Trends and Disparities in Mortality in Eastern North Carolina
Total Deaths, Premature Mortality and Deaths for Ten Leading Causes; 1990-2019

A Resource for Healthy Communities

Health Indicator Series - Report #2.201
January 2022

Health Systems Research and Development
Department of Public Health, East Carolina University
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1. Introduction

Health Indicators Series:
A Resource for Healthy Communities
January 2022


Health Indicators is a series of reports describing community health at the state, regional, and county level. 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 State Center for Health Statistics, 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 overarching goals—to increase the span and quality of life, and to eliminate health disparities. 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 (1990-2019), as well as the most recent 15-year period (2005 to 2019). 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. The next section charts recent trends and disparities in mortality and provides projections to the year 2030. 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 the 29 counties of 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 2019, the age-adjusted mortality rate for Eastern North Carolina is 840 deaths per 100,000. This rate is 9% higher than the state rate. Within Eastern North Carolina, the non-White rate is 16% higher than the White rate. The non-White male rate is 25% higher than the rate for White males. The non-White female rate is 12% higher than the rate for White females.

The five general leading causes of mortality in Eastern North Carolina (2019) are:
1. Diseases of Heart
2. Cancer—All Sites
3. Cerebrovascular Disease
4. Chronic Lower Respiratory Diseases
5. All Other Unintentional Injuries and Adverse Effects

The five general leading causes of mortality in Eastern North Carolina by race and gender (2019) are:

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<th>Race and Gender</th>
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<th>White Males</th>
<th>non-White Females</th>
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<td>Chronic Lower Respiratory Disease</td>
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<td>Cerebrovascular Disease</td>
<td>Alzheimer's Disease</td>
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Trends in Mortality from All Causes

- The 30-year ENC trend line shows all-cause mortality rates increasing. The 15-year trend shows ENC’s rate has increased 13% over the period, and is 13% higher than NC.
- The age-adjusted all-cause mortality rate trend for ENC has been decreasing over the 30-year period; the 15-year trend is decreasing more slowly and remains higher than the RNC and NC rates. ENC’s rate remains 8% greater than the rate for RNC.
- The non-White male mortality rate trend remains higher than other demographic groups but has decreased 19% in the 15-year period. Convergence of non-White males with White males and non-White females with White females is suggested in the future.
The trends for all-cause mortality rates for both non-Whites and Whites are decreasing. The non-White trend is 10% greater than the White rate, but the recent 15-year trend suggests they will converge in the future.
Over the recent 15-year period there is a 58% decrease in racial disparity.

**Trends in Premature Mortality from All Causes of Death**
- ENC’s premature mortality rate trend is flat and not reliable.
- The age-adjusted premature mortality rate trend for ENC is 17% greater than NC, but is also flat and not reliable.
- The non-White male premature mortality rate trend has decreased 10% over the 15-year period. The non-White female rate has decreased 13% over 15 years. The White male and White female rate trends are not reliable.
- The non-White premature mortality rate is 43% greater than the White rate, and has decreased 11% over the 15 year period. The White rate trend is not reliable.
- The 15-year trend for racial disparity shows a 29% decrease in a moderately reliable trend.

**Diseases of the Heart**
- ENC’s 15-year heart disease mortality rate is 25% greater than the RNC rate, but ENC’s rate trend is flat and not reliable.
- While ENC’s age-adjusted mortality rate trend is decreasing at a pace similar to RNC, NC and the US, the ENC rate remains 16% greater than the RNC rate in 2019.
- The non-White male rate trend remains slightly higher than the White male trend. The non-White female trend has converged with the White female trend and is projected to drop below it.
- The non-White rate trend remains 5% greater than for Whites, but the 15-year trends for both are decreasing and convergence is suggested in the future.
- The 15-year trend line for racial disparity is decreasing in a reliable trend.

**Cerebrovascular Disease**
- ENC’s cerebrovascular disease mortality rate has turned up in recent years and is 31% greater than RNC. The rate trend has increased 11% over the 15 year period.
- The ENC age-adjusted cerebrovascular disease mortality rate trend has decreased 15% over the 15-year period. It remains 21% greater than the RNC rate trend.
- Non-White males have the highest mortality rate for cerebrovascular disease but the rate has decreased 20% over the 15-year period. The rate for non-White females has decreased 29% and is projected to converge with the trend for White males and White females.
- The cerebrovascular disease mortality rate trend for non-Whites is decreasing but is still 34% greater than Whites in 2019.
- The 15-year trend for racial disparity is decreasing in a moderately reliable trend.

**Cancer – Trachea, Bronchus, Lung**
- The 15-year trend line for cancer-TBL for ENC has decreased 13% over the period. The rate for 2019 is 20% greater than the rate for RNC.
- In 2019 the age-adjusted rate for ENC is 12% higher than RNC. The 15-year trend rate for ENC has decreased 34%.
- The mortality rate trends for White and non-White males are decreasing and are projected to converge. The rate for non-White females is 33% less than the rate for White females.
The non-White mortality rate trend for this cancer is consistently lower than the White rate. Both trends are decreasing over the 15-year period, but non-White is decreasing more quickly.

The trend for racial disparity is not reliable.

**Chronic Lower Respiratory Diseases**

- The 30-year ENC trend for CLRD is increasing, as is the 15-year trend. In 2019 the ENC rate is 5% greater than the RNC rate.
- The ENC age-adjusted rate trend is lower than the RNC and NC but the trend is flat and not reliable.
- The rate for White males is the highest but is decreasing in a reliable trend. The rate for non-White males has decreased 20% over the 15-year period in a moderately reliable trend and is now below the rate for White females, which is increasing. The rate for non-White females is the lowest and is increasing in a moderately reliable trend.
- The 15-year trend for Whites is higher than the non-White rate, but both rates are flat and unreliable.
- The disparity trend between White and non-White is unreliable.

**All Other Unintentional Injuries and Adverse Effects**

- The mortality rate trend for unintentional injuries and adverse effects shows a sharp increase in ENC (107% over 15 years). The trends for RNC and the NC are also up sharply.
- The age-adjusted mortality rate trends for ENC, RNC, NC, and the US are all increasing. During the last 15 years the ENC rate has increased 97% and it is now 8% greater than RNC.
- The trends are increasing for all groups, but the white male rate is the highest and shows the greatest increase (125% over 15 years).
- The White rate trend has increased 110% over the 15 year period. The non-White rate is 39% less than the white rate, and increased 66% over the period.
- Over the 15-year period the racial disparity has decreased in a moderately reliable trend.

**Alzheimer’s Disease**

- The Alzheimer’s mortality rate trend for ENC shows a steep increase over the 15 year period (152%). ENC’s rate of increase was larger than RNC and NC, but the rate for ENC is still 7% less than RNC.
- In 2019, the age-adjusted rate for ENC is 16% less than the rate for RNC. The ENC rate trend has increased 78% over the 15-year period and has inched above the US rate.
- Rate trends are increasing for all groups but non-White males and non-White females have the greatest increase (162% and 119% over 15 years, respectively). The rate for White females is the highest, followed by non-White females.
- The White and non-White rate trends are both increasing. They are set to converge, and the non-White trend is projected to overtake the White in the future.
- The 15-year trend shows an increase in disparity that favors Whites and is projected to increase in the future.

**Diabetes Mellitus**

- The 15-year rate trend for ENC has increased 28% over the period and is 43% greater than the RNC rate.
- In 2019, the ENC rate trend for age-adjusted diabetes mellitus is 37% greater than RNC. The 15-year trend is not reliable.
The non-White male 15-year rate has increased but the trend is not reliable. The non-White female trend has decreased 21%. The White male and White female trends are lower but are unreliable.

The non-White mortality rate is 11% higher than the White rate. The 15-year rate trends are unreliable.

The 15-year trend for racial disparity is not reliable.

Nephritis, Nephrotic Syndrome, and Nephrosis

- In 2019 ENC’s rate trend for nephritis, nephrotic syndrome and nephrosis is 11% greater than RNC, but the trend is not reliable.
- With age-adjustment, the ENC rate trend has decreased 26% over the 15-year period. It is 2% greater than the RNC rate and NC rate. They are projected to converge soon.
- The 15-year trends for non-White males and non-White females are the highest but have decreased 25% over the 15-year period. The non-White male trend in 2019 is 119% greater than the White male trend and 217% greater than the White female trend. All trends are decreasing.
- The non-White rate in 2019 is 121% greater than the White rate. It has decreased 31% over the 15-year period. The White rate has decreased 24%.
- The trend for racial disparity is decreasing but the trend is not reliable.

Unintentional Motor Vehicle Injuries

- The mortality rate trend for unintentional motor vehicle injuries in ENC has deceased by 26% over the 15-year period, but has recently ticked up. The rate for NC has decreased. In 2019 ENC’s rate trend is 21% greater than RNC.
- With age-adjustment, the ENC rate trend has decreased 27% over the 15-year period, but has recently gone up. It is 22% greater than the RNC rate and 18% greater than the NC rate.
- The 15-year trends for non-White males and White males are the highest, but the White male trend line has experienced a 44% decrease over the 15-year period. The rate for non-White males is unreliable. Non-White females and White females are lower, with White females projected to decrease.
- The non-White rate in 2019 is 52% greater than the White rate but is unreliable. The White rate is decreasing, 43% over 15 years.
- The 15-year trend shows an increase in disparity that favors Whites and is projected to increase in the future.

Cancer—Colon, Rectum, Anus

- The mortality rate trend for unintentional motor vehicle injuries in ENC has deceased by 26% over the 15-year period, but has recently ticked up. The rate for NC has decreased. In 2019 ENC’s rate trend is 21% greater than RNC.
- With age-adjustment, the ENC rate trend has decreased 27% over the 15-year period, but has recently gone up. It is 22% greater than the RNC rate and 18% greater than the NC rate.
- The 15-year trends for non-White males and White males are the highest, but the White male trend line has experienced a 44% decrease over the 15-year period. The rate for non-White males is unreliable. Non-White females and White females are lower, with White females projected to decrease.
- The non-White rate in 2019 is 52% greater than the White rate but is unreliable. The White rate is decreasing, 43% over 15 years.
- The 15-year trend shows an increase in disparity that favors Whites and is projected to increase in the future.
Cancer – All Sites

- The cancer—all sites mortality rate trends for ENC, RNC, and NC are flat and are not reliable.
- The age-adjusted cancer—all sites mortality rate trends for ENC, RNC, NC and US are all decreasing. The ENC rate is 8% greater than the NC rate.
- The rate trend is decreasing for all groups. The rate for non-White males is the highest, but it is decreasing the most and set to converge with the rate for White males. White and non-White females are lower.
- Both the White and non-White cancer mortality trends are decreasing over the 15 year period. The non-White rate decreased 30% and the White rate decreased 21%. The non-White rate remains 8% greater than the White rate in 2019 but they are converging.
- The 15-year trend for racial disparity shows a 67% decrease.

HIV Disease

- The fitted HIV mortality rates for ENC have been decreasing over the past 15 years, but are still 29% greater than NC in 2019.
- The age-adjusted rate trend for ENC, RNC, and the US are all decreasing. The ENC rate is 37% greater than NC in 2019.
- Non-White males continue to have the highest rate of age-adjusted mortality but the rate has decreased 83% in a 15-year reliable trend. Non-White females have the second highest rate, but it has also declined. The rates for White males and non-White females are lower.
- The 15-year age-adjusted HIV mortality rates have decreased for both Whites and non-Whites by 61% and 80% respectively. The non-White rate is still 575% greater than the White rate.
- The 15-year trend for racial disparity shows a 55% decrease.
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).

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 2019. Smaller areas like counties will usually be aggregated into 5-year intervals (e.g., 2014 to 2019). 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 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 2030 from known historical values (2005 to 2019) 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 6.2 ii the year 2013 is the 9th year in the series, so 9 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 cerebrovascular diseases (2005 to 2019), the 2013 expected or fitted age-adjusted rate is calculated to be 50.3 deaths per 100,000 people. The observed age-adjusted rate for 2013 is 46 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 2013 is 4.3—the model (the equation of the line) overestimates the observed value by 4.3 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 trend lines are for those where $R^2$ is less than 0.10 and should be considered not reliable. The thickest 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.

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Percent change provides a measure of the estimated change in mortality over the most recent thirteen year period (2005-2019). 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 2005 and 2019 tables compare the fitted rates calculated for the beginning and end of the observed time series in terms of percent difference. Returning to figure 6.2 ii, ENC29’s age-adjusted fitted rate for cerebrovascular diseases in 2005 is 8% greater than (GT) RNC’s fitted rate. In 2019, ENC29’s fitted rate is 21% greater than (GT) 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.
Trends and Disparities in Mortality in Eastern North Carolina-29 Counties

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 (2019), NC (2019), and US (2016). Mortality rate per 100,000 population.

ENC29

North Carolina

United States

1058 deaths/100,000

915 deaths/100,000

849 deaths/100,000

Slices without percentages constitute less than 5% of the deaths within that chart.

2019 NC rate is 8% higher than 2016 US rate
Figure 4.1 ii. General leading causes of death for ENC29 (2019), NC (2019), and US (2016). Age-adjusted mortality rate per 100,000 population.

ENC29:
- 840 deaths/100,000

North Carolina:
- 768 deaths/100,000

United States:
- 729 deaths/100,000

2019 NC age-adjusted rate is 5% higher than 2016 US age-adjusted rate

Slices without percentages constitute less than 5% of the deaths within that chart.
Figure 4.2 i. General leading causes of death for ENC29 (2019) by race and gender.
Mortality rate per 100,000 population.

Non-White Males

2019 ENC29 NWM rate is 1% lower than 2019 ENC29 WM rate

1092 deaths/100,000 1103 deaths/100,000

Diseases of Heart: 22%
Cancer - All Sites: 5%
Cerebrovascular Disease: 5%
Chronic Lower Respiratory Diseases: 6%
Diabetes Mellitus: 41%
Alzheimers Disease: 7%
All Other Unintentional Injuries and Adverse Effects: 7%
All Other Deaths: 7%

Non-White Females

2019 ENC29 NWF rate is 7% lower than 2019 ENC29 WF rate

968 deaths/100,000 1046 deaths/100,000

Diseases of Heart: 20%
Cancer - All Sites: 4%
Cerebrovascular Disease: 7%
Chronic Lower Respiratory Diseases: 7%
Diabetes Mellitus: 39%
Alzheimers Disease: 7%
All Other Unintentional Injuries and Adverse Effects: 7%
All Other Deaths: 7%

Slices without percentages constitute less than 5% of the deaths within that chart.
Figure 4.2 ii. General leading causes of death for ENC29 (2019) by race and gender. Age-adjusted mortality rate per 100,000 population.

Non-White Males

2019 ENC29 NWM age-adjusted rate is 25% higher than 2019 ENC29 WM age-adjusted rate

1157 deaths/100,000

Non-White Females

2019 ENC29 NWF age-adjusted rate is 12% higher than 2019 ENC29 WF age-adjusted rate

758 deaths/100,000

White Males

929 deaths/100,000

White Females

676 deaths/100,000

Slices without percentages constitute less than 5% of the deaths within that chart.
Figure 4.3 i. General leading causes of death for ENC29 (2017) by race. Mortality rate per 100,000 population.

- **Non-White**
  - 1027 deaths/100,000

- **White**
  - 1075 deaths/100,000

2019 ENC29 NW rate is 4% lower than 2019 ENC29 W rate

- Diseases of Heart
- Cancer - All Sites
- Cerebrovascular Disease
- Chronic Lower Respiratory Diseases
- Diabetes Mellitus
- All Other Unintentional Injuries and Adverse Effects
- Alzheimers Disease
- All Other Deaths

Slices without percentages constitute less than 5% of the deaths within that chart.
Figure 4.3 ii. General leading causes of death for ENC29 (2017) by race. Age-adjusted mortality rate per 100,000 population.

2019 ENC29 NW age-adjusted rate is 16% higher than 2019 ENC29 W age-adjusted rate

- **Non-White**
  - 924 deaths/100,000
  - 42%
    - Diseases of Heart
  - 22%
    - Cancer - All Sites
  - 47%
    - Cerebrovascular Disease
  - 21%
    - Chronic Lower Respiratory Diseases
  - 4%
    - Diabetes Mellitus
  - 20%
    - All Other Unintentional Injuries and Adverse Effects
  - 4%
    - Alzheimers Disease
  - 4%
    - All Other Deaths

- **White**
  - 796 deaths/100,000
  - 21%
    - Diseases of Heart
  - 22%
    - Cancer - All Sites
  - 5%
    - Cerebrovascular Disease
  - 4%
    - Chronic Lower Respiratory Diseases
  - 2%
    - Diabetes Mellitus
  - 3%
    - All Other Unintentional Injuries and Adverse Effects
  - 3%
    - Alzheimers Disease
  - 2%
    - All Other Deaths

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; 1990-2019
All Causes of Death

- The 30-year ENC trend line shows all-cause mortality rates increasing. The 15-year trend shows ENC's rate has increased 13% over the period, and is 13% higher than NC.

- The age-adjusted all-cause mortality rate trend for ENC has been decreasing over the 30-year period; the 15-year trend is decreasing more slowly and remains higher than the RNC and NC rates. ENC’s rate remains 8% greater than the rate for RNC.

- The non-White male mortality rate trend remains higher than other demographic groups but has decreased 19% in the 15-year period. Convergence of non-White males with White males and non-White females with White females is suggested in the future.

- The trends for all-cause mortality rates for both non-Whites and Whites are decreasing. The non-White trend is 10% greater than the White rate, but the recent 15-year trend suggests they will converge in the future.

- Over the recent 15-year period there is a 58% 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 $R^2 < 0.10$. 
Figure 5.1 i. All Causes of Death:
Trends in mortality rates for ENC29, RNC71, and NC
1990-2019 with projections to 2030

2005 ENC29 rate is 13% greater than RNC71
2019 ENC29 rate is 15% greater than RNC71

Comparison of Fitted Rates in 2005

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<thead>
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<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
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Comparison of Fitted Rates in 2019

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</tr>
<tr>
<td>11% GT</td>
<td>2% LT</td>
<td>NC</td>
</tr>
</tbody>
</table>

ENC29 15-yr trendline: 13% increase
R2 = 0.50
y = 7.82x + 901.65

RNC71 15-yr trendline: 11% increase
R2 = 0.68
y = 5.74x + 796.23

NC 15-yr trendline: 11% increase
R2 = 0.66
y = 5.92x + 812.19

2019 ENC29 rate is 15% greater than RNC71.
Figure 5.1 ii. All Causes of Death: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2019 with projections to 2030.
Figure 5.1 iii. All Causes of Death:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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<td>23% LT</td>
<td>27% LT</td>
<td>WM</td>
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<tr>
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<td>63% GT</td>
<td>37% GT</td>
<td>6% GT</td>
<td>WF</td>
</tr>
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</table>
Figure 5.1 iv. All Causes of Death:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
18% decrease
R² = 0.64
\[ y = -12.55x + 1,046.85 \]

W 15-yr trendline
7% decrease
R² = 0.47
\[ y = -4.24x + 847.73 \]

2005 non-White rate is 23% greater than White
2019 non-White rate is 10% greater than White
Figure 5.1 v. All Causes of Death:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
58% decrease
$R^2 = 0.54$
$y = -0.91x + 23.48$
All Causes of Premature Mortality

- ENC’s premature mortality rate trend is flat and not reliable.
- The age-adjusted premature mortality rate trend for ENC is 17% greater than NC, but is also flat and not reliable.
- The non-White male premature mortality rate trend has decreased 10% over the 15-year period. The non-White female rate has decreased 13% over 15 years. The White male and White female rate trends are not reliable.
- The non-White premature mortality rate is 43% greater than the White rate, and has decreased 11% over the 15 year period. The White rate trend is not reliable.
- The 15-year trend for racial disparity shows a 29% decrease 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 $R^2 < 0.10$. 

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Figure 5.2 i. All Causes of Premature Mortality: Trends in premature mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030.

2005 ENC29 rate is 18% greater than RNC71
2019 ENC29 rate is 19% greater than RNC71

Comparison of Fitted Rates in 2005

<table>
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Comparison of Fitted Rates in 2019

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Comparison of Fitted Rates in 2019

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Figure 5.2 ii. All Causes of Premature Mortality:

- ENC29 15-yr trendline: R2 = 0.04, y = -2.10x + 892.64
- RNC71 15-yr trendline: R2 = 0.17, y = -2.93x + 759.41
- NC 15-yr trendline: R2 = 0.16, y = -3.00x + 779.24
- US 12-yr trendline: R2 = 0.46, y = -4.89x + 715.69

- 2005 ENC29 rate is 18% greater than RNC71
- 2019 ENC29 rate is 20% greater than RNC71
Figure 5.2 iii. All Causes of Premature Mortality: Trends in age-adjusted premature mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030.
Figure 5.2 iv. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline

W 15-yr trendline

11% decrease

R² = 0.13

y = -8.35x + 1,183.21

R² = 0.00

y = 0.22x + 745.11

2005 non-White rate is 59% greater than White

2019 non-White rate is 43% greater than White
Figure 5.2 v. All Causes of Premature Mortality:
Measuring disparity in age-adjusted premature mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
29% decrease
$R^2 = 0.20$
y = -1.15x + 58.55
Diseases of Heart

- ENC’s 15-year heart disease mortality rate is 25% greater than the RNC rate, but ENC’s rate trend is flat and not reliable.
- While ENC’s age-adjusted mortality rate trend is decreasing at a pace similar to RNC, NC and the US, the ENC rate remains 16% greater than the RNC rate in 2019.
- The non-White male rate trend remains slightly higher than the White male trend. The non-White female trend has converged with the White female trend and is projected to drop below it.
- The non-White rate trend remains 5% greater than for Whites, but the 15-year trends for both are decreasing and convergence is suggested in the future.
- The 15-year trend line for racial disparity is decreasing in 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 $R^2 < 0.10$. 
Figure 6.1 i. Diseases of Heart:
Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

ENC29 15-yr trendline  RNC71 15-yr trendline  NC 15-yr trendline
8% decrease 7% decrease
R2 = 0.00  R2 = 0.36  R2 = 0.27
y = -0.01x + 217.35  y = -0.98x + 187.39  y = -0.88x + 191.95

2005 ENC29 rate is 16% greater than RNC71
2019 ENC29 rate is 25% greater than RNC71
Figure 6.1 ii. Diseases of Heart: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2019 with projections to 2030

ENC29 15-yr trendline
24% decrease
R2 = 0.76
\( y = -3.46x + 219.56 \)

RNC71 15-yr trendline
26% decrease
R2 = 0.90
\( y = -3.44x + 195.52 \)

NC 15-yr trendline
26% decrease
R2 = 0.89
\( y = -3.47x + 199.26 \)

US 12-yr trendline
25% decrease
R2 = 0.89
\( y = -4.39x + 210.82 \)

2005 ENC29 rate is 12% greater than RNC71
2019 ENC29 rate is 16% greater than RNC71

Comparison of Fitted Rates in 2005

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<td>1% GT</td>
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</table>
Figure 6.1 iii. Diseases of Heart:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

R2 = 0.70
y = -5.95x + 318.00
NWM 15-yr trendline
28% decrease

R2 = 0.74
y = -4.18x + 269.57
WM 15-yr trendline
23% decrease

R2 = 0.72
y = -4.57x + 198.40
NWF 15-yr trendline
35% decrease

R2 = 0.70
y = -2.24x + 161.18
WF 15-yr trendline
21% decrease
Figure 6.1 iv. Diseases of Heart:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

2005 non-White rate is 18% greater than White
2019 non-White rate is 5% greater than White
Figure 6.1 v. Diseases of Heart:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
71% decrease
R² = 0.37
y = -0.85x + 18.10
Cerebrovascular Disease

- ENC’s cerebrovascular disease mortality rate has turned up in recent years and is 31% greater than RNC. The rate trend has increased 11% over the 15 year period.

- The ENC age-adjusted cerebrovascular disease mortality rate trend has decreased 15% over the 15-year period. It remains 21% greater than the RNC rate trend.

- Non-White males have the highest mortality rate for cerebrovascular disease but the rate has decreased 20% over the 15-year period. The rate for non-White females has decreased 29% and is projected to converge with the trend for White males and White females.

- The cerebrovascular disease mortality rate trend for non-Whites is decreasing but is still 34% greater than Whites in 2019.

- The 15-year trend for racial disparity is decreasing 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 $R^2 < 0.10$. 
Figure 6.2 i. Cerebrovascular Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

- ENC29 15-yr trendline: 11% increase, R^2 = 0.14, y = 0.41x + 54.02
- RNC71 15-yr trendline: 6% decrease, R^2 = 0.10, y = -0.20x + 48.39
- NC 15-yr trendline: 2% decrease, R^2 = 0.03, y = -0.12x + 49.27

2005 ENC29 rate is 12% greater than RNC71
2019 ENC29 rate is 31% greater than RNC71
Figure 6.2 ii. Cerebrovascular Disease:

ENC29 15-yr trendline
15% decrease
R2 = 0.32
y = -0.56x + 55.36

RNC71 15-yr trendline
25% decrease
R2 = 0.71
y = -0.86x + 51.28

NC 15-yr trendline
24% decrease
R2 = 0.67
y = -0.82x + 51.94

US 12-yr trendline
25% decrease
R2 = 0.80
y = -0.94x + 46.09

2005 ENC29 rate is 8% greater than RNC71
2019 ENC29 rate is 21% greater than RNC71

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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Figure 6.2 iii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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<td>58% GT</td>
<td>2% LT</td>
<td>18% GT</td>
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Figure 6.2 iv. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
25% decrease
$R^2 = 0.47$
$y = -1.22x + 74.49$

W 15-yr trendline
11% decrease
$R^2 = 0.17$
$y = -0.33x + 47.45$

2005 non-White rate is 57% greater than White
2019 non-White rate is 34% greater than White
Figure 6.2 v. Cerebrovascular Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
42% decrease
$R^2 = 0.34$
$y = -1.58x + 57.12$
Cancer—Trachea, Bronchus, Lung

- The 15-year trend line for cancer-TBL for ENC has decreased 13% over the period. The rate for 2019 is 20% greater than the rate for RNC.
- In 2019 the age-adjusted rate for ENC is 12% higher than RNC. The 15-year trend rate for ENC has decreased 34%.
- The mortality rate trends for White and non-White males are decreasing and are projected to converge. The rate for non-White females is 33% less than the rate for White females.
- The non-White mortality rate trend for this cancer is consistently lower than the White rate. Both trends are decreasing over the 15-year period, but non-White is decreasing more quickly.
- The trend for racial disparity 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 $R^2 < 0.10$. 
Figure 6.3 i. Cancer - Trachea, Bronchus, Lung: Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

ENC29 15-yr trendline
13% decrease
R2 = 0.50
y = -0.58x + 68.33

RNC71 15-yr trendline
19% decrease
R2 = 0.87
y = -0.76x + 60.68

NC 15-yr trendline
18% decrease
R2 = 0.89
y = -0.74x + 61.83

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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2005 ENC29 rate is 13% greater than RNC71
2019 ENC29 rate is 20% greater than RNC71
Figure 6.3 ii. Cancer - Trachea, Bronchus, Lung:
Figure 6.3 iii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

<table>
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<tr>
<th>NWM 15-yr trendline</th>
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<th>NWF 15-yr trendline</th>
<th>WF 15-yr trendline</th>
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<tr>
<td>48% decrease R2 = 0.87 y = -3.42x + 107.43</td>
<td>39% decrease R2 = 0.81 y = -2.37x + 91.30</td>
<td>21% decrease R2 = 0.24 y = -0.45x + 32.02</td>
<td>26% decrease R2 = 0.67 y = -0.86x + 50.30</td>
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Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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Figure 6.3 iv. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

2005 non-White rate is 10% less than White
2019 non-White rate is 16% less than White

38% decrease
R2 = 0.81
y = -1.54x + 61.01

32% decrease
R2 = 0.85
y = -1.46x + 67.68
Figure 6.3 v. Cancer - Trachea, Bronchus, Lung: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030.

Regression analysis:

\[ R^2 = 0.06 \]
\[ y = -0.52x - 11.63 \]
Chronic Lower Respiratory Diseases

- The 30-year ENC trend for CLRD is increasing, as is the 15-year trend. In 2019 the ENC rate is 5% greater than the RNC rate.
- The ENC age-adjusted rate trend is lower than the RNC and NC but the trend is flat and not reliable.
- The rate for White males is the highest but is decreasing in a reliable trend. The rate for non-White males has decreased 20% over the 15-year period in a moderately reliable trend and is now below the rate for White females, which is increasing. The rate for non-White females is the lowest and is increasing in a moderately reliable trend.
- The 15-year trend for Whites is higher than the non-White rate, but both rates are flat and unreliable.
- The disparity trend between White and non-White is 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 $R^2 < 0.10$. 
Figure 6.4 i. Chronic Lower Respiratory Diseases: Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

- ENC29 15-yr trendline: 29% increase, $y = 0.84x + 43.23$, $R^2 = 0.65$
- RNC71 15-yr trendline: 15% increase, $y = 0.45x + 45.88$, $R^2 = 0.77$
- NC 15-yr trendline: 17% increase, $y = 0.51x + 45.51$, $R^2 = 0.77$

- 2005 ENC29 rate is 6% less than RNC71
- 2019 ENC29 rate is 5% greater than RNC71

Comparison of Fitted Rates in 2005:
- ENC29: 6% GT
- RNC71: 5% GT
- NC: 1% LT

Comparison of Fitted Rates in 2019:
- ENC29: 5% LT
- RNC71: 4% LT
- NC: 1% GT
Figure 6.4 ii. Chronic Lower Respiratory Diseases:

Comparison of Fitted Rates in 2005

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Figure 6.4 iii. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

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R2 = 0.18
y = -0.67x + 50.42

R2 = 0.45
y = -0.73x + 61.99

R2 = 0.14
y = 0.24x + 17.31

R2 = 0.13
y = 0.21x + 42.85
Figure 6.4 iv. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

- NW 15-yr trendline
- W 15-yr trendline

*R2 = 0.01
y = -0.07x + 28.79

*R2 = 0.06
y = -0.13x + 50.21

2005 non-White rate is 43% less than White
2019 non-White rate is 43% less than White
Figure 6.4 v. Chronic Lower Respiratory Diseases: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity

R² = 0.00
y = 0.25x - 77.89
All Other Unintentional Injuries and Adverse Effects

- The mortality rate trend for unintentional injuries and adverse effects shows a sharp increase in ENC (107% over 15 years). The trends for RNC and the NC are also up sharply.

- The age-adjusted mortality rate trends for ENC, RNC, NC, and the US are all increasing. During the last 15 years the ENC rate has increased 97% and it is now 8% greater than RNC.

- The trends are increasing for all groups, but the white male rate is the highest and shows the greatest increase (125% over 15 years).

- The White rate trend has increased 110% over the 15 year period. The non-White rate is 39% less than the white rate, and increased 66% over the period.

- Over the 15-year period the racial disparity has decreased 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 $R^2 < 0.10$. 
Figure 6.5 i. All Other Unintentional Injuries and Adverse Effects: Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030.
Figure 6.5 ii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2019 with projections to 2030

ENC29 15-yr trendline
97% increase
R2 = 0.73
y = 1.41x + 21.73

RNC71 15-yr trendline
63% increase
R2 = 0.75
y = 1.01x + 24.29

NC 15-yr trendline
67% increase
R2 = 0.75
y = 1.06x + 23.96

US 12-yr trendline
41% increase
R2 = 0.83
y = 0.78x + 22.86

Comparison of Fitted Rates in 2005

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<th>US</th>
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<td>6% GT</td>
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<tr>
<td>12% LT</td>
<td>12% LT</td>
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Comparison of Fitted Rates in 2019

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<td>8% GT</td>
<td>7% LT</td>
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<td>19% LT</td>
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<td>7% GT</td>
<td>1% LT</td>
<td>13% LT</td>
<td>NC</td>
</tr>
<tr>
<td>23% GT</td>
<td>14% GT</td>
<td>15% GT</td>
<td>US</td>
</tr>
</tbody>
</table>
Figure 6.5 iii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

- NWM 15-yr trendline: 55% increase
- WM 15-yr trendline: 125% increase
- NWF 15-yr trendline: 54% increase
- WF 15-yr trendline: 81% increase

R² values:
- NWM: 0.37
- WM: 0.73
- NWF: 0.33
- WF: 0.75

Equations:
- NWM: y = 1.05x + 28.70
- WM: y = 2.38x + 28.56
- NWF: y = 0.40x + 11.28
- WF: y = 1.02x + 18.84
Figure 6.5 iv. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

- 66% increase (NW 15-yr trendline) with \( R^2 = 0.45 \) and \( y = 0.79x + 18.00 \)
- 110% increase (W 15-yr trendline) with \( R^2 = 0.76 \) and \( y = 1.72x + 23.50 \)

2005 non-White rate is 23% less than White
2019 non-White rate is 39% less than White
Figure 6.5 v. All Other Unintentional Injuries and Adverse Effects: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity: 72% decrease

R² = 0.17

y = -1.88x - 38.87
Alzheimer’s Disease

- The Alzheimer’s mortality rate trend for ENC shows a steep increase over the 15 year period (152%). ENC’s rate of increase was larger than RNC and NC, but the rate for ENC is still 7% less than RNC.

- In 2019, the age-adjusted rate for ENC is 16% less than the rate for RNC. The ENC rate trend has increased 78% over the 15-year period and has inched above the US rate.

- Rate trends are increasing for all groups but non-White males and non-White females have the greatest increase (162% and 119% over 15 years, respectively). The rate for White females is the highest, followed by non-White females.

- The White and non-White rate trends are both increasing. They are set to converge, and the non-White trend is projected to overtake the White in the future.

- The 15-year trend shows an increase in disparity that favors Whites and is projected to increase in the future.

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. Alzheimer’s Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

ENC29 15-yr trendline

152% increase

R2 = 0.81

y = 1.60x + 15.80

RNC71 15-yr trendline

82% increase

R2 = 0.83

y = 1.28x + 23.41

NC 15-yr trendline

89% increase

R2 = 0.84

y = 1.33x + 22.29

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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2005 ENC29 rate is 32% less than RNC71
2019 ENC29 rate is 7% less than RNC71
Figure 6.6 ii. Alzheimer’s Disease:

Comparison of Fitted Rates in 2005

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<td>20% LT</td>
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Comparison of Fitted Rates in 2019

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<td>9% GT</td>
<td>30% GT</td>
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</table>
Figure 6.6 iii. Alzheimer’s Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

Comparison of Fitted Rates in 2005

Comparison of Fitted Rates in 2019

NWM WM NWF WF NWM WM NWF WF

126% increase 82% increase 119% increase 66% increase

R2 = 0.63 R2 = 0.56 R2 = 0.74 R2 = 0.56

y = 1.04x + 12.43 y = 0.77x + 14.08 y = 1.19x + 15.05 y = 0.96x + 21.92

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Health Systems Research and Development, Dept. of Public Health, ECU
Figure 6.6 iv. Alzheimer’s Disease:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
R² = 0.80
y = 1.17x + 14.28

W 15-yr trendline
R² = 0.59
y = 0.85x + 19.46

2005 non-White rate is 27% less than White
2019 non-White rate is 2% less than White
Figure 6.6 v. Alzheimer’s Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
106% increase
R2 = 0.36
y = 2.16x - 30.58
Diabetes Mellitus

- The 15-year rate trend for ENC has increased 28% over the period and is 43% greater than the RNC rate.
- In 2019, the ENC rate trend for age-adjusted diabetes mellitus is 37% greater than RNC. The 15-year trend is not reliable.
- The non-White male 15-year rate has increased but the trend is not reliable. The non-White female trend has decreased 21%. The White male and White female trends are lower but are unreliable.
- The non-White mortality rate is 11% higher than the White rate. The 15-year rate trends are unreliable.
- The 15-year trend for racial disparity 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 $R^2 < 0.10$. 
Figure 6.7 i. Diabetes Mellitus:
Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

Mortality rate per 100,000 population

- ENC29 15-yr trendline
  - 28% increase
  - $R^2 = 0.52$
  - $y = 0.56x + 30.24$

- RNC71 15-yr trendline
  - 29% increase
  - $R^2 = 0.54$
  - $y = 0.41x + 20.86$

- NC 15-yr trendline
  - 28% increase
  - $R^2 = 0.55$
  - $y = 0.42x + 22.27$

Comparison of Fitted Rates in 2005
- ENC29: 45% greater than RNC71
- ENC29: 31% LT
- RNC71: 26% LT

Comparison of Fitted Rates in 2019
- ENC29: 43% greater than RNC71
- ENC29: 30% LT
- RNC71: 26% LT
Figure 6.7 ii. Diabetes Mellitus:

<table>
<thead>
<tr>
<th>ENC29 15-yr trendline</th>
<th>RNC71 15-yr trendline</th>
<th>NC 15-yr trendline</th>
<th>US 12-yr trendline</th>
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<tbody>
<tr>
<td>R² = 0.00</td>
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<td>R² = 0.00</td>
<td>R² = 0.62</td>
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<tr>
<td>y = -0.02x + 30.36</td>
<td>y = 0.00x + 21.95</td>
<td>y = -0.01x + 23.25</td>
<td>y = -0.28x + 23.68</td>
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2005 ENC29 rate is 38% greater than RNC71
2019 ENC29 rate is 37% greater than RNC71

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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<tr>
<td>52% GT</td>
<td>11% GT</td>
<td>17% GT</td>
<td>US</td>
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</table>

Report #2.201, January 2022
Health Systems Research and Development, Dept. of Public Health, ECU
Figure 6.7 iii. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

NWM 15-yr trendline
R2 = 0.09
y = 0.39x + 53.34

WM 15-yr trendline
R2 = 0.04
y = 0.11x + 26.08

NWF 15-yr trendline
R2 = 0.26
y = -0.69x + 50.41

WF 15-yr trendline
R2 = 0.04
y = -0.08x + 18.20

Comparison of Fitted Rates in 2005

<table>
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<tr>
<th>Race</th>
<th>NWM</th>
<th>WM</th>
<th>NWF</th>
<th>WF</th>
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<td>NWF</td>
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<tr>
<td>193% GT</td>
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<td>177% GT</td>
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Comparison of Fitted Rates in 2019

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<td>243% GT</td>
<td>61% GT</td>
<td>138% GT</td>
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</table>
Figure 6.7 iv. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
W 15-yr trendline

R2 = 0.07
y = -0.27x + 51.98

R2 = 0.01
y = 0.03x + 21.61

2005 non-White rate is 141% greater than White
2019 non-White rate is 119% greater than White
Figure 6.7 v. Diabetes Mellitus:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity

R² = 0.07
y = -1.34x + 139.68
Nephritis, Nephrotic Syndrome, and Nephrosis

- In 2019 ENC’s rate trend for nephritis, nephrotic syndrome and nephrosis is 11% greater than RNC, but the trend is not reliable.

- With age-adjustment, the ENC rate trend has decreased 26% over the 15-year period. It is 2% greater than the RNC rate and NC rate. They are projected to converge soon.

- The 15-year trends for non-White males and non-White females are the highest but have decreased 25% over the 15-year period. The non-White male trend in 2019 is 119% greater than the White male trend and 217% greater than the White female trend. All trends are decreasing.

- The non-White rate in 2019 is 121% greater than the White rate. It has decreased 31% over the 15-year period. The White rate has decreased 24%.

- The trend for racial disparity is decreasing but the trend 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 $R^2 < 0.10$. 
Figure 6.8 i. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030.
Figure 6.8 ii. Nephritis, Nephrotic Syndrome, and Nephrosis:

Comparison of Fitted Rates in 2005

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<tr>
<th>ENC29</th>
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Comparison of Fitted Rates in 2019

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<td>30% GT</td>
<td>28% GT</td>
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</table>
Figure 6.8 iii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

- NWM 15-yr trendline
  - 25% decrease
  - \( R^2 = 0.17 \)
  - \( y = -0.70x + 41.82 \)

- WM 15-yr trendline
  - 25% decrease
  - \( R^2 = 0.32 \)
  - \( y = -0.31x + 18.99 \)

- NWF 15-yr trendline
  - 35% decrease
  - \( R^2 = 0.42 \)
  - \( y = -0.80x + 34.31 \)

- WF 15-yr trendline
  - 23% decrease
  - \( R^2 = 0.30 \)
  - \( y = -0.20x + 12.84 \)

### Comparison of Fitted Rates in 2005

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<th>Race</th>
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<th>WM</th>
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<td>GT</td>
<td>120%</td>
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### Comparison of Fitted Rates in 2019

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<tr>
<td>GT</td>
<td>119%</td>
<td>58%</td>
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Figure 6.8 iv. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030.

- NW 15-yr trendline
  - 31% decrease
  - \( R^2 = 0.36 \)
  - \( y = -0.76x + 37.06 \)

- W 15-yr trendline
  - 24% decrease
  - \( R^2 = 0.45 \)
  - \( y = -0.25x + 15.43 \)

2005 non-White rate is 140% greater than White
2019 non-White rate is 121% greater than White
Figure 6.8 v. Nephritis, Nephrotic Syndrome, and Nephrosis: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity

R2 = 0.05
y = -1.49x + 142.28
Unintentional Motor Vehicle Injuries

- The mortality rate trend for unintentional motor vehicle injuries in ENC has decreased by 26% over the 15-year period, but has recently ticked up. The rate for NC has decreased. In 2019 ENC’s rate trend is 21% greater than RNC.
- With age-adjustment, the ENC rate trend has decreased 27% over the 15-year period, but has recently gone up. It is 22% greater than the RNC rate and 18% greater than the NC rate.
- The 15-year trends for non-White males and White males are the highest, but the White male trend line has experienced a 44% decrease over the 15-year period. The rate for non-White males is unreliable. Non-White females and White females are lower, with White females projected to decrease.
- The non-White rate in 2019 is 52% greater than the White rate but is unreliable. The White rate is decreasing, 43% over 15 years.
- The 15-year trend shows an increase in disparity that favors Whites and is projected to increase in the future.

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. Unintentional Motor Vehicle Injuries:
Trends in mortality rates for ENC29, RNC71, and NC, 1990-2019 with projections to 2030

2005 ENC29 rate is 27% greater than RNC71
2019 ENC29 rate is 21% greater than RNC71

Comparison of Fitted Rates in 2005

<table>
<thead>
<tr>
<th>ENC29 15-yr trendline</th>
<th>RNC71 15-yr trendline</th>
<th>NC 15-yr trendline</th>
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<tbody>
<tr>
<td>26% decrease</td>
<td>22% decrease</td>
<td>23% decrease</td>
</tr>
<tr>
<td>( R^2 = 0.33 )</td>
<td>( R^2 = 0.33 )</td>
<td>( R^2 = 0.34 )</td>
</tr>
<tr>
<td>( y = -0.37x + 21.59 )</td>
<td>( y = -0.25x + 17.04 )</td>
<td>( y = -0.27x + 17.72 )</td>
</tr>
</tbody>
</table>
Figure 6.9 ii. Unintentional Motor Vehicle Injuries:

- ENC29 15-yr trendline: 27% decrease
  \[ R^2 = 0.37 \]
  \[ y = -0.39x + 21.39 \]

- RNC71 15-yr trendline: 25% decrease
  \[ R^2 = 0.40 \]
  \[ y = -0.29x + 17.15 \]

- NC 15-yr trendline: 26% decrease
  \[ R^2 = 0.41 \]
  \[ y = -0.31x + 17.79 \]

- US 12-yr trendline: 29% decrease
  \[ R^2 = 0.62 \]
  \[ y = -0.36x + 14.68 \]

- ENC29 2005 rate is 25% greater than RNC71
- ENC29 2019 rate is 22% greater than RNC71
Figure 6.9 iii. Unintentional Motor Vehicle Injuries: Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

Comparison of Fitted Rates in 2005

<table>
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Comparison of Fitted Rates in 2019

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Figure 6.9 iv. Unintentional Motor Vehicle Injuries: Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
R2 = 0.01
y = 0.08x + 19.34

W 15-yr trendline
R2 = 0.64
y = -0.65x + 22.58

43% decrease

2005 non-White rate is 14% less than White
2019 non-White rate is 52% greater than White
Figure 6.9 v. Unintentional Motor Vehicle Injuries: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
348% increase
$R^2 = 0.44$
$y = 5.05x - 21.73$
Cancer - Colon, Rectum, Anus

- The mortality rate trend for unintentional motor vehicle injuries in ENC has decreased by 26% over the 15-year period, but has recently ticked up. The rate for NC has decreased. In 2019 ENC’s rate trend is 21% greater than RNC.

- With age-adjustment, the ENC rate trend has decreased 27% over the 15-year period, but has recently gone up. It is 22% greater than the RNC rate and 18% greater than the NC rate.

- The 15-year trends for non-White males and White males are the highest, but the White male trend line has experienced a 44% decrease over the 15-year period. The rate for non-White males is unreliable. Non-White females and White females are lower, with White females projected to decrease.

- The non-White rate in 2019 is 52% greater than the White rate but is unreliable. The White rate is decreasing, 43% over 15 years.

- The 15-year trend shows an increase in disparity that favors Whites and is projected to increase in the future.

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, 1990-2019 with projections to 2030

2005 ENC29 rate is 18% greater than RNC71
2019 ENC29 rate is 23% greater than RNC71
Figure 6.10 ii. Cancer - Colon, Rectum, Anus:

- ENC29 15-yr trendline: 26% decrease
  - $R^2 = 0.65$
  - $y = -0.34x + 19.17$

- RNC71 15-yr trendline: 28% decrease
  - $R^2 = 0.87$
  - $y = -0.32x + 16.94$

- NC 15-yr trendline: 28% decrease
  - $R^2 = 0.87$
  - $y = -0.32x + 17.28$

- US 12-yr trendline: 24% decrease
  - $R^2 = 0.98$
  - $y = -0.36x + 17.99$

2005 ENC29 rate is 13% greater than RNC71
2019 ENC29 rate is 16% greater than RNC71

Comparison of Fitted Rates in 2005

<table>
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Comparison of Fitted Rates in 2019

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Figure 6.10 iii. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

- NWM 15-yr trendline: 29% decrease
  - R2 = 0.48
  - y = -0.62x + 32.11
- WM 15-yr trendline: 29% decrease
  - R2 = 0.49
  - y = -0.40x + 21.20
- NWF 15-yr trendline: 29% decrease
  - R2 = 0.43
  - y = -0.37x + 19.38
- WF 15-yr trendline: 24% decrease
  - R2 = 0.45
  - y = -0.22x + 13.74

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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Figure 6.10 iv. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
28% decrease
R² = 0.59
y = -0.45x + 24.15

W 15-yr trendline
26% decrease
R² = 0.60
y = -0.29x + 17.04

2005 non-White rate is 42% greater than White
2019 non-White rate is 37% greater than White
Figure 6.10 v. Cancer - Colon, Rectum, Anus: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity

\[ R^2 = 0.02 \]

\[ y = -0.31x + 42.17 \]
7. Trends and Disparities in Mortality in ENC29: Cancer - All Sites and HIV Disease; 1990-2019
Cancer - All Sites

- The cancer—all sites mortality rate trends for ENC, RNC, and NC are flat and are not reliable.

- The age-adjusted cancer—all sites mortality rate trends for ENC, RNC, NC and US are all decreasing. The ENC rate is 8% greater than the NC rate.

- The rate trend is decreasing for all groups. The rate for non-White males is the highest, but it is decreasing the most and set to converge with the rate for White males. White and non-White females are lower.

- Both the White and non-White cancer mortality trends are decreasing over the 15 year period. The non-White rate decreased 30% and the White rate decreased 21%. The non-White rate remains 8% greater than the White rate in 2019 but they are converging.

- The 15-year trend for racial disparity shows a 67% decrease.

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, 1990-2019 with projections to 2030

2005 ENC29 rate is 16% greater than RNC71
2019 ENC29 rate is 15% greater than RNC71

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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ENC29 15-yr trendline  \( R^2 = 0.01 \) \( y = -0.13x + 216.91 \)
RNC71 15-yr trendline \( R^2 = 0.00 \) \( y = -0.01x + 186.50 \)
NC 15-yr trendline \( R^2 = 0.01 \) \( y = -0.06x + 191.06 \)
Figure 7.1 ii. Cancer - All Sites:

ENC29 15-yr trendline

- 24% decrease
- $R^2 = 0.95$
- $y = -3.33x + 212.40$

RNC71 15-yr trendline

- 22% decrease
- $R^2 = 0.98$
- $y = -2.77x + 192.02$

NC 15-yr trendline

- 22% decrease
- $R^2 = 0.98$
- $y = -2.88x + 195.18$

US 12-yr trendline

- 17% decrease
- $R^2 = 1.00$
- $y = -2.62x + 187.27$

2005 ENC29 rate is 11% greater than RNC71
2019 ENC29 rate is 8% greater than RNC71

Comparison of Fitted Rates in 2005

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<thead>
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Figure 7.1 iii. Cancer - All Sites:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

38% decrease
R² = 0.85
y = -8.61x + 342.58

23% decrease
R² = 0.88
y = -3.81x + 249.35

23% decrease
R² = 0.73
y = -2.85x + 184.67

21% decrease
R² = 0.82
y = -2.27x + 165.59

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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Figure 7.1 iv. Cancer - All Sites:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

NW 15-yr trendline
30% decrease
R² = 0.86
y = -4.87x + 241.90

W 15-yr trendline
21% decrease
R² = 0.92
y = -2.74x + 199.74

2005 non-White rate is 21% greater than White
2019 non-White rate is 8% greater than White
Figure 7.1 v. Cancer - All Sites:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
67% decrease
R² = 0.37
y = -0.97x + 21.67
HIV Disease

- The fitted HIV mortality rates for ENC have been decreasing over the past 15 years, but are still 29% greater than NC in 2019.
- The age-adjusted rate trend for ENC, RNC, and the US are all decreasing. The ENC rate is 37% greater than NC in 2019.
- Non-White males continue to have the highest rate of age-adjusted mortality but the rate has decreased 83% in a 15-year reliable trend. Non-White females have the second highest rate, but it has also declined. The rates for White males and non-White females are lower.
- The 15-year age-adjusted HIV mortality rates have decreased for both Whites and non-Whites by 61% and 80% respectively. The non-White rate is still 575% greater than the White rate.
- The 15-year trend for racial disparity shows a 55% decrease.

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, 1990-2019 with projections to 2030

- ENC29 15-yr trendline
  - 74% decrease
  - $R^2 = 0.83$
  - $y = -0.32x + 6.57$
- RNC71 15-yr trendline
  - 71% decrease
  - $R^2 = 0.92$
  - $y = -0.22x + 4.57$
- NC 15-yr trendline
  - 72% decrease
  - $R^2 = 0.95$
  - $y = -0.23x + 4.86$

Comparison of Fitted Rates in 2005
- ENC29: 44% GT
- RNC71: 6% LT
- NC: 31% LT

Comparison of Fitted Rates in 2019
- ENC29: 35% GT
- RNC71: 5% GT
- NC: 26% LT

2005 ENC29 rate is 44% greater than RNC71
2019 ENC29 rate is 35% greater than RNC71
Figure 7.2 ii. HIV Disease:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US,
1990-2019 with projections to 2030

ENC29 15-yr trendline
77% decrease
R2 = 0.85
y = -0.34x + 6.73

RNC71 15-yr trendline
75% decrease
R2 = 0.93
y = -0.23x + 4.48

NC 15-yr trendline
76% decrease
R2 = 0.95
y = -0.24x + 4.80

US 12-yr trendline
66% decrease
R2 = 0.95
y = -0.24x + 4.29

Comparison of Fitted Rates in 2005

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Comparison of Fitted Rates in 2019

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Figure 7.2 iii. HIV Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2019 with projections to 2030

- NWM 15-yr trendline: 83% decrease, $R^2 = 0.85$, $y = -1.33x + 23.97$
- WM 15-yr trendline: 64% decrease, $R^2 = 0.28$, $y = -0.10x + 2.31$
- NWF 15-yr trendline: 74% decrease, $R^2 = 0.62$, $y = -0.56x + 11.43$
- WF 15-yr trendline: 54% decrease, $R^2 = 0.11$, $y = -0.03x + 0.74$
Figure 7.2 iv. HIV Disease:
Trends in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

- NW 15-yr trendline
  - 80% decrease
  - R² = 0.85
  - y = -0.91x + 17.12

- W 15-yr trendline
  - 61% decrease
  - R² = 0.34
  - y = -0.06x + 1.50

2005 non-White rate is 1043% greater than White
2019 non-White rate is 575% greater than White
Figure 7.2 v. HIV Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29, 1990-2019 with projections to 2030

Racial Disparity
55% decrease
R2 = 0.13
y = -51.75x + 1,414.76
### 8. Appendix

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<tr>
<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, Y85, Y86</td>
<td>E800-E807,E826-E829,E830-E848,E929.0,E929.1,E850-E869,E880-E928,E929.2-E929.9</td>
</tr>
<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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<tr>
<td>Alzheimer's Disease</td>
<td>G30</td>
<td>331.0</td>
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