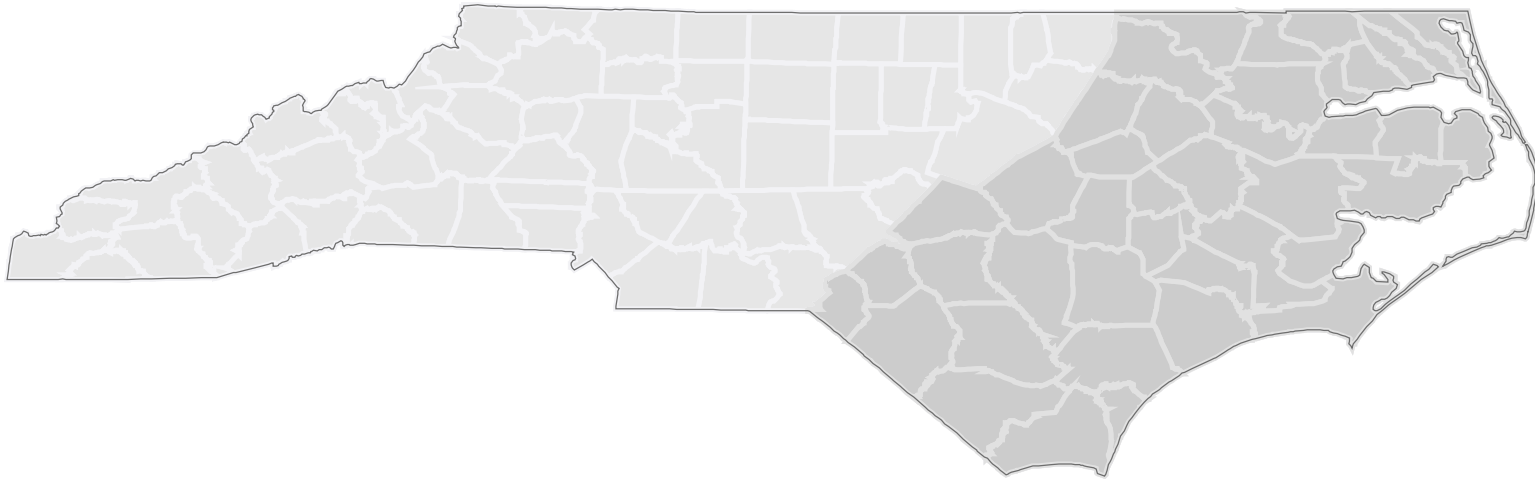


Trends and Disparities in Mortality in Eastern North Carolina

Total Deaths, Premature Mortality and Deaths for Ten Leading Causes; 1990-2019



A Resource for Healthy Communities

Health Indicator Series - Report #2.203
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1. Introduction

**Health Indicators Series:
A Resource for Healthy Communities
March 2022**

Report Series #2: Mortality Trends for Eastern North Carolina - (1990 to 2019)

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*, 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 41 counties located in the extreme east of North Carolina and approximates the coastal plain physiographic province of the state. It includes all 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 ENC41 or ENC. The rest of North Carolina is the remaining 59 counties; abbreviated as RNC59 or RNC.

2. Data Highlights

Trends and Disparities in Mortality in Eastern North Carolina

The following highlights of mortality in the 41 counties of Eastern North Carolina (ENC41) 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, age-adjusted mortality rate for Eastern North Carolina is 826 deaths per 100,000. This rate is 8% higher than the state rate. Within Eastern North Carolina, the non-White rate is 17% 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 13% higher than the rate for White females.

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

1. Disease 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:

	Race and Gender		
	non-White Males	White Males	non-White Females
1st	Diseases of Heart	Diseases of Heart	Cancer - All Sites
2nd	Cancer - All Sites	Cancer - All Sites	Diseases of Heart
3rd	Cerebrovascular Disease	All Other Unintentional Injuries and Adverse Effects	Cerebrovascular Disease
4th	Chronic Lower Respiratory Diseases	Chronic Lower Respiratory Diseases	Diabetes Mellitus
5th	All Other Unintentional Injuries and Adverse Effects	Cerebrovascular Disease	Alzheimer's Disease

Trends in Mortality from All Causes

- ENC's all-cause mortality rate trend is increasing, and in 2019 is 10% greater than RNC and 7% greater than NC. The ENC rate has increased 14% over the 15-year period.
- The age-adjusted all-cause mortality rate for ENC had decreased 11% over the 15-year period. ENC's rate remains 9% greater than RNC for 2019.

Trends and Disparities in Mortality in Eastern North Carolina-41 Counties

- The non-White male rate remains higher than the other demographic groups. The non-White female rate is projected to converge with the White female rate in the near future.
- The trends for all-cause mortality rates for both non-White and White are decreasing. The non-White rate is 14% greater than the White rate in 2019.
- Over the recent 15-year period there is a 36% decrease in racial disparity.

Trends in Premature Mortality from All Causes of Death

- ENC's premature mortality rate is 23% greater than RNC and 16% greater than NC. All the rate trends are unreliable.
- The ENC age-adjusted premature mortality trend for the 15-year period is flat and is unreliable.
- The non-White male rate is higher than the rates for any other demographic group. It has decreased 8% over the 15-year period. The rate for non-White females has the greatest decrease (10% over 15 years).
- The non-White rate remains 45% greater than the White rate. The non-White rate is decreasing; the White rate is flat.
- The racial disparity trend is not reliable.

Diseases of the Heart

- ENC's heart disease rate trend is flat over the 15-year period and is not reliable. The rate trend for NC has declined 7% and for RNC has declined 9% over the period.
- ENC's age-adjusted heart disease rate is 13% greater than NC and 14% greater than the US rate. All three rates have decreased at a similar pace over the recent 15-year period.
- The rate for non-White males is the highest and is decreasing at about the same pace as the White male rate. The non-White female rate is decreasing the most and is set to converge with the White female rate.
- The non-White rate is 11% higher than the White rate in 2019. The 15-year trend for both is decreasing.
- The trend for racial disparity is not reliable.

Cerebrovascular Disease

- ENC's cerebrovascular disease mortality rate trend shows an 11% increase over the recent 15-year period. It is 17% greater than the RNC rate and 12% greater than the NC rate.
- The age-adjusted rate has decreased 17% over the 15-year period. It is 16% greater than the RNC rate and 37% greater than the US rate.
- The non-White male rate is the highest and has decreased 21% over the 15-year period. The non-White female rate has decreased 33% and is set to converge with the White male and female rates. The White male and White female rates are about the same.
- The non-White rate in 2019 is 28% greater than the White rate but is decreasing more rapidly (28% over the 15-year period). Both rates are projected to converge in the future.
- There is a 51% decrease in racial disparity between White and non-Whites over the 15-year period.

Cancer—Trachea, Bronchus, Lung

- The cancer—TBL rate trend for ENC has decreased 11% over the recent 15-year period. The ENC rate is 20% greater than the RNC rate. The RNC rate has decreased 21%.
- In 2019 the age-adjusted rate for ENC was 16% above the RNC rate. The ENC rate decreased 34% over the 15-year period, while the RNC rate decreased 38%.

- In 2019 the non-White male rate was the highest but is only 6% higher than the White male rate, is decreasing, and will likely converge soon. The mortality rate for White females is 40% higher than the rate for non-White females and decreased 26% over the period. The rate for non-White females decreased 16%.
- The non-White mortality rate is 12% less than the White rate. Both are decreasing over the 15-year period at about the same pace.
- The 15-year rate trend for racial disparity is unreliable.

Chronic Lower Respiratory Diseases

- In 2019 the CLRD mortality rate for ENC, RNC and NC are virtually equal. The ENC rate trend is increasing faster— 28% over the 15-year period compared to 13% for RNC and 17% for NC.
- The age-adjusted rate for 2019 for ENC, RNC and NC are equal. The US rate is 5% lower than ENC. The rate trend for ENC is decreasing.
- The age-adjusted rate for White males is the highest. The rates for White males and non-White males are decreasing. The rate for White females is unreliable. The rate for non-White females is lower but increasing.
- The White rate has decreased 9% over the 15-year period. The non-White rate is 38% less than the White rate but the trend is unreliable.
- The racial disparity trend has seen a 30% increase over the last 15 years.

All Other Unintentional Injuries and Adverse Effects

- Mortality from unintentional injuries and adverse effects is increasing in ENC (103% increase over 15 years). The trends for RNC and NC are also increasing, but the ENC rate is increasing faster.
- The age-adjusted mortality rate trend for ENC, RNC, NC and the US are all increasing. ENC's rate trend increased the most, 89% over the 15-year period.
- The 15-year trends for White males, non-White males, and White females are all increasing significantly (106%, 59%, and 86% respectively). The rate for non-White females is increasing, but not as much.
- The White rate has increased 99% over the 15-year period. The non-White rate has increased 63%.
- Racial disparity has decreased 82% over the 15-year period in a trend that favors non-Whites.

Alzheimer's Disease

- The Alzheimer's mortality rate for ENC shows a 186% increase over the recent 15-year period. ENC's rate is 15% less than RNC and 11% less than NC but ENC's rate of increase was larger than both RNC and NC.
- In 2016 the age-adjusted rate for ENC was even with the US rate but it is increasing faster. The ENC rate is lower than the NC rate, but has a higher rate of increase over the 15-year period.
- The mortality rates for females, both White and non-White, are greater than for males. Non-White males have the highest rate of increase (158% over 15 years).
- The non-White mortality rate for Alzheimer's has increased 143% over the 13-year period. In 2019 the non-White rate is 8% greater than the White rate.
- The racial disparity favors Whites and has increased 166% over the 15-year period.

Diabetes Mellitus

- ENC's diabetes mortality rate is 35% greater than RNC in 2019. The rate for ENC increased 24% over the 15-year period.
- ENC's age-adjusted rate is flat over the 15 year period but the trend is unreliable. The trends for RNC and NC are also unreliable.
- The rate for non-White males is the highest and is increasing (9% increase over the 15-year period) in a moderately reliable trend. The non-White female rate has decreased 32% and the White female rate has decreased 10%. The White male rate is unreliable.
- The non-White mortality rate decreased 16% over the 15 year period but remains 111% greater than the White rate. The White rate is unreliable.
- The trend for racial disparity shows a 26% decrease in racial disparity over the 15 year period.

Nephritis, Nephrotic Syndrome, and Nephrosis

- The ENC mortality rate trend for nephritis, nephrotic syndrome, and nephrosis is flat and unreliable. The trend for RNC59 is increasing. The trend for NC is unreliable.
- The age-adjusted ENC rate is equal to the NC rate but the 15-year rate trend for ENC has decreased more than NC and is set to drop below NC.
- The 15-year trends for non-White males and females are higher than those for White males and females. Non-White females show the greatest decrease, 38% over 15 years. White females have the lowest rates.
- In 2019 the non-White rate was 118% greater than the White rate but has declined 31% over 15 years. The White rate declined 28%.
- The racial disparity trend is unreliable over the 15-year period.

Unintentional Motor Vehicle Injuries

- ENC's unintentional motor vehicle injury mortality rate trend is decreasing but is still 43% greater than RNC in 2019.
- The ENC age-adjusted rate is 45% greater than RNC and 80% greater than the US. The 15-year rate trends for ENC, RNC, and NC are all decreasing, although the ENC numbers have ticked up in the last 2 years.
- The rates for non-White males and non-White females are not reliable. The trends for White males and White females are declining.
- The White rate trend has decreased 42% over the 15-year period. The non-White rate is unreliable.
- Racial disparity has increased significantly over the 15-year period.

Pneumonia and Influenza

- The mortality rate trend for pneumonia and influenza for ENC has increased 14% over the 15-year period. The trends for RNC and NC are flat and unreliable.
- The age-adjusted rate trends for all NC regions are similar and are decreasing. The ENC rate is 25% greater than the US rate.
- The age-adjusted rate trends for White males and White females are decreasing. The trends for non-White males and non-White females are unreliable.
- The White rate trend has decreased 19% over the 13-year period. The non-White rate is unreliable.
- Racial disparity has increased 149% over the 15-year period and favors Whites in a moderately reliable trend.

Cancer - All Sites

- The cancer - all sites mortality rate trend for ENC is greater than NC and has seen a 2% increase over the last 15 years. The trends for NC and RNC are unreliable.
- The age-adjusted cancer - all sites mortality rate trends for ENC, RNC, NC and the US are all decreasing at about the same pace. The ENC rate trend is 8% greater than RNC and 9% greater than the US.
- The rate for non-White males has decreased 33% over 15 years and the White male rate has decreased 24%. The non-White male and White male rates are the highest.
- Both White and non-White cancer – all sites mortality rates are decreasing over the 15-year period, although non-White rates are 10% greater than Whites.
- The moderately reliable 15-year trend for racial disparity shows a 34% decrease.

HIV Disease

- The HIV mortality rate for ENC has decreased 74% over the past 15 years but was still 31% higher than RNC in 2019.
- The 15-year age-adjusted rate trend for ENC has been decreasing, but was still 37% greater than RNC and 75% greater than US.
- Non-White males continue to have the highest rate of age-adjusted mortality, but this rate has decreased 81% in a 15-year reliable trend. The rate for White males decreased 81% and non-White females decreased 79%. A convergence of the non-White and White rate is expected in the future.
- The 15-year non-White age-adjusted HIV mortality rate has decreased by 80%; the White rate has decreased by 70%. The two rates are projected to converge in the near future.
- Racial disparity has decreased 28% over the 15-year period in a moderately reliable trend.

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 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 ENC41’s age-adjusted mortality rate series for a selected cause of death. For cerebrovascular disease (2005 to 2019), the 2013 *expected* or *fitted* age-adjusted rate is calculated to be 48.04 deaths per 100,000 people. The *observed* age-adjusted rate for 2013 is 45 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 3.04—the model (the equation of the line) *overestimates* the observed value by 3.04 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.

Percent change provides a measure of the estimated change in mortality over the most recent 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, ENC41's age-adjusted fitted rate for cerebrovascular disease in 2005 is 4% greater than (GT) RNC's fitted rate. In 2019, ENC41's fitted rate is 16% 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, as indicated in *Healthy Carolinians 2030*, 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

Fastrup, J., Vinkenness, M., & O'Dell, M. (1996). *Public Health: A Health Status Indicator for Targeting Federal Aid to States*. Washington, DC: US General Accounting Office.

North Carolina Institute of Medicine. *Healthy North Carolina 2030: A Better State of Health*.

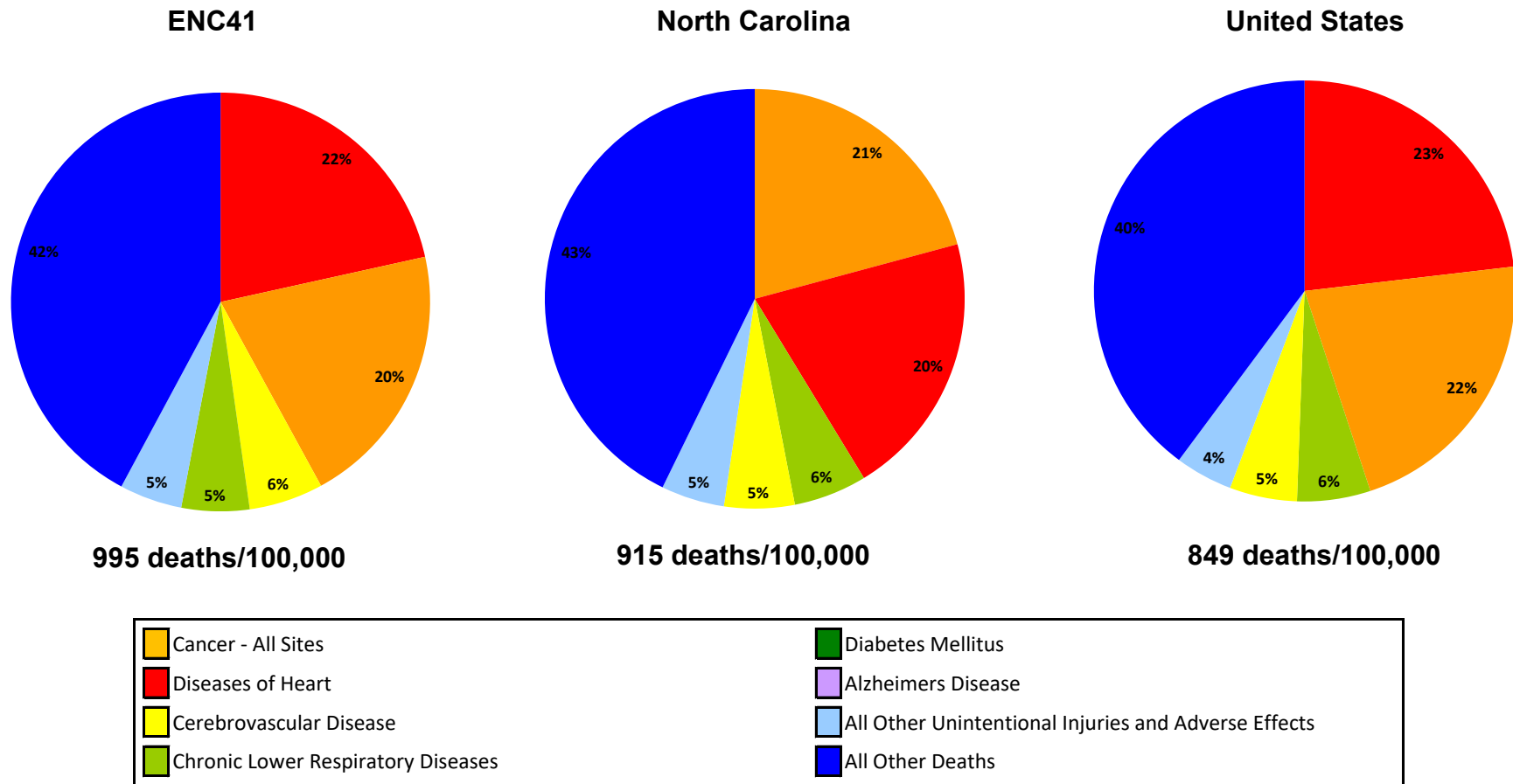
United States Department of Health and Human Services. *Healthy People 2030*. www.healthypeople.gov.

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Buescher, P. A. (1998). *Age-adjusted death rates (13th ed.)*. Raleigh, North Carolina: North Carolina Center for Health Statistics.

4. Current Disparities in Mortality by Geography, Race and Gender, and Race: Total and Five Leading Causes of Death

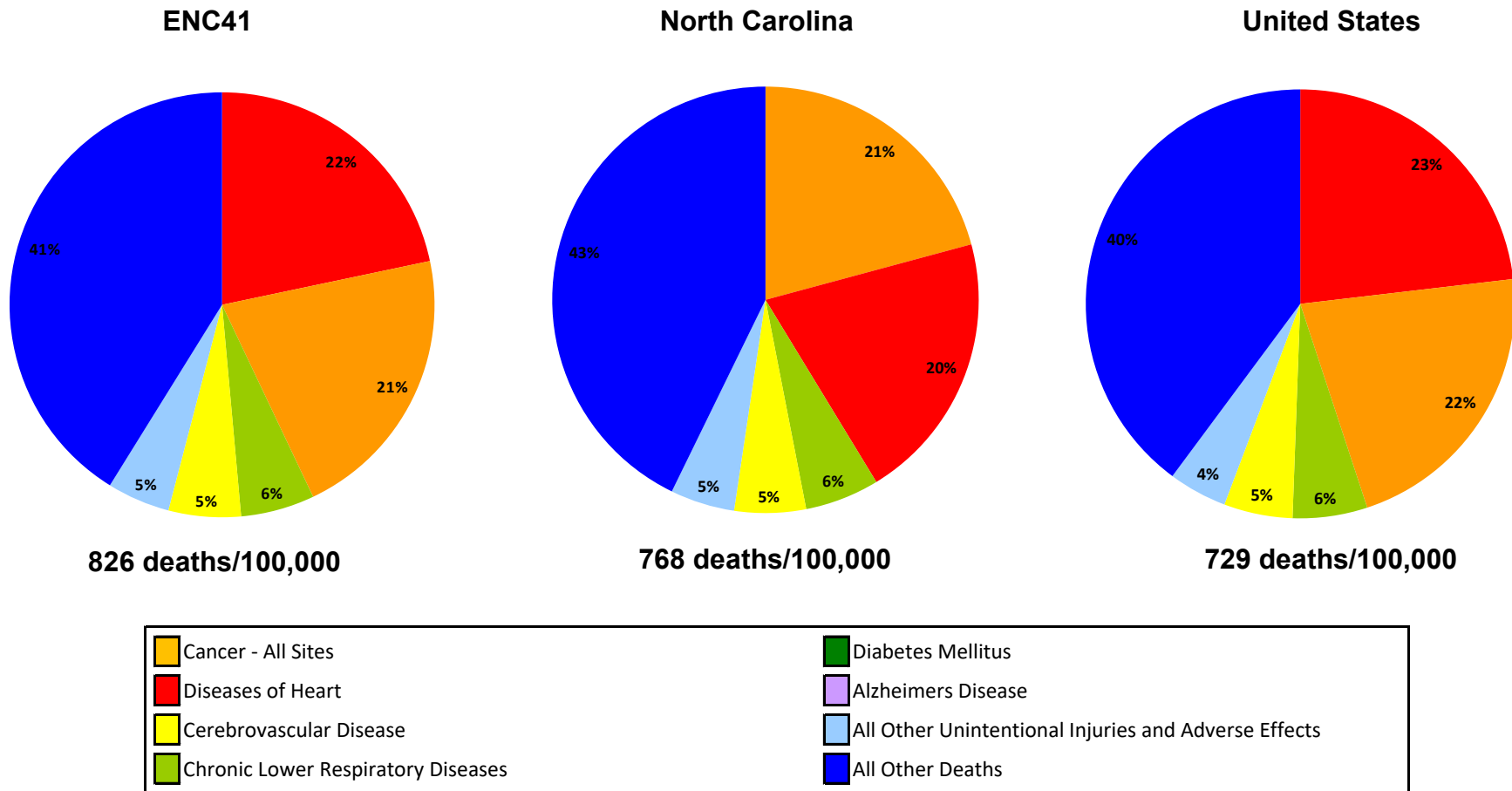
Figure 4.1 i. General leading causes of death for ENC41 (2019), NC (2019), and US (2016). Mortality rate per 100,000 population.



2019 NC rate is 8% higher than 2016 US rate

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

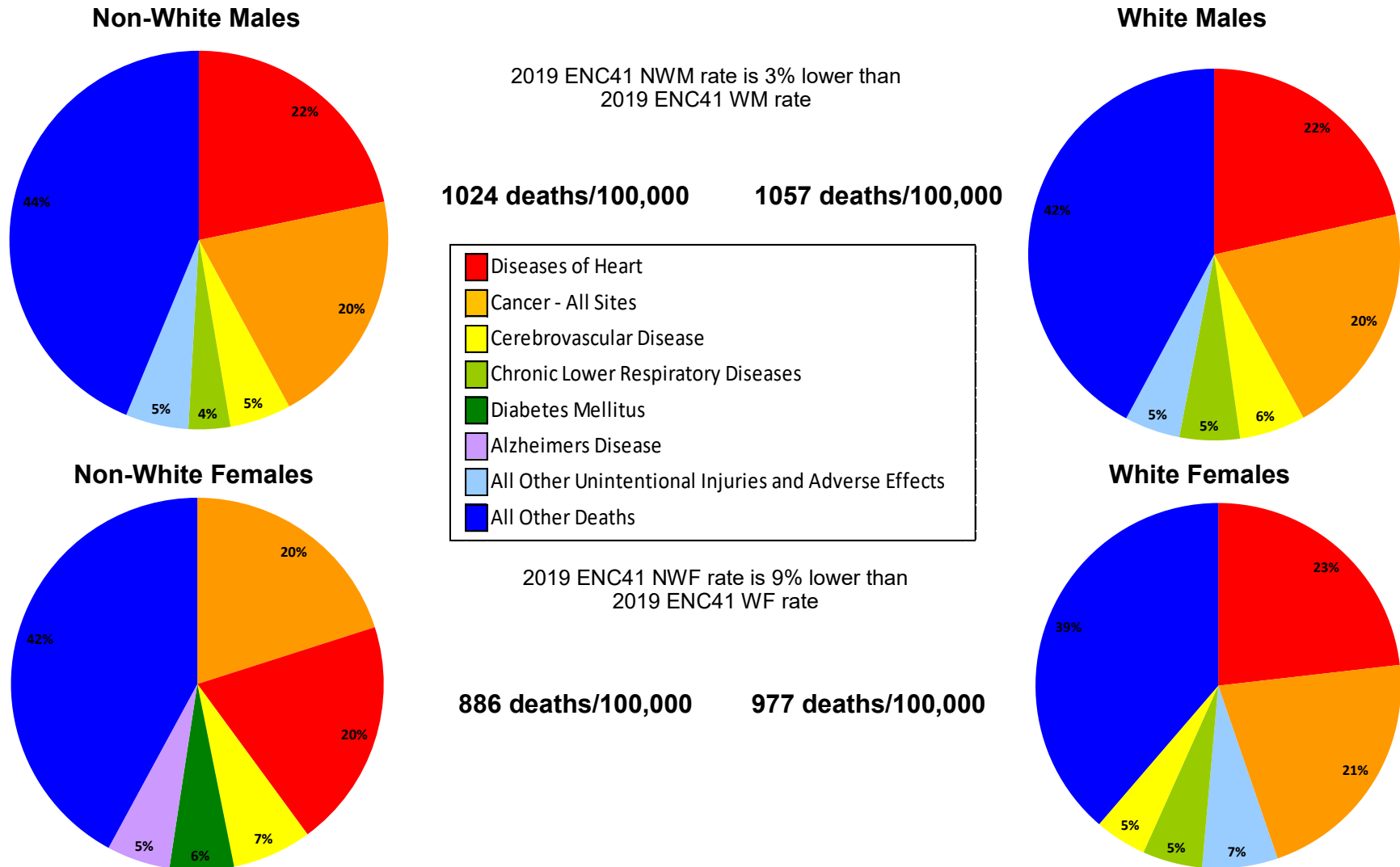
Figure 4.1 ii. General leading causes of death for ENC41 (2019), NC (2019), and US (2016). Age-adjusted mortality rate per 100,000 population.



2019 NC age-adj. rate is 5% higher than US

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

Figure 4.2 i. General leading causes of death for ENC41 (2019) by race and gender.
Mortality rate per 100,000 population.



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

Figure 4.2 ii. General leading causes of death for ENC41 (2019) by race and gender.
Age-adjusted mortality rate per 100,000 population.

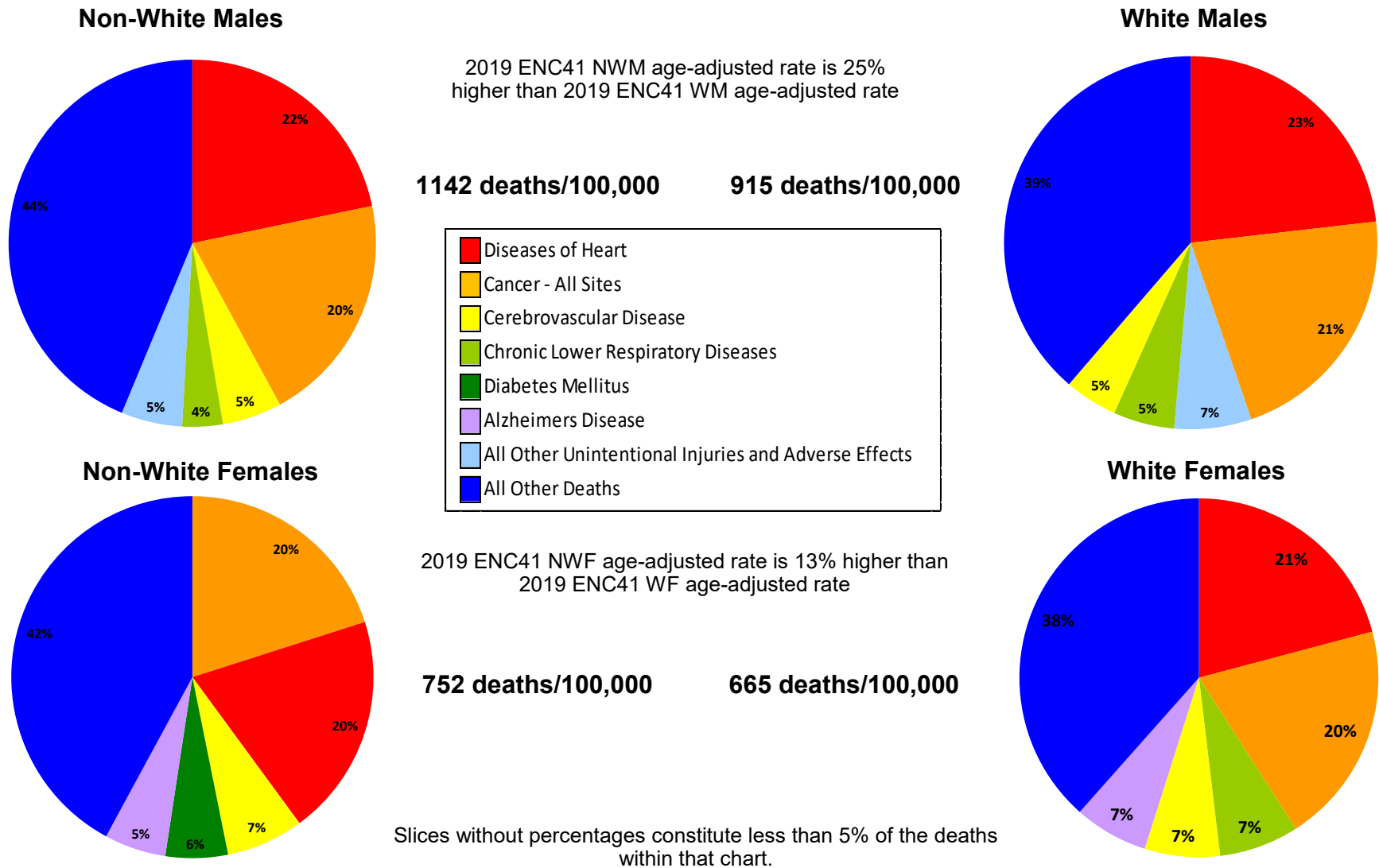
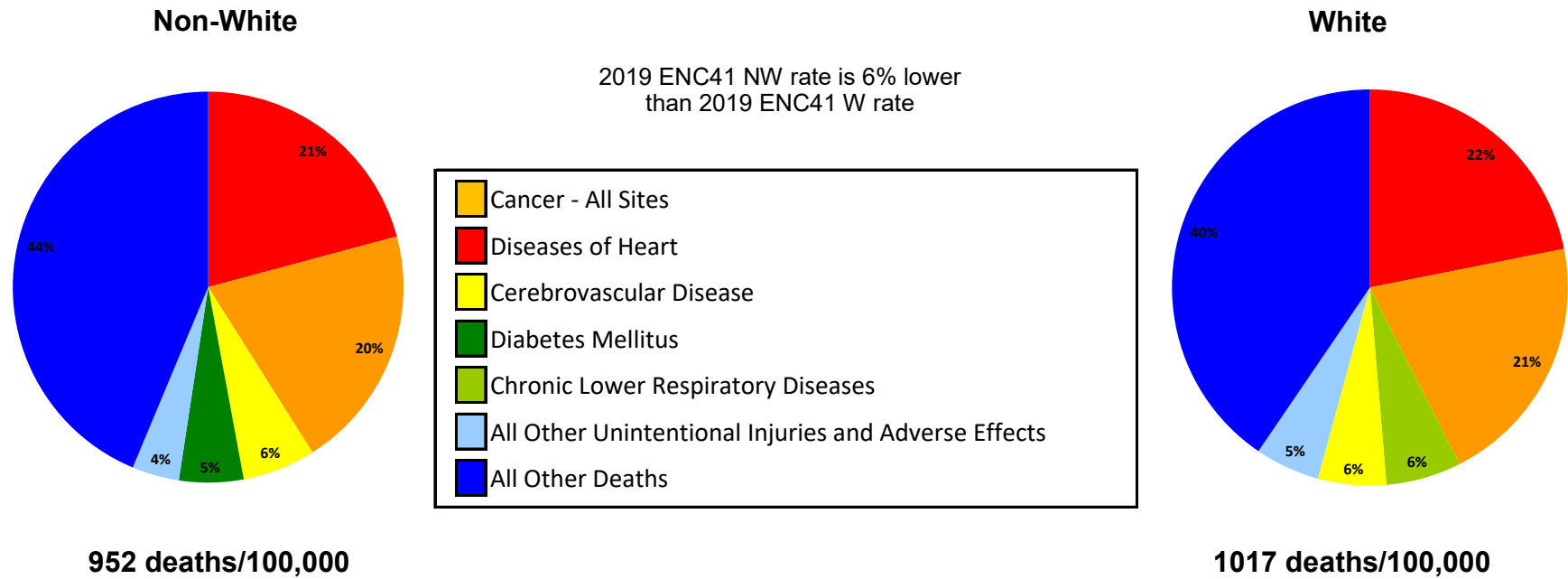
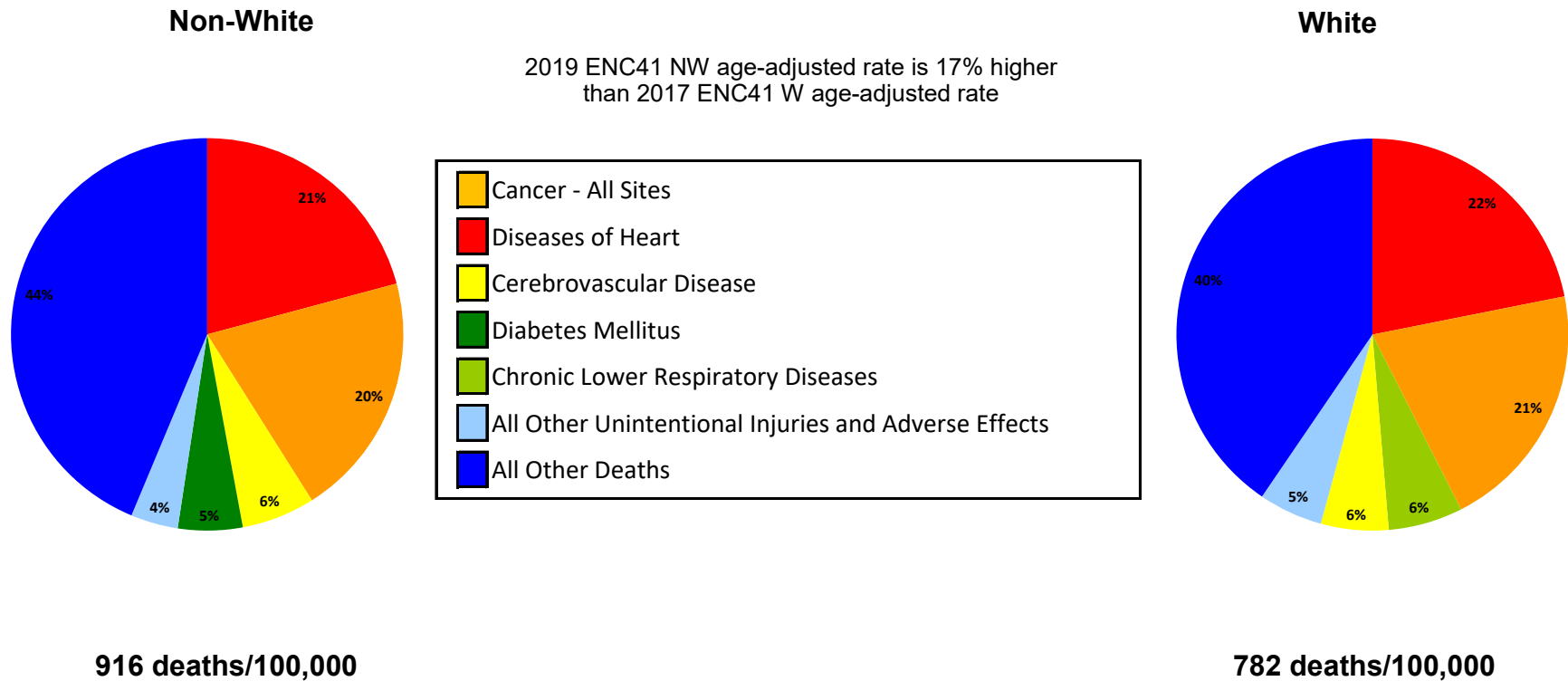


Figure 4.3 i. General leading causes of death for ENC41 (2019) by race.
Mortality rate per 100,000 population.



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

Figure 4.3 ii. General leading causes of death for ENC41 (2019) by race.
Age-adjusted mortality rate per 100,000 population.



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

5. Trends and Disparities in Mortality in ENC41: All Causes of Death and All Causes of Premature Mortality; 1990-2019

All Causes of Death

- ENC's all-cause mortality rate trend is increasing, and in 2019 is 10% greater than RNC and 7% greater than NC. The ENC rate has increased 14% over the 15-year period.
- The age-adjusted all-cause mortality rate for ENC has decreased 11% over the 15-year period. ENC's rate remains 9% greater than RNC for 2019.
- The non-White male rate remains higher than the other demographic groups. The non-White female rate is projected to converge with the White female rate in the near future.
- The trends for all-cause mortality rates for both non-White and White are decreasing. The non-White rate is 14% greater than the White rate in 2019.
- Over the recent 15-year period there is a 36% 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 ENC41, RNC59, and NC
1990-2019 with projections to 2030

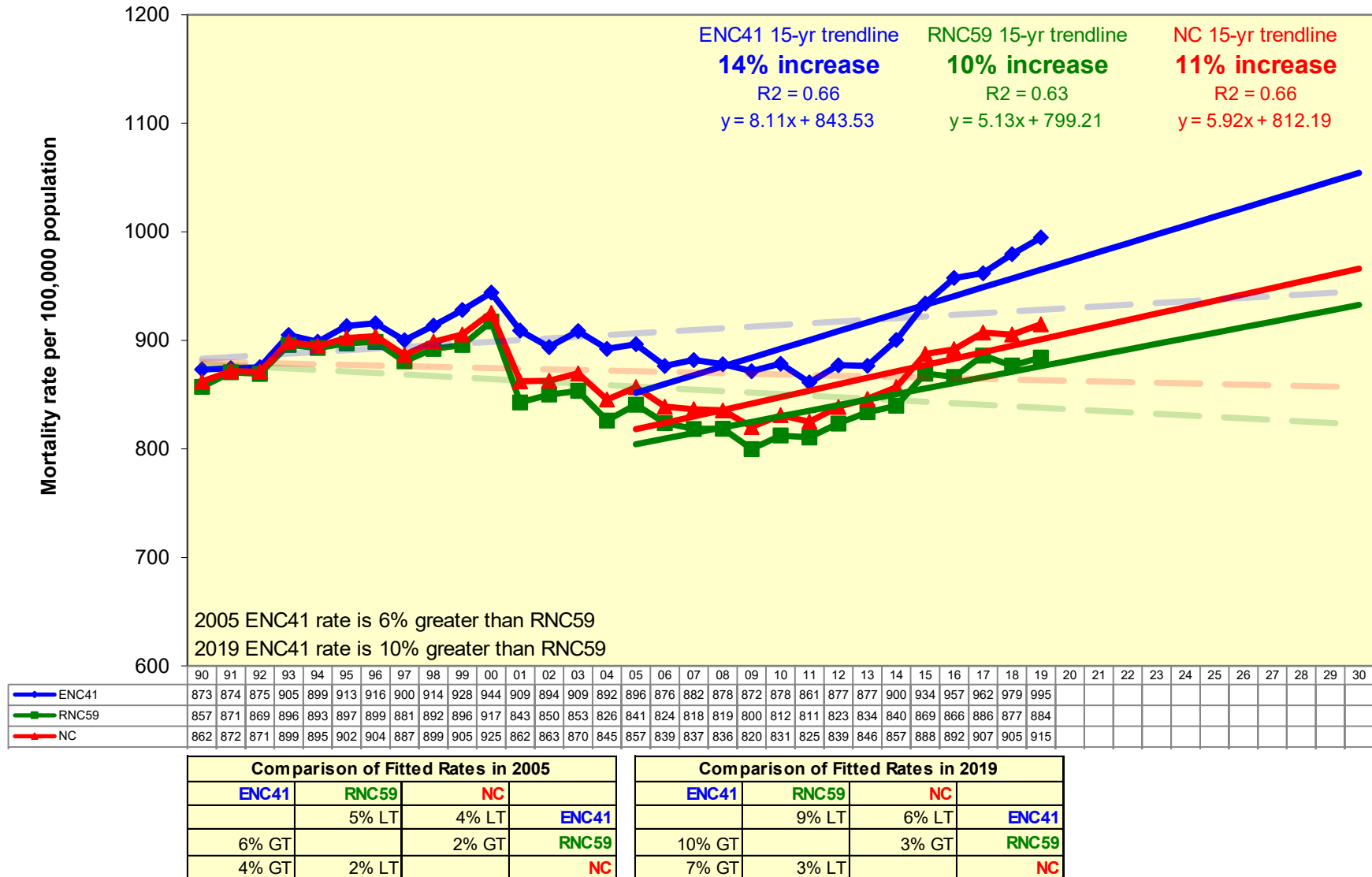
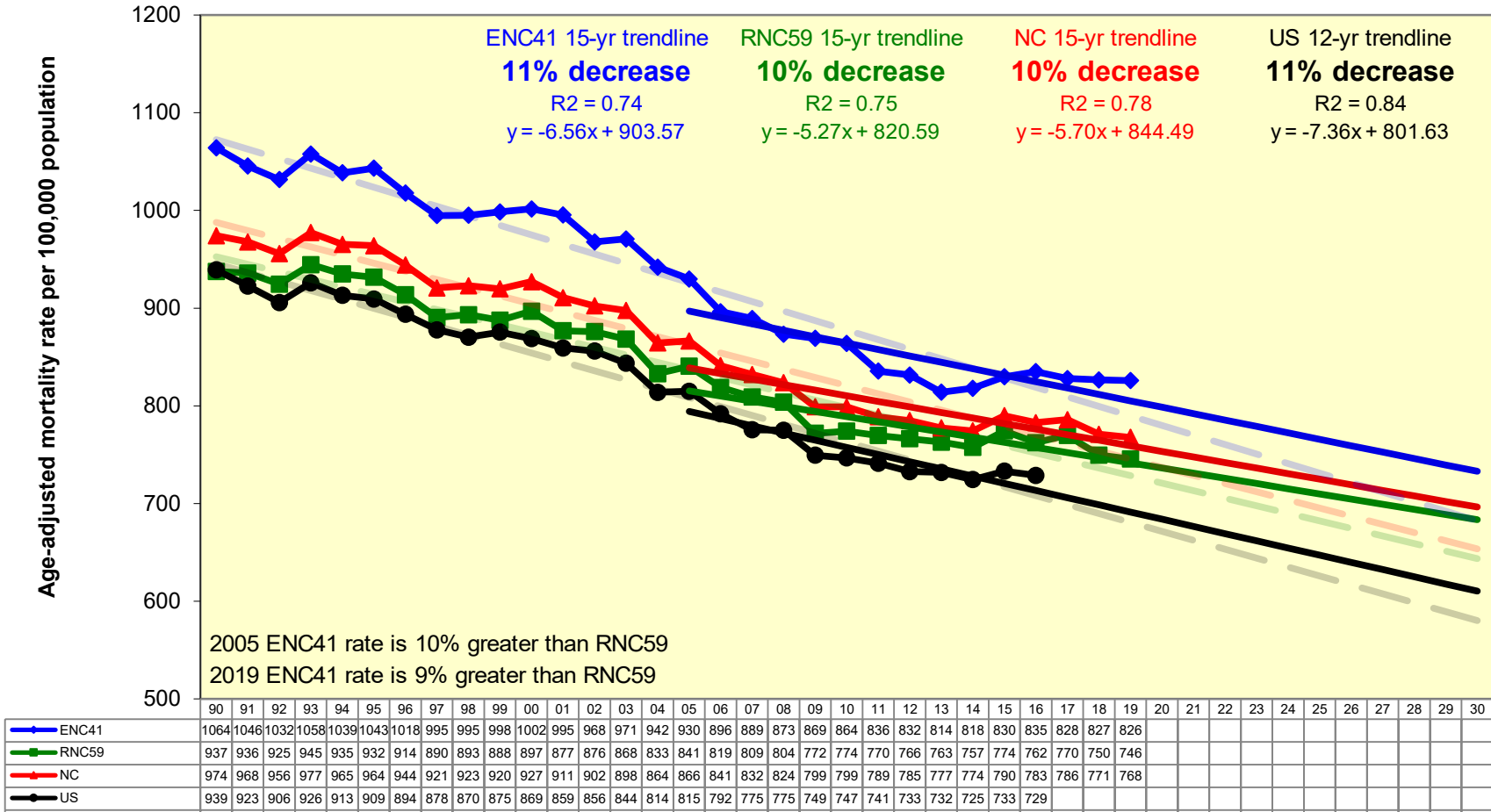


Figure 5.1 ii. All Causes of Death:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030



Comparison of Fitted Rates in 2005				
ENC41	RNC59	NC	US	
	9% LT	7% LT	11% LT	ENC41
10% GT		3% GT	2% LT	RNC59
7% GT	3% LT		5% LT	NC
13% GT	2% GT	5% GT		US

Comparison of Fitted Rates in 2019				
ENC41	RNC59	NC	US	
	8% LT	6% LT	14% LT	ENC41
9% GT		2% GT	6% LT	RNC59
6% GT	2% LT		9% LT	NC
16% GT	7% GT	9% GT		US

Figure 5.1 iv. All Causes of Death:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

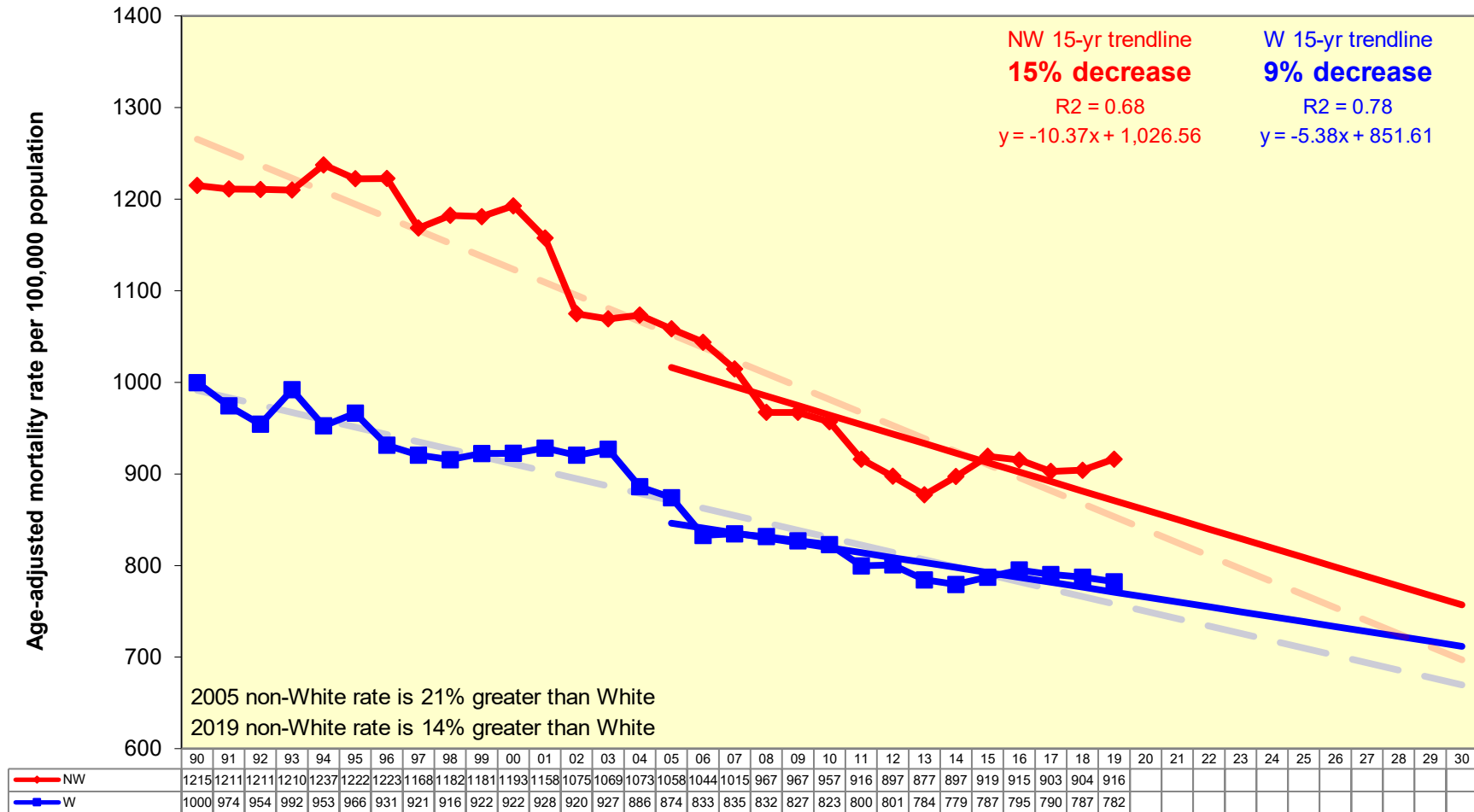
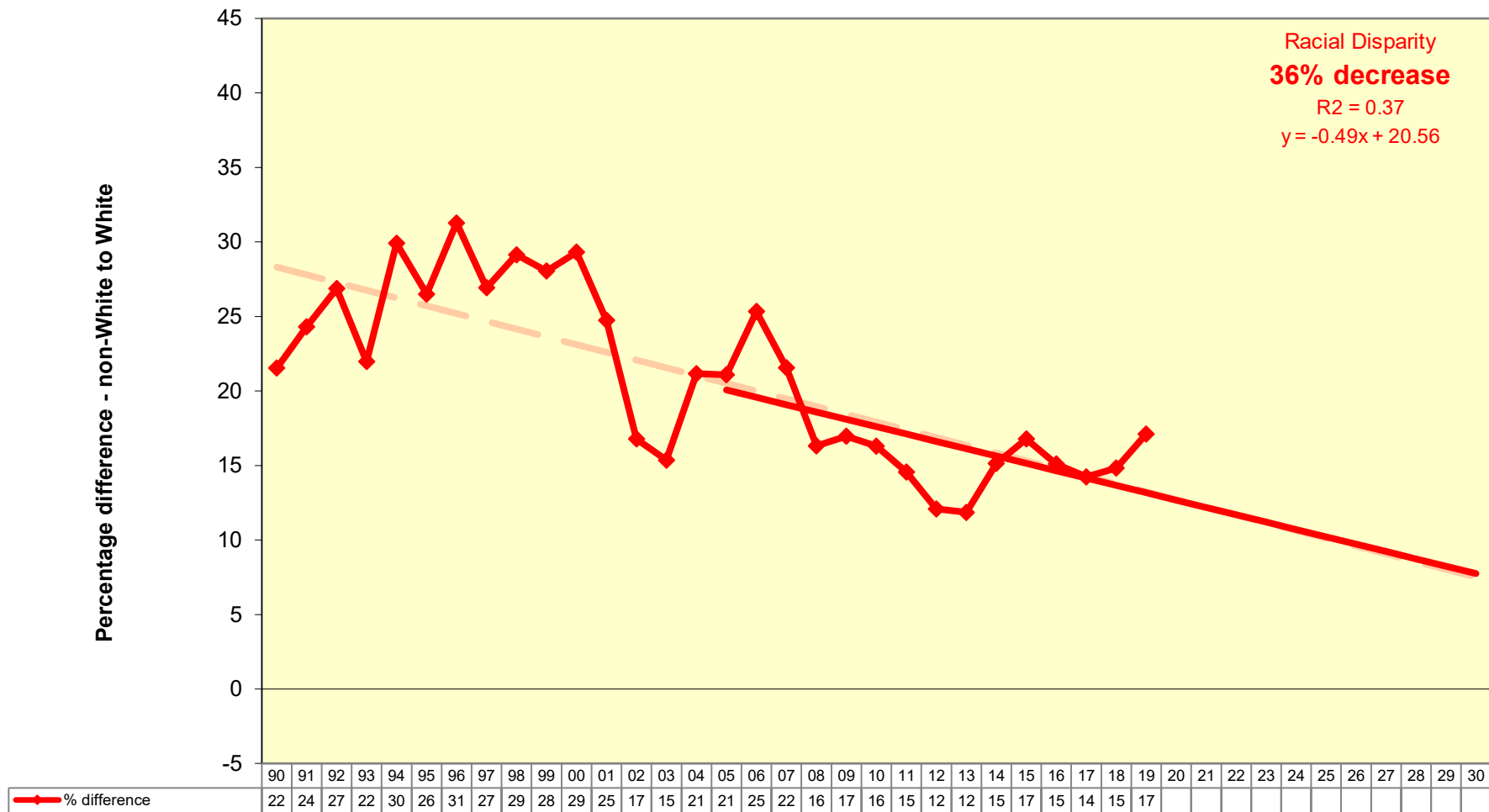


Figure 5.1 v. All Causes of Death:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



All Causes of Premature Mortality

- ENC's premature mortality rate is 23% greater than RNC and 16% greater than NC. All the rate trends are unreliable.
- The ENC age-adjusted premature mortality trend for the 15-year period is flat and is unreliable.
- The non-White male rate is higher than the rates for any other demographic group. It has decreased 8% over the 15-year period. The rate for non-White females has the greatest decrease (10% over 15 years).
- The non-White rate remains 45% greater than the White rate. The non-White rate is decreasing; the White rate is flat.
- The racial disparity 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 5.2 iv. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race for ENC41,
1990-2019 with projections to 2030

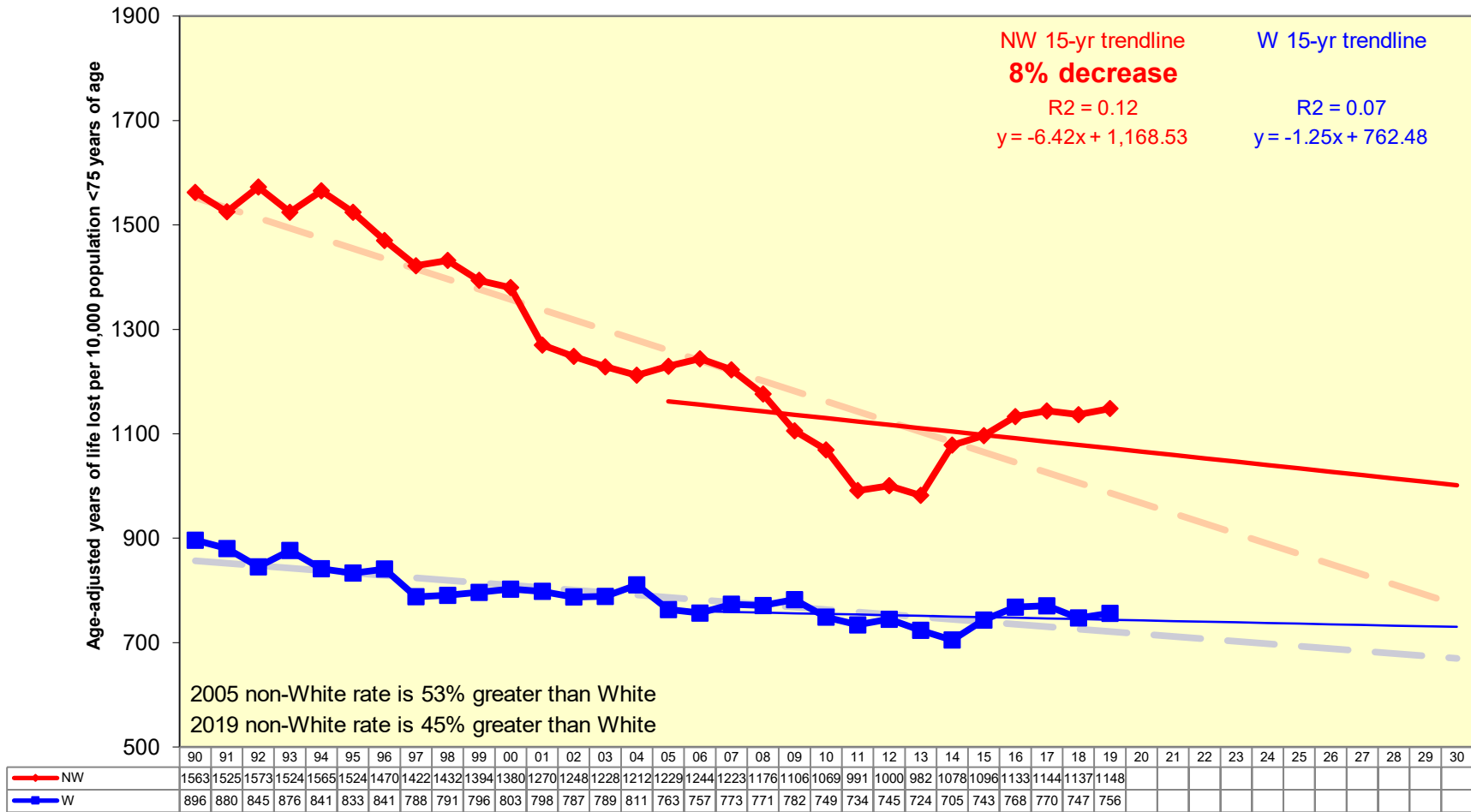
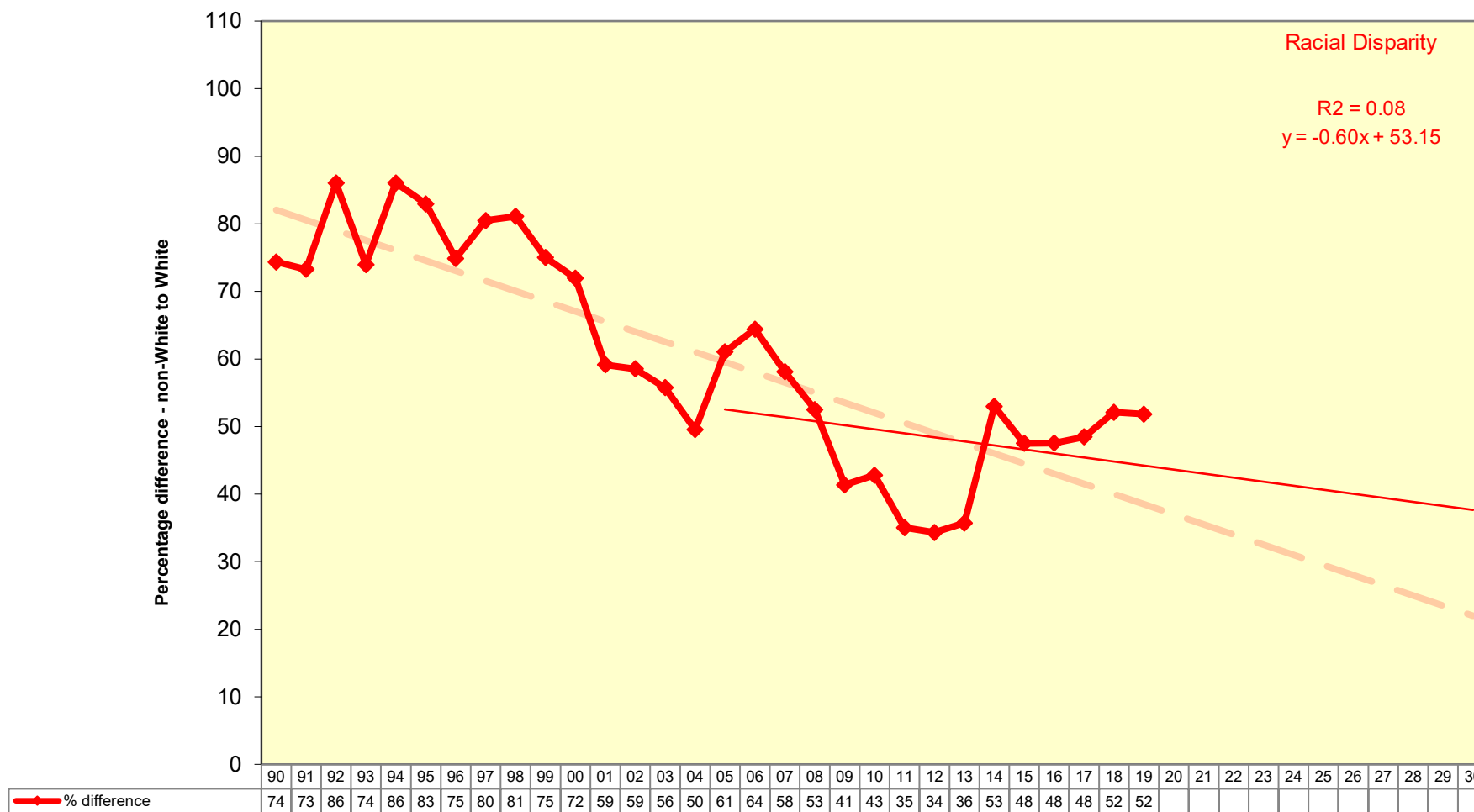


Figure 5.2 v. All Causes of Premature Mortality:
 Measuring disparity in age-adjusted premature mortality rates by race for ENC41,
 1990-2019 with projections to 2030



6. Trends and Disparities in Mortality in ENC41: Ten Specific Leading Causes of Death, 1990-2019

Diseases of Heart

- ENC's heart disease rate trend is flat over the 15-year period and is not reliable. The rate trend for NC has declined 7% and for RNC has declined 9% over the period.
- ENC's age-adjusted heart disease rate is 13% greater than NC and 14% greater than the US rate. All three rates have decreased at a similar pace over the recent 15-year period.
- The rate for non-White males is the highest and is decreasing at about the same pace as the White male rate. The non-White female rate is decreasing the most and is set to converge with the White female rate.
- The non-White rate is 11% higher than the White rate in 2019. The 15-year trend for both is decreasing.
- 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 6.1 ii. Diseases of Heart:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

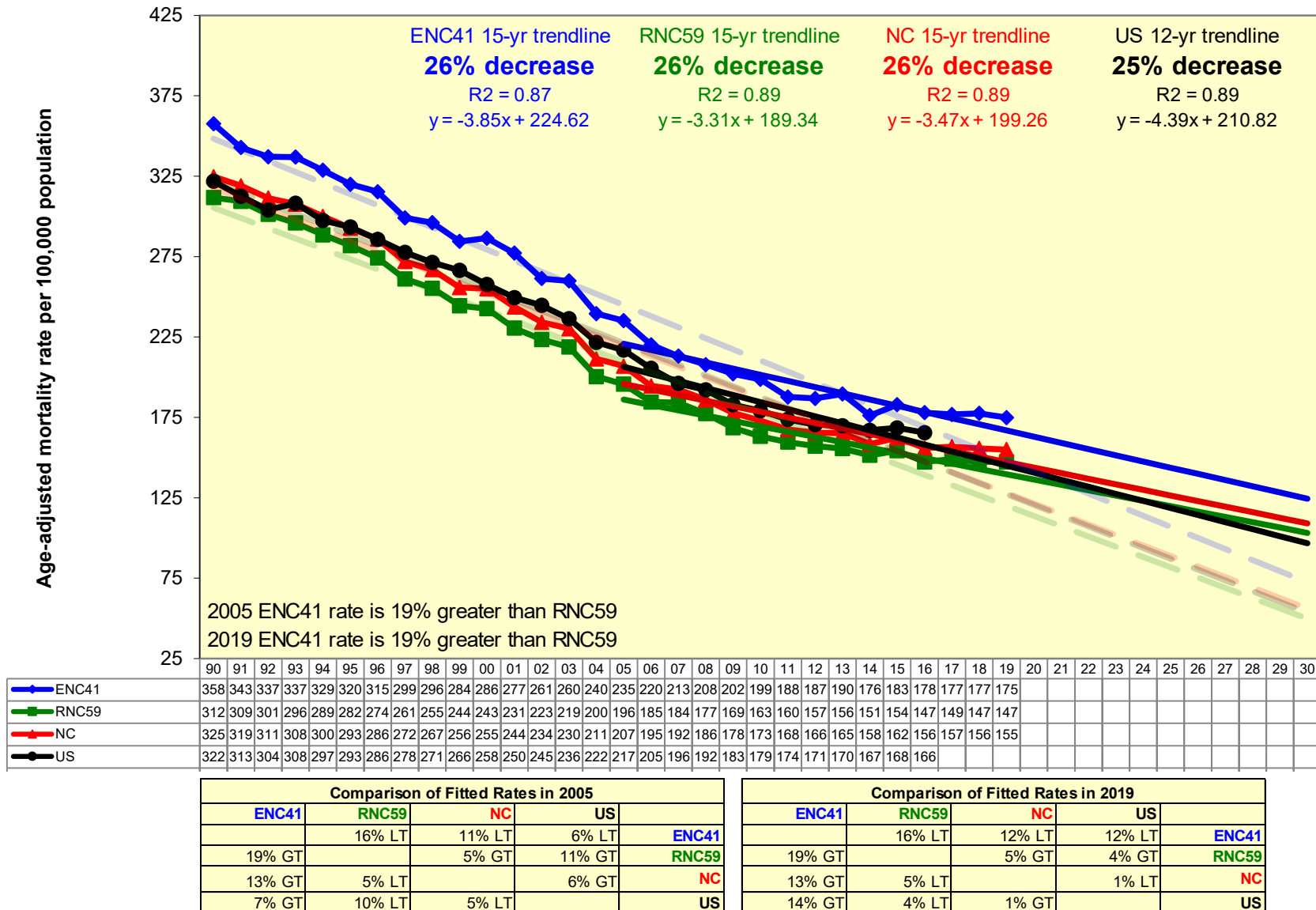


Figure 6.1 iii. Diseases of Heart:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

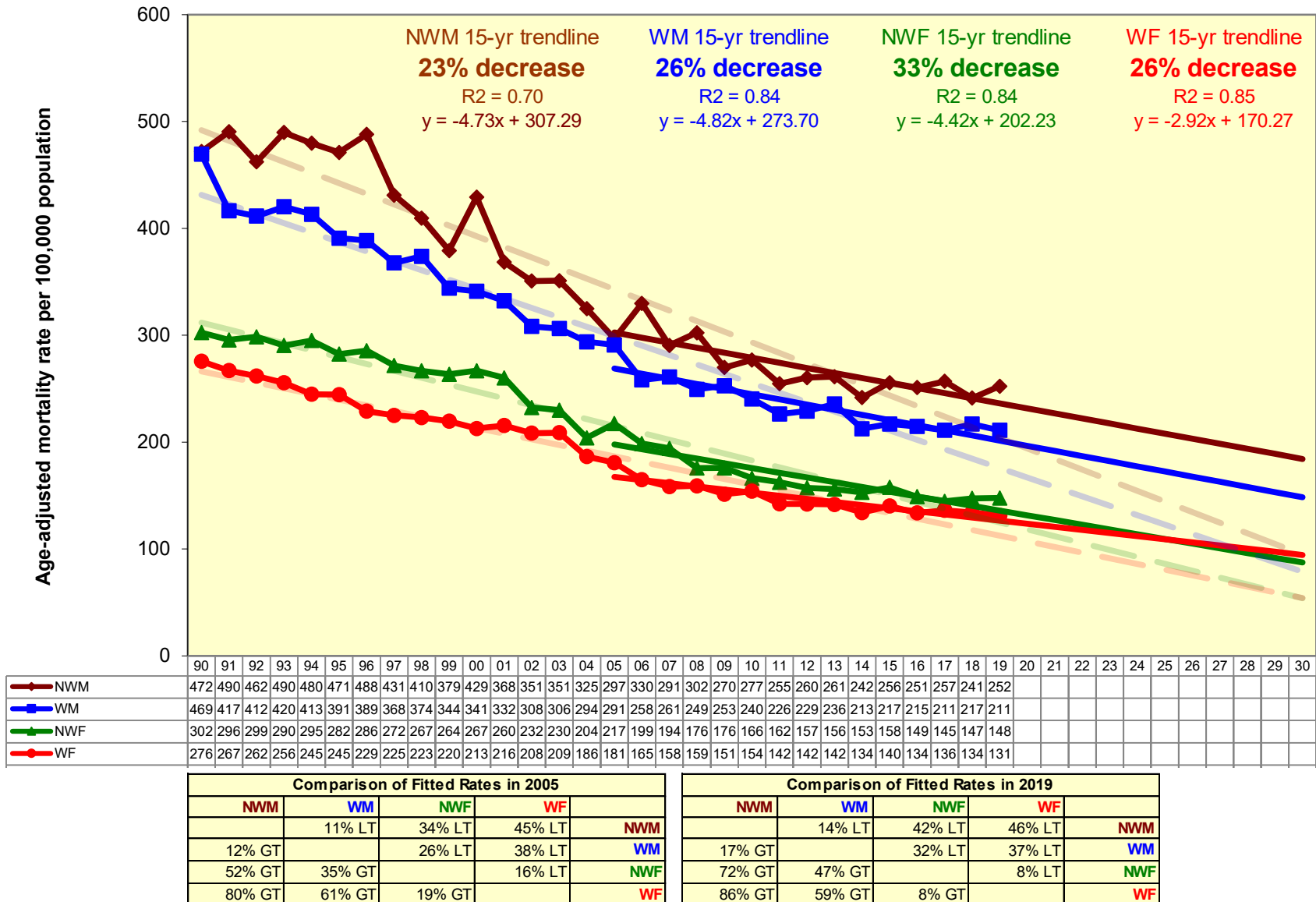


Figure 6.1 iv. Diseases of Heart:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

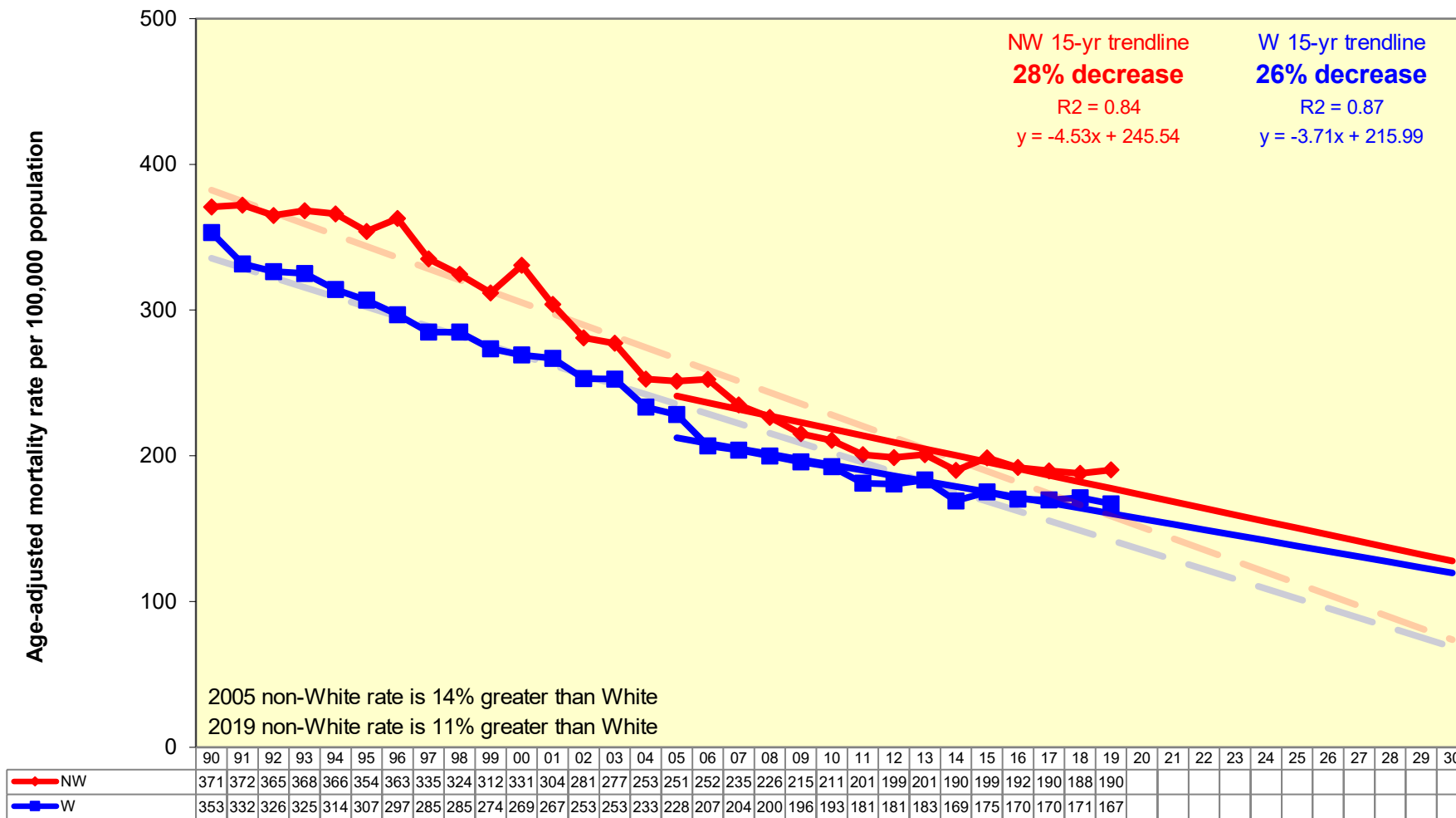
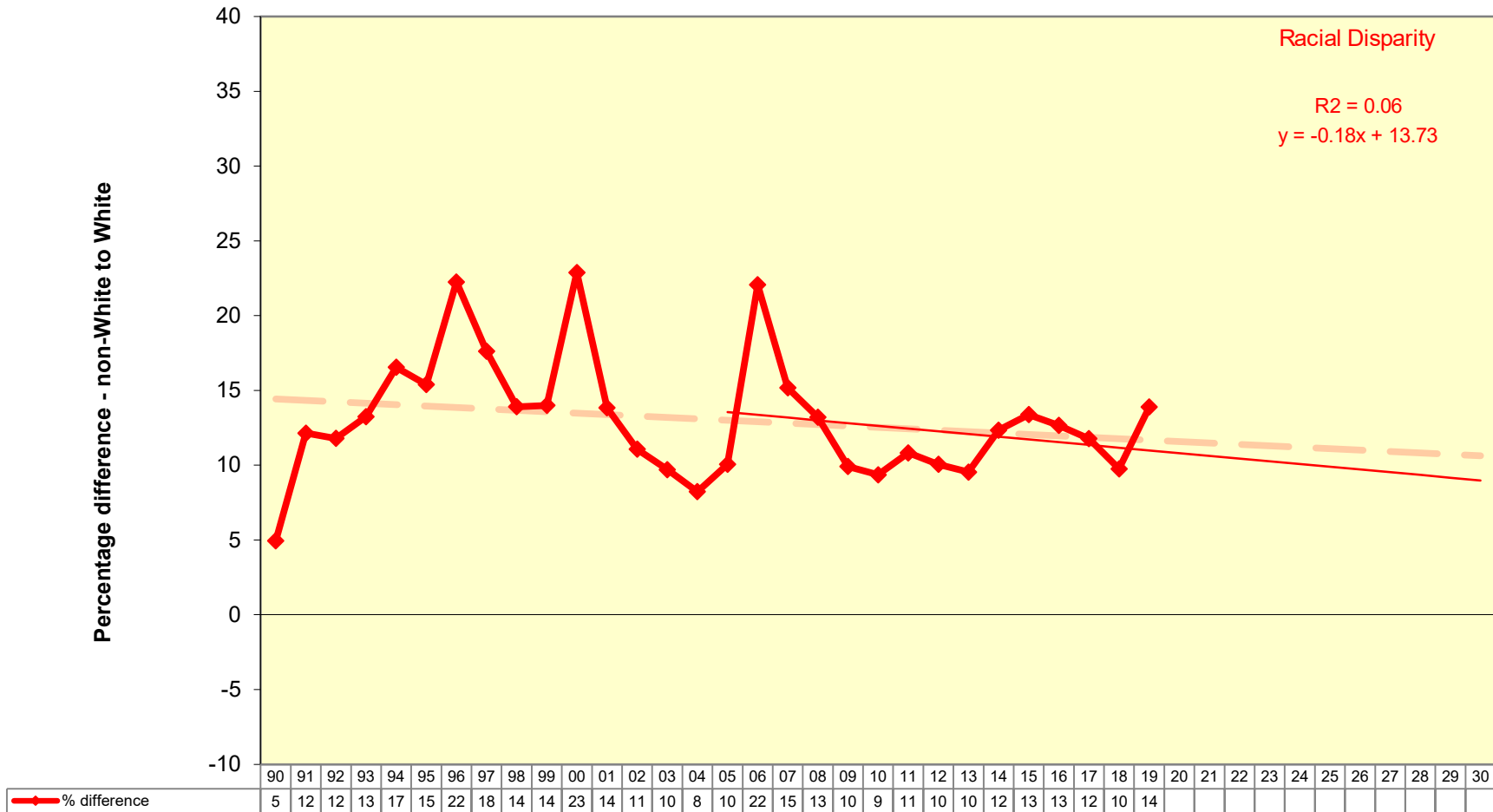


Figure 6.1 v. Diseases of Heart:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



Cerebrovascular Disease

- ENC's cerebrovascular disease mortality rate trend shows an 11% increase over the recent 15-year period. It is 17% greater than the RNC rate and 12% greater than the NC rate.
- The age-adjusted rate has decreased 17% over the 15-year period. It is 16% greater than the RNC rate and 37% greater than the US rate.
- The non-White male rate is the highest and has decreased 21% over the 15-year period. The non-White female rate has decreased 33% and is set to converge with the White male and female rates. The White male and White female rates are about the same.
- The non-White rate in 2019 is 28% greater than the White rate but is decreasing more rapidly (28% over the 15-year period). Both rates are projected to converge in the future.
- There is a 51% decrease in racial disparity between White and non-Whites over the 15-year period.

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 ENC41, RNC59, and NC,
1990-2019 with projections to 2030

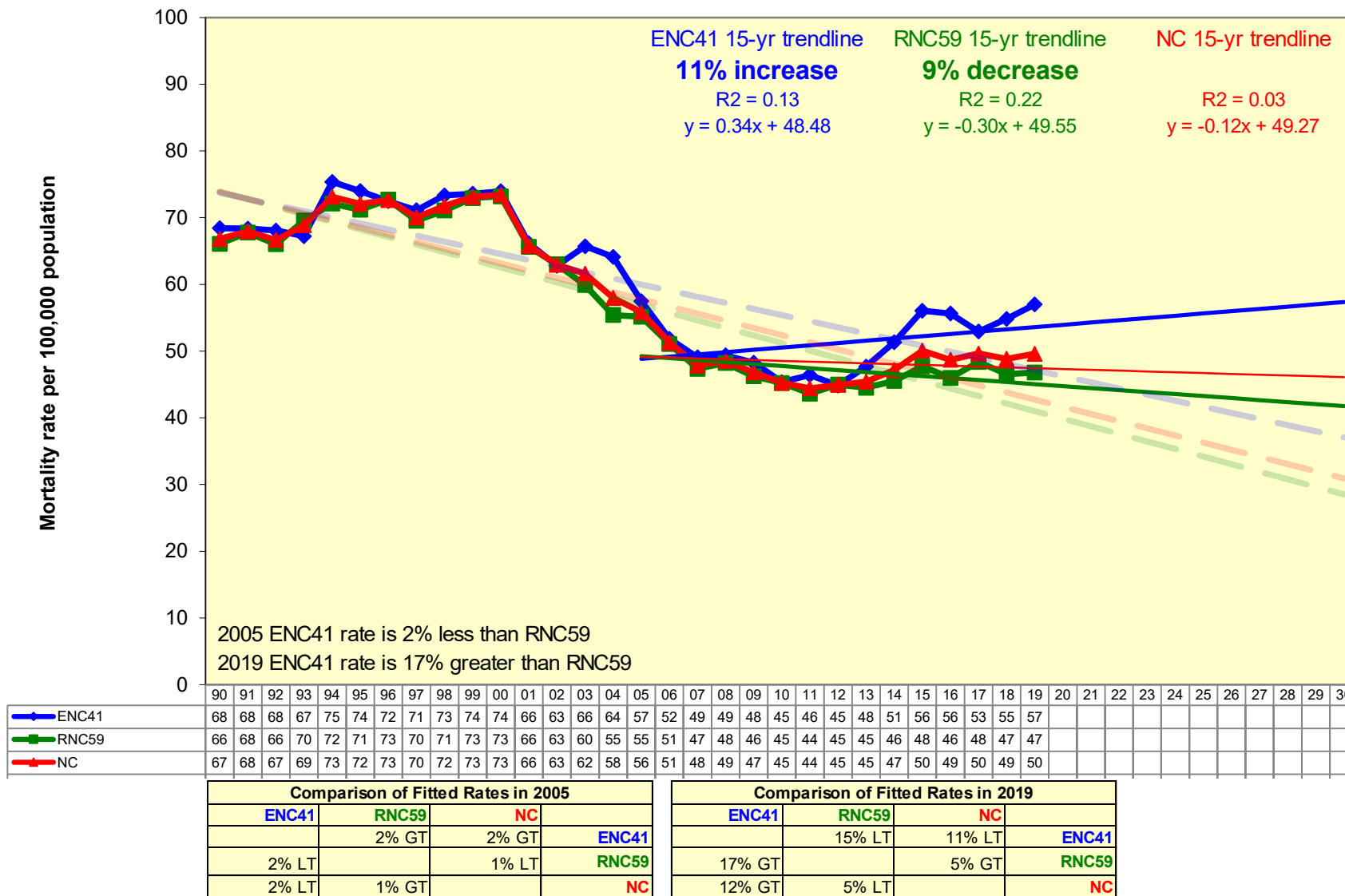


Figure 6.2 ii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US,
1990-2019 with projections to 2030

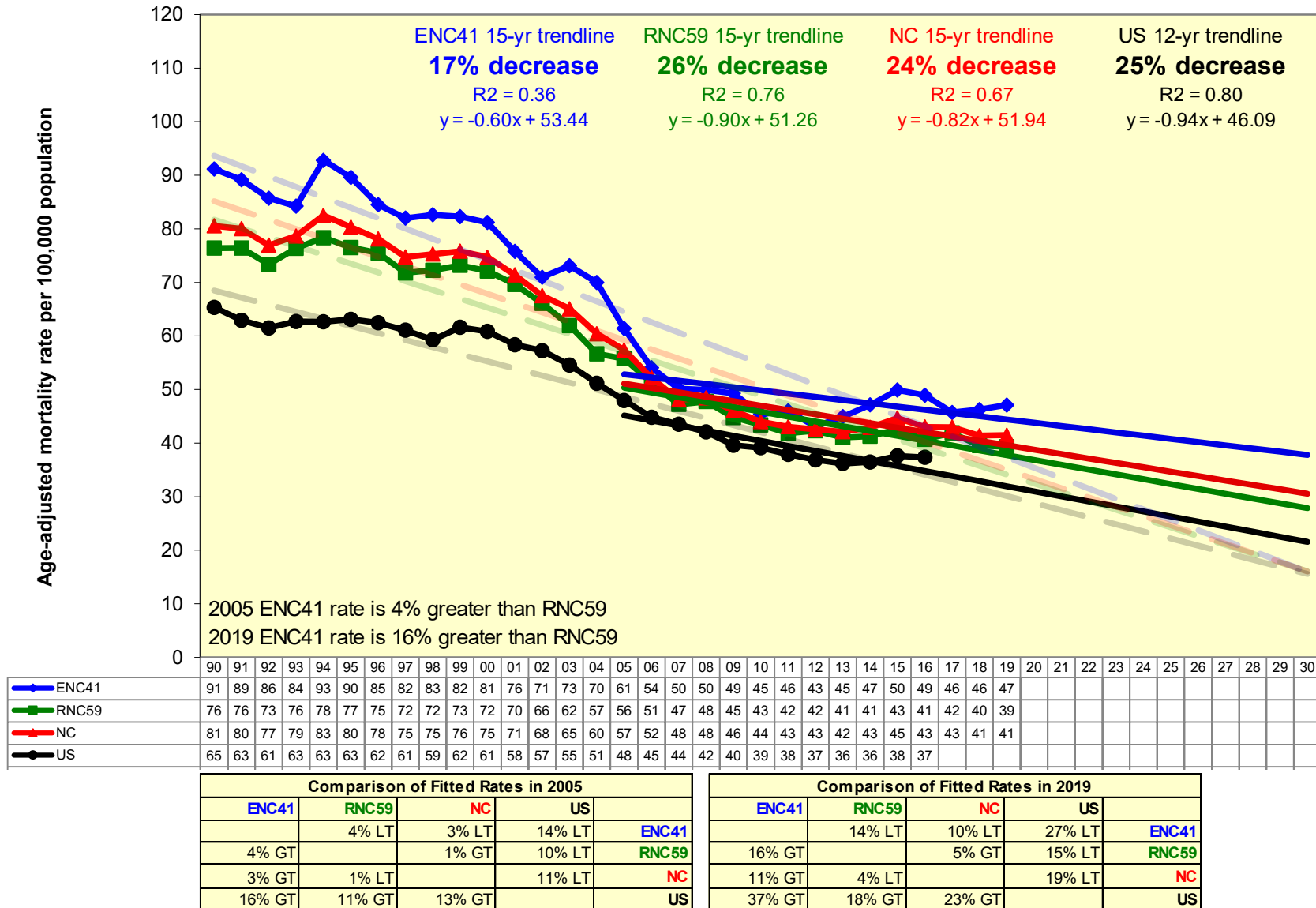


Figure 6.2 iii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

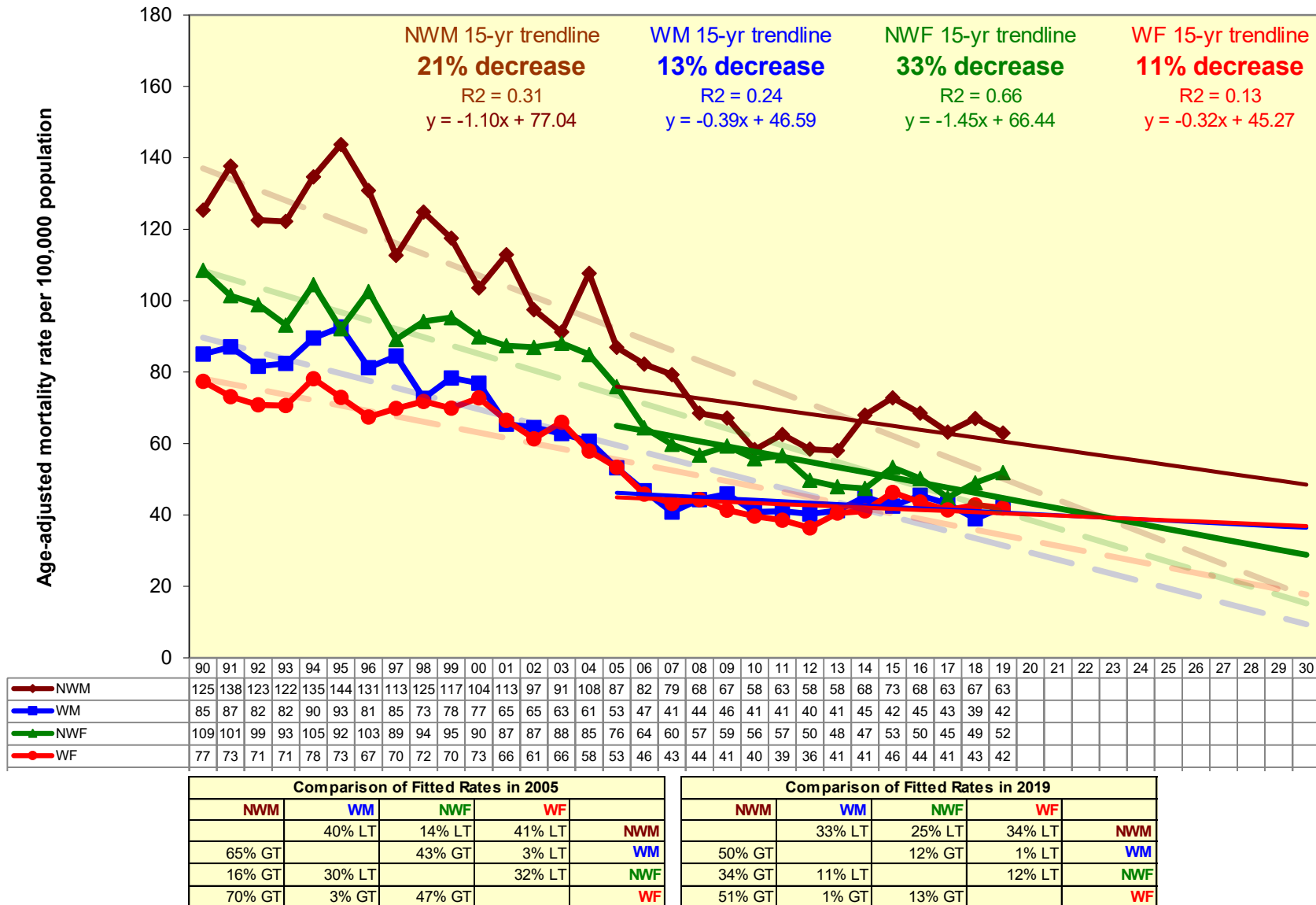


Figure 6.2 iv. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

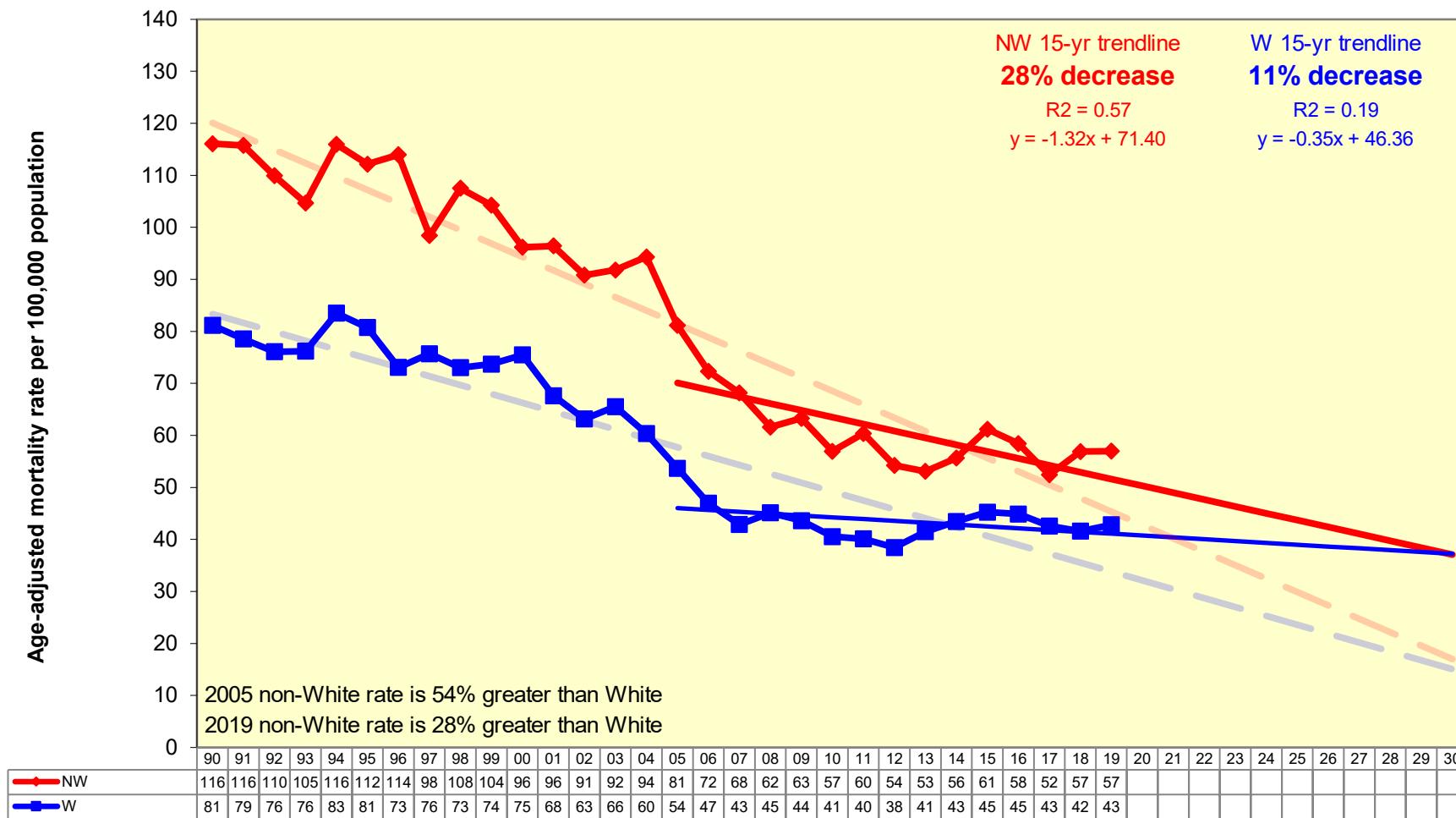
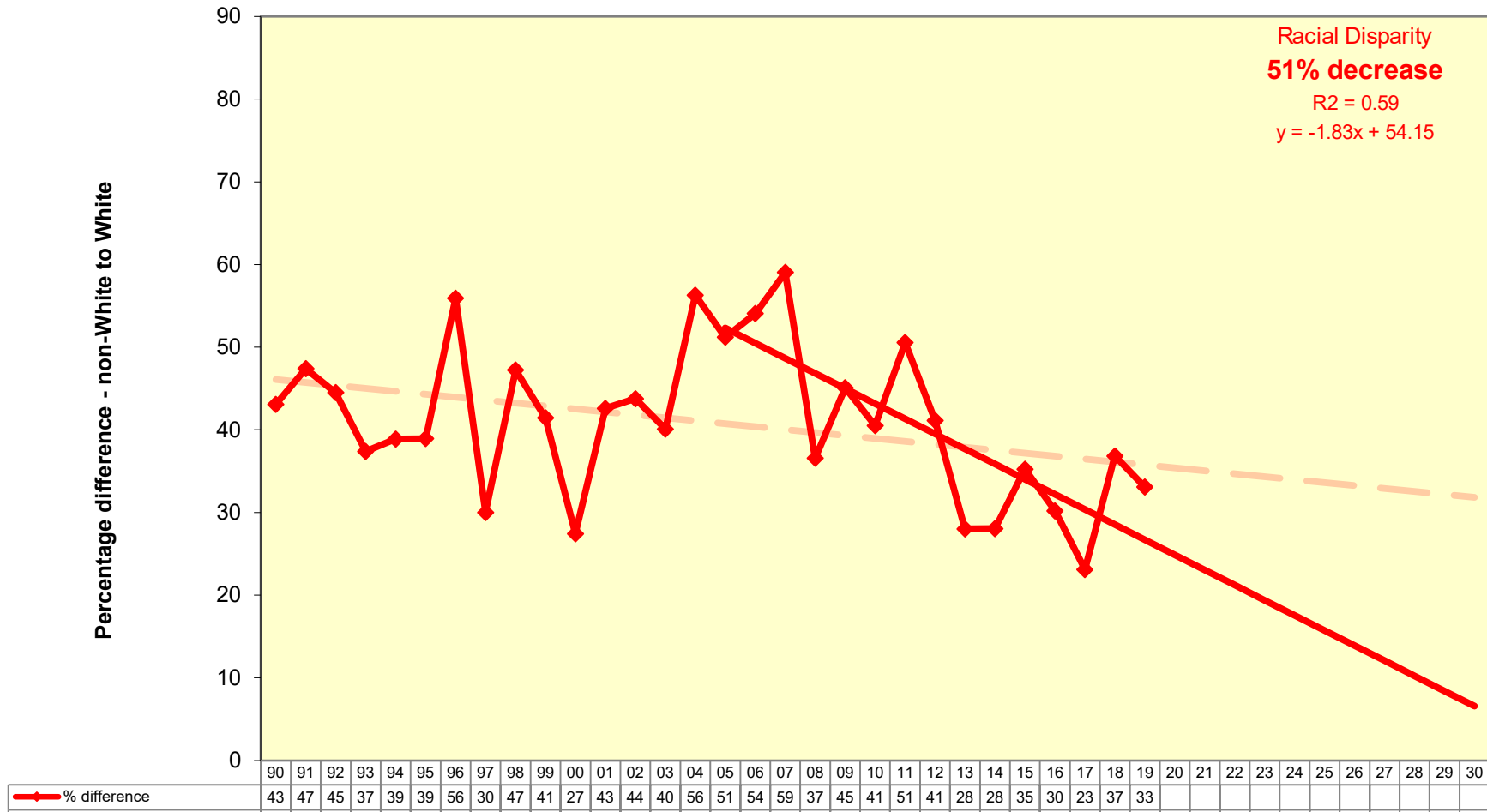


Figure 6.2 v. Cerebrovascular Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030



Cancer—Trachea, Bronchus, Lung

- The cancer—TBL rate trend for ENC has decreased 11% over the recent 15-year period. The ENC rate is 20% greater than the RNC rate. The RNC rate has decreased 21%.
- In 2019 the age-adjusted rate for ENC was 16% above the RNC rate. The ENC rate decreased 34% over the 15-year period, while the RNC rate decreased 38%.
- In 2019 the non-White male rate was the highest but is only 6% higher than the White male rate, is decreasing, and will likely converge soon. The mortality rate for White females is 40% higher than the rate for non-White females and decreased 26% over the period. The rate for non-White females decreased 16%.
- The non-White mortality rate is 12% less than the White rate. Both are decreasing over the 15-year period at about the same pace.
- The 15-year rate trend for racial disparity 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 6.3 i. Cancer - Trachea, Bronchus, Lung:
Trends in mortality rates for ENC41, RNC59, and NC,
1990-2019 with projections to 2030

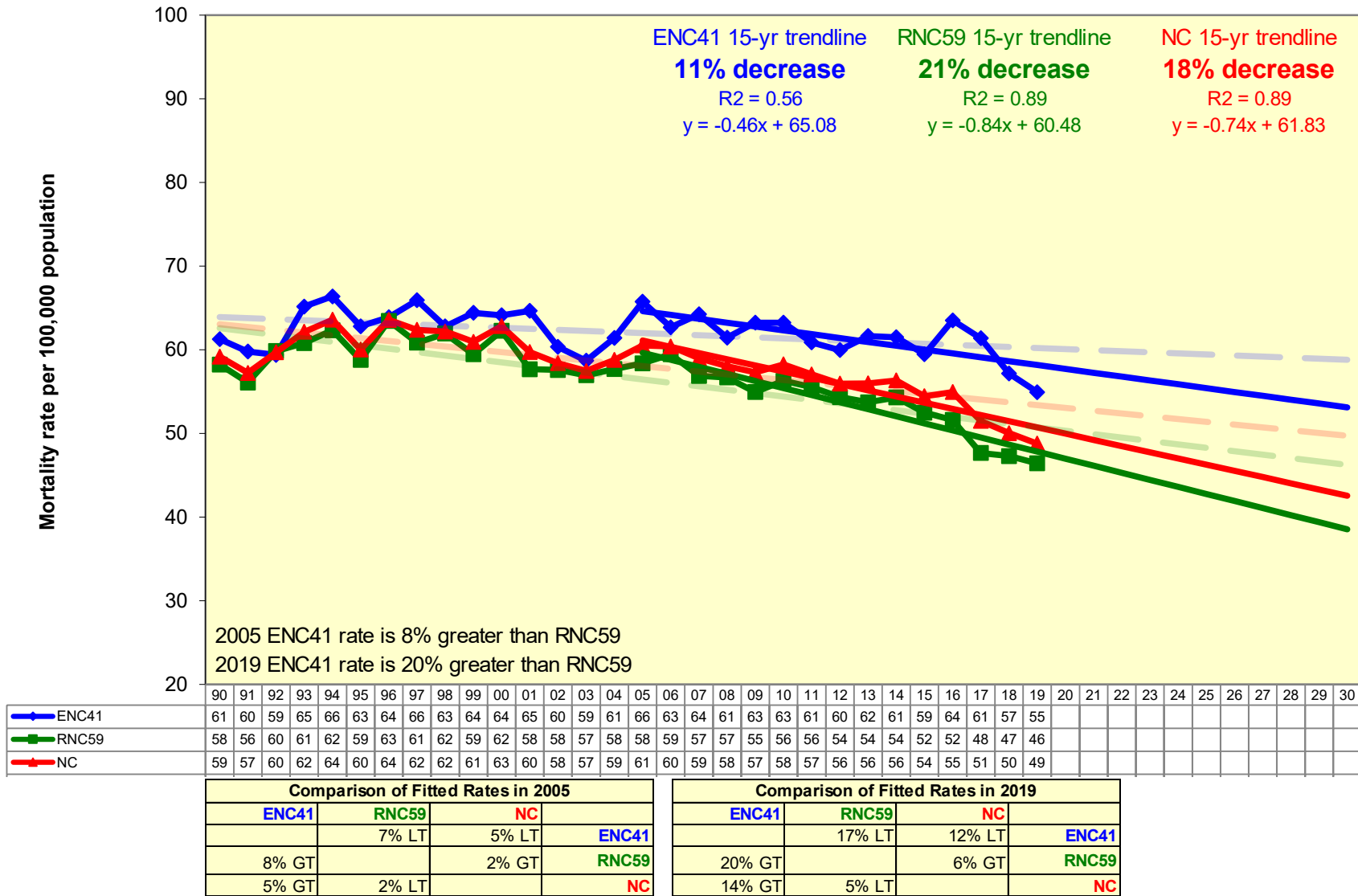


Figure 6.3 ii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

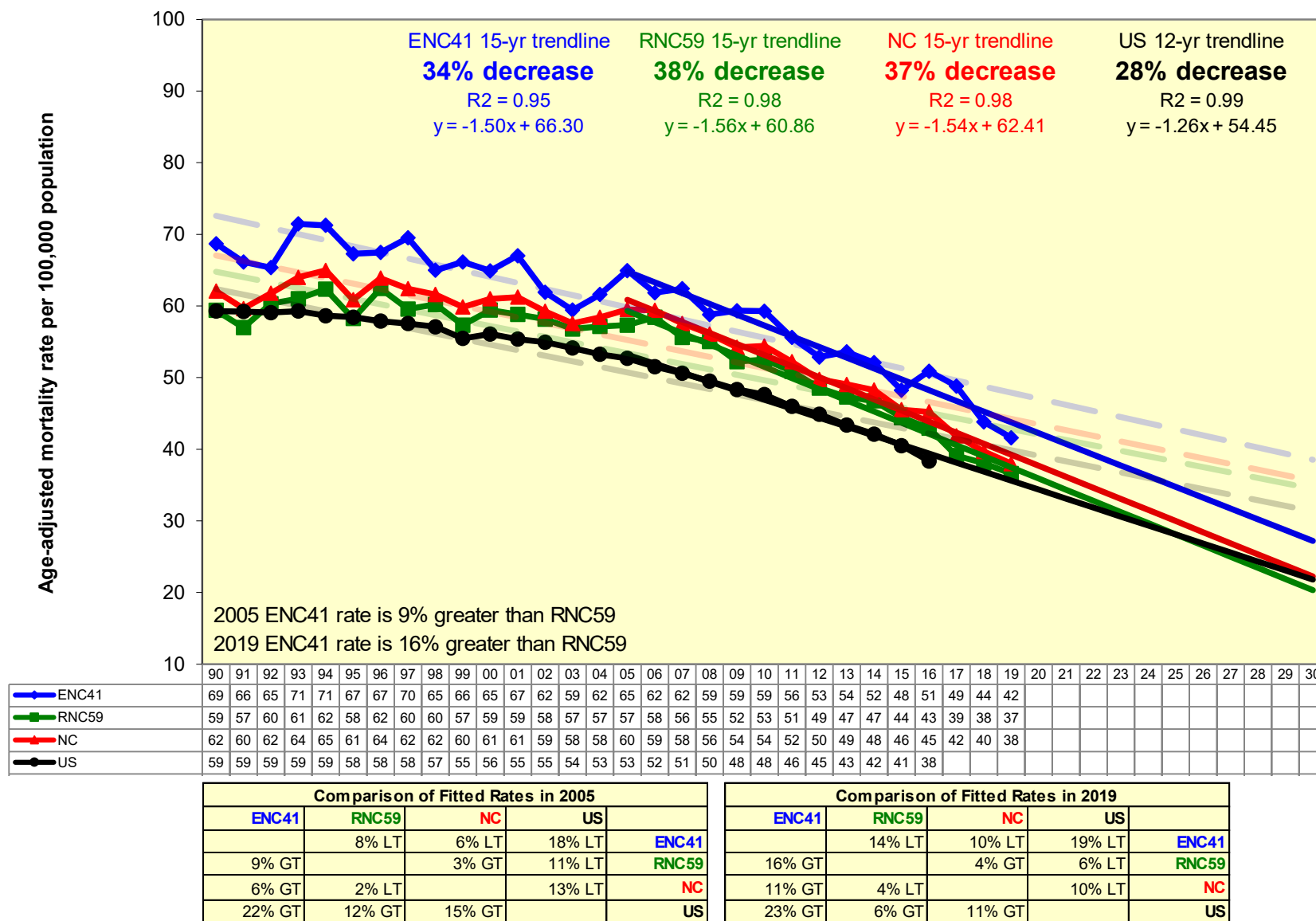


Figure 6.3 iii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

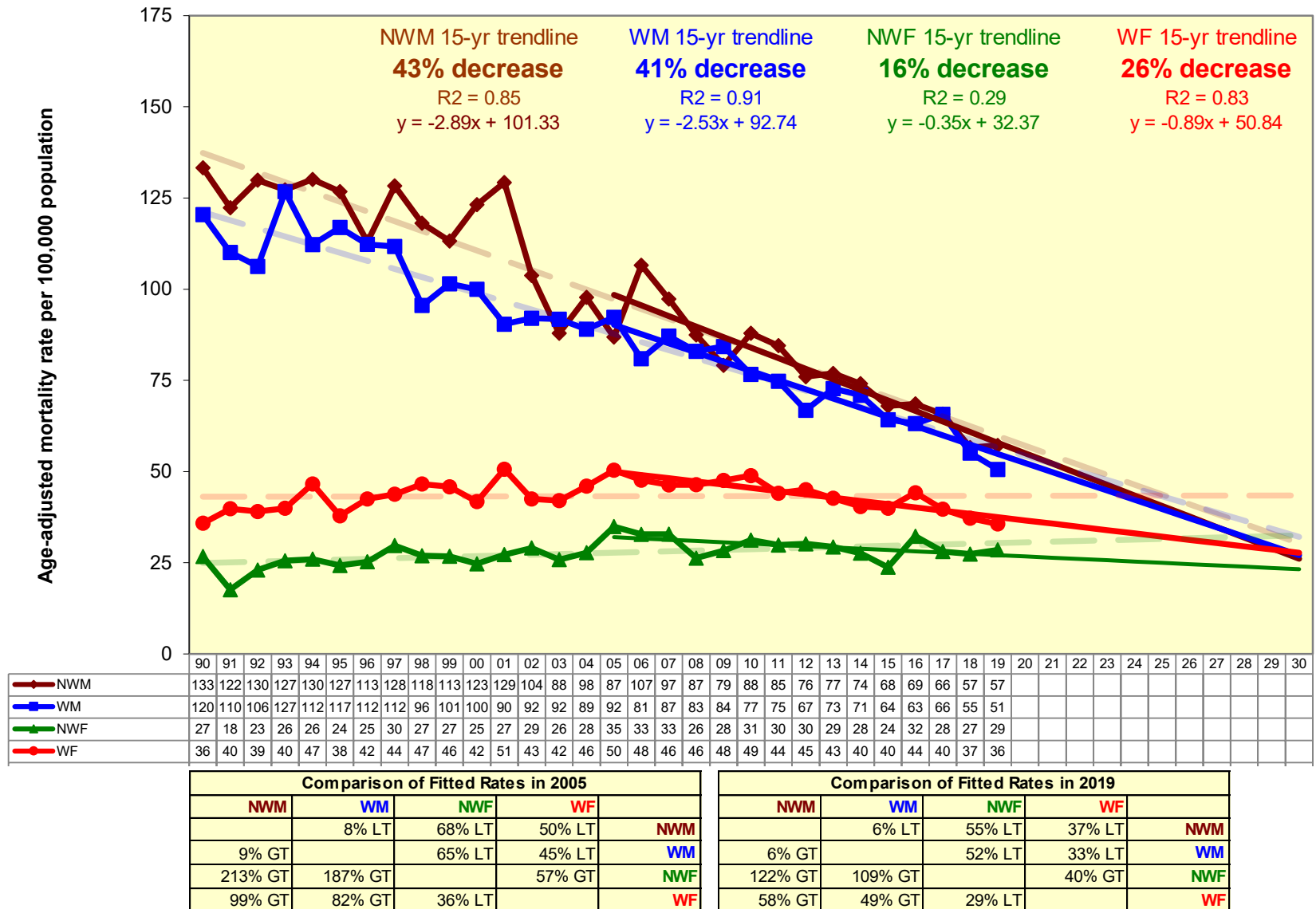


Figure 6.3 iv. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

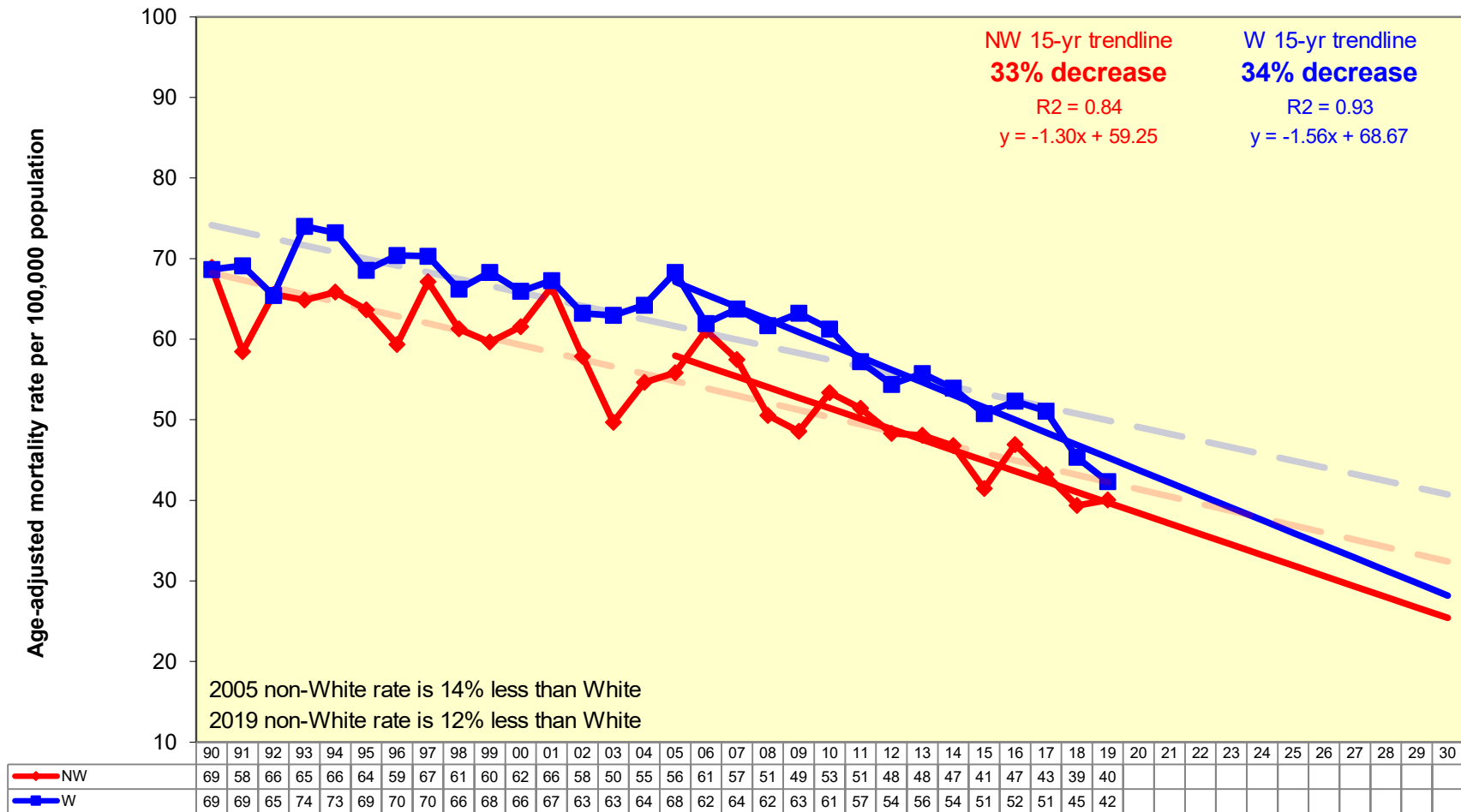
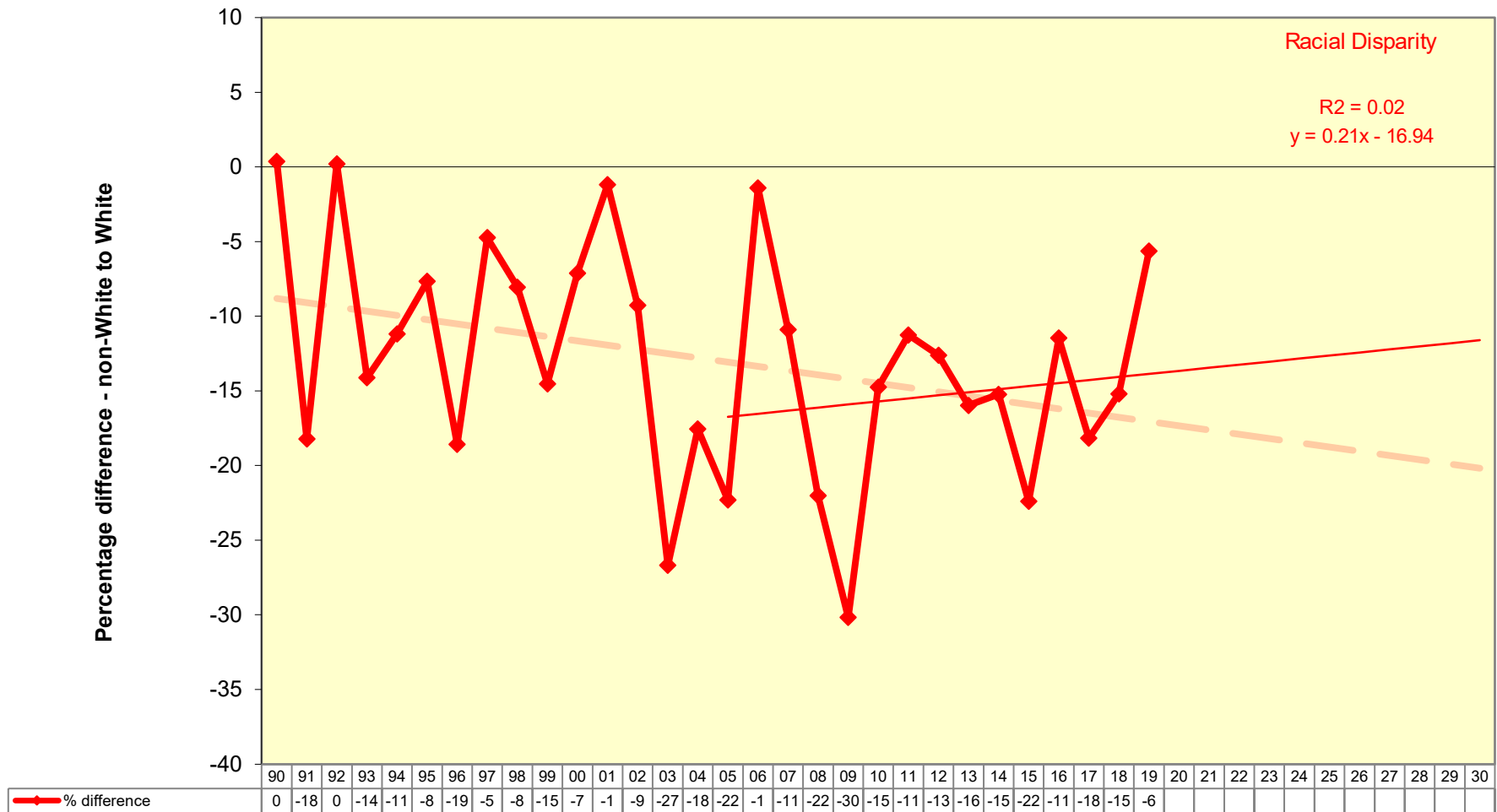


Figure 6.3 v. Cancer - Trachea, Bronchus, Lung:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



Chronic Lower Respiratory Diseases

- In 2019 the CLRD mortality rate for ENC, RNC and NC are virtually equal. The ENC rate trend is increasing faster— 28% over the 15-year period compared to 13% for RNC and 17% for NC.
- The age-adjusted rate for 2019 for ENC, RNC and NC are equal. The US rate is 5% lower than ENC. The rate trend for ENC is decreasing.
- The age-adjusted rate for White males is the highest. The rates for White males and non-White males are decreasing. The rate for White females is unreliable. The rate for non-White females is lower but increasing.
- The White rate has decreased 9% over the 15-year period. The non-White rate is 38% less than the White rate but the trend is unreliable.
- The racial disparity trend has seen a 30% increase over the last 15 years.

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 ENC41, RNC59, and NC,
1990-2019 with projections to 2030

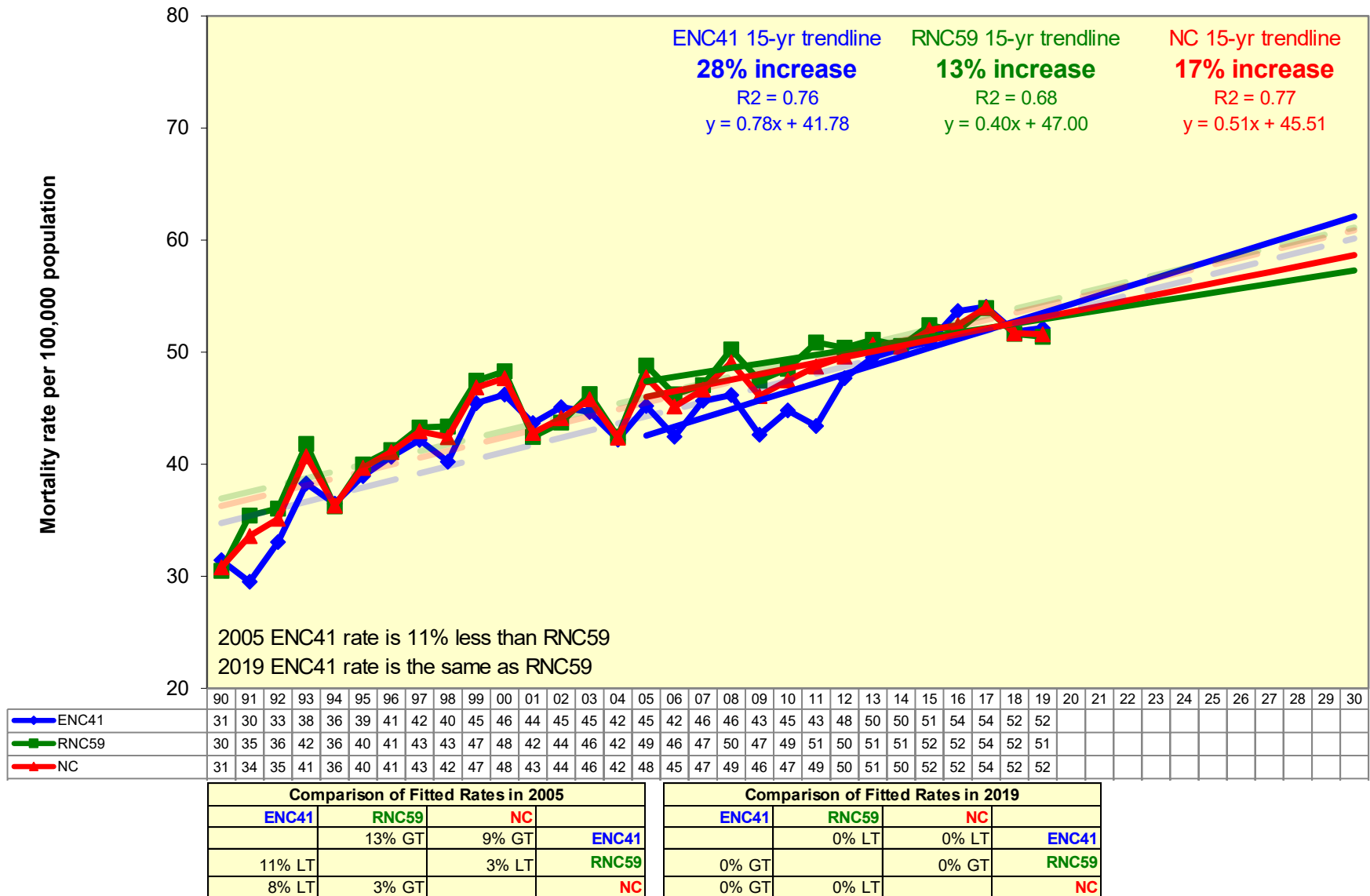


Figure 6.4 ii. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US,
1990-2019 with projections to 2030

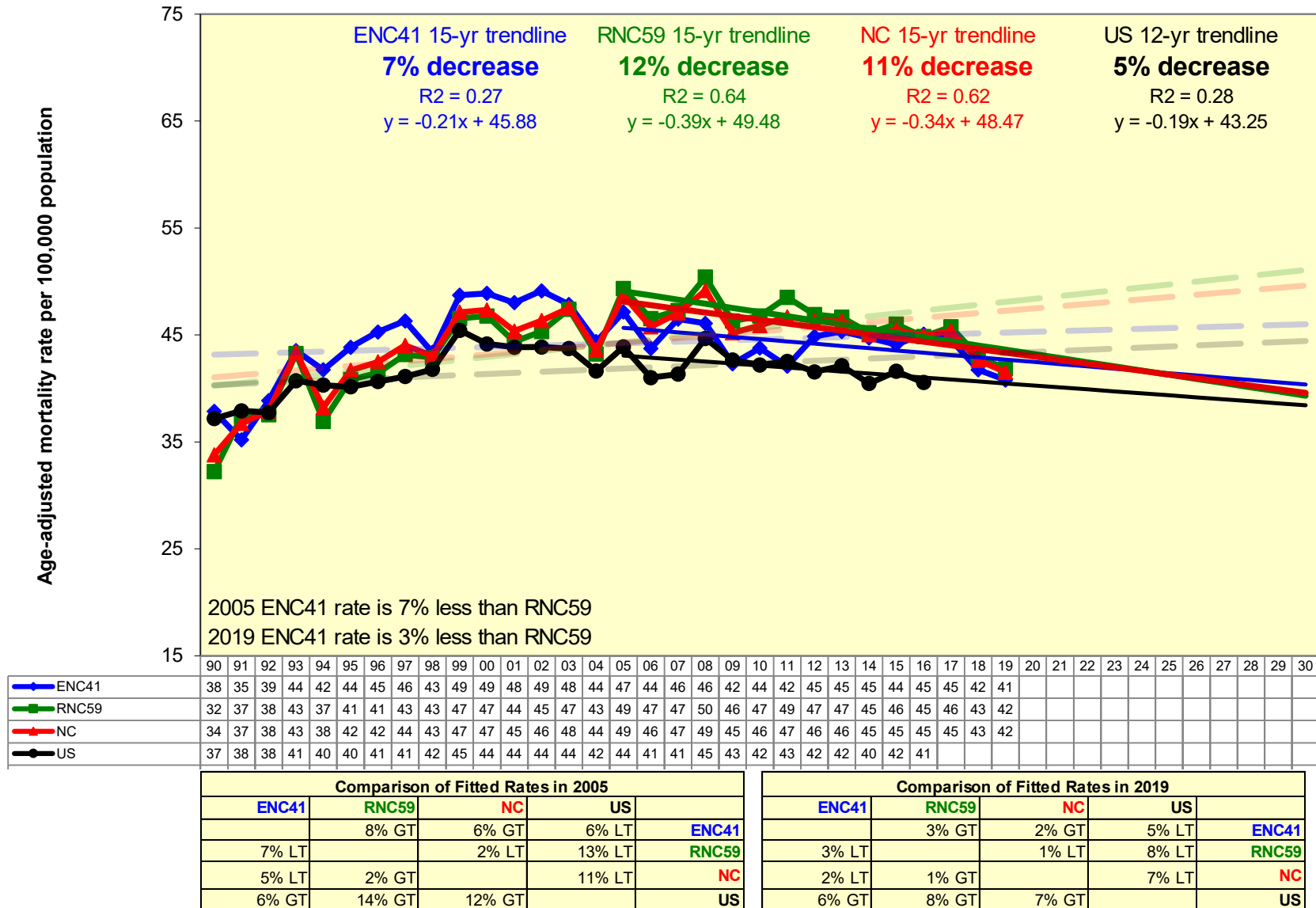


Figure 6.4 iv. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

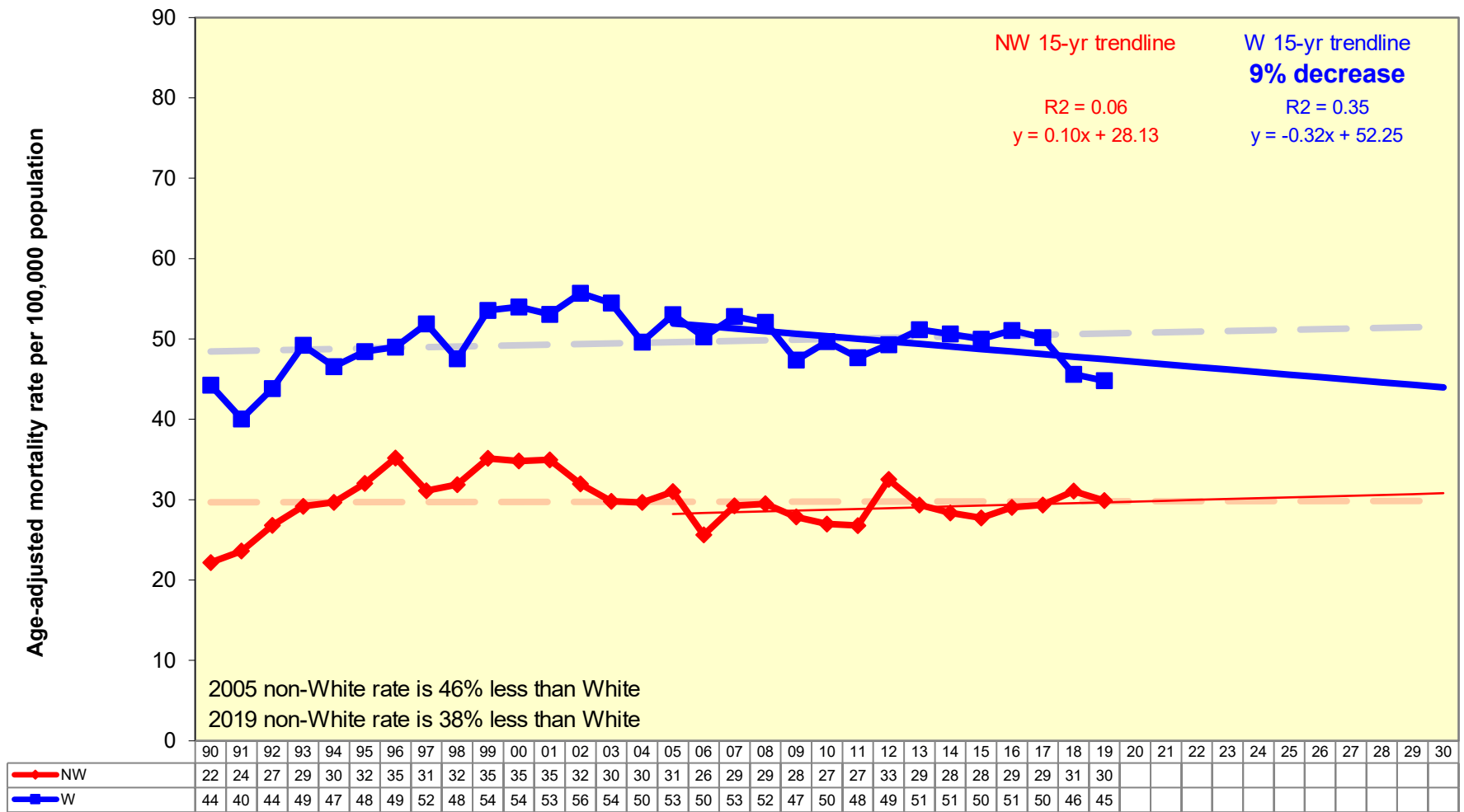
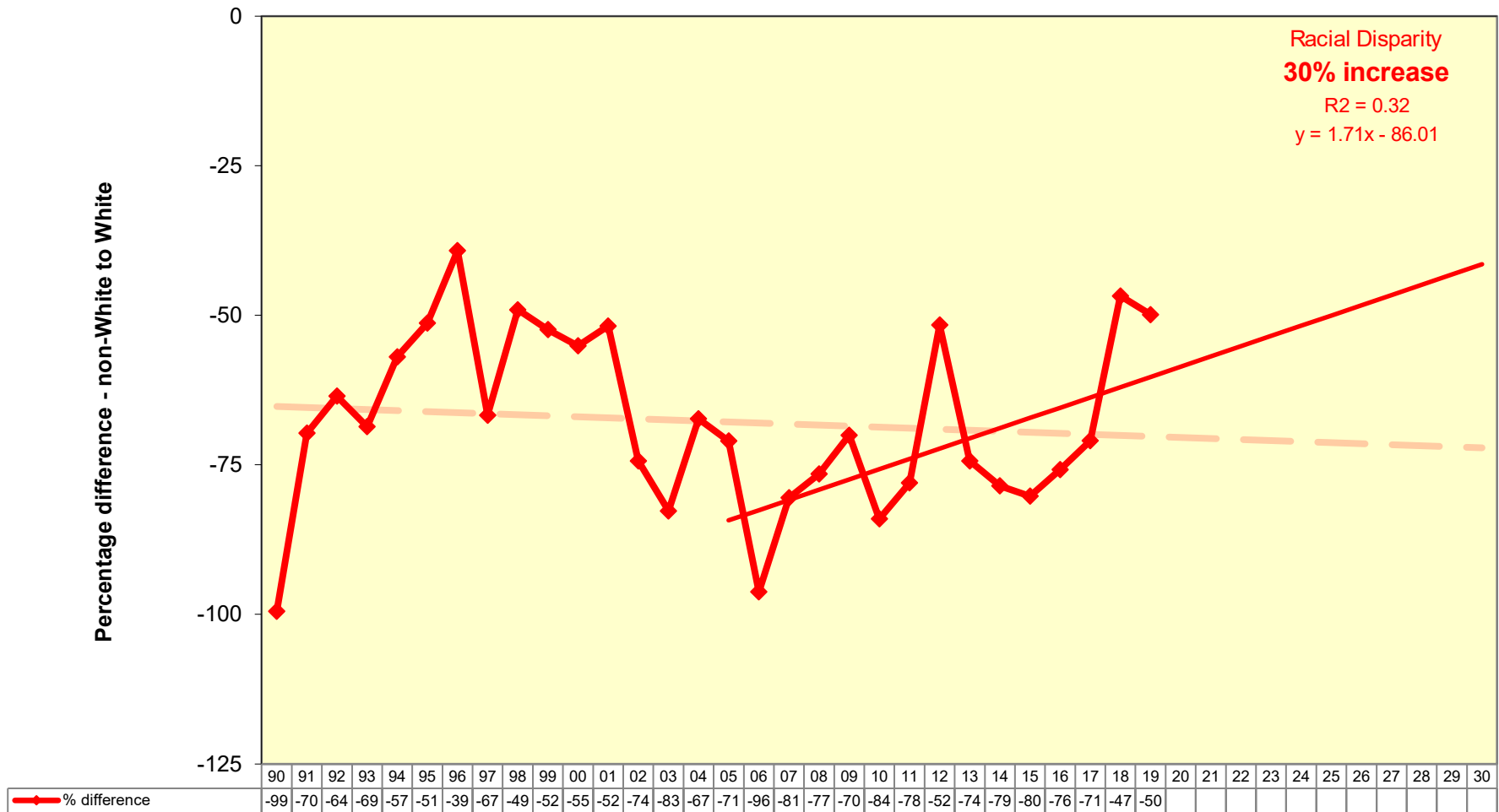


Figure 6.4 v. Chronic Lower Respiratory Diseases:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



All Other Unintentional Injuries and Adverse Effects

- Mortality from unintentional injuries and adverse effects is increasing in ENC (103% increase over 15 years). The trends for RNC and NC are also increasing, but the ENC rate is increasing faster.
- The age-adjusted mortality rate trend for ENC, RNC, NC and the US are all increasing. ENC's rate trend increased the most, 89% over the 15-year period.
- The 15-year trends for White males, non-White males, and White females are all increasing significantly (106%, 59%, and 86% respectively). The rate for non-White females is increasing, but not as much.
- The White rate has increased 99% over the 15-year period. The non-White rate has increased 63%.
- Racial disparity has decreased 82% over the 15-year period in a trend that favors non-Whites.

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

Figure 6.5 ii. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US,
1990-2019 with projections to 2030

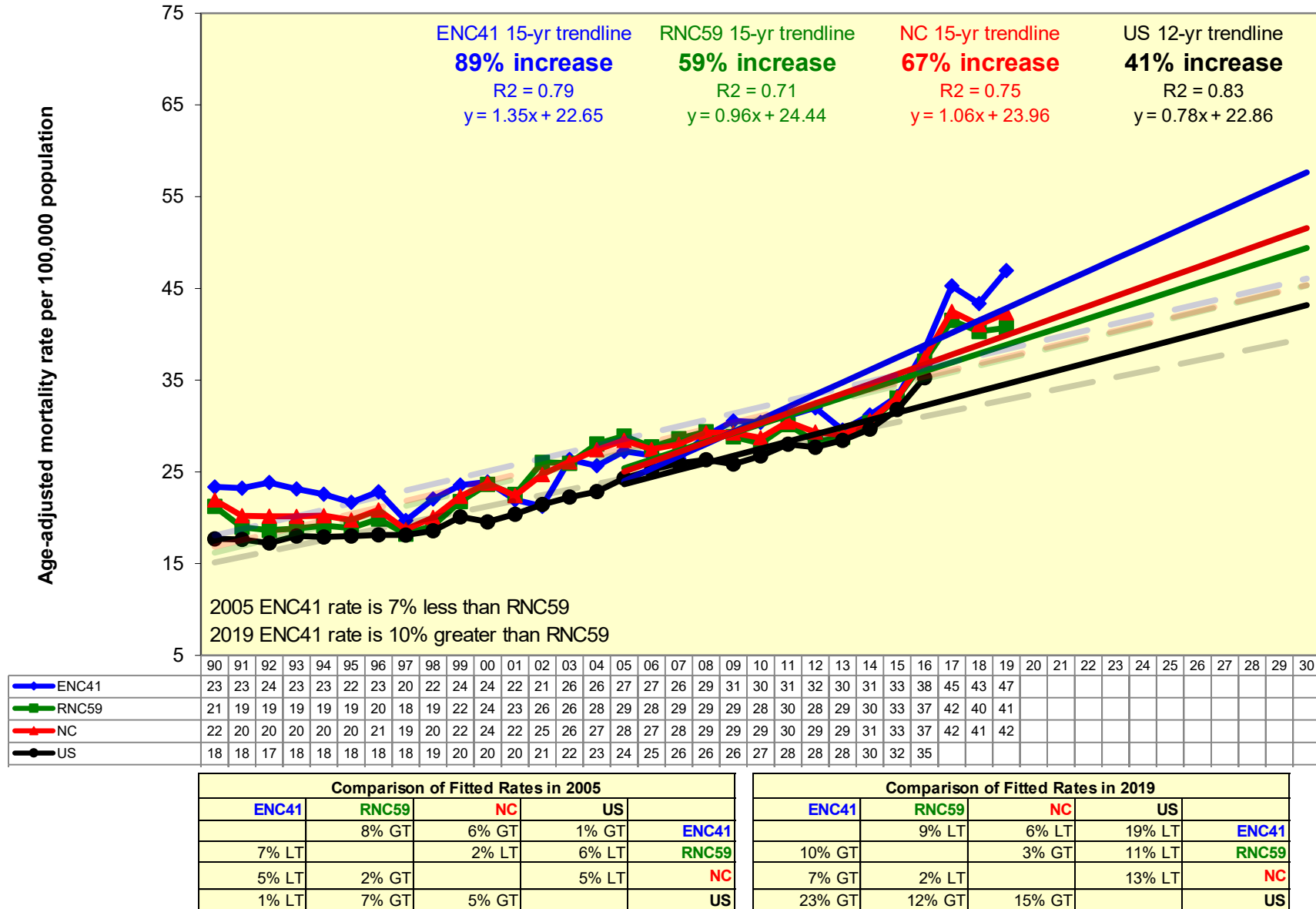


Figure 6.5 iii. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

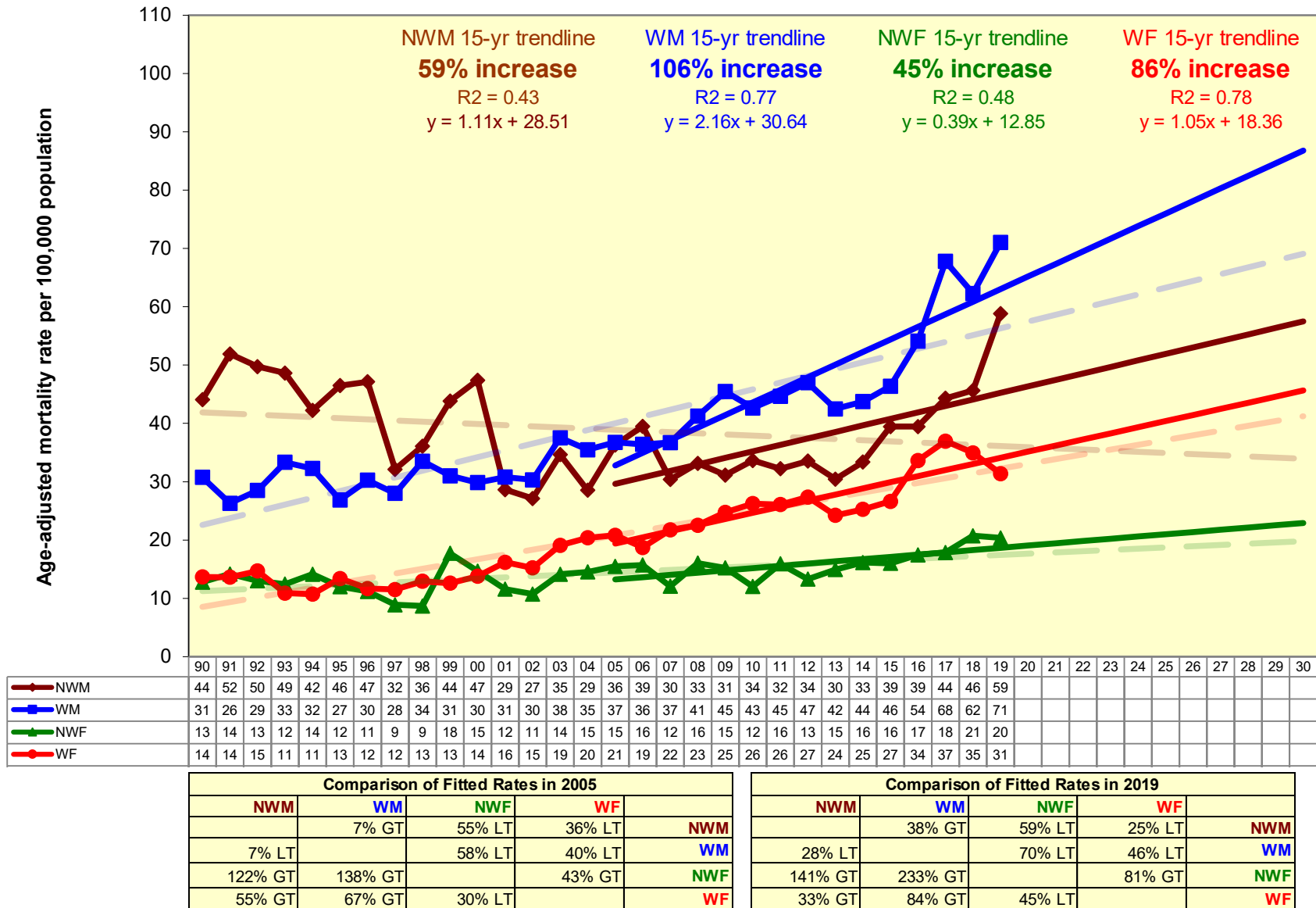


Figure 6.5 iv. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

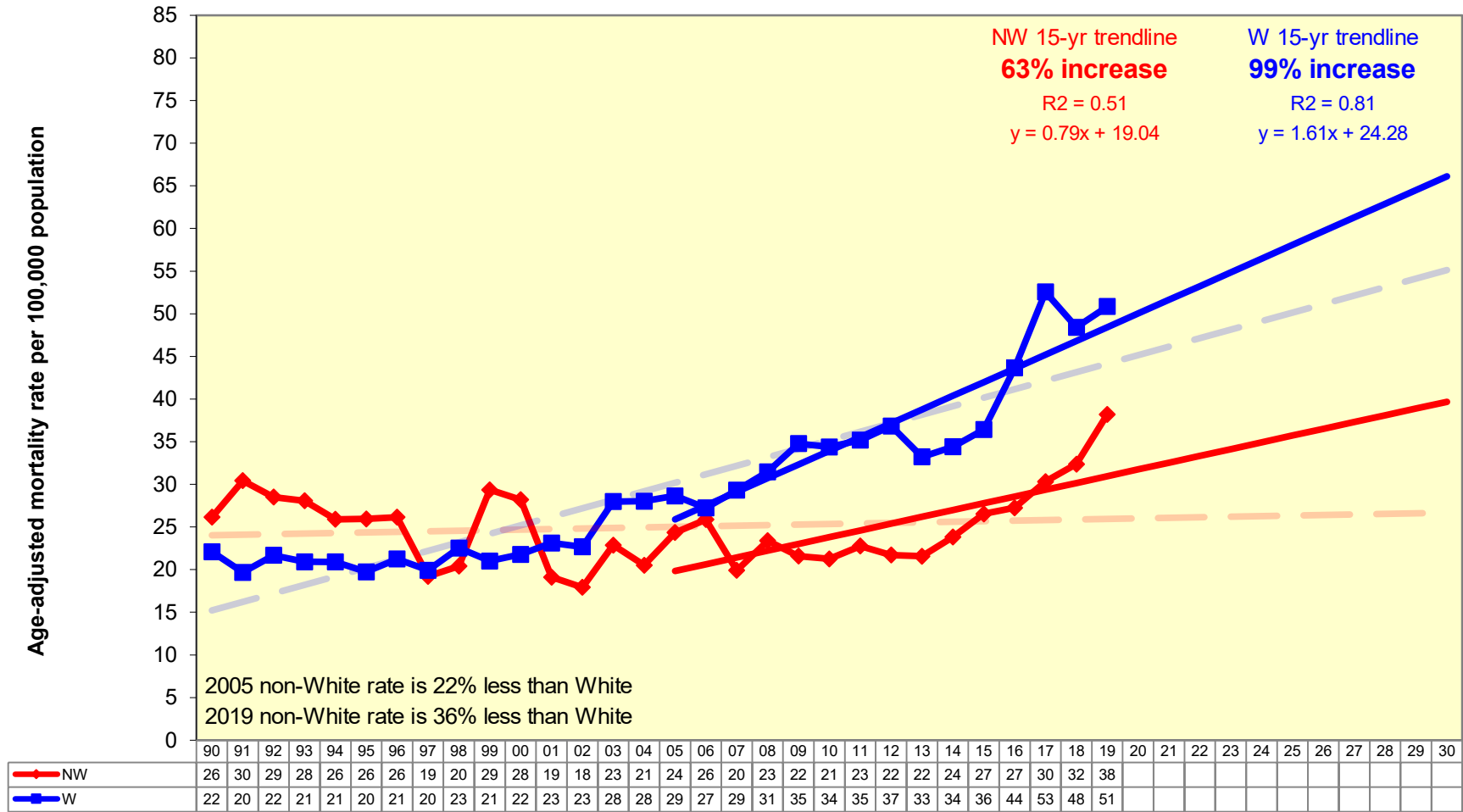
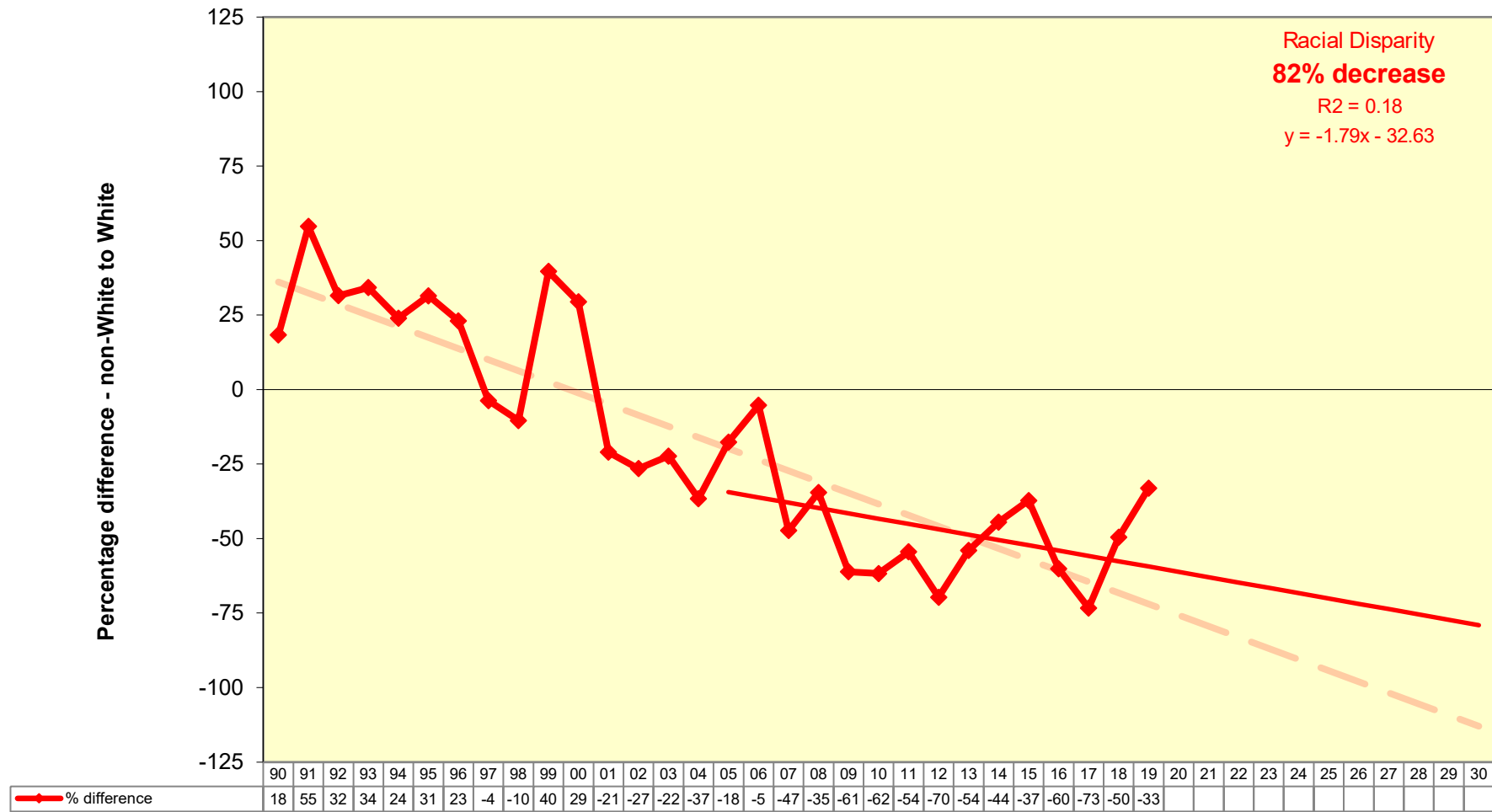


Figure 6.5 v. All Other Unintentional Injuries and Adverse Effects:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



Alzheimer's Disease

- The Alzheimer's mortality rate for ENC shows a 186% increase over the recent 15-year period. ENC's rate is 15% less than RNC and 11% less than NC but ENC's rate of increase was larger than both RNC and NC.
- In 2016 the age-adjusted rate for ENC was even with the US rate but it is increasing faster. The ENC rate is lower than the NC rate, but has a higher rate of increase over the 15-year period.
- The mortality rates for females, both White and non-White, are greater than for males. Non-White males have the highest rate of increase (158% over 15 years).
- The non-White mortality rate for Alzheimer's has increased 143% over the 13-year period. In 2019 the non-White rate is 8% greater than the White rate.
- The racial disparity favors Whites and has increased 166% over the 15-year period.

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 ENC41, RNC59, and NC,
1990-2019 with projections to 2030

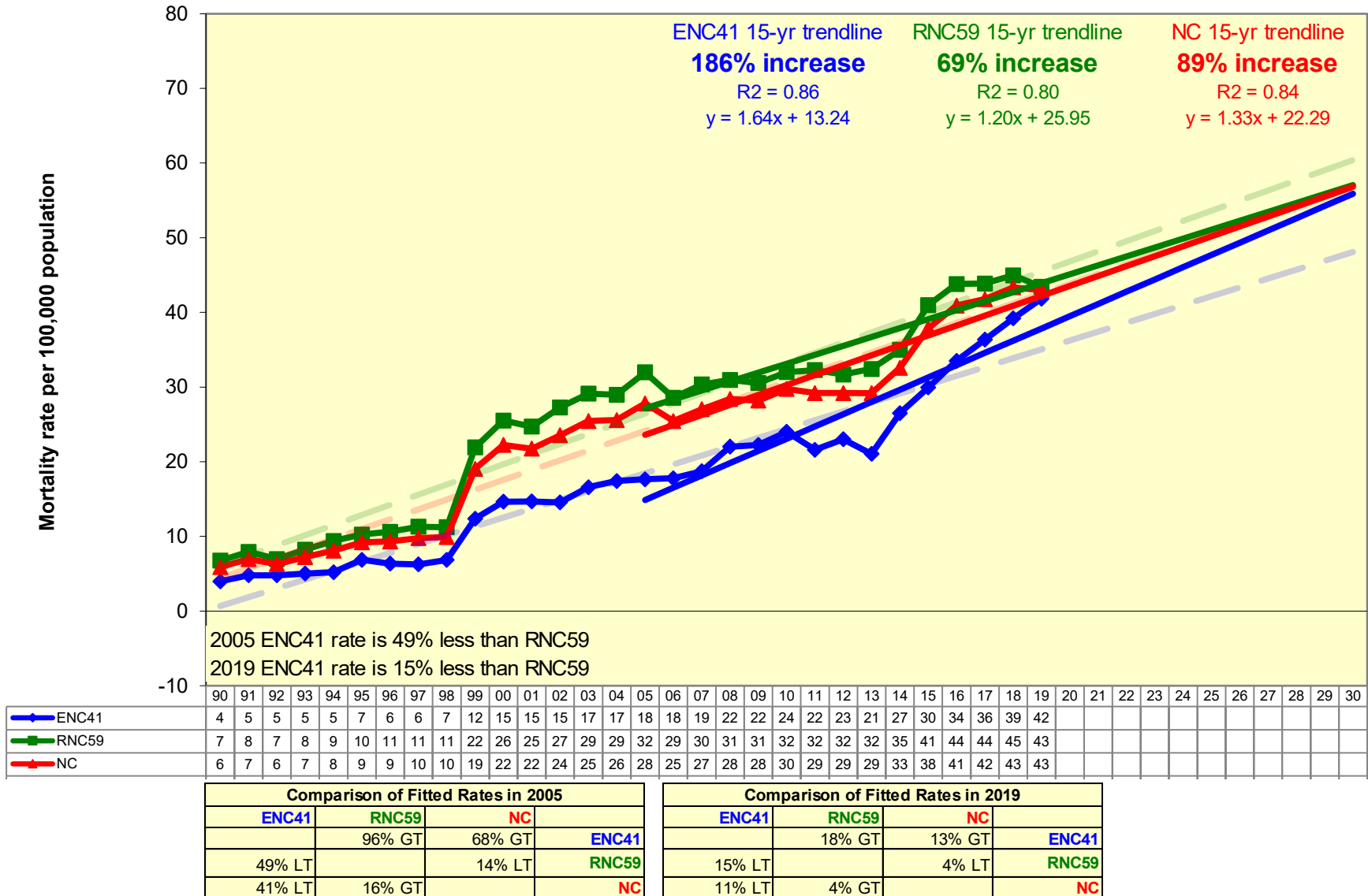


Figure 6.6 ii. Alzheimer's Disease:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

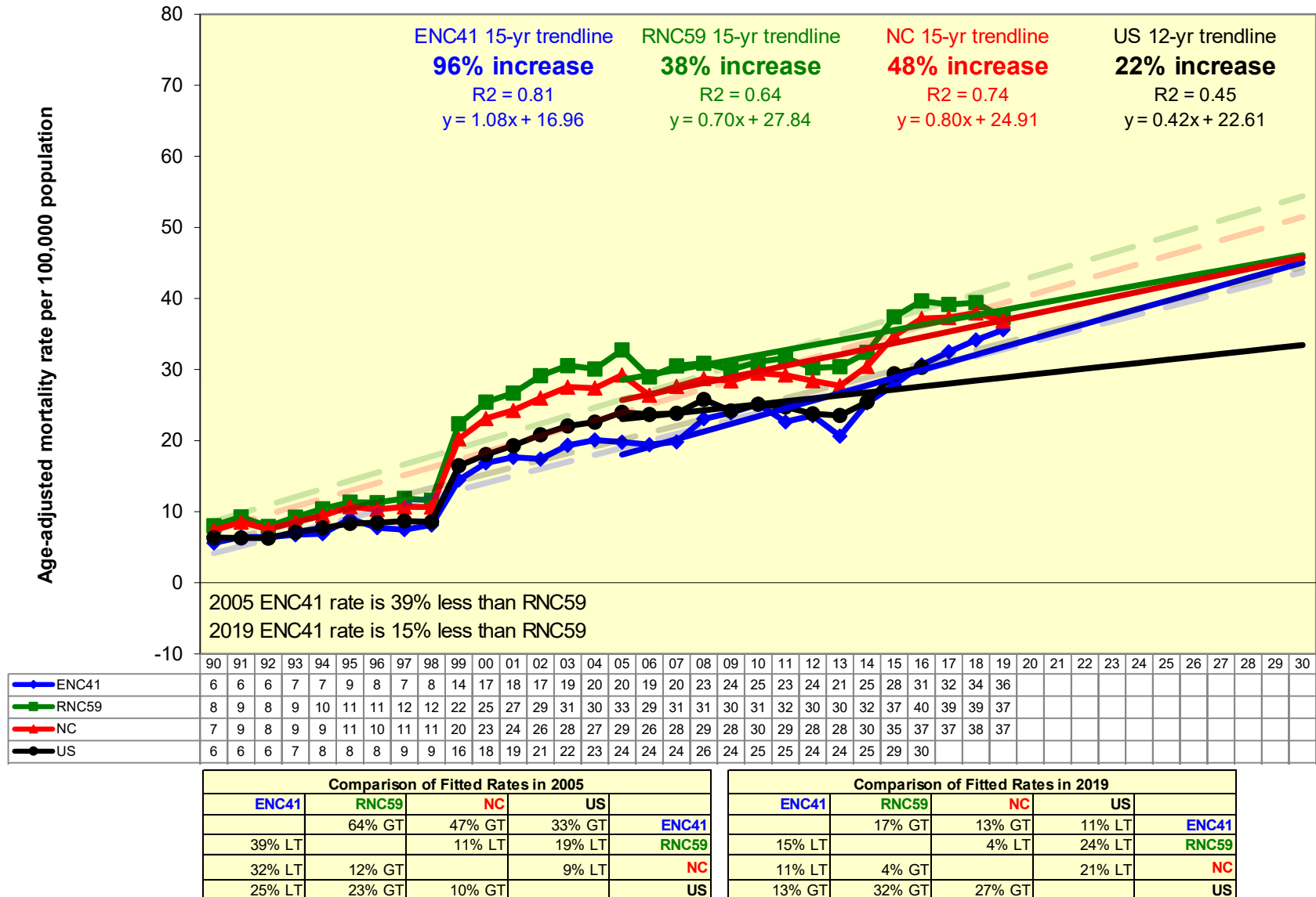


Figure 6.6 iii. Alzheimer's Disease:
Trends in age-adjusted mortality rates by race and gender for ENC41, 1990-2019 with projections to 2030

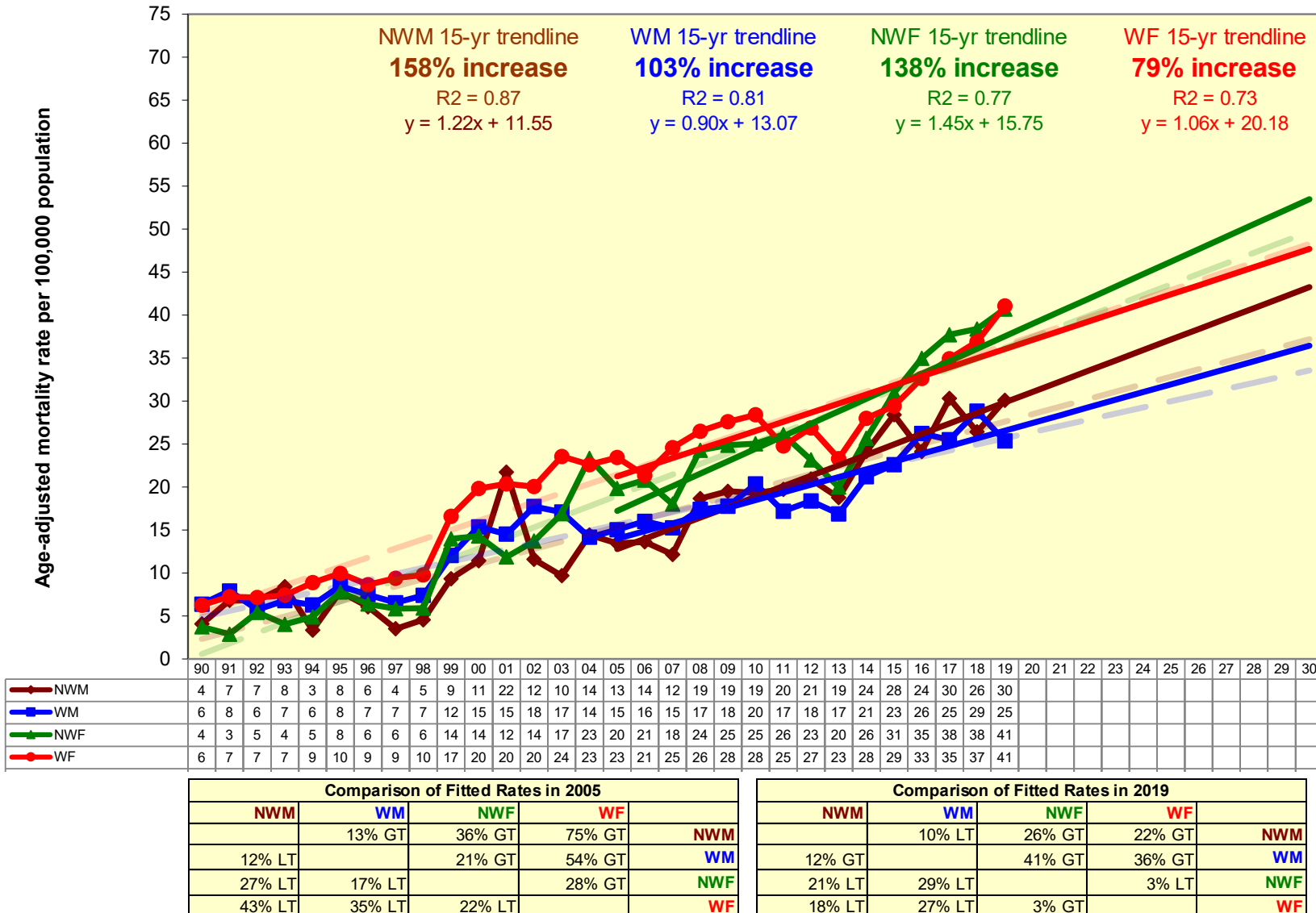


Figure 6.6 iv. Alzheimer's Disease:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

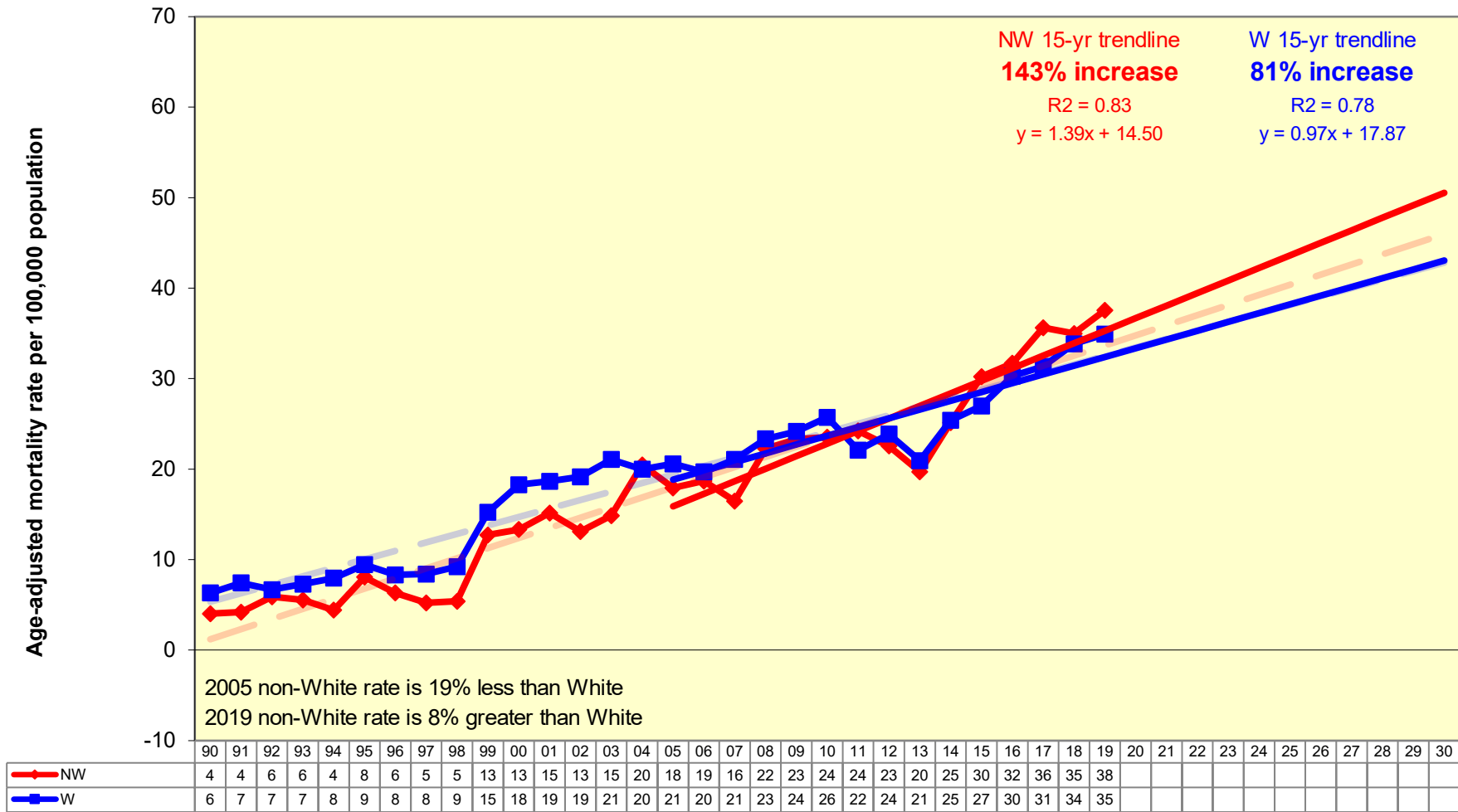
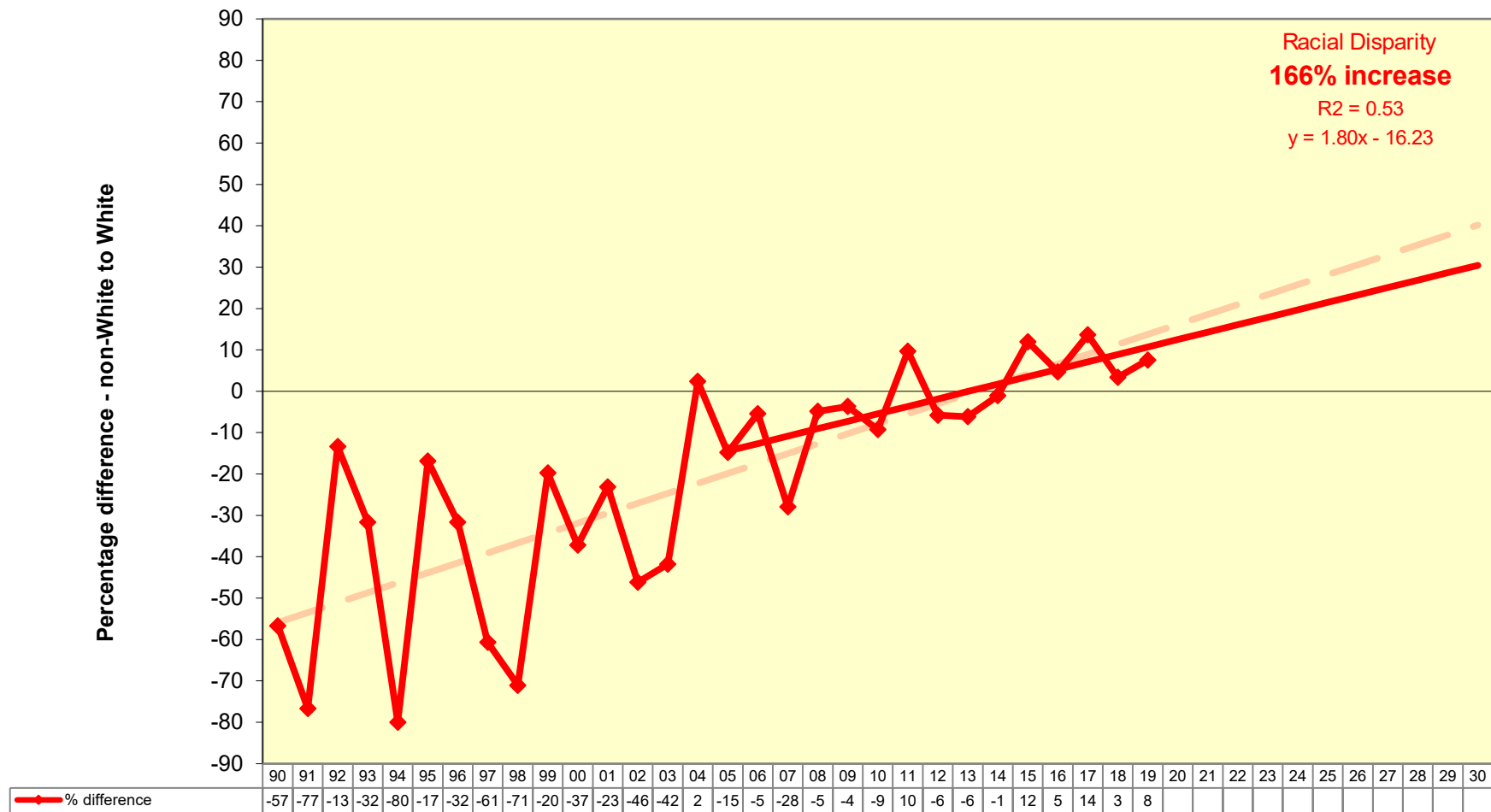


Figure 6.6 v. Alzheimer's Disease:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



Diabetes Mellitus

- ENC's diabetes mortality rate is 35% greater than RNC in 2019. The rate for ENC increased 24% over the 15-year period.
- ENC's age-adjusted rate is flat over the 15 year period but the trend is unreliable. The trends for RNC and NC are also unreliable.
- The rate for non-White males is the highest and is increasing (9% increase over the 15-year period) in a moderately reliable trend. The non-White female rate has decreased 32% and the White female rate has decreased 10%. The White male rate is unreliable.
- The non-White mortality rate decreased 16% over the 15 year period but remains 111% greater than the White rate. The White rate is unreliable.
- The trend for racial disparity shows a 26% decrease in racial disparity over the 15 year period.

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 ENC41, RNC59, and NC,
1990-2019 with projections to 2030

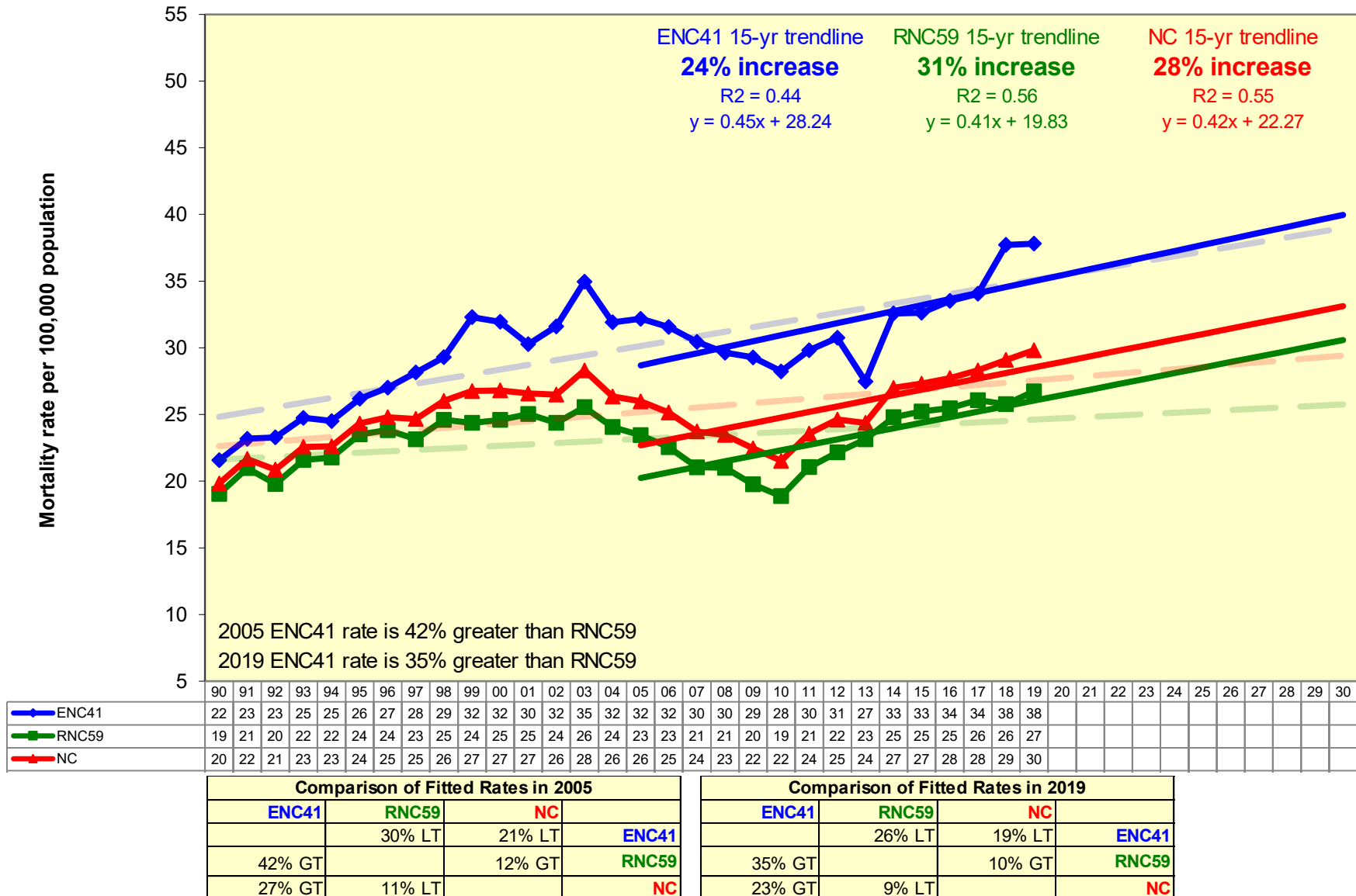


Figure 6.7 ii. Diabetes Mellitus:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

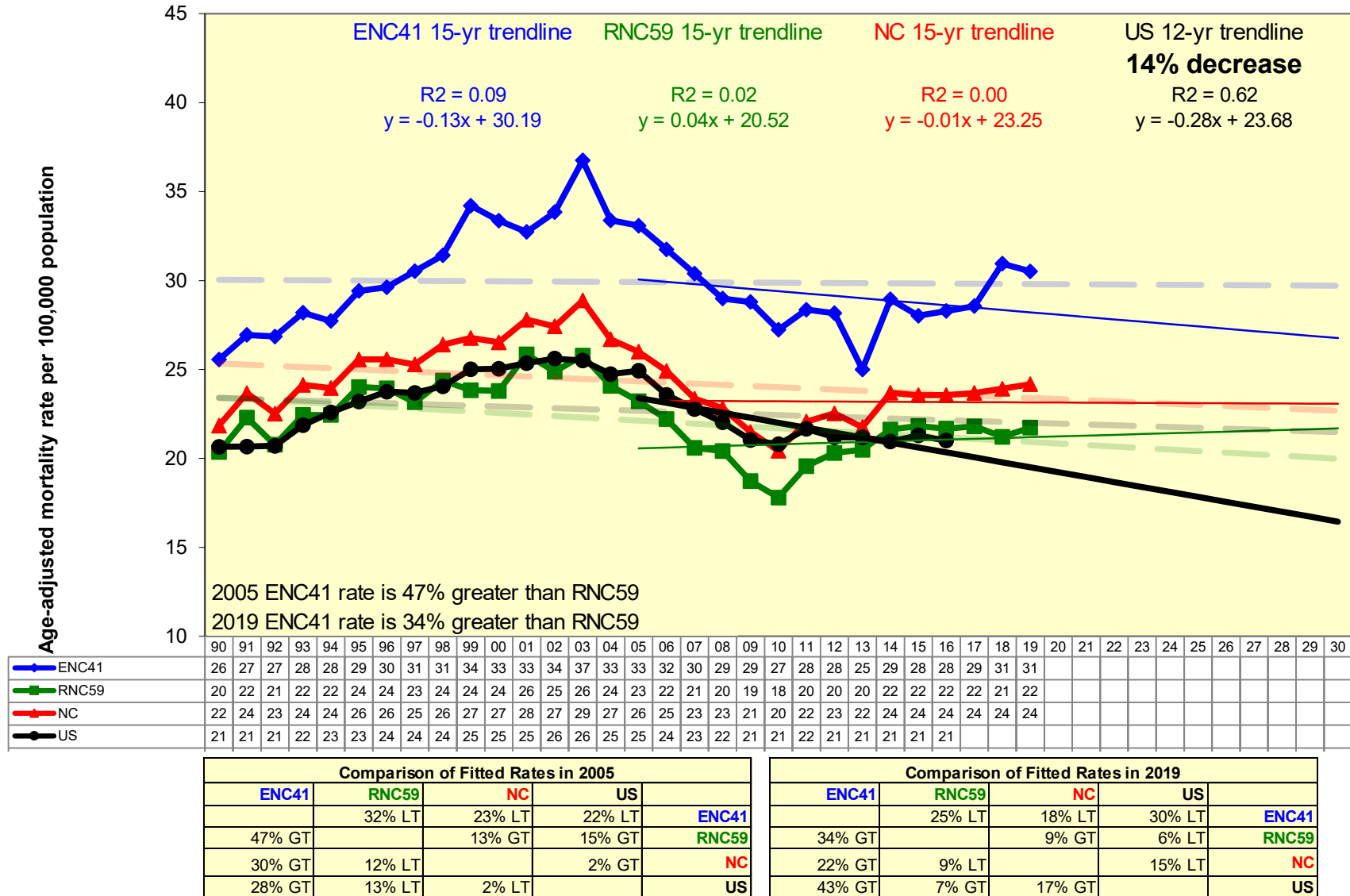


Figure 6.7 iii. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

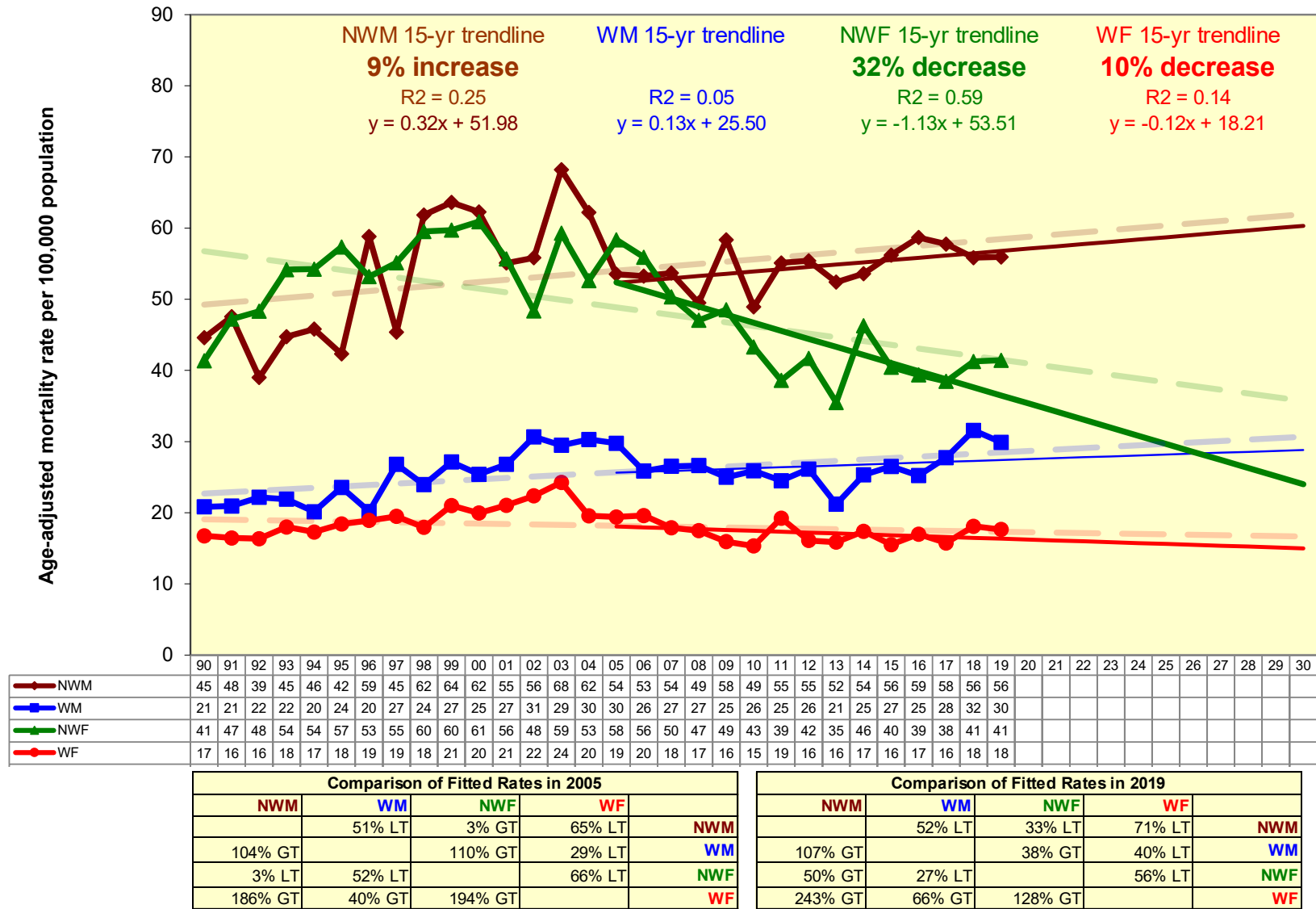


Figure 6.7 iv. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

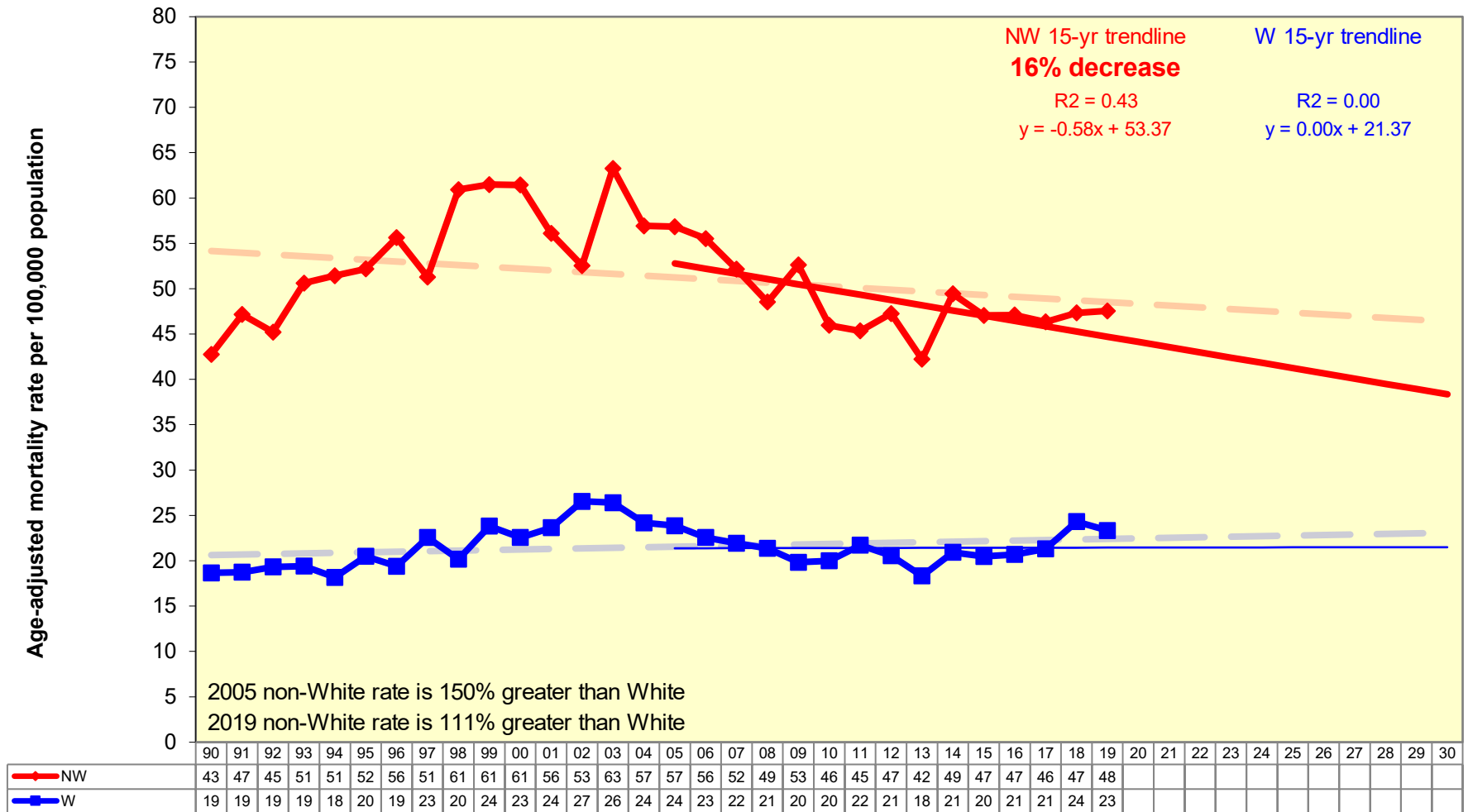
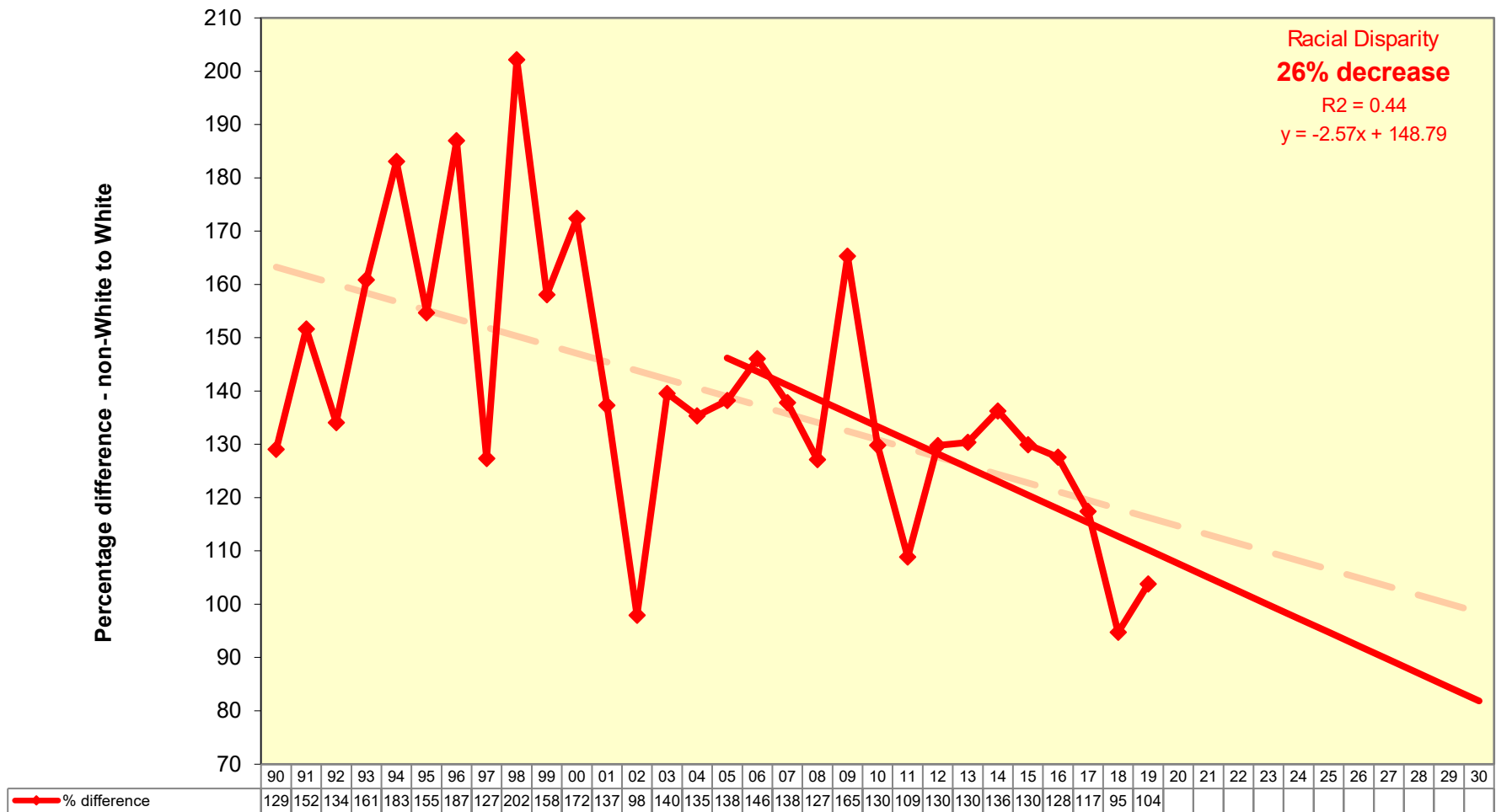


Figure 6.7 v. Diabetes Mellitus:
Measuring disparity in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030



Nephritis, Nephrotic Syndrome, and Nephrosis

- The ENC mortality rate trend for nephritis, nephrotic syndrome, and nephrosis is flat and unreliable. The trend for RNC59 is increasing. The trend for NC is unreliable.
- The age-adjusted ENC rate is equal to the NC rate but the 15-year rate trend for ENC has decreased more than NC and is set to drop below NC.
- The 15-year trends for non-White males and females are higher than those for White males and females. Non-White females show the greatest decrease, 38% over 15 years. White females have the lowest rates.
- In 2019 the non-White rate was 118% greater than the White rate but has declined 31% over 15 years. The White rate declined 28%.
- The racial disparity trend is unreliable over the 15-year period.

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 ENC41, RNC59, and NC,
1990-2019 with projections to 2030

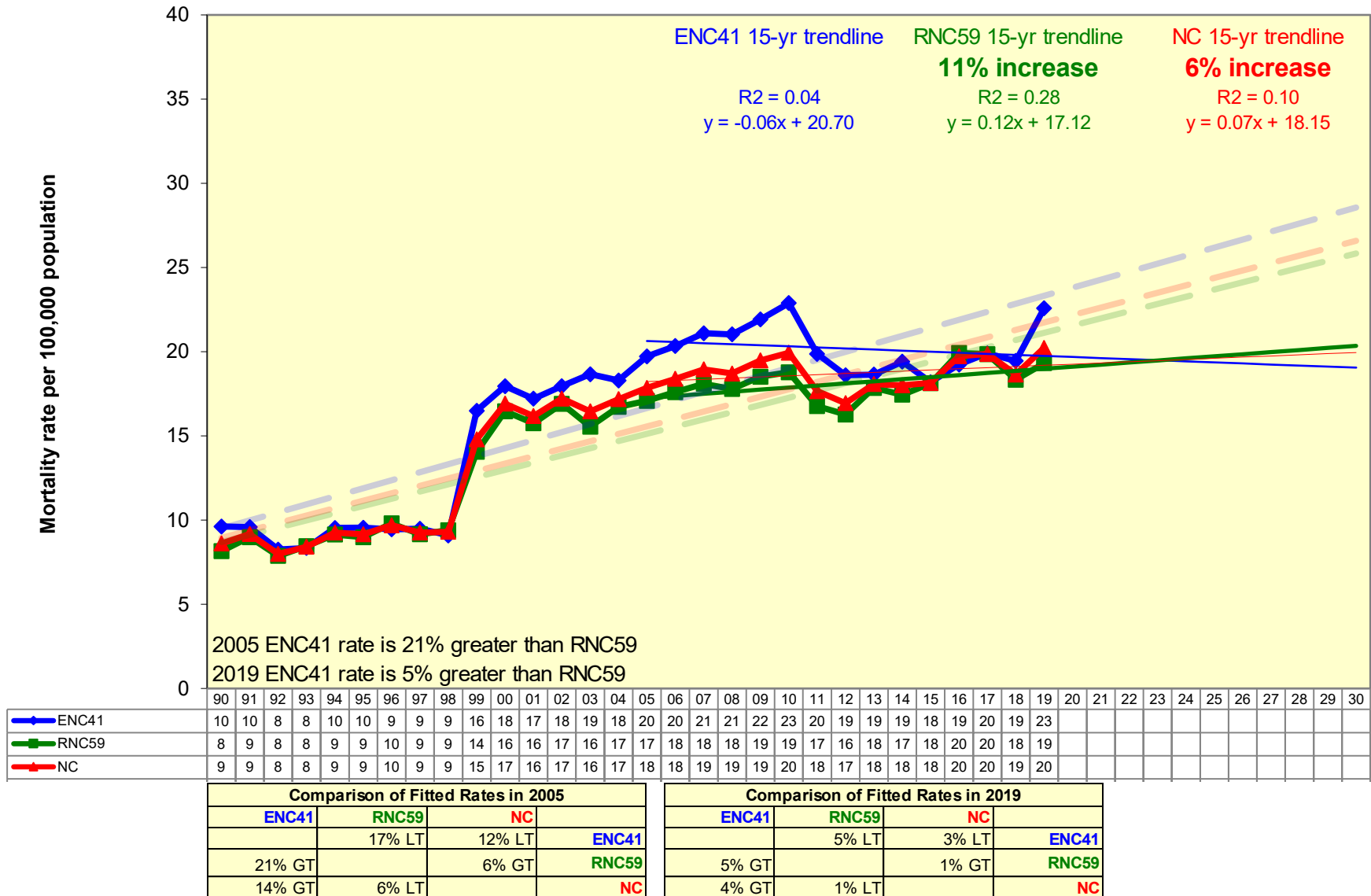


Figure 6.8 ii. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US,
1990-2019 with projections to 2030

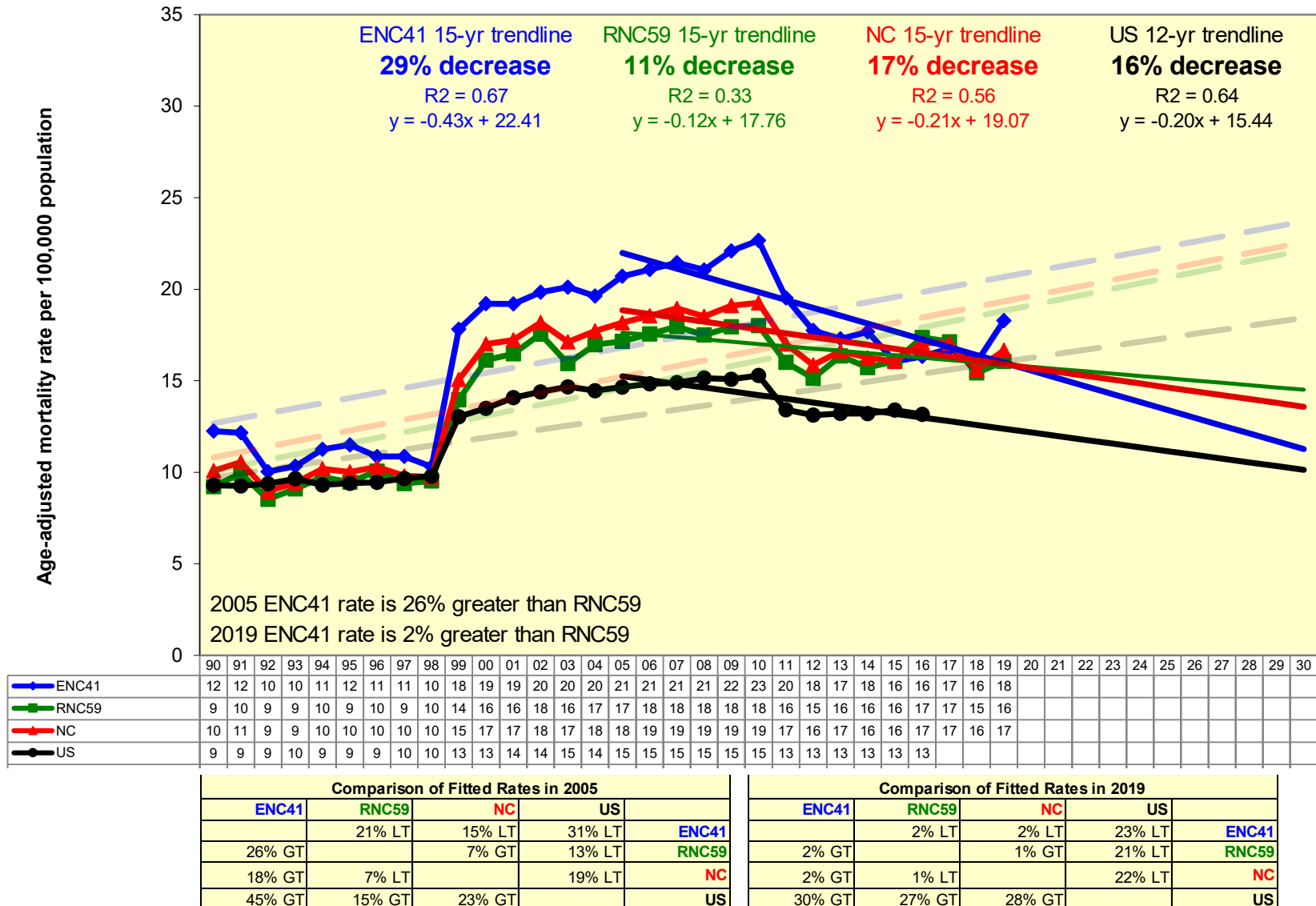


Figure 6.8 iii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender for ENC41, 1990-2019 with projections to 2030

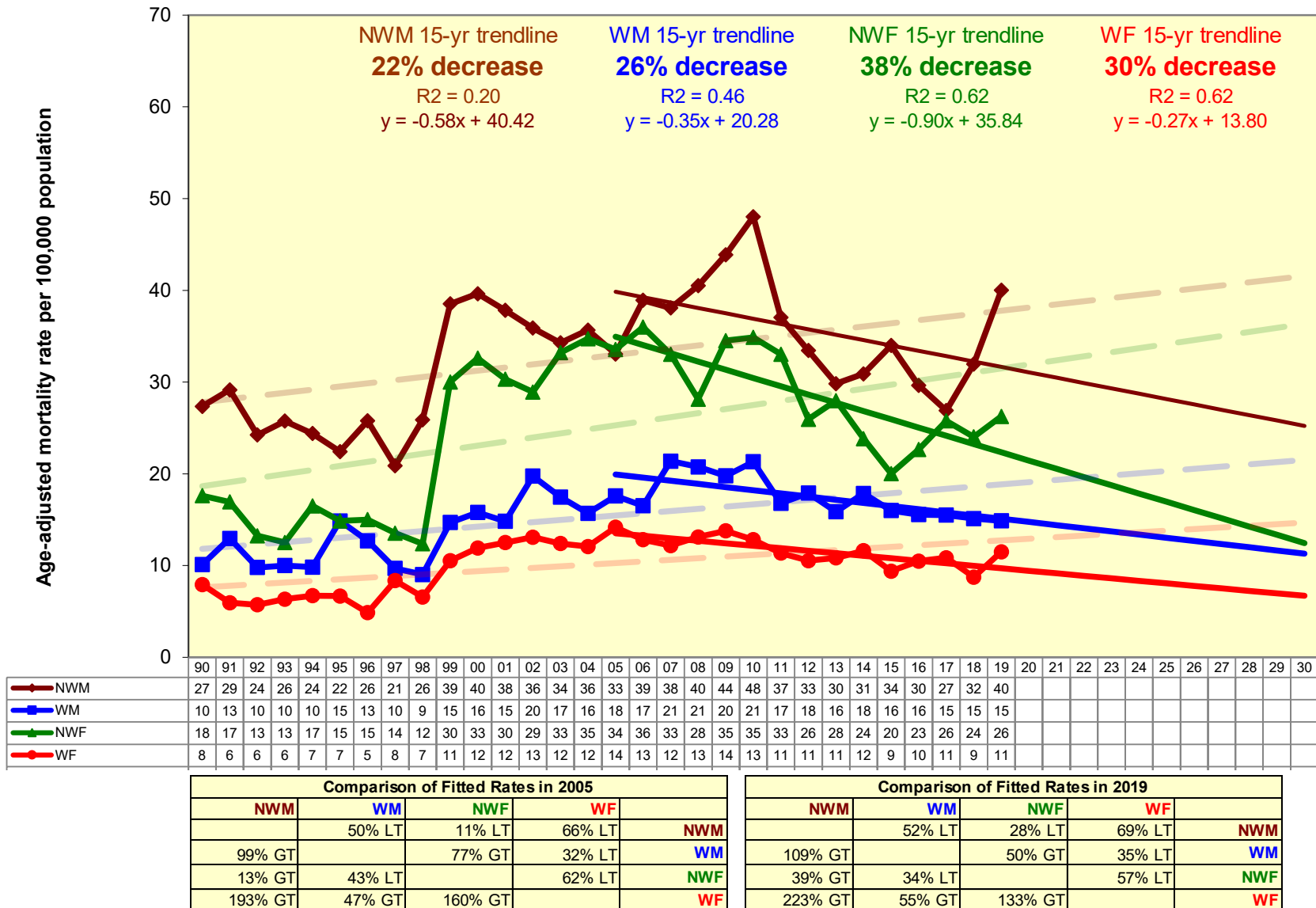


Figure 6.8 iv. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

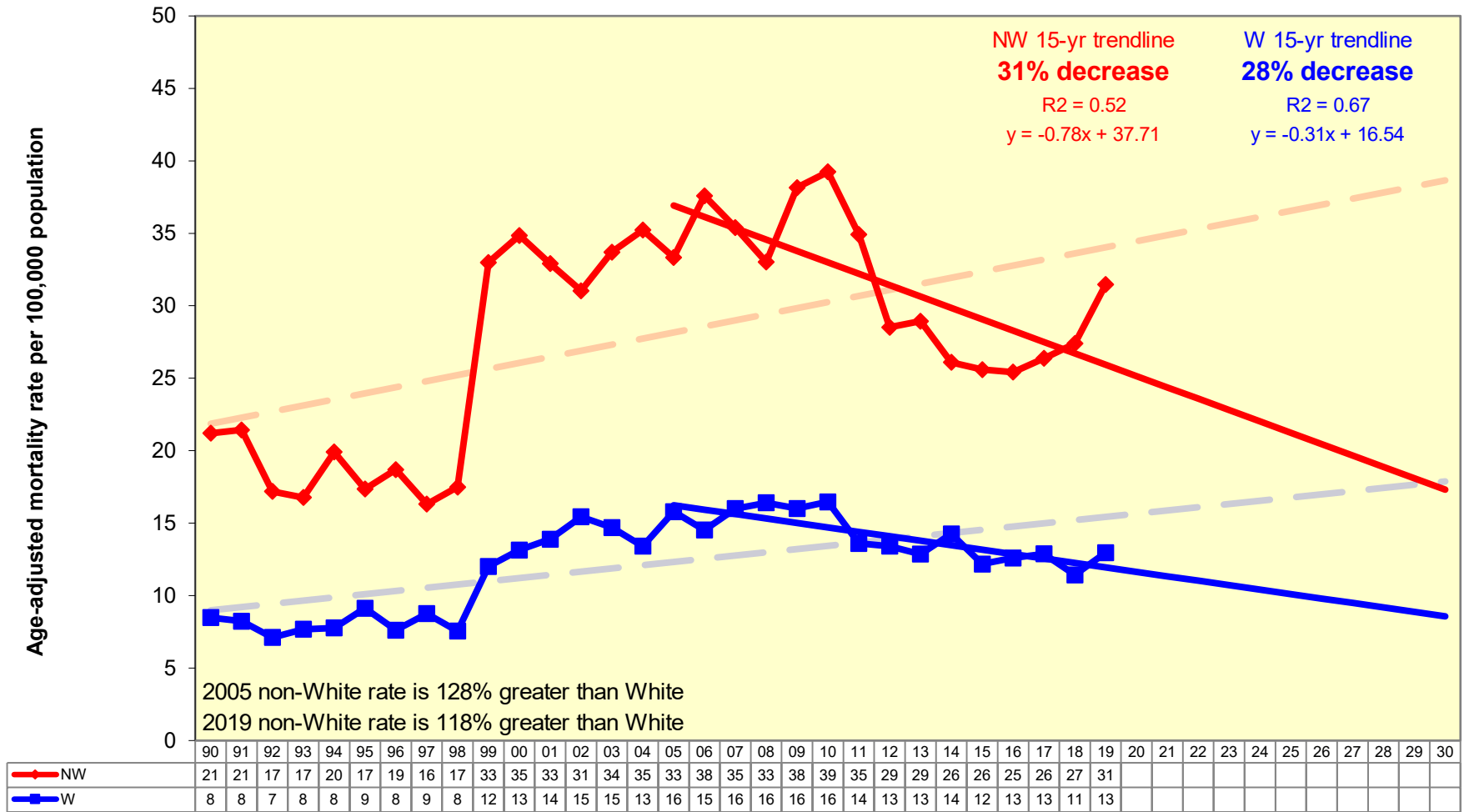
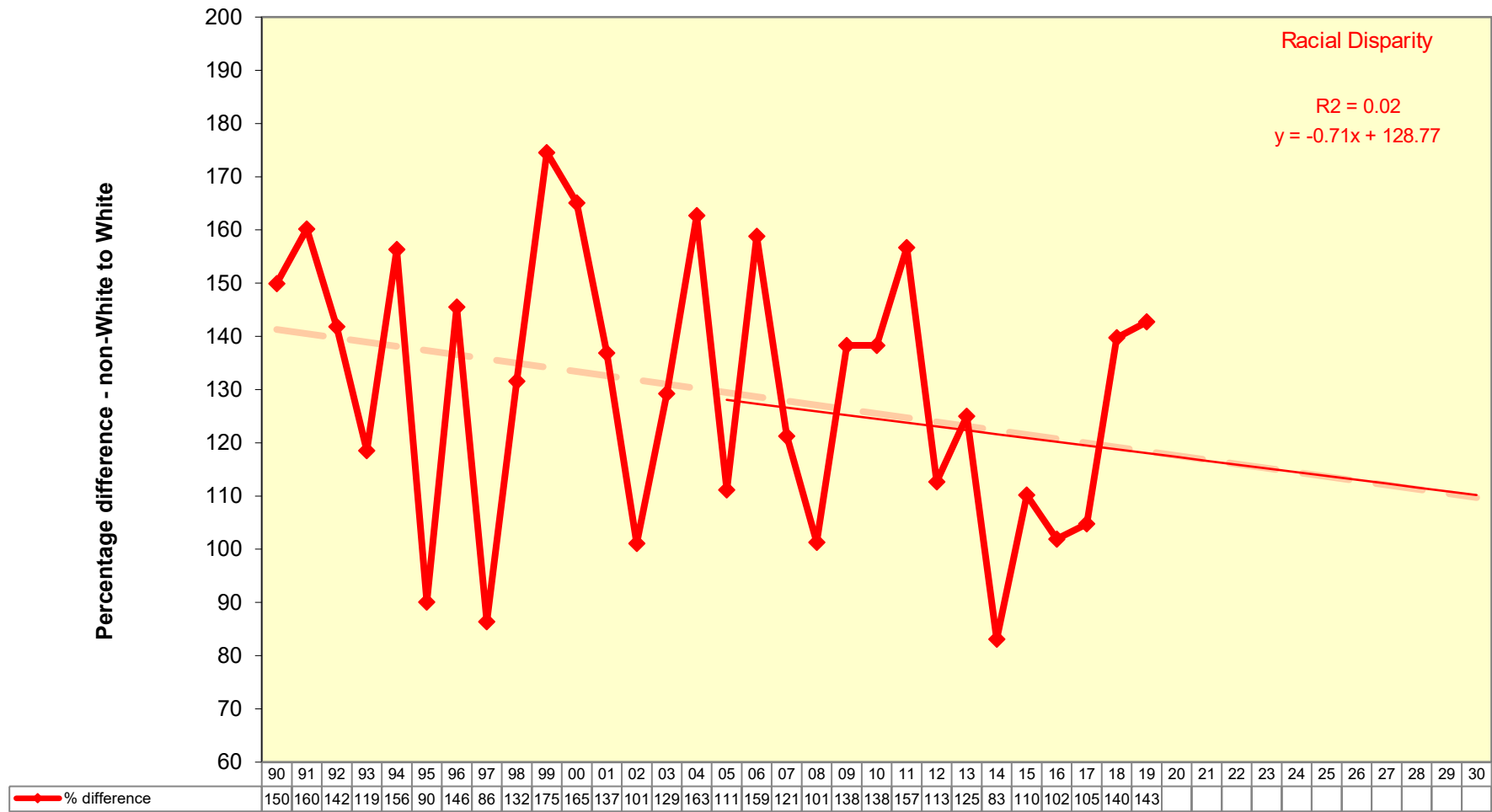


Figure 6.8 v. Nephritis, Nephrotic Syndrome, and Nephrosis:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



Unintentional Motor Vehicle Injuries

- ENC's unintentional motor vehicle injury mortality rate trend is decreasing but is still 43% greater than RNC in 2019.
- The ENC age-adjusted rate is 45% greater than RNC and 80% greater than the US. The 15-year rate trends for ENC, RNC, and NC are all decreasing, although the ENC numbers have ticked up in the last 2 years.
- The rates for non-White males and non-White females are not reliable. The trends for White males and White females are declining.
- The White rate trend has decreased 42% over the 15-year period. The non-White rate is unreliable.
- Racial disparity has increased significantly over the 15-year period.

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 ENC41, RNC59, and NC,
1990-2019 with projections to 2030

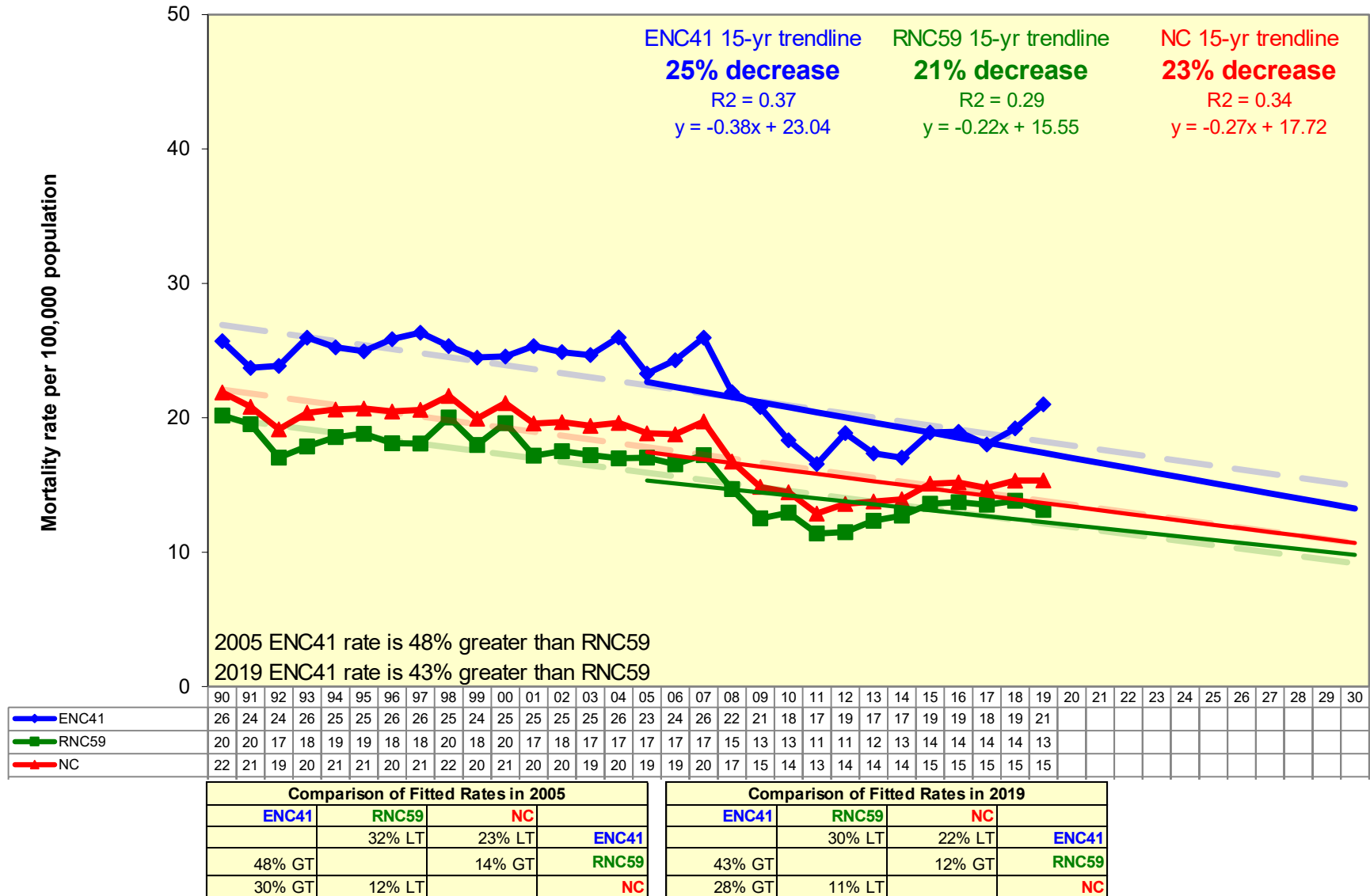


Figure 6.9 ii. Unintentional Motor Vehicle Injuries:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US,
1990-2019 with projections to 2030

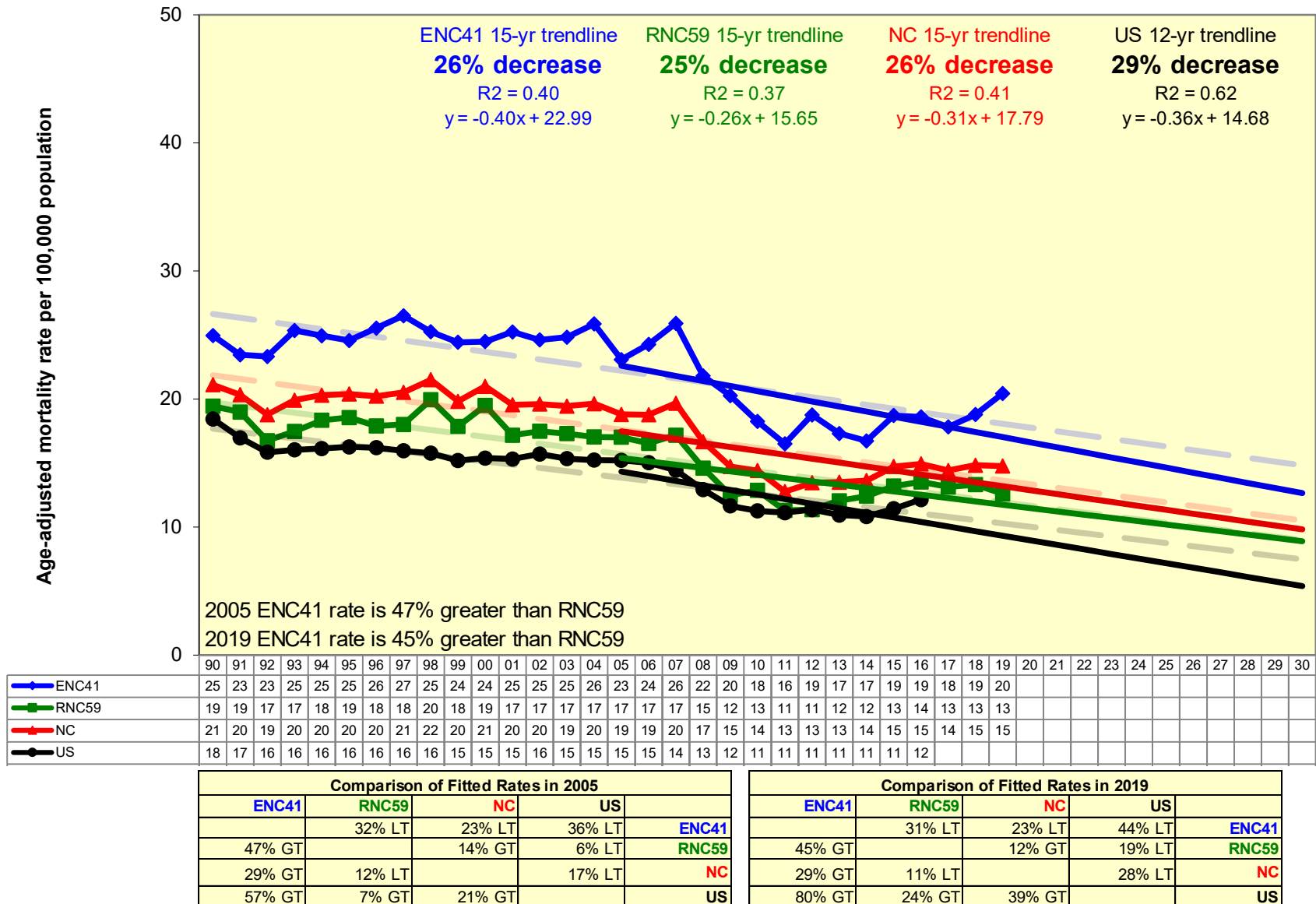


Figure 6.9 iv. Unintentional Motor Vehicle Injuries:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

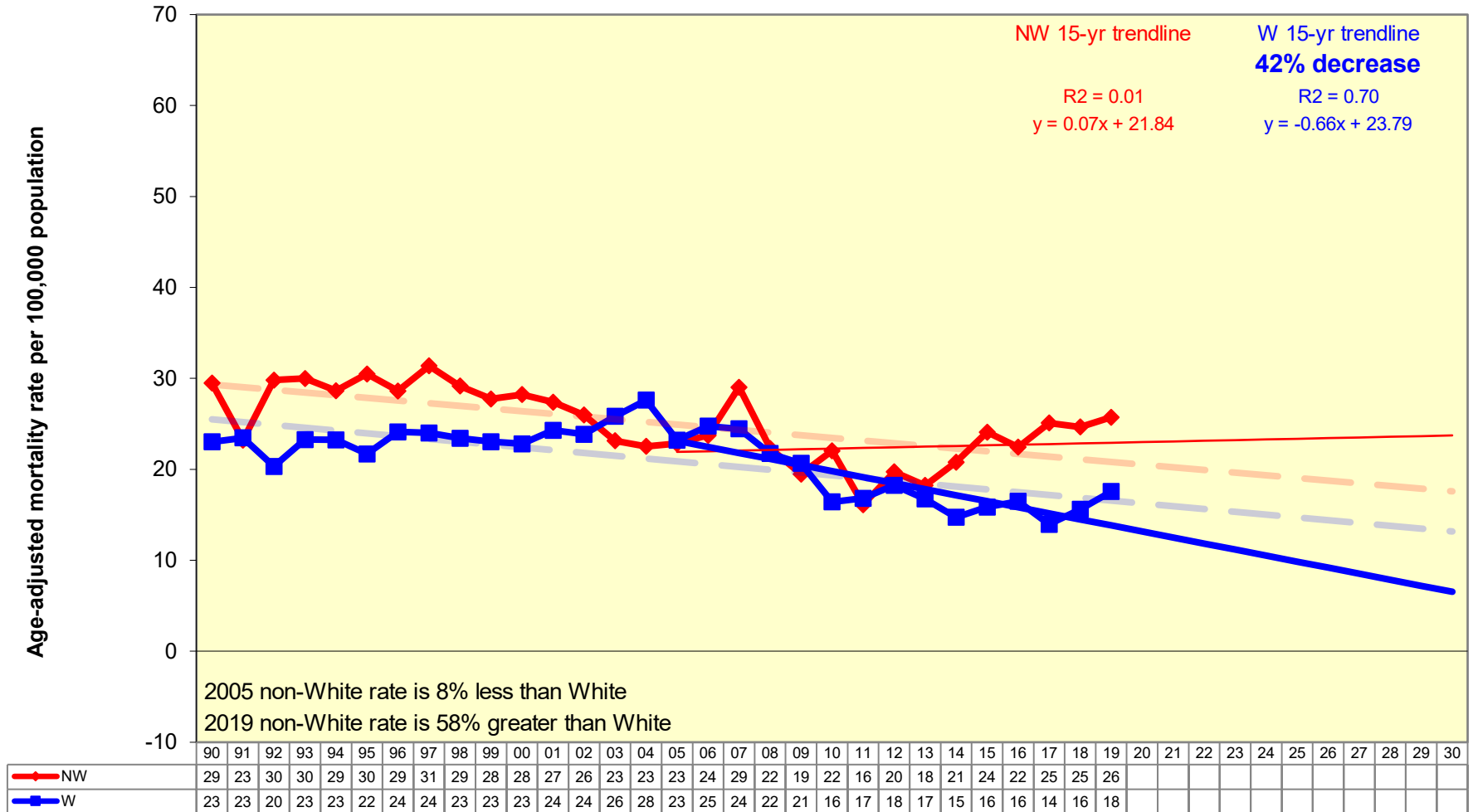
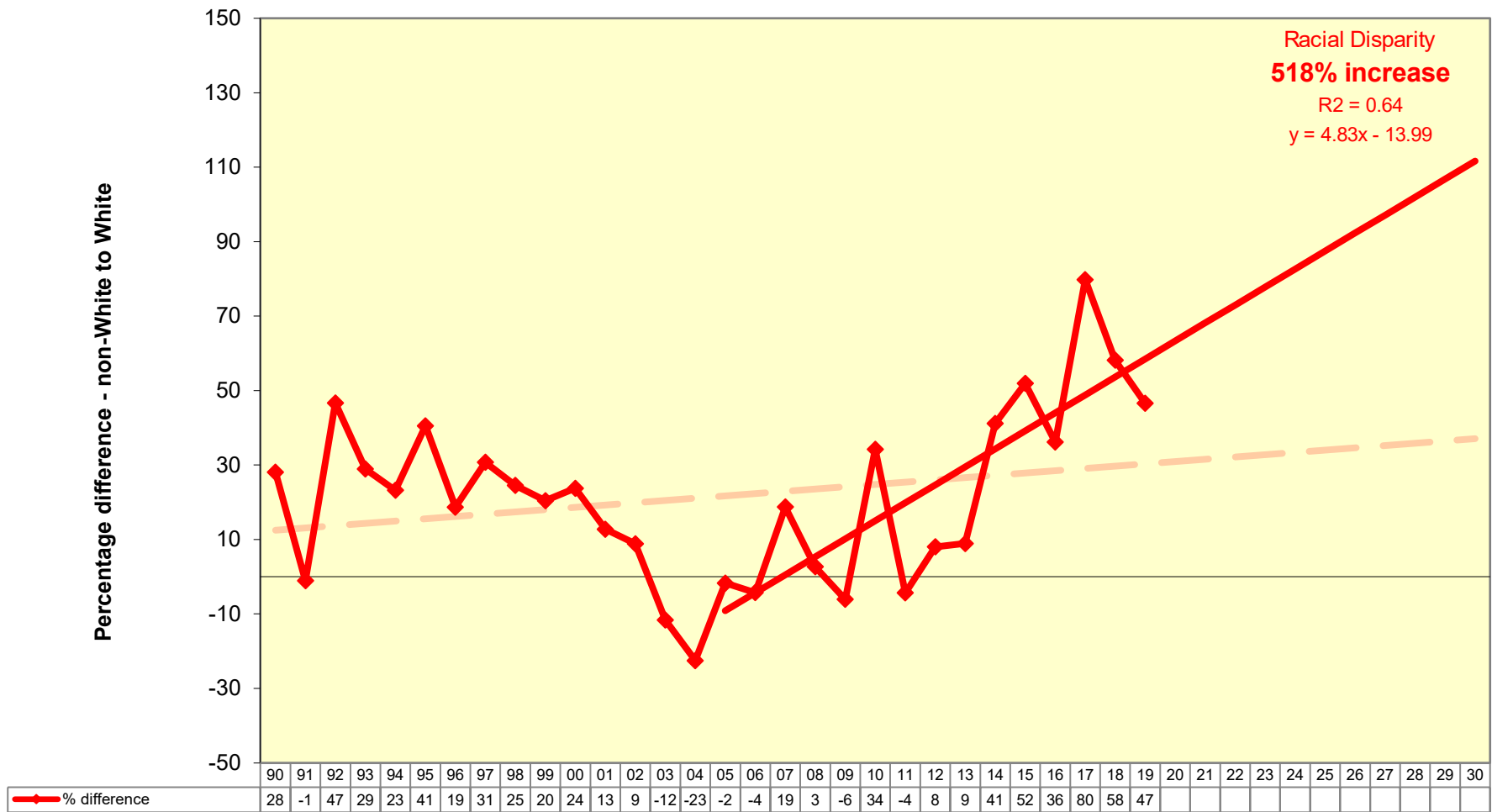


Figure 6.9 v. Unintentional Motor Vehicle Injuries:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



Pneumonia and Influenza

- The mortality rate trend for pneumonia and influenza for ENC has increased 14% over the 15-year period. The trends for RNC and NC are flat and unreliable.
- The age-adjusted rate trends for all NC regions are similar and are decreasing. The ENC rate is 25% greater than the US rate.
- The age-adjusted rate trends for White males and White females are decreasing. The trends for non-White males and non-White females are unreliable.
- The White rate trend has decreased 19% over the 13-year period. The non-White rate is unreliable.
- Racial disparity has increased 149% over the 15-year period and favors Whites 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 6.10 i. Pneumonia and Influenza:
Trends in mortality rates for ENC41, RNC59, and NC,
1990-2019 with projections to 2030

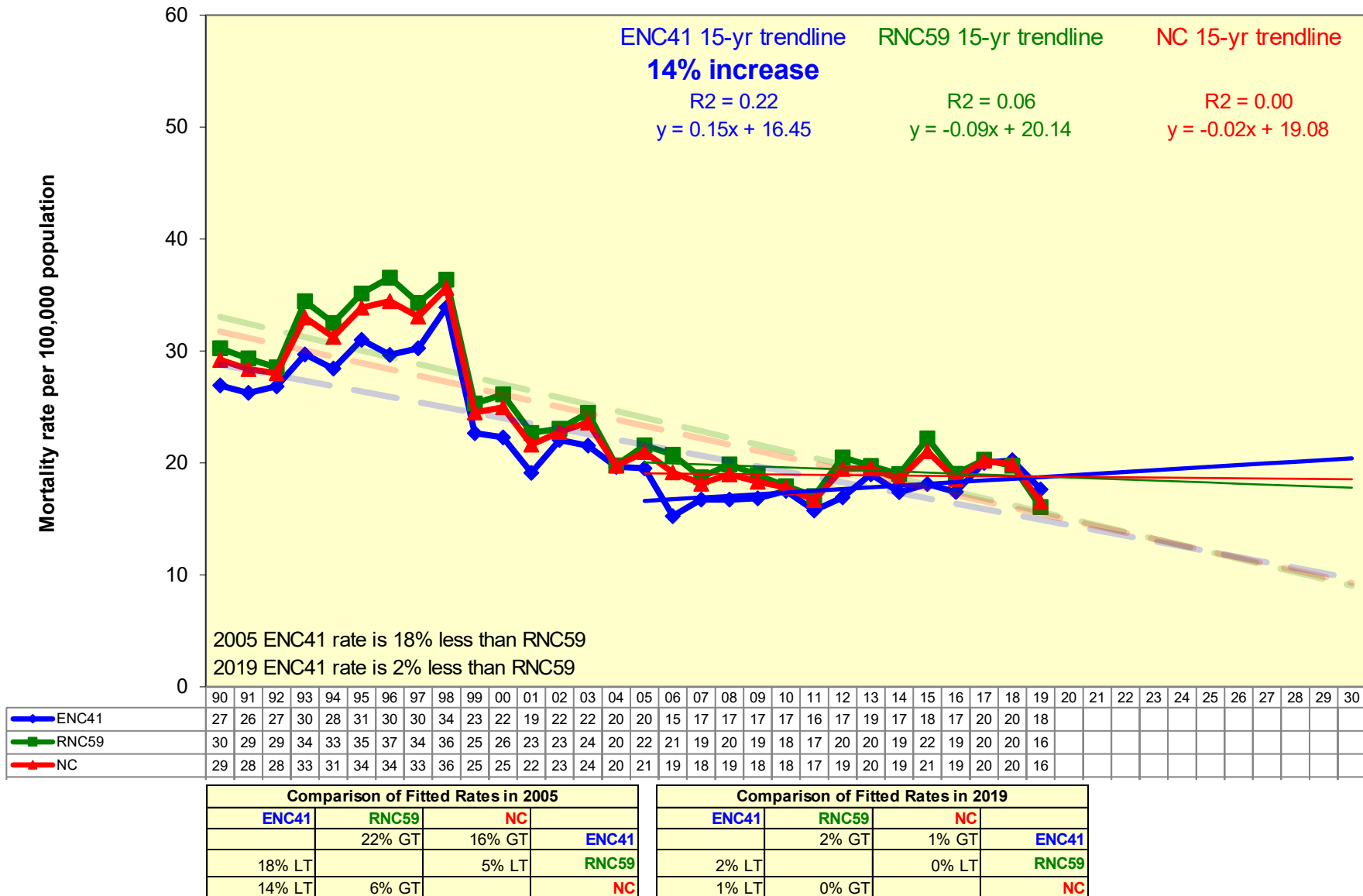


Figure 6.10 ii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

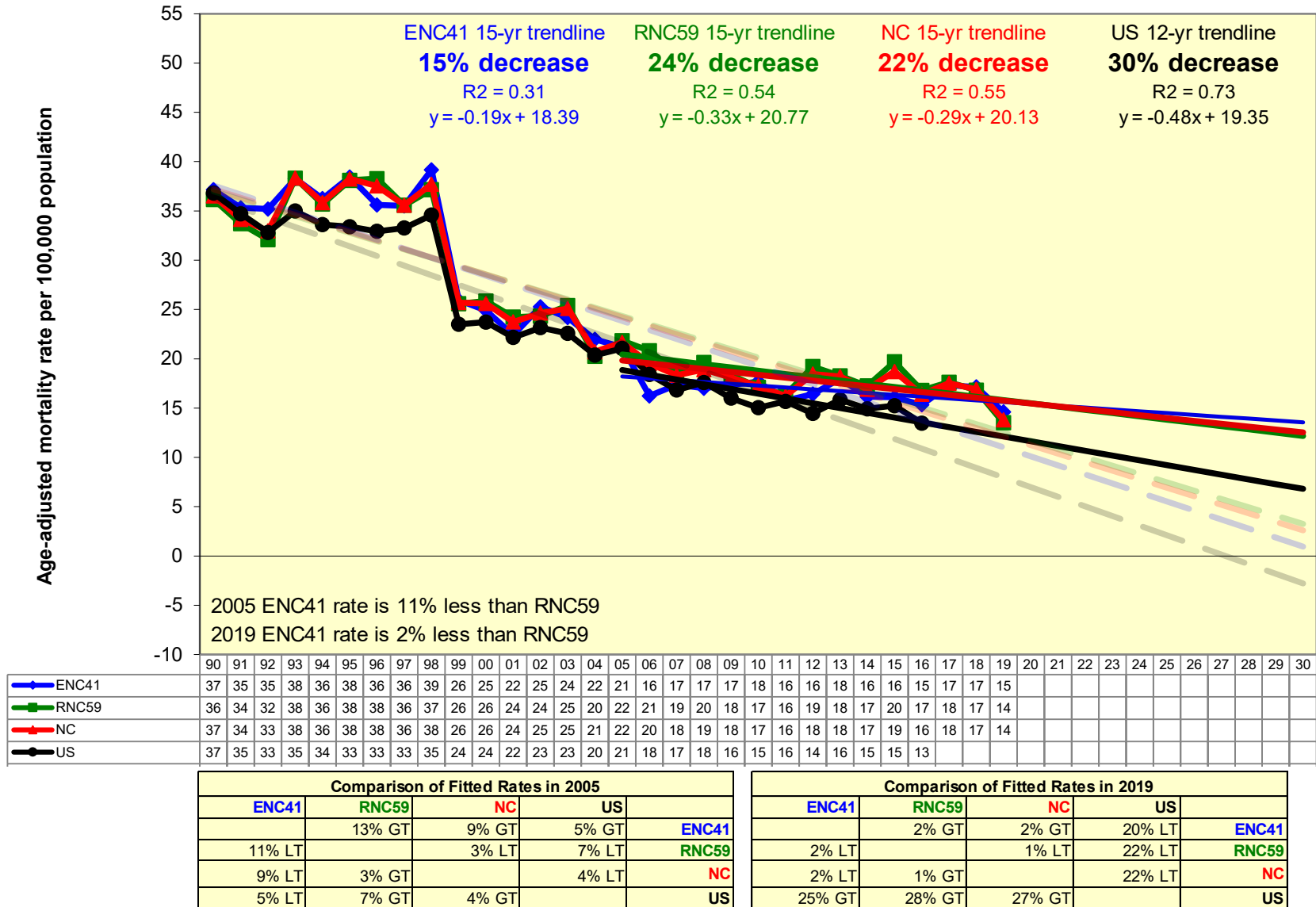


Figure 6.10 iii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

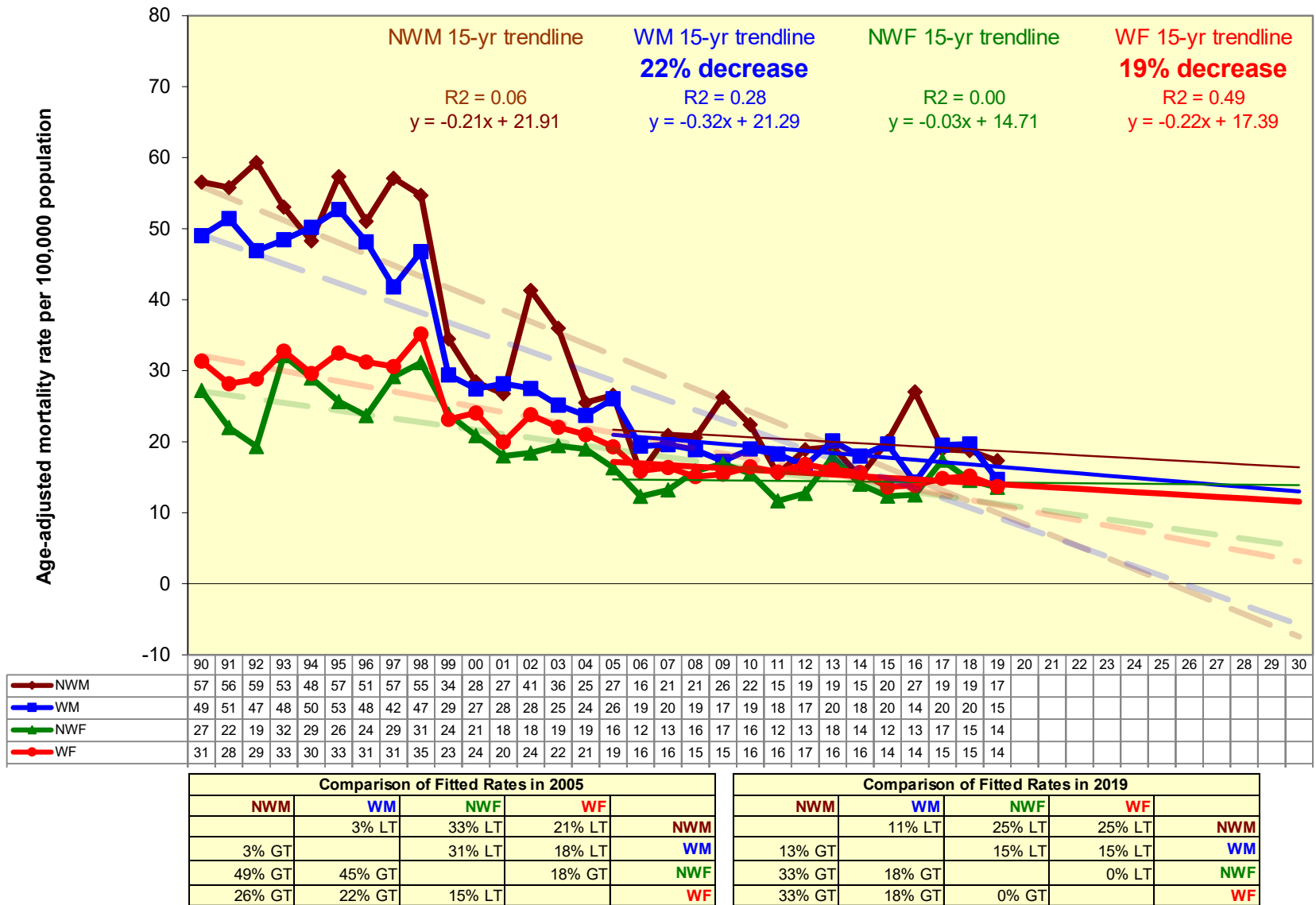


Figure 6.10 iv. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

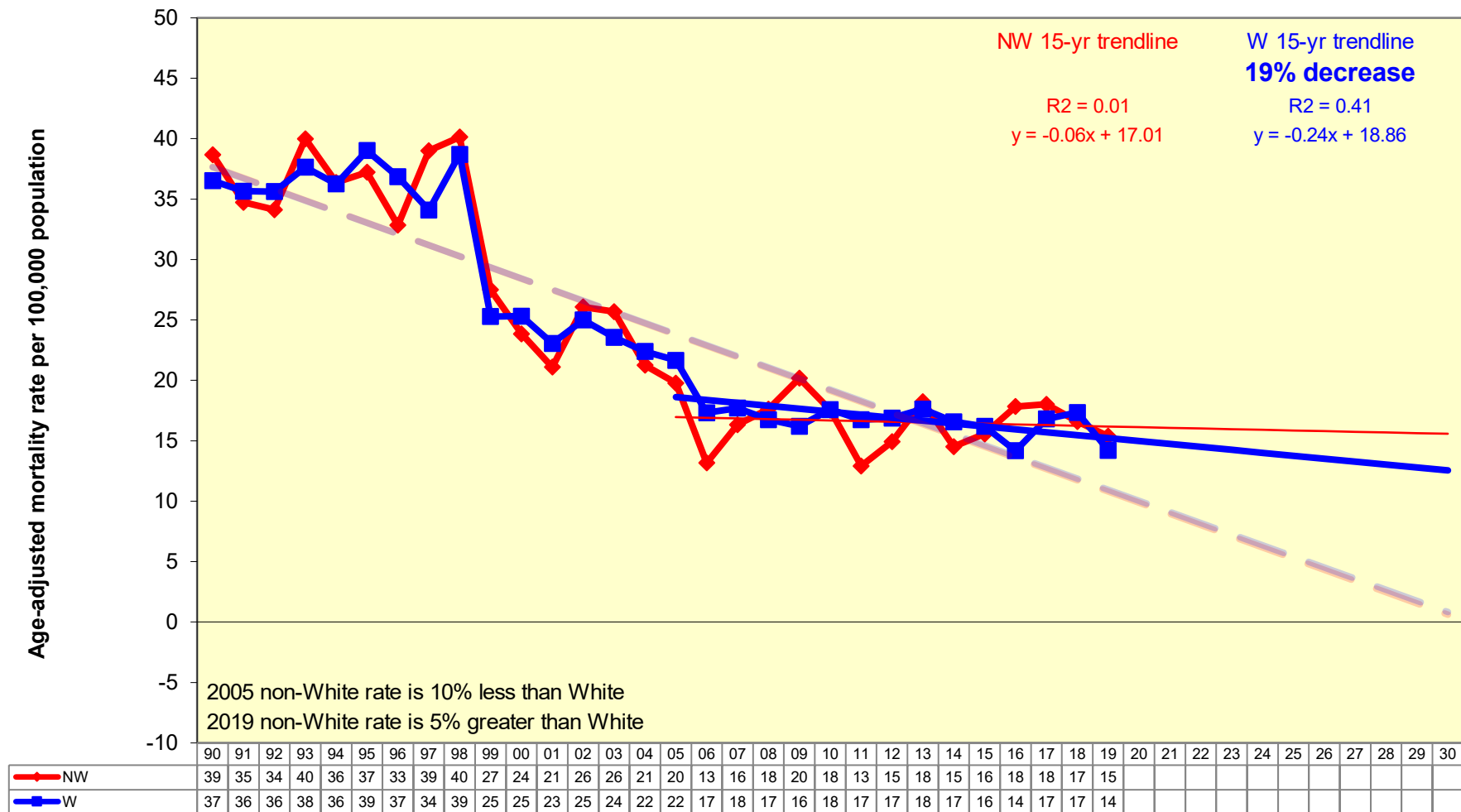
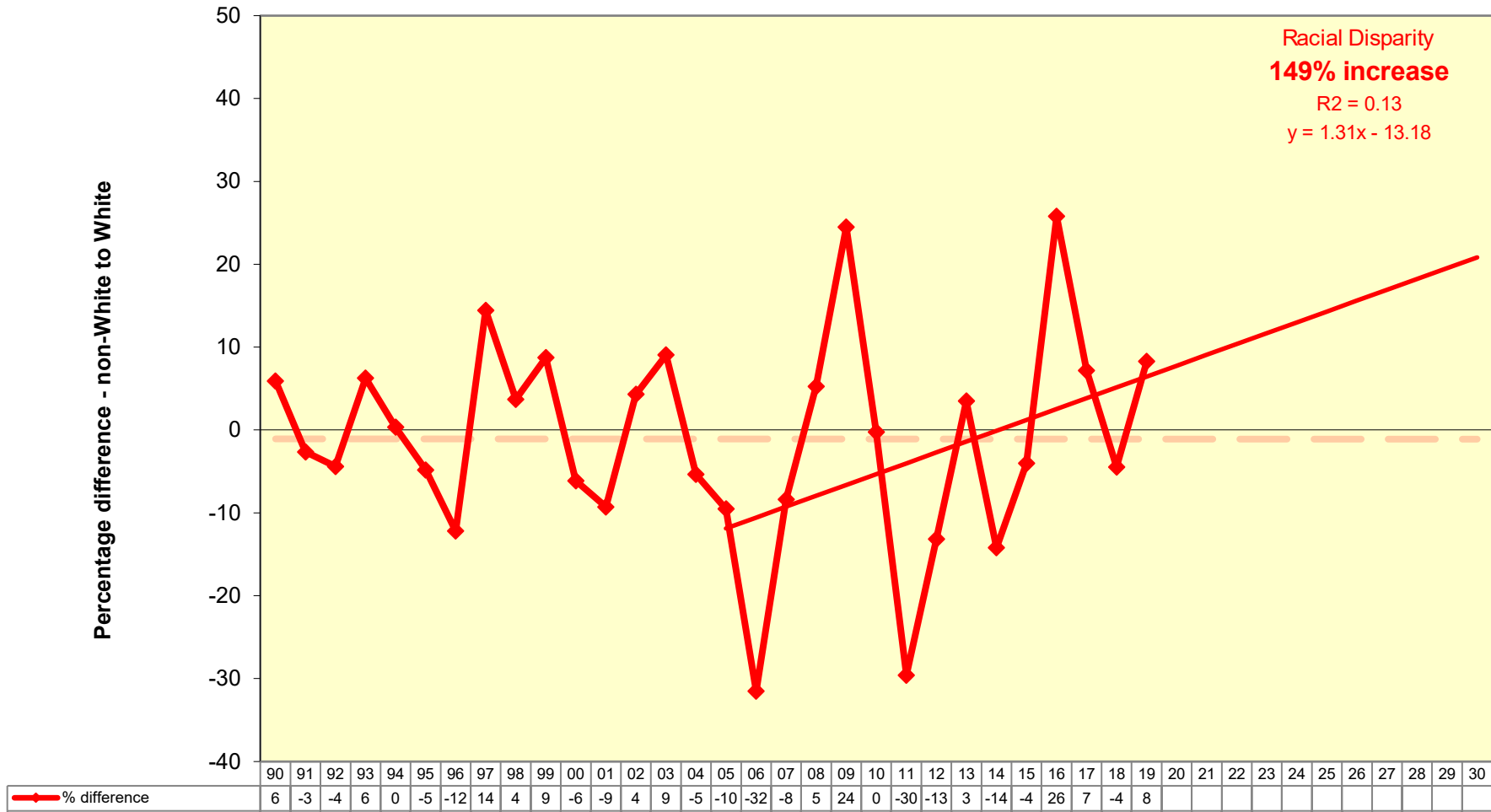


Figure 6.10 v. Pneumonia and Influenza:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



7. Trends and Disparities in Mortality in ENC41: Cancer - All Sites and HIV Disease; 1990-2019

Cancer - All Sites

- The cancer - all sites mortality rate trend for ENC is greater than NC and has seen a 2% increase over the last 15 years. The trends for NC and RNC are unreliable.
- The age-adjusted cancer - all sites mortality rate trends for ENC, RNC, NC and the US are all decreasing at about the same pace. The ENC rate trend is 8% greater than RNC and 9% greater than the US.
- The rate for non-White males has decreased 33% over 15 years and the White male rate has decreased 24%. The non-White male and White male rates are the highest.
- Both White and non-White cancer – all sites mortality rates are decreasing over the 15-year period, although non-White rates are 10% greater than Whites.
- The moderately reliable 15-year trend for racial disparity shows a 34% 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 ENC41, RNC59, and NC, 1990-2019 with projections to 2030

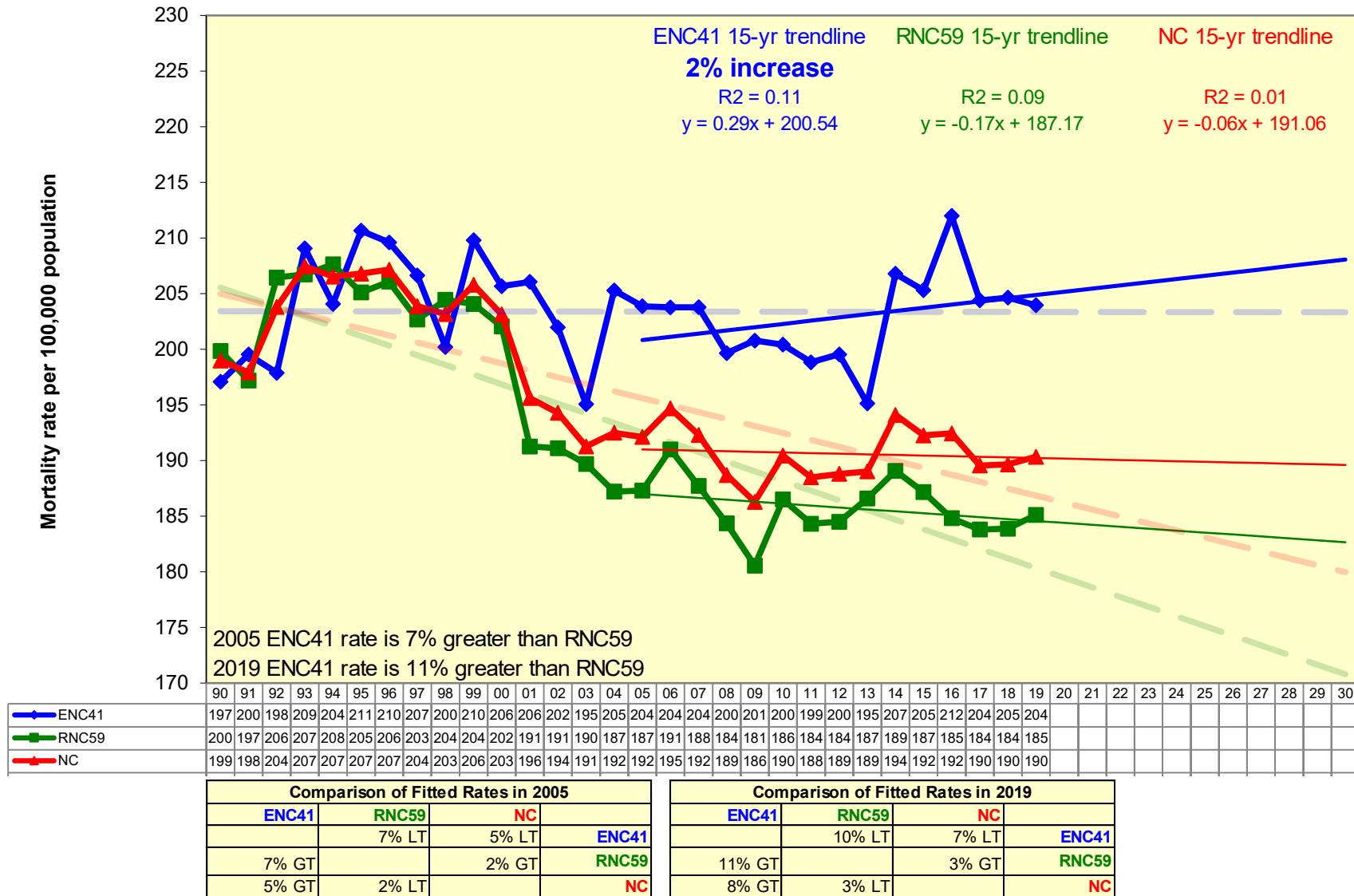


Figure 7.1 ii. Cancer - All Sites:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

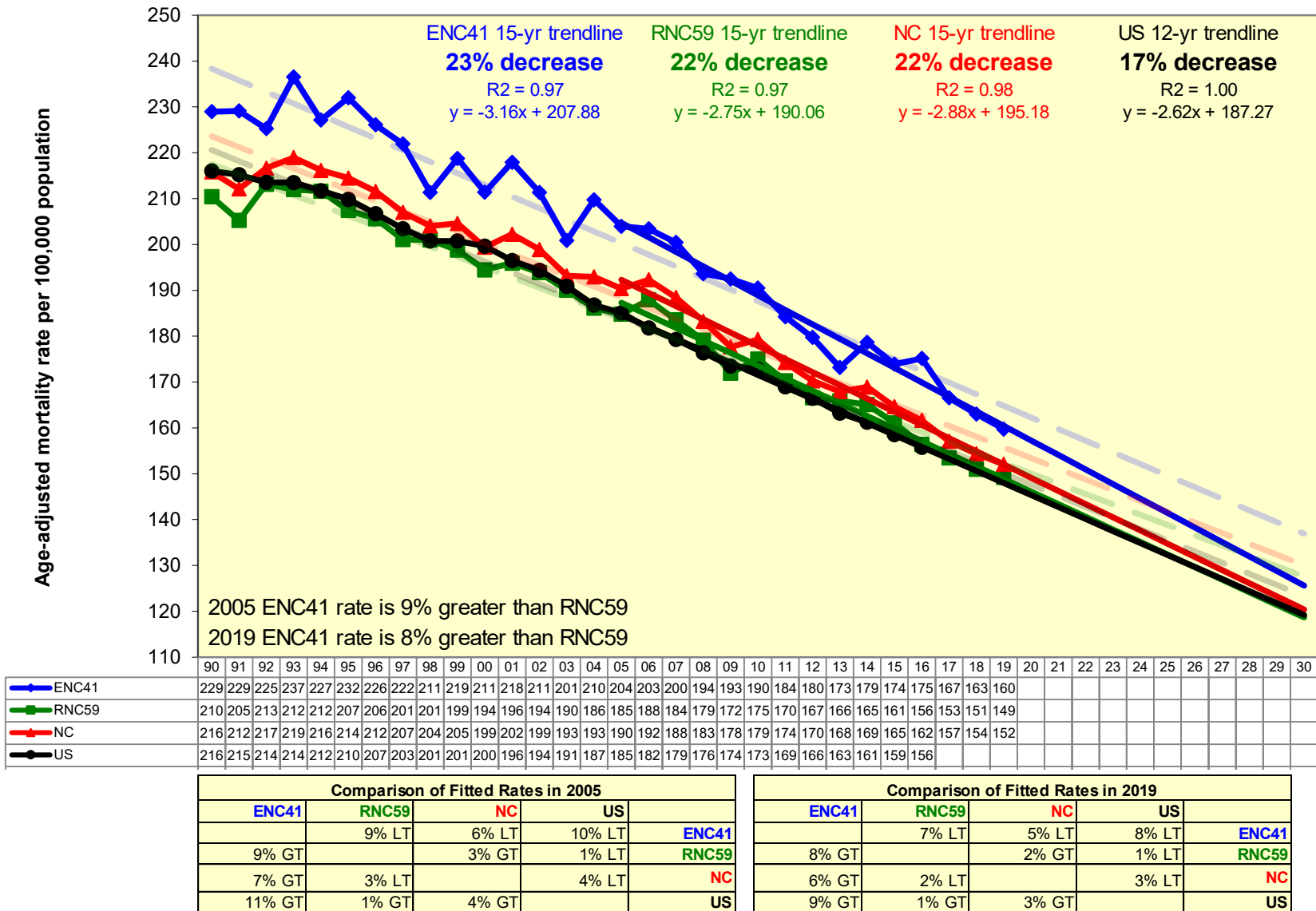


Figure 7.1 iv. Cancer - All Sites:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

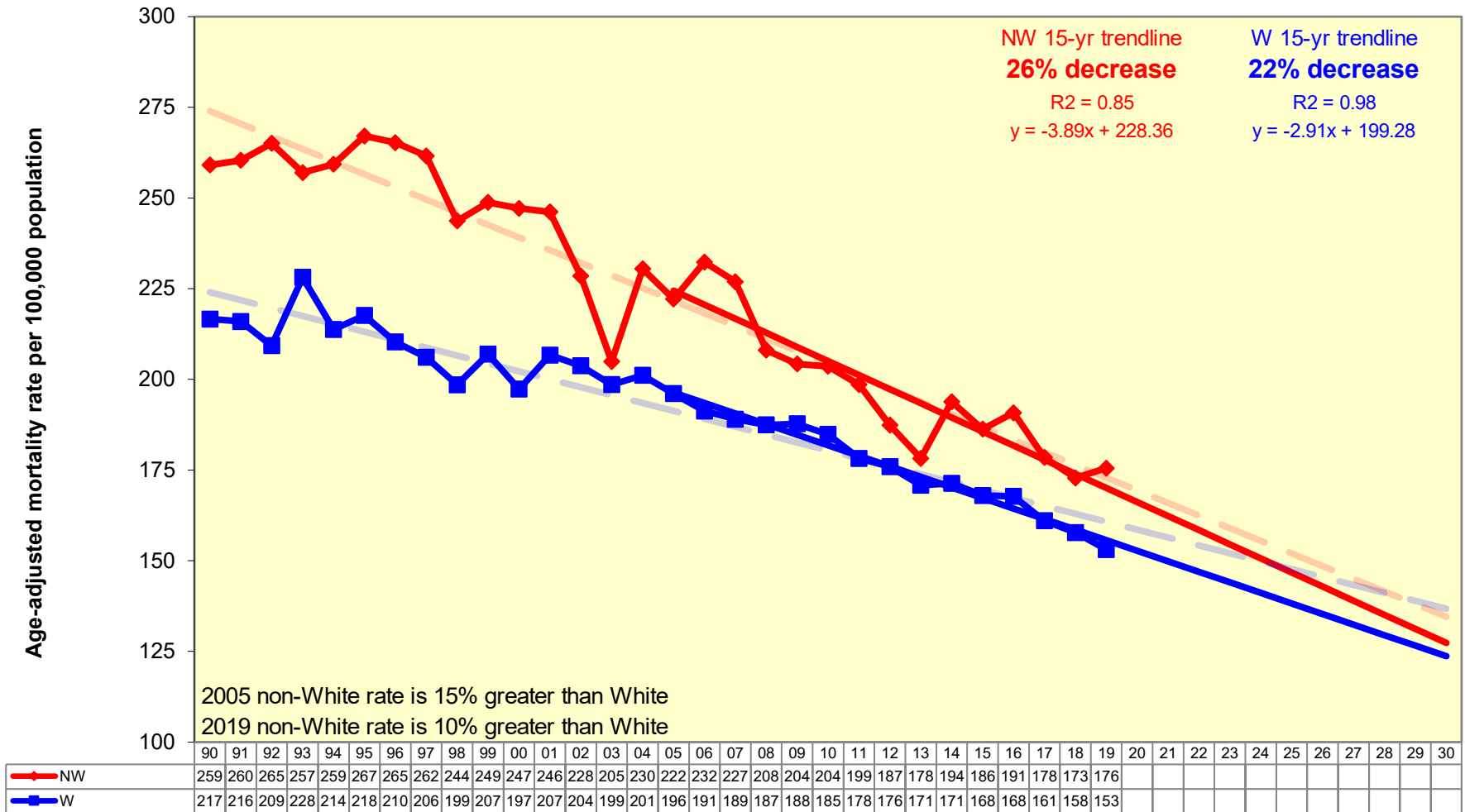
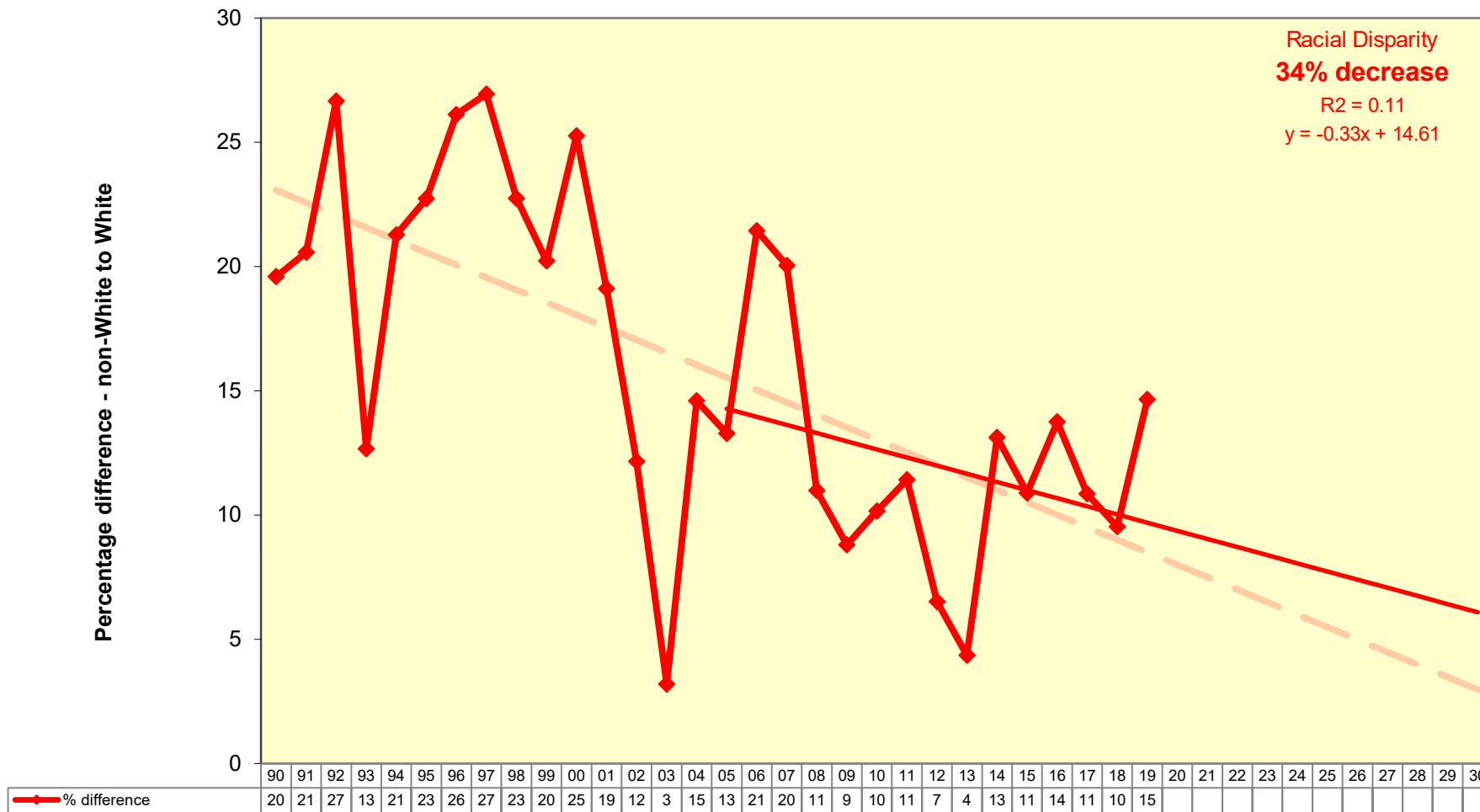


Figure 7.1 v. Cancer - All Sites:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



HIV Disease

- The HIV mortality rate for ENC has decreased 74% over the past 15 years but was still 31% higher than RNC in 2019.
- The 15-year age-adjusted rate trend for ENC has been decreasing, but was still 37% greater than RNC and 75% greater than US.
- Non-White males continue to have the highest rate of age-adjusted mortality, but this rate has decreased 81% in a 15-year reliable trend. The rate for White males decreased 81% and non-White females decreased 79%. A convergence of the non-White and White rate is expected in the future.
- The 15-year non-White age-adjusted HIV mortality rate has decreased by 80%; the White rate has decreased by 70%. The two rates are projected to converge in the near future.
- Racial disparity has decreased 28% over the 15-year period 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 7.2 i. HIV Disease:
Trends in mortality rates for ENC41, RNC59, and NC,
1990-2019 with projections to 2030

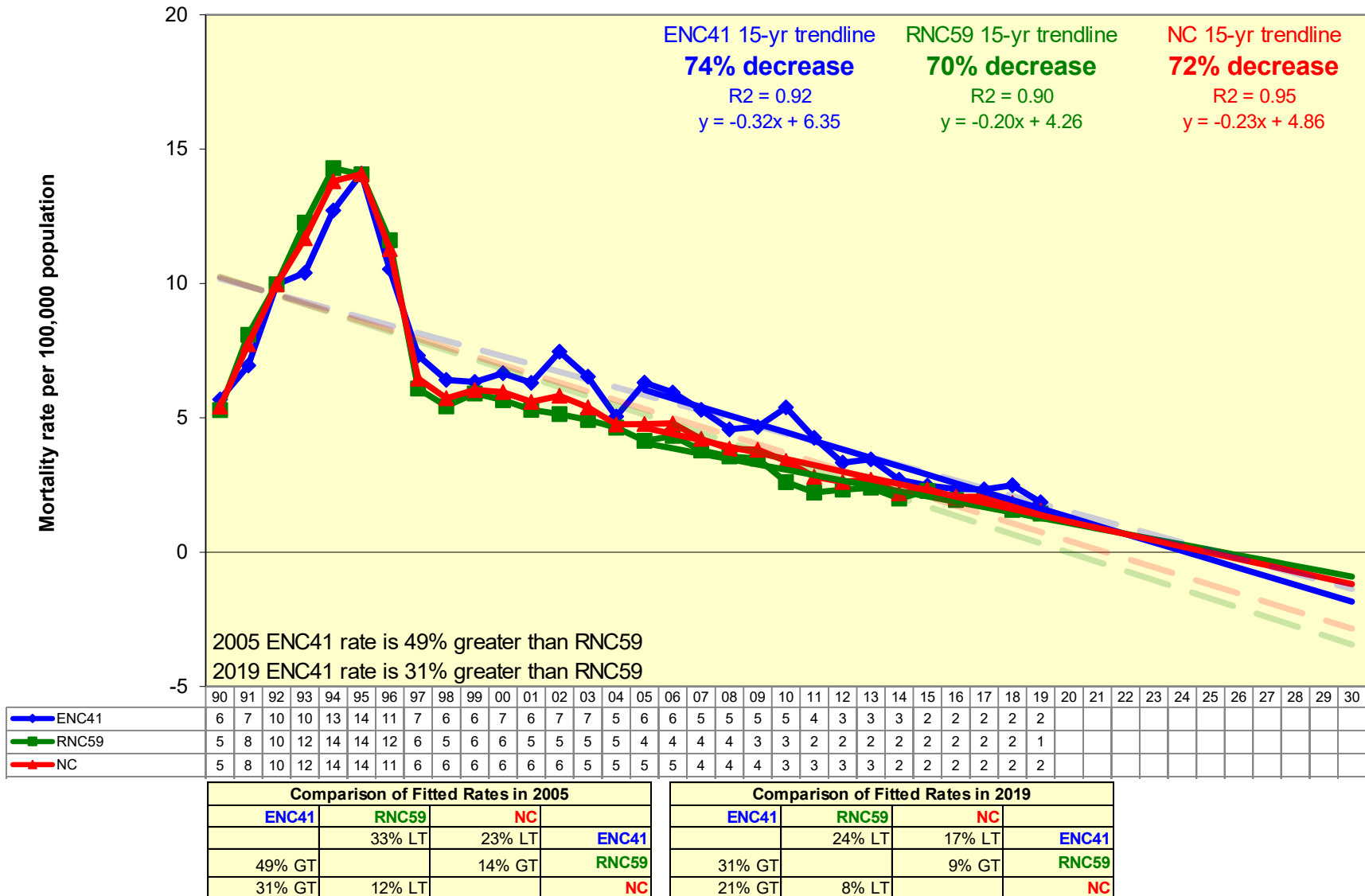


Figure 7.2 ii. HIV Disease:
Trends in age-adjusted mortality rates for ENC41, RNC59, NC, and US, 1990-2019 with projections to 2030

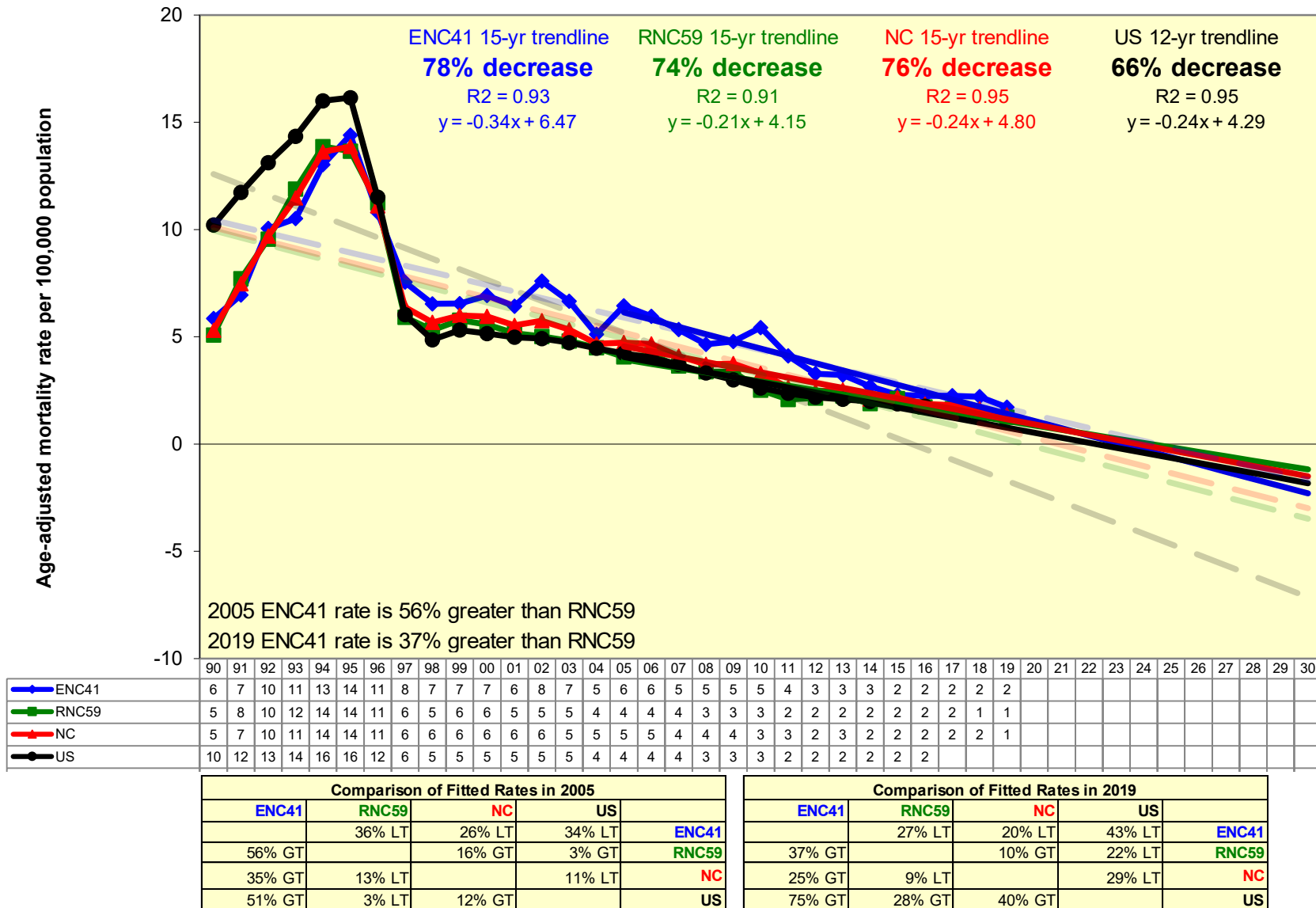


Figure 7.2 iii. HIV Disease:
Trends in age-adjusted mortality rates by race and gender for ENC41,
1990-2019 with projections to 2030

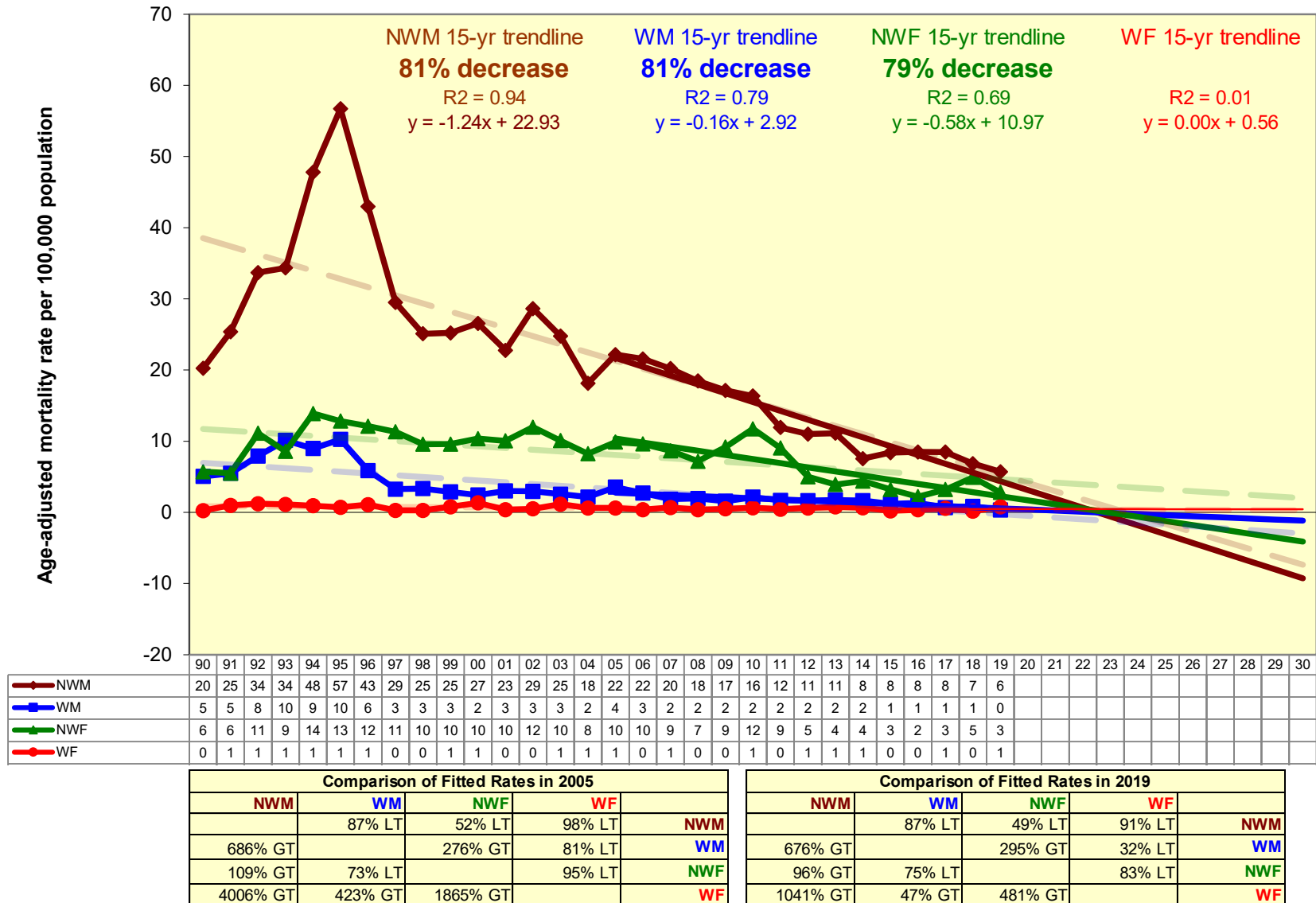


Figure 7.2 iv. HIV Disease:
Trends in age-adjusted mortality rates by race for ENC41,
1990-2019 with projections to 2030

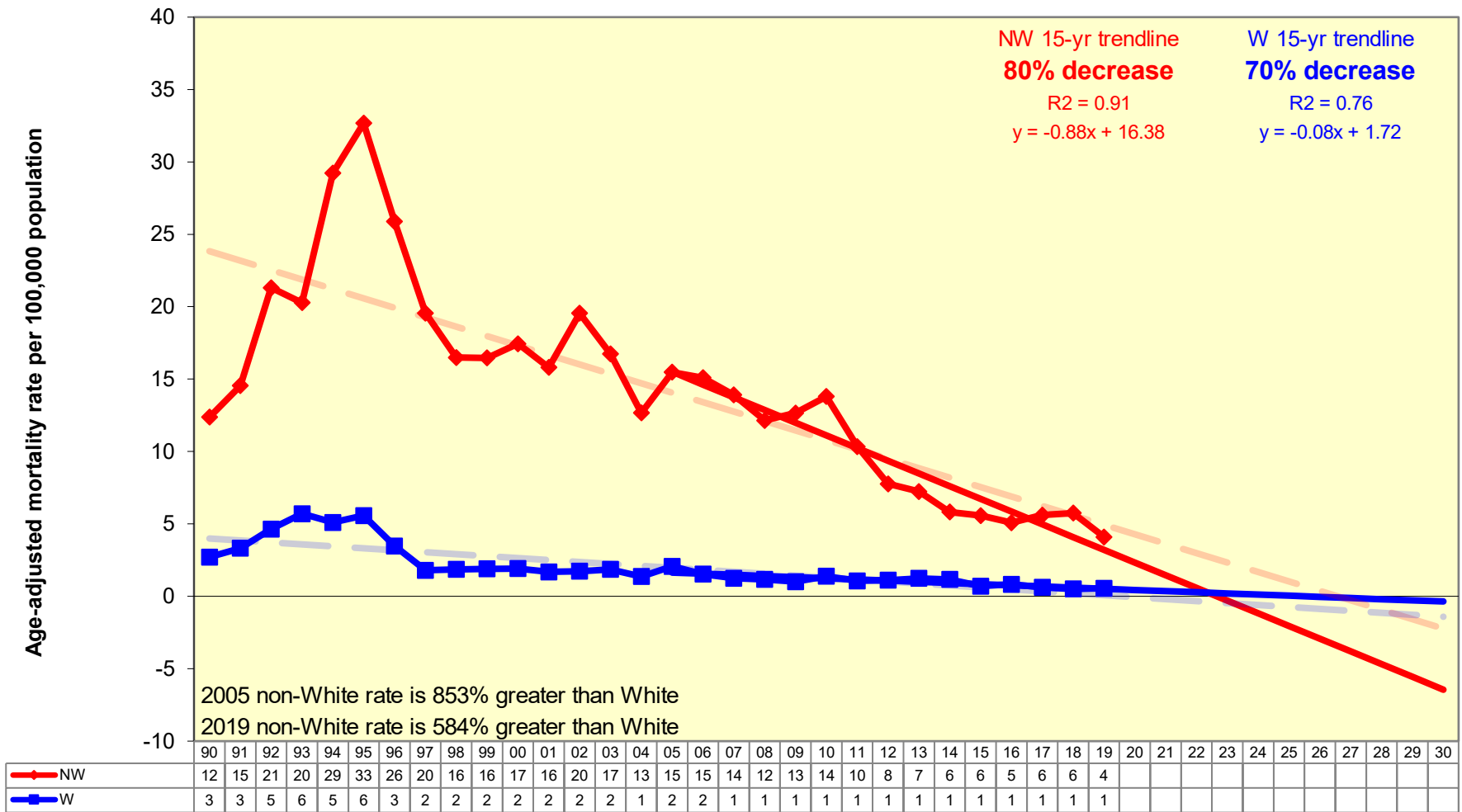
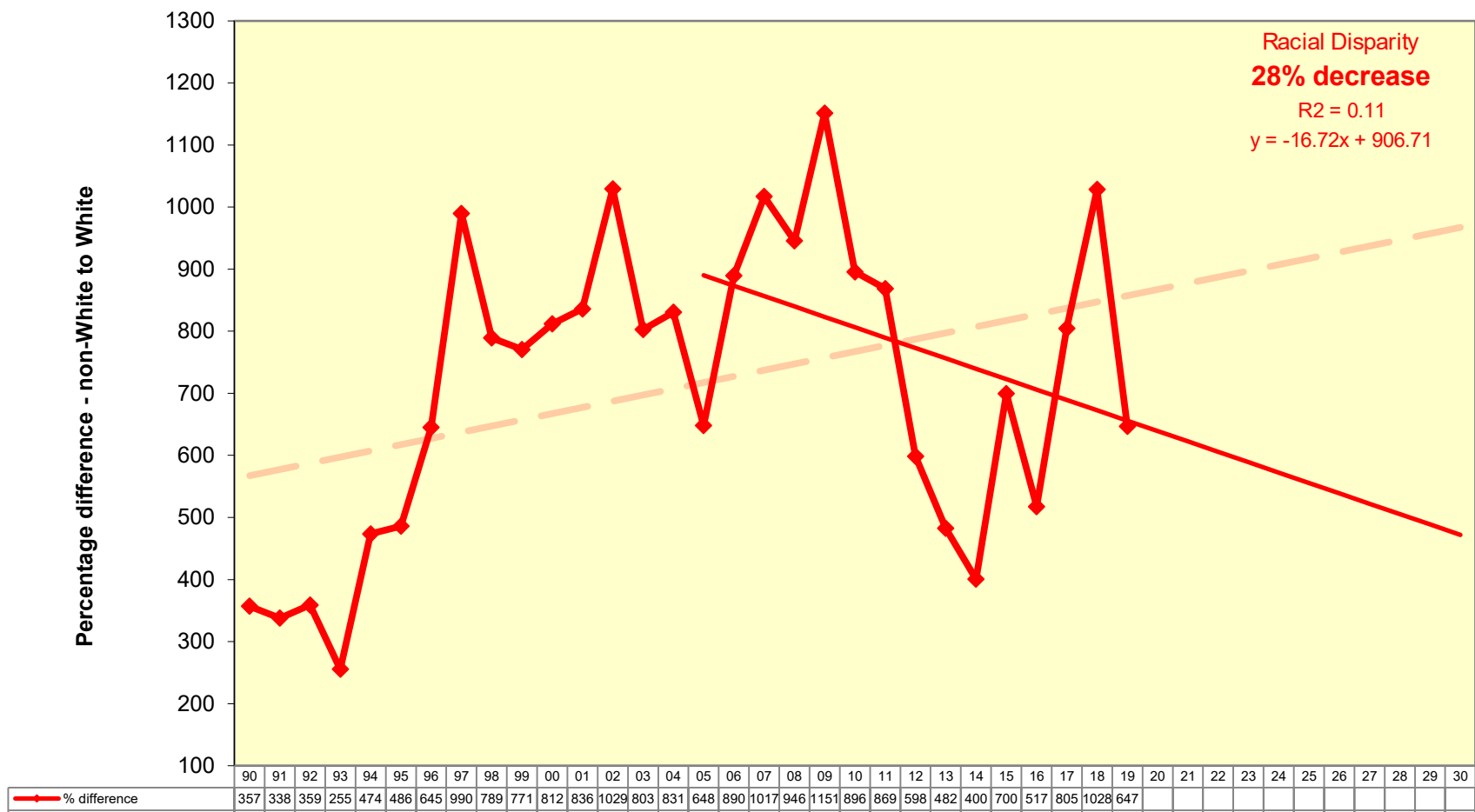


Figure 7.2 v. HIV Disease:
 Measuring disparity in age-adjusted mortality rates by race for ENC41,
 1990-2019 with projections to 2030



8. Appendix

Disease	ICD 10 Code	ICD 9 Code
Diseases of Heart	I00-I09, I11, I13, I20-I51	390-398, 402, 404, 410-429
Cerebrovascular Disease	I60-I69	430-434, 436-438
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