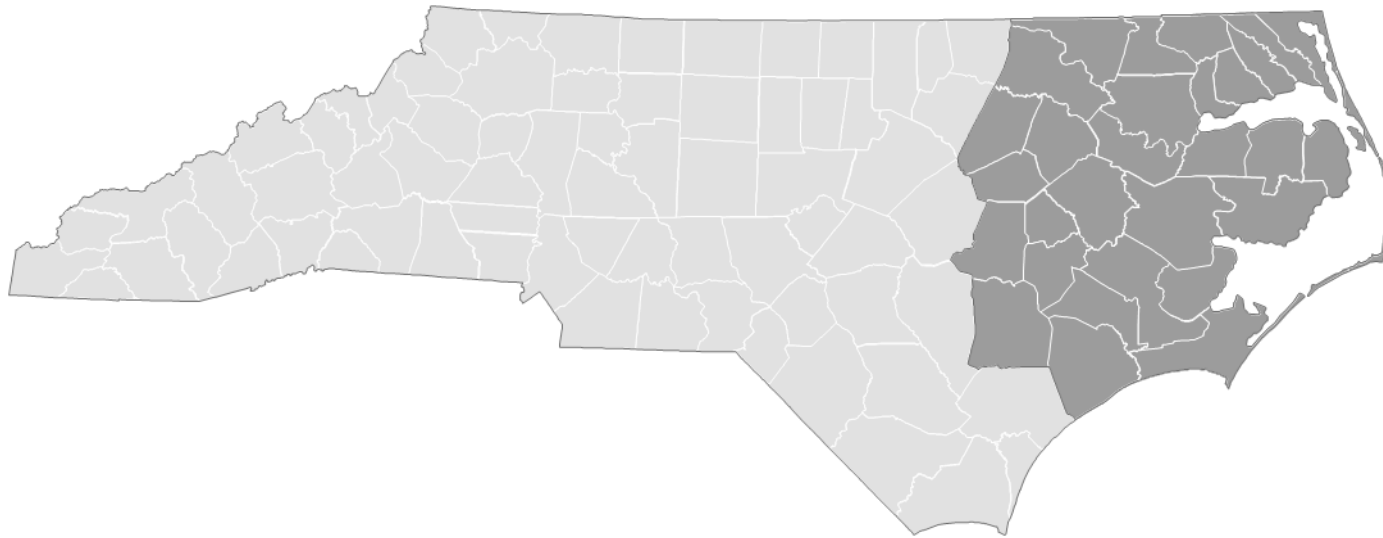


Trends and Disparities in Mortality in Eastern North Carolina

Total Deaths, Premature Mortality and Deaths for Ten Leading Causes; 1990-2017



A Resource for Healthy Communities

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1. Introduction

**Health Indicators Series:
A Resource for Healthy Communities
June 2020 2017**

Report Series #2: Mortality Trends for Eastern North Carolina (1990 to 2017)

Health Indicators is a series of reports describing community health at the state, regional, and county level. *Health Indicators* supplements the *North Carolina Health Data Explorer* published by the center for Health Systems Research and Development at East Carolina University. These reports are intended to provide state policy makers, local health departments, hospitals, and community-based health planning groups with a wide range of information useful for diagnosing the health of Eastern North Carolina's population and its local communities, evaluating the effectiveness of existing services, and envisioning and planning new interventions. The reports in this periodically published series can be used in conjunction with the *County Health Data Book*, produced by the North Carolina 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 28-year period (1990-2017), as well as the most recent 13 year period (2005 to 2017). 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 2017, age-adjusted mortality rate for Eastern North Carolina is 832 deaths per 100,000. This rate is 7% higher than the state rate. Within Eastern North Carolina, the non-White rate is 11% higher than the White rate. The non-White male rate is 20% higher than the rate for White males. The non-White female rate is 7% higher than the rate for White females.

The five general leading causes of mortality in Eastern North Carolina (2017) 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 (2017) are:

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

Trends in Mortality from All Causes

- The 28-year ENC trend line shows all-cause mortality rates increasing slightly. The 13-year trend shows ENC's rate has increased 6% over the period, and is higher than NC and RNC.
- The age-adjusted all-cause mortality rate trend for ENC has been decreasing over the 28-year period; the 13-year trend is decreasing about the same amount but remains higher than the RNC and NC rates. ENC's rate remains 6% greater than the rate for RNC.

Trends and Disparities in Mortality in Eastern North Carolina-29 Counties

- The non-White male mortality rate trend remains higher than other demographic groups but has decreased 21% in the 13-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 11% greater than the White rate, but the recent 13 years trend suggests they will converge in the future.
- Over the recent 13-year period there is a 57% decrease in racial disparity.

Trends in Premature Mortality from All Causes of Death

- ENC's premature mortality rate trend has decreased slightly over the 13-year period since 2005, but the trend is not reliable.
- The age-adjusted premature mortality rate trend for ENC has decreased 9% over the recent 13-year period. It remains 17% greater than the RNC rate in 2017
- The non-White male mortality rate trend is higher than any other demographic group, but has decreased 17% over the 13-year period. White females have the lowest rate but the trend is unreliable.
- A decrease in the premature mortality rate for non-Whites and a leveling of rates for Whites suggests a reduction in racial disparity
- The 13-year trend for racial disparity shows a 37% decrease in a moderately reliable trend.

Diseases of the Heart

- ENC's 13-year mortality rate trend decreased 8%; over the same period the rate for RNC and NC decreased 10%. ENC's rate remains well above the others
- While ENC's age-adjusted mortality rate trend is decreasing at a pace similar to RNC, NC and the US, the ENC rate remains 13% greater than the RNC rate in 2017.
- 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, for 2017, was lower
- The non-White rate trend remains 6% greater than for Whites, but the 13-year trends for both are decreasing and convergence is suggested in the future.
- The 13-year trend line for racial disparity is decreasing in a reliable trend.

Cancer – Trachea, Bronchus, Lung

- The 13-year trend line for cancer-TBL for ENC has decreased 9% over the period in a moderately reliable trend. The rate for 2017 is 18% greater than the rate for RNC.
- In 2017 the age-adjusted rate for ENC is 10% higher than RNC. The 13-year trend rate for ENC has decreased 28%.
- The mortality rate trends for males are decreasing and the rate for non-White males has dropped below the rate for White males. The rate for non-White females is 39% 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 13-year period, but non-White is decreasing more quickly.
- The moderately reliable 13-year trend for racial disparity shows a steep decrease.

Cerebrovascular Disease

- ENC's cerebrovascular disease mortality rate has turned up in recent years and is 25% greater than RNC. The 13-year trend is flat and not reliable.
- The ENC age-adjusted cerebrovascular disease mortality rate trend has decreased 19% over the 13-year period. It remains 16% greater than the RNC rate trend.
- Non-White males have the highest mortality rate for cerebrovascular disease but the rate has decreased 23% over the 13-year period. The rate for non-White females has decreased 33% 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 2017.
- The 13-year trend for racial disparity is decreasing in a reliable trend.

Chronic Lower Respiratory Diseases

- The 28-year ENC trend for CLRD is increasing, as is the 13-year trend. In 2017 the ENC rate is 3% 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 moderately reliable trend. The rate for non-White males has decreased 18% over the 13-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 not reliable.
- The 13-year trend for Whites is higher than the non-White rate. Both rates are flat, and both are 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 (71% over 13 years). The trends for RNC and the US are also up sharply.
- The age-adjusted mortality rate trends for ENC, RNC, NC, and the US are all higher. During the last 13 years the ENC rate has increased 63% and it is now 4% greater than RNC.
- The trends are increasing for all groups, but the white male rate is the highest and shows the greatest increase (82% over 13 years).
- The White rate trend has increased 77% over the 13 year period. The non-White rate is 41% less than the white rate, in a moderately reliable trend.
- Over the 13 year period the racial disparity has decreased in a moderately reliable trend, eliminating the unfavorable disparity in relation to Whites and favoring non-Whites.

Alzheimer's Disease

- The Alzheimer's mortality rate trend for ENC shows a 95% increase over the 13 year period. ENC's rate of increase was larger than RNC and NC, but the rate for ENC is 14% less than RNC.
- In 2017, the age-adjusted rate for ENC is 21% less than the rate for RNC. The ENC rate trend has increased 51% over the 13-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 87% over 13 years, respectively). The rate for White females is the highest but non-White males and females are projected to overtake it in the future.
- The White and non-White rate trends converged in 2015 and the non-White rate is now higher.

- The 13 year trend shows an increase in disparity that favors Whites.

Diabetes Mellitus

- The 13-year rate trend for ENC has increased 14% over the period and is 41% greater than the RNC rate. .
- The 13-year trend for age-adjusted diabetes mellitus shows a decrease of 8% for ENC. In 2017, the ENC rate trend is 34% greater than RNC and 42% greater than the US. .
- The non-White male 13-year rate has increased 13% in a moderately reliable trend. The non-White female trend has decreased 24%. The White male and White female trends are lower, and have decreased 8% and 12% respectively
- The non-White mortality rate trend decreased 9% over 13 years in a moderately reliable trend, but remains 132% greater than the White rate.
- The 13-year trend for racial disparity is not reliable .

Pneumonia and Influenza

- The crude mortality rate for pneumonia and influenza for ENC is 5% greater than RNC in 2017 and is increasing but the trend line is not reliable.
- The age-adjusted mortality rate trend for ENC, RNC and NC are similar and are decreasing at about the same pace. The ENC rate in 2017 is 24% greater than the US rate .
- The age-adjusted mortality rate trends for all four demographics are decreasing. The trends for non-White males and White males are the highest. The trend for non-White females is not reliable .
- The non-White mortality rate and the White mortality rate are both decreasing and are converging.
- The 13-year increasing trend for racial disparity is unreliable .

Nephritis, Nephrotic Syndrome, and Nephrosis

- The mortality rate trend for nephritis, nephrotic syndrome and nephrosis in ENC has decreased over the 13-year period. The rate for NC has increased but is not reliable. In 2017 ENC's rate trend is 6% greater than RNC.
- With age-adjustment, the ENC rate trend has decreased 29% over the 13-year period. It is 1% less than the RNC rate and the NC rate, but 25% greater than the US rate .
- The 13-year trends for non-White males and non-White females are the highest but have decreased more than 30% over the 13-year period. The non-White male trend in 2017 is 95% greater than the White male trend and 197% greater than the White female trend. All trends are decreasing .
- The non-White rate in 2017 is 109% greater than the White rate. It has decreased 37% over the 13-year period. The White rate has decreased 23%. .
- The trend for racial disparity is decreasing in a moderately reliable trend.

Cancer—Colon, Rectum, Anus

- The 13-year rate trends for colon cancer for ENC, RNC and NC have all declined. In 2017 ENC's rate was 18% greater than RNC
- The age-adjusted mortality rate trend for colon cancer for ENC has declined 27% over the 13-year period. The ENC rate is the highest, and is 11% greater than the NC rate .
- The non-White male mortality rate trend is the highest of the demographic groups and is decreasing the slowest. The non-White male rate is 67% greater than the White male rate and 85% greater than the non-White female rate. White females have the lowest rate trend .

Trends and Disparities in Mortality in Eastern North Carolina-29 Counties

- The non-White mortality rate is 45% greater than the White rate in 2017. Both are decreasing.
- The trend for racial disparity is unreliable .

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, PNC, NC and US are all decreasing. The ENC rate is 7% 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 13 year period. The non-White rate decreased 28% and the White rate decreased 18%. The non-White rate remains 9% greater than the White rate in 2017 but they are converging.
- The 13-year trend for racial disparity shows a 63% decrease .

HIV Disease

- The fitted HIV mortality rates for ENC have been decreasing over the past 13 years, but are still 30% greater than NC in 2017 .
- The age-adjusted rate trend for ENC, RNC, and the US are all decreasing. The ENC rate is 38% greater than NC in 2017 .
- Non-White males continue to have the highest rate of age-adjusted mortality but the rate has decreased 73% in a 13-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 13-year age-adjusted HIV mortality rates have decreased for both Whites and non-Whites by 58% and 73% respectively. The non-White rate is still 708% greater than the White rate .
- The trend for racial disparity is not reliable.

3. Methods, Interpretation, and References

Data Sources

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

Measures

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

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 2017. Smaller areas like counties will usually be aggregated into 5-year intervals (e.g., 2013 to 2017). 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 28-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 28 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 2017) 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 6.3 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 2017), the 2013 *expected* or *fitted* age-adjusted rate is calculated to be 49.3 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 3.3—the model (the equation of the line) *overestimates* the observed value by 3.3 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.

Percent change provides a measure of the estimated change in mortality over the most recent thirteen year period (2005-2017). 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 2017 tables compare the fitted rates calculated for the beginning and end of the observed time series in terms of percent difference. Returning to figure 6.3 ii, ENC29's age-adjusted fitted rate for cerebrovascular diseases in 2005 is 9% greater than (GT) RNC's fitted rate. In 2017, ENC29'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, 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

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North Carolina Institute of Medicine. *Healthy North Carolina 2030: A Path Toward Health*.

North Carolina Institute of Medicine. *Healthy North Carolina 2020: A Better State of Health*.

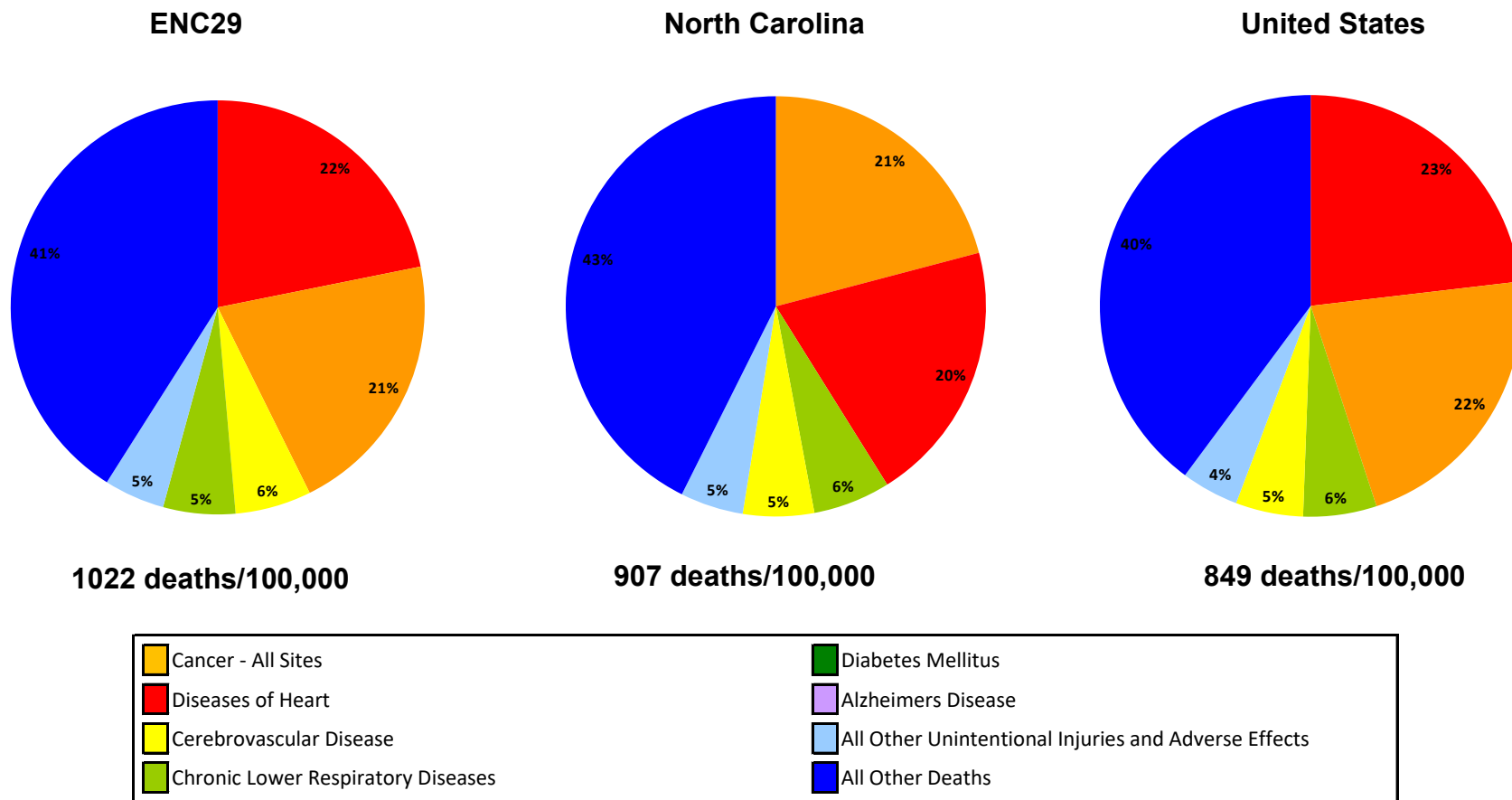
United States Department of Health and Human Services. *Healthy People 2020*. www.healthypeople.gov.

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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

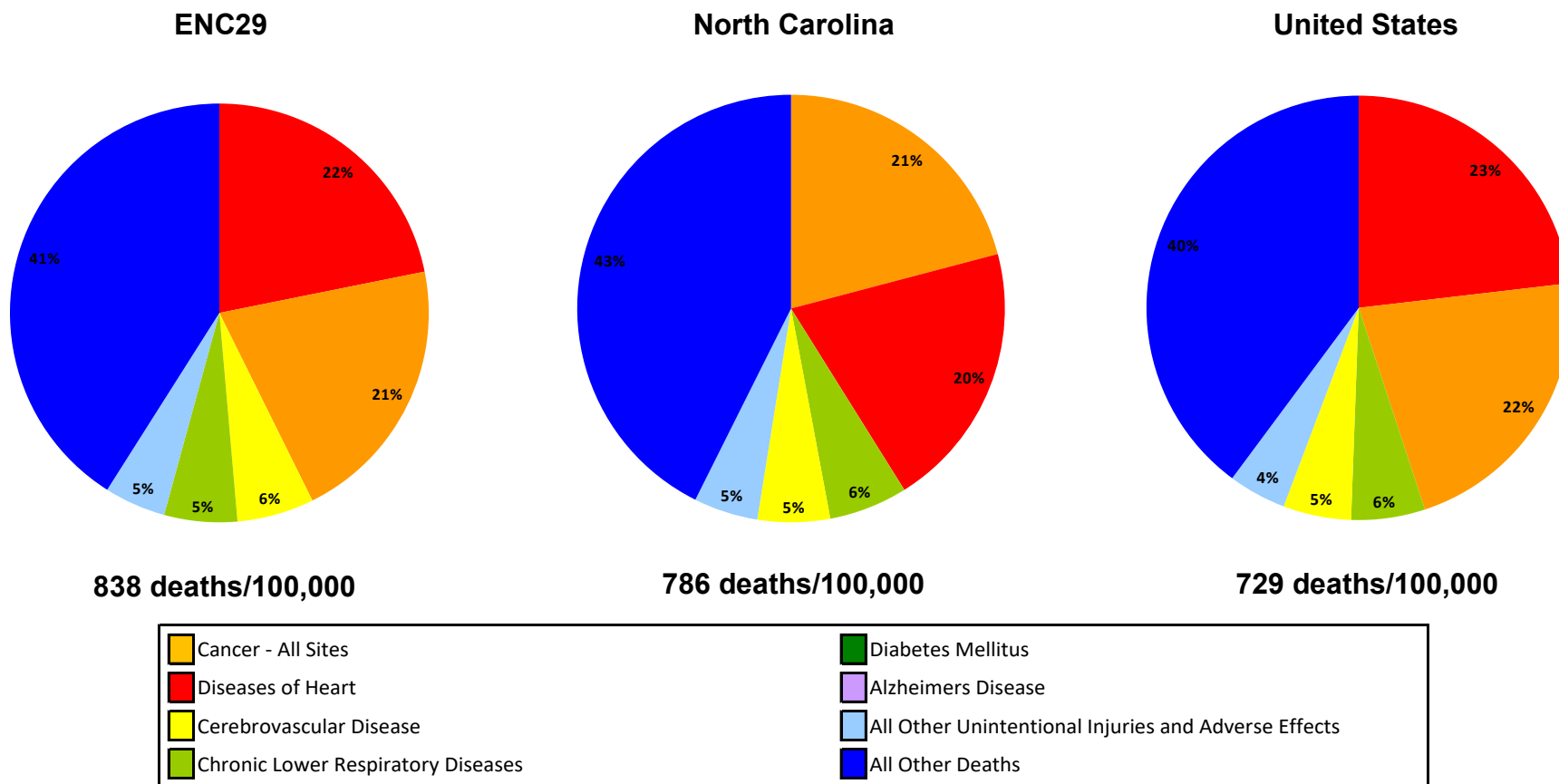
Figure 4.1 i. General leading causes of death for ENC29 (2017), NC (2017), and US (2016). Mortality rate per 100,000 population.



2017 NC rate is 7% 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 ENC29 (2017), NC (2017), and US (2016). Age-adjusted mortality rate per 100,000 population.



2017 NC age-adjusted rate is 8% 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 (2017) by race and gender.
Mortality rate per 100,000 population.

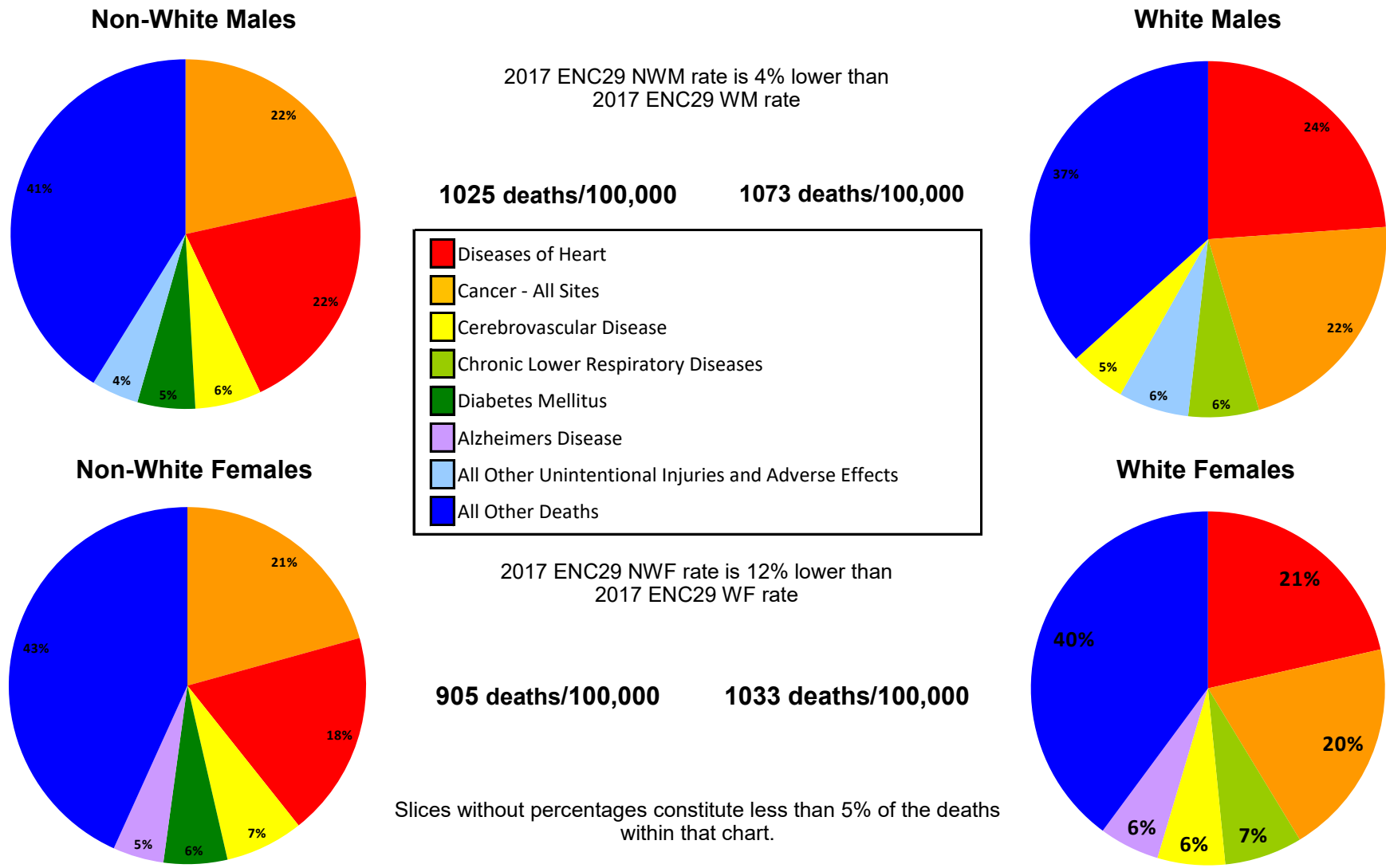


Figure 4.2 ii. General leading causes of death for ENC29 (2017) by race and gender. Age-adjusted mortality rate per 100,000 population.

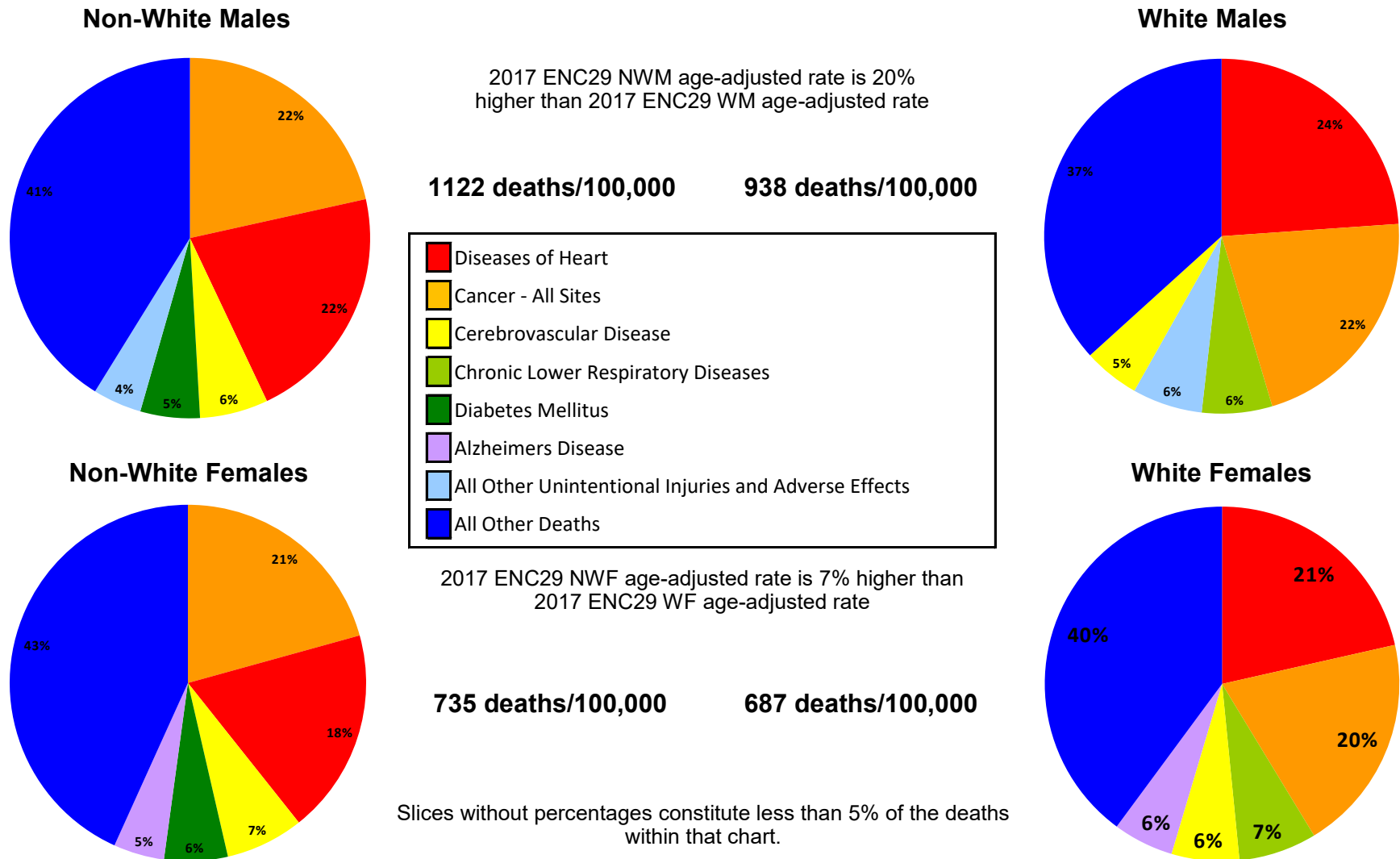
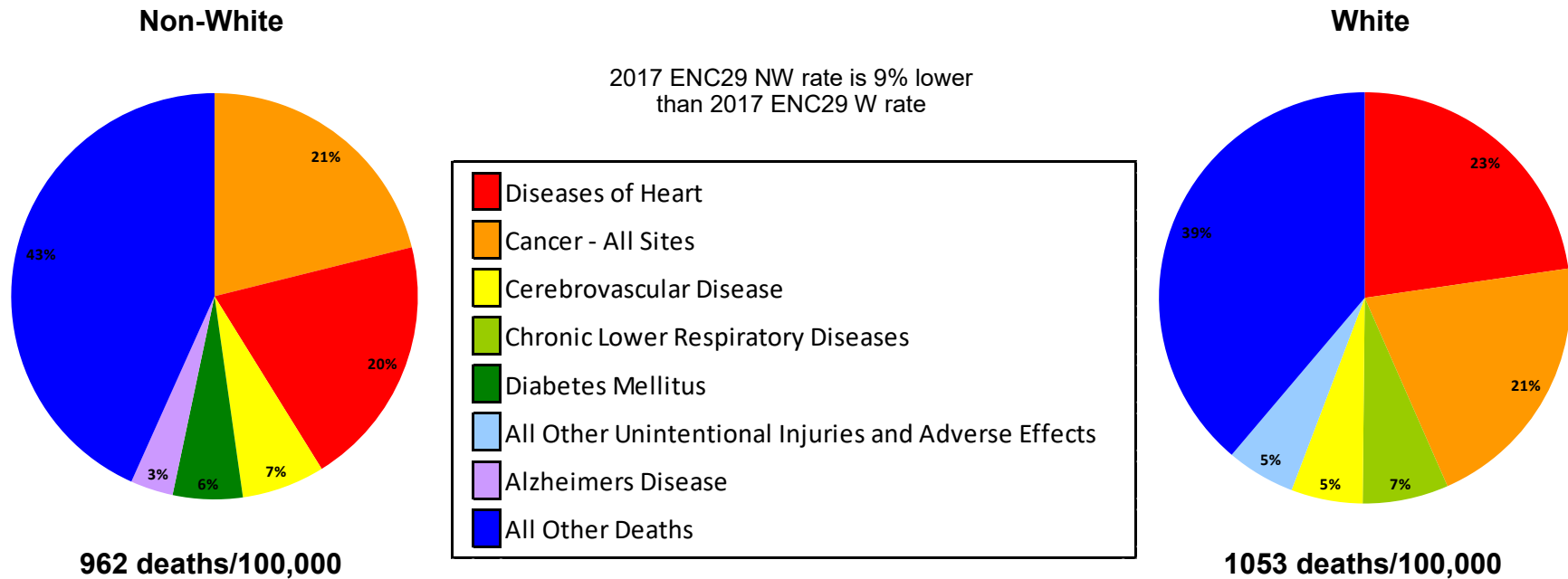
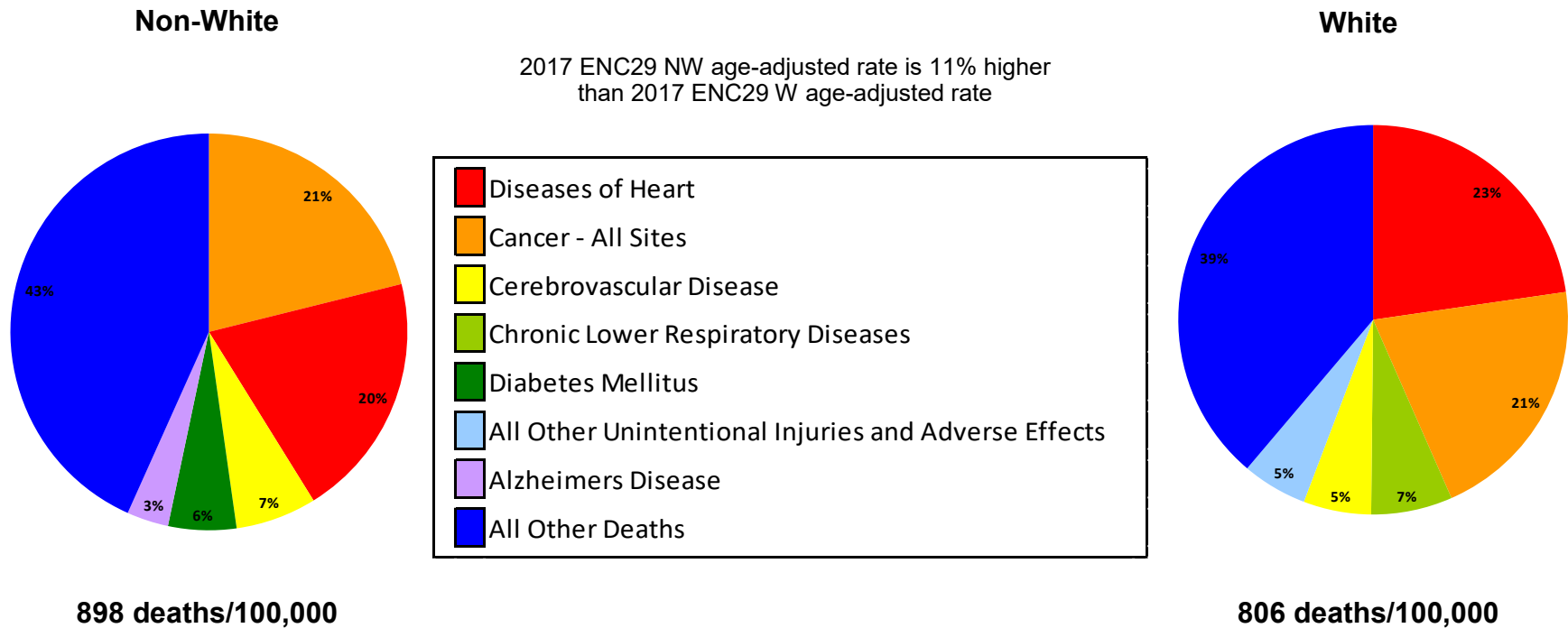


Figure 4.3 i. General leading causes of death for ENC29 (2017) by race.
Mortality rate per 100,000 population.



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

Figure 4.3 ii. General leading causes of death for ENC29 (2017) 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 ENC29: All Causes of Death and All Causes of Premature Mortality; 1990-2017

All Causes of Death

- The 28-year ENC trend line shows all-cause mortality rates increasing slightly. The 13-year trend shows ENC's rate has increased 6% over the period, and is higher than NC and RNC.
- The age-adjusted all-cause mortality rate trend for ENC has been decreasing over the 28-year period; the 13-year trend is decreasing about the same amount but remains higher than the RNC and NC rates. ENC's rate remains 6% greater than the rate for RNC.
- The non-White male mortality rate trend remains higher than other demographic groups decreased 21% in the 13-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 11% greater than the White rate, but the recent 13 years trend suggests they will converge in the future.
- Over the recent 13-year period there is a 57% 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
1990-2017 with projections to 2030

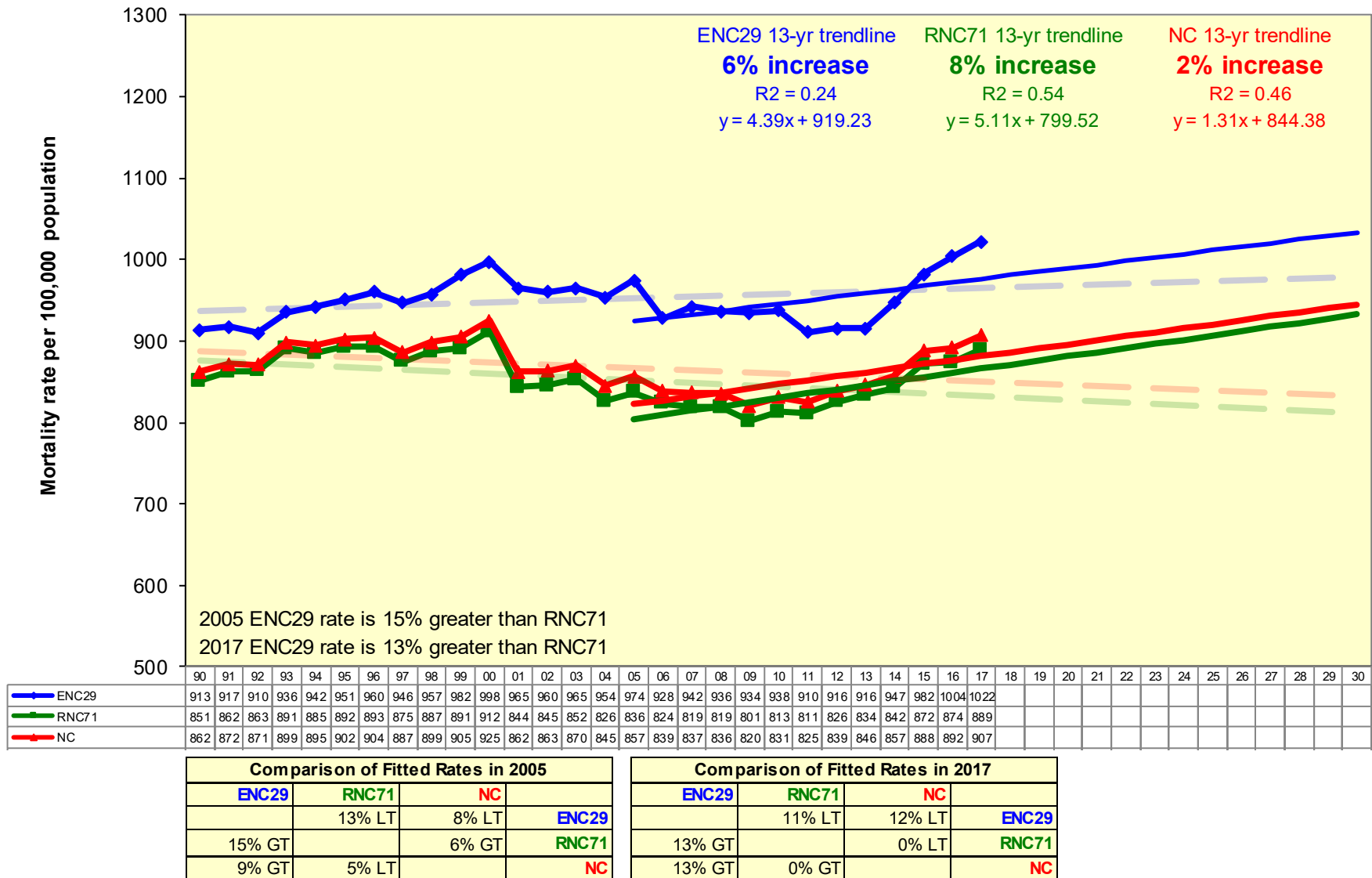
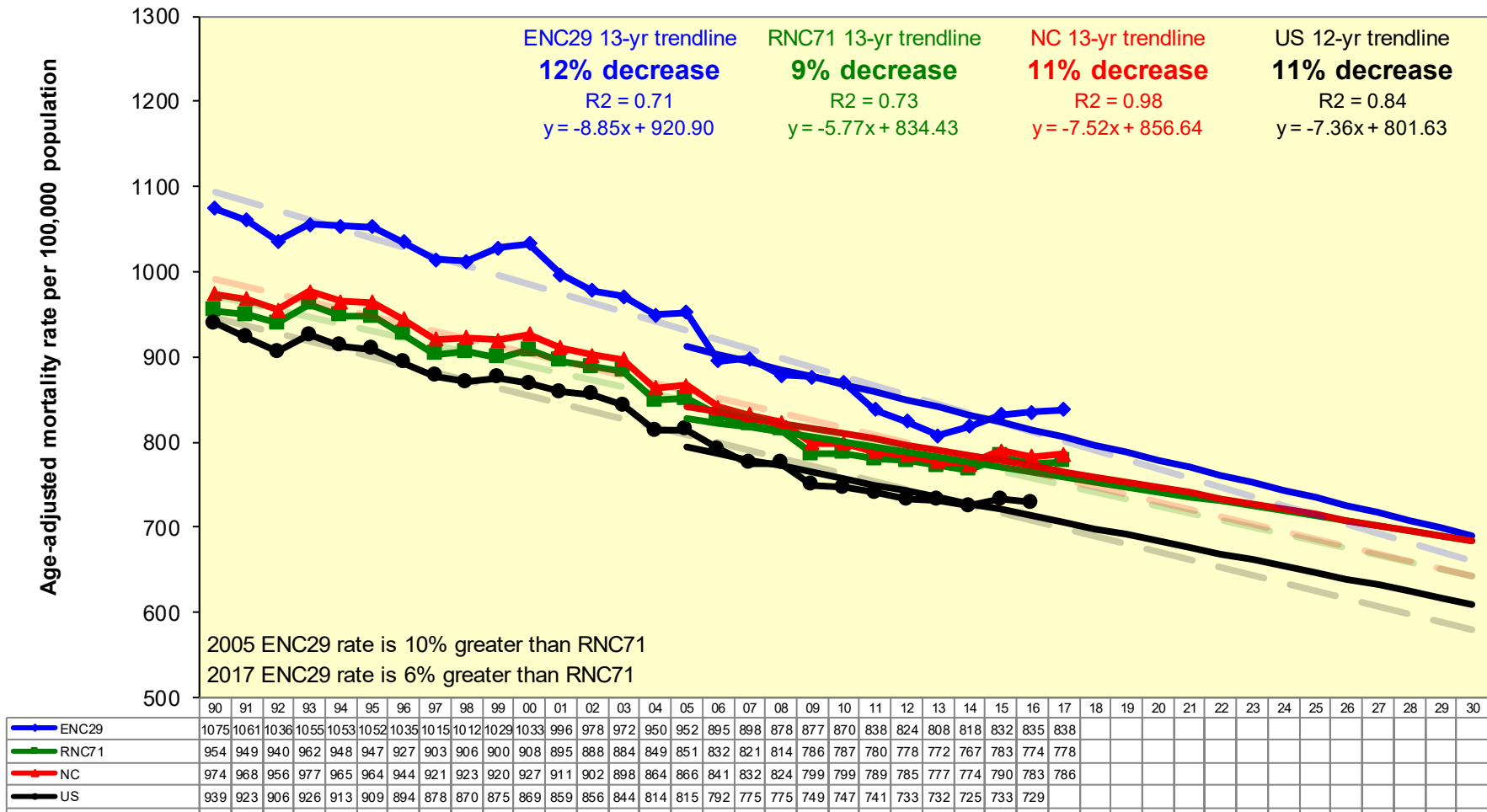


Figure 5.1 ii. All Causes of Death:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US,
1990-2017 with projections to 2030



Comparison of Fitted Rates in 2005				
ENC29	RNC71	NC	US	
	9% LT	7% LT	13% LT	ENC29
10% GT		3% GT	4% LT	RNC71
8% GT	3% LT		6% LT	NC
15% GT	4% GT	7% GT		US

Comparison of Fitted Rates in 2017				
ENC29	RNC71	NC	US	
	6% LT	6% LT	12% LT	ENC29
6% GT		0% GT	7% LT	RNC71
6% GT	0% LT		7% LT	NC
14% GT	7% GT	7% GT		US

Figure 5.1 iii. All Causes of Death:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

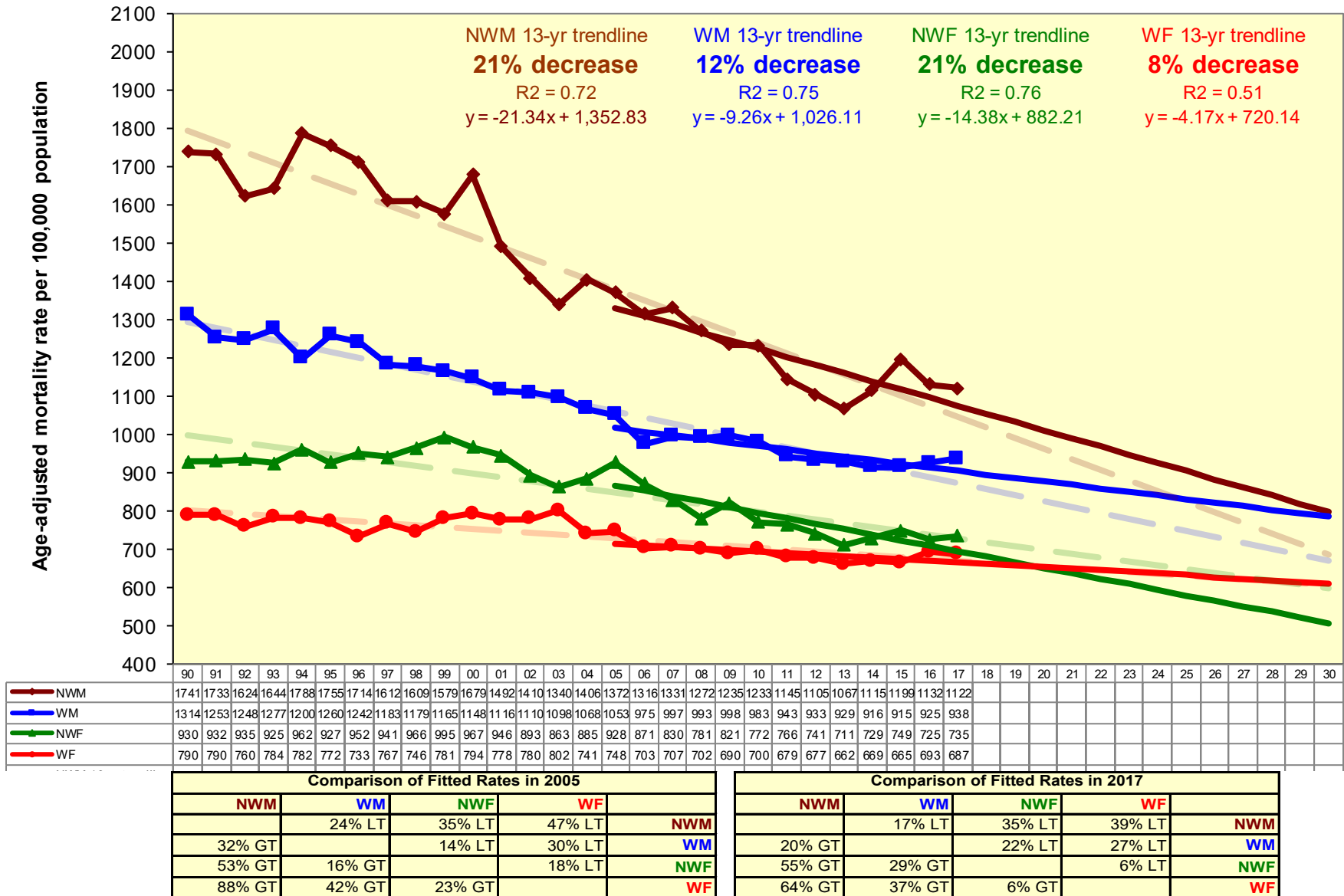


Figure 5.1 iv. All Causes of Death:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

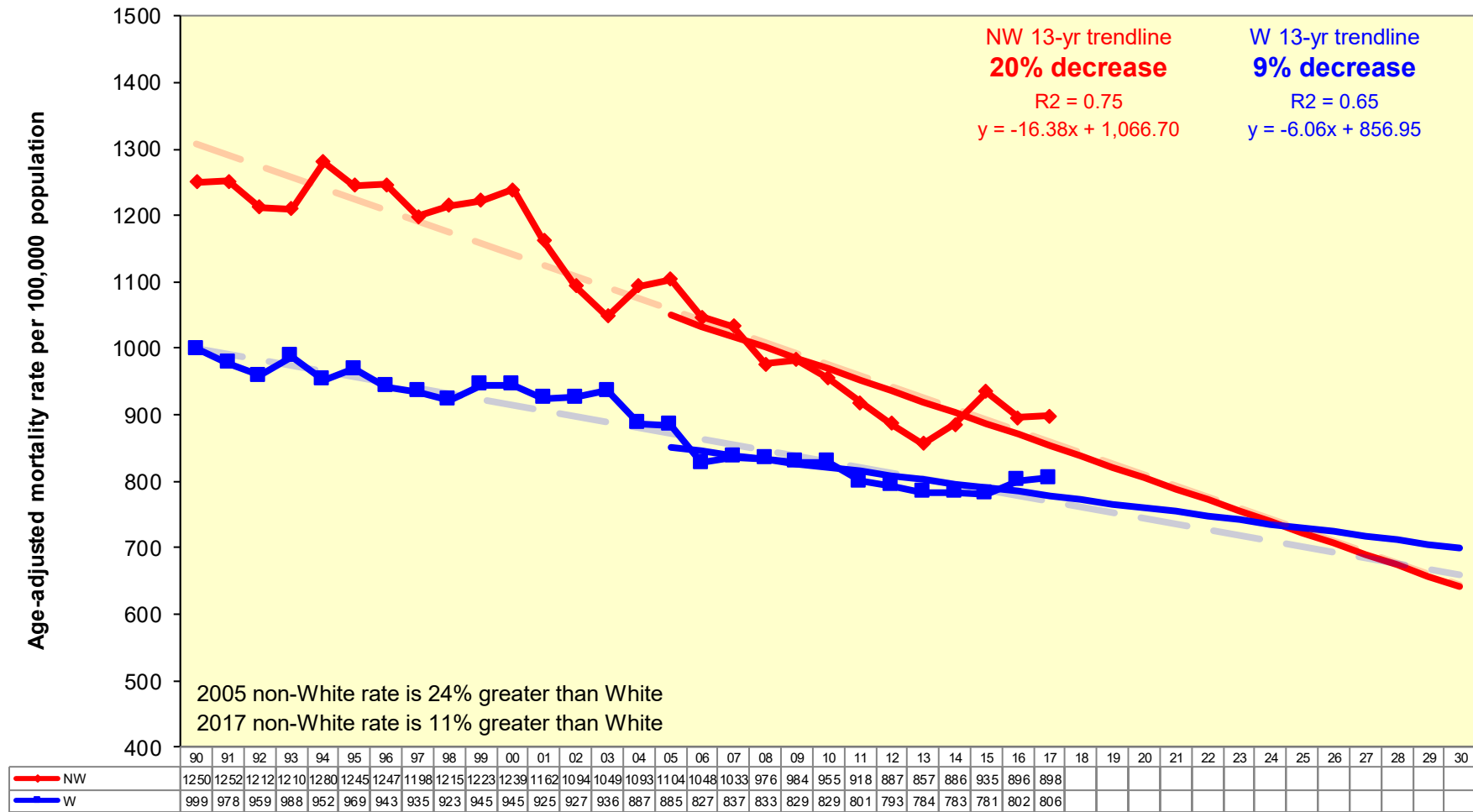
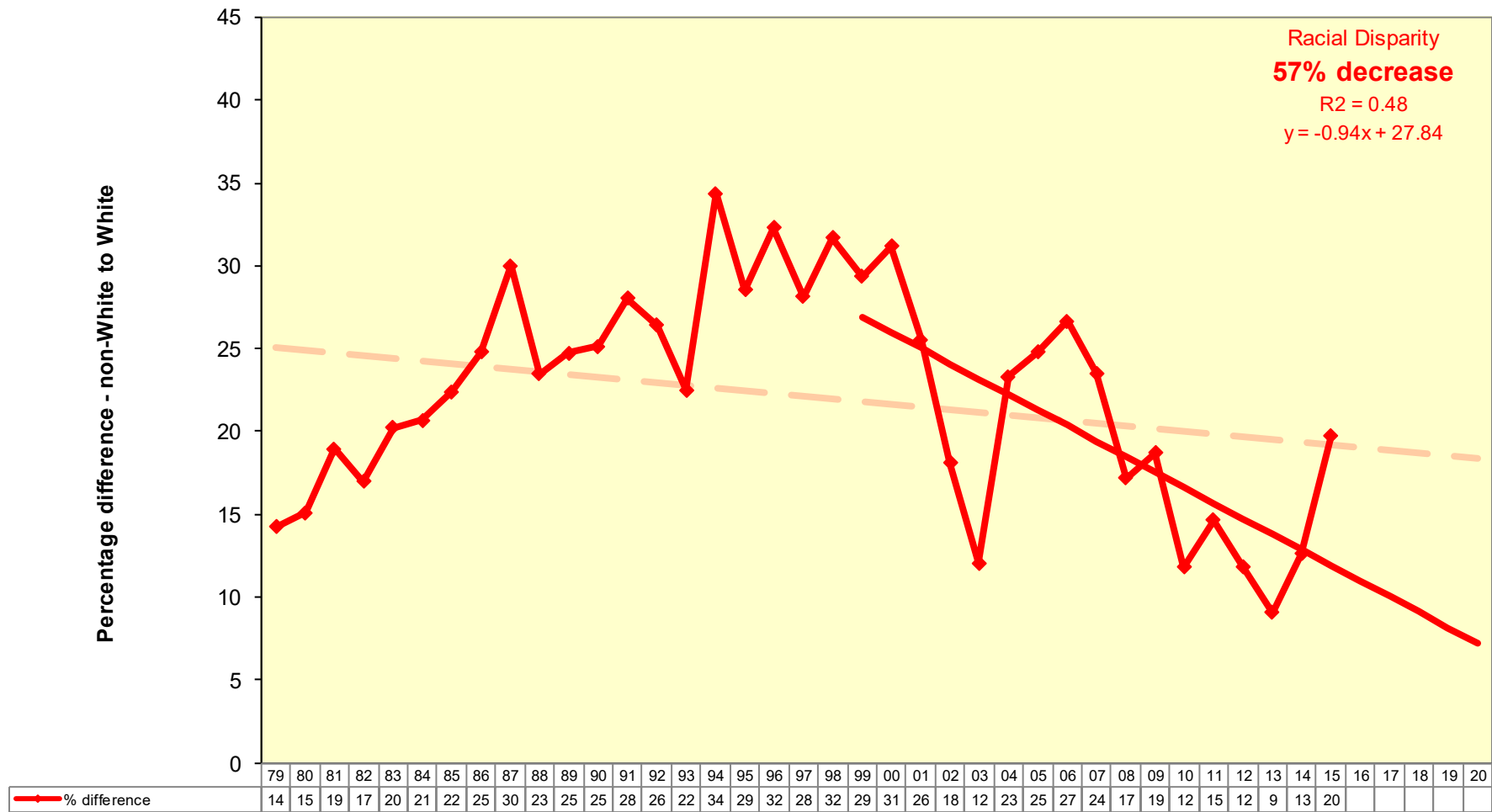


Figure 5.1 v. All Causes of Death:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030

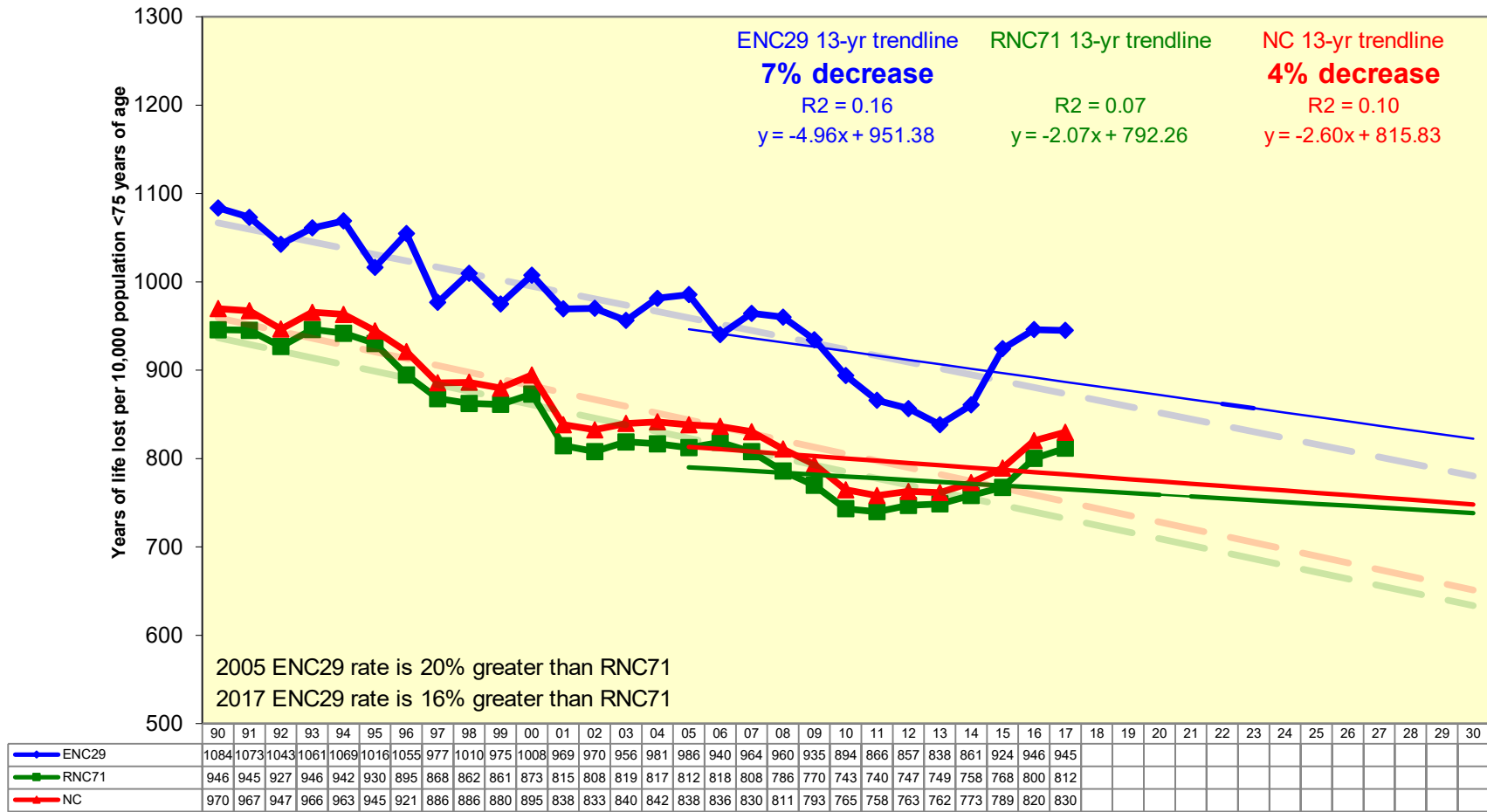


All Causes of Premature Mortality

- ENC's premature mortality rate trend has decreased slightly over the 13-year period since 2005, but the trend is not reliable.
- The age-adjusted premature mortality rate trend for ENC has decreased 9% over the recent 13-year period. It remains 17% greater than the RNC rate in 2017
- The non-White male mortality rate trend is higher than any other demographic group, but has decreased 17% over the 13-year period. White females have the lowest rate but the trend is unreliable.
- A decrease in the premature mortality rate for non-Whites and a leveling of rates for Whites suggests a reduction in racial disparity
- The 13-year trend for racial disparity shows a 37% 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 $R^2 < 0.10$.

Figure 5.2 i. All Causes of Premature Mortality:
Trends in premature mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030



Comparison of Fitted Rates in 2005			
ENC29	RNC71	NC	
	17% LT	14% LT	ENC29
20% GT		3% GT	RNC71
17% GT	3% LT		NC

Comparison of Fitted Rates in 2017			
ENC29	RNC71	NC	
	14% LT	12% LT	ENC29
16% GT		2% GT	RNC71
14% GT	2% LT		NC

Figure 5.2 ii. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

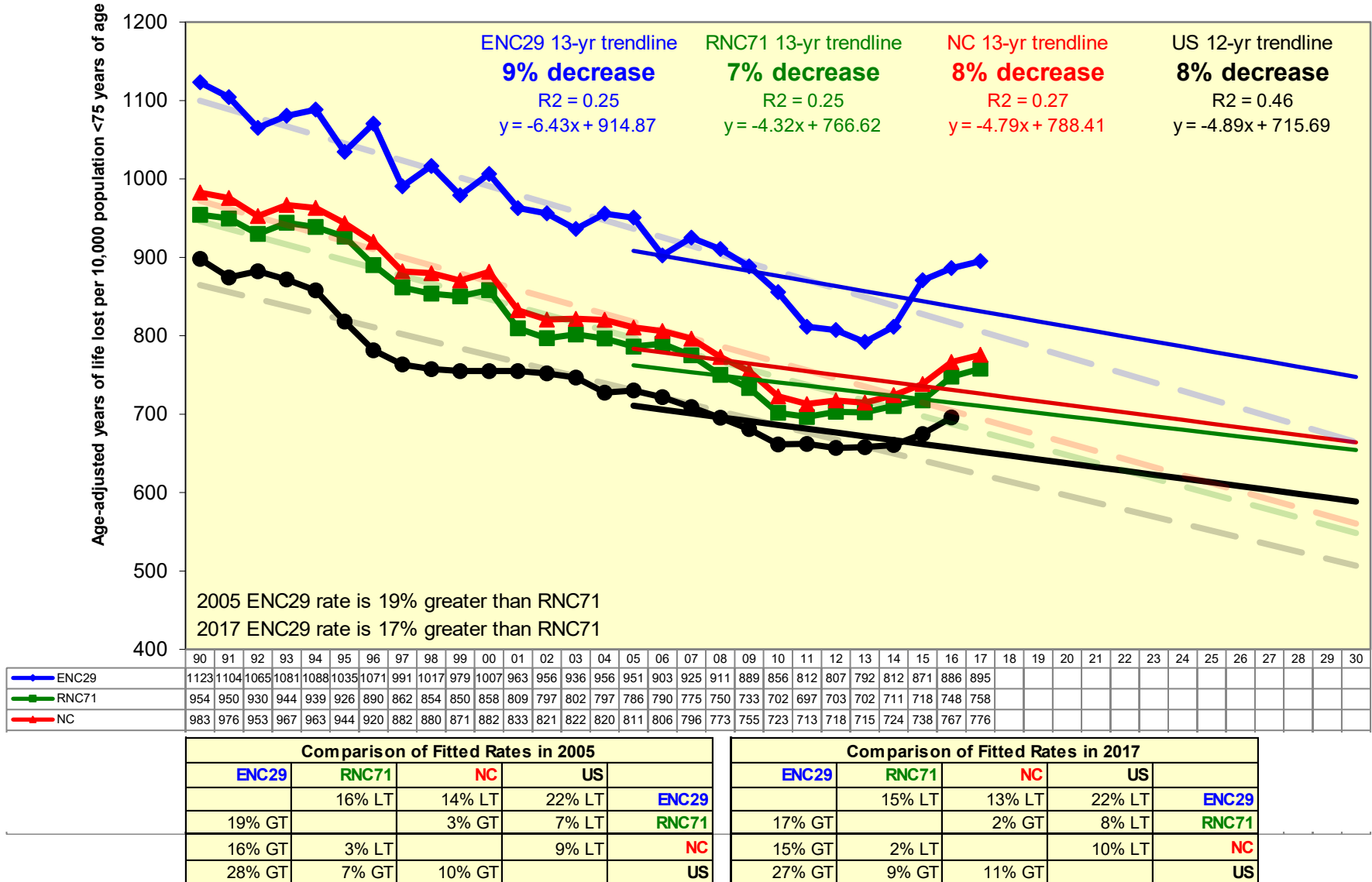


Figure 5.2 iii. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

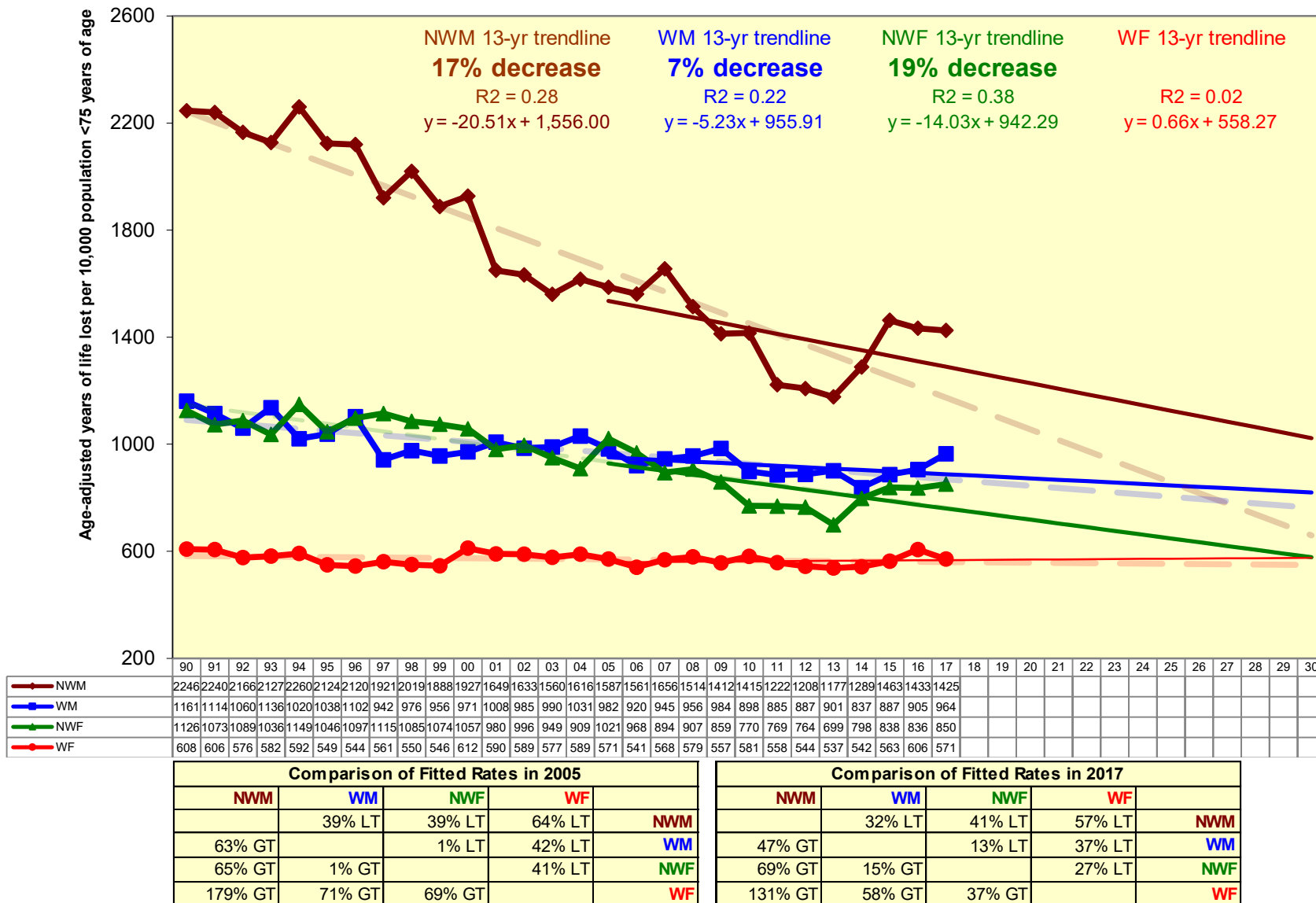


Figure 5.2 iv. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race for ENC29,
1990-2017 with projections to 2030

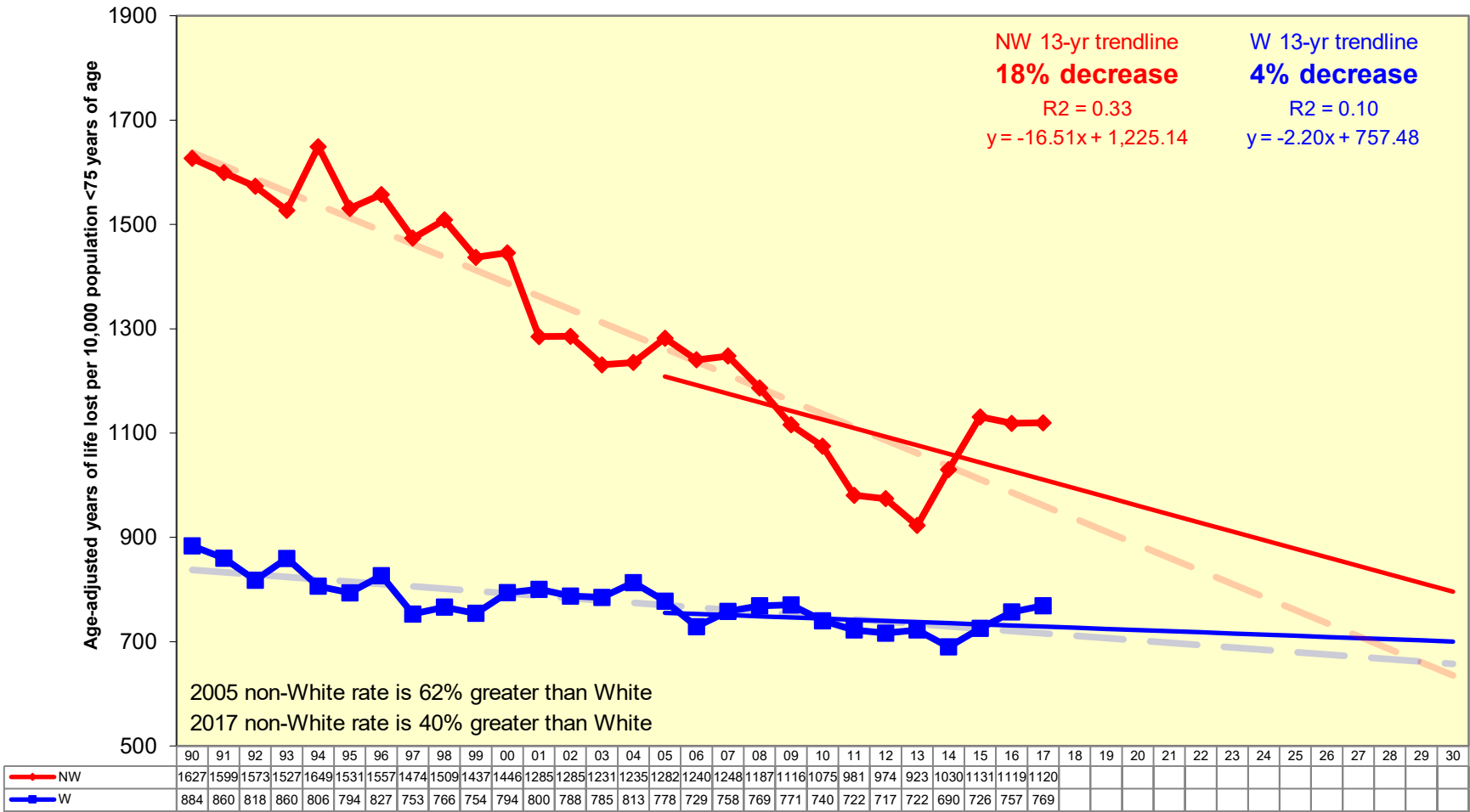
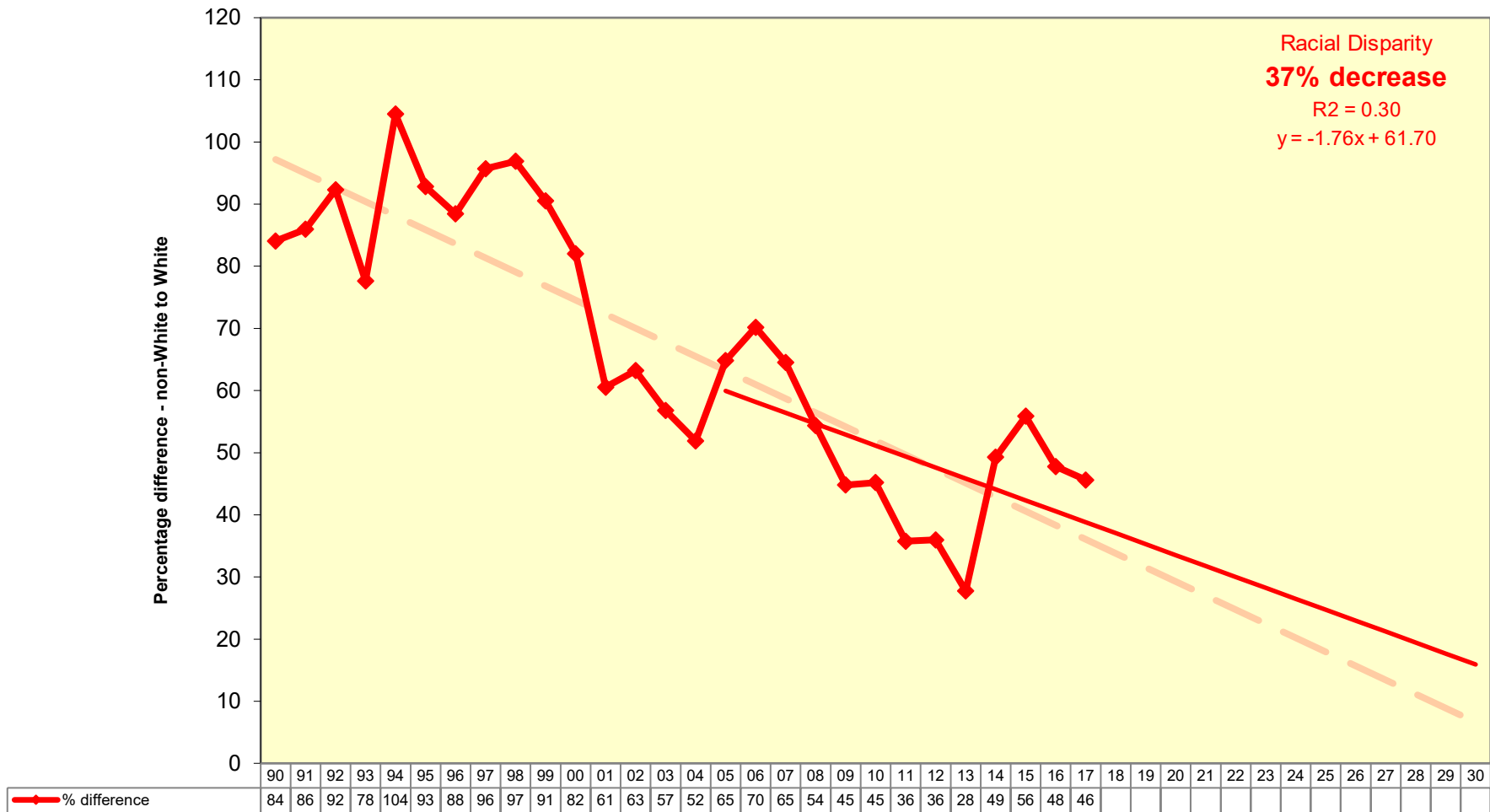


Figure 5.2 v. All Causes of Premature Mortality:
 Measuring disparity in age-adjusted premature mortality rates by race for ENC29,
 1990-2017 with projections to 2030



6. Trends and Disparities in Mortality in ENC29: Ten Specific Leading Causes of Death, 1990-2017

Diseases of Heart

- ENC's 13-year mortality rate trend decreased 8%; over the same period the rate for RNC and NC decreased 10%. ENC's rate remains well above the others
- While ENC's age-adjusted mortality rate trend is decreasing at a pace similar to RNC, NC and the US, the ENC rate remains 13% greater than the RNC rate in 2017.
- 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, for 2017, was lower
- The non-White rate trend remains 6% greater than for Whites, but the 13-year trends for both are decreasing and convergence is suggested in the future.
- The 13-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,
1990-2017 with projections to 2030

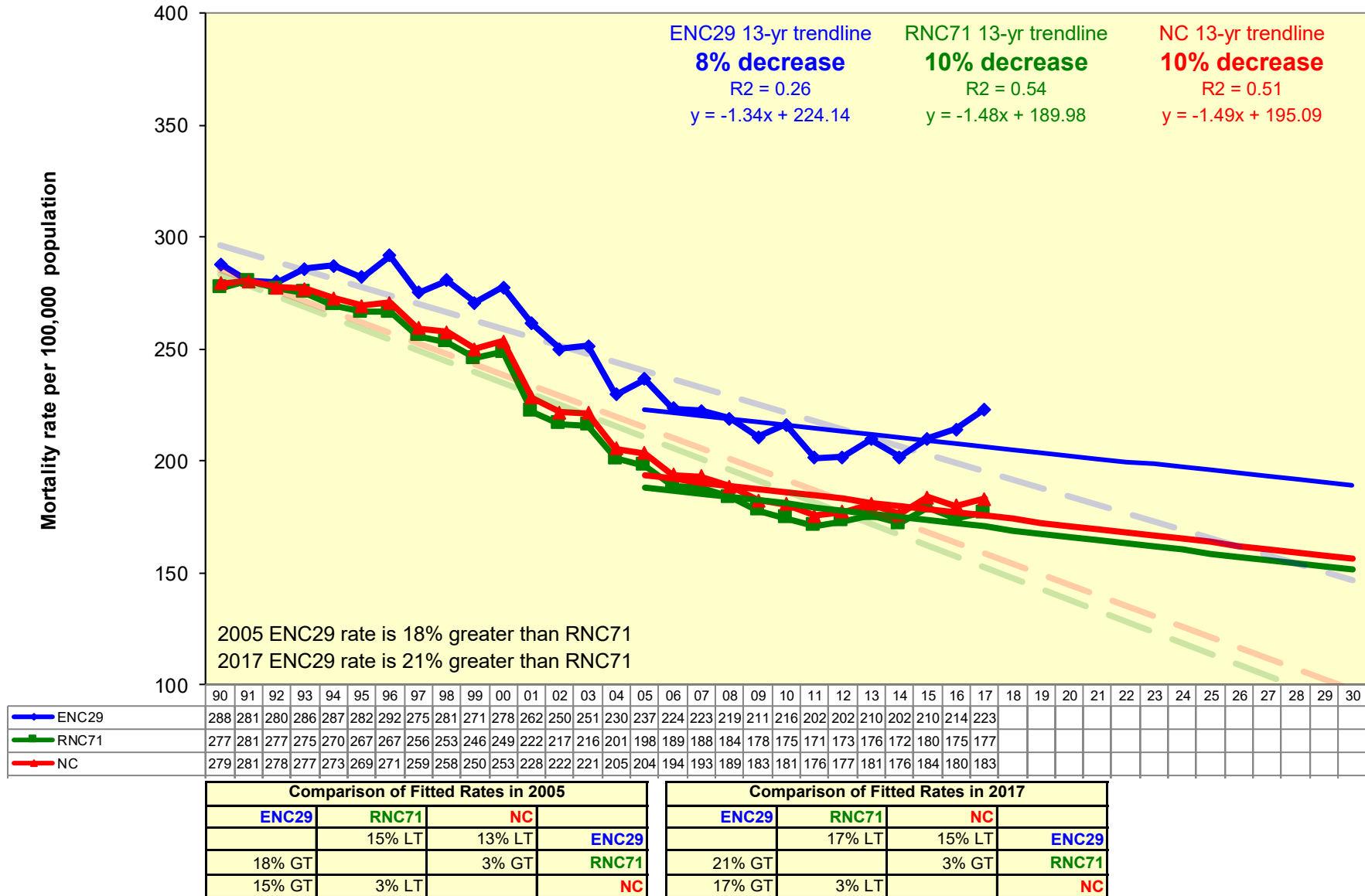


Figure 6.1 ii. Diseases of Heart:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

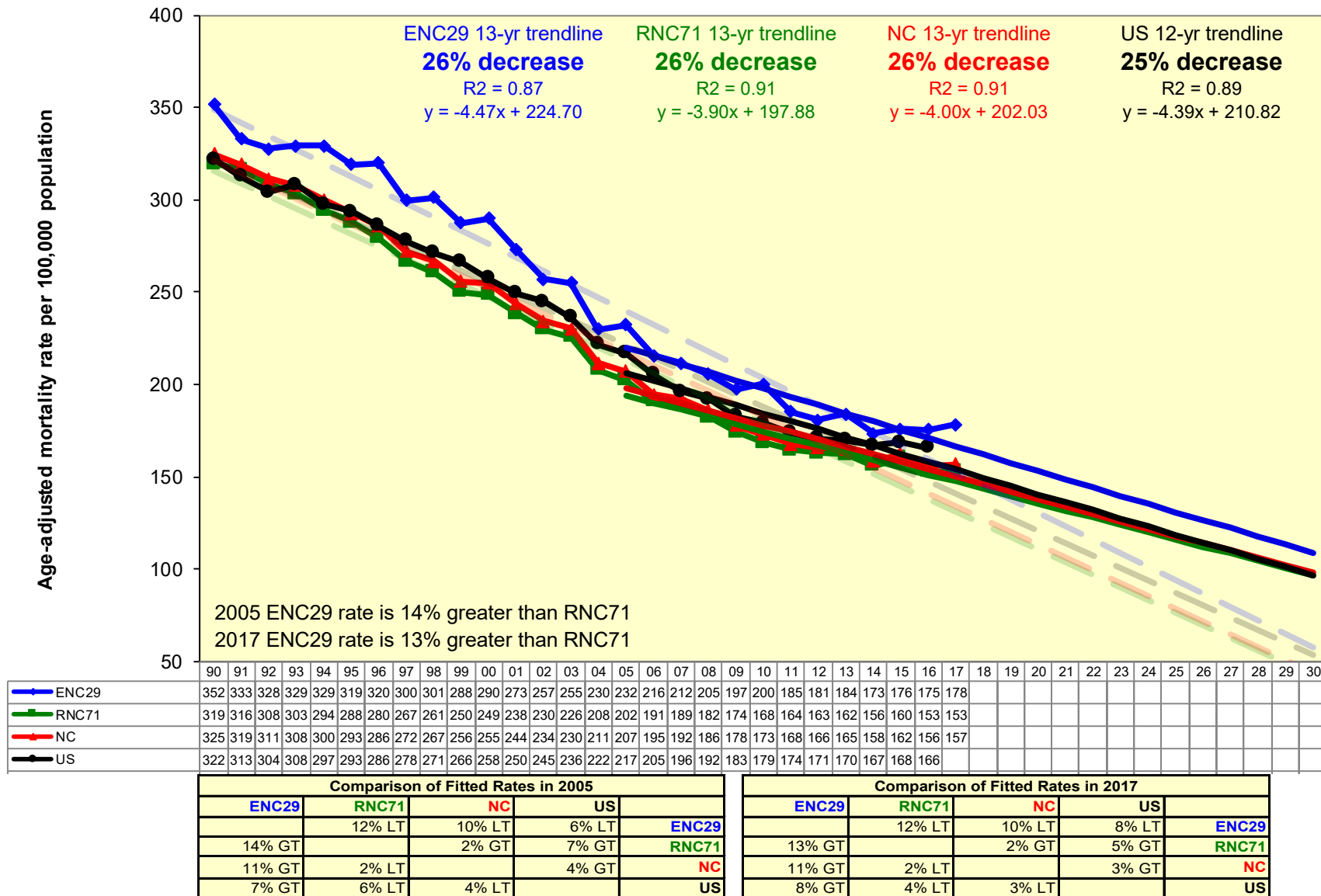
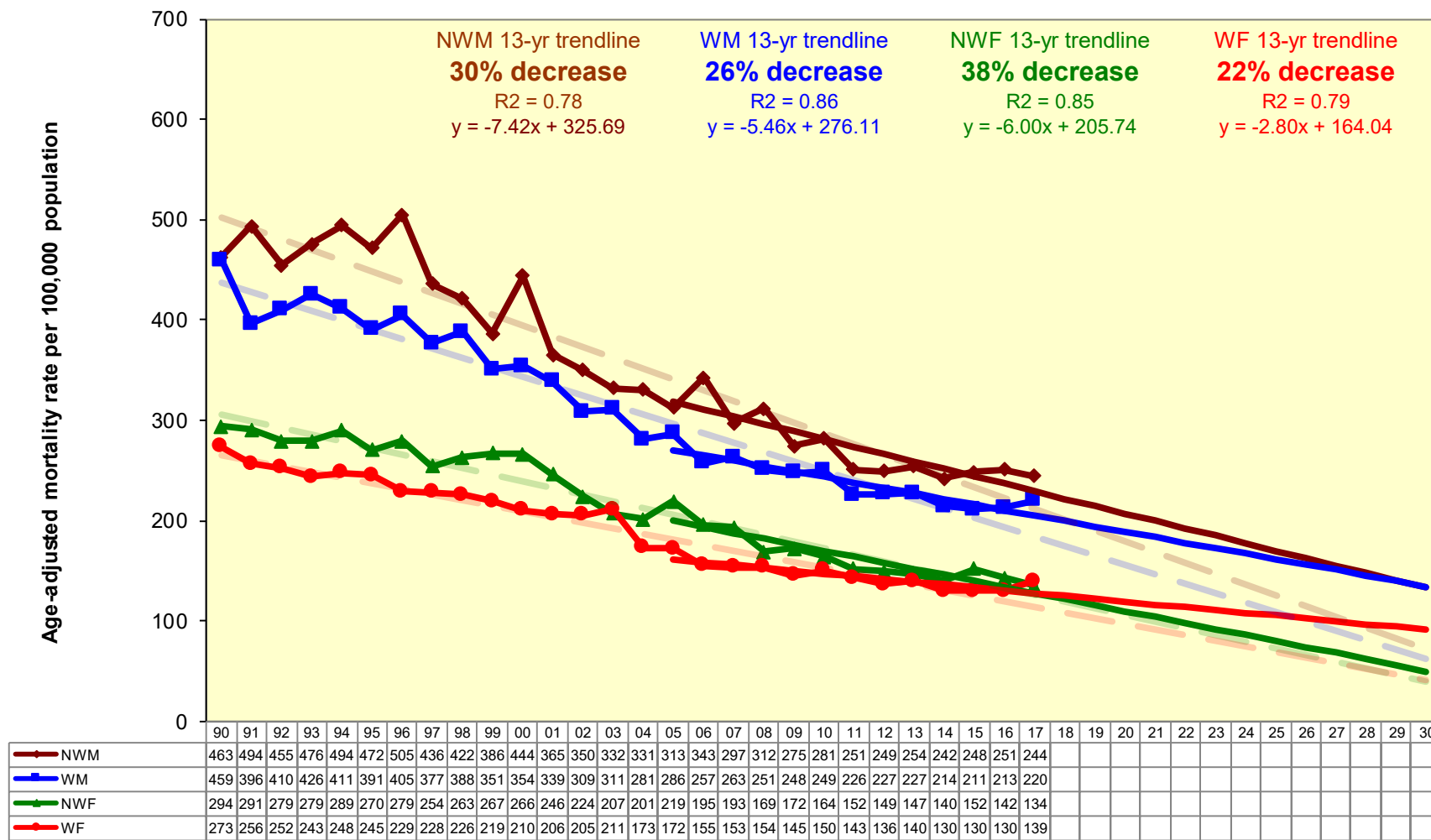


Figure 6.1 iii. Diseases of Heart:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030



Comparison of Fitted Rates in 2005					Comparison of Fitted Rates in 2017				
NWM	WM	NWF	WF		NWM	WM	NWF	WF	
	15% LT	37% LT	50% LT	NWM		11% LT	43% LT	45% LT	NWM
18% GT		25% LT	41% LT	WM	12% GT		36% LT	38% LT	WM
58% GT	34% GT		20% LT	NWF	77% GT	57% GT		2% LT	NWF
99% GT	68% GT	25% GT		WF	81% GT	61% GT	3% GT		WF

Figure 6.1 iv. Diseases of Heart:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

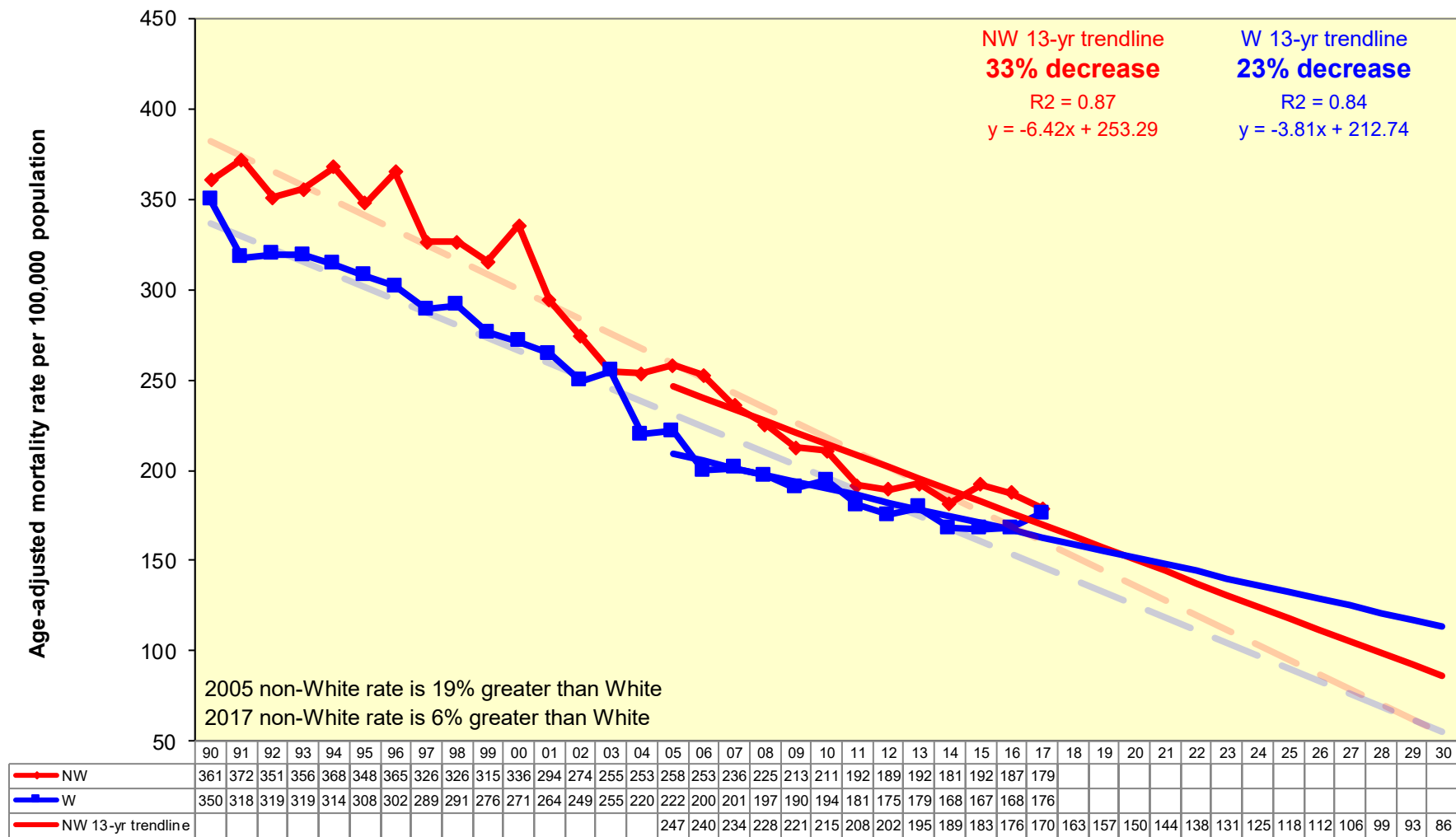
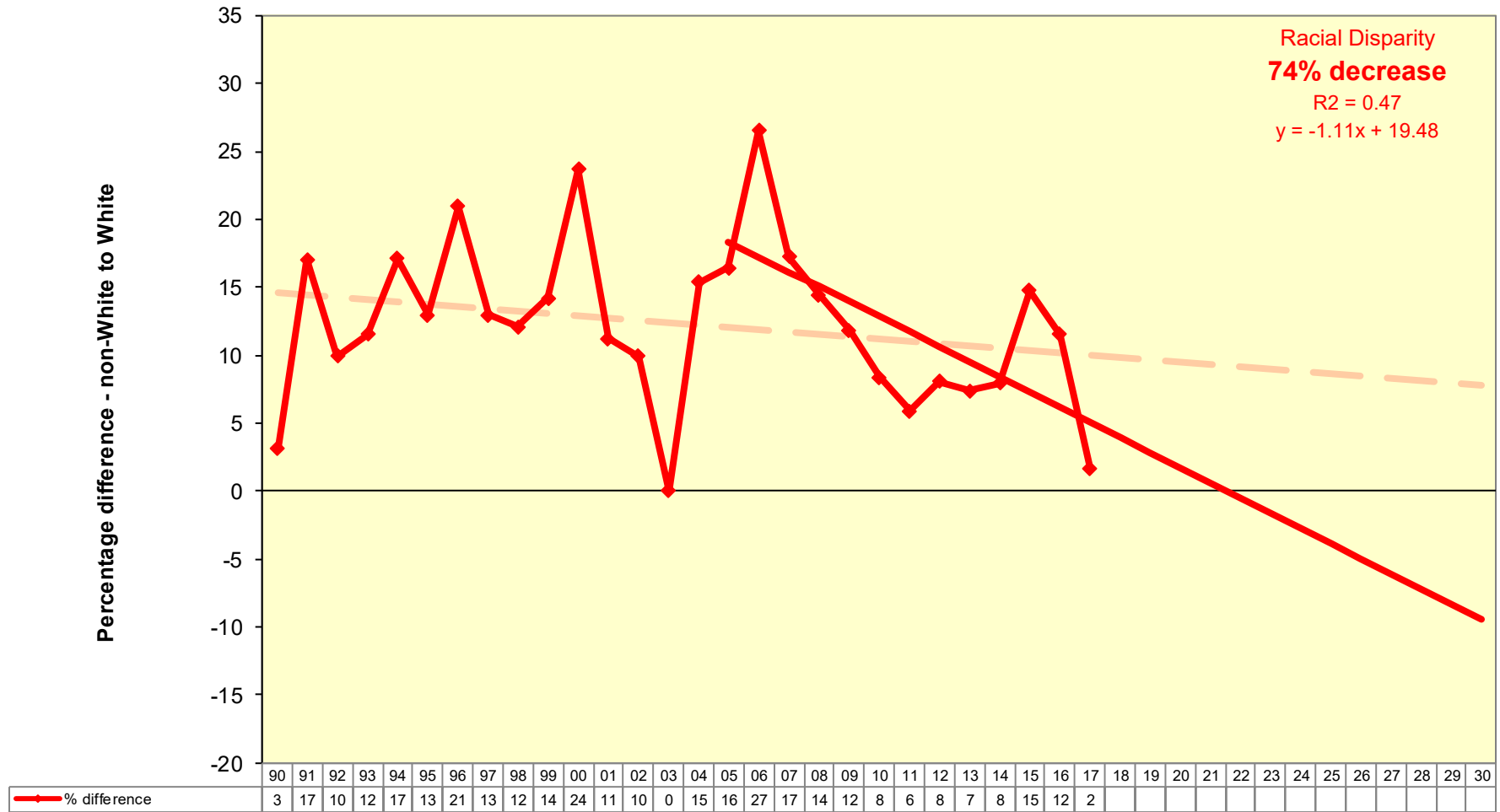


Figure 6.1 v. Diseases of Heart:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Cancer - Trachea, Bronchus, Lung

- The 13-year trend line for cancer-TBL for ENC has decreased 9% over the period in a moderately reliable trend. The rate for 2017 is 18% greater than the rate for RNC.
- In 2017 the age-adjusted rate for ENC is 10% higher than RNC. The 13-year trend rate for ENC has decreased 28%.
- The mortality rate trends for males are decreasing and the rate for non-White males has dropped below the rate for White males. The rate for non-White females is 39% 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 13-year period, but non-White is decreasing more quickly.
- The moderately reliable 13-year trend for racial disparity shows a steep 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 6.2 i. Cancer - Trachea, Bronchus, Lung:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

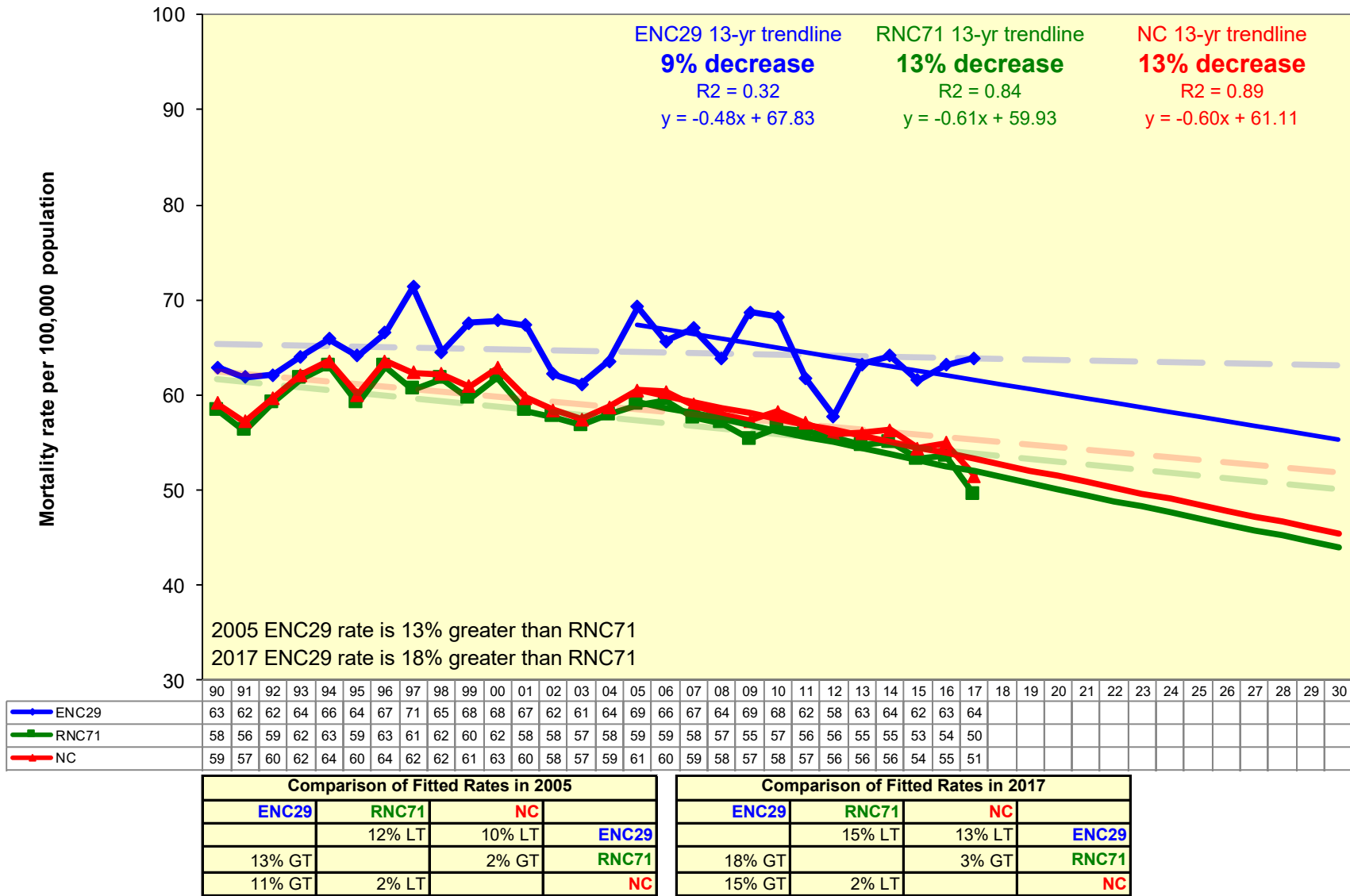


Figure 6.2 ii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

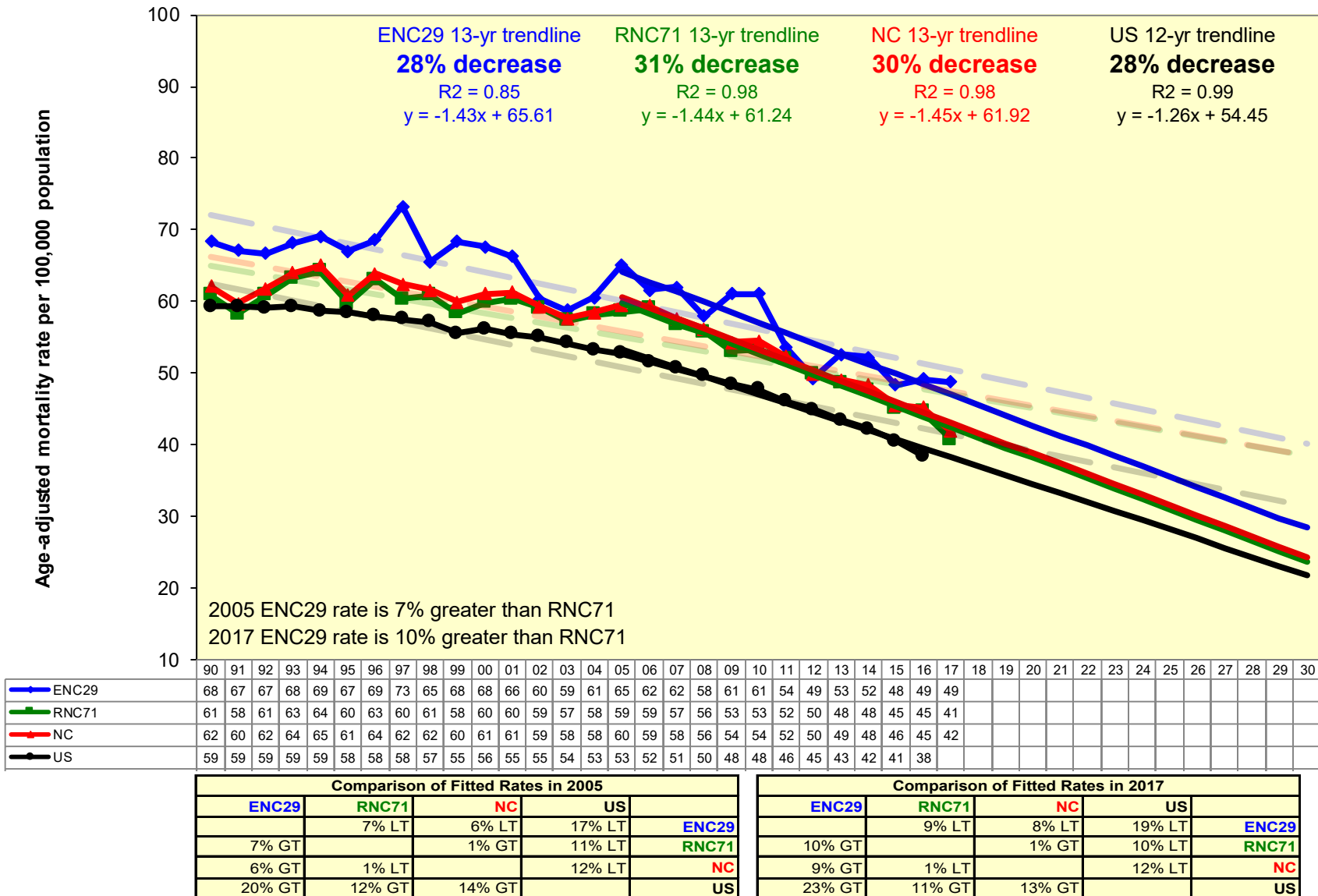


Figure 6.2 iii. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

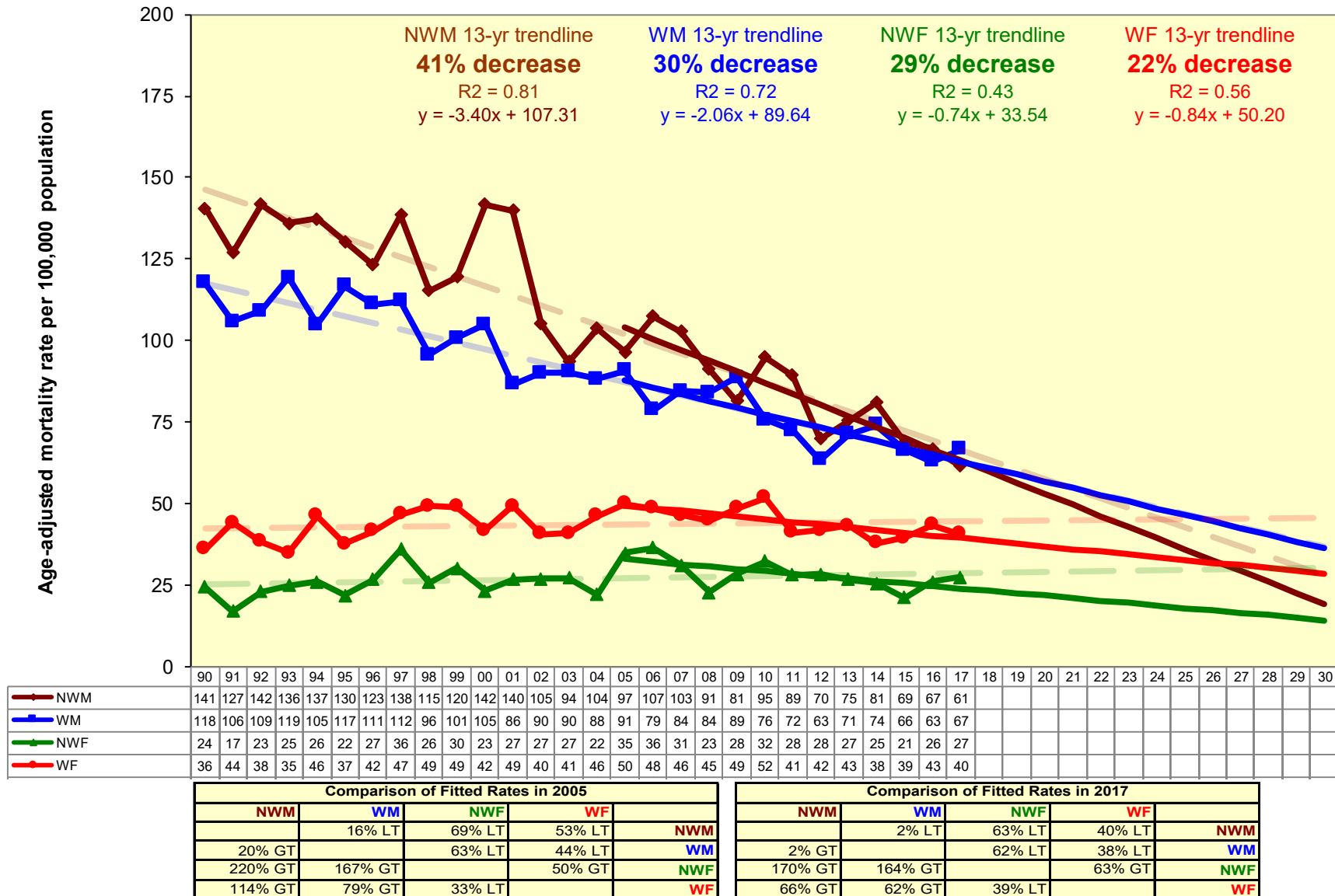


Figure 6.2 iv. Cancer - Trachea, Bronchus, Lung:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

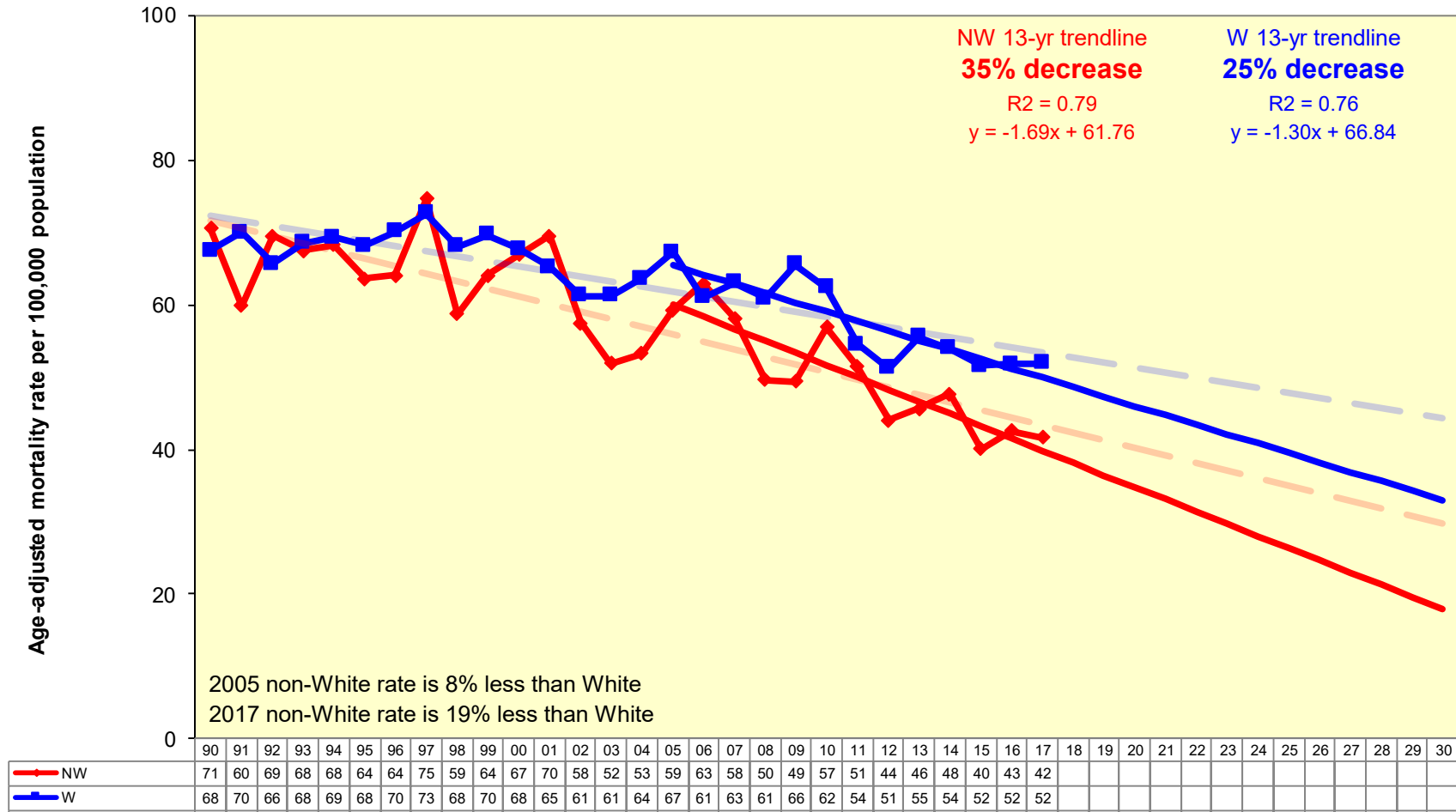
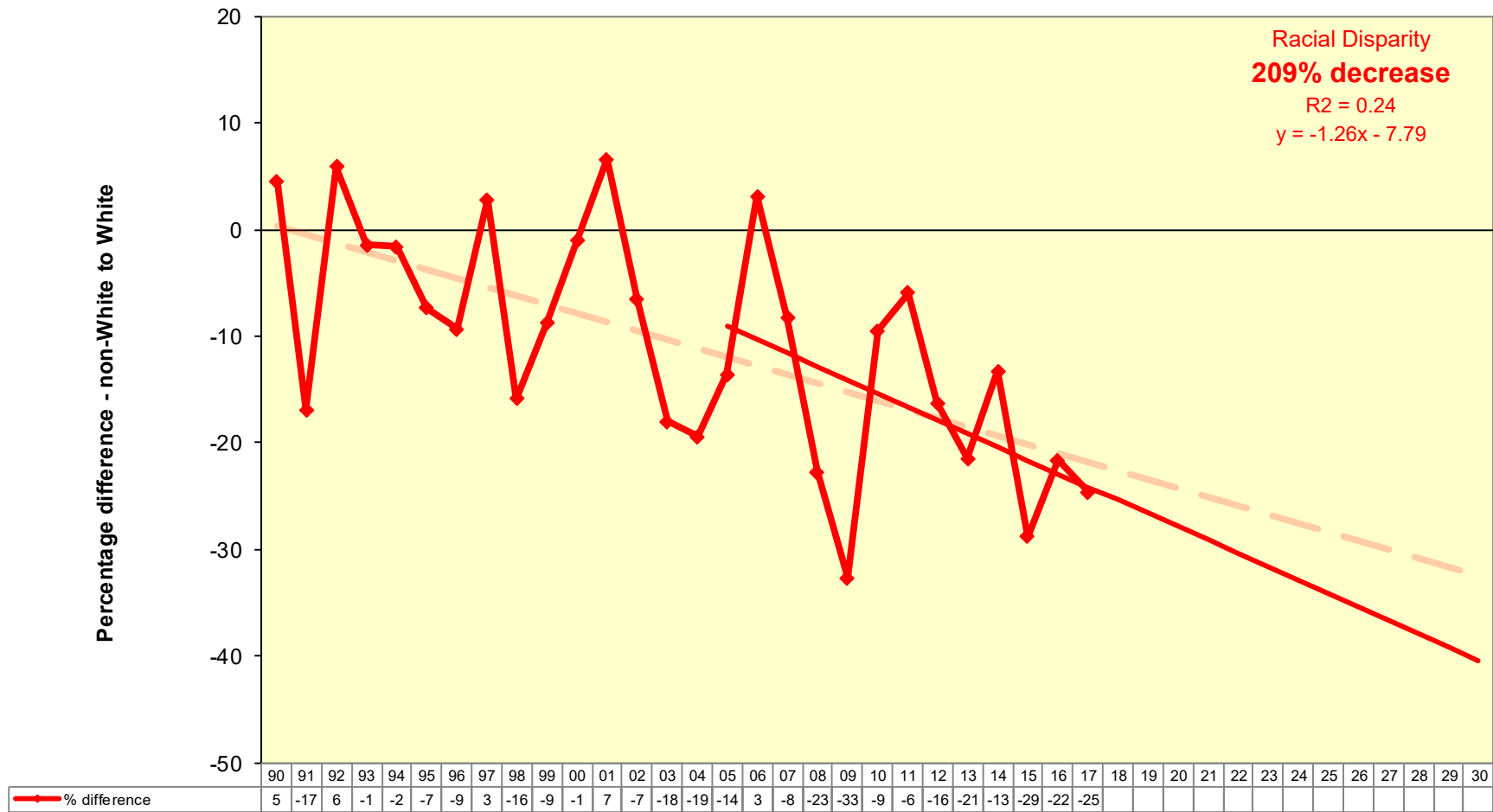


Figure 6.2 v. Cancer - Trachea, Bronchus, Lung:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Cerebrovascular Disease

- ENC's cerebrovascular disease mortality rate has turned up in recent years and is 25% greater than RNC. The 13-year trend is flat and not reliable.
- The ENC age-adjusted cerebrovascular disease mortality rate trend has decreased 19% over the 13-year period. It remains 16% greater than the RNC rate trend.
- Non-White males have the highest mortality rate for cerebrovascular disease but the rate has decreased 23% over the 13-year period. The rate for non-White females has decreased 33% 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 2017.
- The 13-year trend 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 6.3 i. Cerebrovascular Disease:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

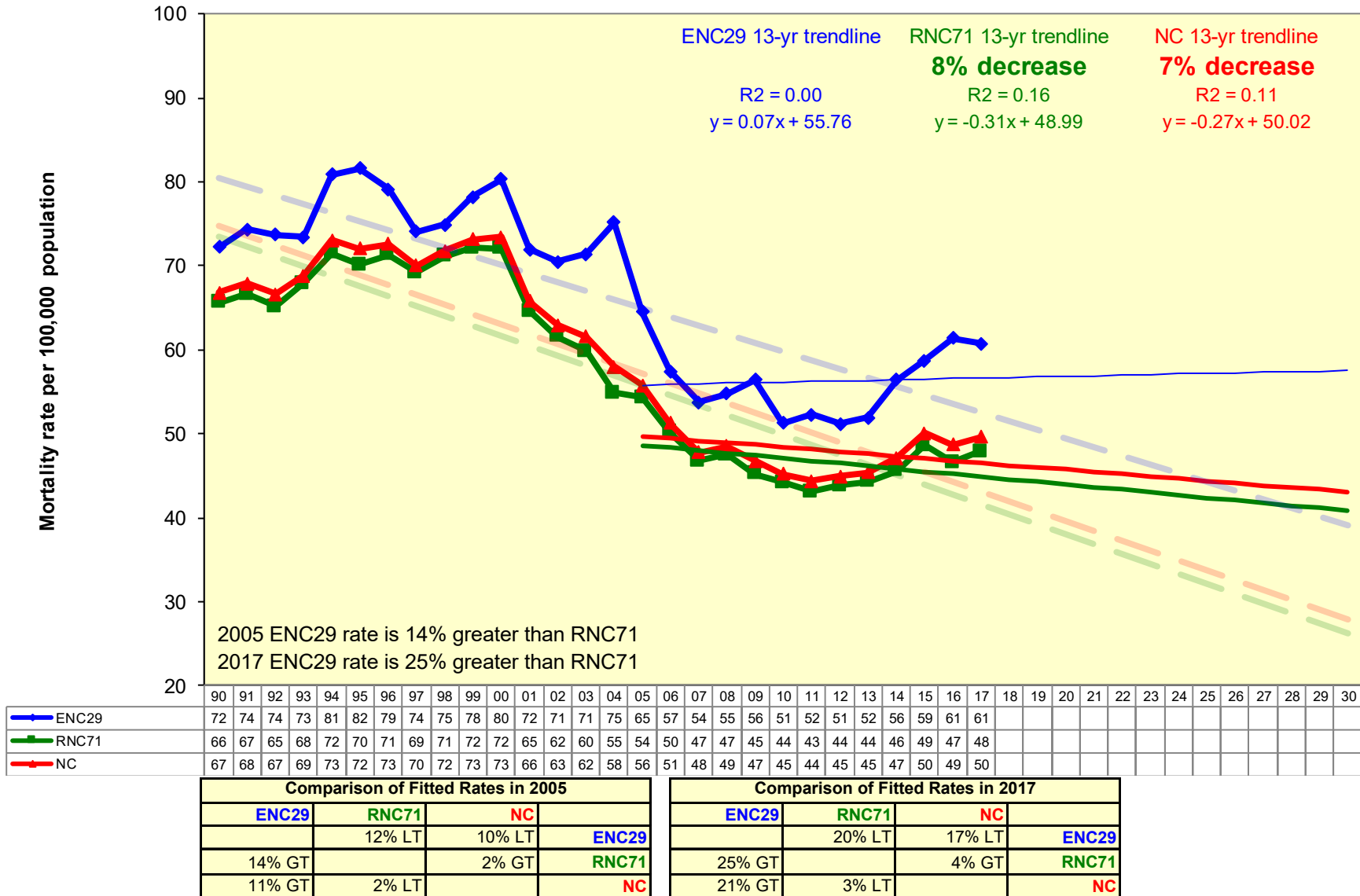


Figure 6.3 ii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US,
1990-2017 with projections to 2030

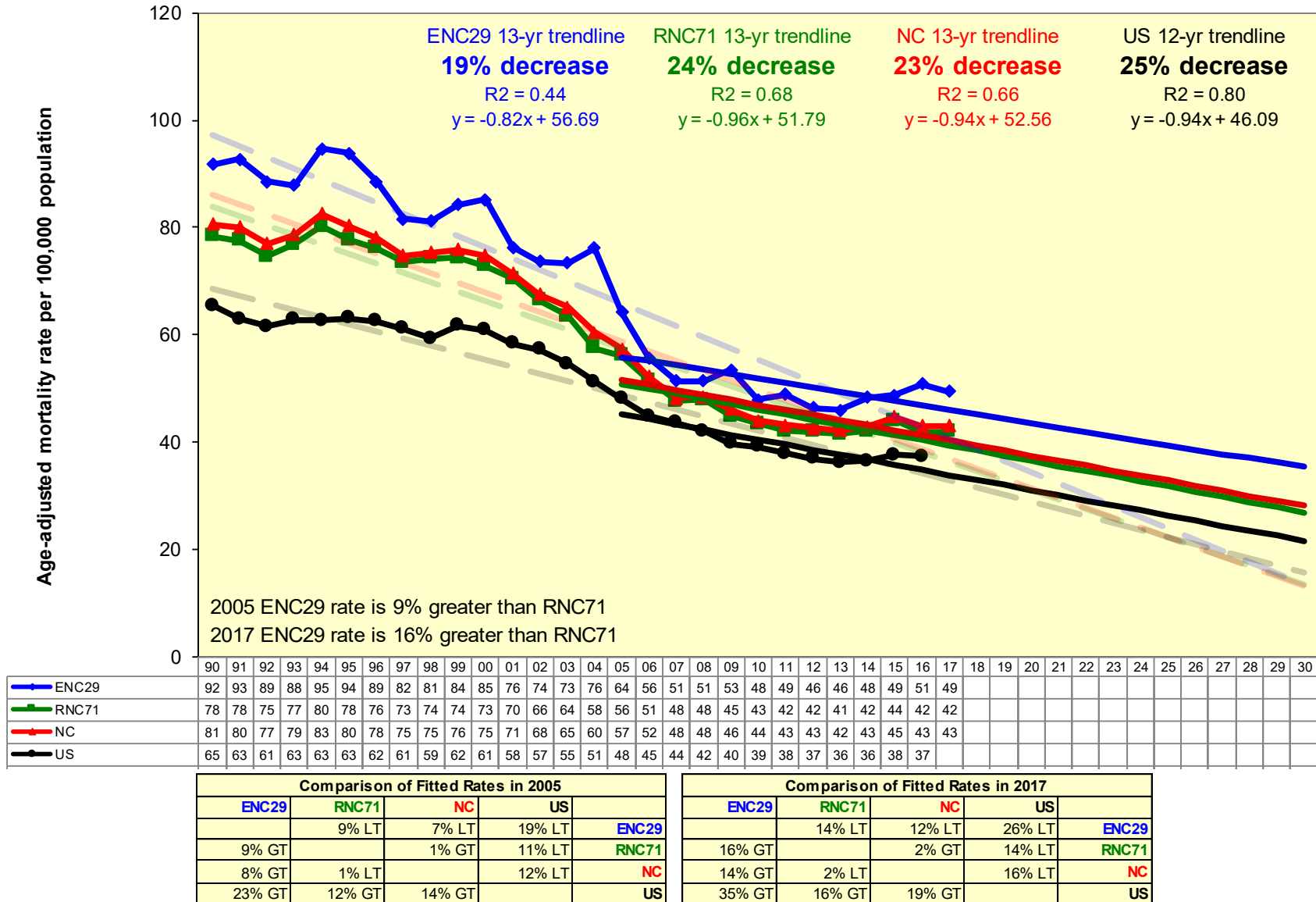


Figure 6.3 iii. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

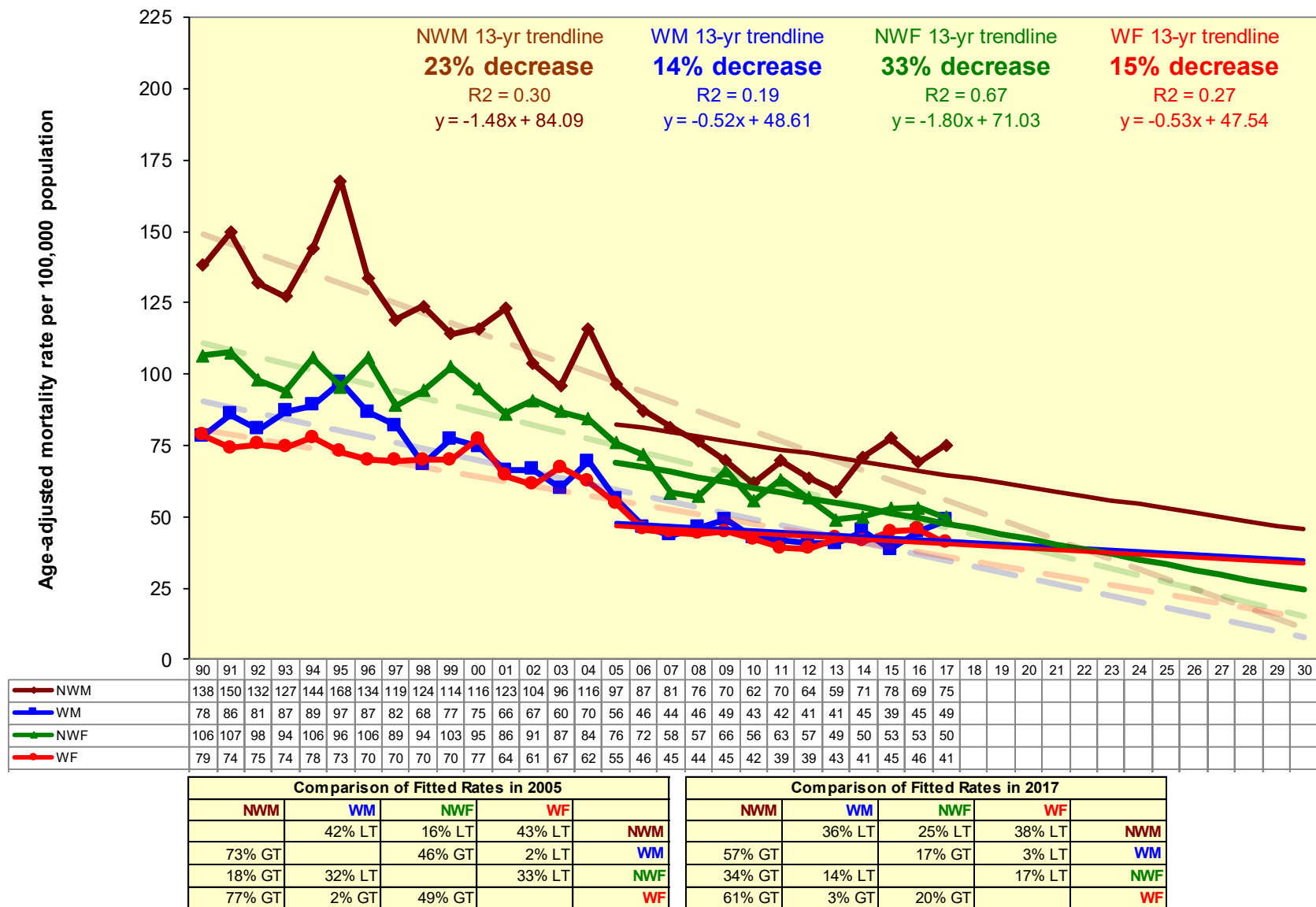


Figure 6.3 iv. Cerebrovascular Disease:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

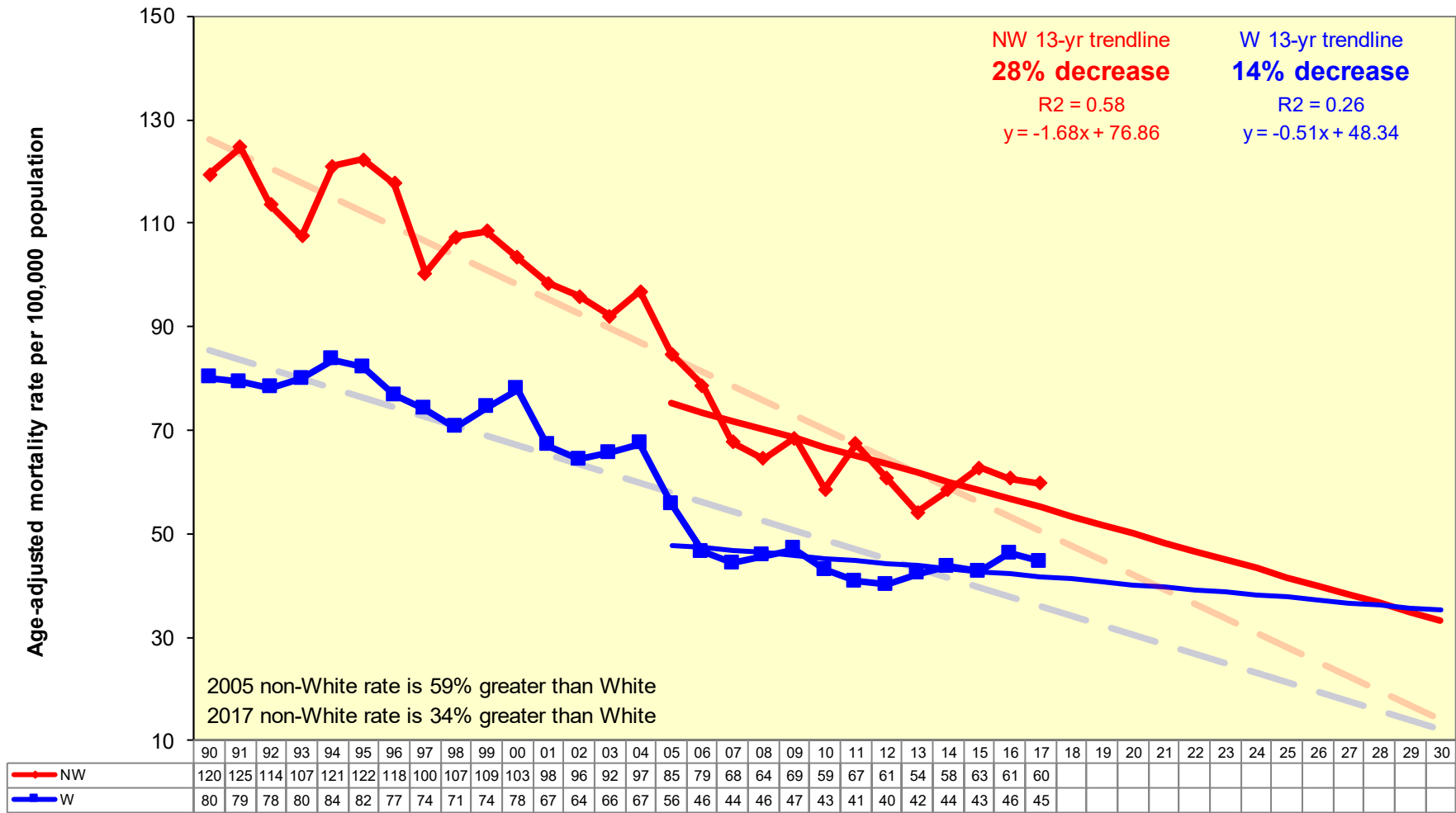
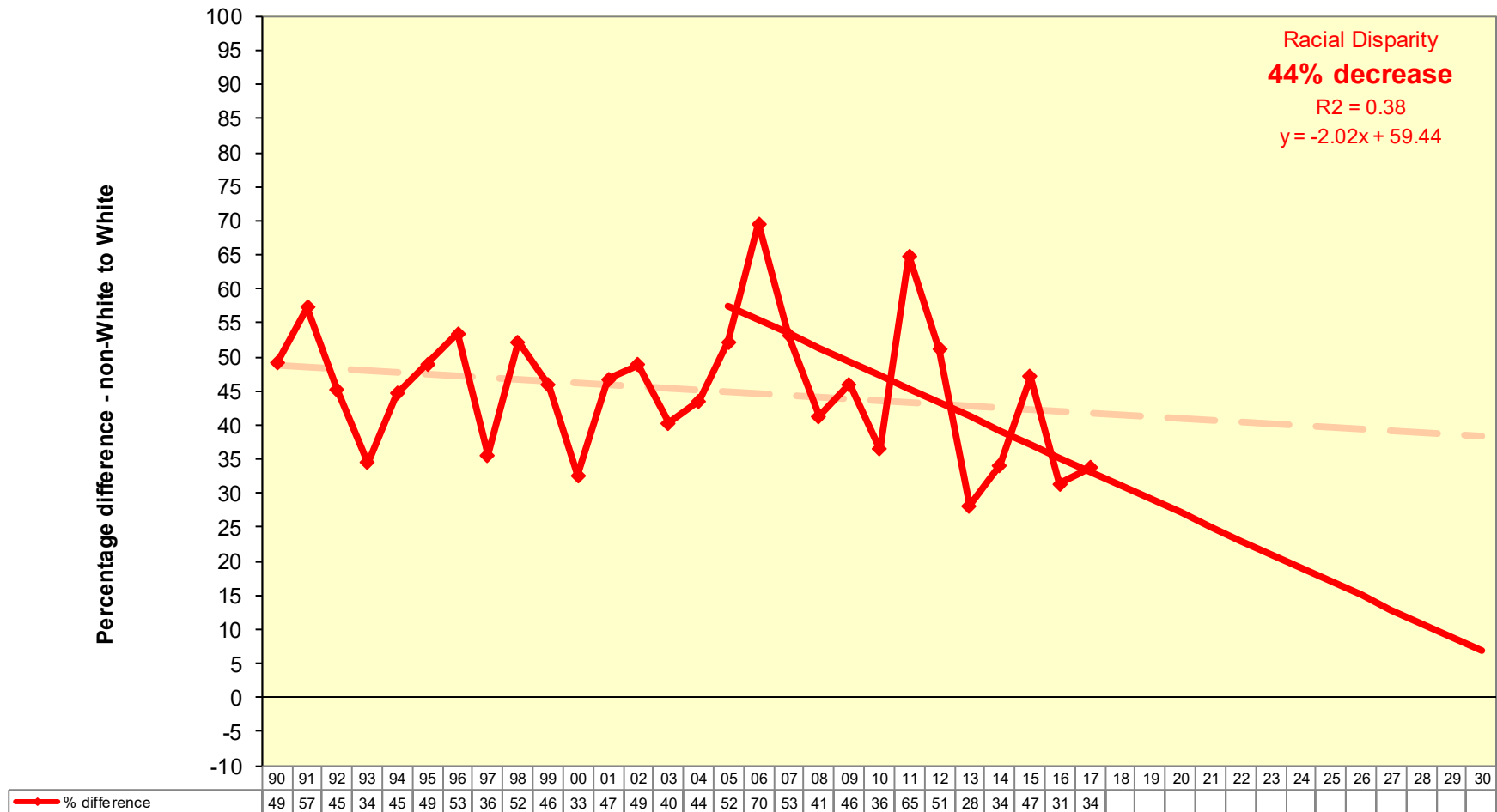


Figure 6.3 v. Cerebrovascular Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030



Chronic Lower Respiratory Diseases

- The 28-year ENC trend for CLRD is increasing, as is the 13-year trend. In 2017 the ENC rate is 3% 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 moderately reliable trend. The rate for non-White males has decreased 18% over the 13-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 not reliable.
- The 13-year trend for Whites is higher than the non-White rate. Both rates are flat, and both are 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, 1990-2017 with projections to 2030

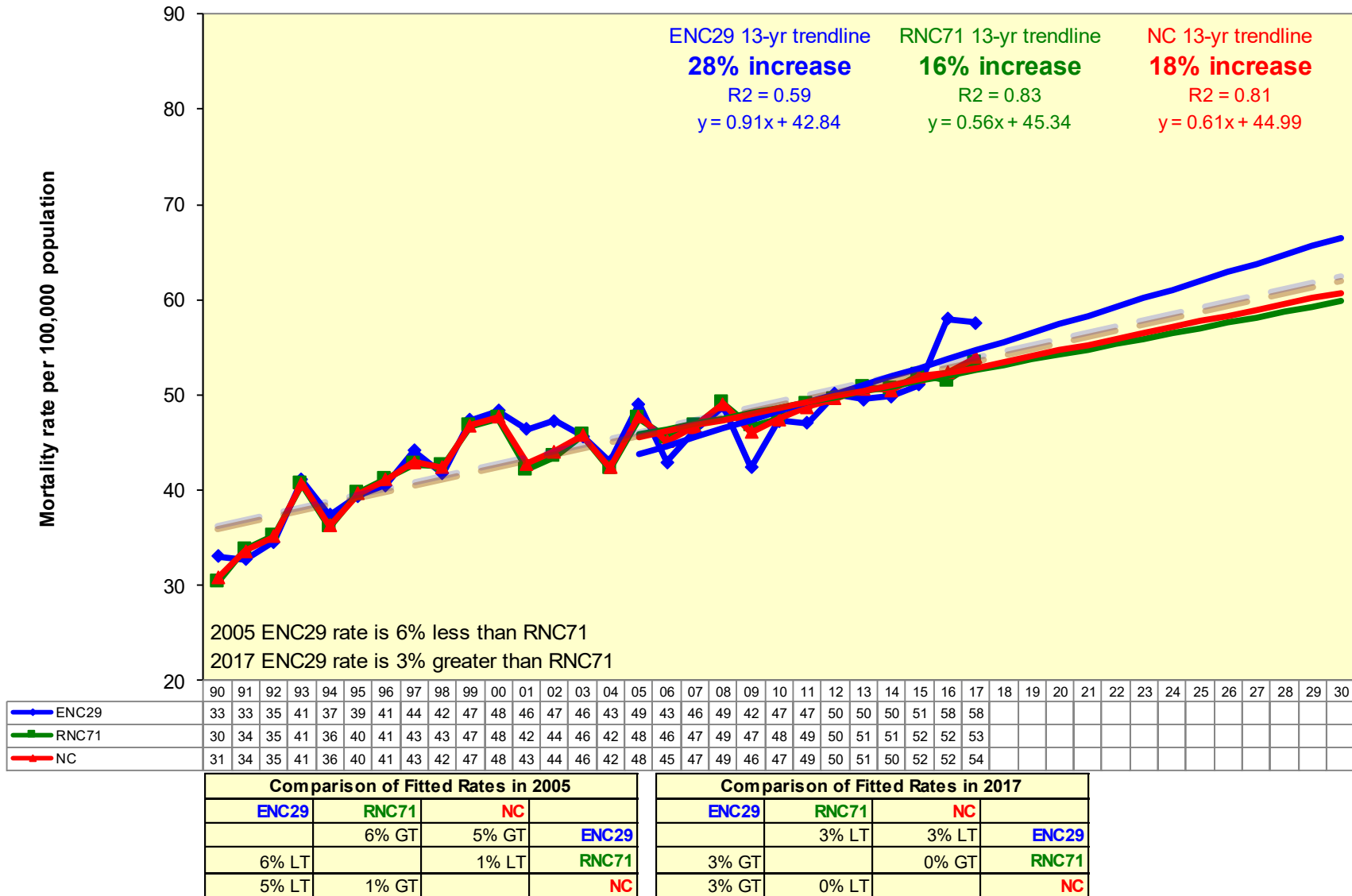


Figure 6.4 ii. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US,
1990-2017 with projections to 2030

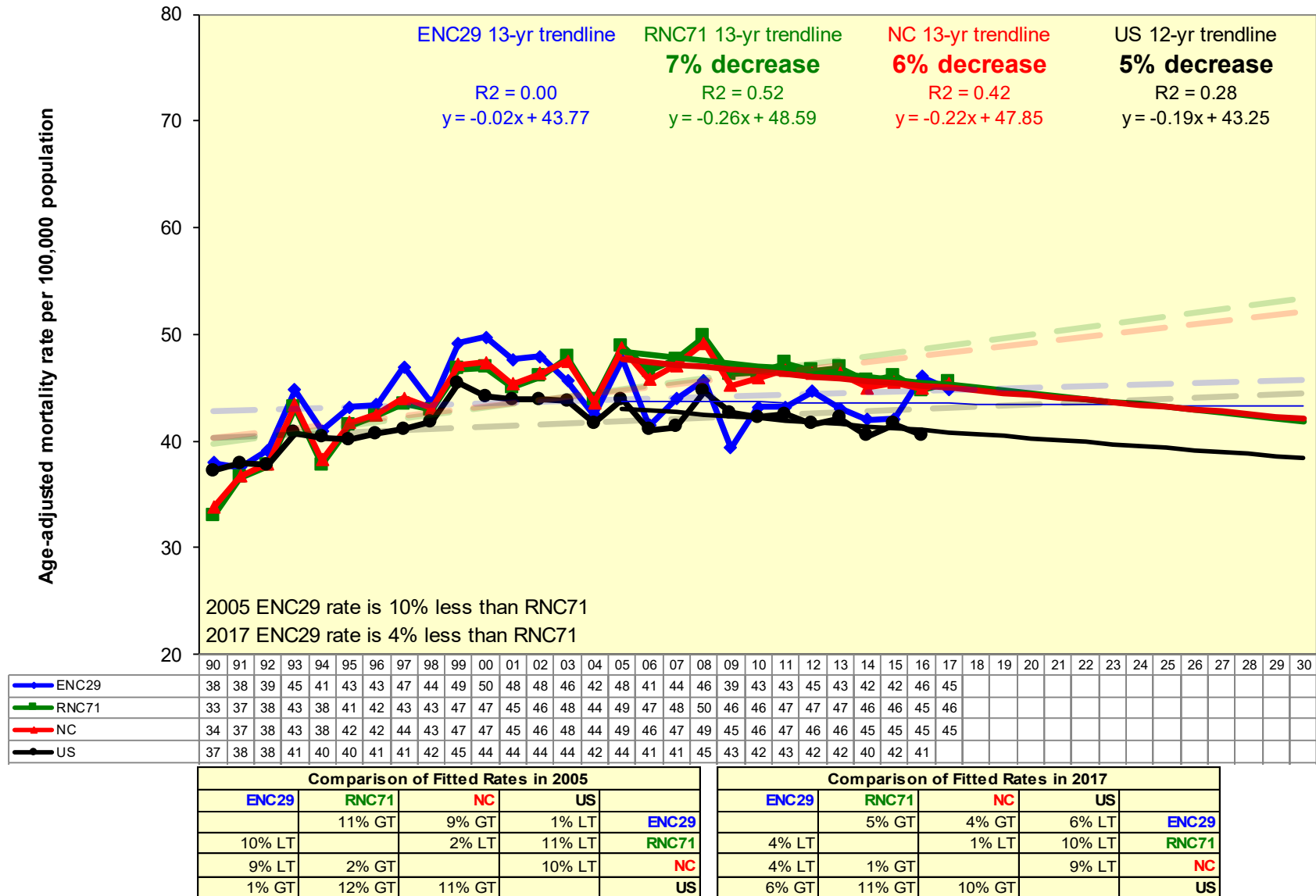


Figure 6.4 iii. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

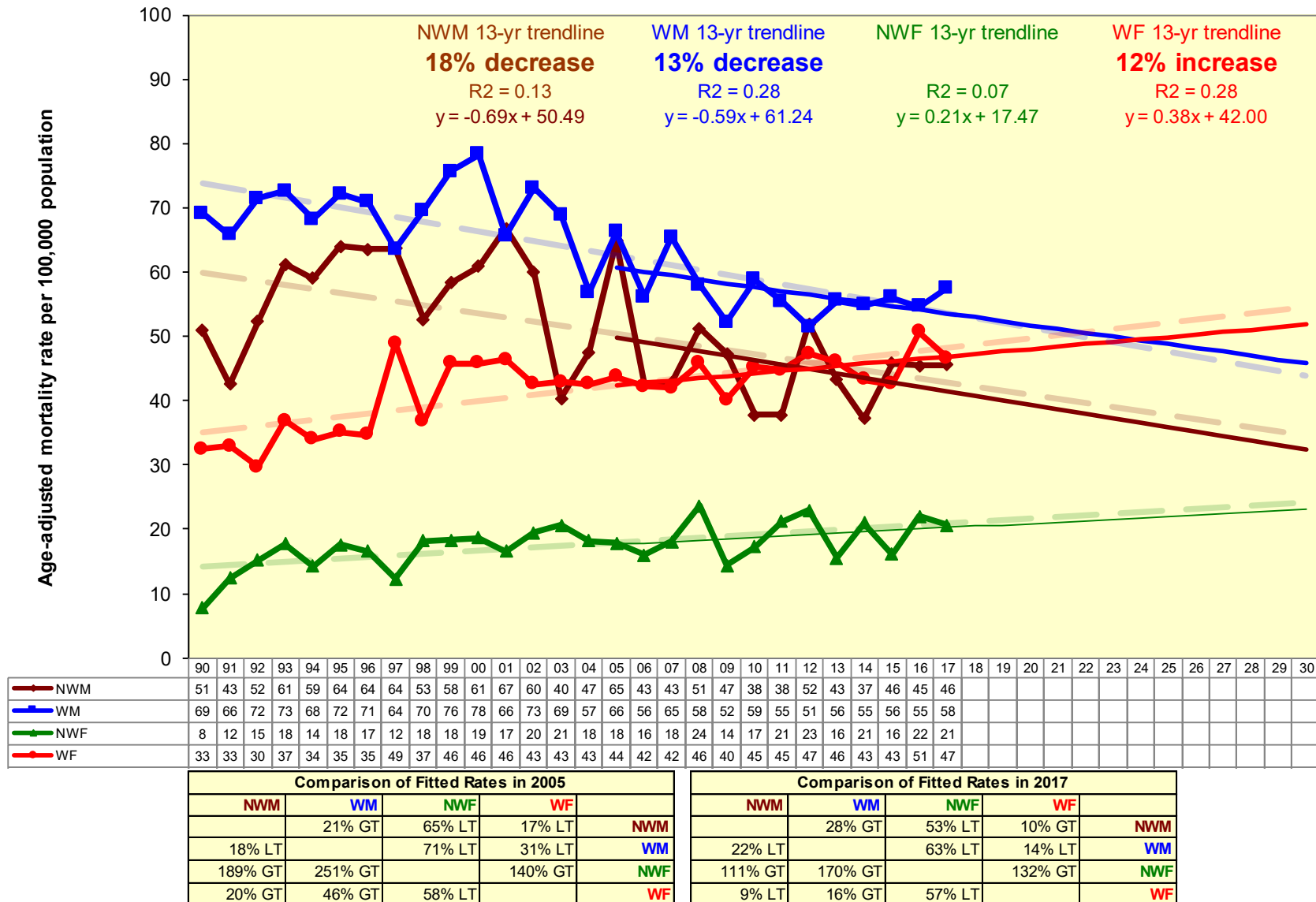


Figure 6.4 iv. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

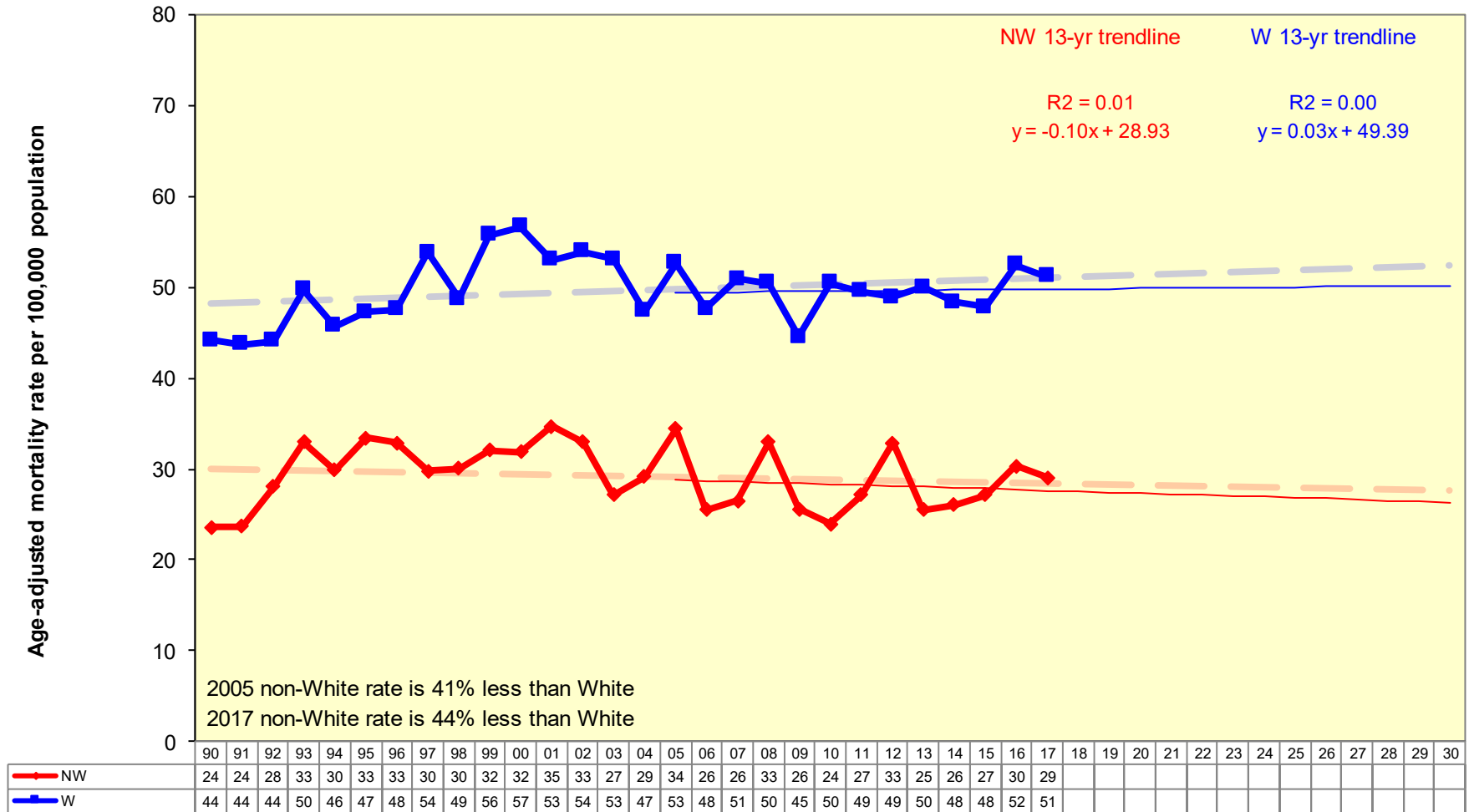
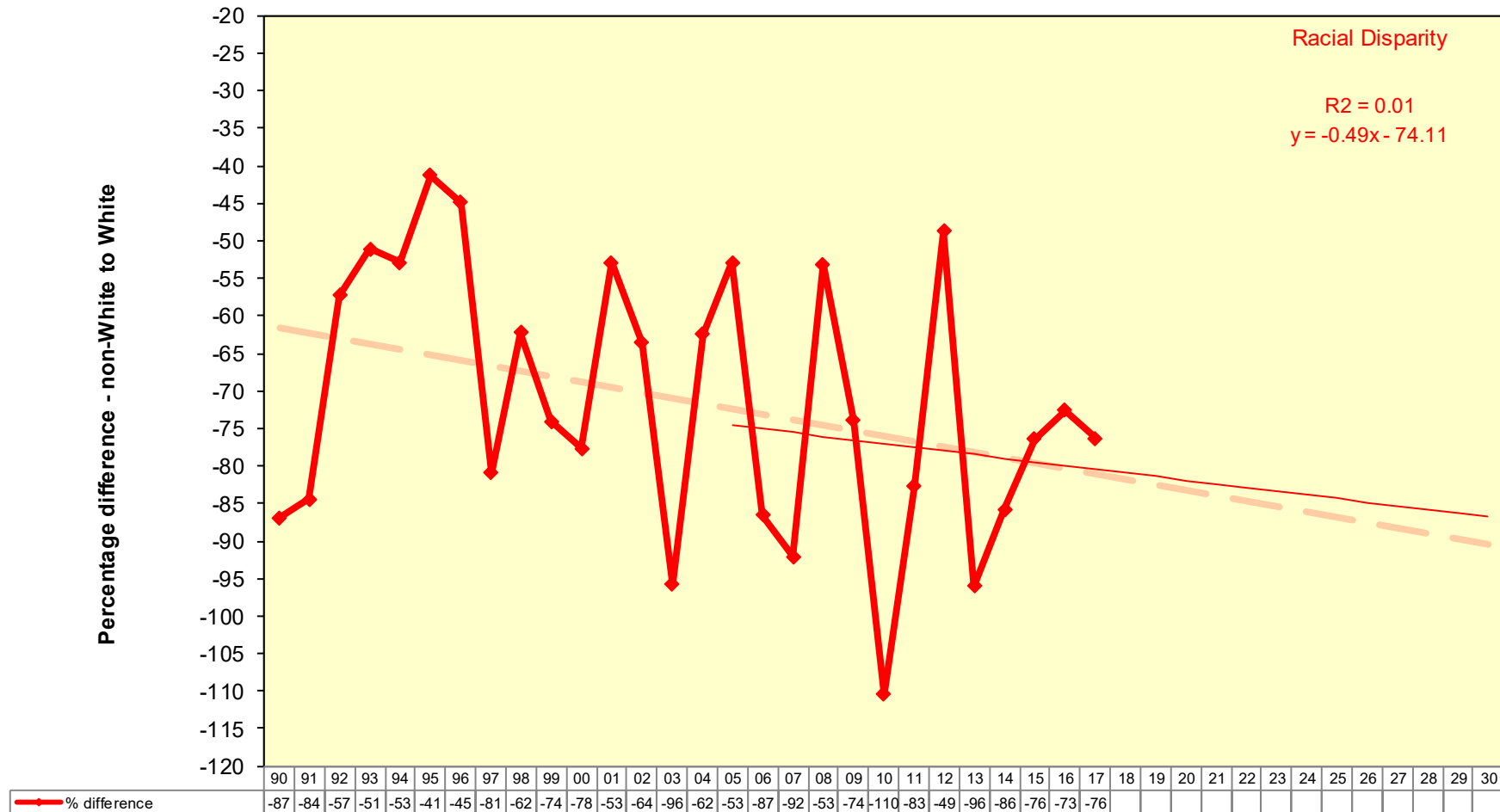


Figure 6.4 v. Chronic Lower Respiratory Diseases:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



All Other Unintentional Injuries and Adverse Effects

- The mortality rate trend for unintentional injuries and adverse effects shows a sharp increase in ENC (71% over 13 years). The trends for RNC and the US are also up sharply.
- The age-adjusted mortality rate trends for ENC, RNC, NC, and the US are all higher. During the last 13 years the ENC rate has increased 63% and it is now 4% greater than RNC.
- The trends are increasing for all groups, but the white male rate is the highest and shows the greatest increase (82% over 13 years).
- The White rate trend has increased 77% over the 13 year period. The non-White rate is 41% less than the white rate, in a moderately reliable trend.
- Over the 13 year period the racial disparity has decreased in a moderately reliable trend, eliminating the unfavorable disparity in relation to Whites and favoring non-Whites.

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

Figure 6.5 i. All Other Unintentional Injuries and Adverse Effects:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

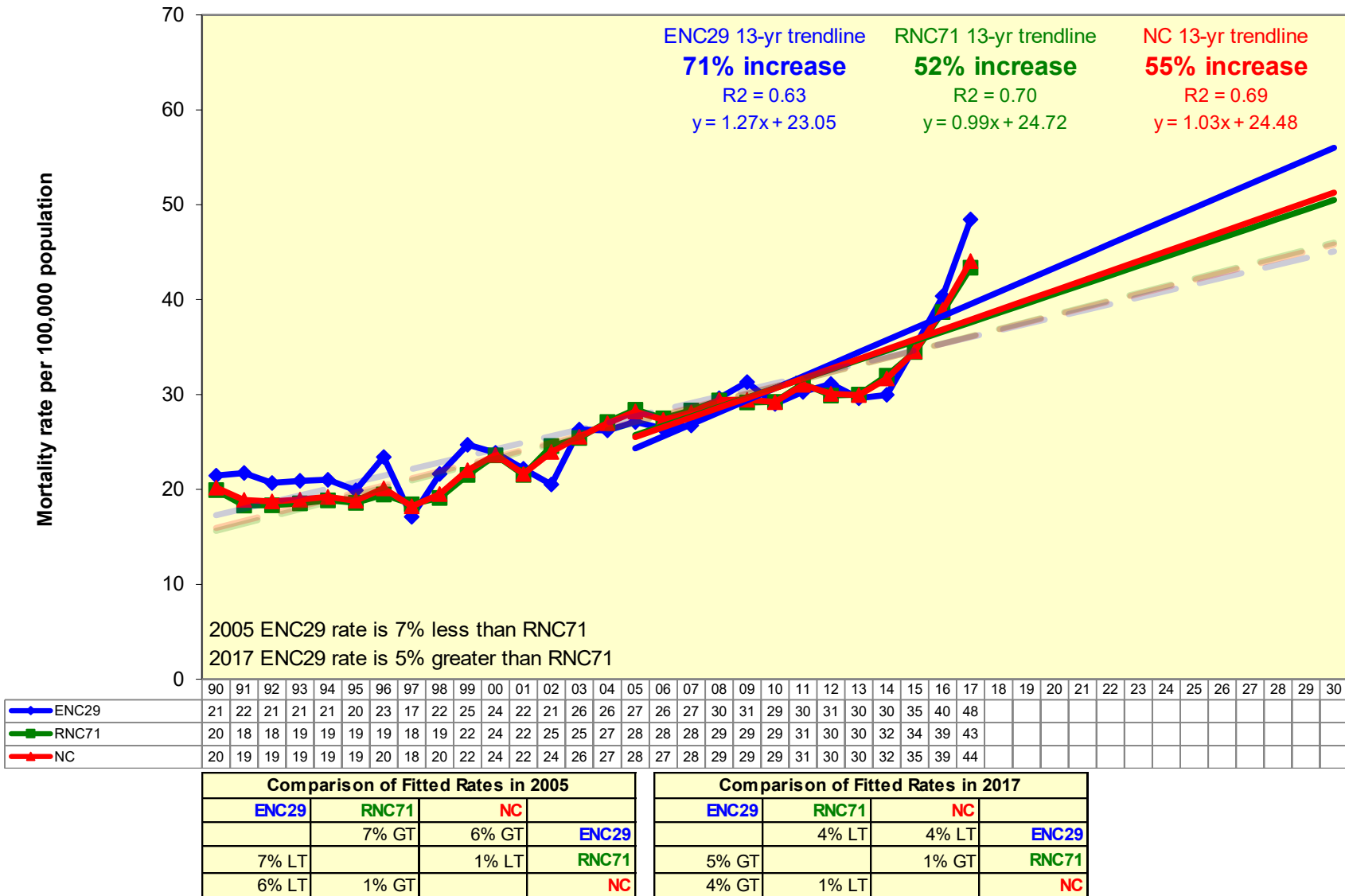


Figure 6.5 ii. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US,
1990-2017 with projections to 2030

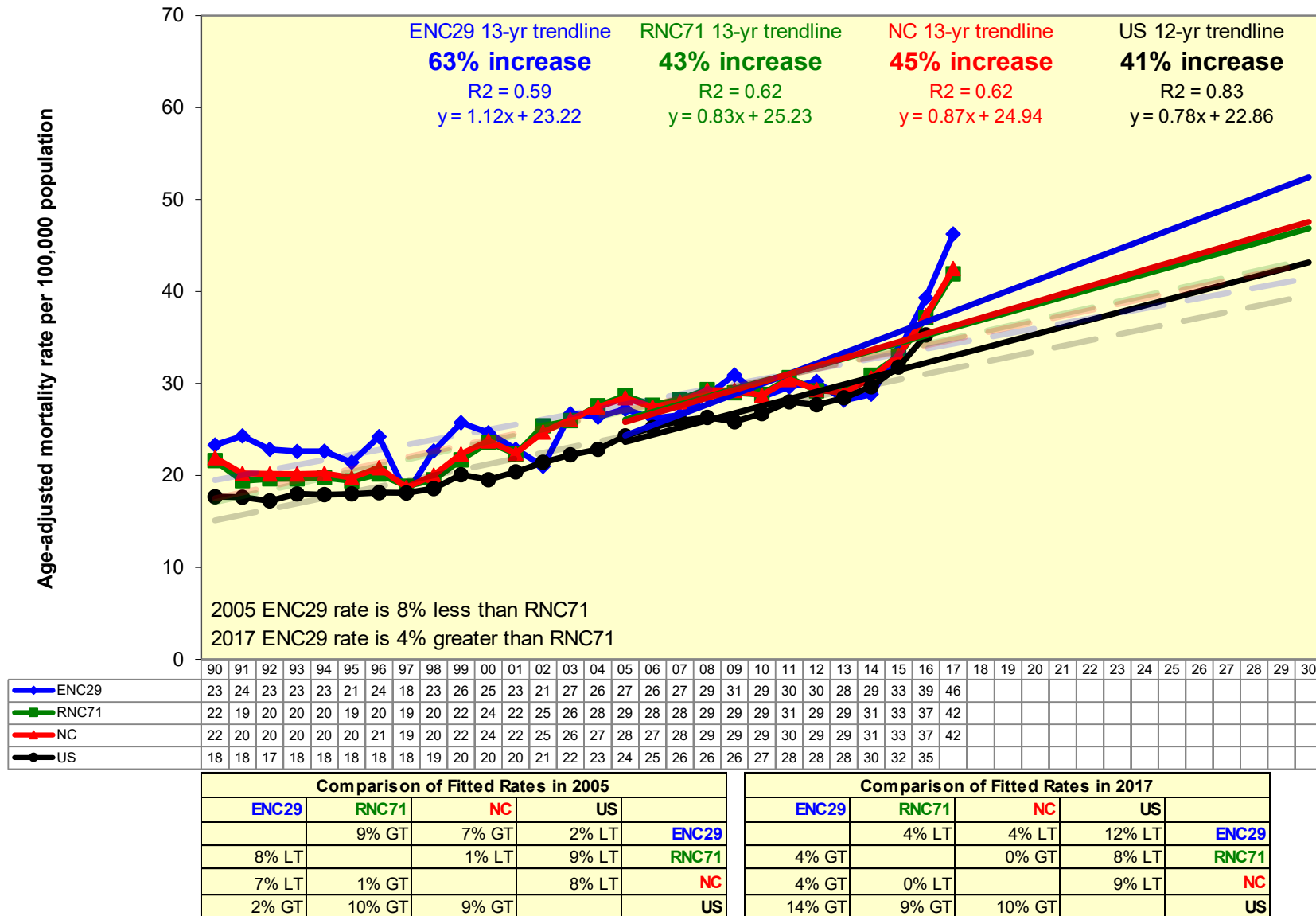


Figure 6.5 iii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2017 with projections to 2030

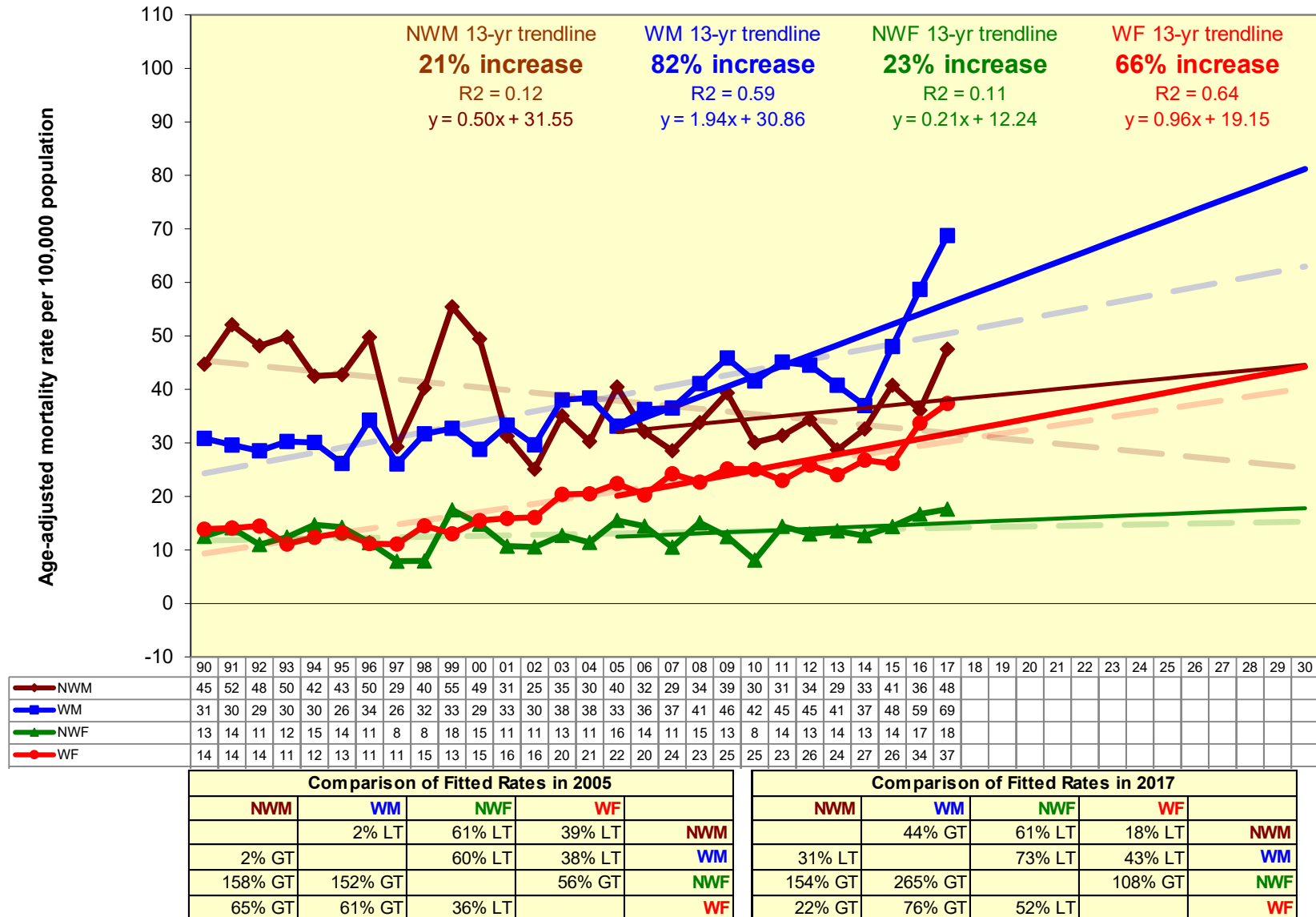


Figure 6.5 iv. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

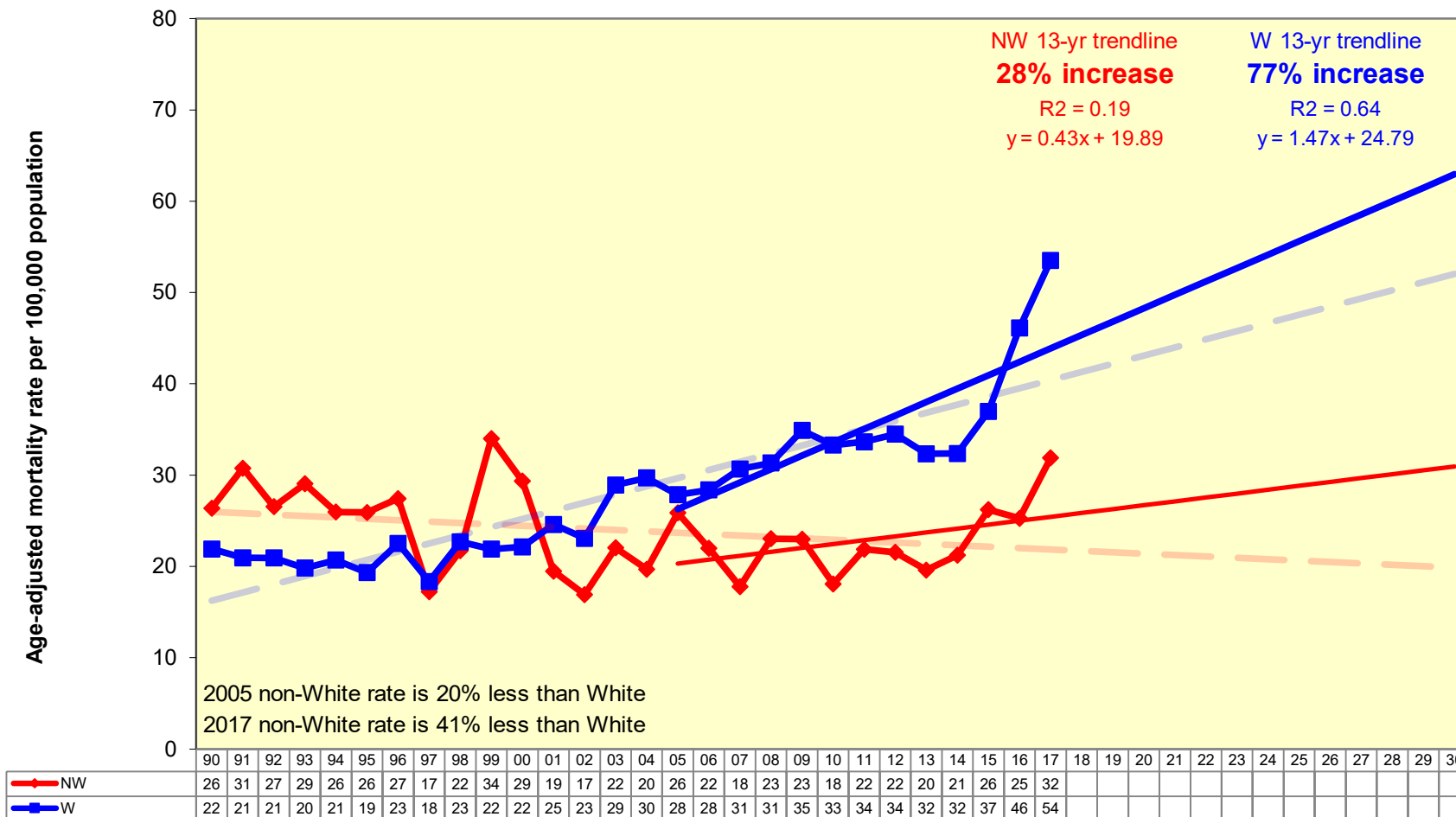
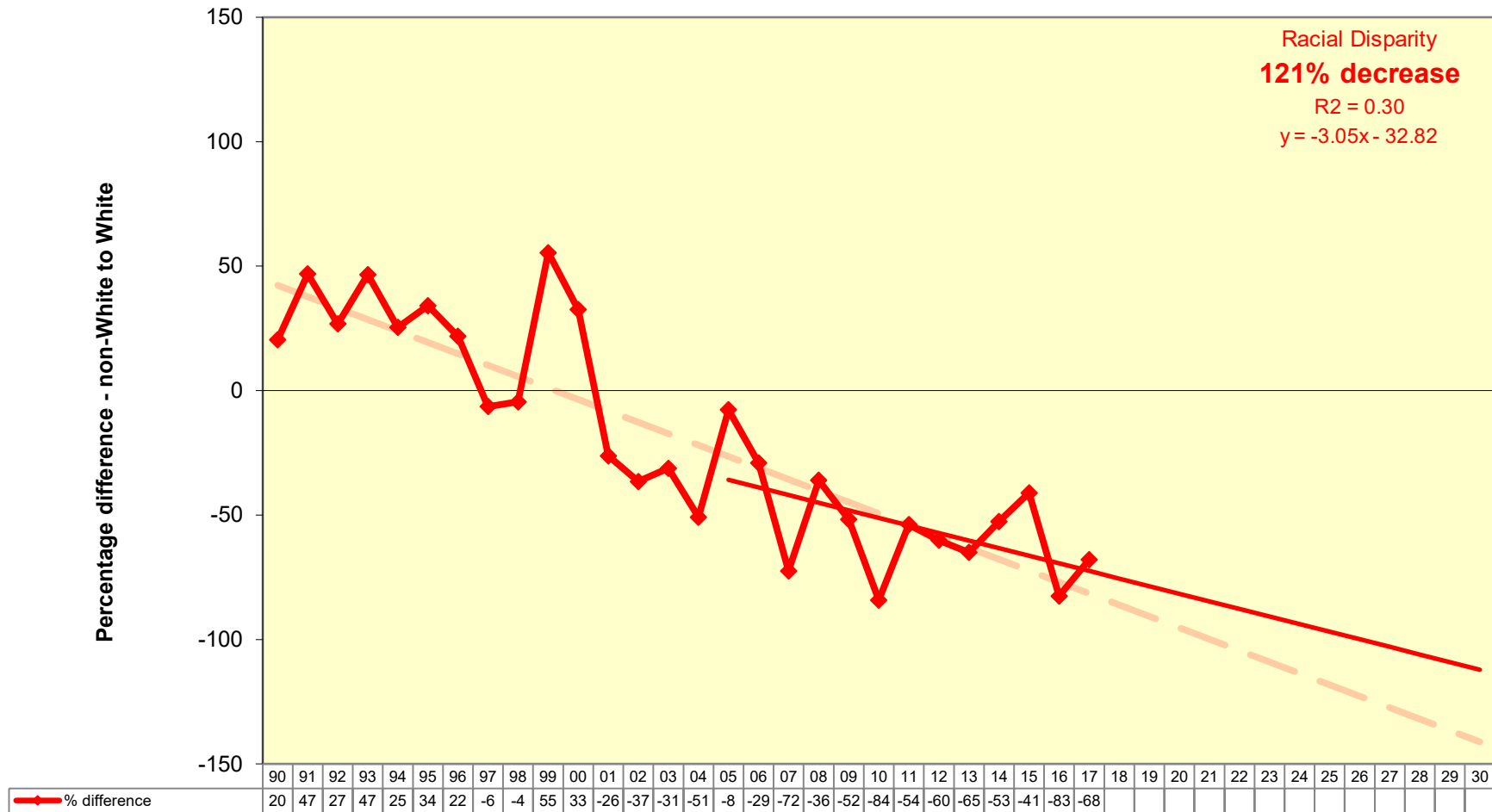


Figure 6.5 v. All Other Unintentional Injuries and Adverse Effects:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Alzheimer's Disease

- The Alzheimer's mortality rate trend for ENC shows a 95% increase over the 13 year period. ENC's rate of increase was larger than RNC and NC, but the rate for ENC is 14% less than RNC.
- In 2017, the age-adjusted rate for ENC is 21% less than the rate for RNC. The ENC rate trend has increased 51% over the 13-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 87% over 13 years, respectively). The rate for White females is the highest but non-White males and females are projected to overtake it in the future.
- The White and non-White rate trends converged in 2015 and the non-White rate is now higher.
- The 13 year trend shows an increase in disparity that favors 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 6.6 i. Alzheimer's Disease:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

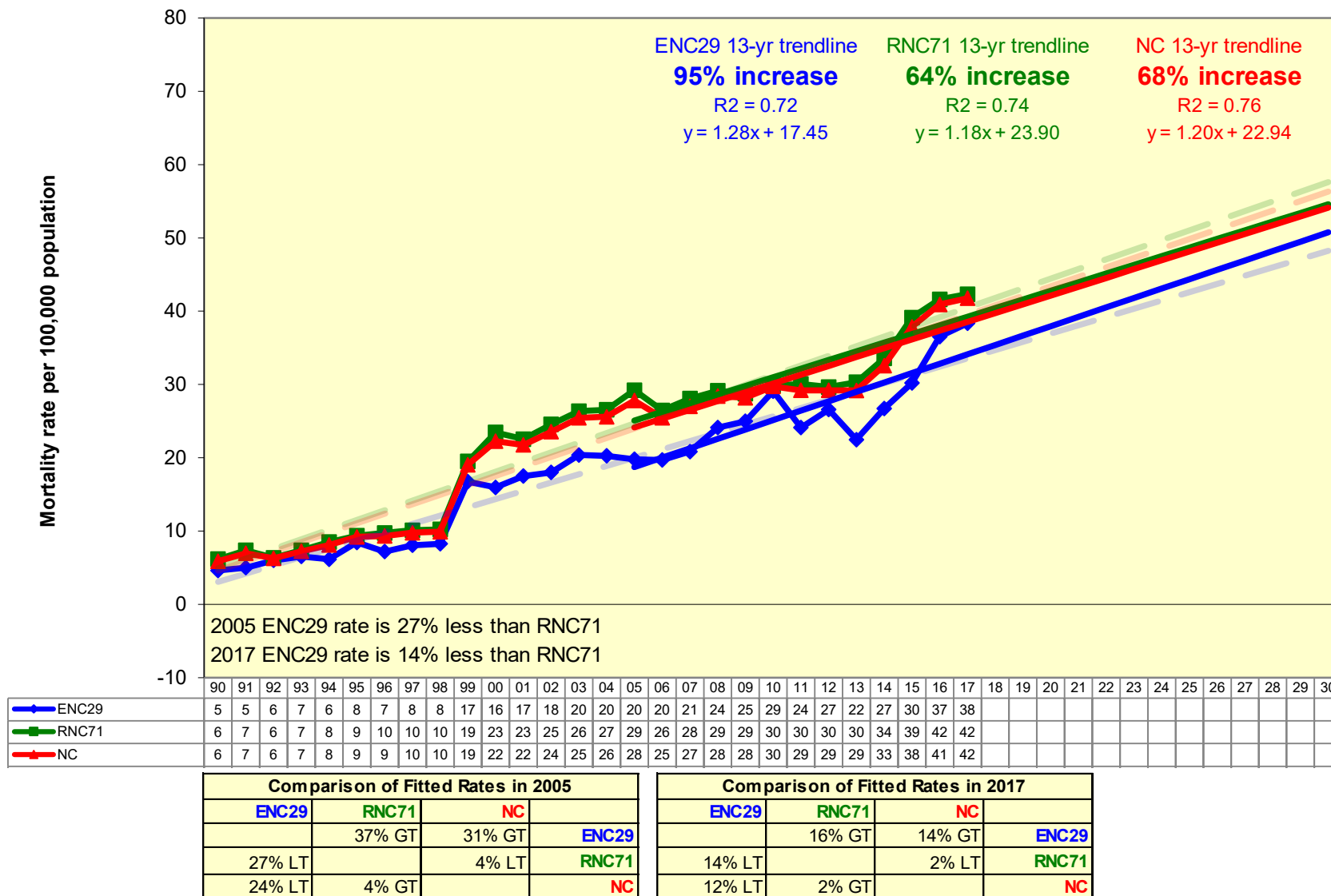


Figure 6.6 ii. Alzheimer's Disease:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

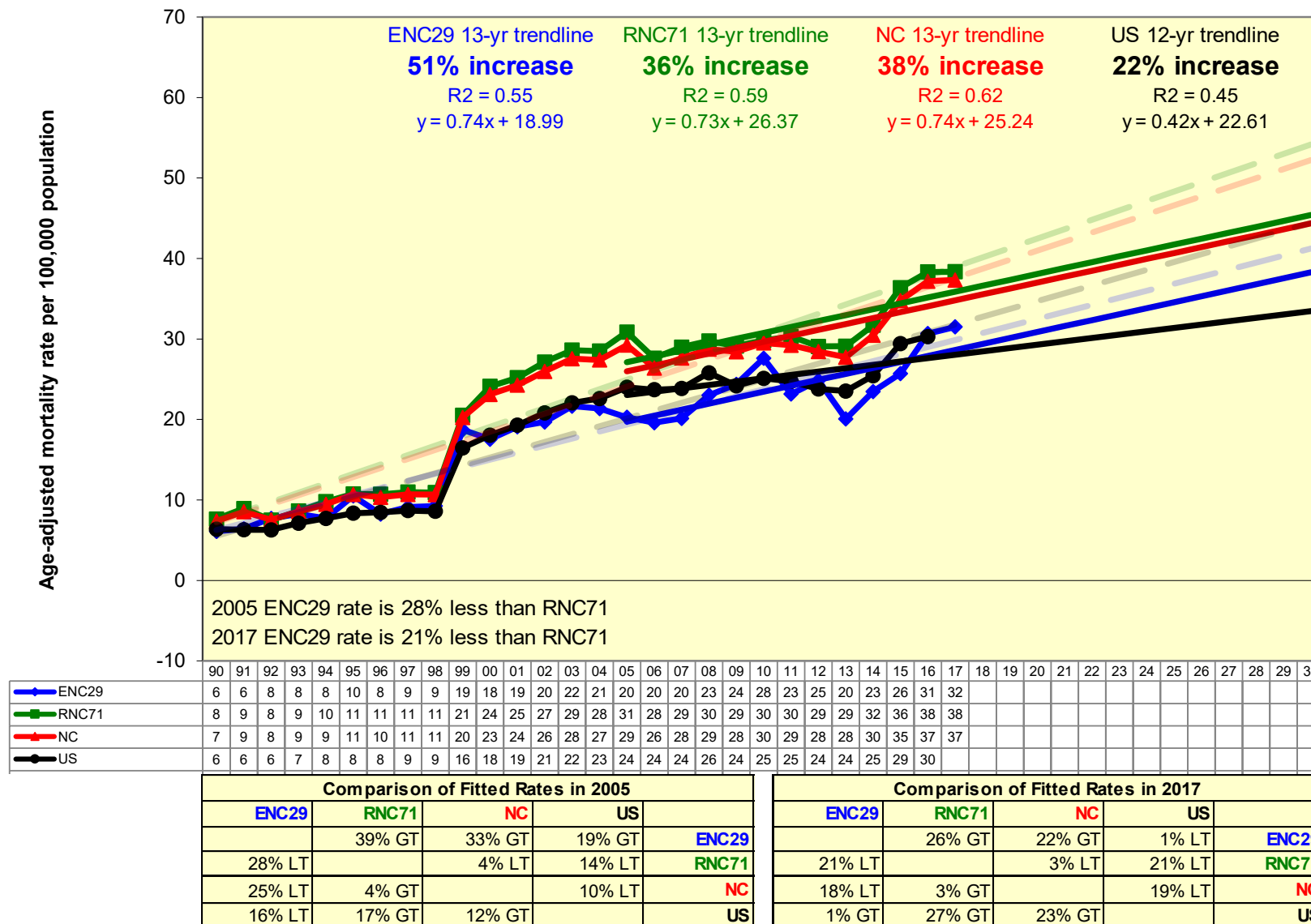


Figure 6.6 iii. Alzheimer's Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

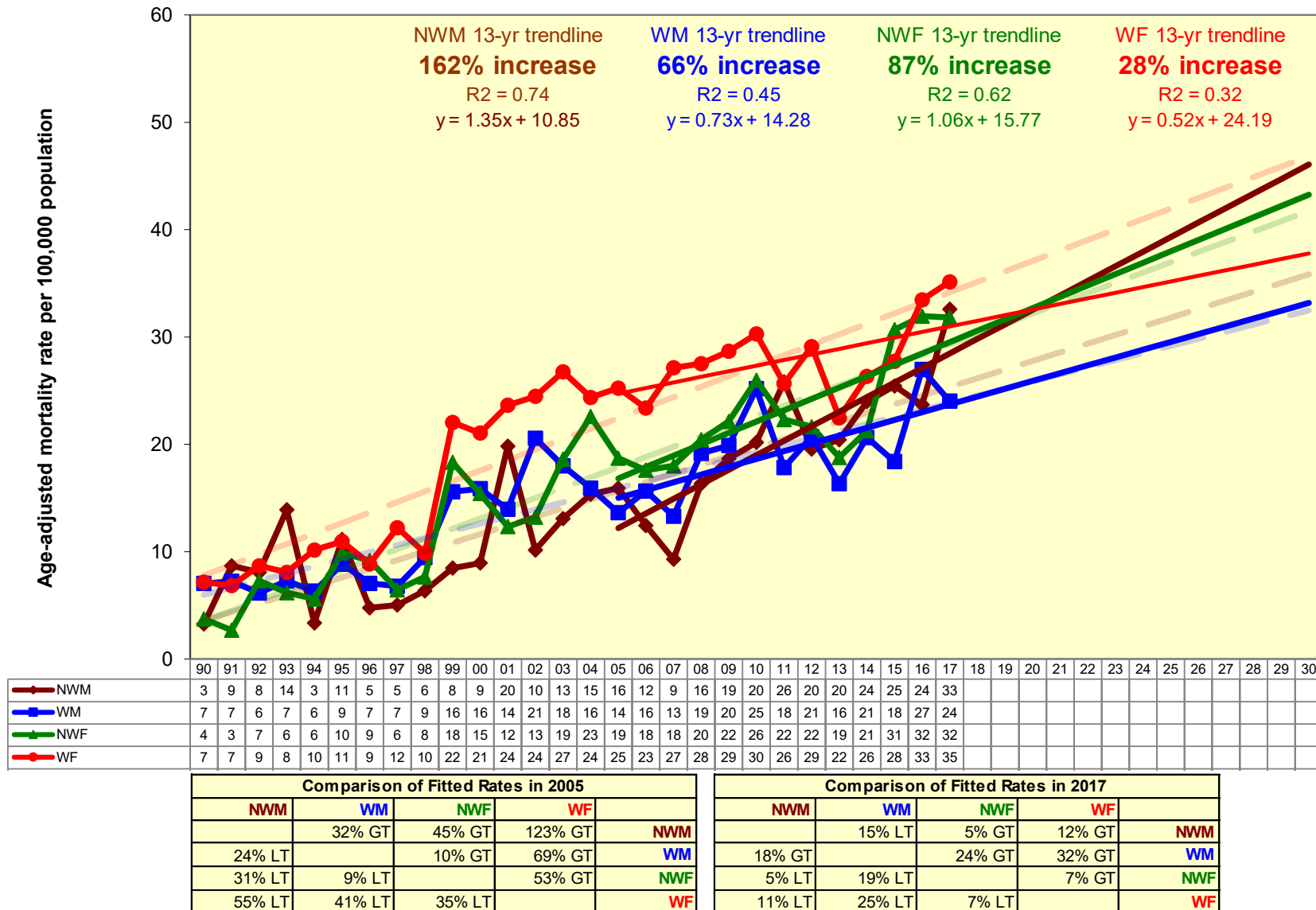


Figure 6.6 iv. Alzheimer's Disease:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

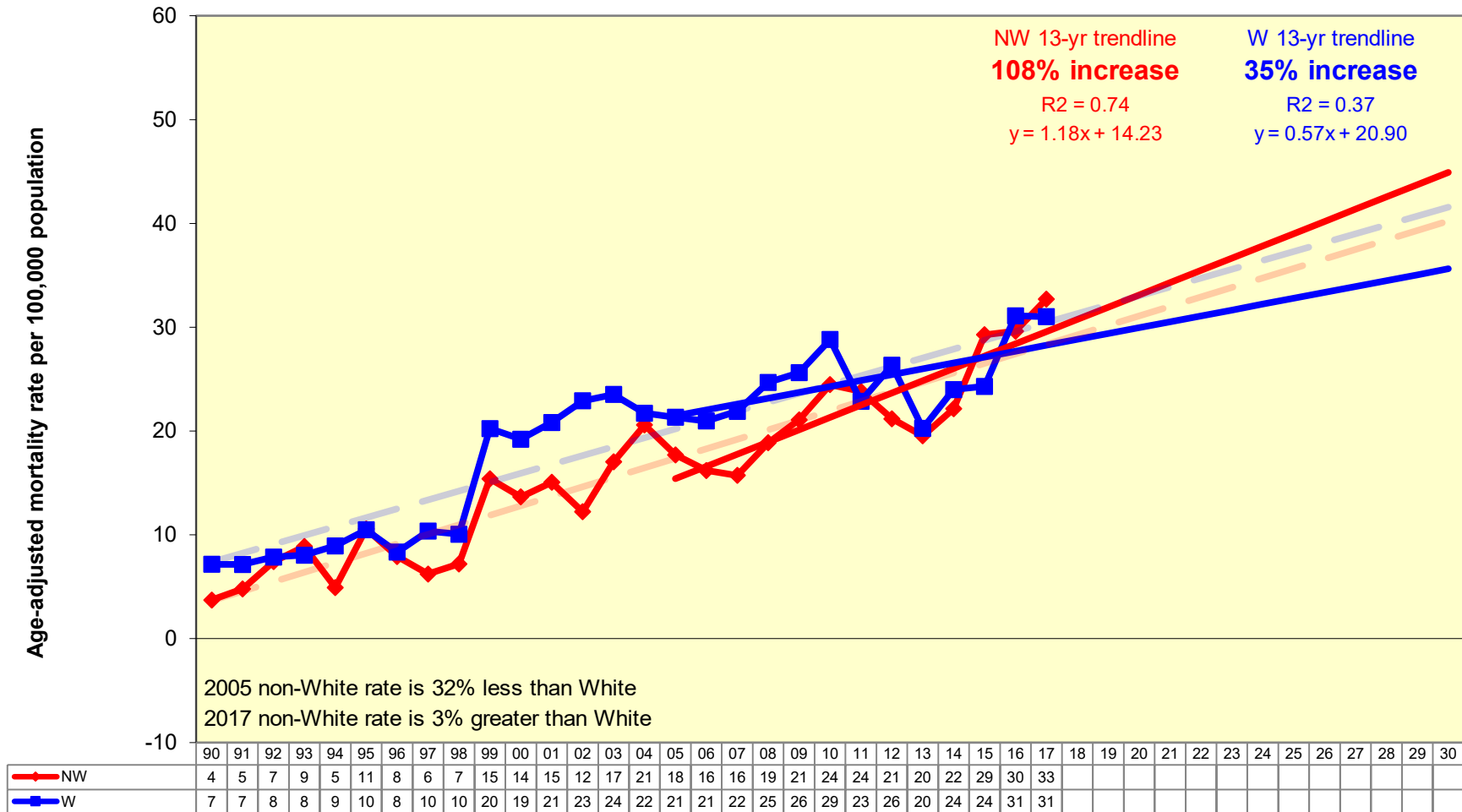
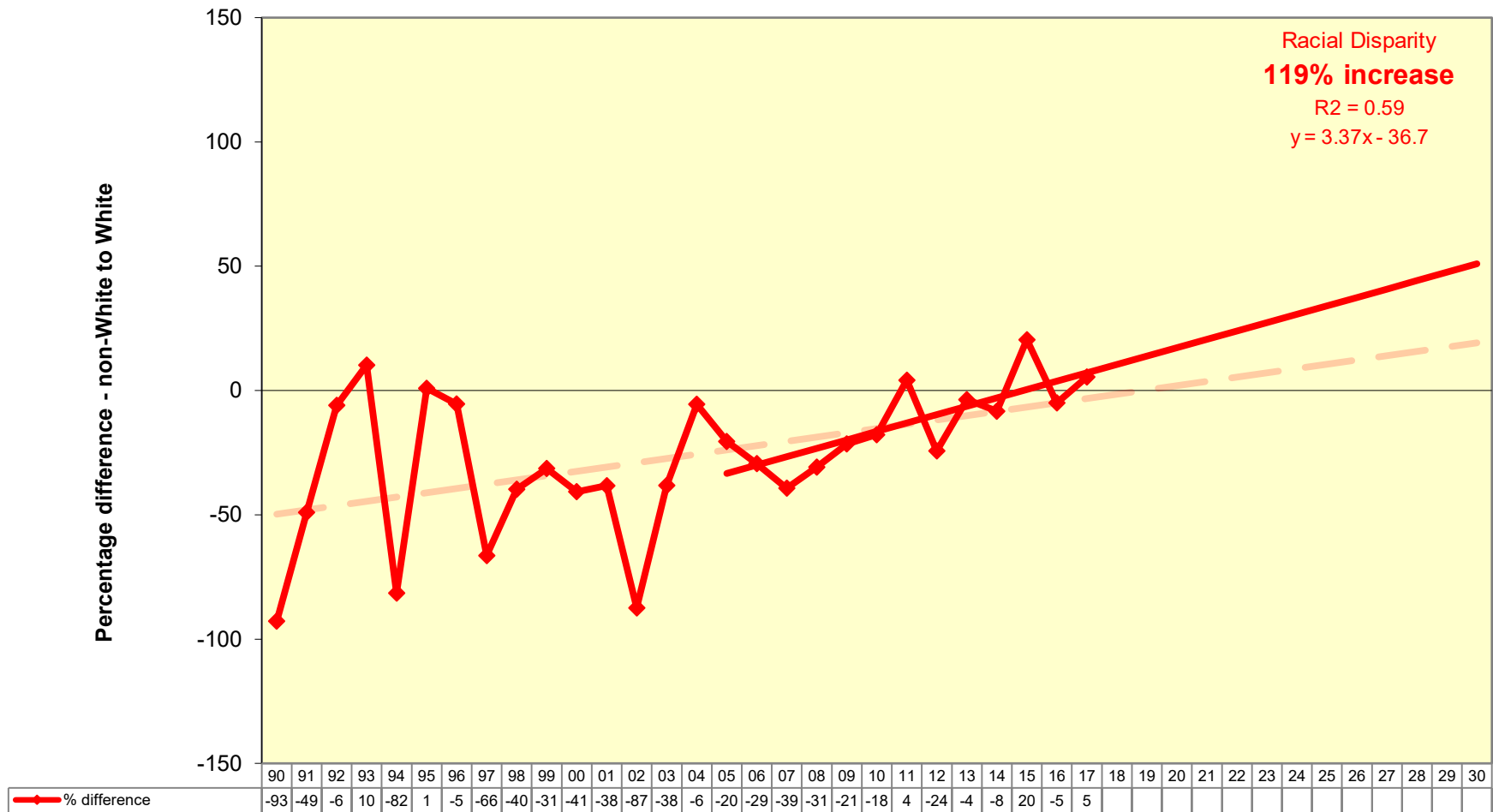


Figure 6.6 v. Alzheimer's Disease:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Diabetes Mellitus

- The 13-year rate trend for ENC has increased 14% over the period and is 41% greater than the RNC rate.
- The 13-year trend for age-adjusted diabetes mellitus shows a decrease of 8% for ENC. In 2017, the ENC rate trend is 34% greater than RNC and 42% greater than the US.
- The non-White male 13-year rate has increased 13% in a moderately reliable trend. The non-White female trend has decreased 24%. The White male and White female trends are lower, and have decreased 8% and 12% respectively.
- The non-White mortality rate trend decreased 9% over 13 years in a moderately reliable trend, but remains 132% greater than the White rate.
- The 13-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,
1990-2017 with projections to 2030

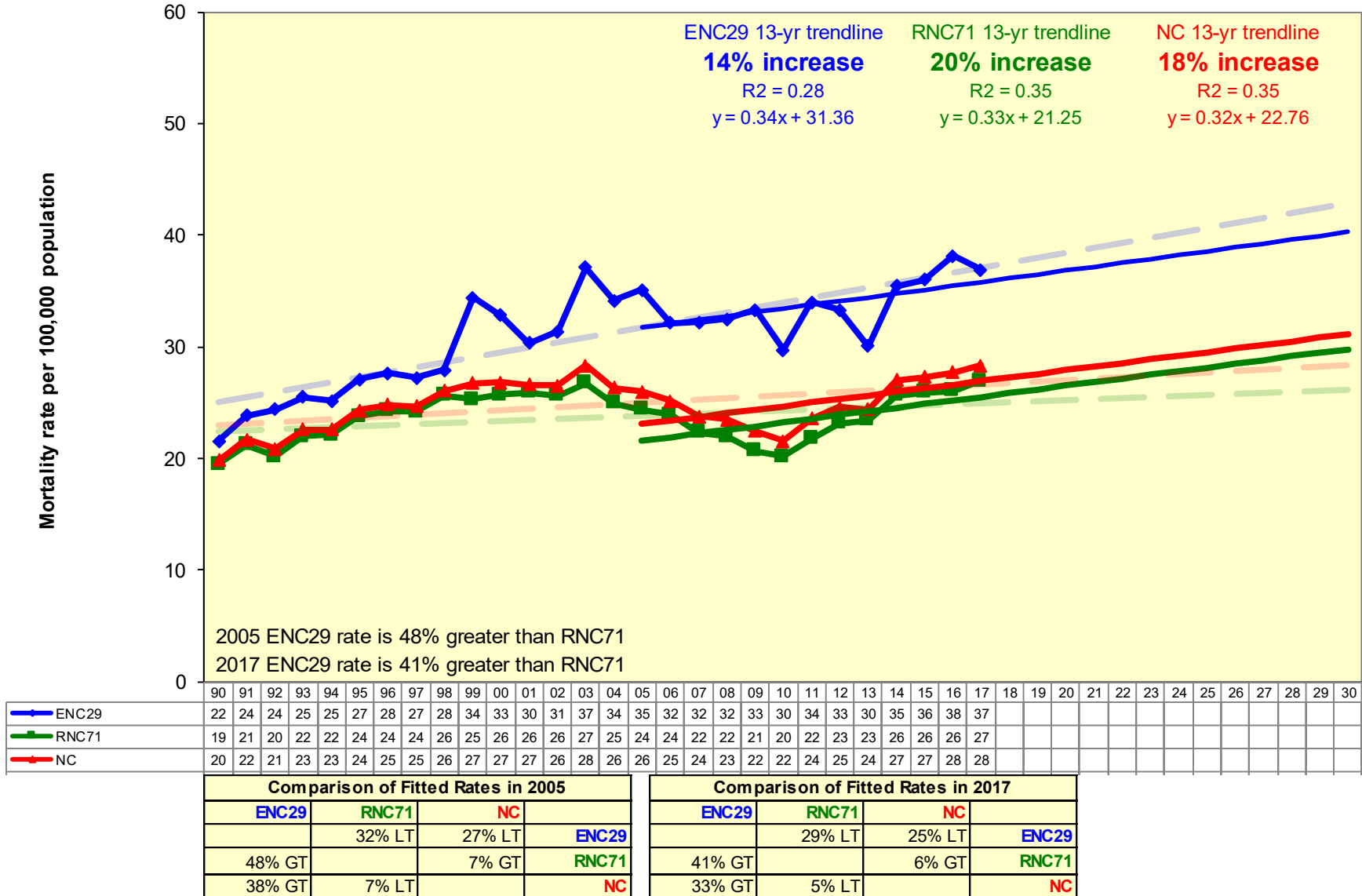


Figure 6.7 ii. Diabetes Mellitus:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

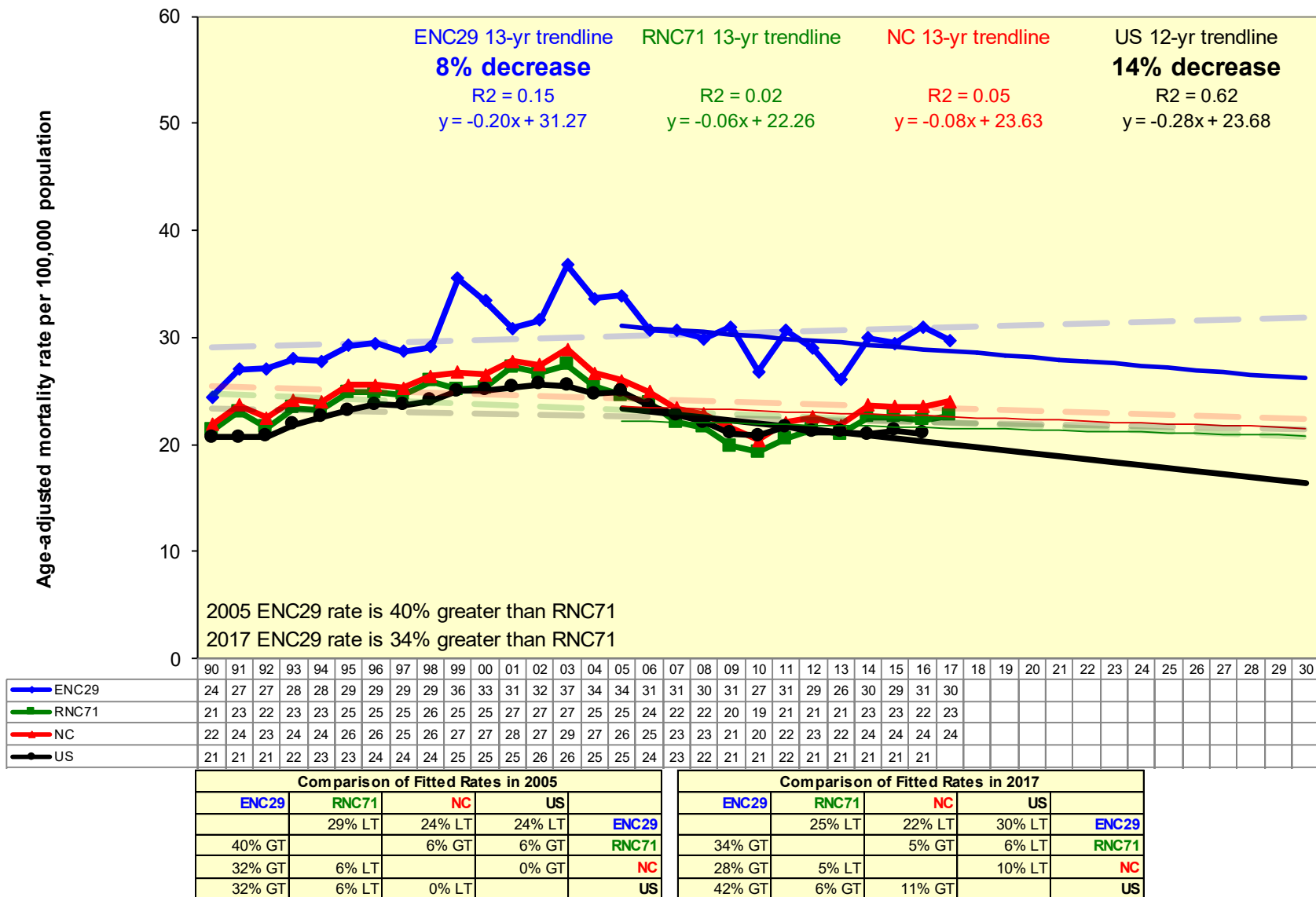


Figure 6.7 iii. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

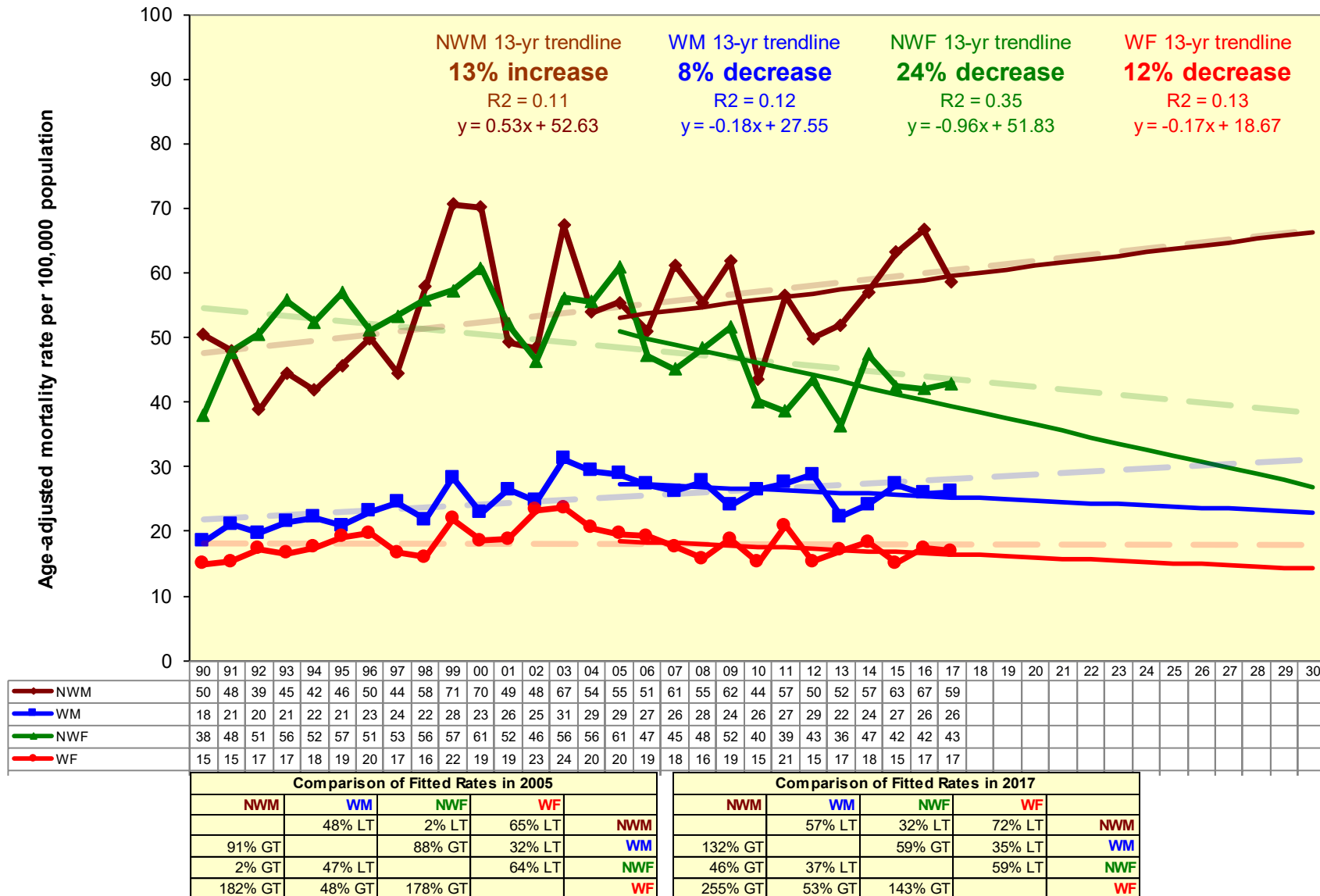


Figure 6.7 iv. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

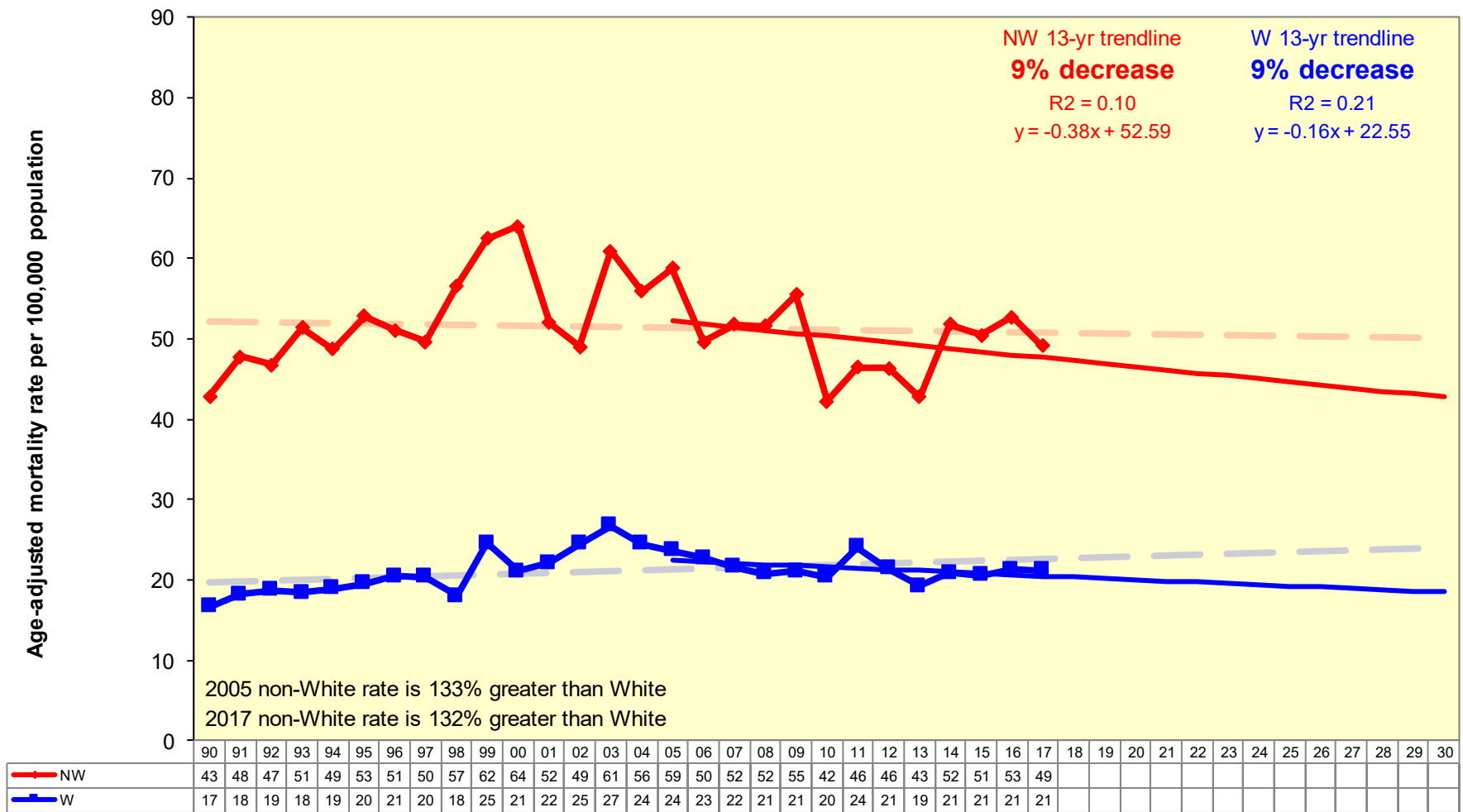
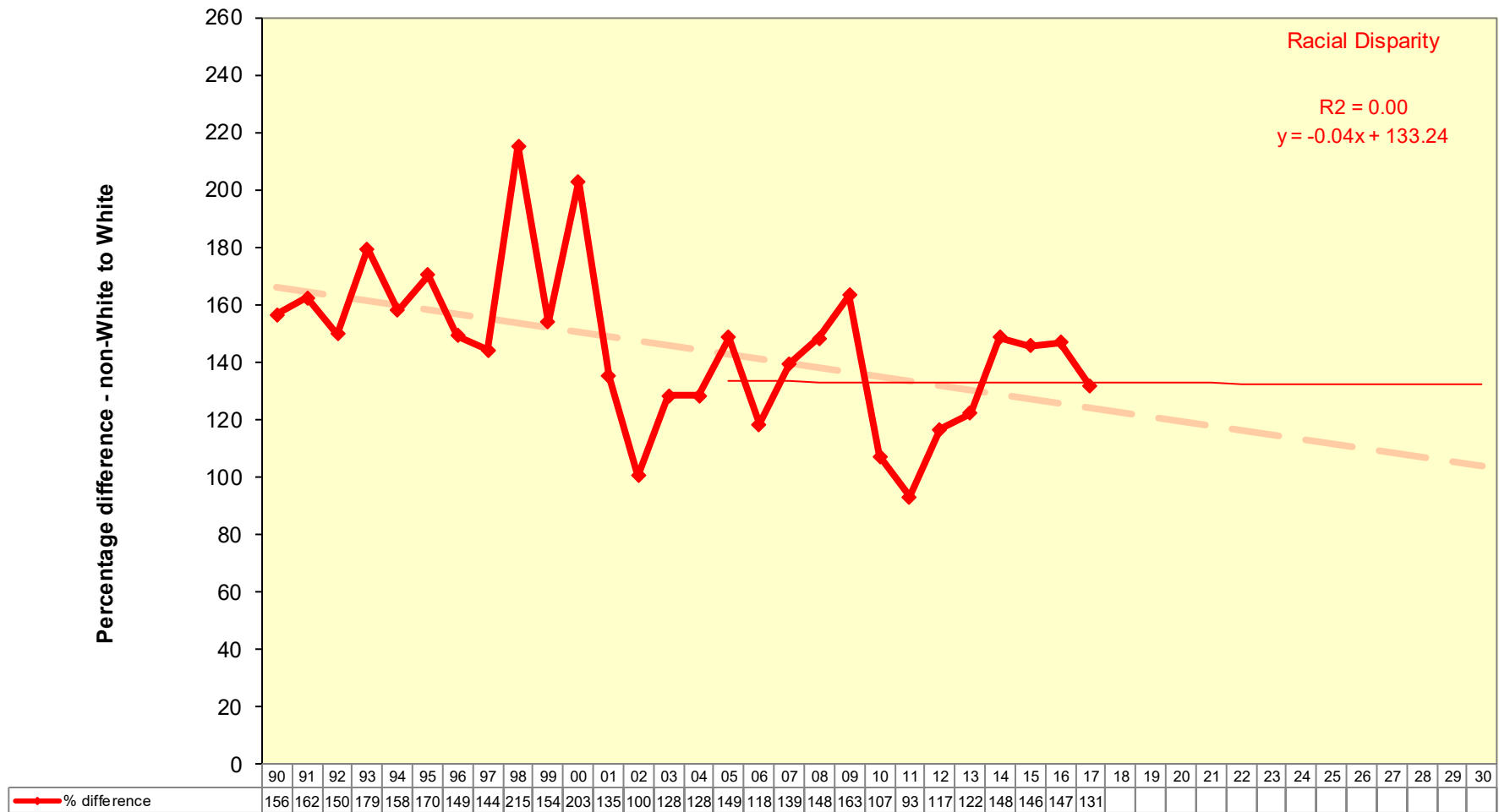


Figure 6.7 v. Diabetes Mellitus:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Pneumonia and Influenza

- The crude mortality rate for pneumonia and influenza for ENC is 5% greater than RNC in 2017 and is increasing but the trend line is not reliable.
- The age-adjusted mortality rate trend for ENC, RNC and NC are similar and are decreasing at about the same pace. The ENC rate in 2017 is 24% greater than the US rate .
- The age-adjusted mortality rate trends for all four demographics are decreasing. The trends for non-White males and White males are the highest. The trend for non-White females is not reliable .
- The non-White mortality rate and the White mortality rate are both decreasing and are converging.
- The 13-year increasing 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 6.8 i. Pneumonia and Influenza:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

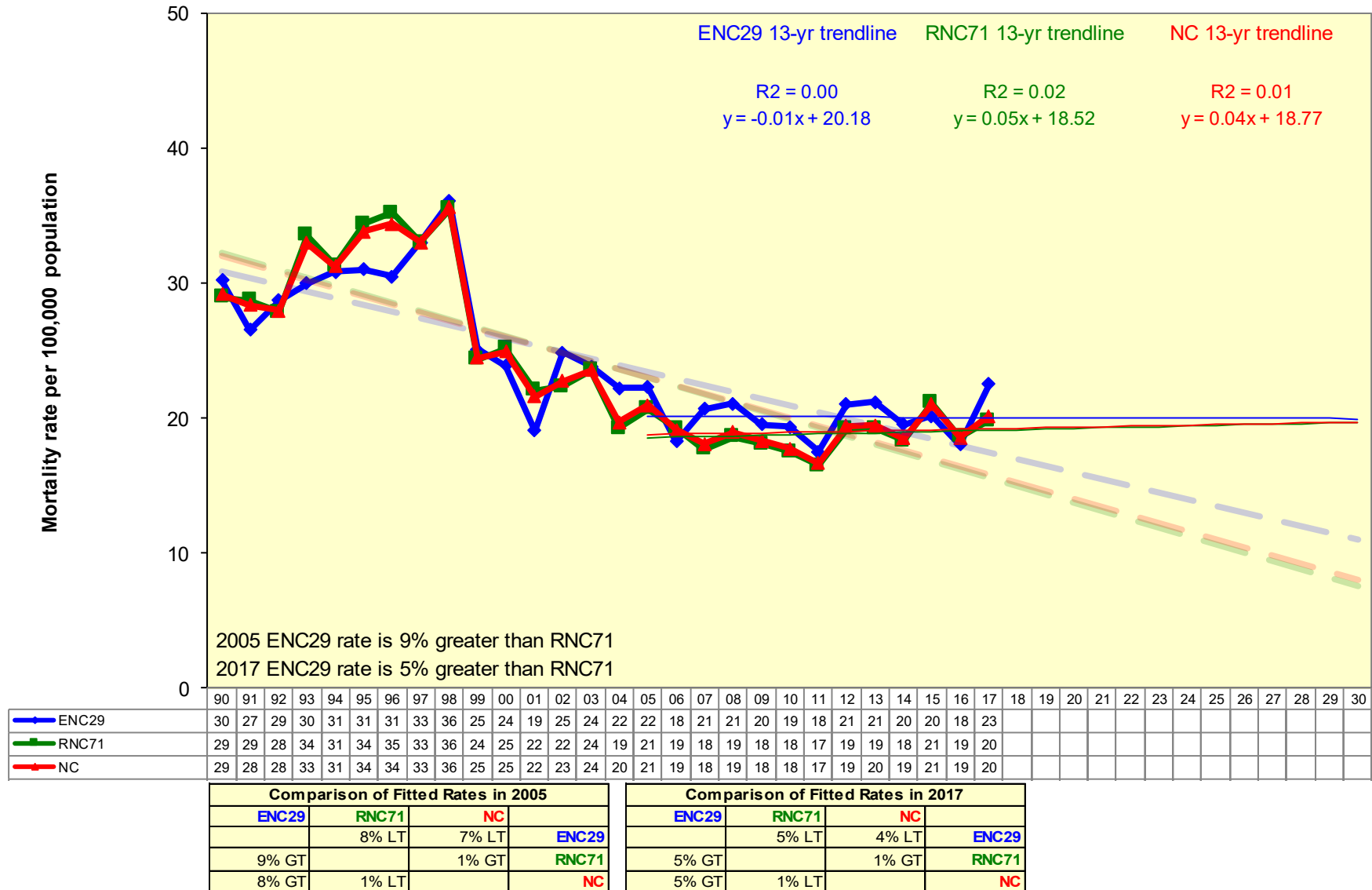


Figure 6.8 ii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

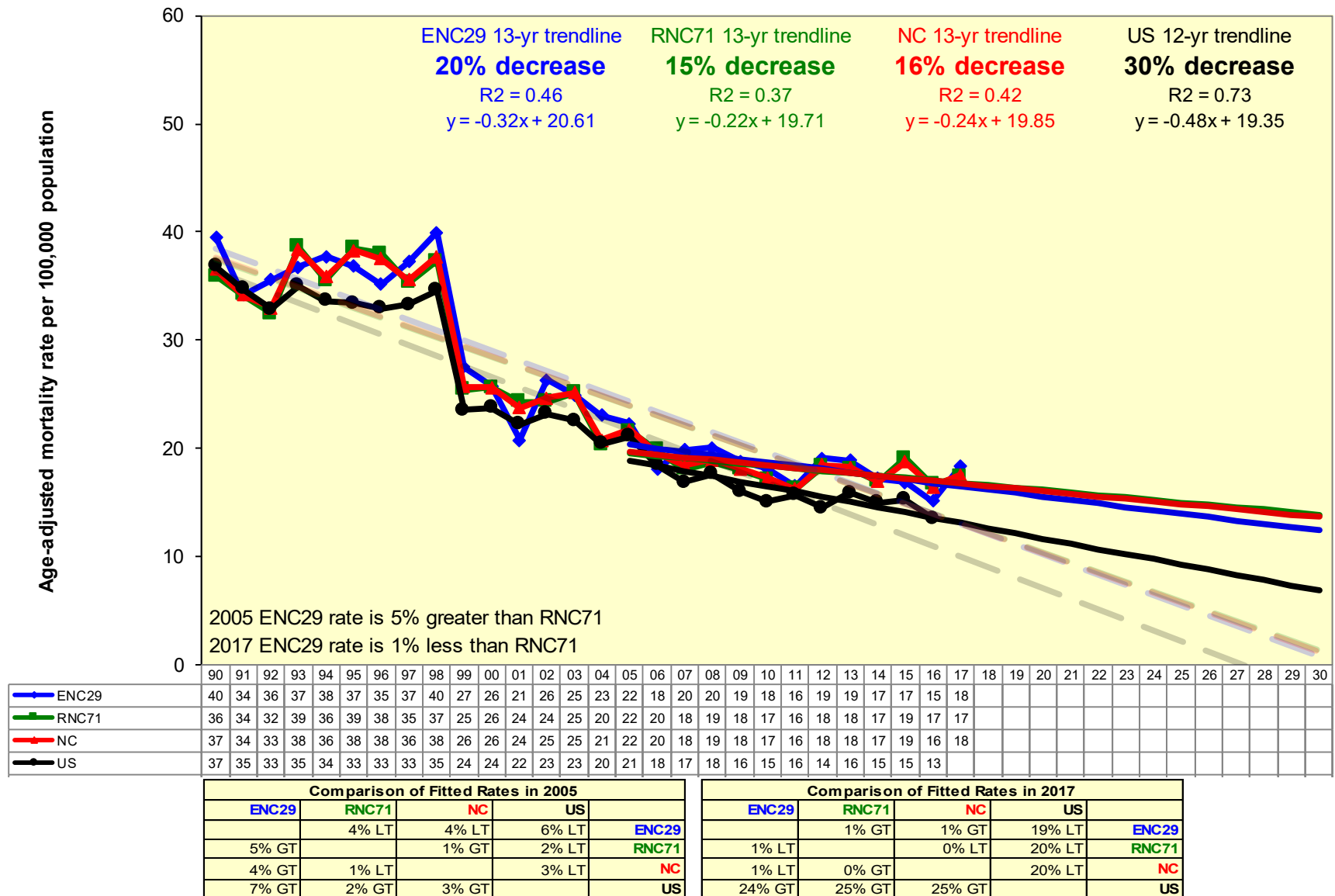


Figure 6.8 iii. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

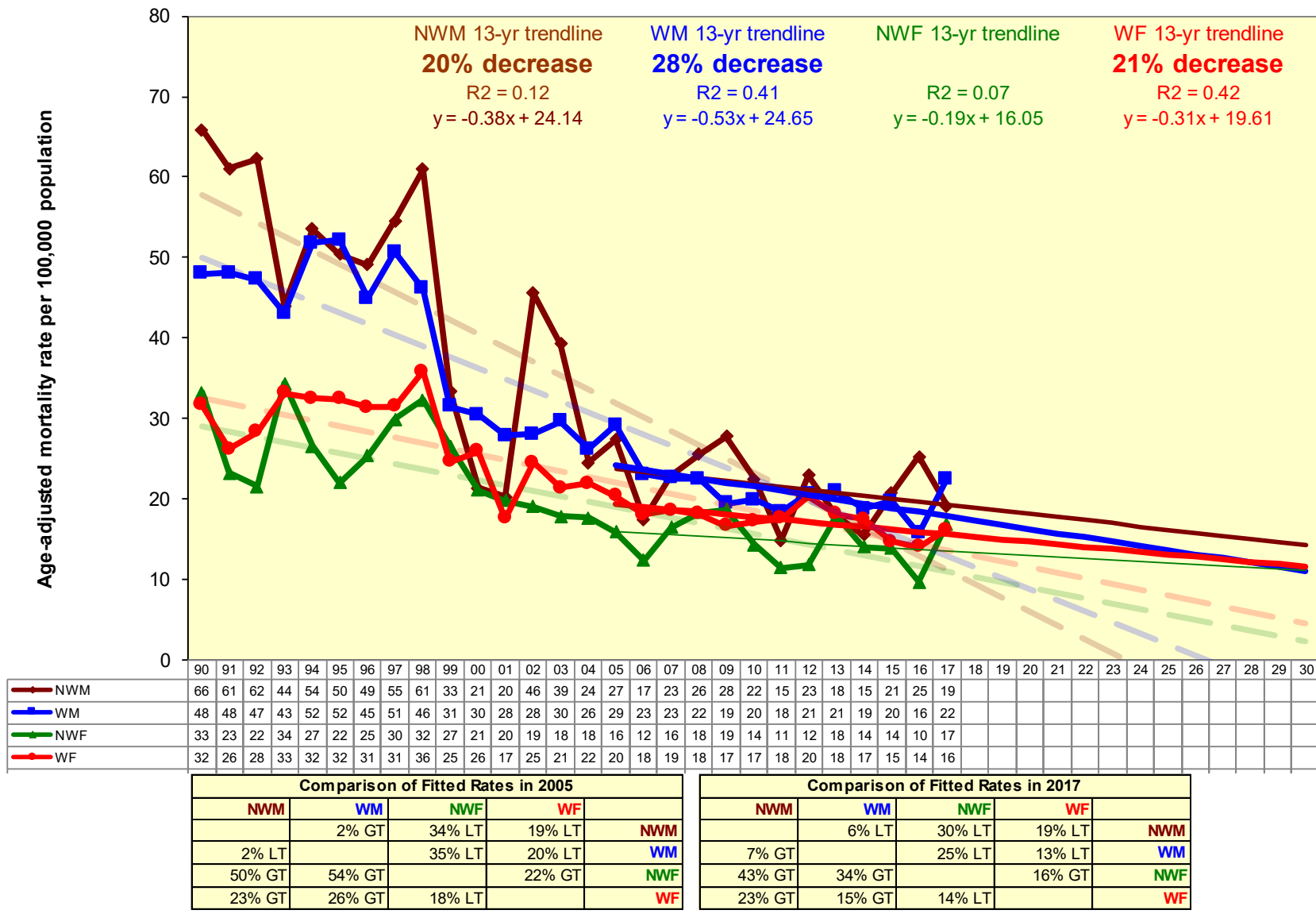


Figure 6.8 iv. Pneumonia and Influenza:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

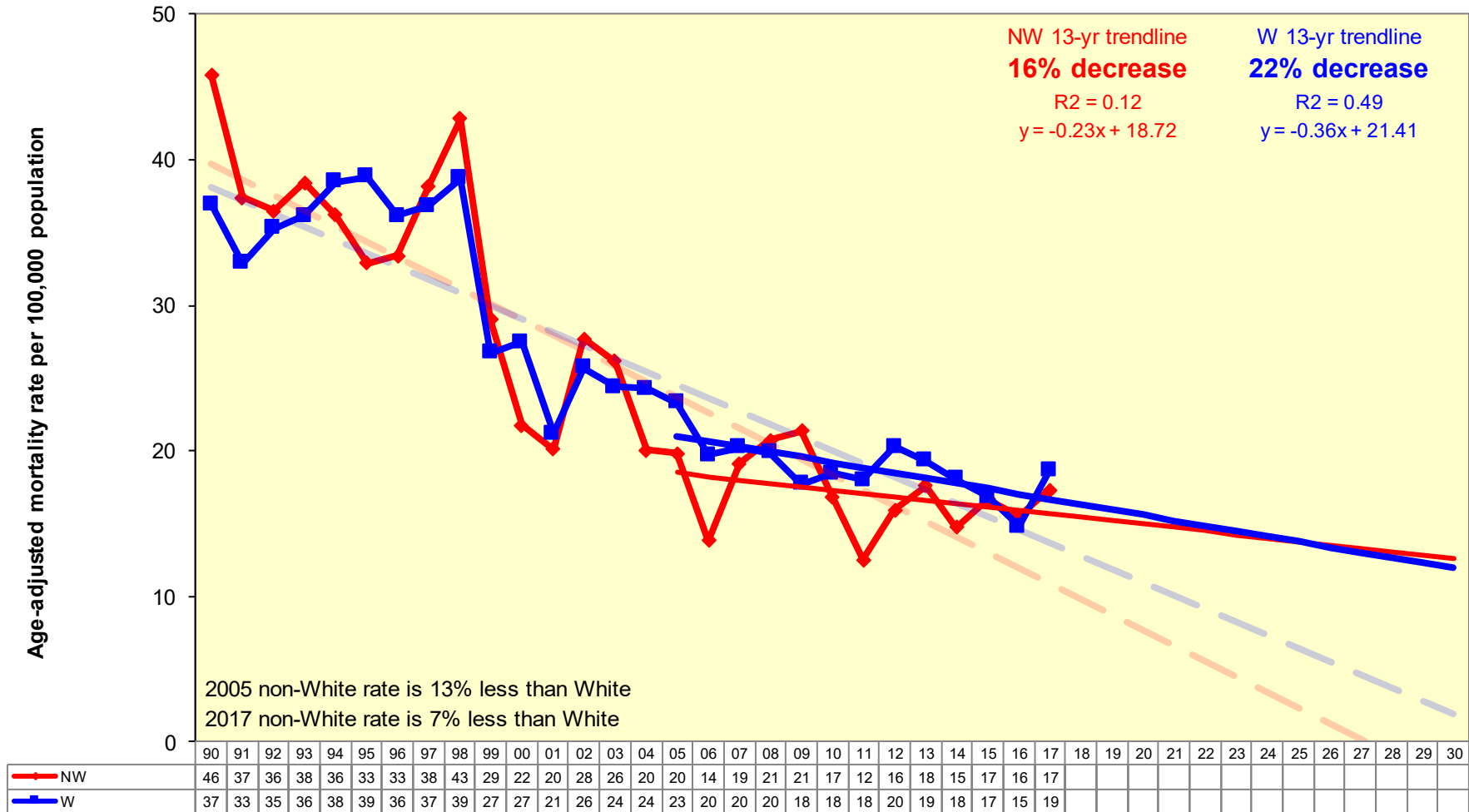
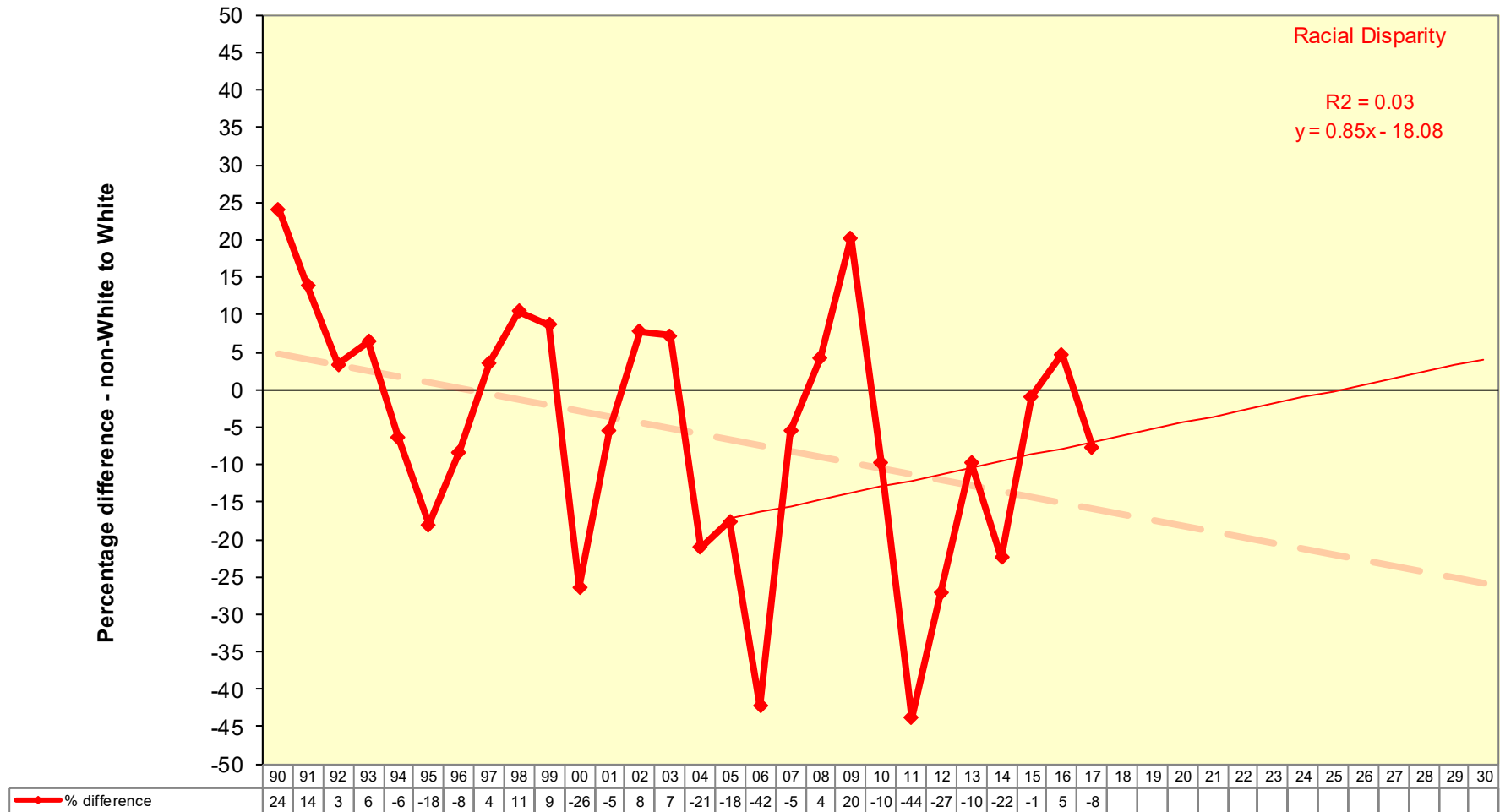


Figure 6.8 v. Pneumonia and Influenza:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Nephritis, Nephrotic Syndrome, and Nephrosis

- The mortality rate trend for nephritis, nephrotic syndrome and nephrosis in ENC has decreased over the 13-year period. The rate for NC has increased but is not reliable. In 2017 ENC's rate trend is 6% greater than RNC .
- With age-adjustment, the ENC rate trend has decreased 29% over the 13-year period. It is 1% less than the RNC rate and the NC rate, but 25% greater than the US rate .
- The 13-year trends for non-White males and non-White females are the highest but have decreased more than 30% over the 13-year period. The non-White male trend in 2017 is 95% greater than the White male trend and 197% greater than the White female trend. All trends are decreasing .
- The non-White rate in 2017 is 109% greater than the White rate. It has decreased 37% over the 13-year period. The White rate has decreased 23%. .
- The 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 6.9 i. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

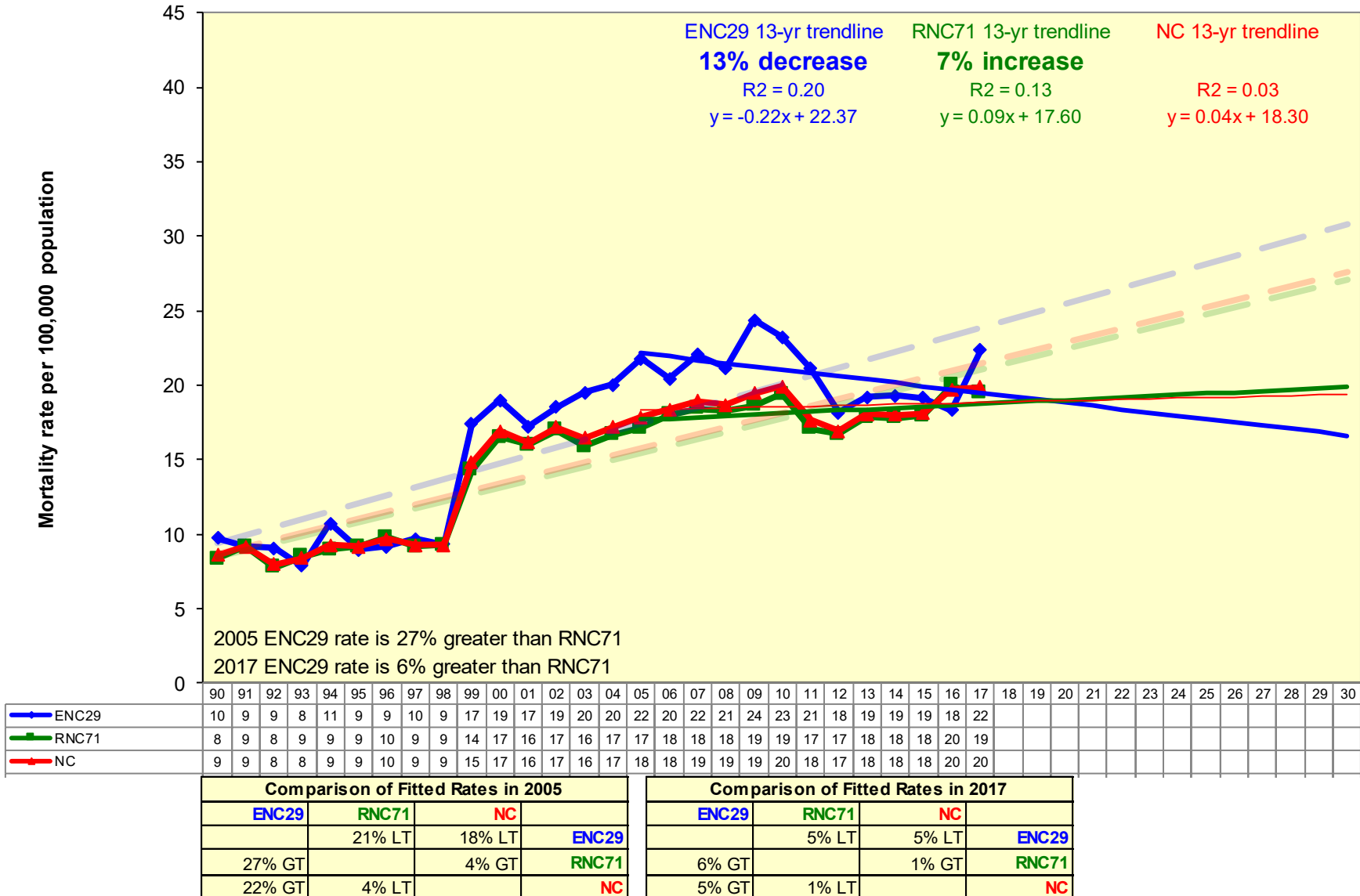


Figure 6.9 ii. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US,
1990-2017 with projections to 2030

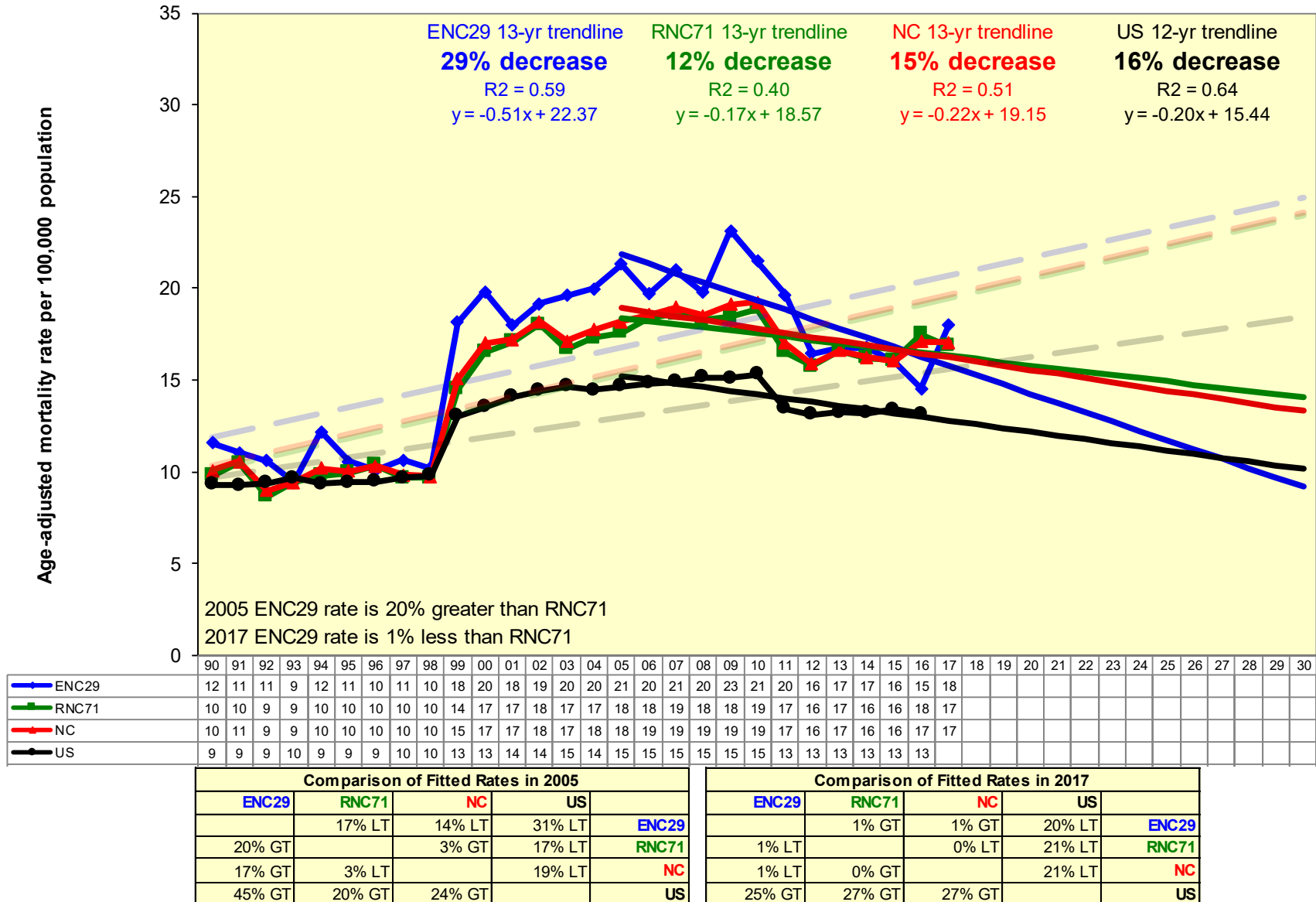


Figure 6.9 iii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2017 with projections to 2030

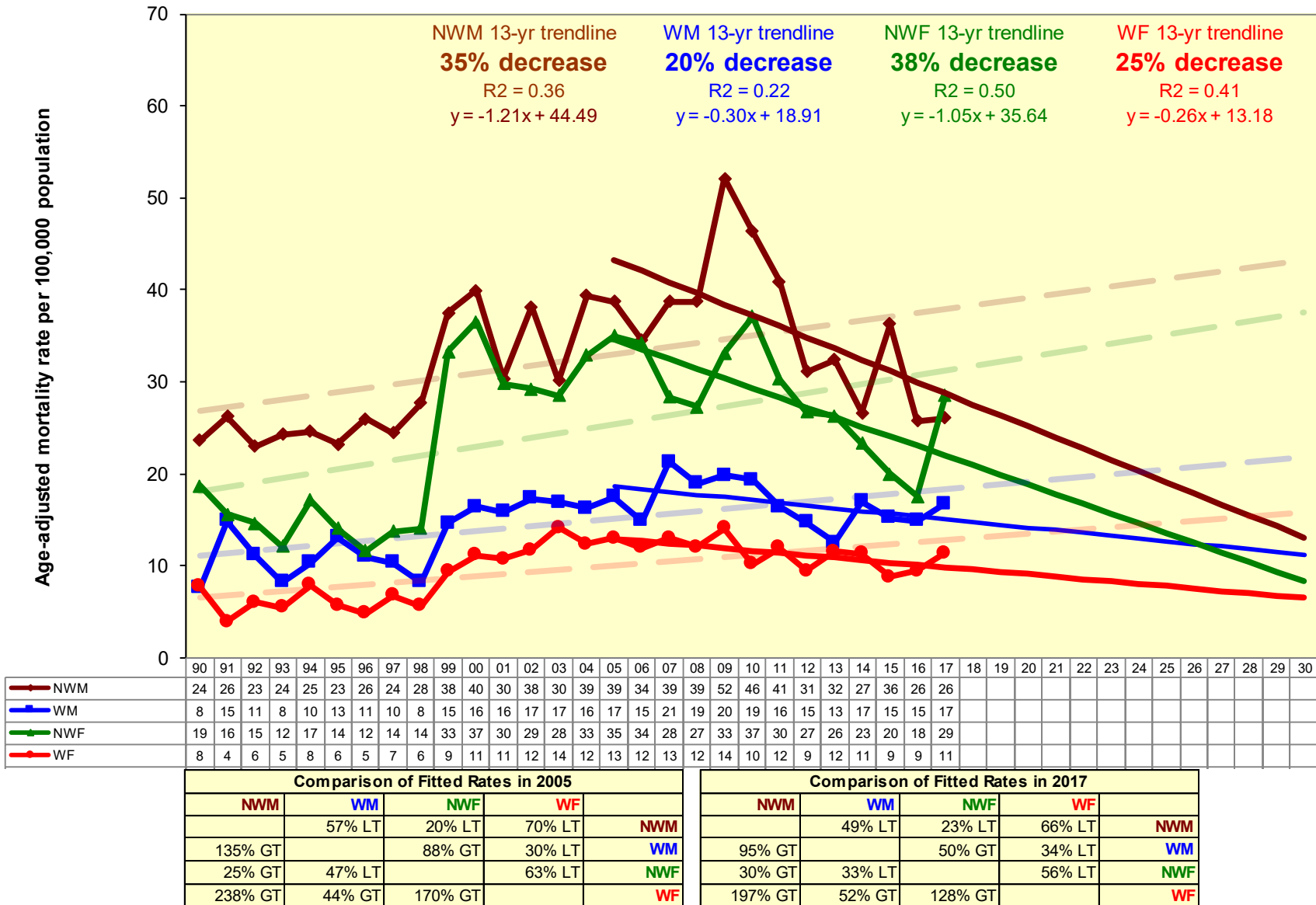


Figure 6.9 iv. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

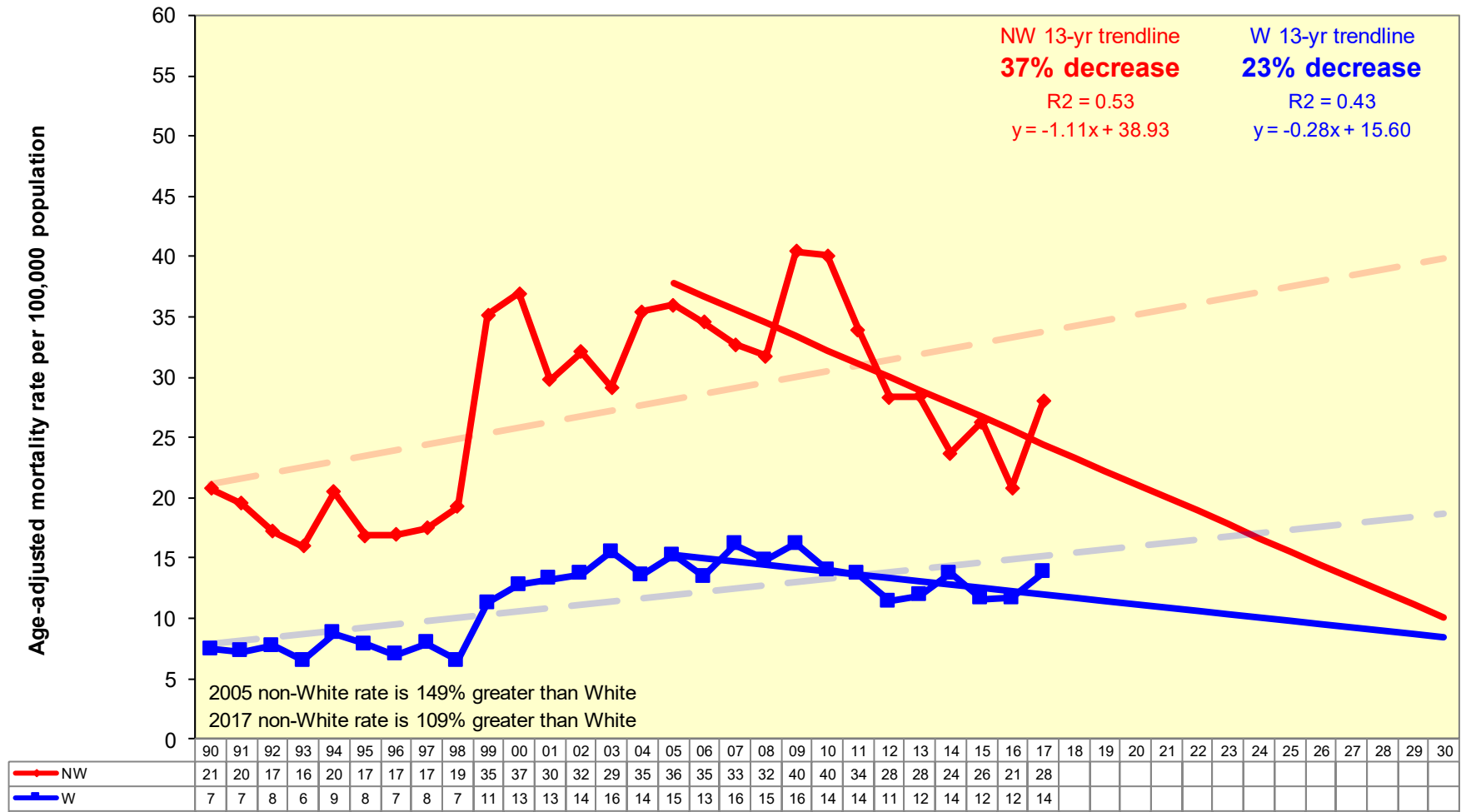
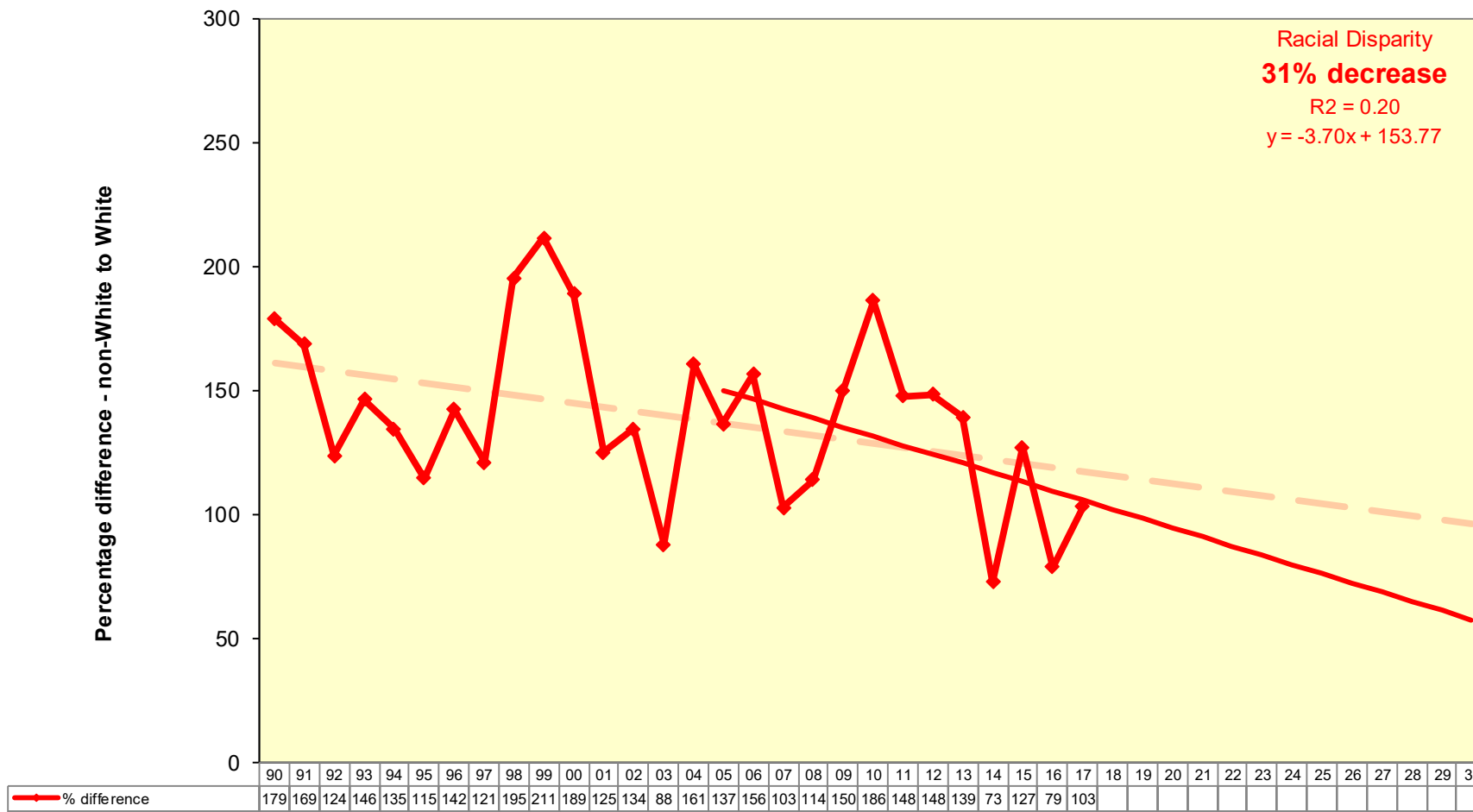


Figure 6.9 v. Nephritis, Nephrotic Syndrome, and Nephrosis:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



Cancer - Colon, Rectum, Anus

- 13-year rate trends for colon cancer for ENC, RNC and NC have all declined. In 2017 ENC's rate was 18% greater than RNC
- The age-adjusted mortality rate trend for colon cancer for ENC has declined 27% over the 13-year period. The ENC rate is the highest, and is 11% greater than the NC rate .
- The non-White male mortality rate trend is the highest of the demographic groups and is decreasing the slowest. The non-White male rate is 67% greater than the White male rate and 85% greater than the non-White female rate. White females have the lowest rate trend .
- The non-White mortality rate is 45% greater than the White rate in 2017. Both are decreasing .
- The 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 6.10 i. Cancer - Colon, Rectum, Anus:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

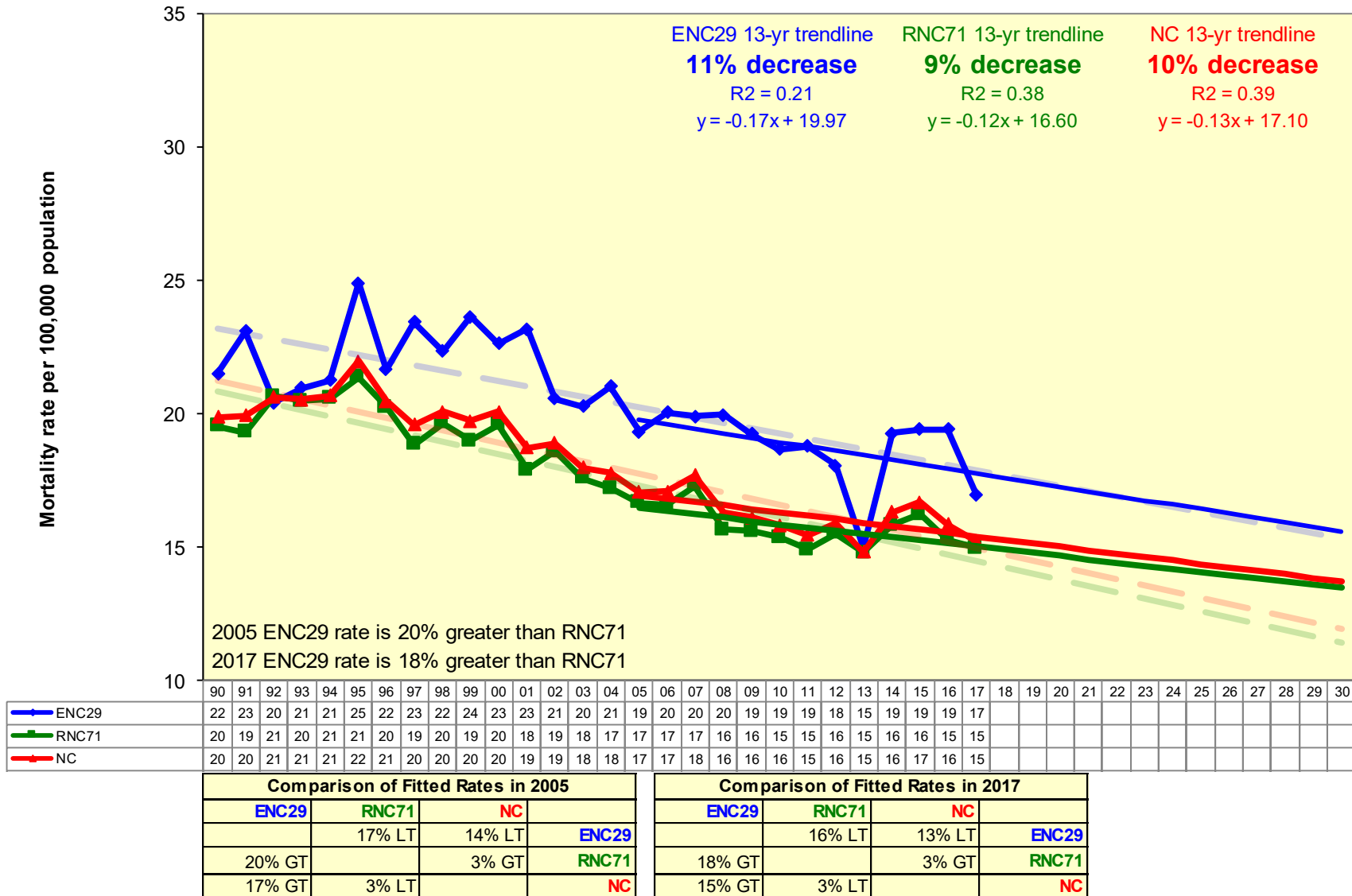


Figure 6.10 ii. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

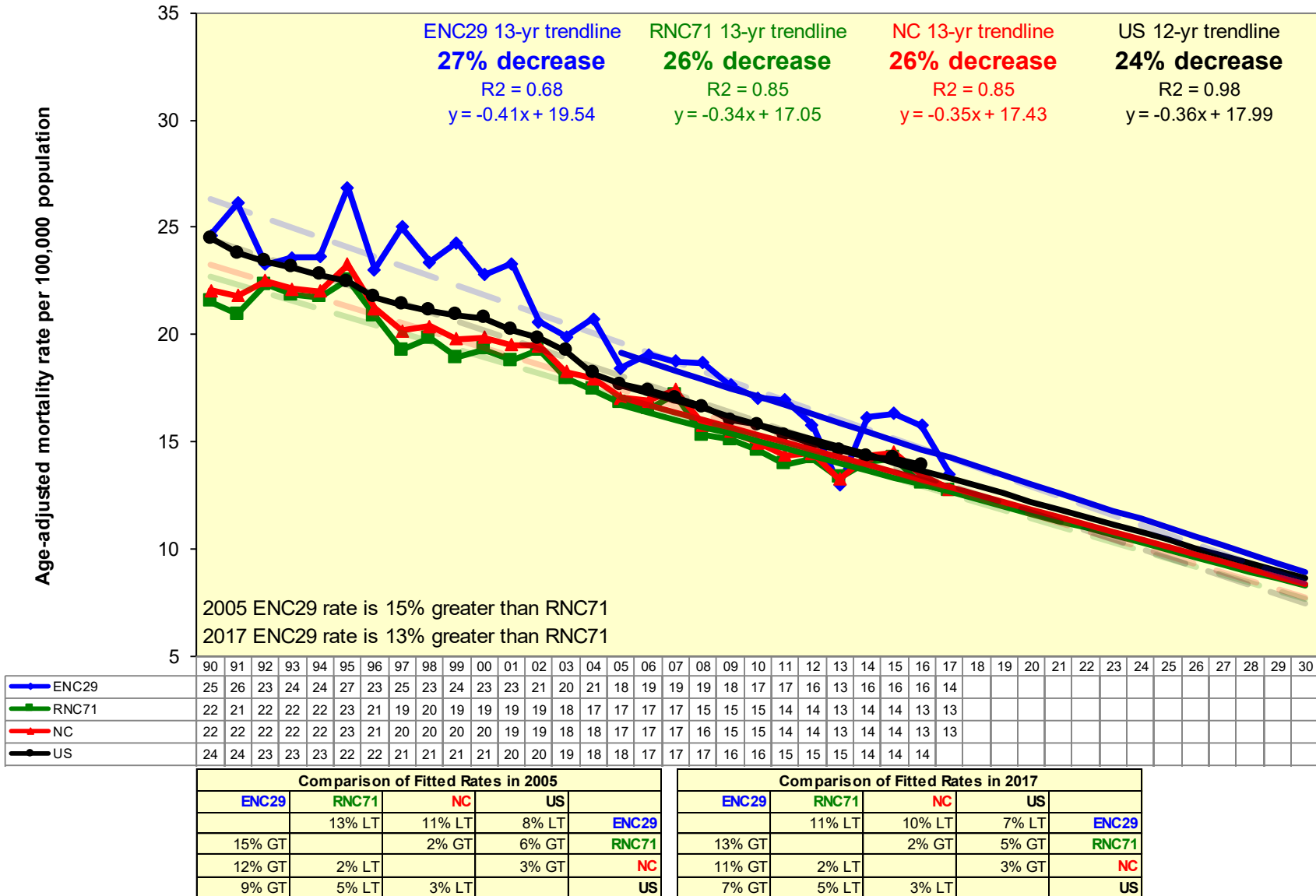


Figure 6.10 iii. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

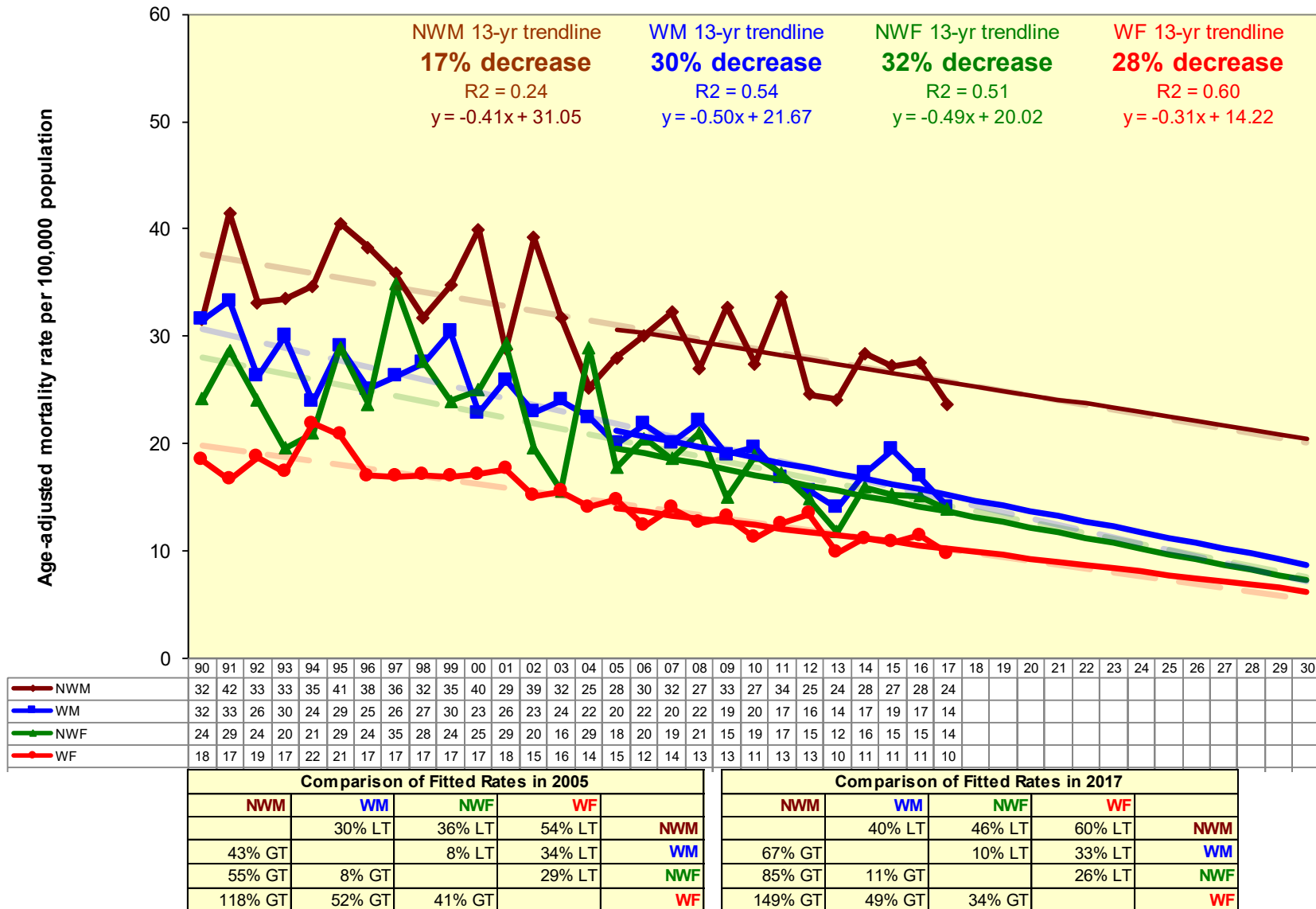


Figure 6.10 iv. Cancer - Colon, Rectum, Anus:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

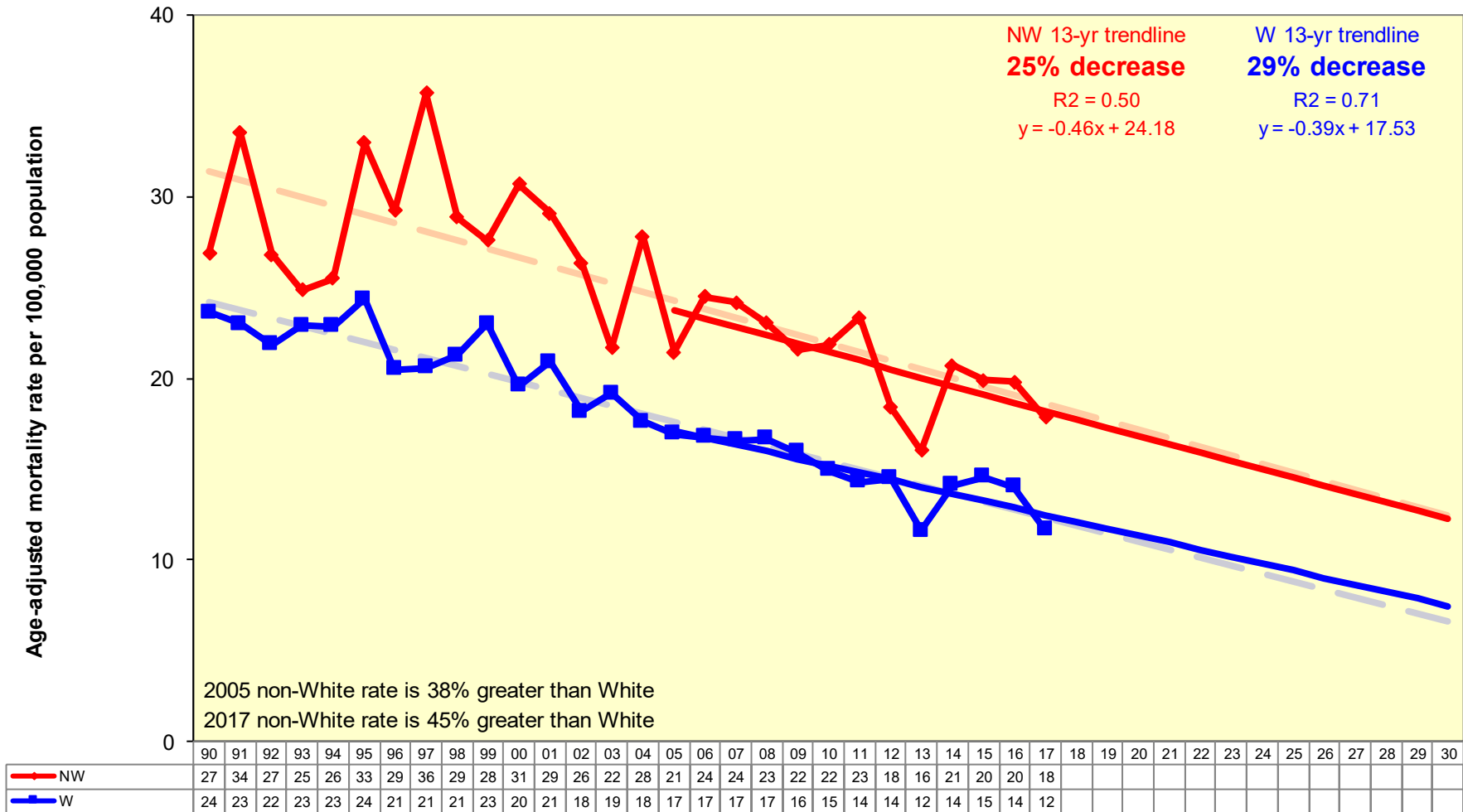
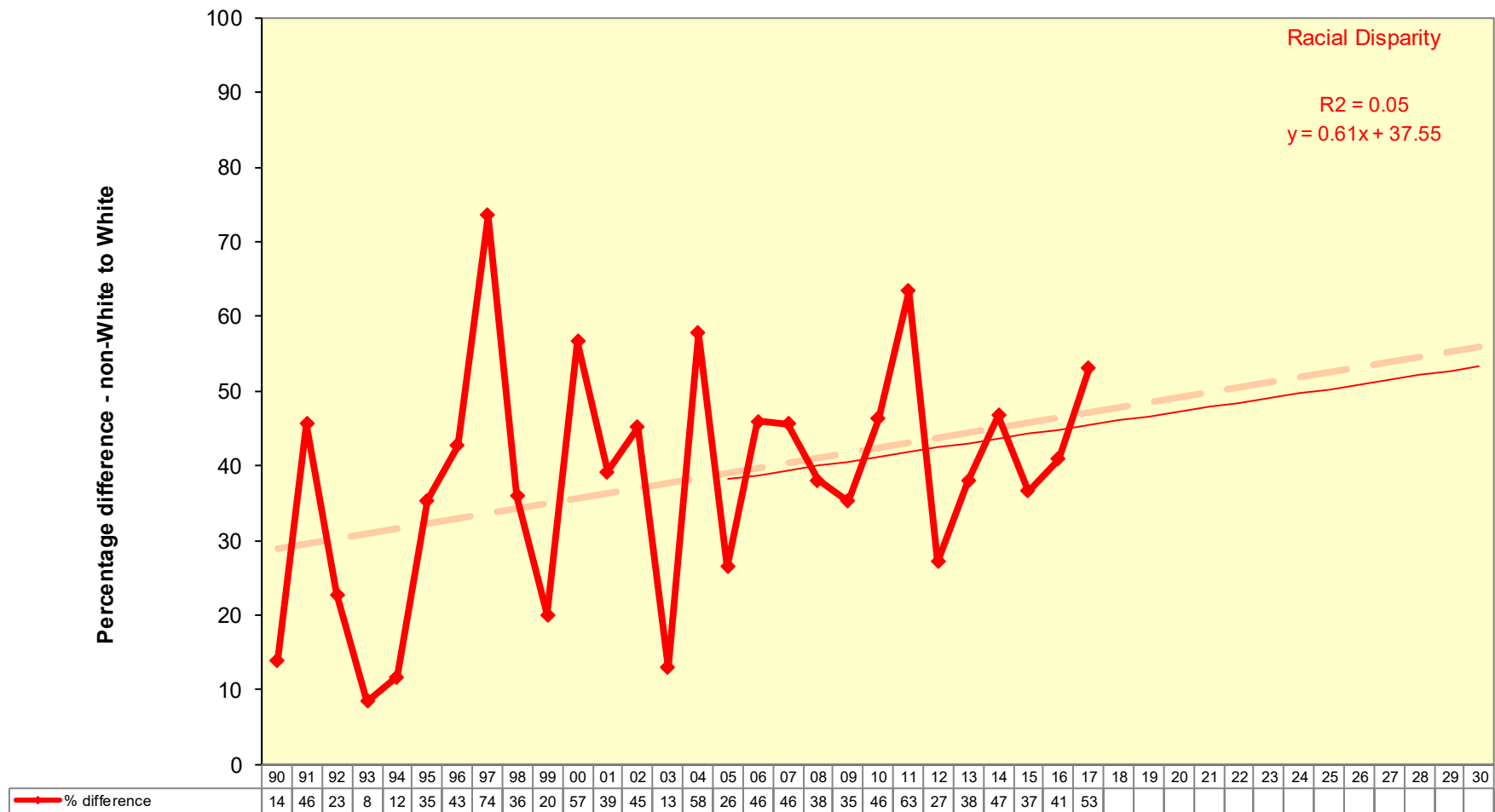


Figure 6.10 v. Cancer - Colon, Rectum, Anus:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



7. Trends and Disparities in Mortality in ENC29: Cancer - All Sites and HIV Disease; 1990-2017

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, PNC, NC and US are all decreasing. The ENC rate is 7% 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 13 year period. The non-White rate decreased 28% and the White rate decreased 18%. The non-White rate remains 9% greater than the White rate in 2017 but they are converging.
- The 13-year trend for racial disparity shows a 63% 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,
1990-2017 with projections to 2030

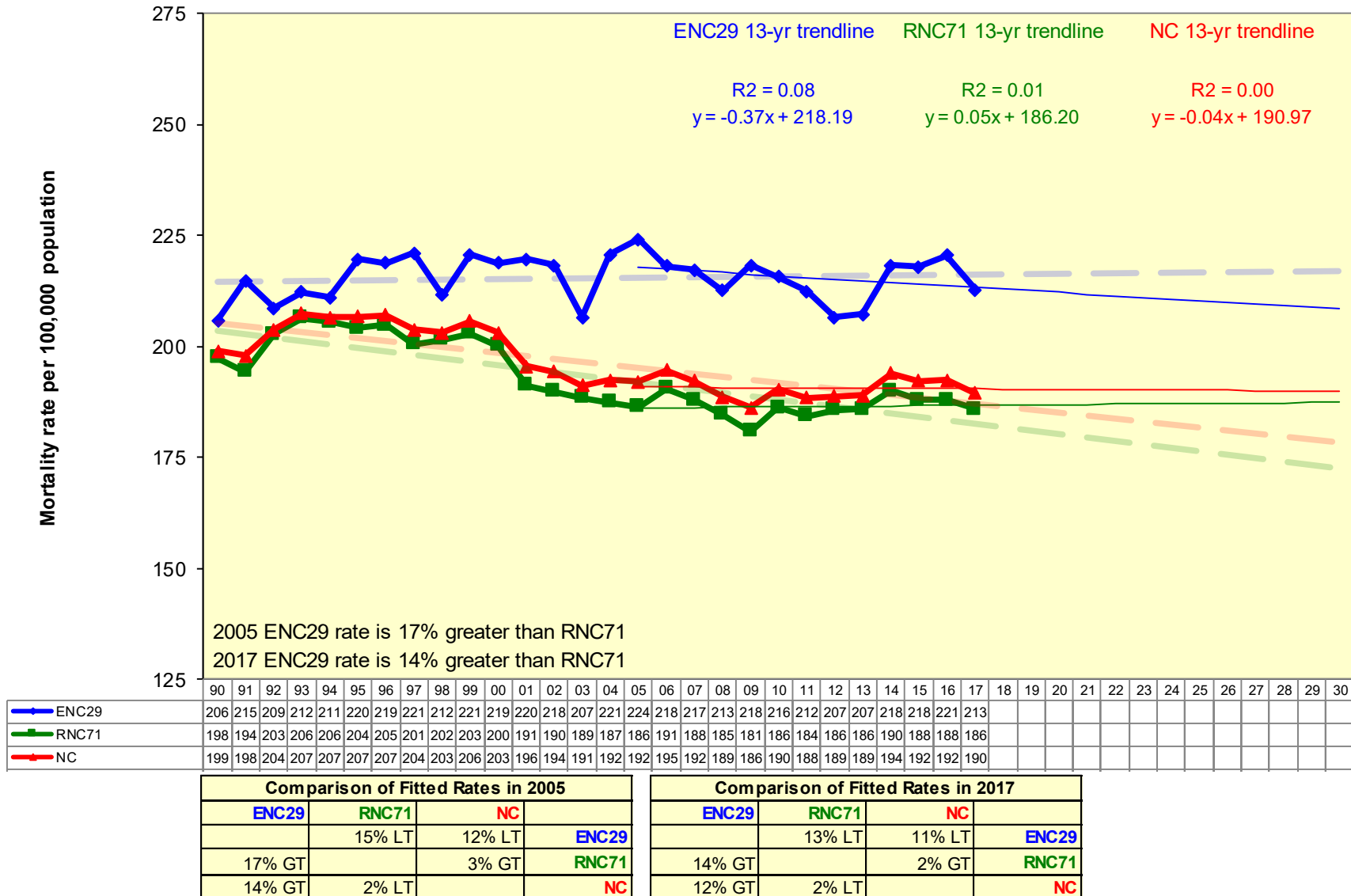


Figure 7.1 ii. Cancer - All Sites:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

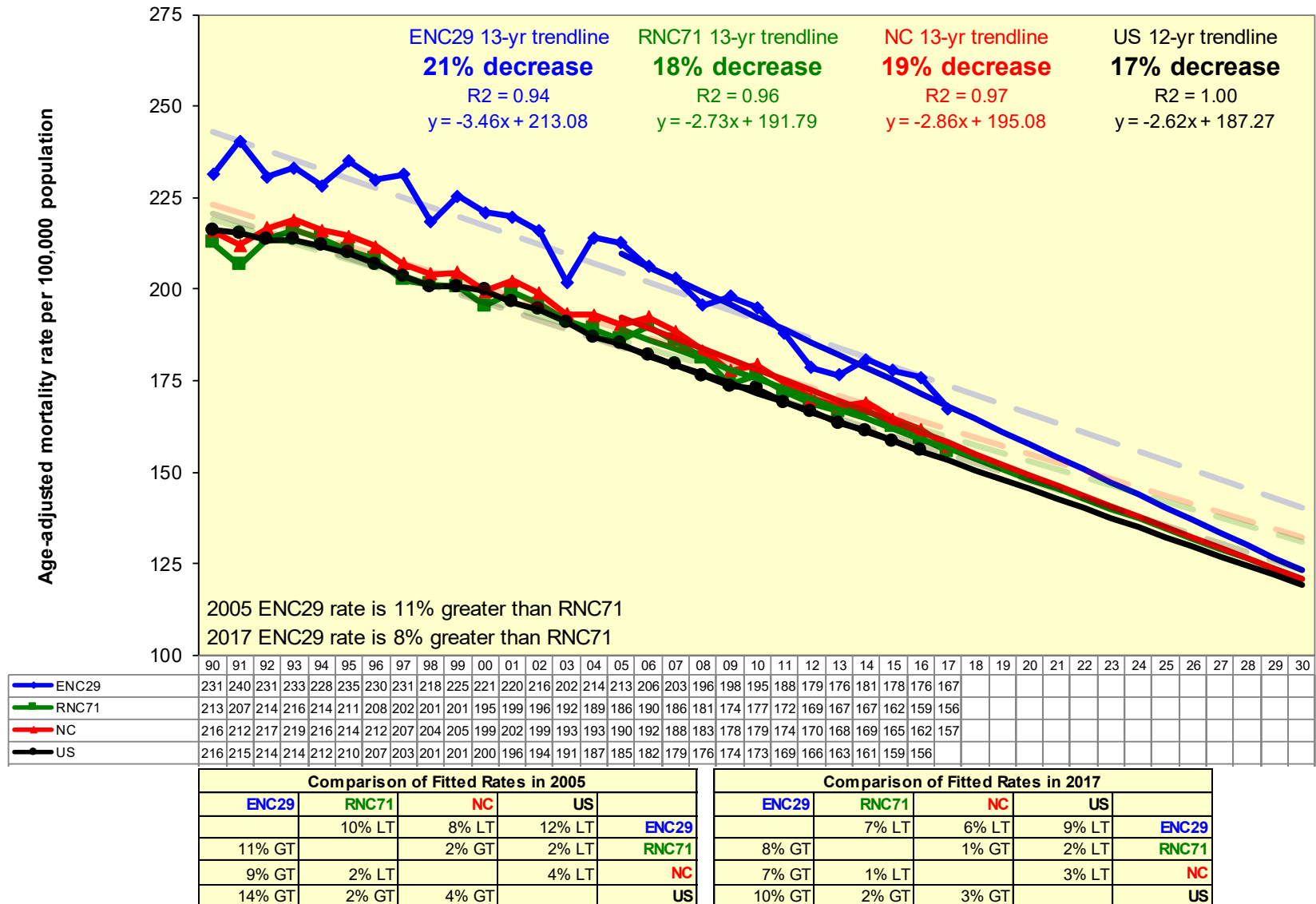


Figure 7.1 iii. Cancer - All Sites:
Trends in age-adjusted mortality rates by race and gender for ENC29, 1990-2017 with projections to 2030

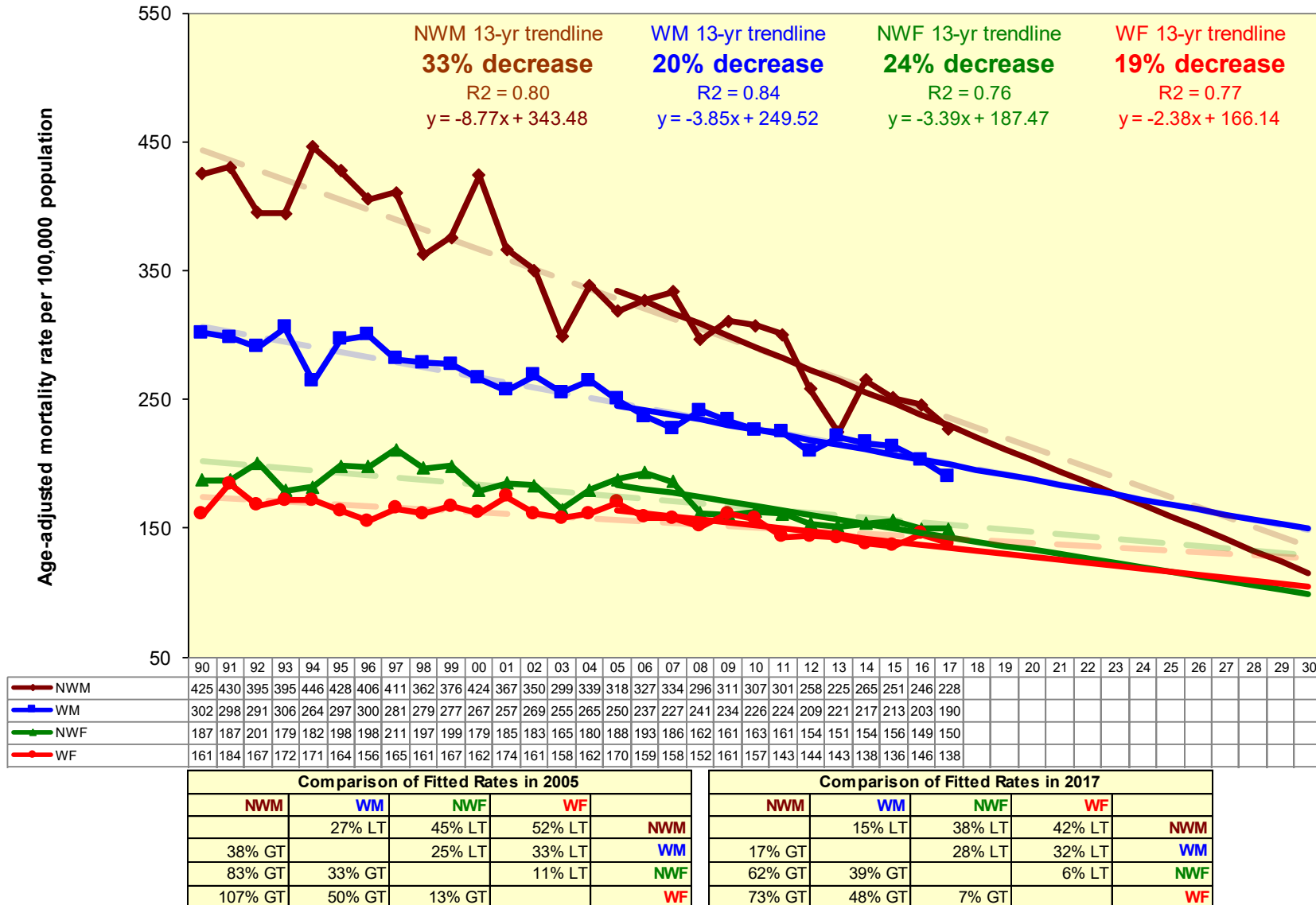


Figure 7.1 iv. Cancer - All Sites:
 Trends in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030

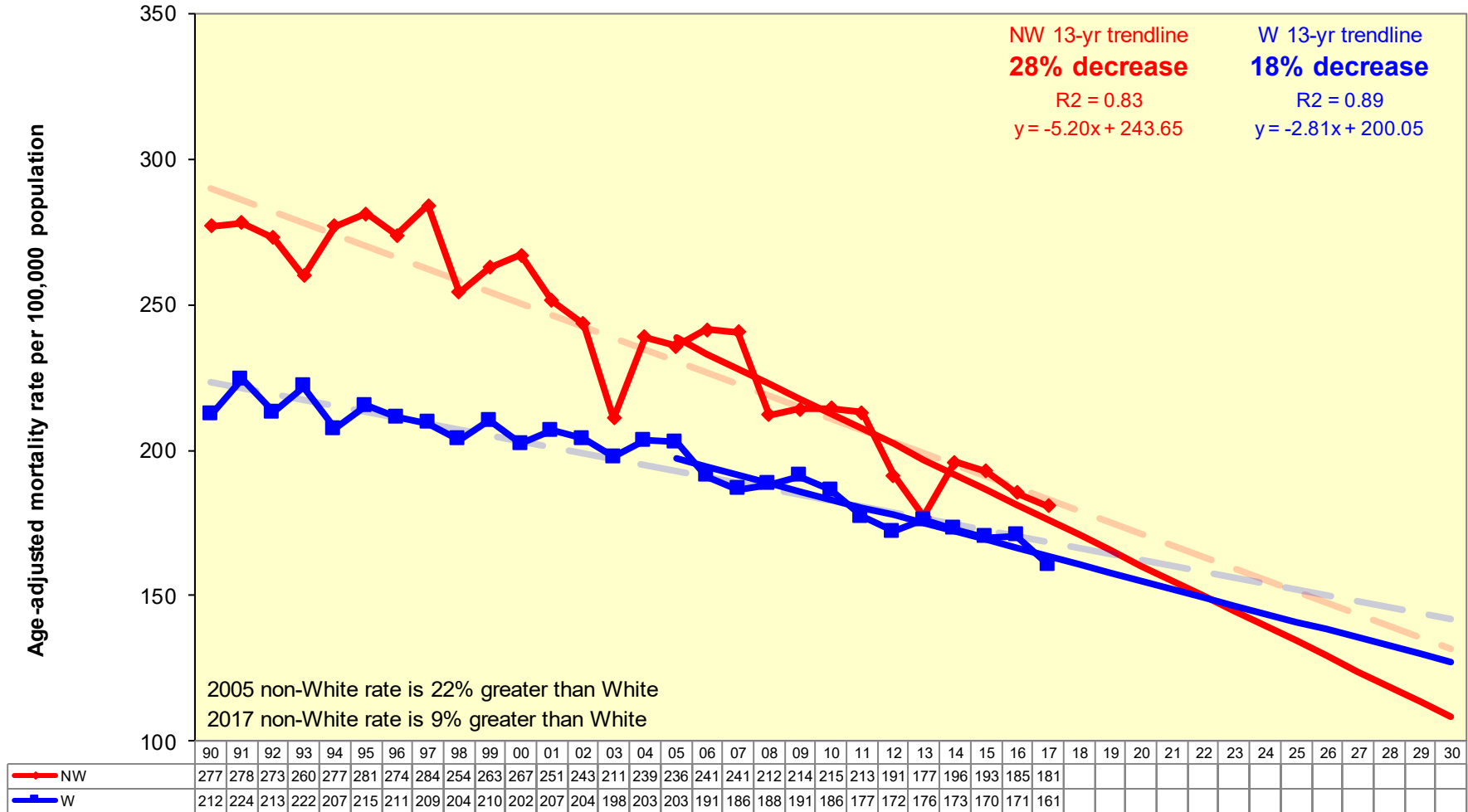
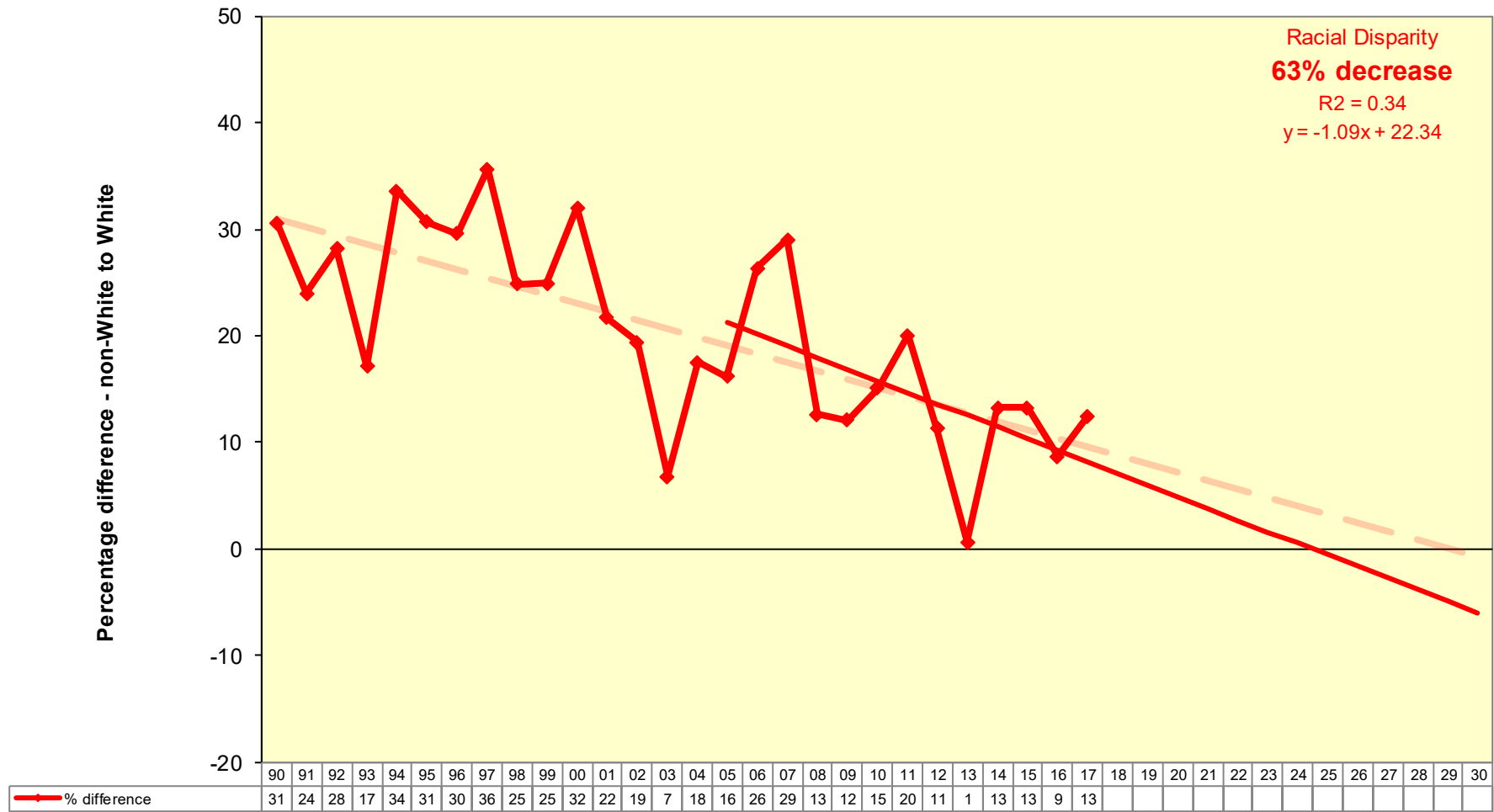


Figure 7.1 v. Cancer - All Sites:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



HIV Disease

- The fitted HIV mortality rates for ENC have been decreasing over the past 13 years, but are still 30% greater than NC in 2017.
- The age-adjusted rate trend for ENC, RNC, and the US are all decreasing. The ENC rate is 38% greater than NC in 2017.
- Non-White males continue to have the highest rate of age-adjusted mortality but the rate has decreased 73% in a 13-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 13-year age-adjusted HIV mortality rates have decreased for both Whites and non-Whites by 58% and 73% respectively. The non-White rate is still 708% greater than the White rate.
- 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 7.2 i. HIV Disease:
Trends in mortality rates for ENC29, RNC71, and NC,
1990-2017 with projections to 2030

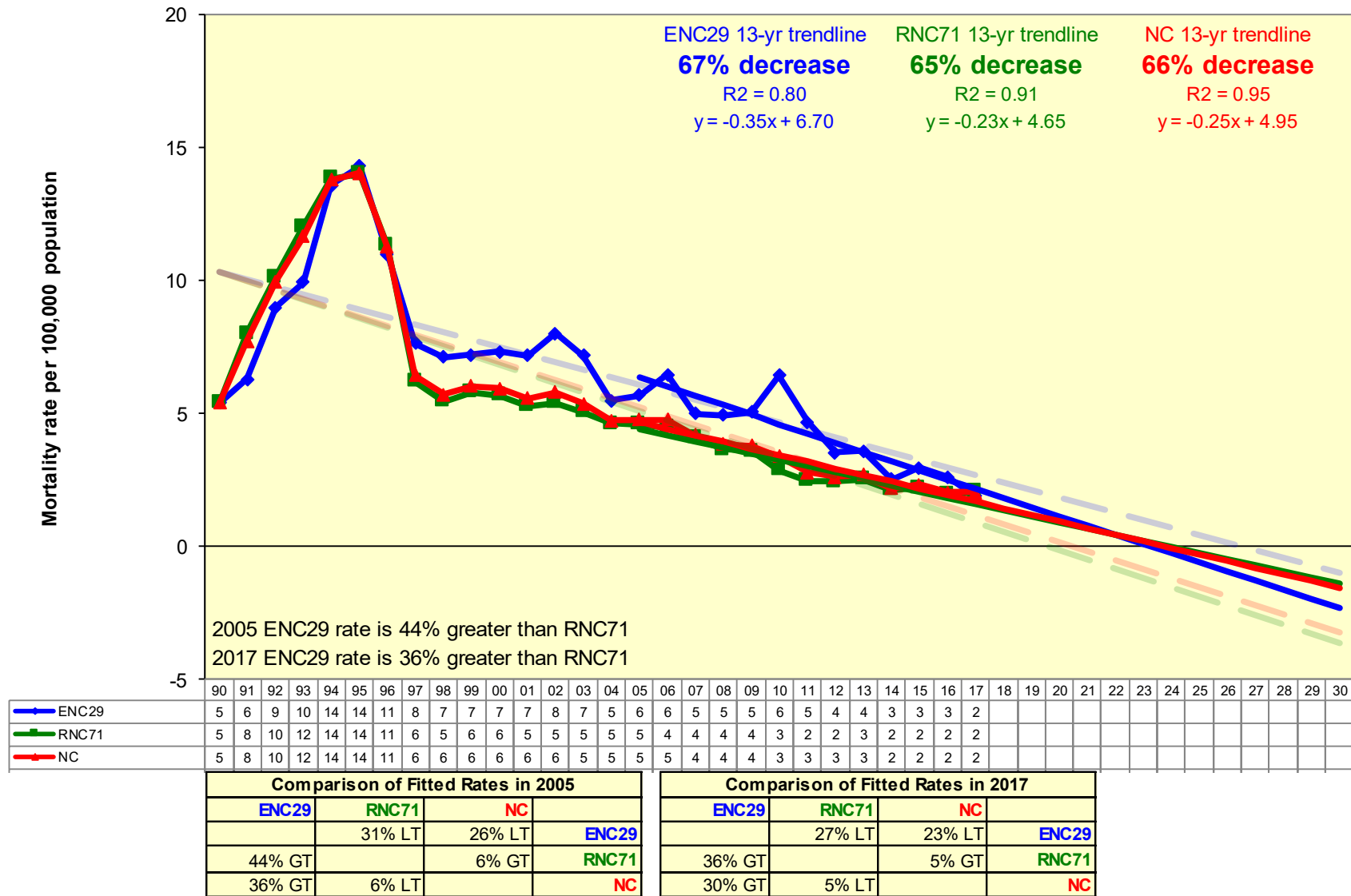


Figure 7.2 ii. HIV Disease:
Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1990-2017 with projections to 2030

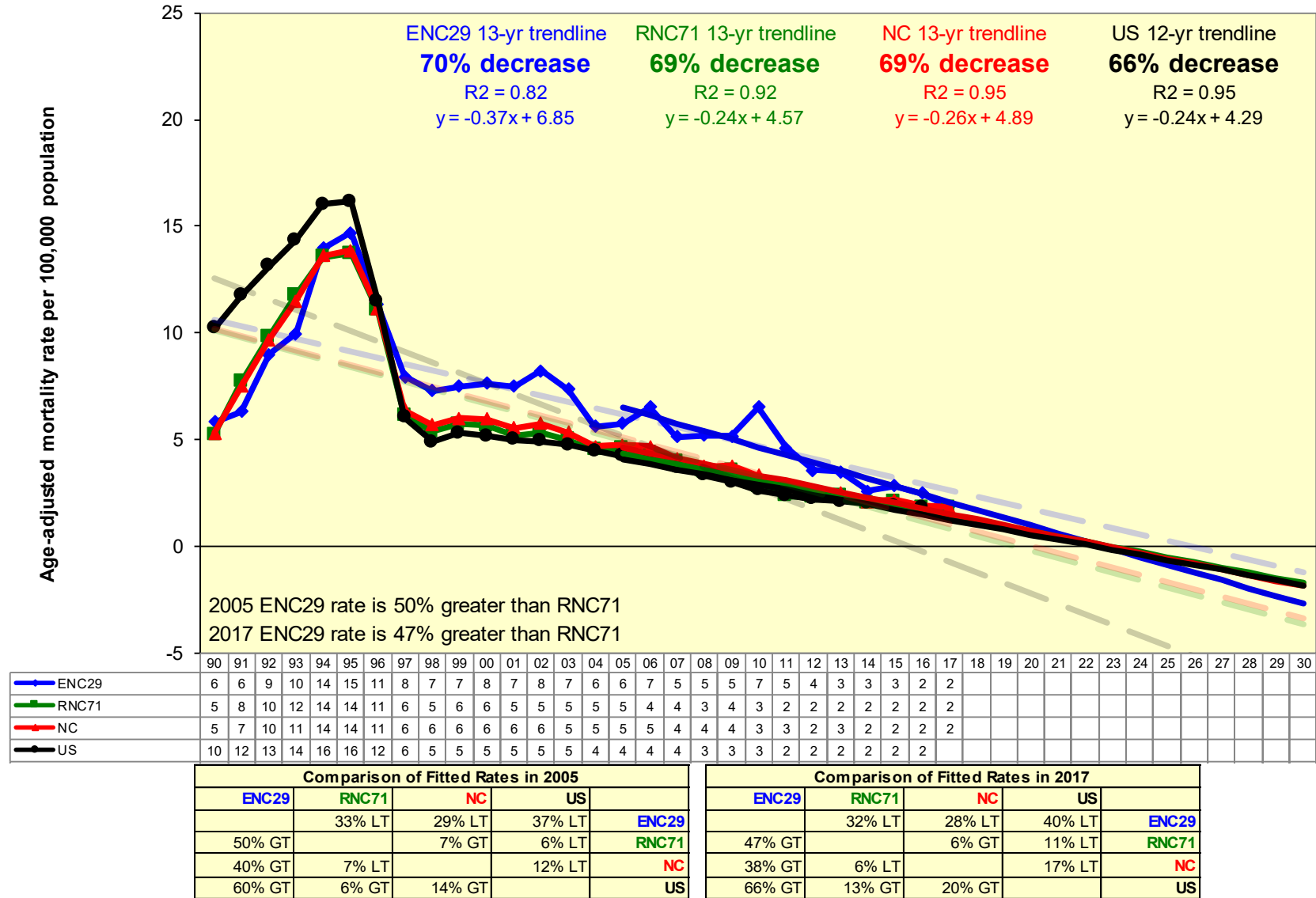


Figure 7.2 iii. HIV Disease:
Trends in age-adjusted mortality rates by race and gender for ENC29,
1990-2017 with projections to 2030

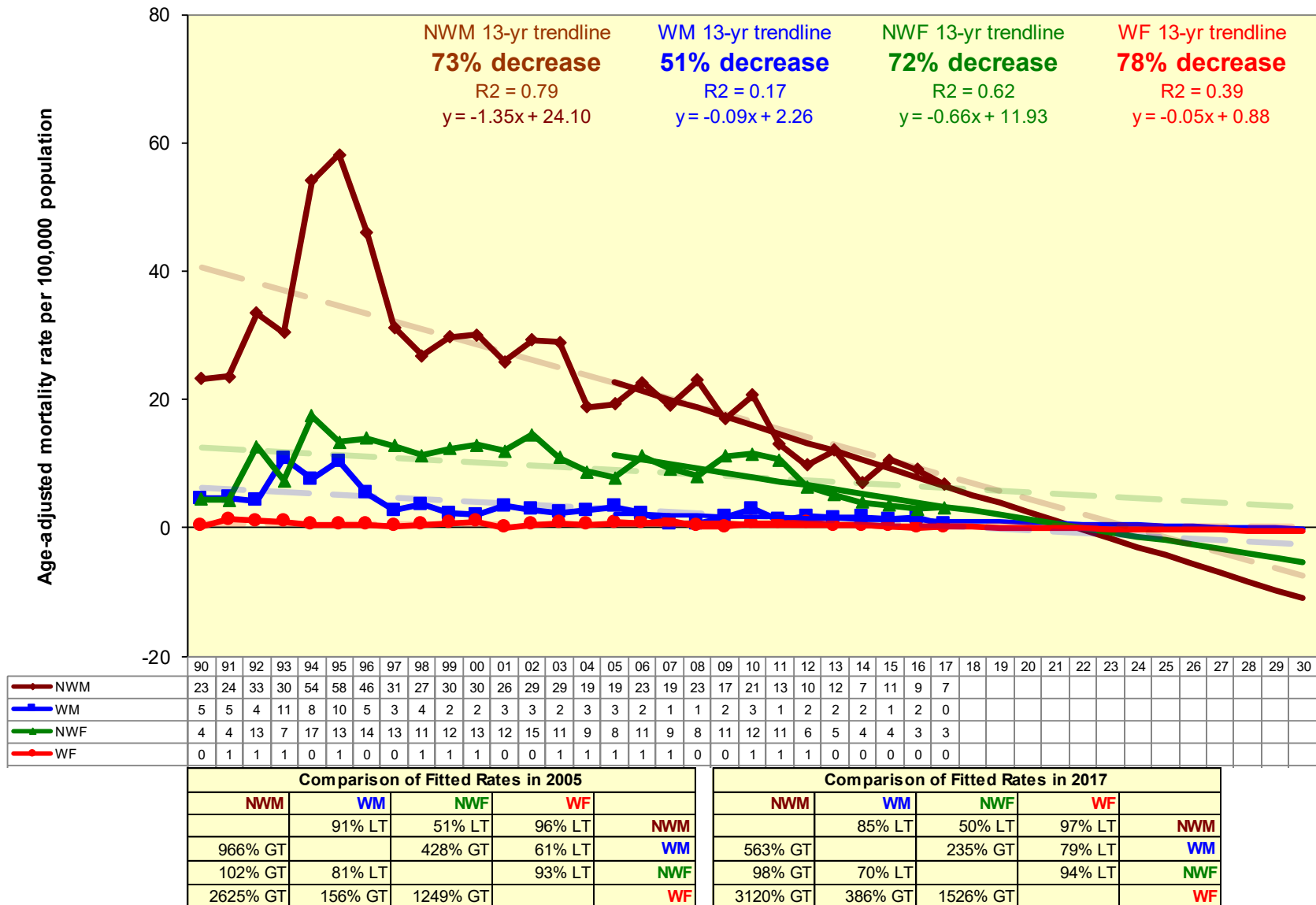


Figure 7.2 iv. HIV Disease:
Trends in age-adjusted mortality rates by race for ENC29,
1990-2017 with projections to 2030

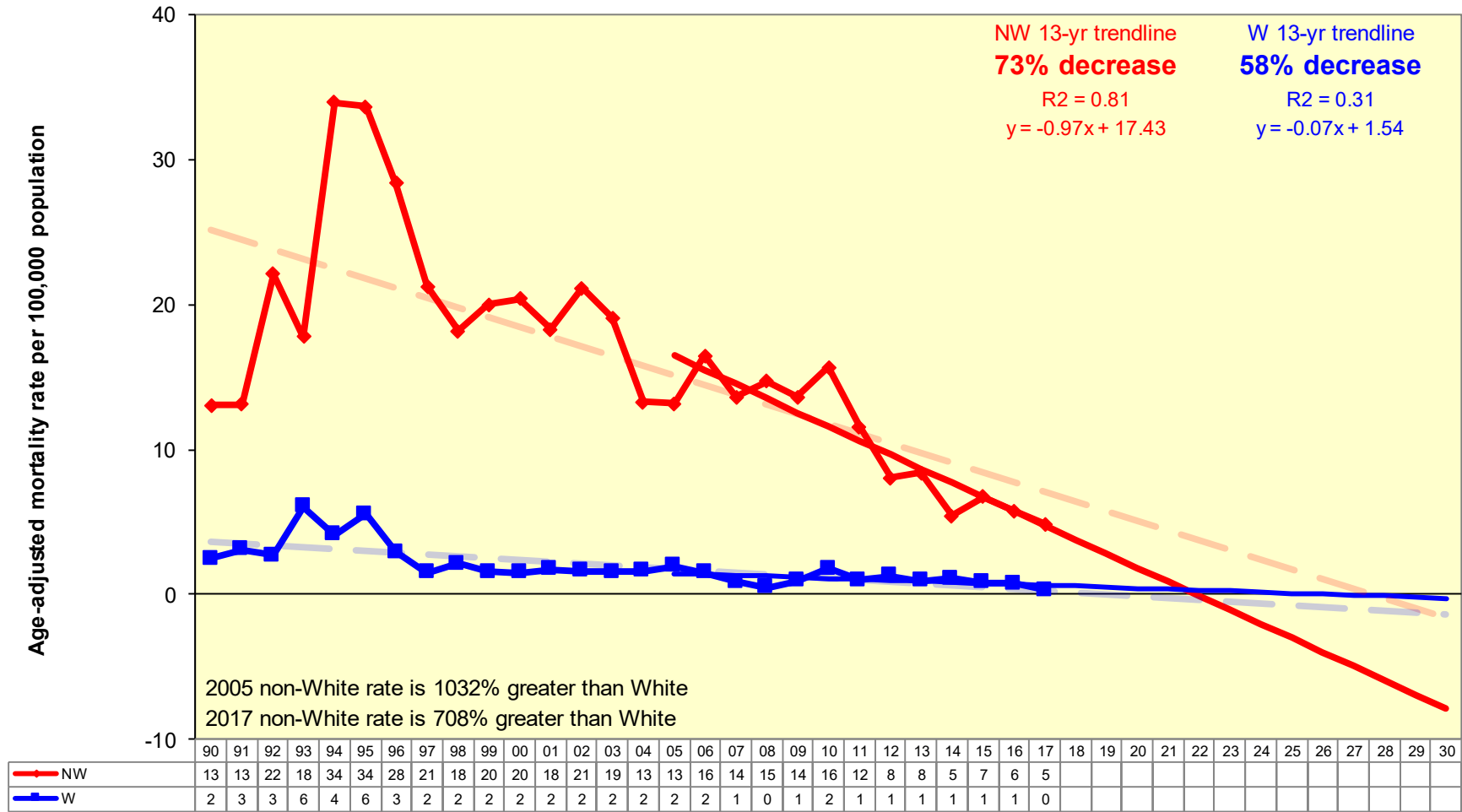
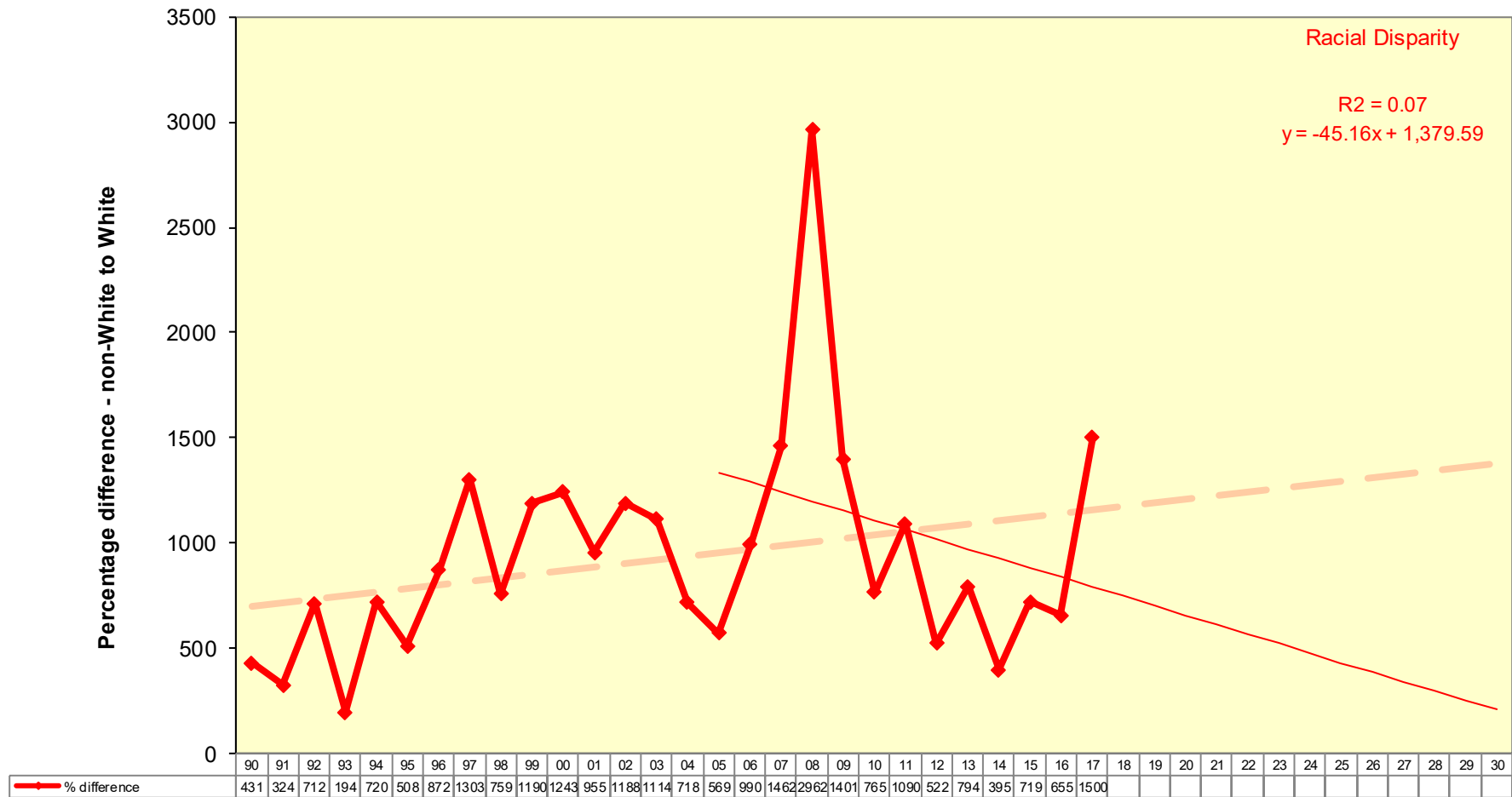


Figure 7.2 v. HIV Disease:
 Measuring disparity in age-adjusted mortality rates by race for ENC29,
 1990-2017 with projections to 2030



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
Atherosclerosis	I70	440
Cancer - All Sites	C00-C97	140-208
Cancer - Lip, Oral Cavity, and Pharynx	C00-C14	140-149
Cancer - Stomach	C16	151
Cancer - Colon, Rectum, and Anus	C18-C21	153-154
Cancer - Liver	C22	155
Cancer - Pancreas	C25	157
Cancer - Larynx	C32	161
Cancer - Trachea, Bronchus, and Lung	C33-C34	162
Cancer - Malignant Melanoma of Skin	C43	172
Cancer - Breast	C50	174-175
Cancer - Cervix Uteri	C53	180
Cancer - Ovary	C56	183.0
Cancer - Prostate	C61	185
Cancer - Bladder	C67	188
Cancer - Brain	C71	
Cancer - Non-Hodgkin's Lymphoma	C82-C85	200, 202
Cancer - Leukemia	C91-C95	204-208
HIV Disease	B20-B24	042-044
Septicemia	A40-A41	038
Diabetes Mellitus	E10-E14	250
Pneumonia and Influenza	J10-J18	480-487
Chronic Lower Respiratory Diseases	J40-J47	490-494, 496
Chronic Liver Disease and Cirrhosis	K70, K73-K74	571
Nephritis, Nephrotic Syndrome, and Nephrosis	N00-N07, N17-N19, N25-N27	580-589
Unintentional Motor Vehicle Injuries	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	E810-E825
All Other Unintentional Injuries and Adverse Effects	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	E800-E807, E826-E829, E830-E848, E929.0, E929.1, E850-E869, E880-E928, E929.2-E929.9
Suicide	X60-X84, Y87.0	E950-E959
Homicide	X85-Y09, Y87.1	E960-E969
Legal Intervention	Y35, Y89.0	E970-E978
Alzheimer's Disease	G30	331.0