Respiratory Diseases:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

ENC29 12-yr trendline: 6% decrease
RNC71 12-yr trendline: 7% increase
NC 12-yr trendline: R2 = 0.09

R2 = 0.13
y = -0.23x + 47.58

R2 = 0.16
y = 0.24x + 44.36

R2 = 0.09
y = 0.17x + 44.85

1999 ENC29 rate is 7% greater than RNC71
2010 ENC29 rate is 4% less than RNC71

Comparison of Fitted Rates in 1999

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Figure 6.4 ii. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline  RNC71 12-yr trendline  NC 12-yr trendline  US 10-yr trendline

17% decrease  
R2 = 0.63  
y = -0.73x + 49.98

8% decrease  
R2 = 0.08  
y = 0.13x + 46.03

1999 ENC29 rate is 9% greater than RNC71
2010 ENC29 rate is 12% less than RNC71

Comparison of Fitted Rates in 1999

Comparison of Fitted Rates in 2010
Figure 6.4 iii. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

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Figure 6.4 iv. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
R2 = 0.40
y = -0.70x + 34.20

W 12-yr trendline
R2 = 0.59
y = -0.76x + 56.27

1999 non-White rate is 39% less than White
2010 non-White rate is 45% less than White
Figure 6.4 v. Chronic Lower Respiratory Diseases:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity
36% decrease
R^2 = 0.12
y = -1.90x - 62.78
Diabetes Mellitus

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. Diabetes Mellitus: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

- ENC29 12-yr trendline: 24% decrease, $y = -0.19x + 34.06$, $R^2 = 0.09$
- RNC71 12-yr trendline: 21% decrease, $y = -0.54x + 27.49$, $R^2 = 0.80$
- NC 12-yr trendline: $y = -0.50x + 28.56$, $R^2 = 0.76$

1999 ENC29 rate is 24% greater than RNC71
2010 ENC29 rate is 49% greater than RNC71

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1999 ENC29 rate is 24% greater than RNC71
2010 ENC29 rate is 49% greater than RNC71

Comparison of Fitted Rates in 1999:
- ENC29: $y = -0.19x + 34.06$
- RNC71: $y = -0.54x + 27.49$
- NC: $y = -0.50x + 28.56$

Comparison of Fitted Rates in 2010:
- ENC29: $y = -0.19x + 34.06$
- RNC71: $y = -0.54x + 27.49$
- NC: $y = -0.50x + 28.56$
Figure 6.5 ii. Diabetes Mellitus: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

- ENC29 12-yr trendline: 19% decrease, $R^2 = 0.48$, $y = -0.55x + 35.55$
- RNC71 12-yr trendline: 28% decrease, $R^2 = 0.73$, $y = -0.65x + 28.26$
- NC 12-yr trendline: 26% decrease, $R^2 = 0.75$, $y = -0.64x + 29.42$
- US 10-yr trendline: 14% decrease, $R^2 = 0.73$, $y = -0.36x + 26.27$

Comparison of Fitted Rates in 1999
- ENC29: 26% greater than RNC71
- US: 32% greater than ENC29

Comparison of Fitted Rates in 2010
- ENC29: 40% greater than RNC71
- US: 32% greater than ENC29
Figure 6.5 iii. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1979-2010 with projections to 2020
Figure 6.5 iv. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race for ENC29,
1979-2010 with projections to 2020

NW 12-yr trendline
23% decrease
R² = 0.41
y = -1.19x + 62.10

W 12-yr trendline
15% decrease
R² = 0.30
y = -0.31x + 24.79

1999 non-White rate is 150% greater than White
2010 non-White rate is 129% greater than White
Figure 6.5 v. Diabetes Mellitus:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2010 with projections to 2020

Racial Disparity

$R^2 = 0.09$

$y = -2.28x + 153.81$
Alzheimer's Disease

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 6.6 i. Alzheimers Disease:
Trends in mortality rates for ENC29, RNC71, and NC,
1979-2010 with projections to 2020

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ENC29 12-yr trendline: 76% increase, R2 = 0.86
ENC29 fitted rate: y = 0.92x + 14.55

RNC71 12-yr trendline: 45% increase, R2 = 0.83
RNC71 fitted rate: y = 0.80x + 21.03

NC 12-yr trendline: 49% increase, R2 = 0.88
NC fitted rate: y = 0.82x + 20.00

1999 ENC29 rate is 31% less than RNC71
2010 ENC29 rate is 17% less than RNC71
Figure 6.6 ii. Alzheimers Disease:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline
-45% increase
R2 = 0.67
y = 0.64x + 16.94

RNC71 12-yr trendline
-36% increase
R2 = 0.69
y = 0.69x + 23.10

NC 12-yr trendline
-37% increase
R2 = 0.75
y = 0.68x + 22.15

US 10-yr trendline
-47% increase
R2 = 0.93
y = 0.79x + 16.63

1999 ENC29 rate is 27% less than RNC71
2010 ENC29 rate is 22% less than RNC71

Comparison of Fitted Rates in 1999
ENC29
36% GT
27% LT

RNC71
31% GT
22% LT

NC
2% LT

US
2% GT

Comparison of Fitted Rates in 2010
ENC29
28% GT
19% LT

RNC71
24% GT
15% LT

NC
3% GT

US
5% LT

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Center for Health Systems Research and Development, ECU
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Figure 6.6 iii. Alzheimers Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

- NWM 12-yr trendline: 74% increase
  \[ R^2 = 0.29 \]
  \[ y = 0.62x + 9.97 \]
- WM 12-yr trendline: 42% increase
  \[ R^2 = 0.24 \]
  \[ y = 0.50x + 14.07 \]
- NWF 12-yr trendline: 64% increase
  \[ R^2 = 0.50 \]
  \[ y = 0.74x + 13.78 \]
- WF 12-yr trendline: 39% increase
  \[ R^2 = 0.76 \]
  \[ y = 0.68x + 21.00 \]
Figure 6.6 iv. Alzheimers Disease: Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

- 1999 non-White rate is 32% less than White
- 2010 non-White rate is 20% less than White

NW 12-yr trendline: 65% increase, $R^2 = 0.56$, $y = 0.69x + 12.80$

W 12-yr trendline: 38% increase, $R^2 = 0.60$, $y = 0.60x + 18.79$
Figure 6.6 v. Alzheimers Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity

50% increase

$R^2 = 0.13$

$y = 1.96x - 46.62$
All Other Unintentional Injuries and Adverse Effects

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 6.7 i. All Other Unintentional Injuries and Adverse Effects: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

1999 ENC29 rate is 2% greater than RNC71
2010 ENC29 rate is 2% less than RNC71

ENC29 12-yr trendline
36% increase
R2 = 0.62
y = 0.65x + 21.83

RNC71 12-yr trendline
42% increase
R2 = 0.87
y = 0.75x + 21.41

NC 12-yr trendline
41% increase
R2 = 0.88
y = 0.74x + 21.49
Figure 6.7 ii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline: 26% increase, \( R^2 = 0.49 \)  
\[ y = 0.50x + 22.95 \]

RNC71 12-yr trendline: 38% increase, \( R^2 = 0.85 \)  
\[ y = 0.69x + 22.03 \]

NC 12-yr trendline: 36% increase, \( R^2 = 0.86 \)  
\[ y = 0.66x + 22.19 \]

US 10-yr trendline: 41% increase, \( R^2 = 0.97 \)  
\[ y = 0.76x + 18.40 \]

1999 ENC29 rate is 4% greater than RNC71
2010 ENC29 rate is 4% less than RNC71
Figure 6.7 iii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

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Comparison of Fitted Rates in 2010

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Figure 6.7 iv. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

1999 non-White rate is 30% greater than White
2010 non-White rate is 41% less than White

NW 12-yr trendline
32% decrease
R² = 0.26
y = -0.73x + 27.25

W 12-yr trendline
62% increase
R² = 0.86
y = 1.08x + 20.95
Figure 6.7 v. All Other Unintentional Injuries and Adverse Effects:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity
365% decrease
R2 = 0.63
y = -8.86x + 29.11
Nephritis, Nephrotic Syndrome, and Nephrosis

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 6.8 i. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

ENC29 12-yr trendline
38% increase
R2 = 0.81
y = 0.53x + 16.87

RNC71 12-yr trendline
30% increase
R2 = 0.86
y = 0.37x + 14.80

NC 12-yr trendline
31% increase
R2 = 0.89
y = 0.39x + 15.14

1999 ENC29 rate is 14% greater than RNC71
2010 ENC29 rate is 21% greater than RNC71

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Figure 6.8 ii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline 18 19 19 20 20 20 20 21 21 21 21 22 22 22 23 23 23 23 24 24 24 25
RNC71 12-yr trendline 16 16 16 17 17 17 18 18 18 19 19 19 19 20 20 20 21 21 21 22 22 22
NC 12-yr trendline 16 17 17 17 17 18 18 18 19 19 19 20 20 20 20 21 21 21 22 22 22 22
US 10-yr trendline 13 14 14 14 14 14 14 15 15 15 15 15 15 15 16 16 16 16 16 16 17 17

20% increase R2 = 0.57 y = 0.30x + 18.12
23% increase R2 = 0.73 y = 0.29x + 15.62
22% increase R2 = 0.79 y = 0.29x + 16.01
12% increase R2 = 0.80 y = 0.15x + 13.30

1999 ENC29 rate is 16% greater than RNC71
2010 ENC29 rate is 13% greater than RNC71

Comparison of Fitted Rates in 1999

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Figure 6.8 iii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

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<th>12-yr Trendline</th>
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<th>R²</th>
<th>y = 0.89x + 32.74</th>
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<td>y = -0.03x + 32.17</td>
<td>y = 0.16x + 10.92</td>
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Comparison of Fitted Rates in 1999

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Figure 6.8 iv. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
13% increase
R² = 0.14
y = 0.35x + 32.10

W 12-yr trendline
27% increase
R² = 0.46
y = 0.27x + 12.38

1999 non-White rate is 159% greater than White
2010 non-White rate is 133% greater than White
Figure 6.8 v. Nephritis, Nephrotic Syndrome, and Nephrosis: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity

R² = 0.08

y = -2.80x + 163.43
Pneumonia and Influenza

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 6.9 i. Pneumonia and Influenza:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020
Figure 6.9 ii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline
RNC71 12-yr trendline
NC 12-yr trendline
US 10-yr trendline

35% decrease, $R^2 = 0.72$
37% decrease, $R^2 = 0.89$
37% decrease, $R^2 = 0.90$
34% decrease, $R^2 = 0.90$

$y = -0.79x + 27.21$
$y = -0.84x + 27.01$
$y = -0.83x + 27.05$
$y = -0.86x + 25.21$

1999 ENC29 rate is 1% greater than RNC71
2010 ENC29 rate is 4% greater than RNC71

Comparison of Fitted Rates in 1999
Comparison of Fitted Rates in 2010
Figure 6.9 iii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1979-2010 with projections to 2020

Age-adjusted mortality rate per 100,000 population

Comparison of Fitted Rates in 1999

Comparison of Fitted Rates in 2010

R2 = 0.11
y = -0.75x + 32.08

R2 = 0.85
y = -1.06x + 32.76

R2 = 0.50
y = -0.71x + 22.71

R2 = 0.62
y = -0.70x + 24.93

28% decrease

39% decrease

38% decrease

34% decrease
Figure 6.9 iv. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

1999 non-White rate is 5% less than White
2010 non-White rate is 5% less than White

NW 12-yr trendline
35% decrease
R2 = 0.39
y = -0.77x + 26.34

W 12-yr trendline
35% decrease
R2 = 0.76
y = -0.80x + 27.62
Figure 6.9 v. Pneumonia and Influenza:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2010 with projections to 2020

Racial Disparity

$R^2 = 0.00$
y = 0.03x - 7.34
Cancer - Colon, Rectum, Anus

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 6.10 i. Cancer - Colon, Rectum, Anus:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

1999 ENC29 rate is 20% greater than RNC71
2010 ENC29 rate is 20% greater than RNC71

Comparison of Fitted Rates in 1999

<table>
<thead>
<tr>
<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
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<tr>
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<td>RNC71</td>
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<tr>
<td>16% GT</td>
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Comparison of Fitted Rates in 2010

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<tr>
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<td>3% GT</td>
<td>RNC71</td>
</tr>
<tr>
<td>17% GT</td>
<td>3% LT</td>
<td>NC</td>
</tr>
</tbody>
</table>
Figure 6.10 ii. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline
31% decrease
R2 = 0.89
y = -0.63x + 24.13

RNC71 12-yr trendline
26% decrease
R2 = 0.91
y = -0.44x + 20.09

NC 12-yr trendline
27% decrease
R2 = 0.95
y = -0.47x + 20.73

US 10-yr trendline
25% decrease
R2 = 0.98
y = -0.54x + 21.65

1999 ENC29 rate is 20% greater than RNC71
2010 ENC29 rate is 13% greater than RNC71

Comparison of Fitted Rates in 1999
<table>
<thead>
<tr>
<th>ENC29</th>
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<th>US</th>
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<tr>
<td>20% GT</td>
<td>16% GT</td>
<td>11% LT</td>
<td>7% LT</td>
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Comparison of Fitted Rates in 2010
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<th>RNC71</th>
<th>NC</th>
<th>US</th>
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<tbody>
<tr>
<td>11% LT</td>
<td>9% LT</td>
<td>2% GT</td>
<td>0% GT</td>
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<tr>
<td>13% GT</td>
<td>10% GT</td>
<td>10% GT</td>
<td>0% GT</td>
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<tr>
<td>16% GT</td>
<td>11% GT</td>
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<td>4% GT</td>
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<tr>
<td>11% LT</td>
<td>11% GT</td>
<td>4% LT</td>
<td>1% LT</td>
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Figure 6.10 iii. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

<table>
<thead>
<tr>
<th></th>
<th>NWM</th>
<th>WM</th>
<th>NWF</th>
<th>WF</th>
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<tbody>
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<td>24% LT</td>
<td>28% LT</td>
<td>50% LT</td>
<td>NWM</td>
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<td>5% LT</td>
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<tr>
<td>101% GT</td>
<td>52% GT</td>
<td>45% GT</td>
<td>45% GT</td>
<td>WF</td>
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Comparison of Fitted Rates in 2010

<table>
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<th>WM</th>
<th>NWF</th>
<th>WF</th>
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<td>32% GT</td>
<td>32% LT</td>
<td>37% LT</td>
<td>57% LT</td>
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<td>36% GT</td>
<td>6% LT</td>
<td>9% LT</td>
<td>59% LT</td>
<td>WM</td>
</tr>
<tr>
<td>101% GT</td>
<td>9% GT</td>
<td>9% GT</td>
<td>9% GT</td>
<td>NWF</td>
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</table>

R2 = 0.29
$y = -0.72x + 36.00$

R2 = 0.68
$y = -0.74x + 27.31$

R2 = 0.33
$y = -0.76x + 26.01$

R2 = 0.85
$y = -0.53x + 17.93$
Figure 6.10 iv. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
29% decrease
R2 = 0.61
y = -0.73x + 29.62

W 12-yr trendline
33% decrease
R2 = 0.85
y = -0.60x + 21.89

1999 non-White rate is 35% greater than White
2010 non-White rate is 41% greater than White
| Year | % Difference | 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 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1979 | -21          | 31 | 21 | 5  | 51 | 6  | 1  | 42 | 42 | 21 | 51 | 6  | 8  | 1  | 44 | 62 | 3  | 8  | 1  | 23 | 54 | 37 | 43 | 62 | 05 | 73 | 94 | 51 | 35 | 82 | 64 | 64 | 63 | 83 | 54 | 37 |
| 1980 | -25          | 36 | 37 | 37 | 38 | 38 | 39 | 39 | 40 | 40 | 40 | 41 | 41 | 42 | 42 | 43 | 43 | 44 | 44 | 44 | 45 | 45 | 46 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**Figure 6.10 v. Cancer - Colon, Rectum, Anus:**
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

- **Racial Disparity**
  - $R^2 = 0.01$
  - $y = 0.45x + 35.99$
7. Trends and Disparities in Mortality in ENC29: Cancer - All Sites and HIV Disease; 1979-2010
Cancer - All Sites

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 7.1 i. Cancer - All Sites:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

ENC29 12-yr trendline 3% decrease
R2 = 0.15
y = -0.58x + 220.69

RNC71 12-yr trendline 9% decrease
R2 = 0.70
y = -1.44x + 199.10

NC 12-yr trendline 8% decrease
R2 = 0.73
y = -1.35x + 202.57

1999 ENC29 rate is 11% greater than RNC71
2010 ENC29 rate is 17% greater than RNC71

<table>
<thead>
<tr>
<th>Year</th>
<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
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<tr>
<td>1979</td>
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<tr>
<td>2010</td>
<td>199</td>
<td>196</td>
<td>197</td>
</tr>
</tbody>
</table>

Comparison of Fitted Rates in 1999

ENC29 | RNC71 | NC | ENC29 | RNC71 | NC |
11% GT | 2% LT | 10% LT | 15% LT | 12% LT | ENC29 |
9% GT  | 2% LT | ENC29 | ENC29 | ENC29 | ENC29

Comparison of Fitted Rates in 2010
Figure 7.1 ii. Cancer - All Sites:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020

ENC29 12-yr trendline
RNC71 12-yr trendline
NC 12-yr trendline
US 10-yr trendline

y = -2.95x + 227.61
y = -2.23x + 203.29
y = -2.35x + 207.11
y = -2.95x + 204.64

1999 ENC29 rate is 12% greater than RNC71
2010 ENC29 rate is 9% greater than RNC71
Figure 7.1 iii. Cancer - All Sites:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

Comparison of Fitted Rates in 1999

Comparison of Fitted Rates in 2010
Figure 7.1 iv. Cancer - All Sites: Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
21% decrease
R² = 0.65
y = -4.62x + 265.23

W 12-yr trendline
13% decrease
R² = 0.81
y = -2.33x + 212.11

1999 non-White rate is 25% greater than White
2010 non-White rate is 15% greater than White
Figure 7.1 v. Cancer - All Sites:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity
44% decrease
R2 = 0.19
y = -0.93x + 25.37
HIV Disease

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 7.2 i. HIV Disease:
Trends in mortality rates for ENC29, RNC71, and NC, 1979-2010 with projections to 2020

**Comparison of Fitted Rates in 1999**

<table>
<thead>
<tr>
<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% LT</td>
<td>17% LT</td>
<td>ENC29</td>
</tr>
<tr>
<td>25% GT</td>
<td>4% GT</td>
<td>RNC71</td>
</tr>
<tr>
<td>20% GT</td>
<td>4% LT</td>
<td>NC</td>
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**Comparison of Fitted Rates in 2010**

<table>
<thead>
<tr>
<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>52% GT</td>
<td>8% GT</td>
<td>RNC71</td>
</tr>
<tr>
<td>42% GT</td>
<td>7% LT</td>
<td>NC</td>
</tr>
</tbody>
</table>

1999 ENC29 rate is 25% greater than RNC71
2010 ENC29 rate is 52% greater than RNC71

ENC29 12-yr trendline
35% decrease
R² = 0.58
y = -0.23x + 7.79

RNC71 12-yr trendline
48% decrease
R² = 0.96
y = -0.25x + 6.22

NC 12-yr trendline
46% decrease
R² = 0.96
y = -0.25x + 6.47
Figure 7.2 ii. HIV Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2010 with projections to 2020.

ENC29 12-yr trendline: 37% decrease
RNC71 12-yr trendline: 49% decrease
NC 12-yr trendline: 48% decrease
US 10-yr trendline: 38% decrease

R2 = 0.66
y = -0.25x + 8.09

R2 = 0.96
y = -0.25x + 6.14
y = -0.26x + 6.44
y = -0.21x + 5.65

1999 ENC29 rate is 32% greater than RNC71
2010 ENC29 rate is 58% greater than RNC71
Figure 7.2 iii. HIV Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2010 with projections to 2020

- 44% decrease
  \[ R^2 = 0.67 \]
  \[ y = -1.13x + 30.95 \]

- 39% decrease
  \[ R^2 = 0.15 \]
  \[ y = -0.09x + 2.87 \]

- 30% decrease
  \[ R^2 = 0.31 \]
  \[ y = -0.32x + 12.84 \]

- 30% decrease
  \[ R^2 = 0.01 \]
  \[ y = -0.01x + 0.67 \]
Figure 7.2 iv. HIV Disease:
Trends in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

NW 12-yr trendline
39% decrease
R² = 0.62
y = -0.67x + 20.87

W 12-yr trendline
39% decrease
R² = 0.23
y = -0.06x + 1.80

1999 non-White rate is 1063% greater than White
2010 non-White rate is 1062% greater than White
Figure 7.2 v. HIV Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2010 with projections to 2020

Racial Disparity

\[ R^2 = 0.06 \]
\[ y = 40.53x + 949.30 \]
### 8. Appendix

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<td>I00-I09, I11, I13, I20-I51</td>
<td>390-398, 402, 404, 410-429</td>
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<tr>
<td>Cerebrovascular Disease</td>
<td>I60-I69</td>
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<tr>
<td>Atherosclerosis</td>
<td>I70</td>
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<tr>
<td>Cancer - All Sites</td>
<td>C00-C97</td>
<td>140-208</td>
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<tr>
<td>Cancer - Lip, Oral Cavity, and Pharynx</td>
<td>C00-C14</td>
<td>140-149</td>
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<td>Cancer - Colon, Rectum, and Anus</td>
<td>C18-C21</td>
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<td>Cancer - Pancreas</td>
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<td>Cancer - Trachea, Bronchus, and Lung</td>
<td>C33-C34</td>
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<td>Cancer - Cervix Uteri</td>
<td>C53</td>
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<td>Cancer - Ovary</td>
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<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>
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<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, Y85, Y86</td>
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