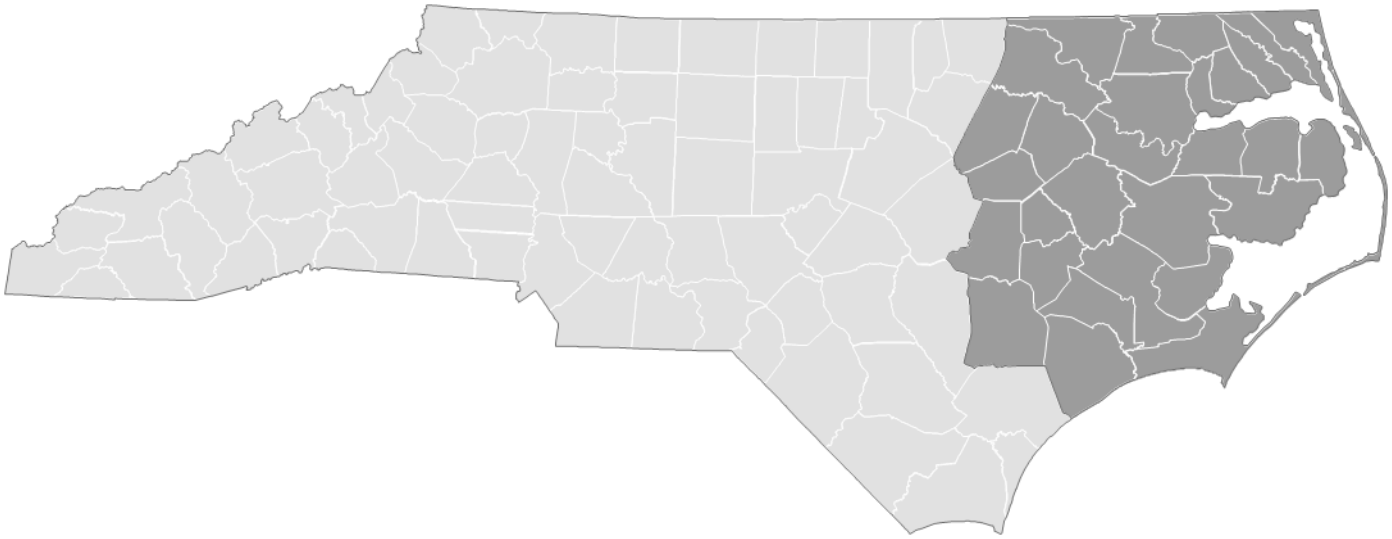
Trends and Disparities in Mortality in Eastern North Carolina

Total Deaths, Premature Mortality and Deaths for Ten Leading Causes; 1979-2015



A Resource for Healthy Communities

Health Indicator Series - Report #2.201
October 2018

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

Table of Contents

List of Figures iii

1. Introduction 1.1

2. Data Highlights 2.1

3. Methods, Interpretation, and References 3.1
Data Sources 3.1
Measures 3.1
Interpreting the Pie Charts 3.2
Interpreting the Trend Figures 3.3
Caveats about the Concepts of Race, Gender, and Geography 3.5
References 3.6

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

5. Trends and Disparities in Mortality in ENC29: All Causes of Death and All Causes of Premature Mortality, 1979-2015 with Projections to 2020 5
All Causes of Death 5.1
All Causes of Premature Mortality 5.7

6. Trends and Disparities in Mortality in ENC29: Ten Specific Leading Causes of Death, 1979-2015 6
Diseases of Heart 6.1
Cancer - Trachea, Bronchus, Lung 6.7
Cerebrovascular Disease 6.13
Chronic Lower Respiratory Diseases 6.19
Diabetes Mellitus 6.25
All Other Unintentional Injuries and Adverse Effects 6.31
Alzheimer's Disease 6.37
Pneumonia and Influenza 6.43
Cancer - Colon, Rectum, Anus 6.49
Nephritis, Nephrotic Syndrome, and Nephrosis 6.55

7. Trends and Disparities in Mortality in ENC29: Cancer - All Sites and HIV Disease, 1979-2015 7
Cancer - All Sites 7.1
HIV Disease 7.7

8. Appendix 8

List of Figures

Figure 4.1 i. General leading causes of death for ENC29 (2015), NC (2015), and US (2014). Mortality rate per 100,000 population 4.1
Figure 4.1 ii. General leading causes of death for ENC29 (2015), NC (2015), and US (2014). Age-adjusted mortality rate per 100,000 population 4.2
Figure 4.2 i. General leading causes of death for ENC29 by race and gender, (2015). Mortality rate per 100,000 population 4.3
Figure 4.2 ii. General leading causes of death for ENC29 by race and gender, (2015). Age-adjusted mortality rate per 100,000 population 4.4
Figure 4.3 i. General leading causes of death for ENC29 by race, (2015). Mortality rate per 100,000 population 4.5
Figure 4.3 ii. General leading causes of death for ENC29 by race, (2015). Age-adjusted mortality rate per 100,000 population 4.6
Figure 5.1 i. All Causes of Death: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 5.2
Figure 5.1 ii. All Causes of Death: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 5.3
Figure 5.1 iii. All Causes of Death: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 5.4
Figure 5.1 iv. All Causes of Death: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 5.5
Figure 5.1 v. All Causes of Death: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 5.6
Figure 5.2 i. All Causes of Premature Mortality: Trends in premature mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 5.8
Figure 5.2 ii. All Causes of Premature Mortality: Trends in age-adjusted premature mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 5.9
Figure 5.2 iii. All Causes of Premature Mortality: Trends in age-adjusted premature mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 5.10
Figure 5.2 iv. All Causes of Premature Mortality: Trends in age-adjusted premature mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 5.11
Figure 5.2 v. All Causes of Premature Mortality: Measuring disparity in age-adjusted premature mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 5.12
Figure 6.1 i. Diseases of Heart: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.2
Figure 6.1 ii. Diseases of Heart: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 6.3
Figure 6.1 iii. Diseases of Heart: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.4
Figure 6.1 iv. Diseases of Heart: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.5
Figure 6.1 v. Diseases of Heart: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.6
Figure 6.2 i. Cancer - Trachea, Bronchus, Lung: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.8

Figure 6.2 ii. Cancer - Trachea, Bronchus, Lung: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 6.9
Figure 6.2 iii. Cancer - Trachea, Bronchus, Lung: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.10
Figure 6.2 iv. Cancer - Trachea, Bronchus, Lung: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020..... 6.11
Figure 6.2 v. Cancer - Trachea, Bronchus, Lung: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.12
Figure 6.3 i. Cerebrovascular Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.14
Figure 6.3 ii. Cerebrovascular Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020..... 6.15
Figure 6.3 iii. Cerebrovascular Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020..... 6.16
Figure 6.3 iv. Cerebrovascular Disease: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020..... 6.17
Figure 6.3 v. Cerebrovascular Disease: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020..... 6.18
Figure 6.4 i. Chronic Lower Respiratory Diseases: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.20
Figure 6.4 ii. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020..... 6.21
Figure 6.4 iii. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020..... 6.22
Figure 6.4 iv. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.23
Figure 6.4 v. Chronic Lower Respiratory Diseases: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020..... 6.24
Figure 6.5 i. Diabetes Mellitus: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.26
Figure 6.5 ii. Diabetes Mellitus: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 6.27
Figure 6.5 iii. Diabetes Mellitus: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.28
Figure 6.5 iv. Diabetes Mellitus: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020..... 6.29
Figure 6.5 v. Diabetes Mellitus: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.30
Figure 6.6 i. All Other Unintentional Injuries and Adverse Effects: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.32
Figure 6.6 ii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020..... 6.33

Figure 6.6 iii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.34
Figure 6.6 iv. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.35
Figure 6.6 v. All Other Unintentional Injuries and Adverse Effects: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.36
Figure 6.7 i. Alzheimer's Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.38
Figure 6.7 ii. Alzheimer's Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 6.39
Figure 6.7 iii. Alzheimer's Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.40
Figure 6.7 iv. Alzheimer's Disease: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020..... 6.29
Figure 6.7 v. Alzheimer's Disease: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.42
Figure 6.8 i. Pneumonia and Influenza: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.44
Figure 6.8 ii. Pneumonia and Influenza: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 6.45
Figure 6.8 iii. Pneumonia and Influenza: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.46
Figure 6.8 iv. Pneumonia and Influenza: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.47
Figure 6.8 v. Pneumonia and Influenza: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.48
Figure 6.9 i. Cancer - Colon, Rectum, Anus: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.50
Figure 6.9 ii. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 6.51
Figure 6.9 iii. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.52
Figure 6.9 iv. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.53
Figure 6.9 v. Cancer - Colon, Rectum, Anus: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.54
Figure 6.10 i. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 6.56
Figure 6.10 ii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979- 2015 with projections to 2020 ..... 6.57
Figure 6.10 iii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 6.58

Figure 6.10 iv. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.59
Figure 6.10 v. Nephritis, Nephrotic Syndrome, and Nephrosis: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 6.60
Figure 7.1 i. Cancer - All Sites: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 7.2
Figure 7.1 ii. Cancer - All Sites: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 7.3
Figure 7.1 iii. Cancer - All Sites: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 7.4
Figure 7.1 iv. Cancer - All Sites: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 7.5
Figure 7.1 v. Cancer - All Sites: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 7.6
Figure 7.2 i. HIV Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020 ..... 7.8
Figure 7.2 ii. HIV Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020 ..... 7.9
Figure 7.2 iii. HIV Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020 ..... 7.10
Figure 7.2 iv. HIV Disease: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 7.11
Figure 7.2 v. HIV Disease: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020 ..... 7.12

1. Introduction

Health Indicators Series:
A Resource for Healthy Communities
October 2018

Report Series #2: Mortality Trends for Eastern North Carolina (1979 to 2015)

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 of the overarching goals of *Healthy People 2020*, the national blueprint for health improvement. The first goal is to increase the span and quality of life and the second is to eliminate health disparities. North Carolina's companion plan, *Healthy North Carolina 2020,* has also embraced these two goals. Using rate comparisons, this report describes the inequalities in mortality among Eastern North Carolina and other regions, and among four demographic groups. Premature mortality, the focus of Report Series #1, is included in the death from all causes section located at the beginning of this report. The measure used to quantify premature mortality is described in more detail in the Methods and Interpretations section.

This report describes the leading contributors to mortality, provides a geographic context, and examines trends and inequalities over a 37-year period (1979-2015), as well as the most recent 17 year period (1999 to 2015). 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 2020. These charts place Eastern North Carolina's health status in a historical context and provide a glimpse into the future.

[*] The region *Eastern North Carolina* is comprised of 29 counties located in the extreme east of North Carolina and approximates the coastal plain physiographic province of the state. It includes the northern counties east of I-95. This region is characterized by its rurality, poverty, and some of the highest mortality rates in the nation. The name of the region is abbreviated as ENC29 or ENC. The rest of North Carolina is the remaining 71 counties; abbreviated as RNC71 or RNC.

2. Data Highlights

Trends and Disparities in Mortality in Eastern North Carolina

The following highlights of mortality in 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 2015, age-adjusted mortality rate for Eastern North Carolina is 832 deaths per 100,000. This rate is 5% higher than the state rate. Within Eastern North Carolina, the non-White rate is 20% higher than the White rate. The non-White male rate is 31% 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 (2015) are:
1. Cancer - All Sites
2. Diseases of Heart
3. Cerebrovascular Disease
4. Chronic Lower Respiratory Diseases
5. Diabetes Mellitus

The five general leading causes of mortality in Eastern North Carolina by race and gender (2015) are:

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

Trends in Mortality from All Causes

- The 37 year ENC trend line shows all cause mortality rates are increasing. The 17 year trend line shows ENC's rate is decreasing but is still higher than NC and RNC. All three have gone up in the most recent three years.
- The age-adjusted, all-cause mortality rate trend for ENC has been decreasing over the 37 year period. The 17-year trend shows greater decrease and suggests the ENC rate will converge with 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 but has had the greatest rate of decrease (34%) in the 17-year trend. 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 rate is 12% greater than the White rate, but the recent 17-year trend suggests they will converge in the future.
- Over the recent 17-year period there is a drop in racial disparity.

Trends in Premature Mortality from All Causes of Death

- ENC's premature mortality rate trend has decreased by 15% over the 17 year period since 1999. This decline is similar to RNC and NC, but ENC remains about 17% higher.
- The age-adjusted premature mortality rate trend for ENC is also decreasing, but remains 17% higher than the RNC rate in 2015.
- The non-White male rate trend is significantly higher than any other demographic group, but also has the highest rate of decrease (35% over 17 years). White females have the lowest rate and also the lowest rate of decrease (8% over 17 years).
- A recent decrease in the premature mortality rate for non-Whites and leveling of rates for Whites suggests a reduction in racial disparity.
- The 17 year trend for racial disparity shows a 54% decrease, in a reliable trend.

Diseases of the Heart

- ENC's 17-year mortality rate trend is decreasing, as are the rates for RNC and NC, although ENC remains well above the others.
- While ENC's age-adjusted mortality rate trend is decreasing at a pace similar to RNC, the ENC rate remains 11% greater than RNC in 2015.
- The non-White male rate trend remains slightly higher than the White male trend. They are both decreasing.
- The non-White rate trend remains 9% greater than for Whites, but the 17-year trends for both are decreasing, and convergence is suggested in the future.
- The 17-year trend line for racial disparity is decreasing in a moderately reliable trend.

Cancer – Trachea, Bronchus, Lung

- The 17-year trend line for Cancer—TBL for ENC is 15% greater than RNC. The trend is moderately reliable.
- In 2015, the age-adjusted rate trend for ENC is 6% above the RNC rate and 19% above the US rate. The 17-year trend lines suggest that the ENC rate is decreasing a bit more quickly, suggesting convergence with RNC and NC in the future.
- The mortality rate trends for males are decreasing. Non-White males continue to have the highest rate, however the 17-year trend line suggests White males will have a higher rate than non-White males in the near future. The trend for White females is decreasing and is moderately reliable. The trend for non-White females is not reliable.
- The non-White mortality rate trend for this cancer is consistently lower than the White rate. Both trends are decreasing over the 17-year period, but non-White is decreasing more quickly.
- The moderately reliable 17-year trend for racial disparity shows a steep decrease.

Cerebrovascular Disease

- ENC's cerebrovascular disease mortality trend line is decreasing but is 22% greater than RNC in 2015.
- The ENC age-adjusted cerebrovascular disease mortality rate trend is decreasing and converging with the RNC and NC rates. It remains 11% greater than the RNC trend.
- Non-White males have the highest mortality rate for cerebrovascular disease but the rate trend continues to decrease and converge with the other demographic groups. Over the 17-year period the trend has decreased by about 50% for all demographic groups.
- The cerebrovascular disease mortality rate trend for non-Whites is decreasing and converging with that of whites but is still 45% greater than Whites in 2015.
- The 17-year trend for racial disparity is unreliable.

Chronic Lower Respiratory Diseases

- The 37 year ENC trend for CLRD mortality is increasing. The 17-year trend for ENC is moderately reliable.
- The 17-year CLRD age-adjusted rate trend for ENC is decreasing. The rate for ENC is lower than the rates for RNC and NC.
- Fitted rates for non-White males and White males have decreased over 17 years by 36% and 32%, respectively. White male rates remain the highest. The 17-year trend for White females and non-White females are unreliable.
- The 17-year White mortality rate trend is higher than the non-White trend, although both are declining. The non-White rate is 45% less than the White rate in 2015.
- The disparity trend between the White and non-White rate is unreliable.

Diabetes Mellitus

- The 17-year trend for diabetes mellitus mortality is decreasing for RNC and NC. The trend for ENC is higher, but it is not reliable.
- The 17-year trend for age-adjusted diabetes mellitus mortality shows a decrease of 20% for ENC. In 2015, the ENC age-adjusted rate trend remains 37% greater than RNC and 38% greater than the US.
- The non-White male and non-White female 17-year trends are decreasing more quickly than their White counterparts, but the non-White male rate is not reliable. The White female rate is decreasing slightly. The White male rate is also unreliable.
- The non-White mortality rate trend decreased 25% over 17 years but remains 123% greater than the White rate.
- The 17-year trend for racial disparity is not reliable.

All Other Unintentional Injuries and Adverse Effects

- The mortality rate trend for unintentional injuries and adverse effects is increasing in ENC (49% over 17 years). The trends for RNC and NC are also increasing.
- The age-adjusted mortality rate trends for ENC, RNC, NC, and the US are all increasing. During the last 17 years, ENC has increased 35%, although it is 3% below RNC in 2015.
- The trends for White males and White females are both increasing (50% and 89% respectively over the 17-year period). The mortality rate trend for non-White males decreased 23% over 17 years. The trend for non-White females is not reliable.
- The White rate trend has increased 64% over the 17-year period. The non-White rate trend has dropped below the White but it is not reliable.

- Over the last 17 years, racial disparity has decreased in a 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 84% increase over the 17 year period. ENC's rate of increase was larger than RNC and NC but the rate for ENC is 18% less than RNC.
- In 2015, the age-adjusted rate trend for ENC is 6% below the US rate, but has increased 38% over the 17-year period. The ENC rate is 24% less than RNC.
- The 17-year mortality rate trends for White and non-White females are greater than White males and non-White males. Rate trends for all demographic groups are increasing but non-White males are increasing the most and will soon converge with non-White females.
- The non-White mortality rate trend line for Alzheimer's remains 4% less than the White mortality rate trend in 2015 but the 17-year trend is increasing for both and suggests convergence.
- The 17-year moderately-reliable trend suggests an increase in disparity that favors whites.

Pneumonia and Influenza

- The mortality rate trend for pneumonia and influenza for ENC, RNC and NC have all declined over the 17 year period. The ENC rate in 2015 is 8% higher than the RNC rate.
- The age-adjusted mortality rate trends for all NC regions are similar and are decreasing at about the same pace. The ENC rate is 22% higher than the US rate.
- The age-adjusted mortality rate trend for all four demographics are decreasing. The trends for non-White males and White males are the highest. Trend lines predict convergence of all four groups in the future.
- The Non-White mortality rate is 14% less than the White rate in 2015. Both are decreasing.
- The 17-year decreasing trend for racial disparity is unreliable.

Cancer - Colon, Rectum, Anus

- The 17-year rate trends for colon cancer for ENC, RNC and NC have all declined over the period. In 2015 ENC's rate was 18% greater than RNC.
- The age-adjusted mortality rate trend for colon cancer for ENC has declined 39% over the 17-year period. The ENC rate is the highest (10% greater than RNC) but is projected to converge with the NC and RNC trends.
- The non-White male mortality rate trend is the highest of the demographic groups and is decreasing the most slowly. White males and non-White females are 39% and 46% less than non-White males, respectively. White females have the lowest rate trend.
- The non-White rate in 2015 is 43% greater than the White rate, but both are declining.
- The trend for racial disparity is unreliable.

Nephritis, Nephrotic Syndrome, and Nephrosis

- The mortality rate trend for nephritis, nephrotic syndrome, and nephrosis in ENC is unreliable. The rate trends for RNC and NC have increased. In 2015 ENC's rate is 13% greater than RNC.
- With age-adjustment, ENC is 6% greater than RNC, and 30% greater than the US rate trend. The ENC rate trend is moderately reliable. The other trends are not reliable.
- The 17 year trend for non-White males is the highest. The trends for White males and White females are flat. The trend for non-White females is declining and is the only trend that is reliable.
- In 2015, the non-White rate was 122% greater than the White rate. The White rate is flat but is unreliable, the non-White rate is decreasing.
- The racial disparity trend is decreasing, the trend is moderately reliable.

Cancer – All Sites

- The cancer – all sites mortality rate trend for ENC has decreased slightly (4%) over 17 years. The RNC and NC rates are lower, and have decreased more than ENC.
- The age-adjusted cancer – all sites mortality rate trend for ENC, NC and RNC are all decreasing, although the ENC rate is 8% greater than the RNC rate.
- The rate trend is decreasing for all groups. The rate for non-White males is the highest but is decreasing the most. White and non-White females show smaller decreases.
- Both White and non-White cancer mortality trends are decreasing over the 17 year period. The Non-White rate decreased 30% and the White rate decreased 20%. The non-White rate remains 10% greater than the White rate in 2015, but they are converging.
- The moderately reliable 17-year trend for racial disparity shows a 62% decrease.

HIV Disease

- The fitted HIV mortality rates for ENC have been decreasing over the past 17 years, but are still 56% greater than RNC in 2015.
- The age-adjusted rate trend for ENC, RNC and the US are all decreasing. The ENC rate is 63% greater than RNC in 2015.
- Non-White males continue to have the highest rates of age-adjusted mortality, but these rates have also decreased 73% in a 17-year reliable trend. Non-White females have the second highest rate, but it has also declined over the 17-year period. The rate for White males is lower but has also decreased. The White female rate is not reliable.
- The 17-year age-adjusted HIV mortality rates have decreased for both Whites and non-Whites by 49% and 69% respectively. The non-White rate is still 720% greater than the White rate.
- The trend for racial disparity is unreliable.

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 2015. Smaller areas like counties will usually be aggregated into 5-year intervals (e.g., 2011 to 2015). 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 37-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 37 year time series. Trend lines provide historical depth to mortality processes and a basis for prediction, future comparisons, and action.

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

The equation of the line is derived from a set of observation points. This line is an estimate of where each observed rate would be if the previous observation could predict with 100% accuracy the value of the next observation. In nature, this situation seldom arises and the degree to which individual observations deviate from this linear trend line is an indication of how well they "fit" or conform to the trend. The linear trend lines in the time series figures project expected rates to the year 2020 from known historical values (1979 to 2015) to provide a *general* idea about where mortality trends are heading.

The equation of the line allows the user to calculate an expected or fitted rate for any given year, *x*. For example, in figure 6.4 ii the year 2005 is the 7th year in the series, so 7 would be substituted for *x* in the equation of the line derived from ENC29's age-adjusted mortality rate series for a selected cause of death. For chronic lower respiratory diseases (1999 to 2015), the 2005 *expected* or *fitted* age-adjusted rate is calculated to be a little more than 45 deaths per 100,000 people. The *observed* age-adjusted rate for 2005 is 48 deaths per 100,000 people. (The observed rates are the values found in the table that runs along the x-axis of the time series chart.) The numeric difference between the expected and observed rates for 2005 is 2.5—the model (the equation of the line) *underestimates* the observed value by 2.5 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, 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 seventeen year period (1999-2015). The percent value is followed by the term increase or decrease to help denote the direction of the overall trend. This information is in boldface and included with the R^2 value and the equation of the line. Percent change and the direction of that change is provided on the graphs for trends where R^2 is greater than 0.10.

Another tool is the equation of the line that fits a trend among the observed data point (the rates). The slope coefficient of this equation, *b*, is the estimated/expected number of deaths per unit of time (*x*) or the *rate of change* in deaths per annum. The direction of change is indicated with a negative sign preceding the *b* and if positive, *b* is unsigned. Visually, a negative slope shows a trend decreasing in annual rates from left to right and a positive slope will be rising (increasing) from left to right. An examination of the different slopes for regional or demographic group trends will quickly reveal that they are not equal. Visual inspection combined with slope coefficients also provides a means for making comparisons between any two trend line series in the time series figure. Trends will *diverge, converge*, or run *parallel* with one another indicating, respectively, increasing separation, decreasing separation, or very little change in rates between two trend lines. Setting two equations of the line equal to one another can yield an estimated year of convergence in the future (or the year the two trends diverged in the past). However, the investigator is cautioned to not put too much stock in the results if the forward or backward projections are very distant in time, especially when R^2 is low. Recent (or temporally adjacent) short term trends with good correspondence between the fitted trend line and observed trend line will be better indicators of rates in the near future or past (if historical rates are unknown).

The final tool is the pair of comparison tables located in the lower portion of the page. The tables, found in every time series figure (except the ones showing comparisons by race and disparity) are structured so that the reader can make comparisons of rates derived from the equation of the line (i.e., the fitted rates) among all regions or demographic groups portrayed in the figure. The 1999 and 2015 tables compare the fitted rates calculated for the beginning and end of the observed time series in terms of percent difference. Returning to figure 6.4 ii, ENC29's age-adjusted fitted rate for chronic lower respiratory diseases in 1999 is 4% greater than (GT) RNC's fitted rate. In 2015, ENC29's fitted rate is 11% less than (LT) RNC's fitted rate. The tables permit a quick assessment of trends calculated from observed time series data.

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

Caveats about the Concepts of Race, Gender, and Geography

Several caveats are offered about the concepts of race, gender, and geography as they apply to the analysis of mortality patterns. While we do intend to bring attention to the stark racial inequalities in mortality across North Carolina, we do not mean to imply that this is a biological phenomenon. Other factors such as differences in socioeconomic status, educational attainment, occupation, and lifestyle probably account for the large racial gaps in mortality rates. Likewise, gender inequalities may have less to do with biological differences between men and women than with socially structured gender roles, health behaviors, occupational exposures, and use of health services. Finally, it is important to consider that county borders may not always be the most appropriate way to look at specific health problems. Few of our health care problems begin or end at political boundary lines and many of our health problems in North Carolina are common to large groups of counties. Counties and larger regions composed of counties are convenient units of data collection and readers should not jump to conclusions about health problems or possible solutions based solely on the way data appear when aggregated to this level. In some cases, data at multi-county, zip code, or minor civil division levels are a better way to understand problems and solutions. Similarly, as indicated in *Healthy Carolinians 2020*, 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., Vinkeness, 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 2020: A Better State of Health.*

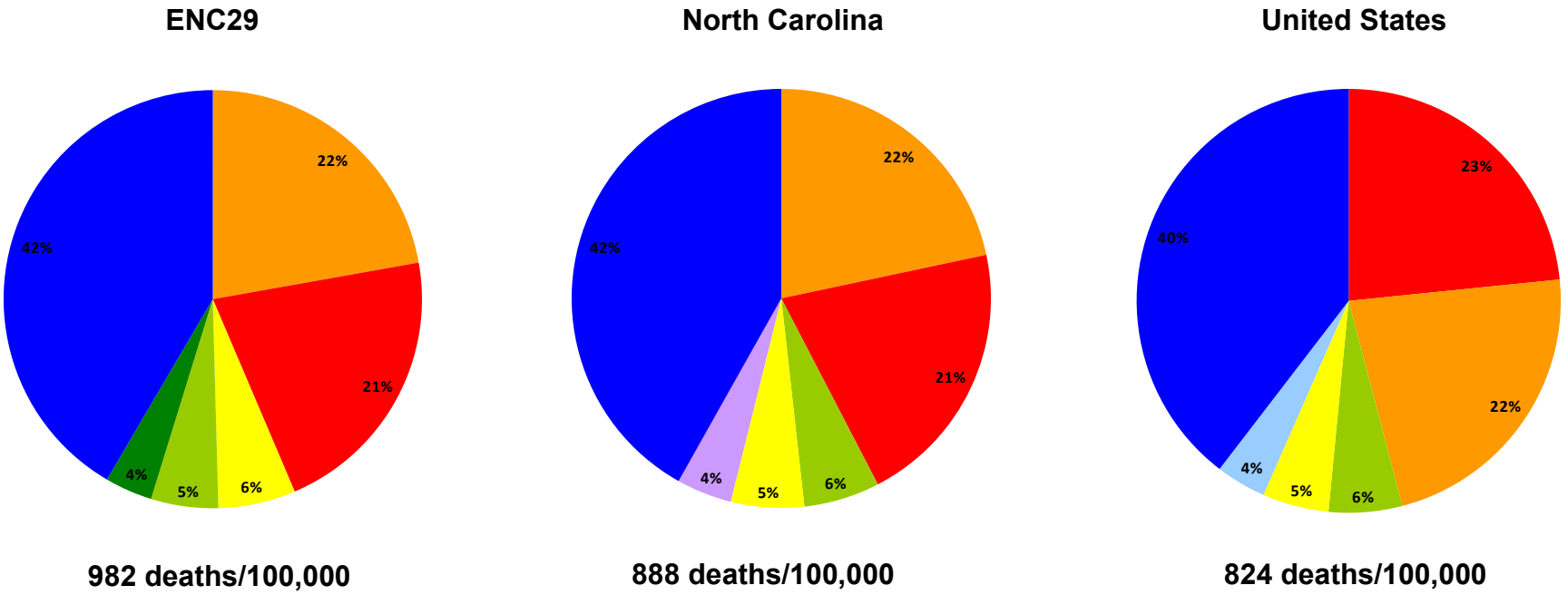
United States Department of Health and Human Services. *Healthy People 2020*. www.healthypeople.gov.

Cited References

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

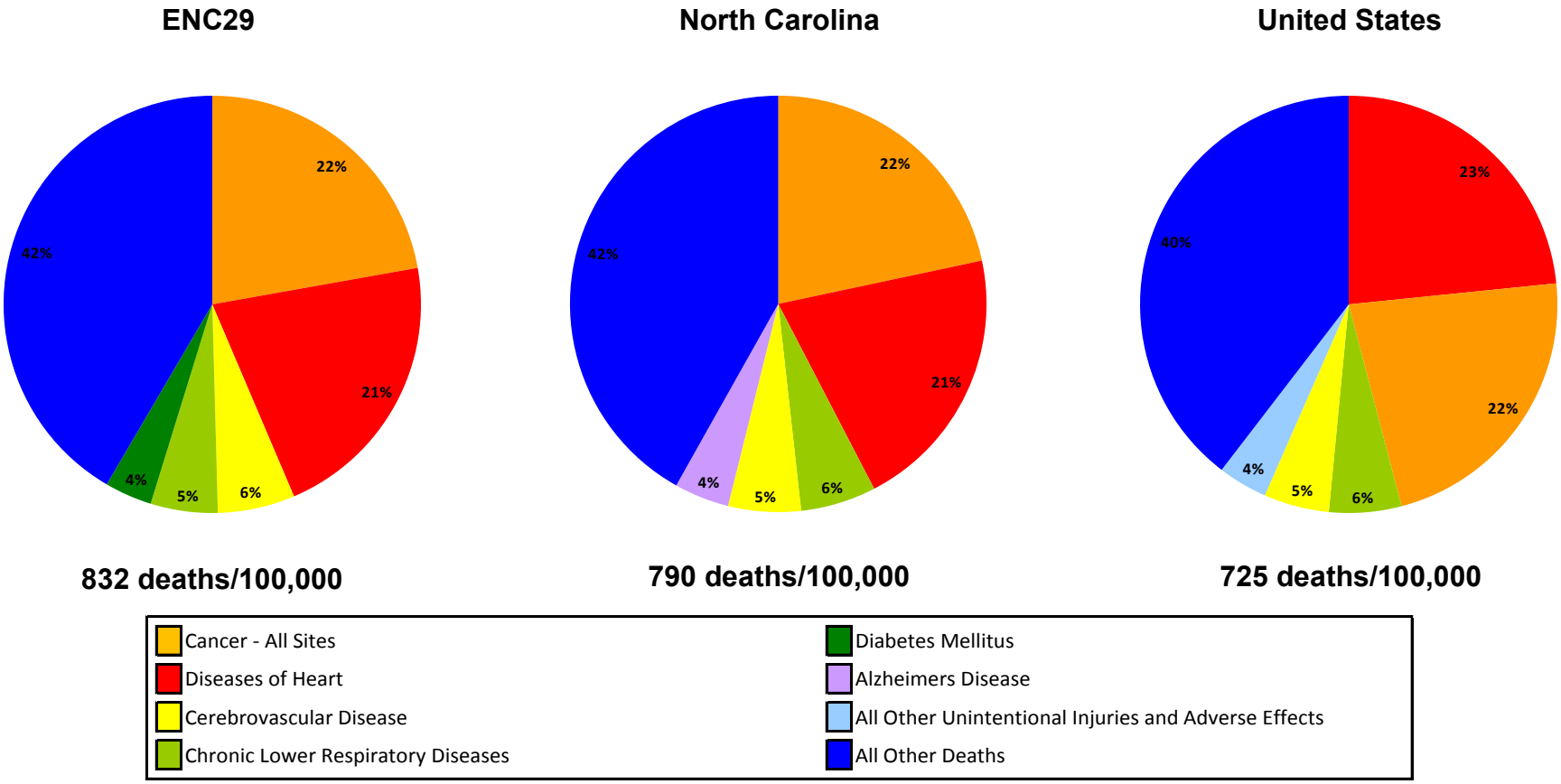
Figure 4.1 i. General leading causes of death for ENC29 (2015), NC (2015), and US (2014). Mortality rate per 100,000 population.



2015 NC rate is 8% higher than 2014 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 (2015), NC (2015), and US (2014). Age-adjusted mortality rate per 100,000 population.



2015 NC age-adjusted rate is 9% higher than 2014 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 (2015) by race and gender.
Mortality rate per 100,000 population.

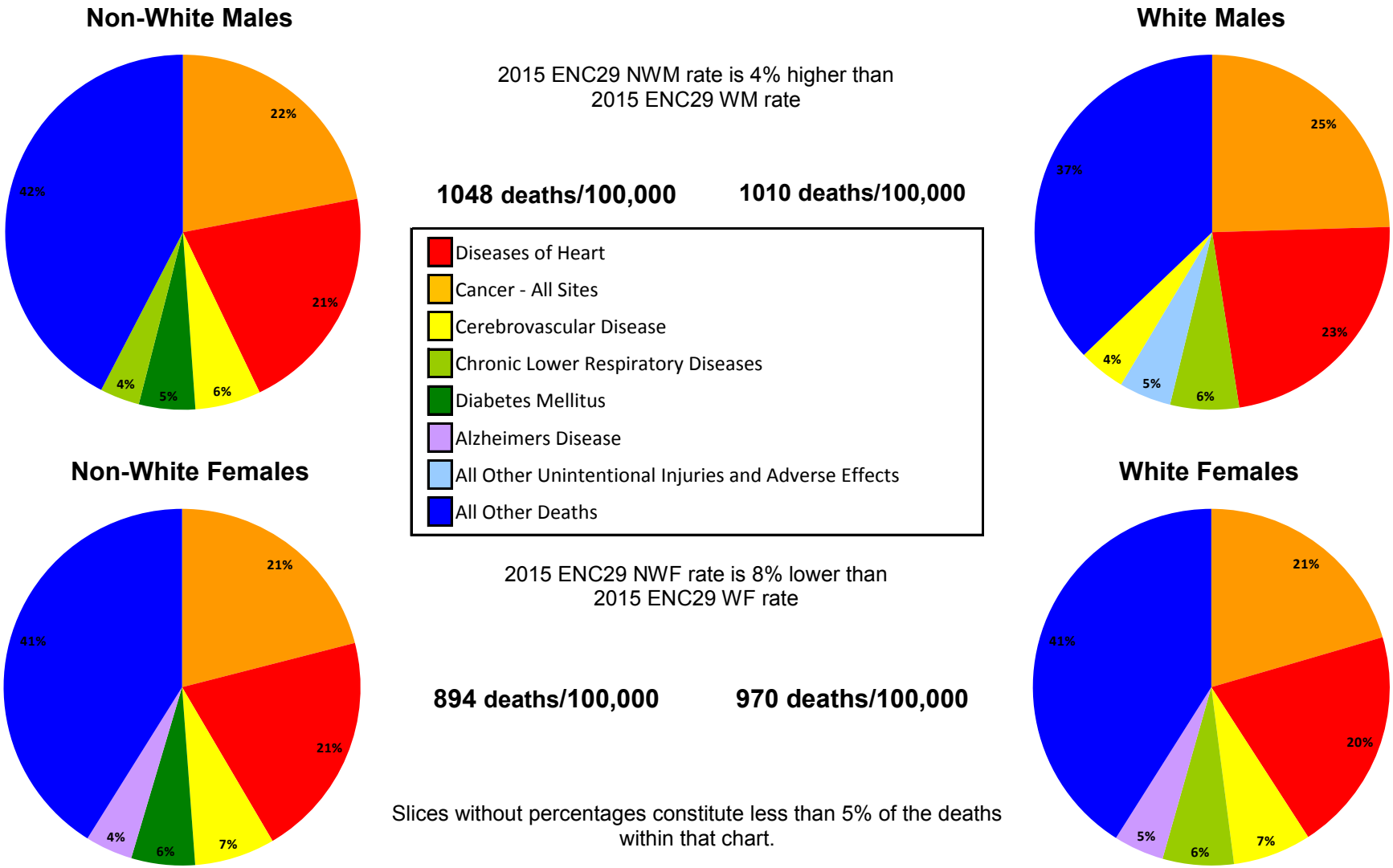
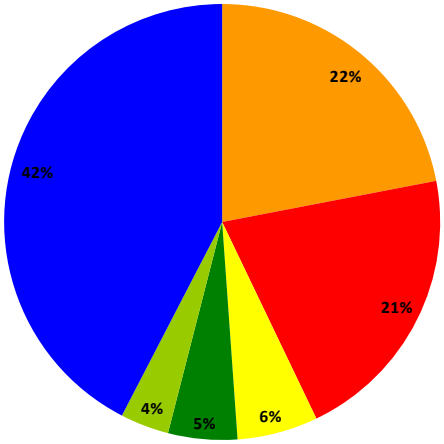
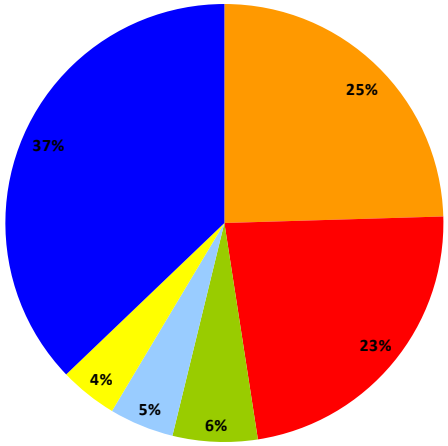


Figure 4.2 ii. General leading causes of death for ENC29 (2015) by race and gender.
Age-adjusted mortality rate per 100,000 population.

Non-White Males



White Males

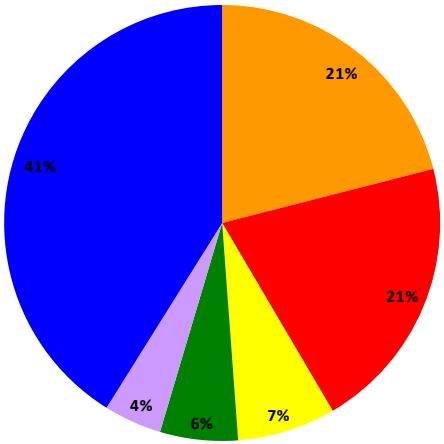


2015 ENC29 NWM age-adjusted rate is 31% higher than 2015 ENC29 WM age-adjusted rate

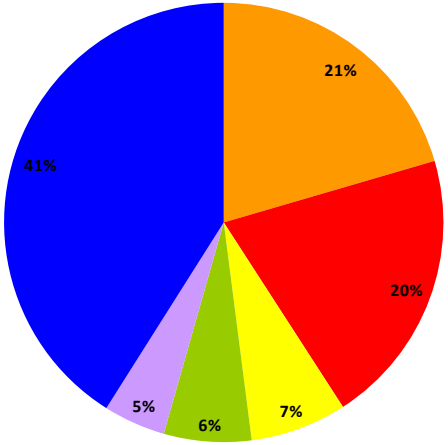
1199 deaths/100,000 **915 deaths/100,000**

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

Non-White Females



White Females

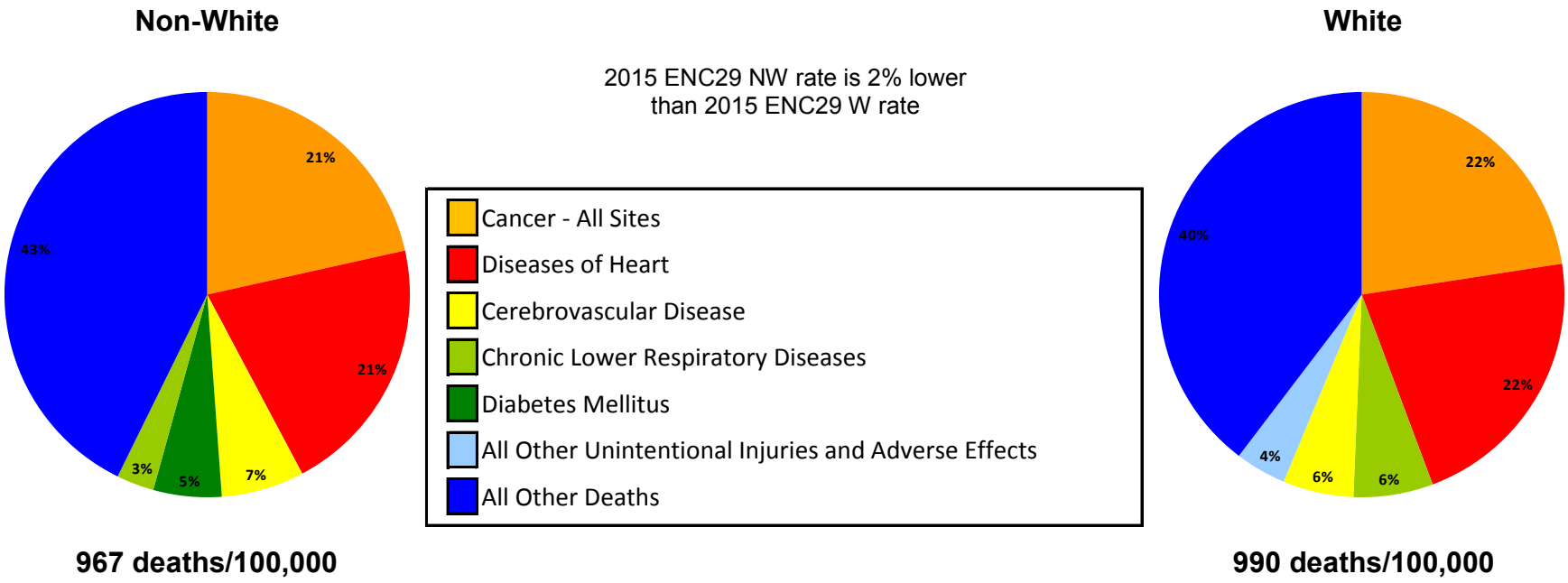


2015 ENC29 NWF age-adjusted rate is 13% higher than 2015 ENC29 WF age-adjusted rate

749 deaths/100,000 **665 deaths/100,000**

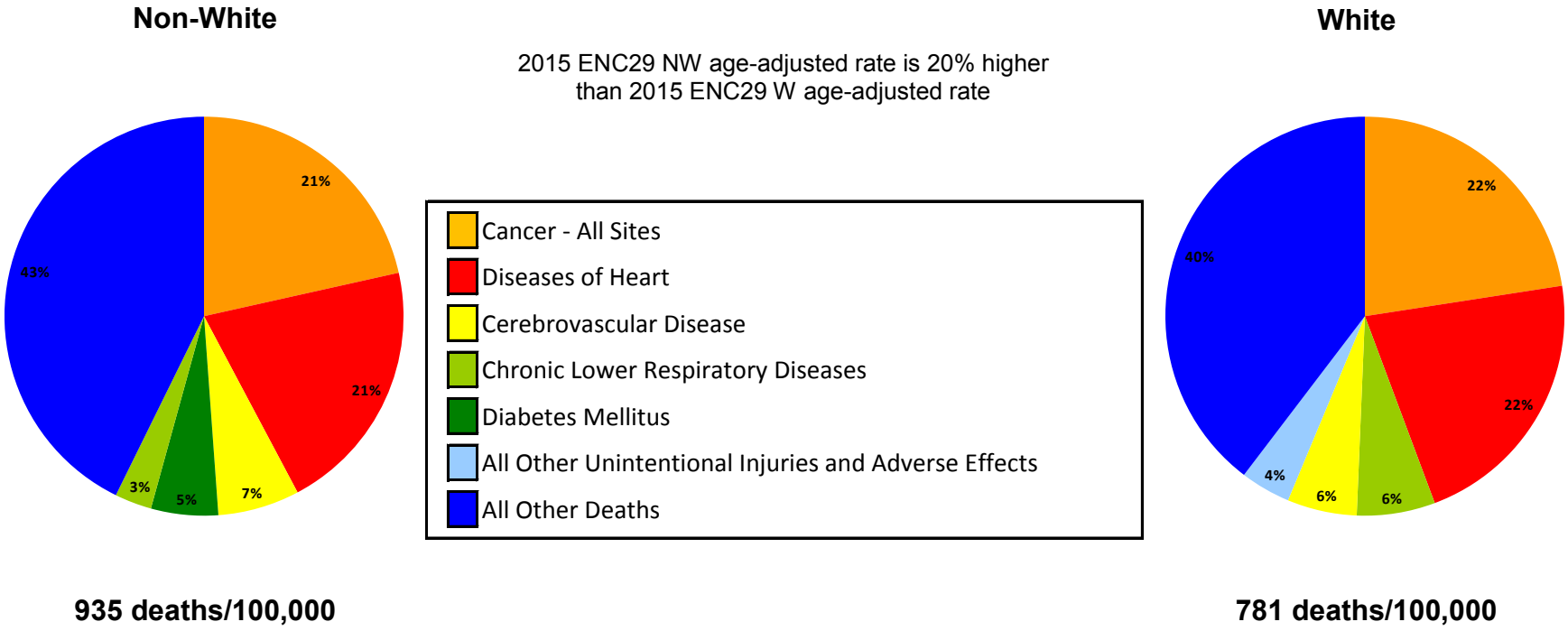
Slices without percentages constitute less than 5% of the deaths within that chart.

Figure 4.3 i. General leading causes of death for ENC29 (2015) 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 (2015) by race.
Age-adjusted mortality rate per 100,000 population.



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

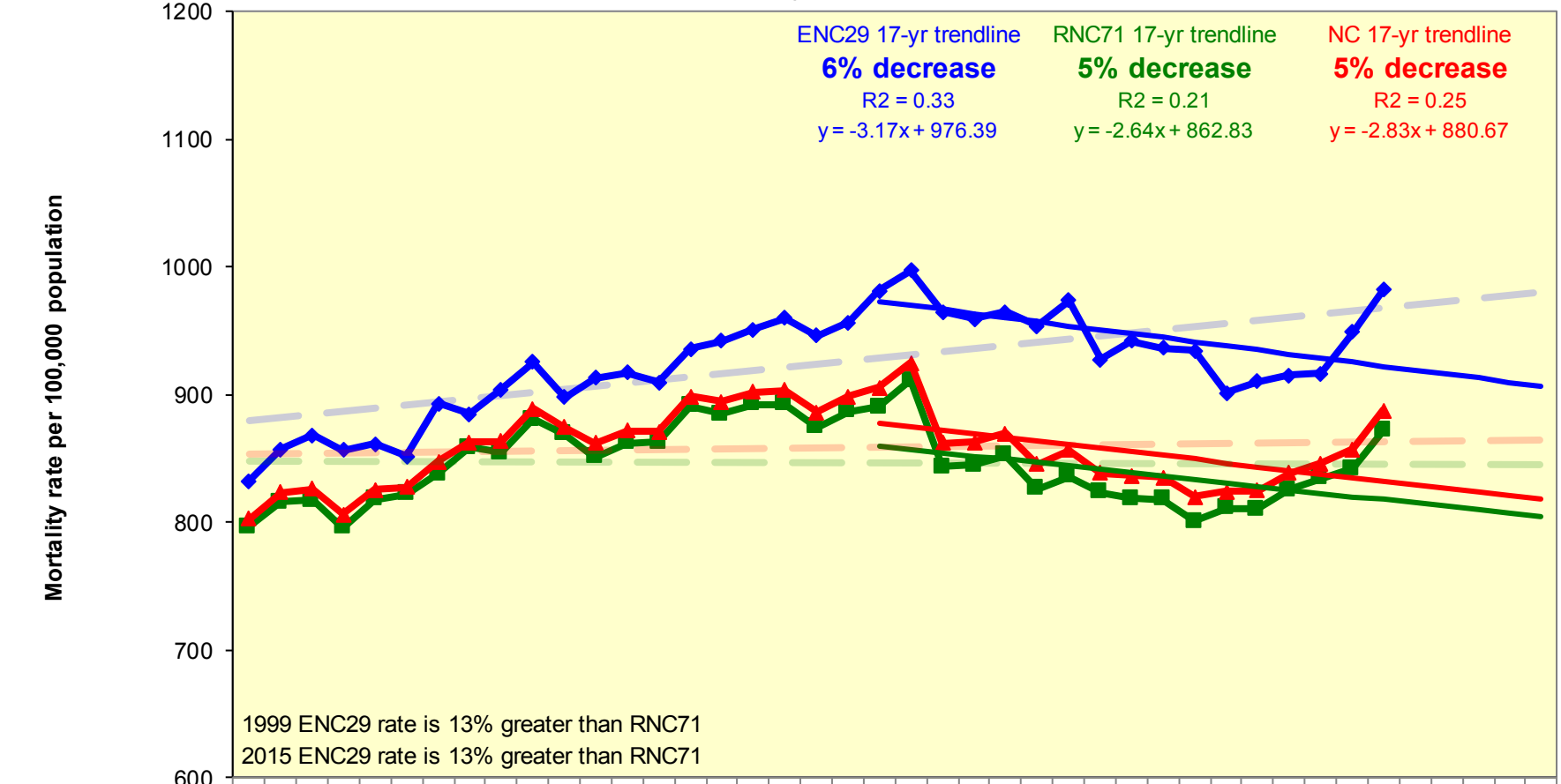
5. Trends and Disparities in Mortality in ENC29: All Causes of Death and All Causes of Premature Mortality; 1979-2015

All Causes of Death

- The 37 year ENC trend line shows all cause mortality rates are increasing. The 17 year trend line shows ENC's rate is decreasing but is still higher than NC and RNC. All three have gone up in the most recent three years.
- The age-adjusted, all-cause mortality rate trend for ENC has been decreasing over the 37 year period. The 17-year trend shows greater decrease and suggests the ENC rate will converge with 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 but has had the greatest rate of decrease (34%) in the 17-year trend. 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 rate is 12% greater than the White rate, but the recent 17-year trend suggests they will converge in the future.
- Over the recent 17-year period there is a drop 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 1979-2015 with projections to 2020

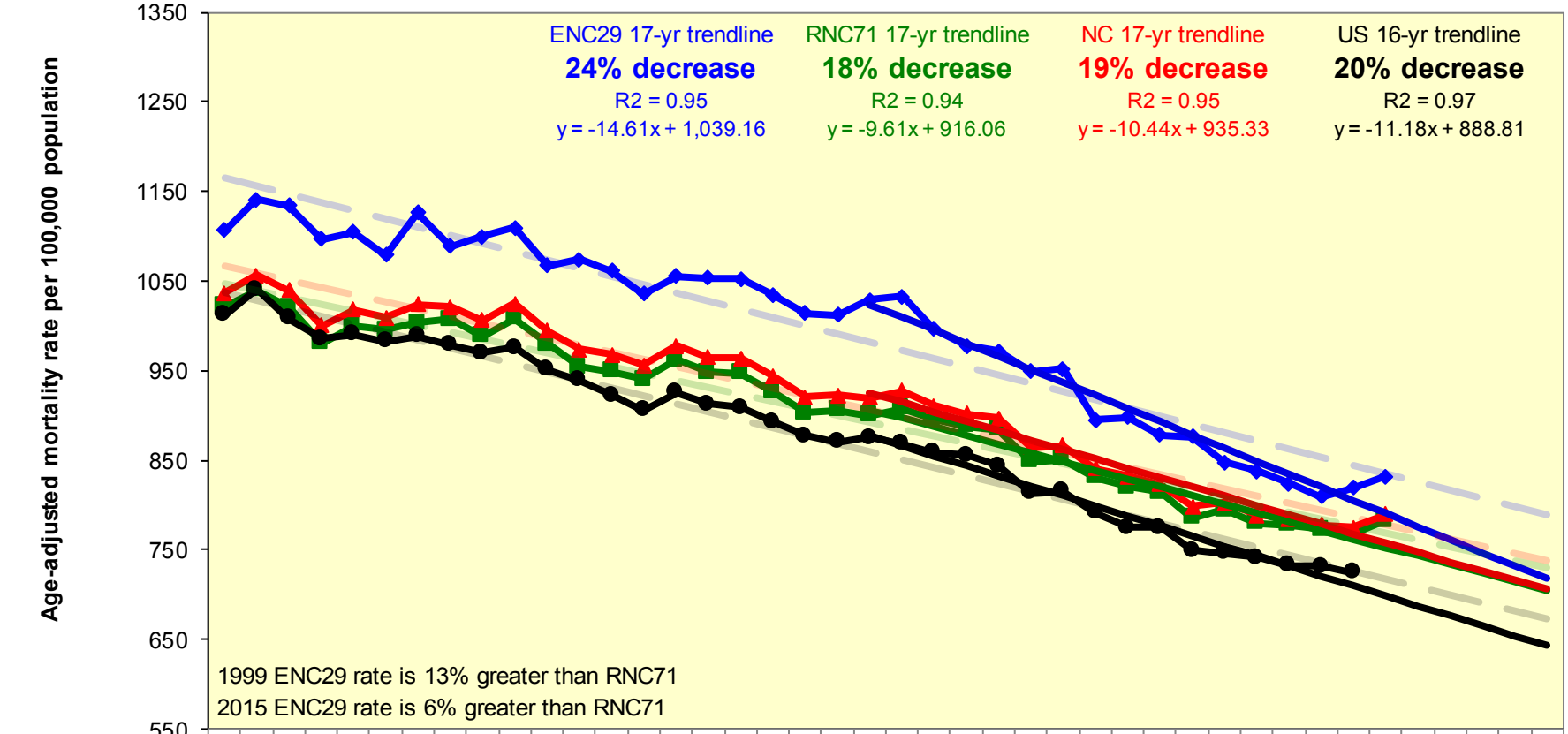


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	833	858	868	857	861	852	893	885	904	926	898	913	917	910	936	942	951	960	946	957	982	998	965	960	965	954	974	928	942	936	934	902	910	916	917	949	982					
RNC71	797	816	817	796	818	823	838	859	855	881	869	851	862	863	891	885	892	893	875	887	891	912	844	845	852	826	836	824	819	819	801	811	811	826	834	842	872					
NC	803	824	826	807	826	828	848	863	864	889	874	862	872	871	899	895	902	904	887	899	905	925	862	863	870	845	857	839	837	836	820	824	825	839	846	857	888					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	12% LT	10% LT	ENC29
13% GT		2% GT	RNC71
11% GT	2% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	11% LT	10% LT	ENC29
13% GT		2% GT	RNC71
11% GT	2% LT		NC

Figure 5.1 ii. All Causes of Death: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

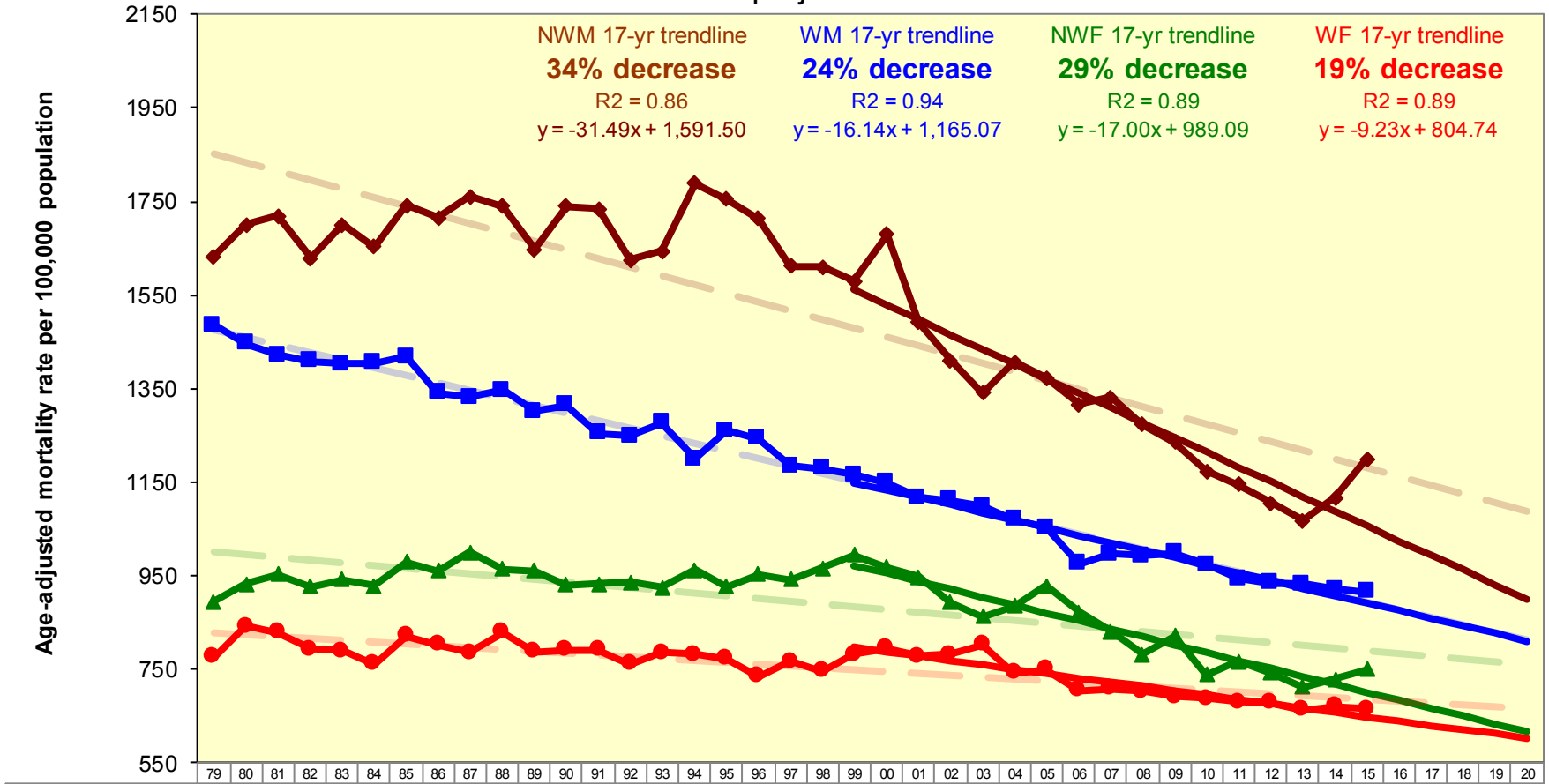


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	1107	1141	1135	1096	1105	1079	1126	1089	1100	1110	1068	1075	1061	1036	1055	1053	1052	1035	1015	1012	1029	1033	996	978	972	950	952	895	898	878	877	847	838	824	810	820	832					
RNC71	1022	1040	1021	980	1000	996	1003	1007	988	1009	980	954	949	940	962	948	947	927	903	906	900	908	895	888	884	849	851	832	821	814	786	795	780	778	773	768	783					
NC	1037	1057	1040	1000	1018	1010	1024	1021	1007	1025	994	974	968	956	977	965	964	944	921	923	920	927	911	902	898	864	866	841	832	824	799	803	789	785	778	775	790					
US	1012	1040	1008	986	991	983	988	979	970	976	951	939	923	906	926	913	909	894	878	870	875	869	859	856	844	814	815	792	775	775	749	747	741	733	732	725						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	12% LT	10% LT	14% LT	ENC29
13% GT		2% GT	3% LT	RNC71
11% GT	2% LT		5% LT	NC
17% GT	3% GT	5% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	5% LT	5% LT	12% LT	ENC29
6% GT		1% GT	7% LT	RNC71
5% GT	1% LT		8% LT	NC
13% GT	7% GT	8% GT		US

Figure 5.1 iii. All Causes of Death: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

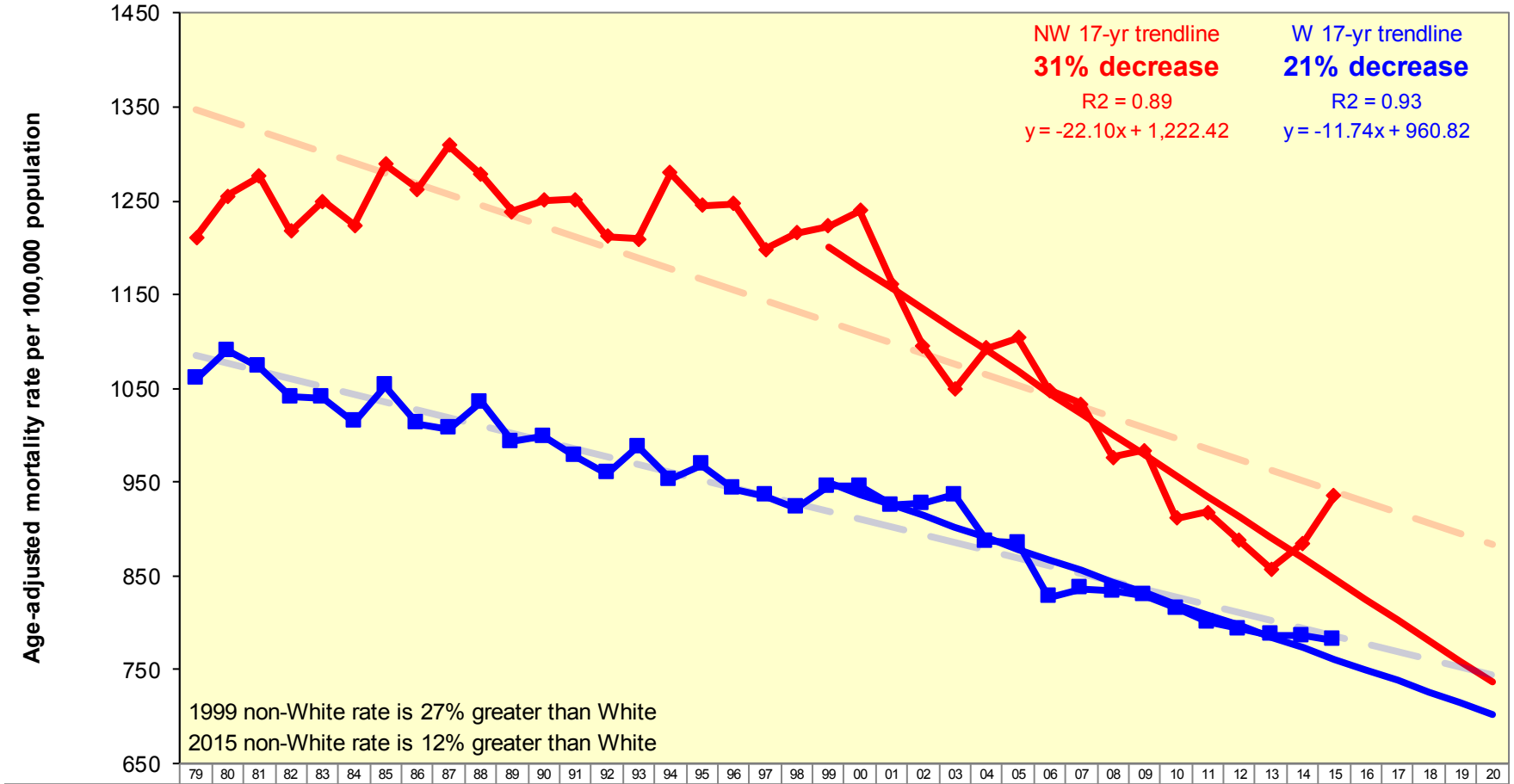


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	1633	1700	1719	1629	1700	1653	1742	1714	1760	1739	1648	1741	1733	1624	1644	1788	1755	1714	1612	1609	1579	1679	1492	1410	1340	1406	1372	1316	1331	1272	1235	1173	1145	1105	1068	1116	1199					
WM	1486	1445	1421	1408	1403	1404	1417	1341	1331	1346	1301	1314	1253	1248	1277	1200	1260	1242	1183	1179	1165	1148	1116	1110	1098	1068	1053	975	997	993	998	973	943	933	932	920	915					
NWF	895	931	952	926	940	927	979	960	999	964	961	930	932	935	925	962	927	952	941	966	995	967	946	893	863	885	928	871	830	781	821	739	766	741	712	728	749					
WF	775	842	828	793	789	760	821	802	784	829	786	790	790	760	784	782	772	733	767	746	781	794	778	780	802	741	748	703	707	702	690	688	679	677	663	671	665					

Comparison of Fitted Rates in 1999				
NWM	WM	NWF	WF	
	27% LT	38% LT	49% LT	NWM
37% GT		15% LT	31% LT	WM
61% GT	18% GT		19% LT	NWF
98% GT	45% GT	23% GT		WF

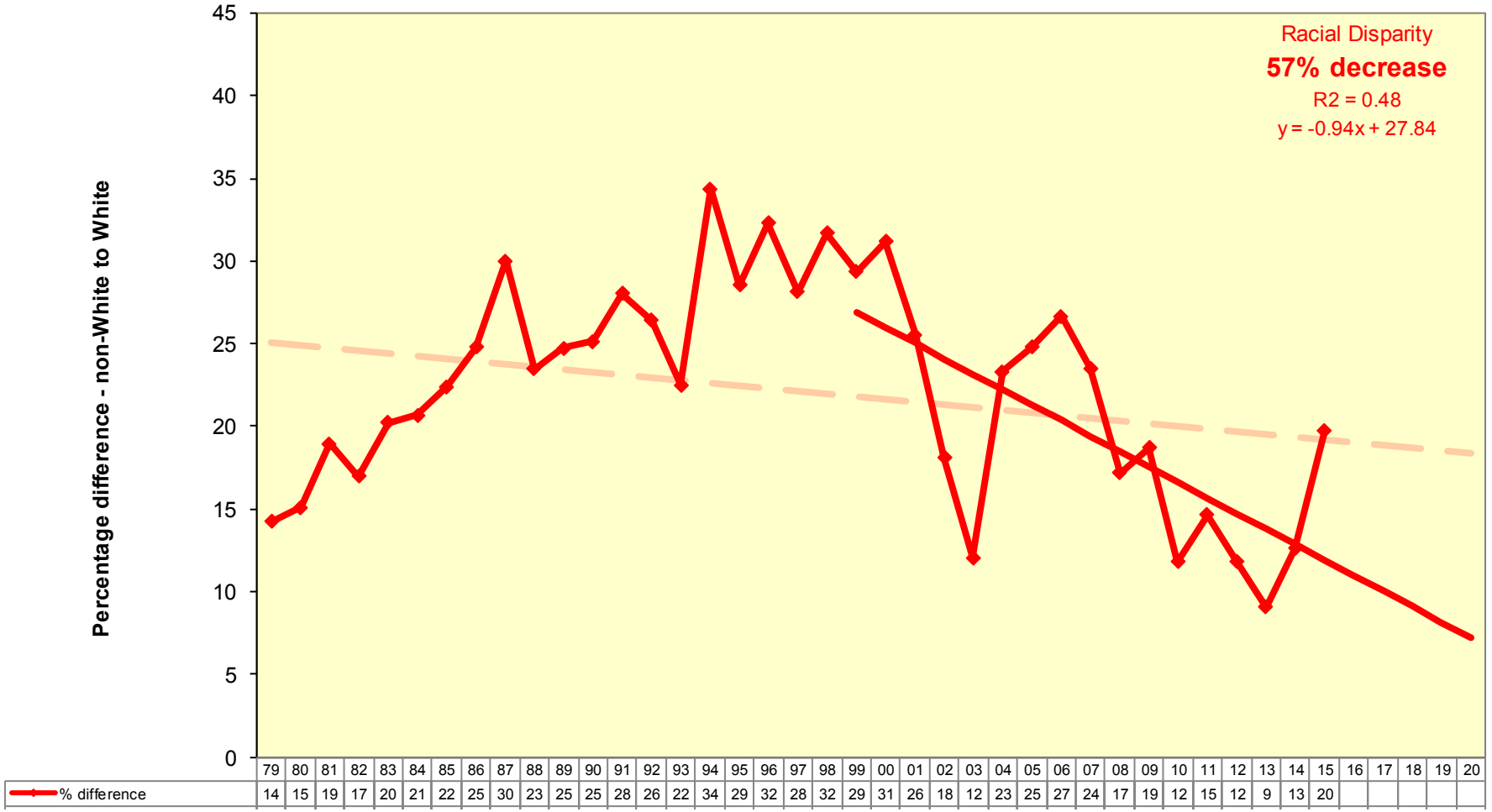
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	17% LT	34% LT	40% LT	NWM
20% GT		21% LT	28% LT	WM
52% GT	26% GT		8% LT	NWF
66% GT	38% GT	9% GT		WF

Figure 5.1 iv. All Causes of Death:
Trends in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	1211	1255	1276	1218	1249	1224	1289	1263	1309	1278	1238	1250	1252	1212	1210	1280	1245	1247	1198	1215	1223	1239	1162	1094	1049	1093	1104	1048	1033	976	984	912	918	887	858	885	935					
W	1060	1091	1073	1041	1039	1014	1053	1012	1007	1035	993	999	978	959	988	952	969	943	935	923	945	945	925	927	936	887	885	827	837	833	829	816	801	793	786	786	781					

Figure 5.1 v. All Causes of Death:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020

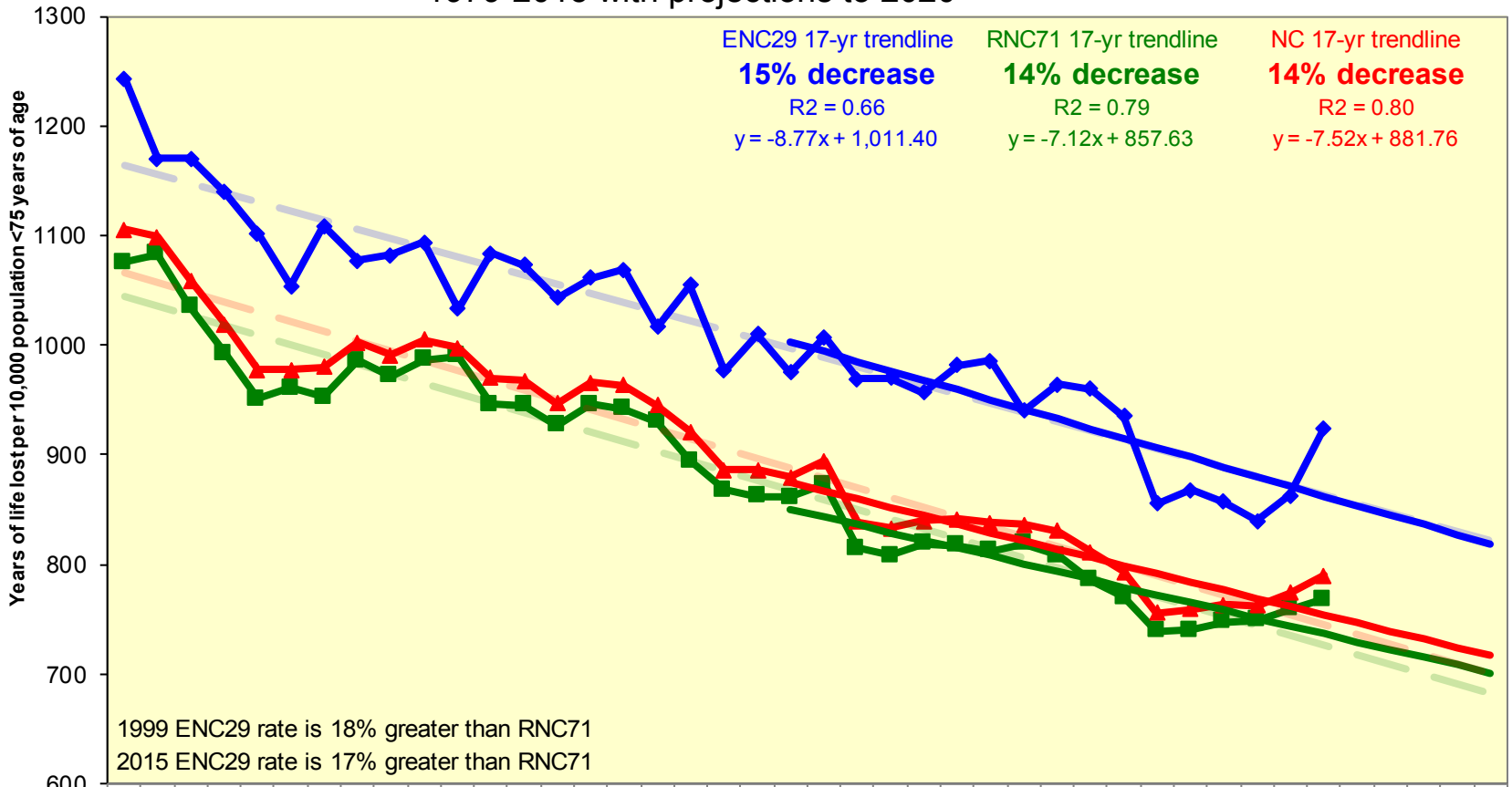


All Causes of Premature Mortality

- ENC's premature mortality rate trend has decreased by 15% over the 17 year period since 1999. This decline is similar to RNC and NC, but ENC remains about 17% higher.
- The age-adjusted premature mortality rate trend for ENC is also decreasing, but remains 17% higher than the RNC rate in 2015.
- The non-White male rate trend is significantly higher than any other demographic group, but also has the highest rate of decrease (35% over 17 years). White females have the lowest rate and also the lowest rate of decrease (8% over 17 years).
- A recent decrease in the premature mortality rate for non-Whites and leveling of rates for Whites suggests a reduction in racial disparity.
- The 17 year trend for racial disparity shows a 54% decrease, 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 5.2 i. All Causes of Premature Mortality: Trends in premature mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

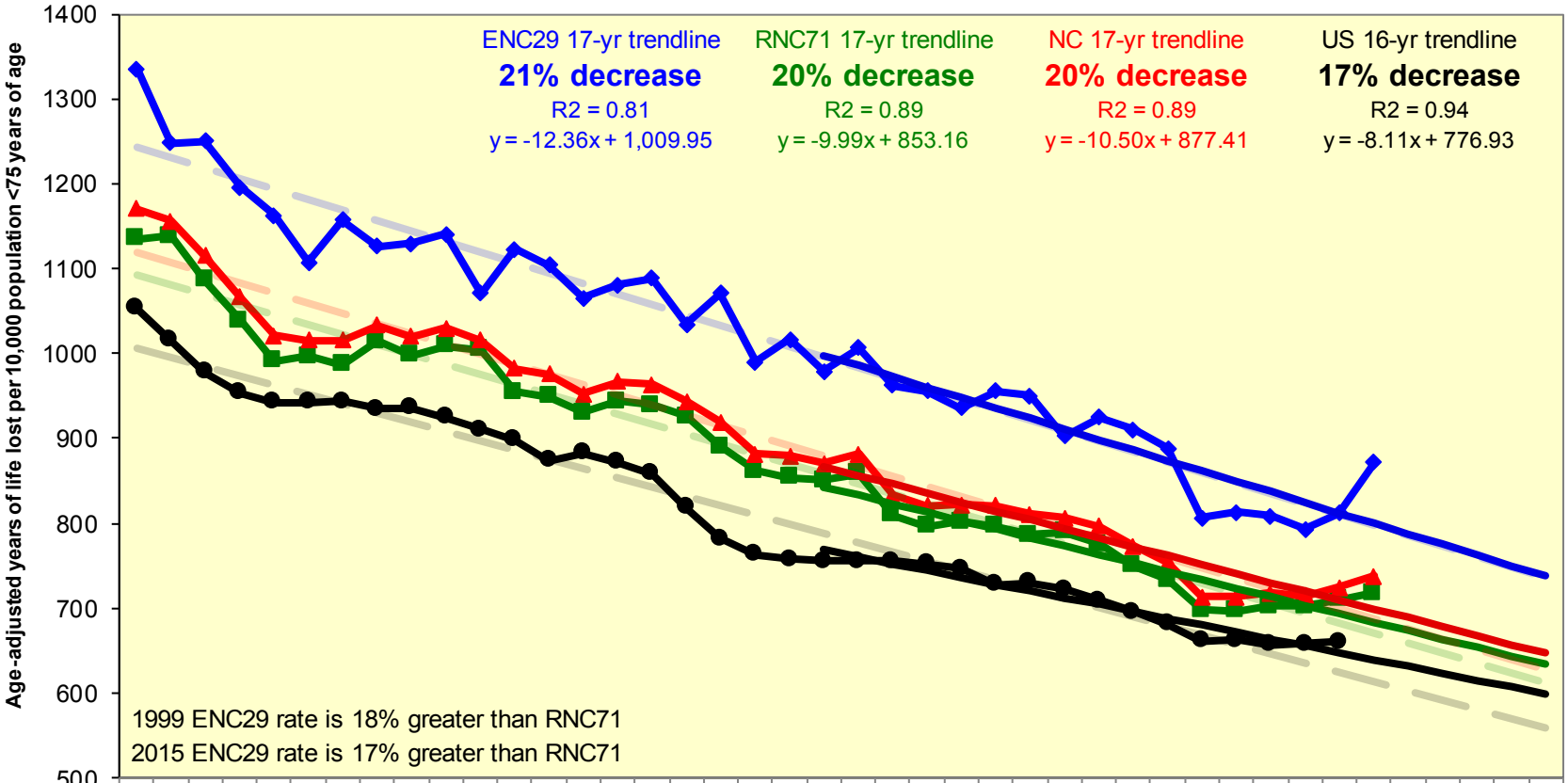


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	1243	1170	1170	1139	1102	1054	1109	1077	1082	1094	1033	1084	1073	1043	1061	1069	1016	1055	977	1010	975	1008	969	970	956	981	986	940	964	960	935	855	868	857	839	863	924					
RNC71	1076	1083	1035	993	951	961	953	986	971	986	990	946	945	927	946	942	930	895	868	862	861	873	815	808	819	817	812	818	808	786	770	739	740	748	749	759	768					
NC	1106	1098	1059	1019	978	977	980	1002	991	1005	997	970	967	947	966	963	945	921	886	886	880	895	838	833	840	842	838	836	830	811	793	756	759	763	762	774	790					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	15% LT	13% LT	ENC29
18% GT		3% GT	RNC71
15% GT	3% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	15% LT	13% LT	ENC29
17% 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, 1979-2015 with projections to 2020

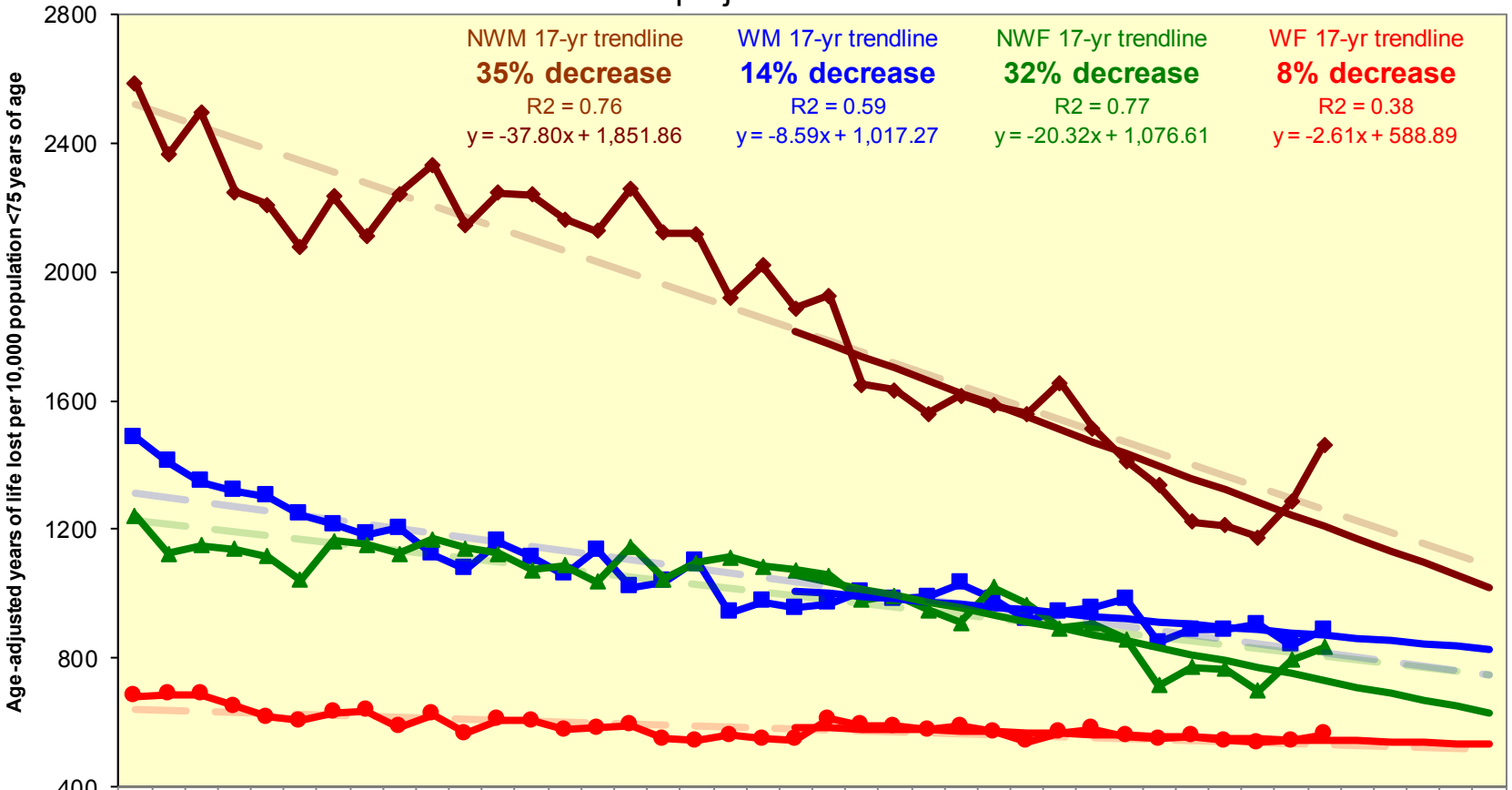


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	1336	1248	1251	1196	1163	1108	1158	1126	1130	1140	1071	1123	1104	1065	1081	1088	1035	1071	991	1017	979	1007	963	956	936	956	951	903	925	911	889	806	813	808	793	812	871					
RNC71	1135	1138	1087	1039	992	997	986	1015	998	1009	1005	954	950	930	944	939	926	890	862	854	850	858	809	797	802	797	786	790	775	750	733	698	697	703	702	710	717					
NC	1170	1157	1115	1067	1021	1016	1016	1034	1021	1030	1016	983	976	953	967	963	944	920	882	880	871	882	833	821	822	820	811	806	796	773	755	714	713	717	715	724	738					
US	1053	1016	977	954	943	943	944	935	936	925	910	898	874	882	872	858	818	782	763	758	755	755	755	752	747	728	730	722	709	696	681	662	662	657	658	661						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	16% LT	13% LT	23% LT	ENC29
18% GT		3% GT	9% LT	RNC71
15% GT	3% LT		11% LT	NC
30% GT	10% GT	13% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	15% LT	13% LT	20% LT	ENC29
17% GT		2% GT	7% LT	RNC71
14% GT	2% LT		9% LT	NC
25% GT	7% GT	10% GT		US

Figure 5.2 iii. All Causes of Premature Mortality: Trends in age-adjusted premature mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

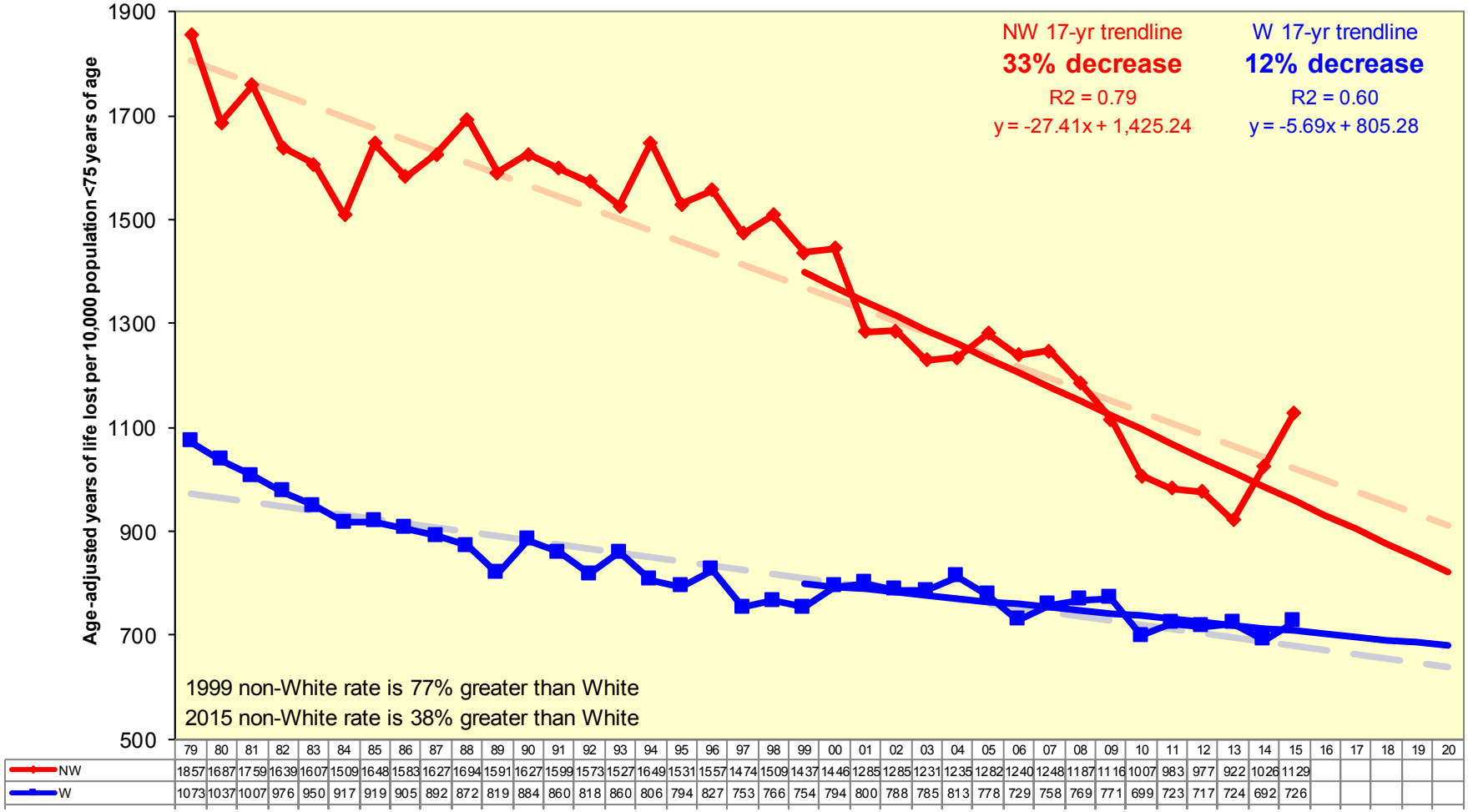


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	2588	2365	2499	2248	2209	2077	2236	2112	2244	2334	2146	2246	2240	2166	2127	2260	2124	2120	1921	2019	1888	1927	1649	1633	1560	1616	1587	1561	1656	1514	1412	1336	1223	1212	1176	1285	1463					
WM	1485	1409	1347	1320	1303	1245	1215	1183	1204	1123	1077	1161	1114	1060	1136	1020	1038	1102	942	976	956	971	1008	985	990	1031	982	920	945	956	984	849	887	887	904	840	887					
NWF	1245	1124	1149	1140	1116	1044	1164	1152	1126	1171	1143	1126	1073	1089	1036	1149	1046	1097	1115	1085	1074	1057	980	996	949	909	1021	968	894	907	859	715	771	766	698	794	834					
WF	681	688	687	651	616	604	631	636	584	625	565	608	606	576	582	592	549	544	561	550	546	612	590	589	577	589	571	541	568	579	557	548	558	544	538	543	564					

Comparison of Fitted Rates in 1999				
NWM	WM	NWF	WF	
	45% LT	42% LT	68% LT	NWM
82% GT		6% GT	42% LT	WM
72% GT	6% LT		45% LT	NWF
214% GT	73% GT	83% GT		WF

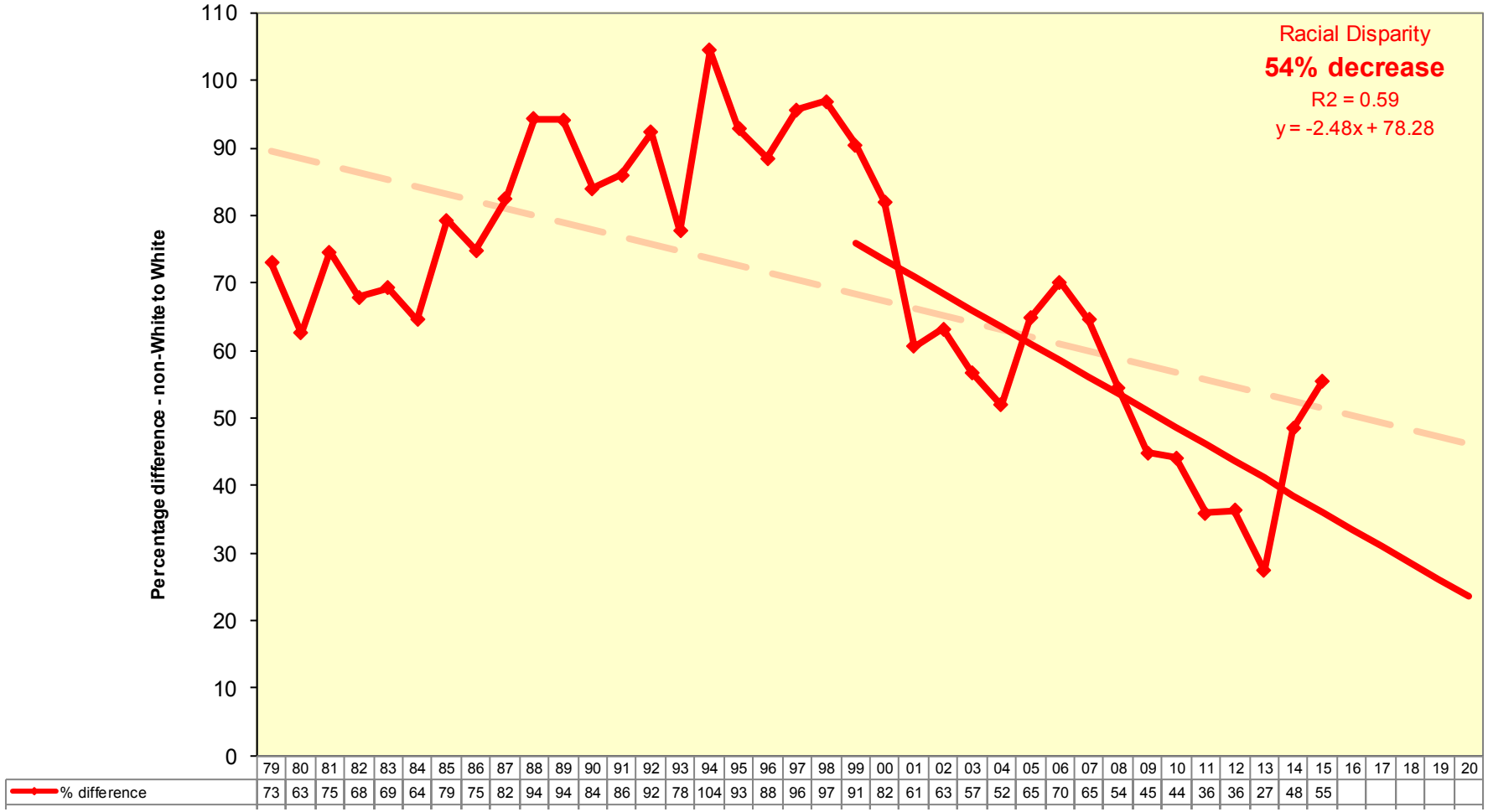
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	29% LT	40% LT	56% LT	NWM
42% GT		15% LT	38% LT	WM
66% GT	17% GT		27% LT	NWF
128% GT	61% GT	37% GT		WF

Figure 5.2 iv. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race for ENC29,
1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	1857	1687	1759	1639	1607	1509	1648	1583	1627	1694	1591	1627	1599	1573	1527	1649	1531	1557	1474	1509	1437	1446	1285	1285	1231	1235	1282	1240	1248	1187	1116	1007	983	977	922	1026	1129					
W	1073	1037	1007	976	950	917	919	905	892	872	819	884	860	818	860	806	794	827	753	766	754	794	800	788	785	813	778	729	758	769	771	699	723	717	724	692	726					

Figure 5.2 v. All Causes of Premature Mortality: Measuring disparity in age-adjusted premature mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	73	63	75	68	69	64	79	75	82	94	94	84	86	92	78	104	93	88	96	97	91	82	61	63	57	52	65	70	65	54	45	44	36	36	27	48	55					

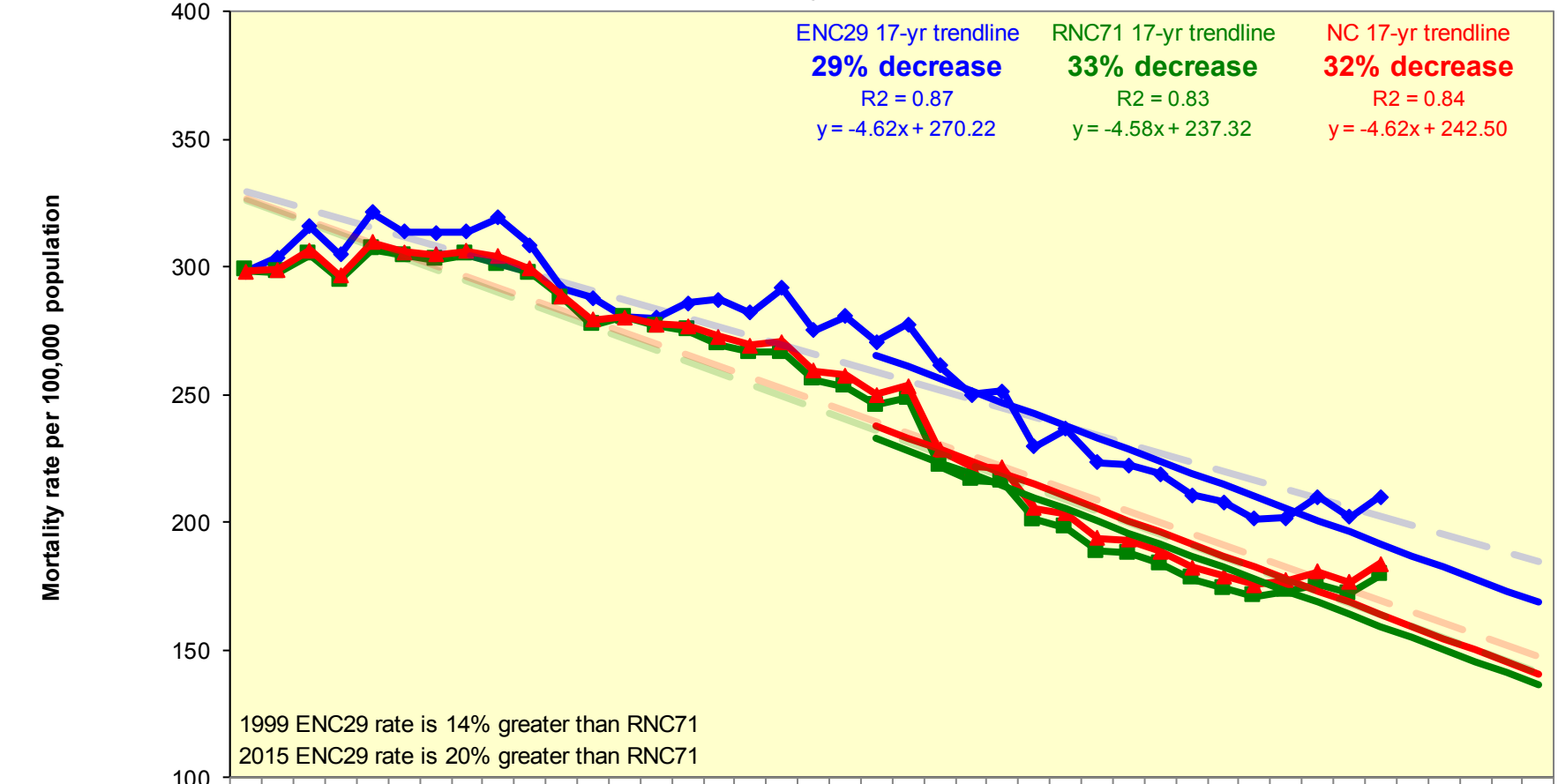
6. Trends and Disparities in Mortality in ENC29: Ten Specific Leading Causes of Death, 1979-2015

Diseases of Heart

- ENC's 17-year mortality rate trend is decreasing, as are the rates for RNC and NC, although ENC remains well above the others.
- While ENC's age-adjusted mortality rate trend is decreasing at a pace equal to RNC, the ENC rate remains 11% greater than RNC in 2015.
- The non-White male rate trend remains slightly higher than the White male trend. They are both decreasing.
- The non-White rate trend remains 9% greater than for Whites, but the 17-year trends for both are decreasing, and convergence is suggested in the future.
- The 17-year trend line 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 6.1 i. Diseases of Heart: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

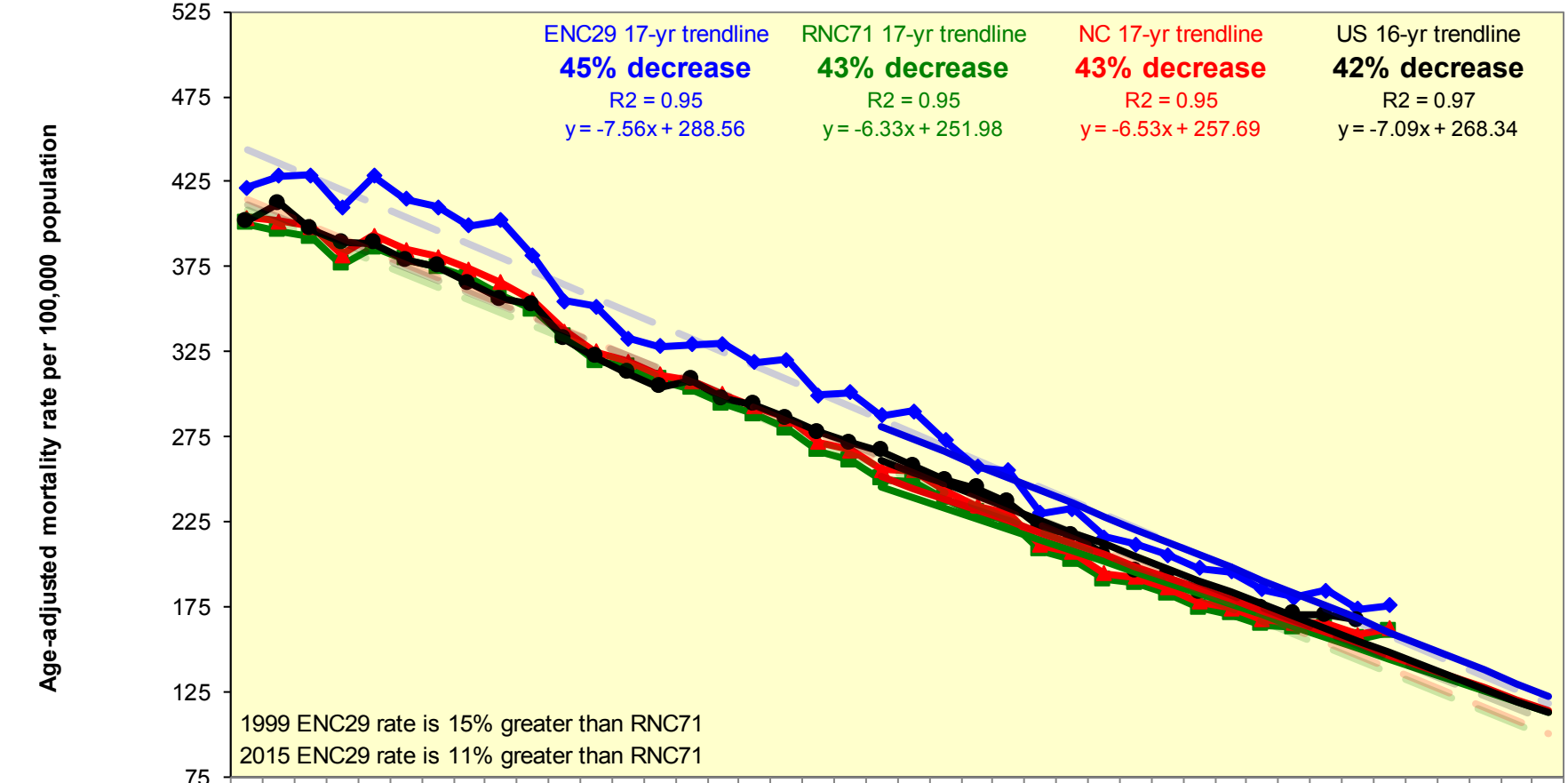


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	298	304	316	305	321	314	314	314	319	309	291	288	281	280	286	287	282	292	275	281	271	278	262	250	251	230	237	224	223	219	211	208	202	202	210	202	210					
RNC71	299	298	305	295	307	304	303	305	301	298	288	277	281	277	275	270	267	267	256	253	246	249	222	217	216	201	198	189	188	184	178	174	171	173	176	172	180					
NC	299	299	307	297	310	306	305	306	304	300	289	279	281	278	277	273	269	271	259	258	250	253	228	222	221	205	204	194	193	189	183	179	176	177	181	177	184					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	12% LT	10% LT	ENC29
14% GT		2% GT	RNC71
11% GT	2% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	16% LT	14% LT	ENC29
20% GT		3% GT	RNC71
16% GT	3% LT		NC

Figure 6.1 ii. Diseases of Heart: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

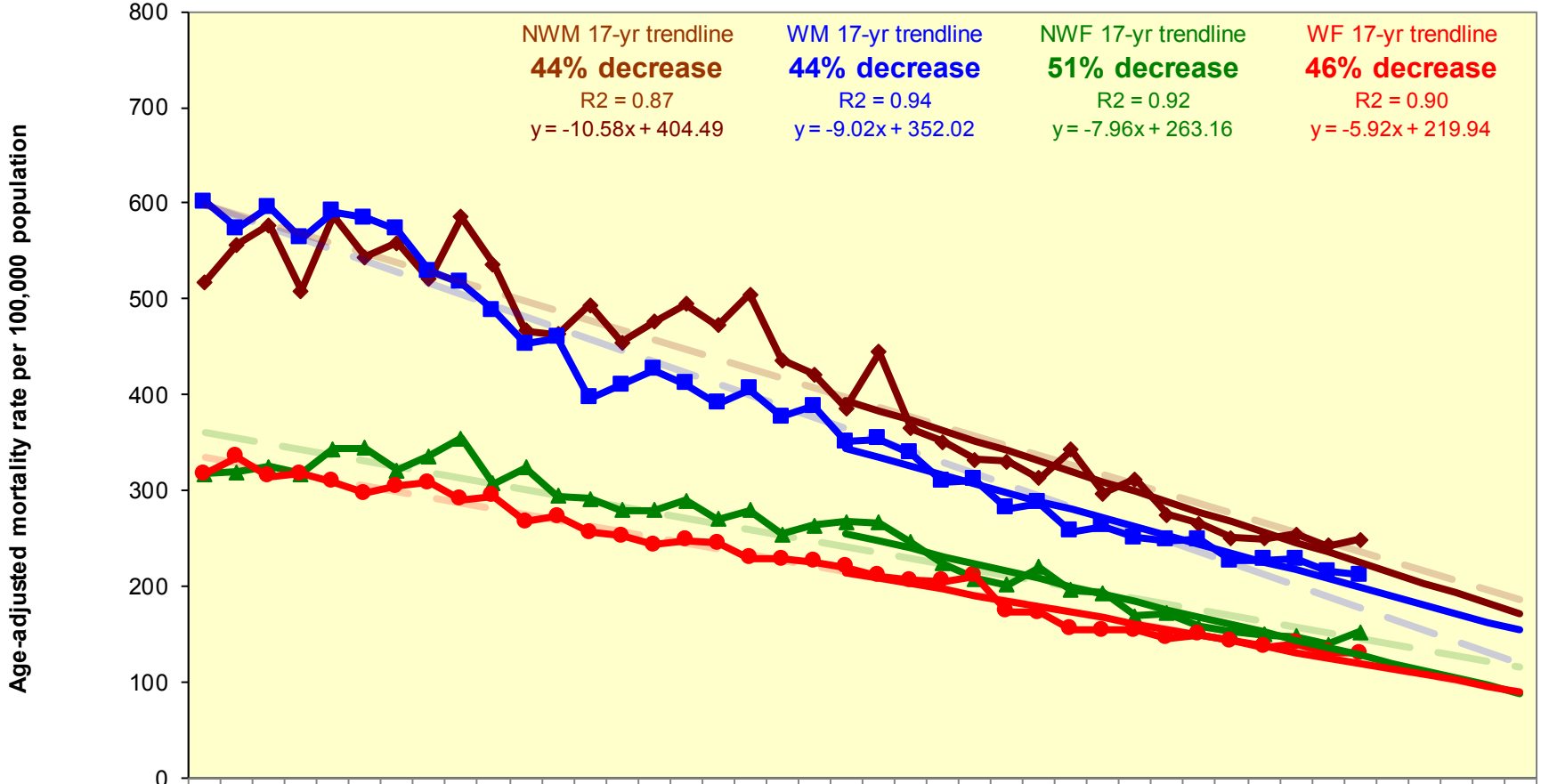


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	422	428	429	410	428	415	410	399	402	381	355	352	333	328	329	329	319	320	300	301	288	290	273	257	255	230	232	216	212	205	197	196	185	181	184	174	176					
RNC71	400	396	393	376	386	379	375	369	358	350	333	319	316	308	303	294	288	280	267	261	250	249	238	230	226	208	202	191	189	182	174	170	164	163	162	156	160					
NC	404	402	399	382	393	385	381	374	365	355	337	325	319	311	308	300	293	286	272	267	256	255	244	234	230	211	207	195	192	186	178	174	168	166	165	158	162					
US	402	412	397	389	389	379	375	365	356	352	332	322	313	304	308	297	293	286	278	271	266	258	250	245	236	222	217	205	196	192	183	179	174	171	170	167						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	13% LT	11% LT	7% LT	ENC29
15% GT		2% GT	6% GT	RNC71
12% GT	2% LT		4% GT	NC
8% GT	6% LT	4% LT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	10% LT	9% LT	8% LT	ENC29
11% GT		2% GT	3% GT	RNC71
9% GT	2% LT		1% GT	NC
8% GT	3% LT	1% LT		US

Figure 6.1 iii. Diseases of Heart: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

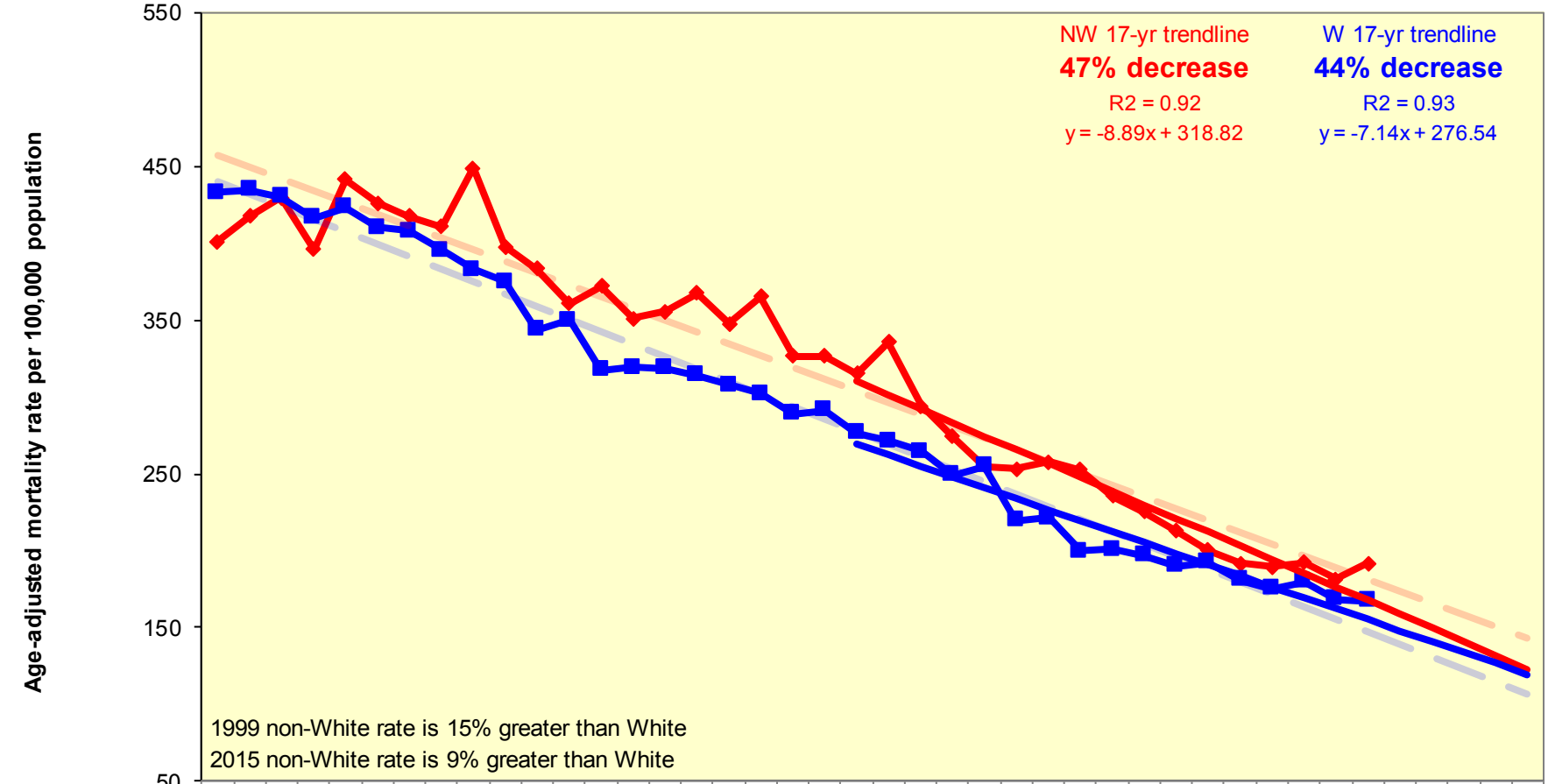


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	517	557	577	508	587	543	559	521	586	536	467	463	494	455	476	494	472	505	436	422	386	444	365	350	332	331	313	343	297	312	275	266	251	249	254	242	248					
WM	601	573	596	564	591	585	572	528	517	488	453	459	396	410	426	411	391	405	377	388	351	354	339	309	311	281	286	257	263	251	248	249	226	227	228	215	211					
NWF	317	319	324	317	343	344	321	336	355	307	324	294	291	279	279	289	270	279	254	263	267	266	246	224	207	201	219	195	193	169	172	157	152	149	147	139	152					
WF	317	335	314	318	309	297	304	308	290	294	267	273	256	252	243	248	245	229	228	226	219	210	206	205	211	173	172	155	153	154	145	149	143	136	140	130	130					

Comparison of Fitted Rates in 1999				
NWM	WM	NWF	WF	
	13% LT	35% LT	46% LT	NWM
15% GT		25% LT	38% LT	WM
54% GT	34% GT		16% LT	NWF
84% GT	60% GT	20% GT		WF

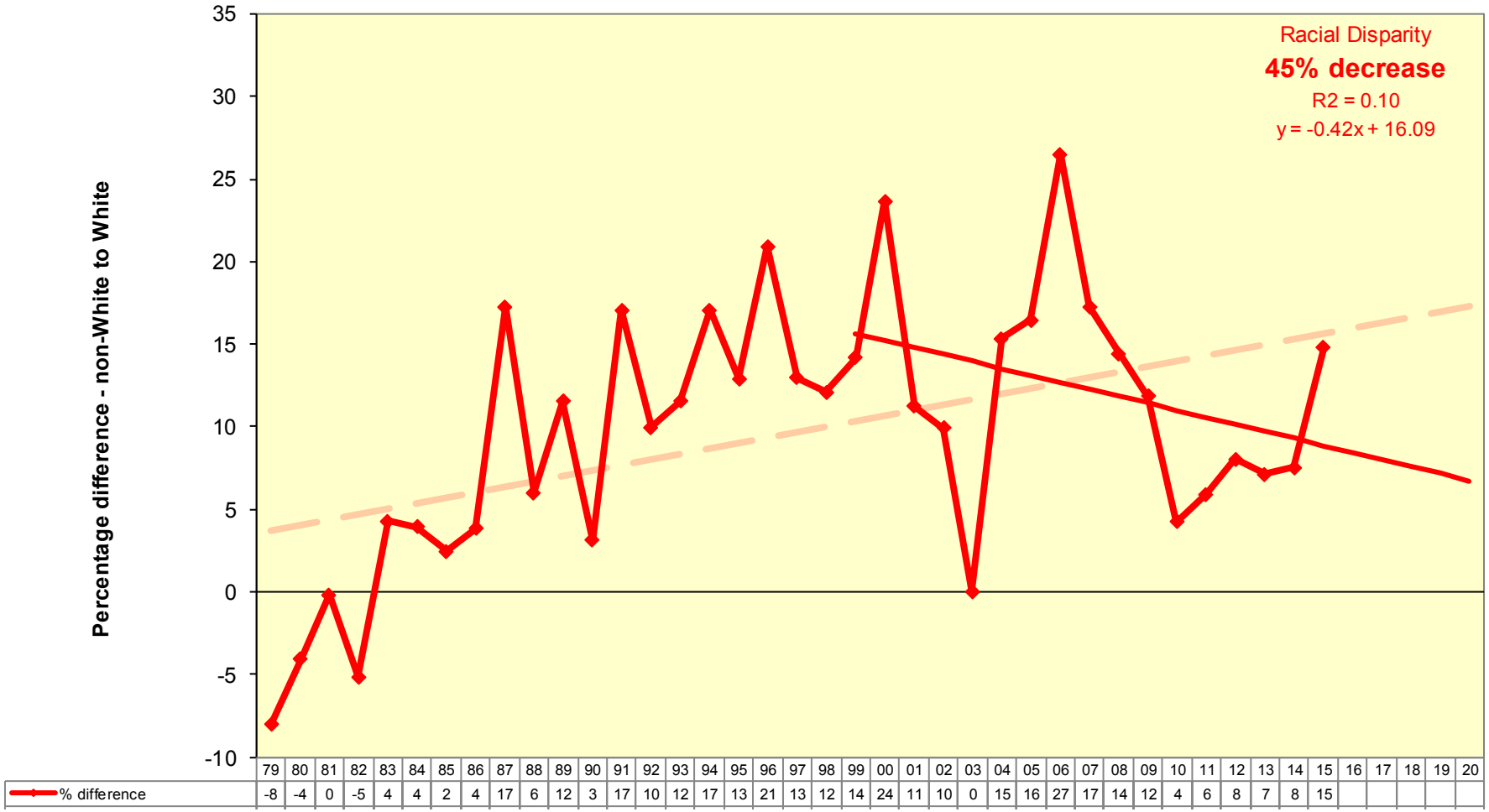
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	12% LT	42% LT	47% LT	NWM
13% GT		35% LT	40% LT	WM
73% GT	53% GT		8% LT	NWF
88% GT	66% GT	9% GT		WF

Figure 6.1 iv. Diseases of Heart: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	401	417	429	396	441	426	418	411	449	398	383	361	372	351	356	368	348	365	326	326	315	336	294	274	255	253	258	253	236	225	213	201	192	189	193	181	192					
W	433	434	430	417	423	410	408	395	383	375	344	350	318	319	319	314	308	302	289	291	276	271	264	249	255	220	222	200	201	197	190	192	181	175	180	169	167					

Figure 6.1 v. Diseases of Heart:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



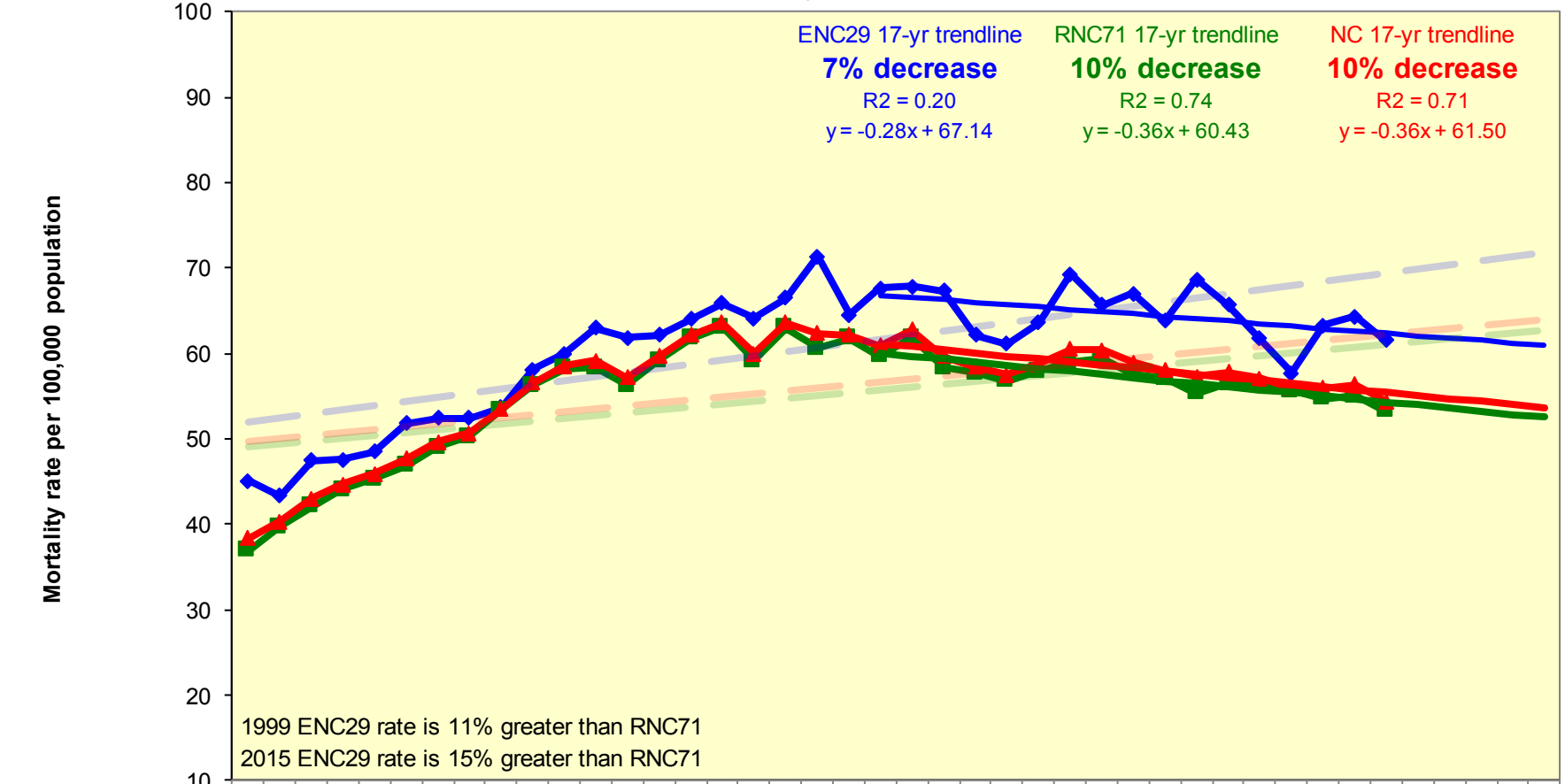
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	-8	-4	0	-5	4	4	2	4	17	6	12	3	17	10	12	17	13	21	13	12	14	24	11	10	0	15	16	27	17	14	12	4	6	8	7	8	15					

Cancer - Trachea, Bronchus, Lung

- The 17-year trend line for Cancer—TBL for ENC is 15% greater than RNC. The trend is moderately reliable.
- In 2015, the age-adjusted rate trend for ENC is 6% above the RNC rate and 19% above the US rate. The 17-year trend lines suggest that the ENC rate is decreasing more quickly, suggesting convergence with RNC and NC in the future.
- The mortality rate trends for males are decreasing. Non-White males continue to have the highest rate, however the 17-year trend line suggests White males will have a higher rate than non-White males in the near future. The trend for White females is decreasing and is moderately reliable. The trend for non-White females is not reliable.
- The non-White mortality rate trend for this cancer is consistently lower than the White rate. Both trends are decreasing over the 17-year period, but non-White is decreasing more quickly.
- The moderately reliable 17-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, 1979-2015 with projections to 2020

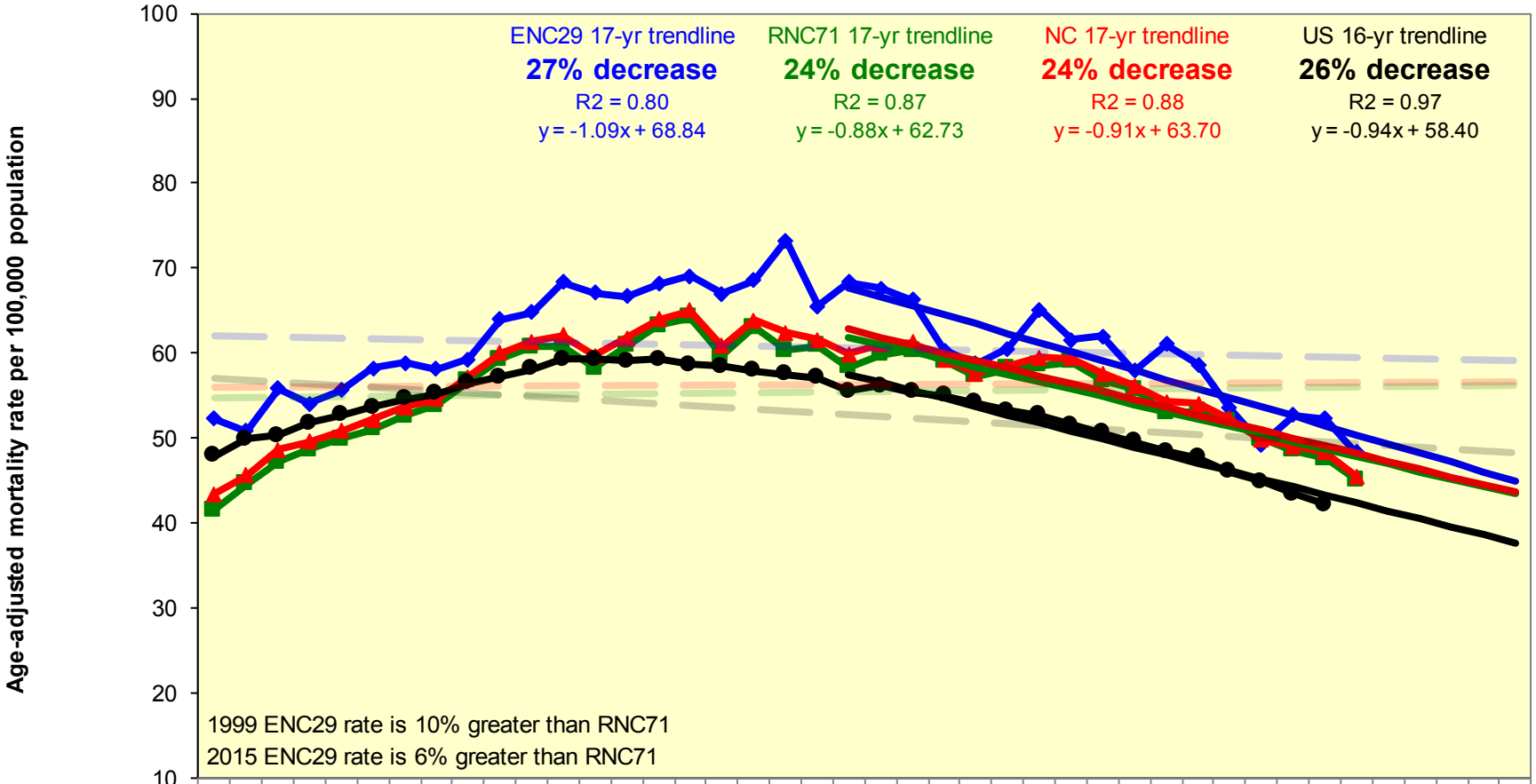


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	45	43	47	48	48	52	52	52	54	58	60	63	62	62	64	66	64	67	71	65	68	68	67	62	61	64	69	66	67	64	69	66	62	58	63	64	62					
RNC71	37	40	42	44	45	47	49	50	53	56	58	58	56	59	62	63	59	63	61	62	60	62	58	58	57	58	59	59	58	57	55	56	56	56	55	55	53					
NC	38	40	43	45	46	48	50	51	53	57	59	59	57	60	62	64	60	64	62	62	61	63	60	58	57	59	61	60	59	58	57	58	57	56	56	56	54					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	10% LT	8% LT	ENC29
11% GT		2% GT	RNC71
9% GT	2% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	13% LT	11% LT	ENC29
15% GT		2% GT	RNC71
12% GT	2% LT		NC

Figure 6.2 ii. Cancer - Trachea, Bronchus, Lung: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

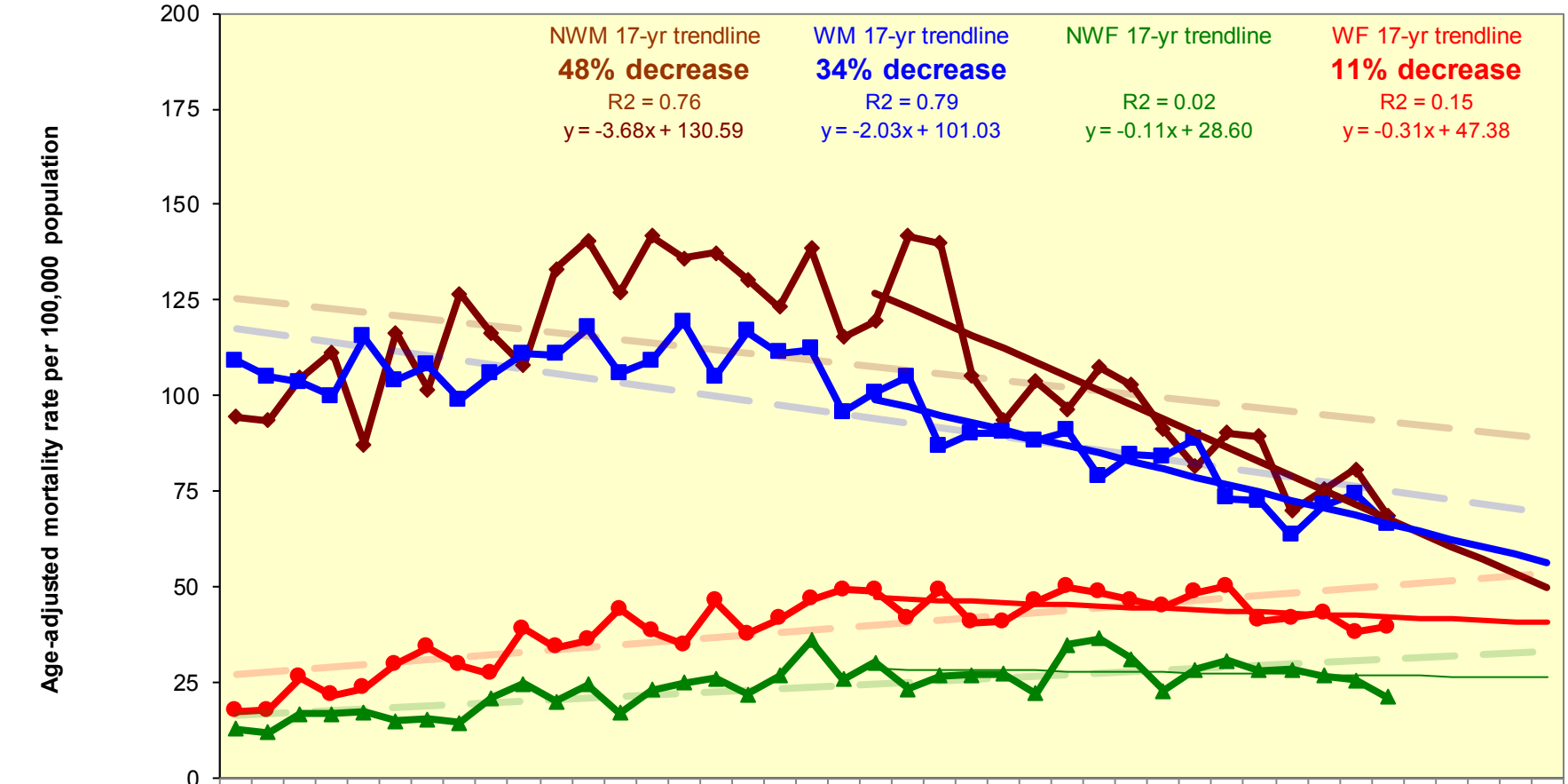


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	52	51	56	54	56	58	59	58	59	64	65	68	67	67	68	69	67	69	73	65	68	68	66	60	59	61	65	62	62	58	61	59	54	49	53	52	48					
RNC71	42	45	47	49	50	51	53	54	57	59	61	61	58	61	63	64	60	63	60	61	58	60	60	59	57	58	59	59	57	56	53	53	52	50	48	48	45					
NC	43	46	49	50	51	52	54	55	57	60	61	62	60	62	64	65	61	64	62	62	60	61	61	59	58	58	60	59	58	56	54	54	52	50	49	48	46					
US	48	50	50	52	53	54	55	55	56	57	58	59	59	59	59	59	58	58	58	57	55	56	55	55	54	53	53	52	51	50	48	48	46	45	43	42						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	9% LT	7% LT	15% LT	ENC29
10% GT		2% GT	7% LT	RNC71
8% GT	2% LT		8% LT	NC
18% GT	7% GT	9% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	5% LT	5% LT	16% LT	ENC29
6% GT		1% GT	11% LT	RNC71
5% GT	1% LT		12% LT	NC
19% GT	12% GT	13% GT		US

Figure 6.2 iii. Cancer - Trachea, Bronchus, Lung: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	94	94	105	111	87	116	102	127	116	108	133	141	127	142	136	137	130	123	138	115	120	142	140	105	94	104	97	107	103	91	81	90	89	70	75	81	69					
WM	109	105	104	100	115	104	108	99	105	111	111	118	106	109	119	105	117	111	112	96	101	105	86	90	90	88	91	79	84	84	89	73	72	63	71	74	66					
NWF	13	12	17	17	17	15	15	14	21	25	20	24	17	23	25	26	22	27	36	26	30	23	27	27	27	22	35	36	31	23	28	31	28	28	27	25	21					
WF	17	18	26	22	23	30	34	30	27	39	34	36	44	38	35	46	37	42	47	49	49	42	49	40	41	46	50	48	46	45	49	50	41	42	43	38	39					

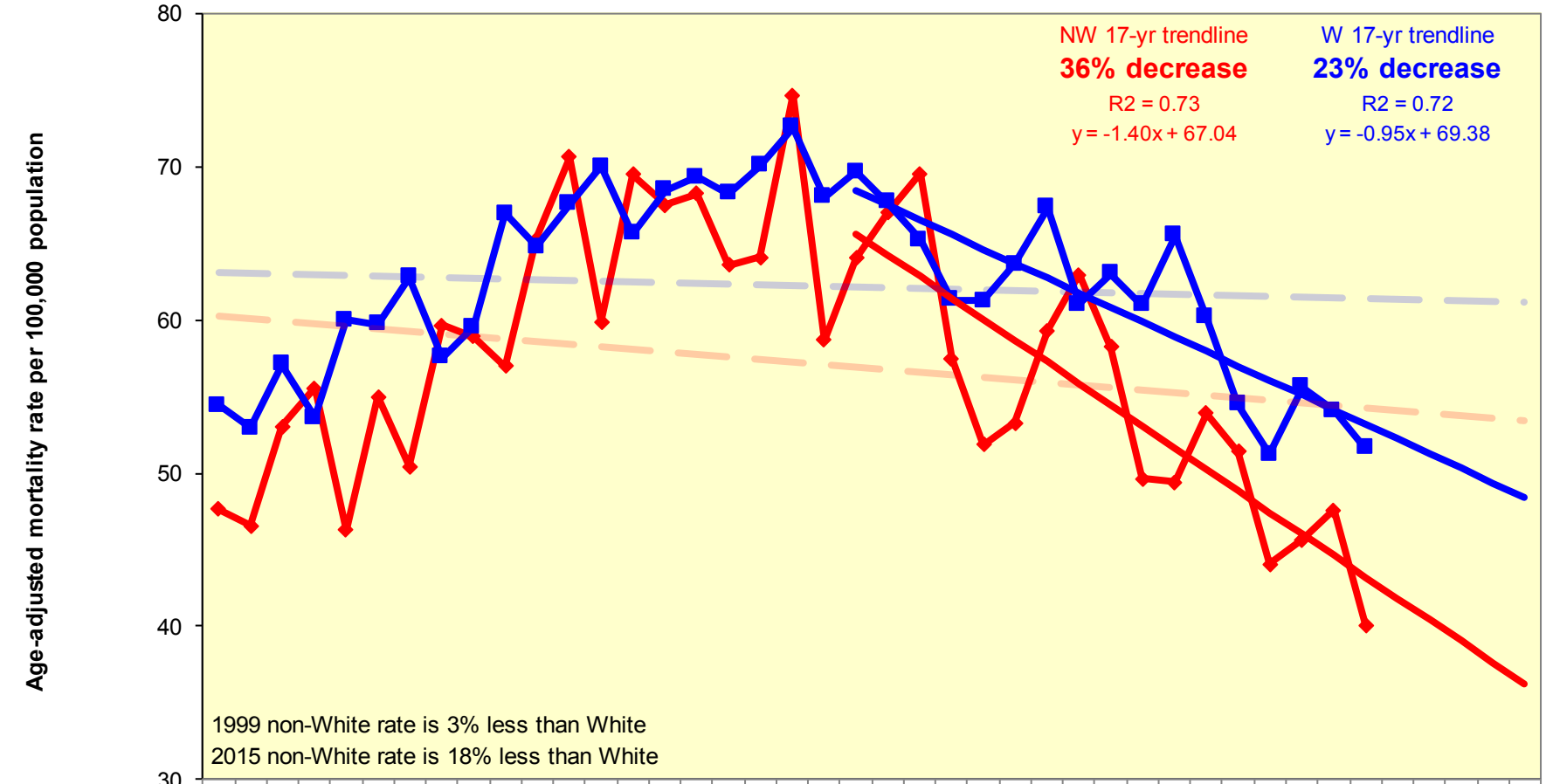
Comparison of Fitted Rates in 1999

NWM	WM	NWF	WF	
	23% LT	78% LT	64% LT	NWM
29% GT		72% LT	53% LT	WM
357% GT	253% GT		66% GT	NWF
176% GT	113% GT	40% LT		WF

Comparison of Fitted Rates in 2015

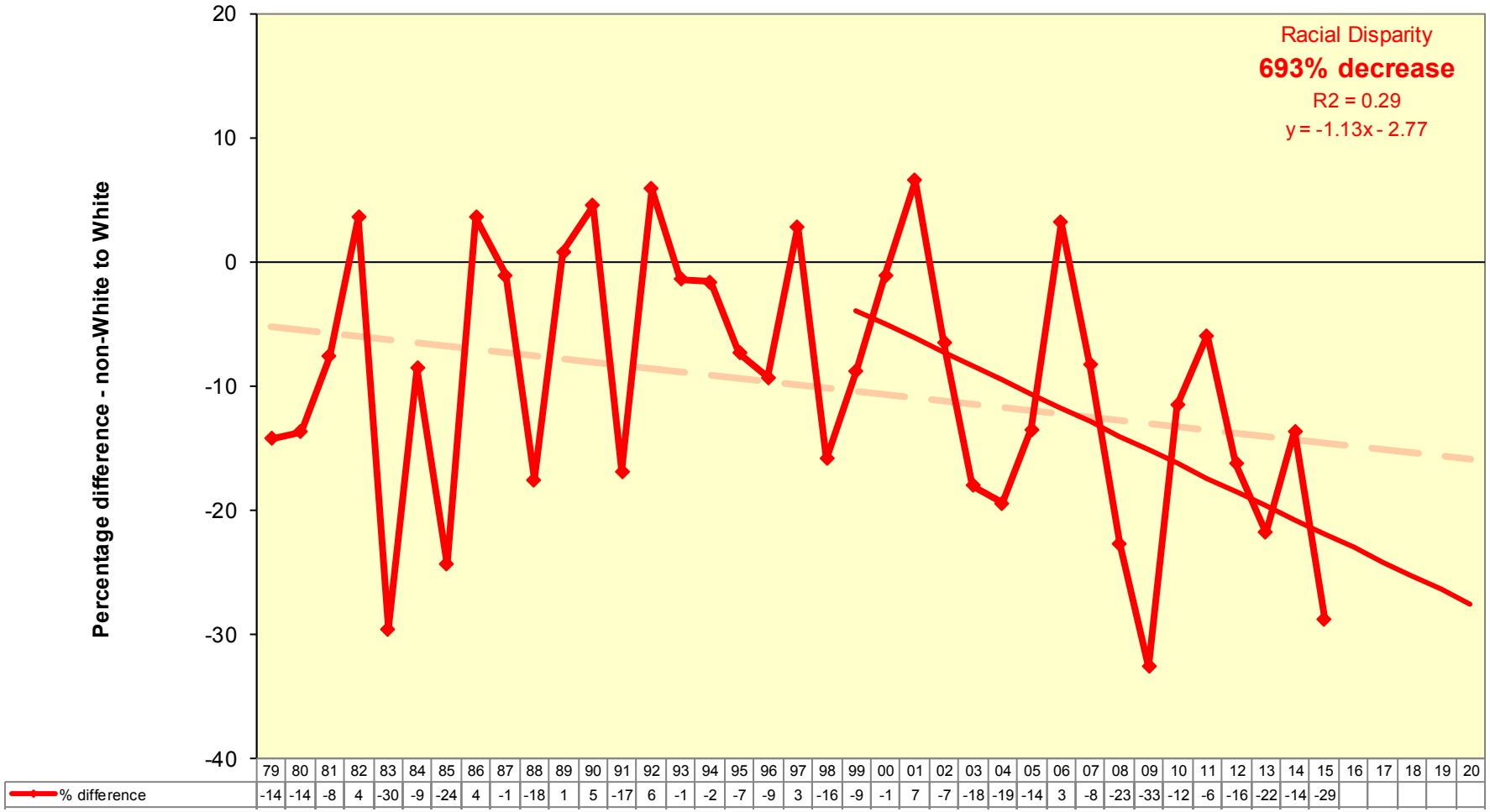
NWM	WM	NWF	WF	
	4% LT	63% LT	41% LT	NWM
5% GT		61% LT	38% LT	WM
167% GT	156% GT		58% GT	NWF
69% GT	62% GT	37% LT		WF

Figure 6.2 iv. Cancer - Trachea, Bronchus, Lung: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	48	47	53	56	46	55	50	60	59	57	65	71	60	69	68	68	64	64	75	59	64	67	70	58	52	53	59	63	58	50	49	54	51	44	46	48	40					
W	54	53	57	54	60	60	63	58	60	67	65	68	70	66	68	69	68	70	73	68	70	68	65	61	61	64	67	61	63	61	66	60	54	51	56	54	52					

Figure 6.2 v. Cancer - Trachea, Bronchus, Lung:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



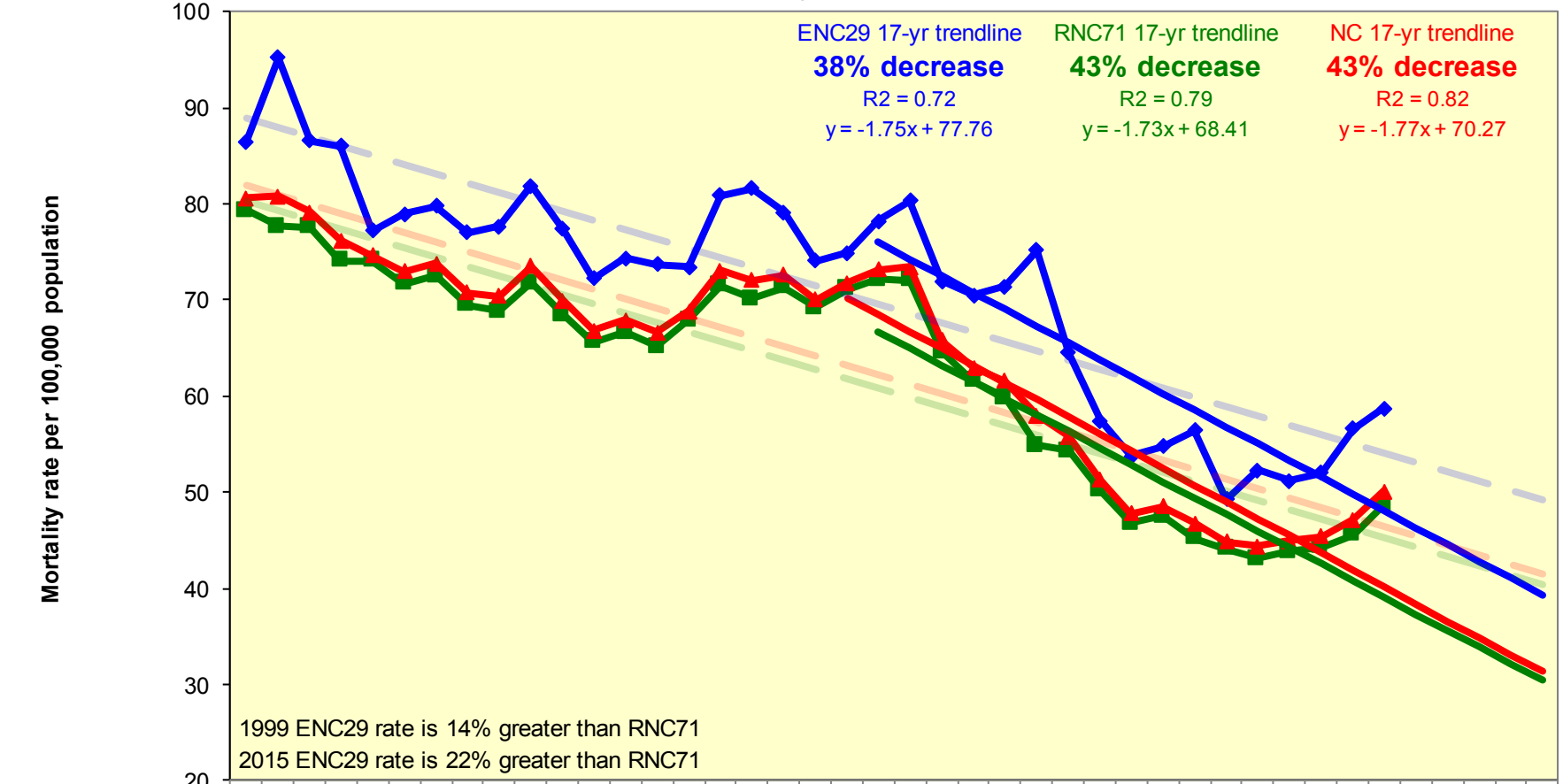
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	-14	-14	-8	4	-30	-9	-24	4	-1	-18	1	5	-17	6	-1	-2	-7	-9	3	-16	-9	-1	7	-7	-18	-19	-14	3	-8	-23	-33	-12	-6	-16	-22	-14	-29					

Cerebrovascular Disease

- ENC's cerebrovascular disease mortality trend line is decreasing but is 22% greater than RNC in 2015.
- The ENC age-adjusted cerebrovascular disease mortality rate trend is decreasing and converging with the RNC and NC rates. It remains 11% greater than the RNC trend.
- Non-Whites have the highest mortality rate for cerebrovascular disease but the rate trend continues to decrease and converge with the other demographic groups. Over the 17-year period the trend has decreased by about 50% for all demographic groups.
- The cerebrovascular disease mortality rate trend for non-Whites is decreasing and converging with that of whites but is still 45% greater than Whites in 2015.
- The 17-year 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. Cerebrovascular Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

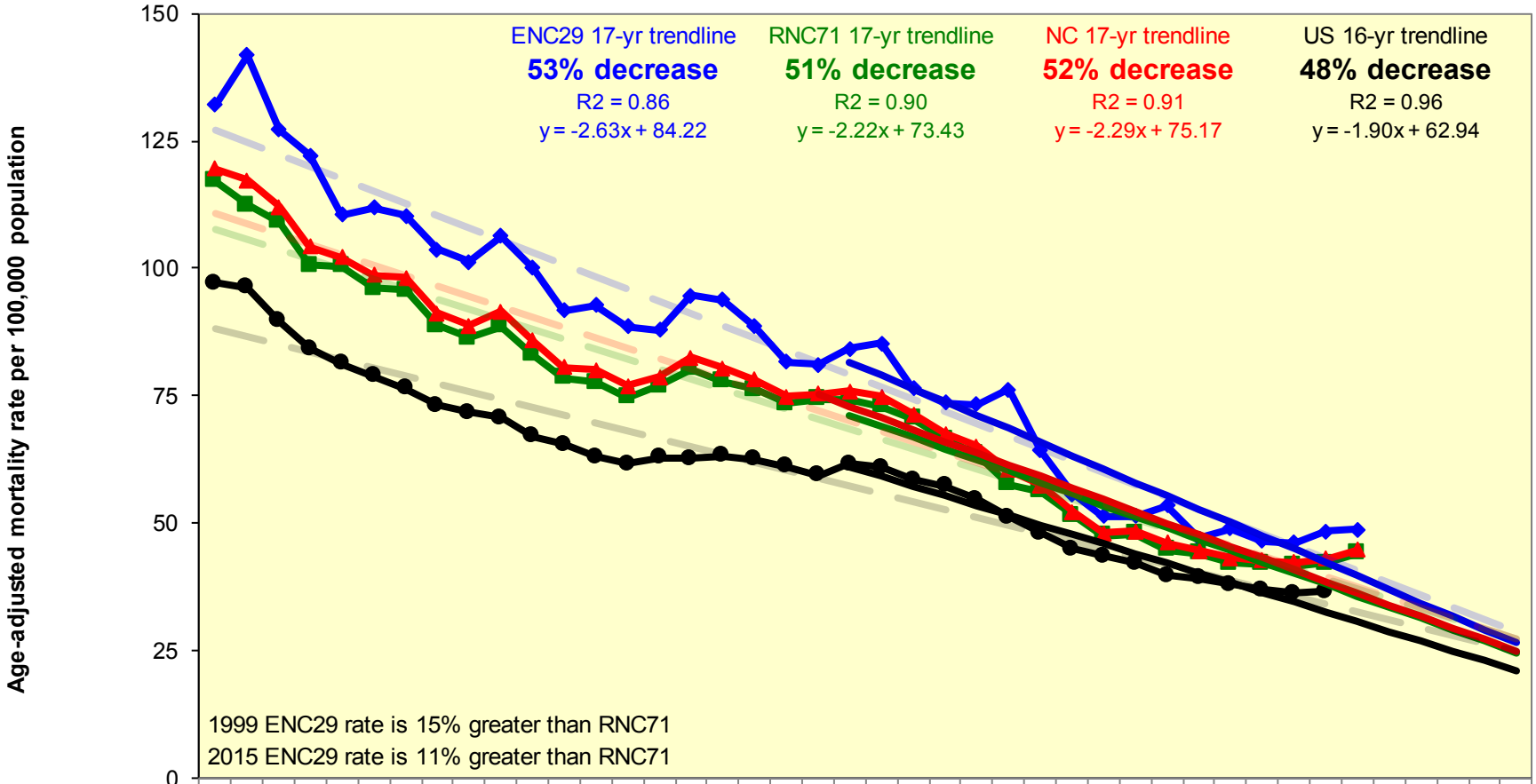


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	86	95	87	86	77	79	80	77	78	82	77	72	74	74	73	81	82	79	74	75	78	80	72	71	71	75	65	57	54	55	56	49	52	51	52	57	59					
RNC71	79	78	78	74	74	72	73	69	69	72	68	66	67	65	68	72	70	71	69	71	72	72	65	62	60	55	54	50	47	47	45	44	43	44	44	46	49					
NC	81	81	79	76	75	73	74	71	70	74	70	67	68	67	69	73	72	73	70	72	73	73	66	63	62	58	56	51	48	49	47	45	44	45	45	47	50					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	12% LT	10% LT	ENC29
14% GT		3% GT	RNC71
11% GT	3% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	18% LT	16% LT	ENC29
22% GT		3% GT	RNC71
19% GT	3% LT		NC

Figure 6.3 ii. Cerebrovascular Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	132	142	127	122	110	112	110	104	101	106	100	92	93	89	88	95	94	89	82	81	84	85	76	74	73	76	64	56	51	51	53	47	49	46	46	48	49					
RNC71	117	112	109	101	100	96	96	89	86	89	83	78	78	75	77	80	78	76	73	74	74	73	70	66	64	58	56	51	48	48	45	44	42	42	42	42	44					
NC	120	117	112	104	102	99	98	91	89	91	86	81	80	77	79	83	80	78	75	75	76	75	71	68	65	60	57	52	48	48	46	45	43	43	42	43	45					
US	97	96	90	84	81	79	76	73	72	71	67	65	63	61	63	63	63	62	61	59	62	61	58	57	55	51	48	45	44	42	40	39	38	37	36	36						

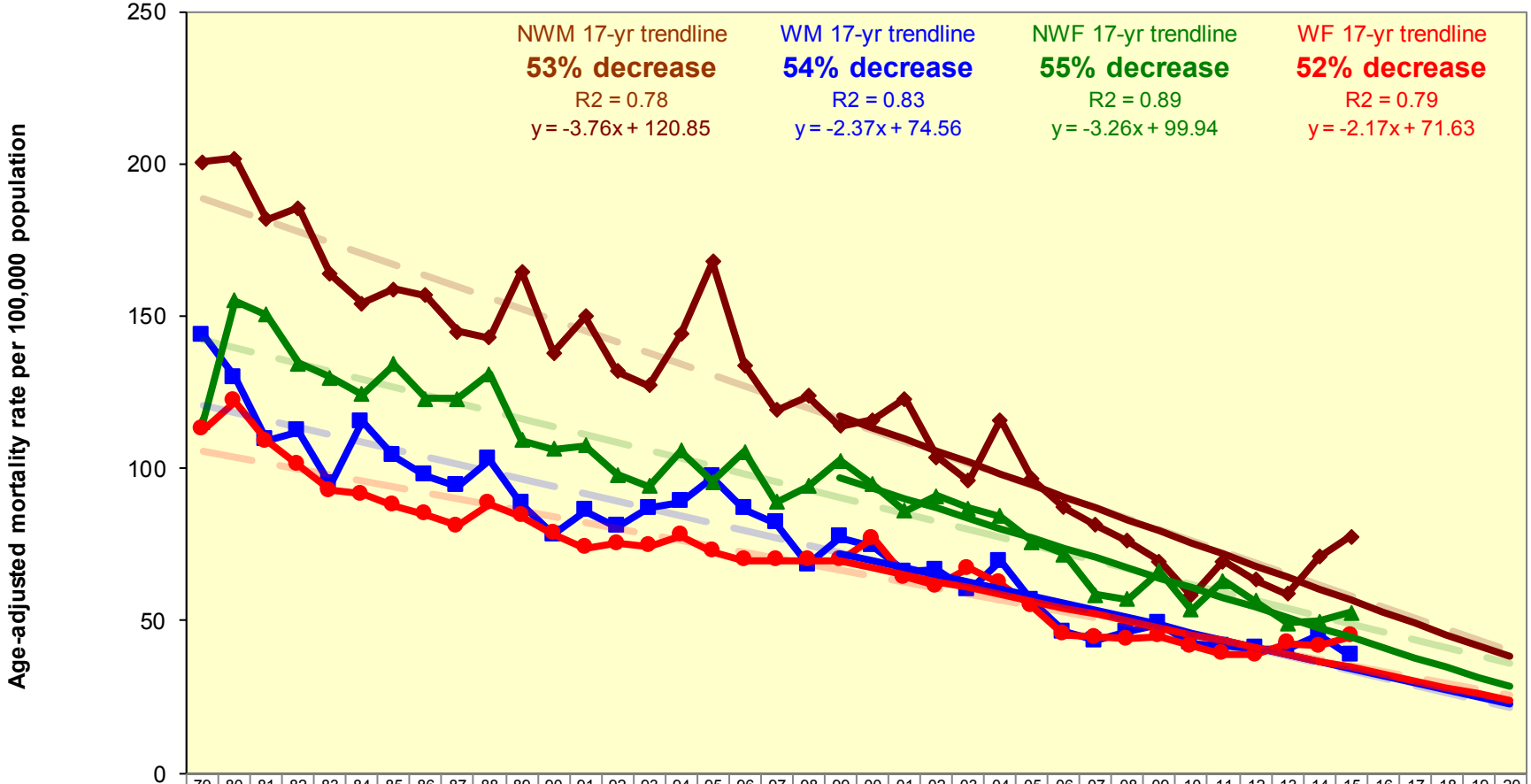
Comparison of Fitted Rates in 1999

ENC29	RNC71	NC	US	
	13% LT	11% LT	25% LT	ENC29
15% GT		2% GT	14% LT	RNC71
12% GT	2% LT		16% LT	NC
34% GT	17% GT	19% GT		US

Comparison of Fitted Rates in 2015

ENC29	RNC71	NC	US	
	10% LT	9% LT	23% LT	ENC29
11% GT		2% GT	14% LT	RNC71
10% GT	2% LT		16% LT	NC
30% GT	16% GT	18% GT		US

Figure 6.3 iii. Cerebrovascular Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	201	202	182	186	164	154	159	157	145	143	165	138	150	132	127	144	168	134	119	124	114	116	123	104	96	116	97	87	81	76	70	58	70	64	59	71	78					
WM	144	130	109	112	95	115	104	98	94	103	88	78	86	81	87	89	97	87	82	68	77	75	66	67	60	70	56	46	44	46	49	43	42	41	41	45	39					
NWF	115	155	150	135	130	124	134	123	123	131	109	106	107	98	94	106	96	106	89	94	103	95	86	91	87	84	76	72	58	57	66	54	63	57	49	50	53					
WF	113	122	109	101	93	92	88	85	81	88	84	79	74	75	74	78	73	70	70	70	70	77	64	61	67	62	55	46	45	44	45	42	39	39	43	42	45					

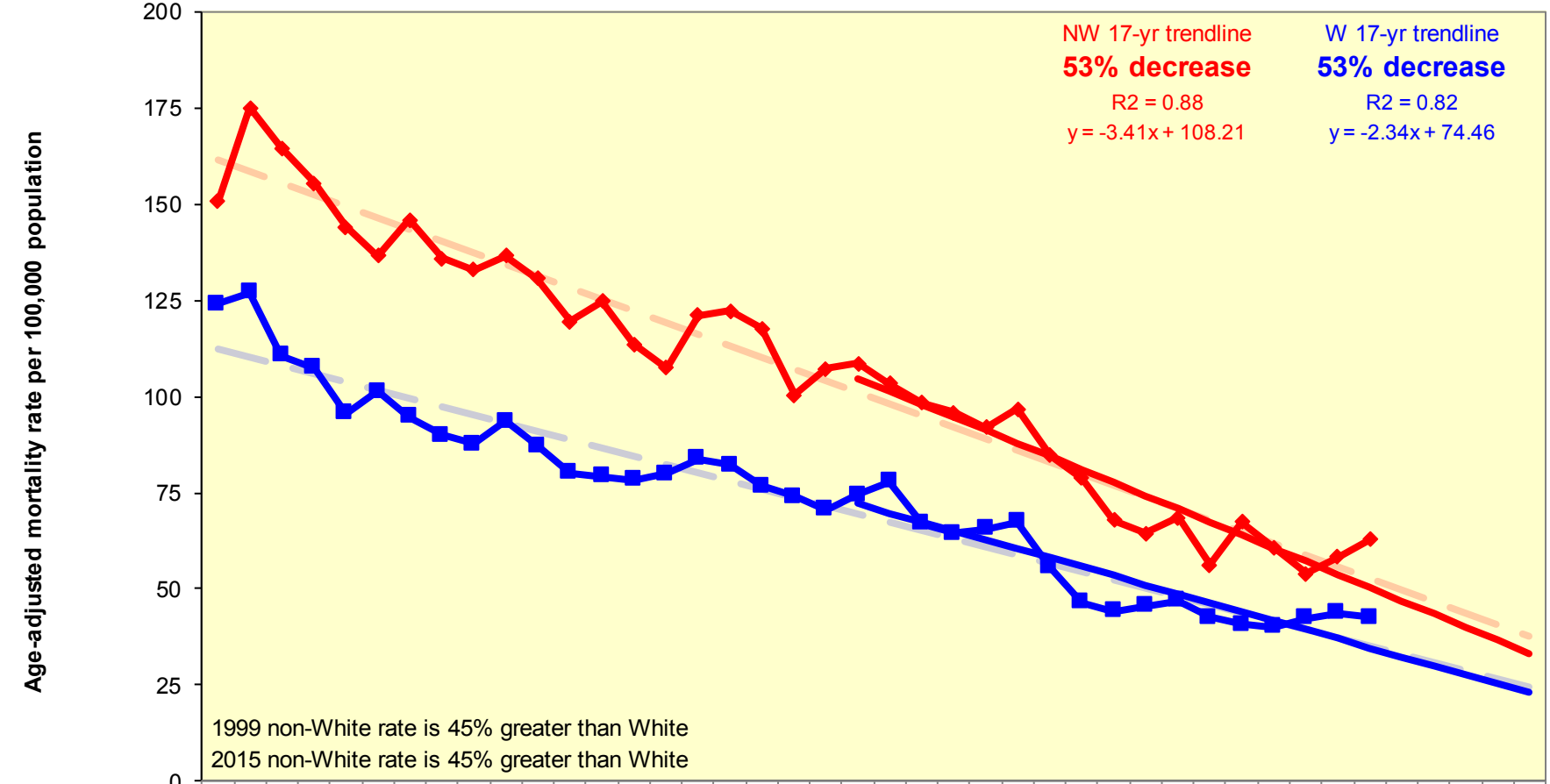
Comparison of Fitted Rates in 1999

NWM	WM	NWF	WF	
	38% LT	17% LT	41% LT	NWM
62% GT		34% GT	4% LT	WM
21% GT	25% LT		28% LT	NWF
69% GT	4% GT	40% GT		WF

Comparison of Fitted Rates in 2015

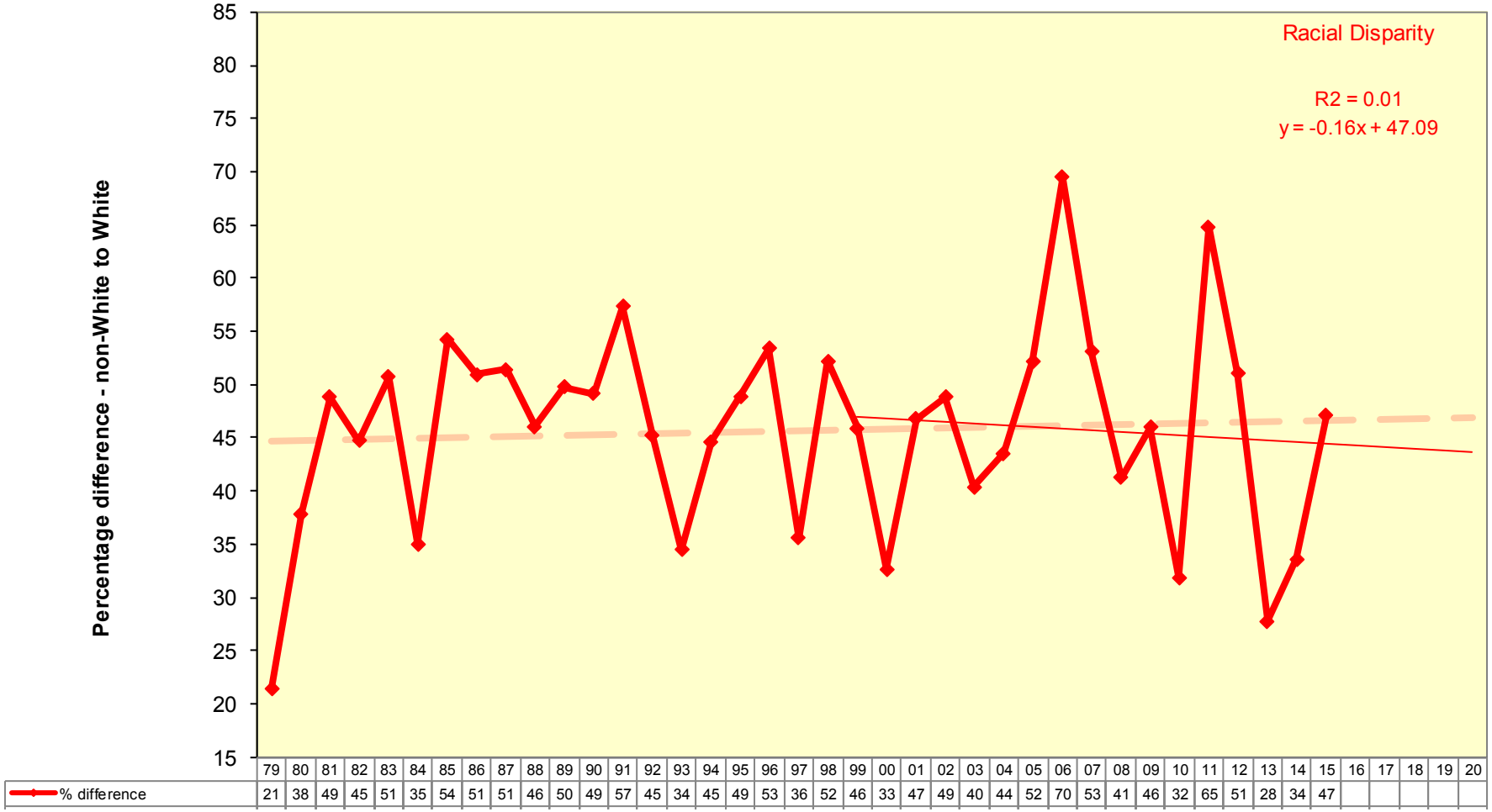
NWM	WM	NWF	WF	
	40% LT	21% LT	39% LT	NWM
65% GT		30% GT	0% GT	WM
27% GT	23% LT		23% LT	NWF
65% GT	0% LT	30% GT		WF

Figure 6.3 iv. Cerebrovascular Disease: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	151	175	165	156	144	137	146	136	133	136	131	120	125	114	107	121	122	118	100	107	109	103	98	96	92	97	85	79	68	64	69	56	67	61	54	58	63					
W	124	127	111	107	96	101	95	90	88	93	87	80	79	78	80	84	82	77	74	71	74	78	67	64	66	67	56	46	44	46	47	43	41	40	42	44	43					

Figure 6.3 v. Cerebrovascular Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



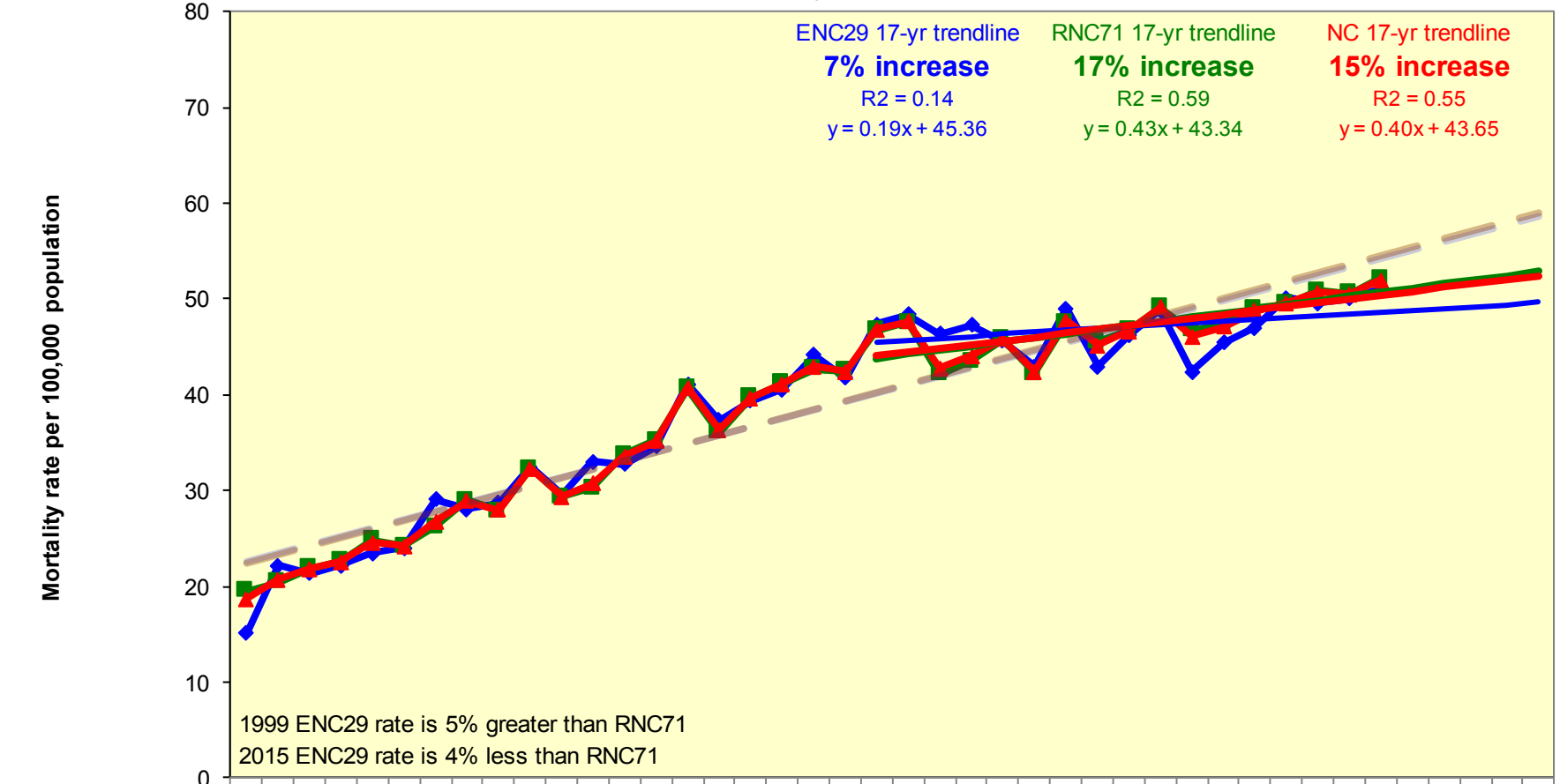
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	21	38	49	45	51	35	54	51	51	46	50	49	57	45	34	45	49	53	36	52	46	33	47	49	40	44	52	70	53	41	46	32	65	51	28	34	47					

Chronic Lower Respiratory Diseases

- The 37 year ENC trend for CLRD mortality is increasing. The 17-year trend for ENC is moderately reliable.
- The 17-year CLRD age-adjusted rate trend for ENC is decreasing. The rate for ENC is lower than the rates for RNC and NC.
- Fitted rates for non-White males and White males have decreased over 17 years by 36% and 32%, respectively. White male rates remain the highest. The 17-year trend for White females and non-White females are unreliable.
- The 17-year White mortality rate trend is higher than the non-White trend, although both are declining. The non-White rate is 45% less than the White rate in 2015.
- The disparity trend between the White and non-White rate 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, 1979-2015 with projections to 2020

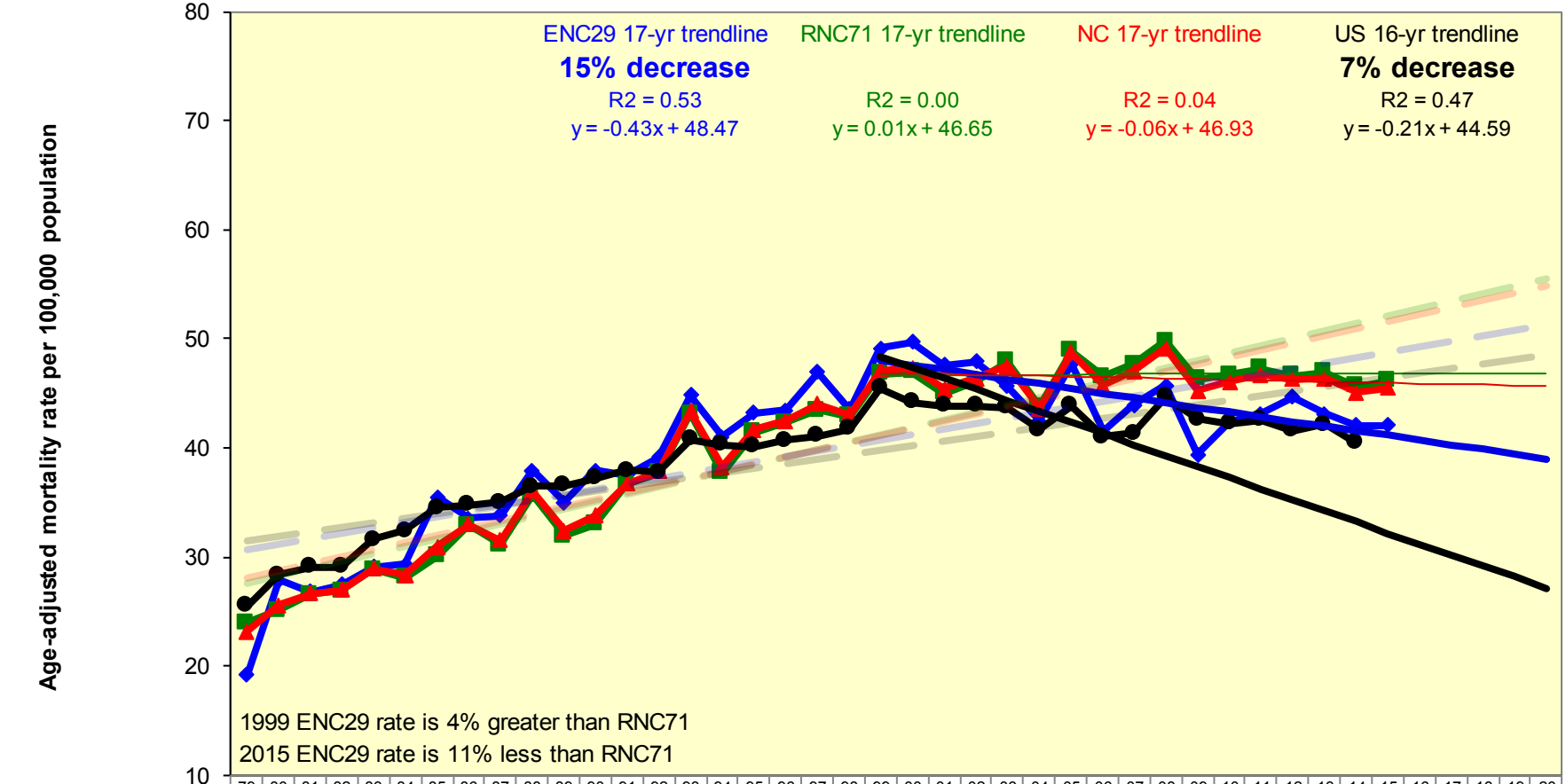


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	15	22	21	22	23	24	29	28	29	32	30	33	33	35	41	37	39	41	44	42	47	48	46	47	46	43	49	43	46	49	42	45	47	50	50	50	51					
RNC71	20	20	22	23	25	24	26	29	28	32	29	30	34	35	41	36	40	41	43	43	47	48	42	44	46	42	48	46	47	49	47	47	49	50	51	51	52					
NC	19	21	22	23	25	24	27	29	28	32	29	31	34	35	41	36	40	41	43	42	47	48	43	44	46	42	48	45	47	49	46	47	49	50	51	51	52					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	4% LT	4% LT	ENC29
5% GT		1% GT	RNC71
4% GT	1% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	4% GT	3% GT	ENC29
4% LT		1% LT	RNC71
3% LT	1% GT		NC

Figure 6.4 ii. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

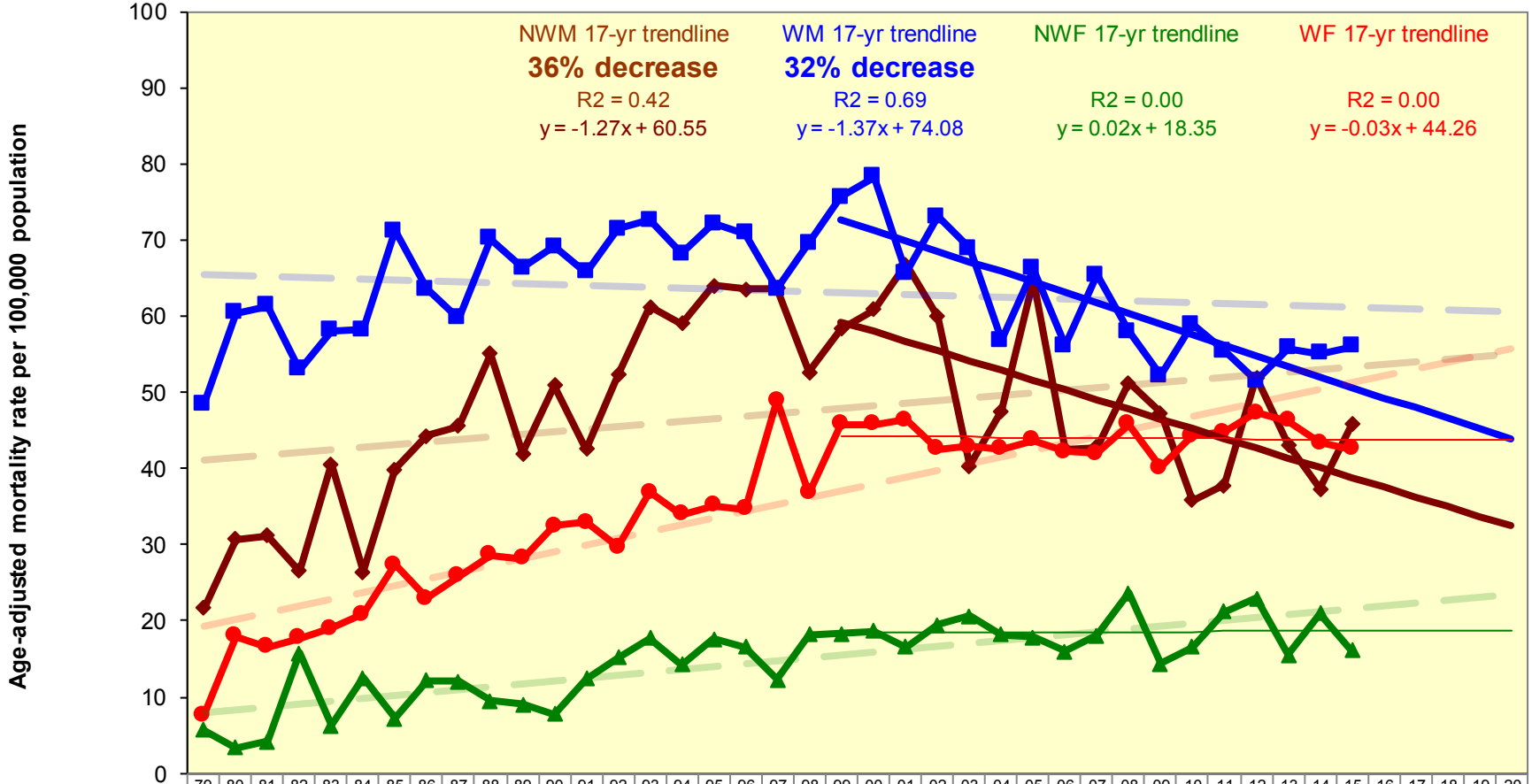


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	19	28	27	27	29	29	35	34	34	38	35	38	38	39	45	41	43	43	47	44	49	50	48	48	46	42	48	41	44	46	39	42	43	45	43	42	42					
RNC71	24	25	27	27	29	28	30	33	31	36	32	33	37	38	43	38	41	42	43	43	47	47	45	46	48	44	49	47	48	50	46	47	47	47	47	46	46					
NC	23	26	27	27	29	28	31	33	32	36	32	34	37	38	43	38	42	42	44	43	47	47	45	46	48	44	49	46	47	49	45	46	47	46	46	45	45					
US	26	28	29	29	32	32	35	35	35	36	37	37	38	38	41	40	40	41	41	42	45	44	44	44	44	42	44	41	41	45	43	42	43	42	42	40						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	4% LT	3% LT	8% LT	ENC29
4% GT		1% GT	4% LT	RNC71
3% GT	1% LT		5% LT	NC
9% GT	5% GT	5% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	13% GT	11% GT	1% LT	ENC29
11% LT		2% LT	12% LT	RNC71
10% LT	2% GT		10% LT	NC
1% GT	14% GT	12% GT		US

Figure 6.4 iii. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

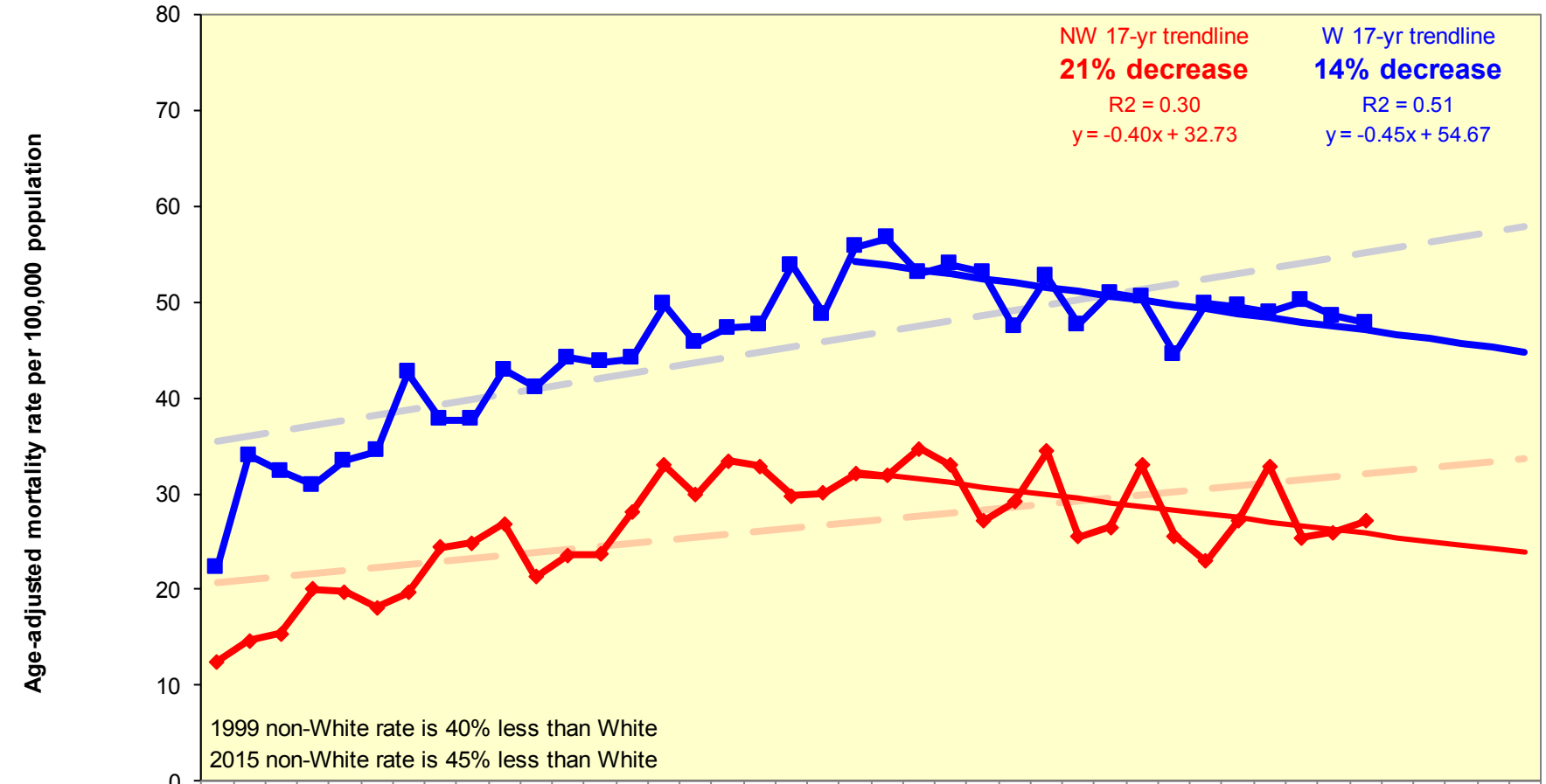


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	22	31	31	27	41	26	40	44	46	55	42	51	43	52	61	59	64	64	64	53	58	61	67	60	40	47	65	43	43	51	47	36	38	52	43	37	46					
WM	48	60	61	53	58	58	71	64	60	70	66	69	66	72	73	68	72	71	64	70	76	78	66	73	69	57	66	56	65	58	52	59	55	51	56	55	56					
NWF	6	3	4	16	6	13	7	12	12	10	9	8	12	15	18	14	18	17	12	18	18	19	17	20	21	18	18	16	18	24	14	17	21	23	16	21	16					
WF	8	18	17	18	19	21	27	23	26	29	28	33	33	30	37	34	35	35	49	37	46	46	46	43	43	43	44	42	42	46	40	44	45	47	46	43	43					

Comparison of Fitted Rates in 1999					
NWM	WM	NWF	WF	
	22% GT	70% LT	27% LT	NWM
18% LT		75% LT	40% LT	WM
230% GT	304% GT		141% GT	NWF
37% GT	67% GT	59% LT		WF

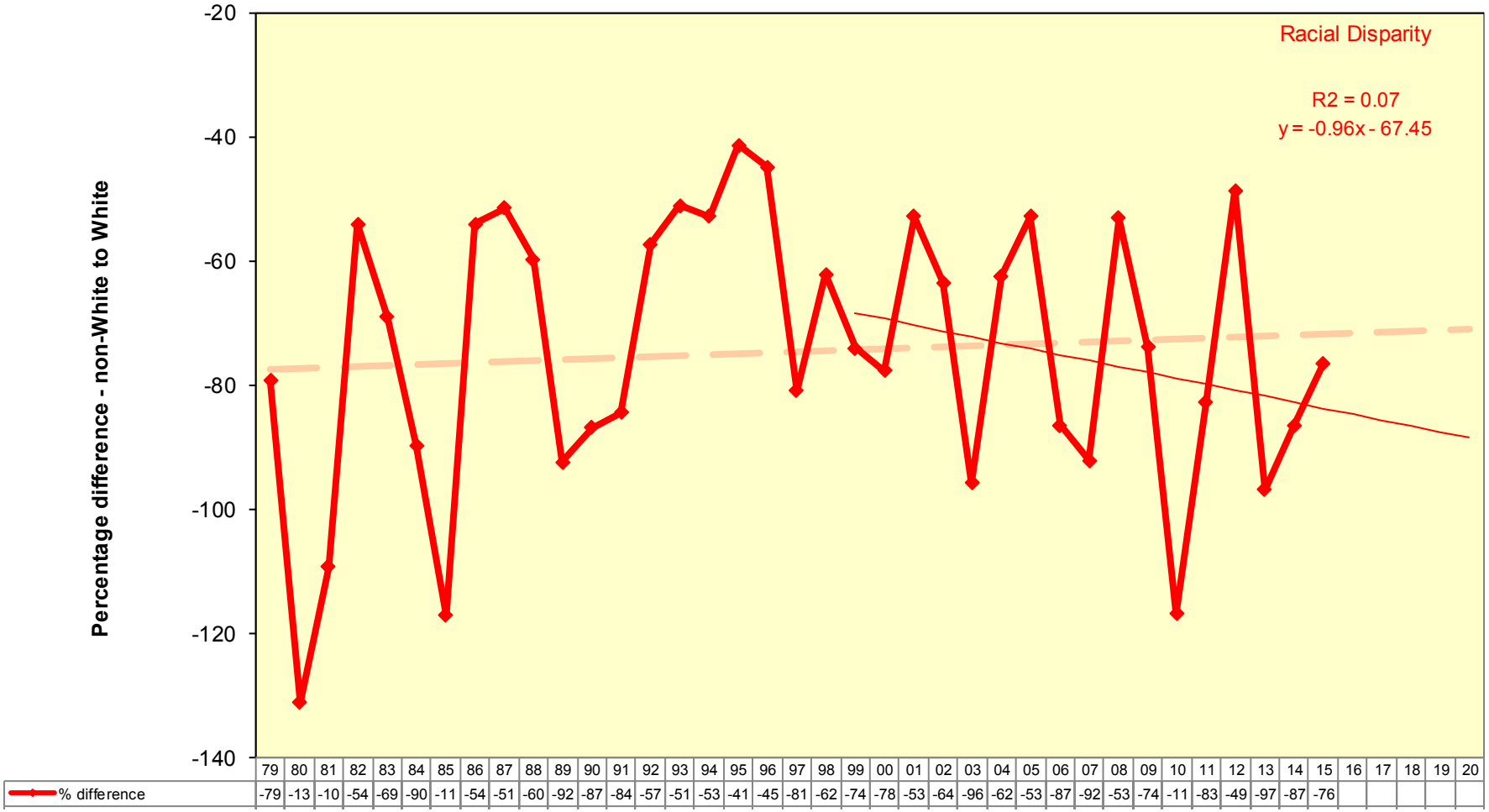
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	30% GT	54% LT	9% GT	NWM
23% LT		64% LT	16% LT	WM
115% GT	179% GT		135% GT	NWF
8% LT	19% GT	57% LT		WF

Figure 6.4 iv. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	12	15	15	20	20	18	20	24	25	27	21	24	24	28	33	30	33	33	30	30	32	32	35	33	27	29	34	26	26	33	26	23	27	33	25	26	27					
W	22	34	32	31	33	34	43	38	38	43	41	44	44	44	50	46	47	48	54	49	56	57	53	54	53	47	53	48	51	50	45	50	49	49	50	48	48					

Figure 6.4 v. Chronic Lower Respiratory Diseases:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



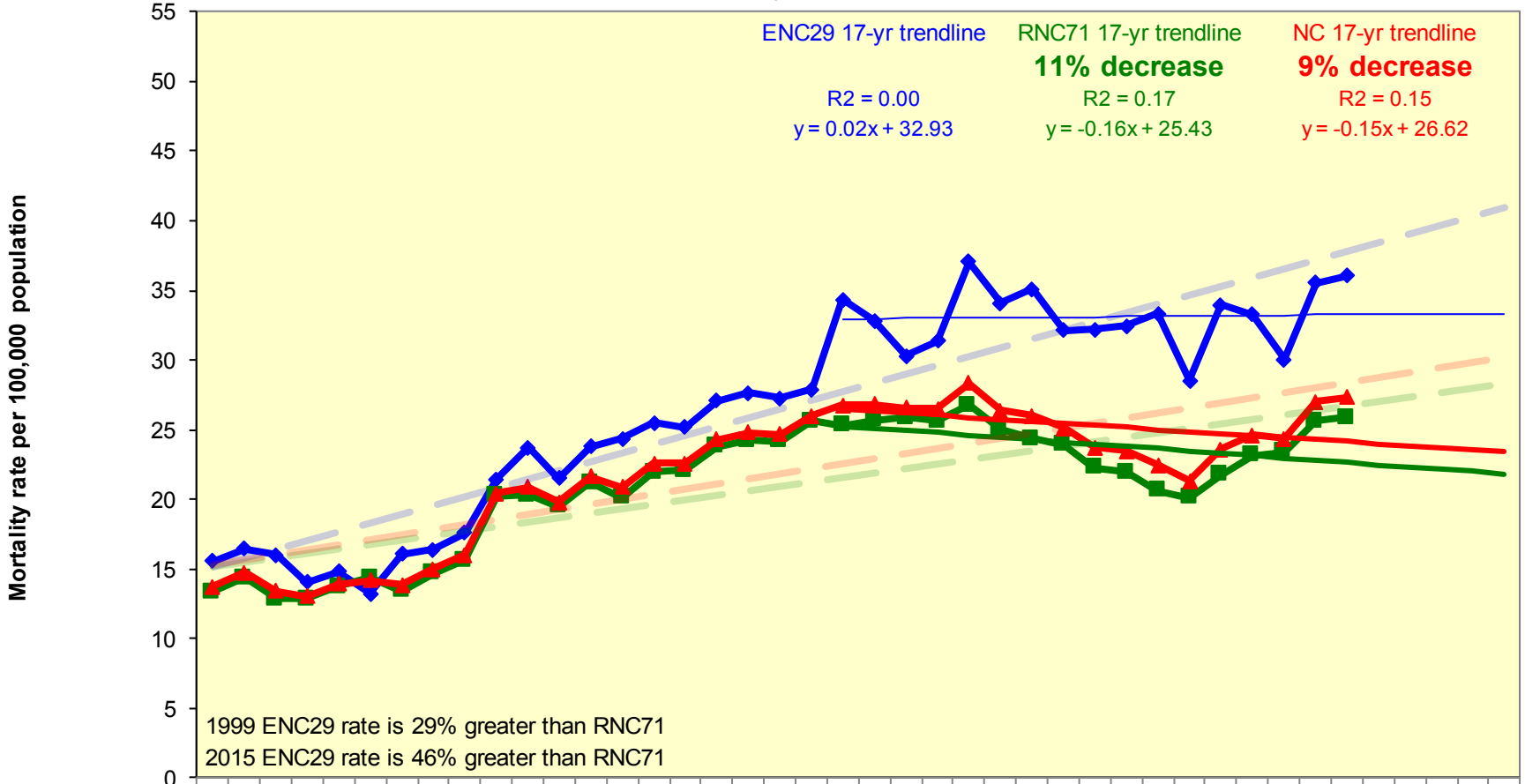
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	-79	-13	-10	-54	-69	-90	-11	-54	-51	-60	-92	-87	-84	-57	-51	-53	-41	-45	-81	-62	-74	-78	-53	-64	-96	-62	-53	-87	-92	-53	-74	-11	-83	-49	-97	-87	-76					

Diabetes Mellitus

- The 17-year trend for diabetes mellitus mortality is decreasing for RNC and NC. The trend for ENC is higher, but is not reliable.
- The 17-year trend for age-adjusted diabetes mellitus mortality shows a decrease of 20% for ENC. In 2015, the ENC age-adjusted rate trend remains 37% greater than RNC and 38% greater than the US.
- The non-White male and non-White female 17-year trends are decreasing more quickly than their White counterparts, but the non-White male rate is not reliable. The White female rate is decreasing slightly. The White male rate is also unreliable.
- The non-White mortality rate trend decreased 25% over 17 years but remains 123% greater than the White rate.
- The 17-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 6.5 i. Diabetes Mellitus: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

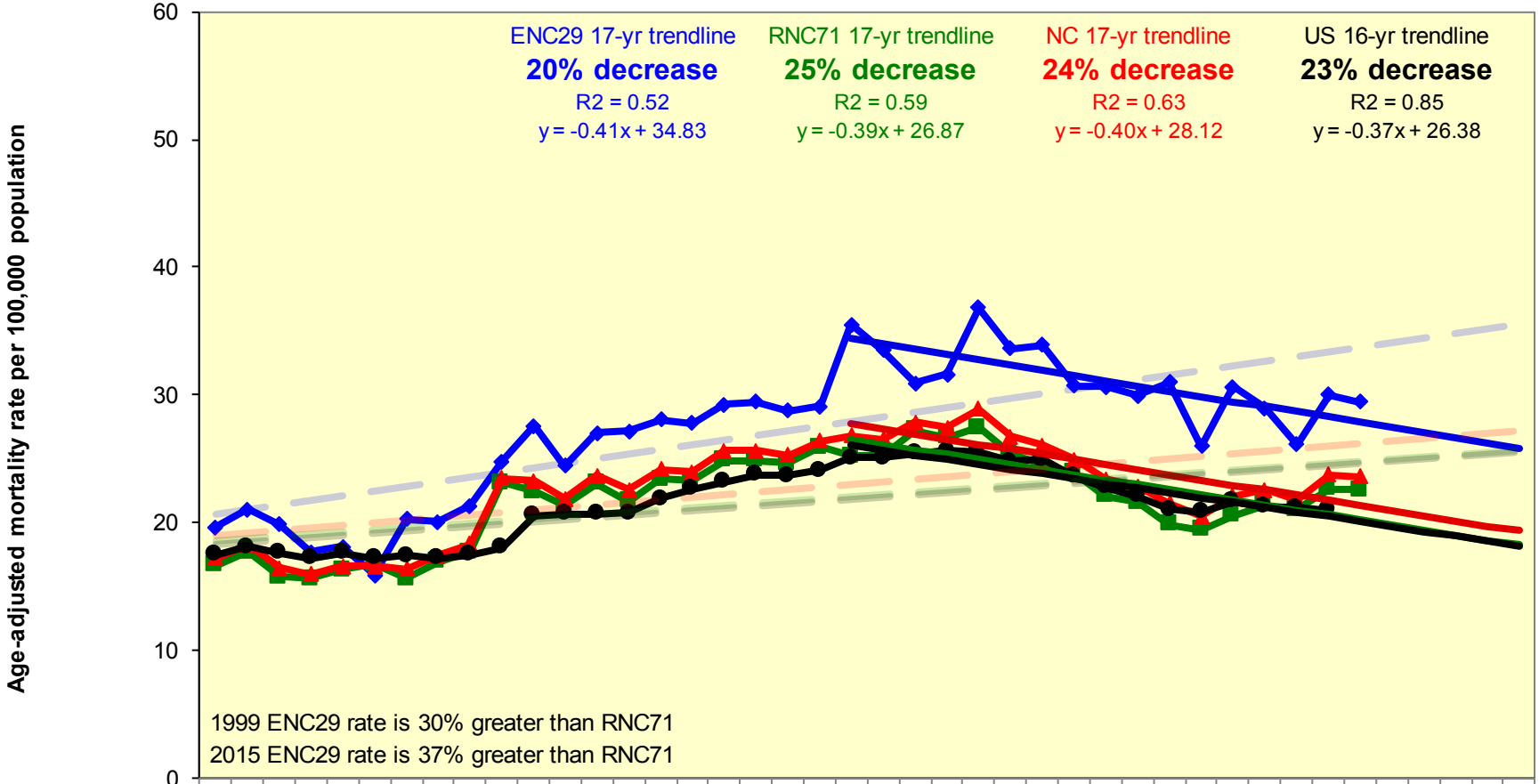


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	16	16	16	14	15	13	16	16	18	21	24	22	24	24	25	25	27	28	27	28	34	33	30	31	37	34	35	32	32	32	33	29	34	33	30	36	36					
RNC71	13	14	13	13	14	14	13	15	16	20	20	19	21	20	22	22	24	24	24	26	25	26	26	26	27	25	24	24	22	22	21	20	22	23	23	26	26					
NC	14	15	13	13	14	14	14	15	16	20	21	20	22	21	23	23	24	25	25	26	27	27	27	26	28	26	26	25	24	23	22	21	24	25	24	27	27					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	23% LT	19% LT	ENC29
29% GT		5% GT	RNC71
24% GT	4% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	31% LT	27% LT	ENC29
46% GT		6% GT	RNC71
37% GT	6% LT		NC

Figure 6.5 ii. Diabetes Mellitus: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

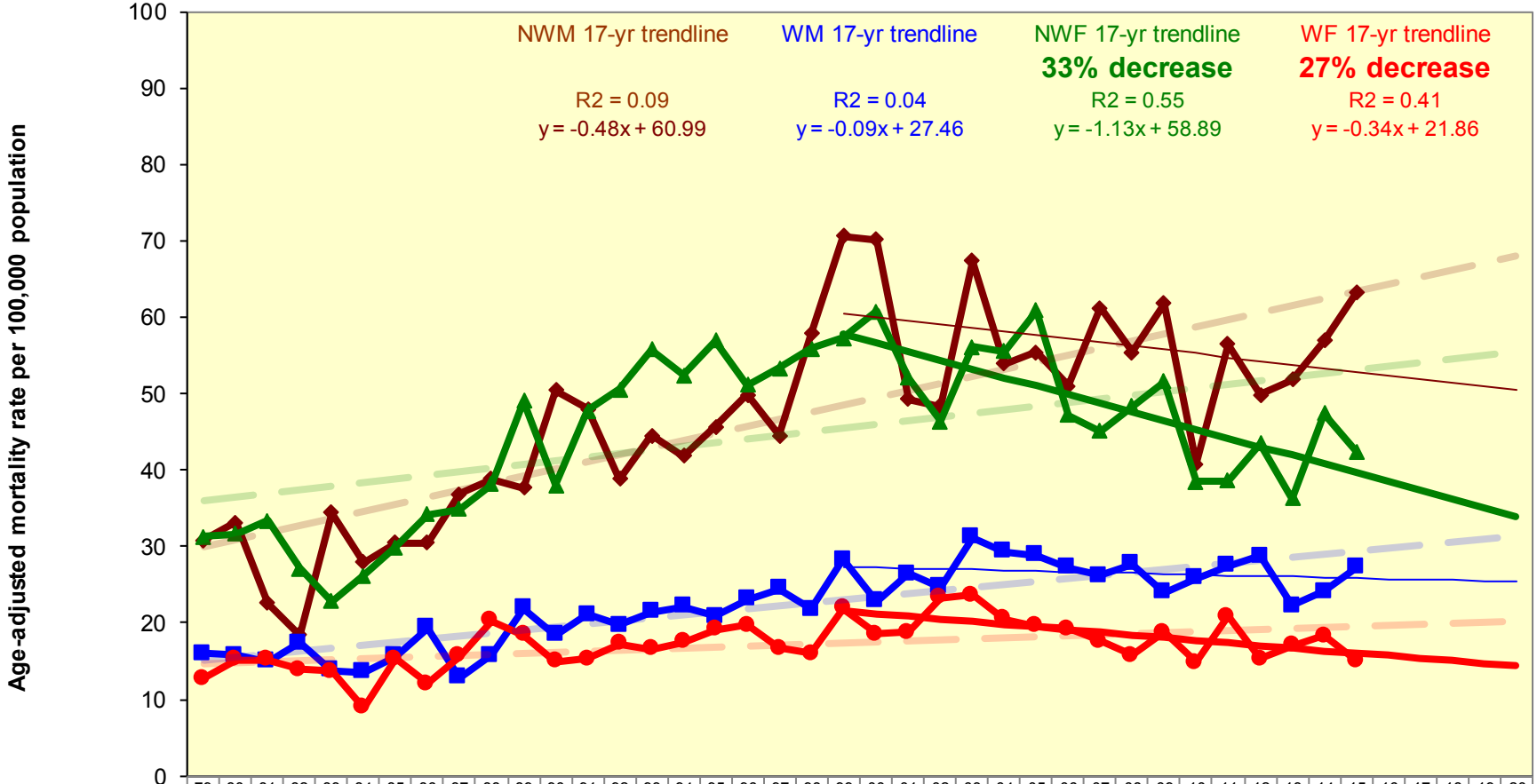


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	20	21	20	18	18	16	20	20	21	25	28	24	27	27	28	28	29	29	29	29	36	33	31	32	37	34	34	31	31	30	31	26	31	29	26	30	29					
RNC71	17	18	16	16	16	17	16	17	18	23	22	21	23	22	23	23	25	25	25	26	25	25	27	27	27	25	25	24	22	22	20	19	21	21	21	23	23					
NC	17	18	16	16	17	17	16	17	18	23	23	22	24	23	24	24	26	26	25	26	27	27	28	27	29	27	26	25	23	23	21	20	22	23	22	24	24					
US	17	18	18	17	18	17	17	17	17	18	21	21	21	21	22	23	23	24	24	24	25	25	25	26	26	25	25	24	23	22	21	21	22	21	21	21						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	23% LT	19% LT	24% LT	ENC29
30% GT		5% GT	2% LT	RNC71
24% GT	4% LT		6% LT	NC
32% GT	2% GT	7% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	27% LT	23% LT	28% LT	ENC29
37% GT		6% GT	1% LT	RNC71
30% GT	5% LT		6% LT	NC
38% GT	1% GT	6% GT		US

Figure 6.5 iii. Diabetes Mellitus: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

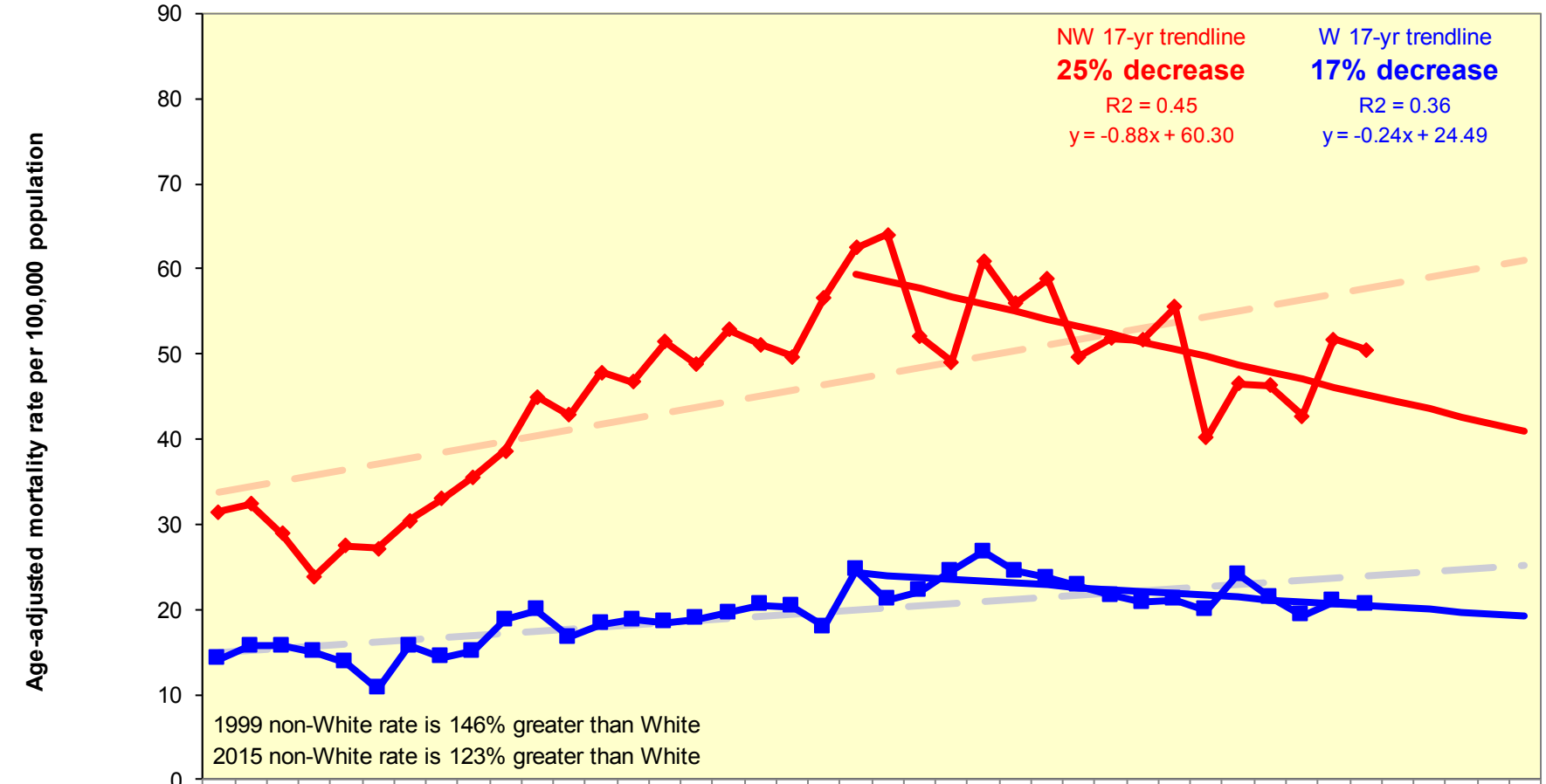


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	31	33	23	18	34	28	31	30	37	39	38	50	48	39	45	42	46	50	44	58	71	70	49	48	67	54	55	51	61	55	62	41	57	50	52	57	63					
WM	16	16	15	17	14	14	16	19	13	16	22	18	21	20	21	22	21	23	24	22	28	23	26	25	31	29	29	27	26	28	24	26	27	29	22	24	27					
NWF	31	32	33	27	23	26	30	34	35	38	49	38	48	51	56	52	57	51	53	56	57	61	52	46	56	56	61	47	45	48	52	38	39	43	36	47	42					
WF	13	15	15	14	14	9	15	12	16	20	18	15	15	17	17	18	19	20	17	16	22	19	19	23	24	20	20	19	18	16	19	15	21	15	17	18	15					

Comparison of Fitted Rates in 1999					
NWM	WM	NWF	WF		
	55% LT	3% LT	64% LT	NWM	
122% GT		114% GT	20% LT	WM	
4% GT	53% LT		63% LT	NWF	
179% GT	26% GT	169% GT		WF	

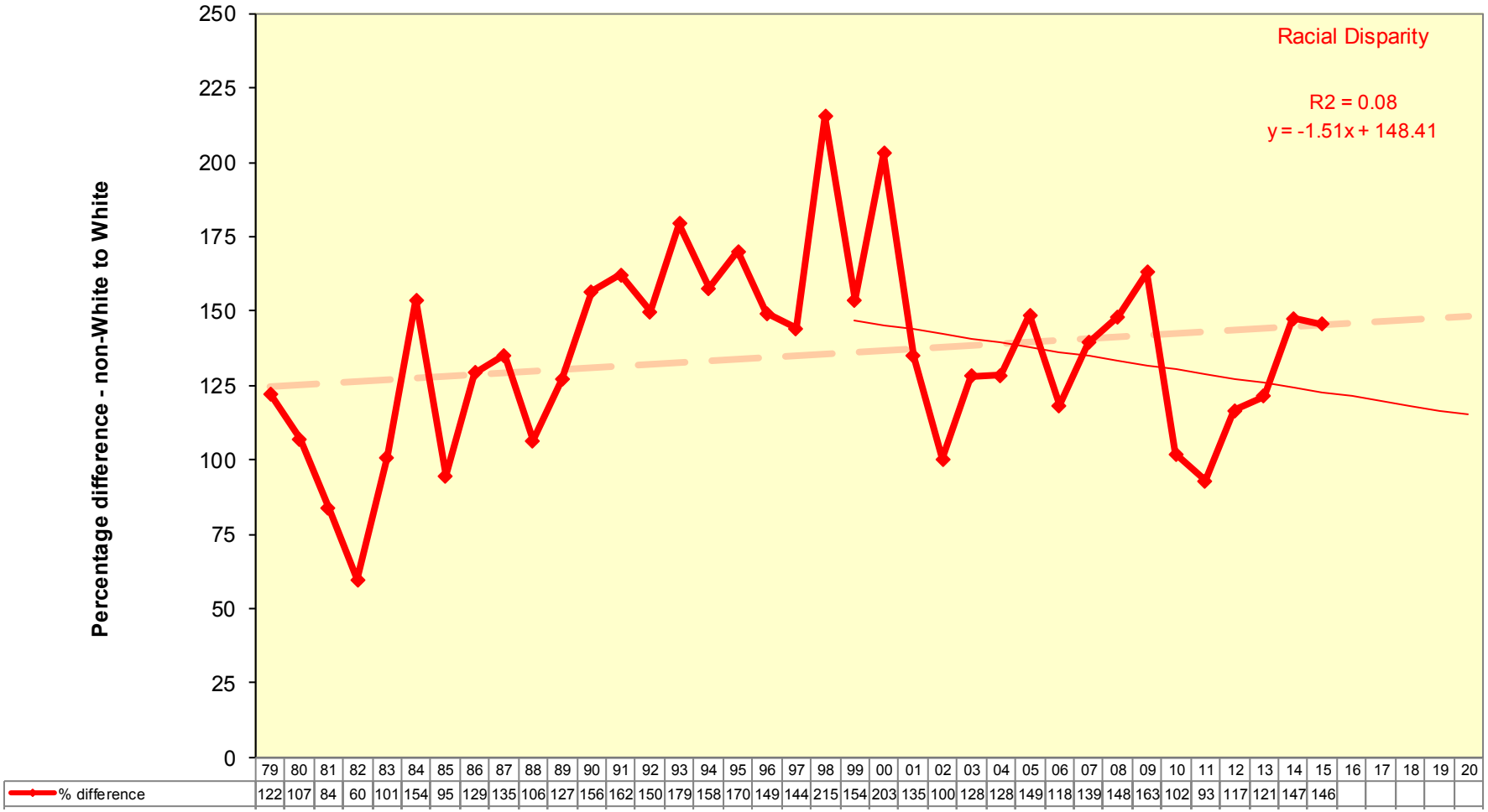
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	51% LT	24% LT	69% LT	NWM
105% GT		57% GT	37% LT	WM
31% GT	36% LT		60% LT	NWF
226% GT	58% LT	149% GT		WF

Figure 6.5 iv. Diabetes Mellitus: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	31	32	29	24	27	27	30	33	36	39	45	43	48	47	51	49	53	51	50	57	62	64	52	49	61	56	59	50	52	52	55	40	46	46	43	52	51					
W	14	16	16	15	14	11	16	14	15	19	20	17	18	19	18	19	20	21	20	18	25	21	22	25	27	24	24	23	22	21	21	20	24	21	19	21	21					

Figure 6.5 v. Diabetes Mellitus:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020

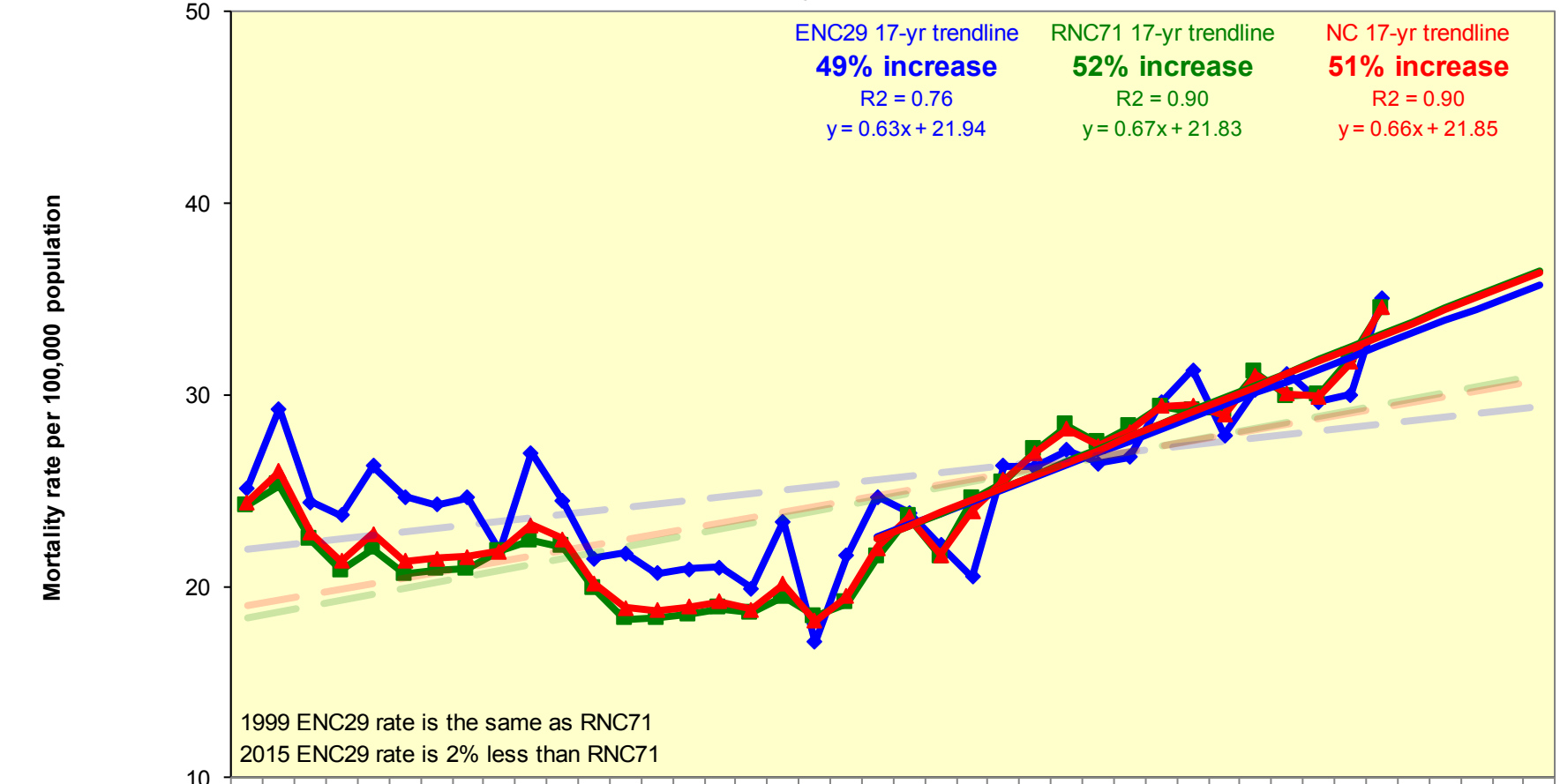


All Other Unintentional Injuries and Adverse Effects

- The mortality rate trend for unintentional injuries and adverse effects is increasing in ENC (49% over 17 years). The trends for RNC and NC are also increasing.
- The age-adjusted mortality rate trends for ENC, RNC, NC, and the US are all increasing. During the last 17 years, ENC has increased 35%, although it is 3% below RNC in 2015.
- The trends for White males and White females are both increasing (50% and 89% respectively over the 17-year period). The mortality rate trend for non-White males decreased 23% over 17 years. The trend for non-White females is not reliable.
- The White rate trend has increased 64% over the 17-year period. The non-White rate trend has dropped below the White but it is not reliable.
- Over the last 17 years, racial disparity has decreased in a 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 6.6 i. All Other Unintentional Injuries and Adverse Effects: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

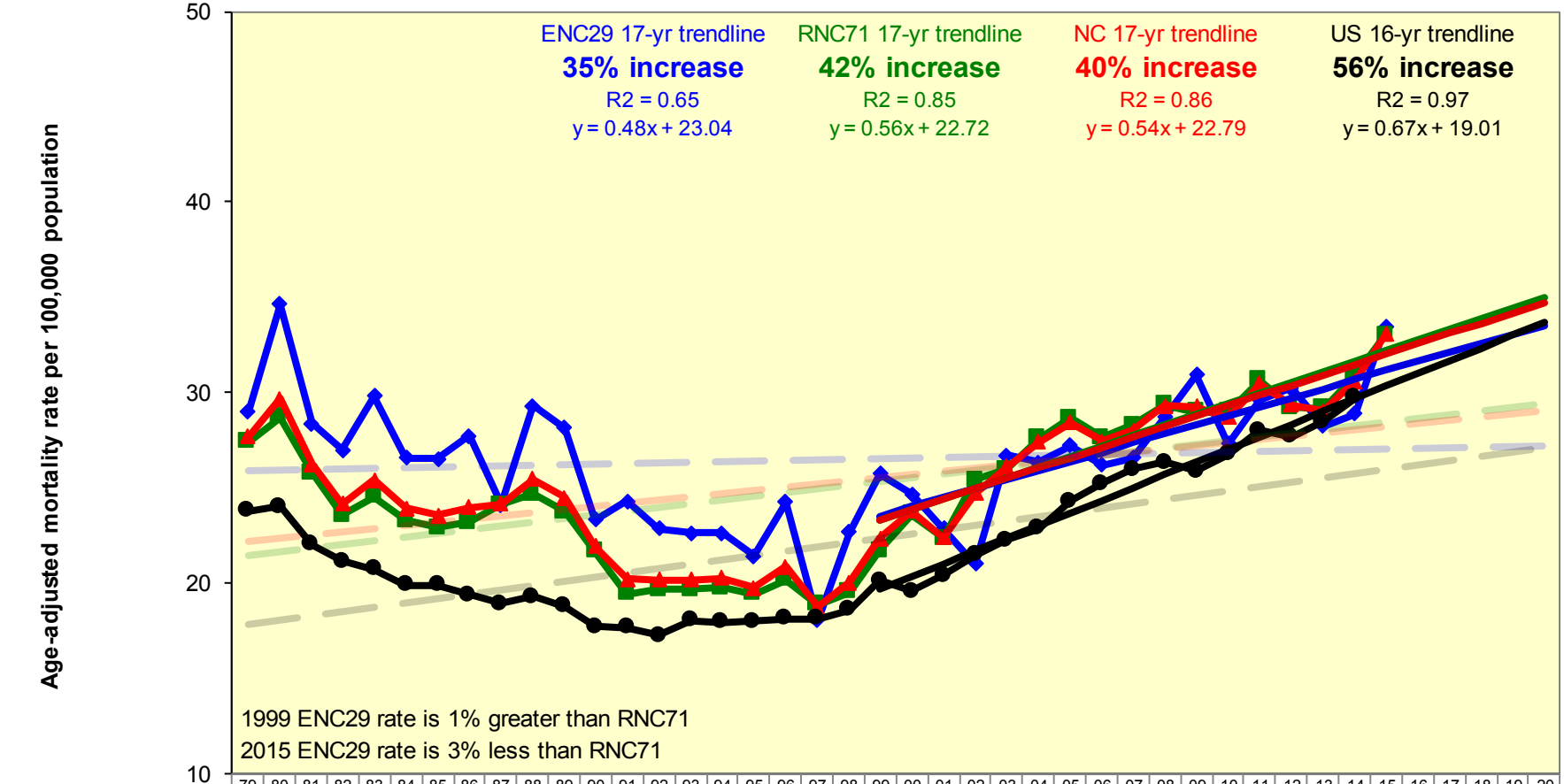


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	25	29	24	24	26	25	24	25	22	27	24	21	22	21	21	21	20	23	17	22	25	24	22	21	26	26	27	26	27	30	31	28	30	31	30	30	35					
RNC71	24	25	22	21	22	21	21	21	22	22	22	20	18	18	19	19	19	19	18	19	22	24	22	25	25	27	28	28	28	29	29	29	31	30	30	32	34					
NC	24	26	23	21	23	21	21	22	22	23	22	20	19	19	19	19	19	20	18	20	22	24	22	24	26	27	28	27	28	29	29	29	31	30	30	32	35					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	0% LT	0% LT	ENC29
0% GT		0% GT	RNC71
0% GT	0% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	2% GT	1% GT	ENC29
2% LT		0% LT	RNC71
1% LT	0% GT		NC

Figure 6.6 ii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

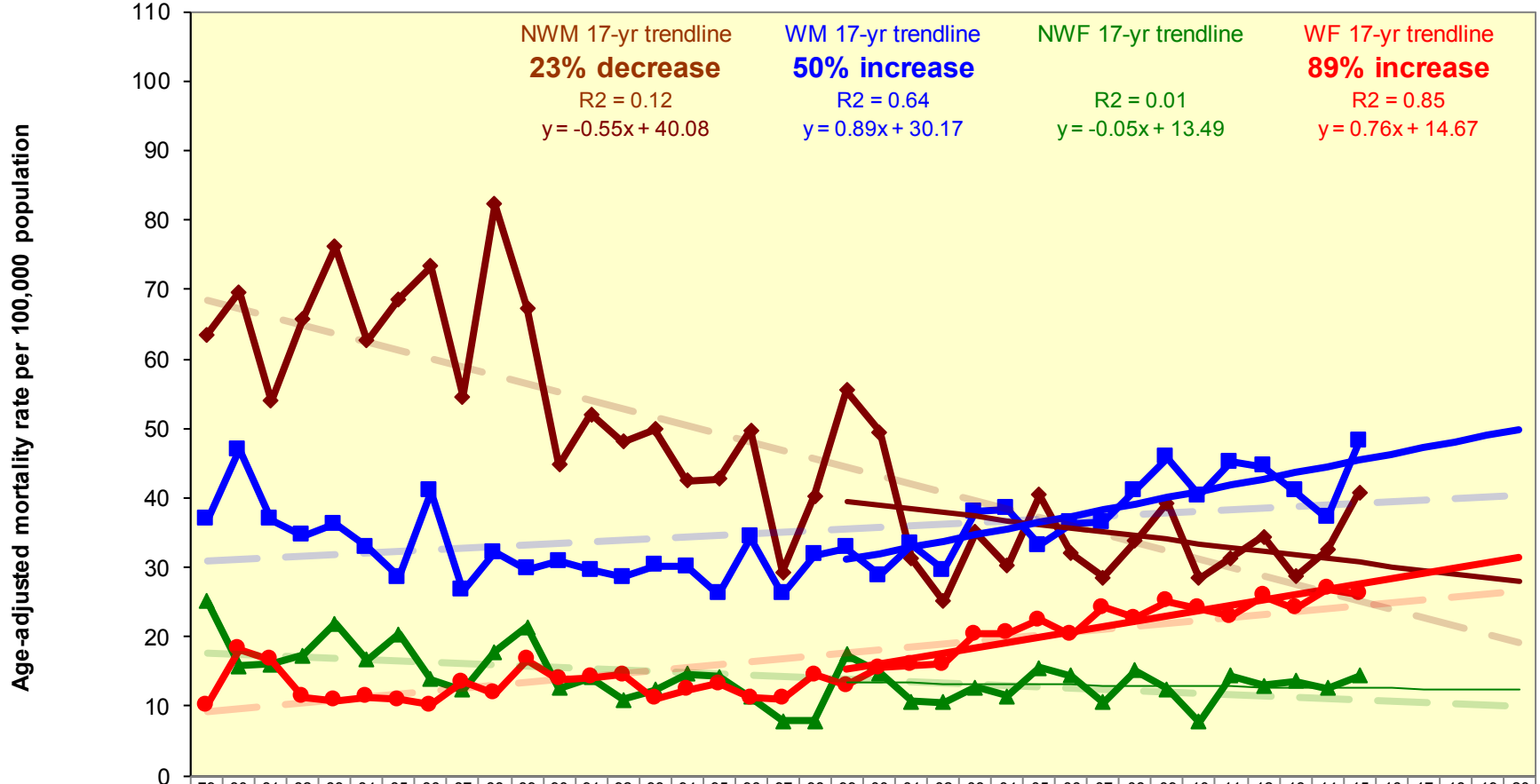


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	29	35	28	27	30	27	27	28	24	29	28	23	24	23	23	23	21	24	18	23	26	25	23	21	27	26	27	26	27	29	31	27	30	30	28	29	33					
RNC71	27	29	26	24	25	23	23	23	24	25	24	22	19	20	20	20	19	20	19	20	22	24	22	25	26	28	29	28	28	29	29	29	31	29	29	31	33					
NC	28	30	26	24	25	24	24	24	24	25	24	22	20	20	20	20	20	21	19	20	22	24	22	25	26	27	28	27	28	29	29	29	30	29	29	31	33					
US	24	24	22	21	21	20	20	19	19	19	19	18	18	17	18	18	18	18	18	19	20	20	20	21	22	23	24	25	26	26	26	27	28	28	28	30						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	1% LT	1% LT	17% LT	ENC29
1% GT		0% GT	16% LT	RNC71
1% GT	0% LT		17% LT	NC
21% GT	19% GT	20% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	3% GT	3% GT	3% LT	ENC29
3% LT		1% LT	6% LT	RNC71
2% LT	1% GT		6% LT	NC
3% GT	7% GT	6% GT		US

Figure 6.6 iii. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

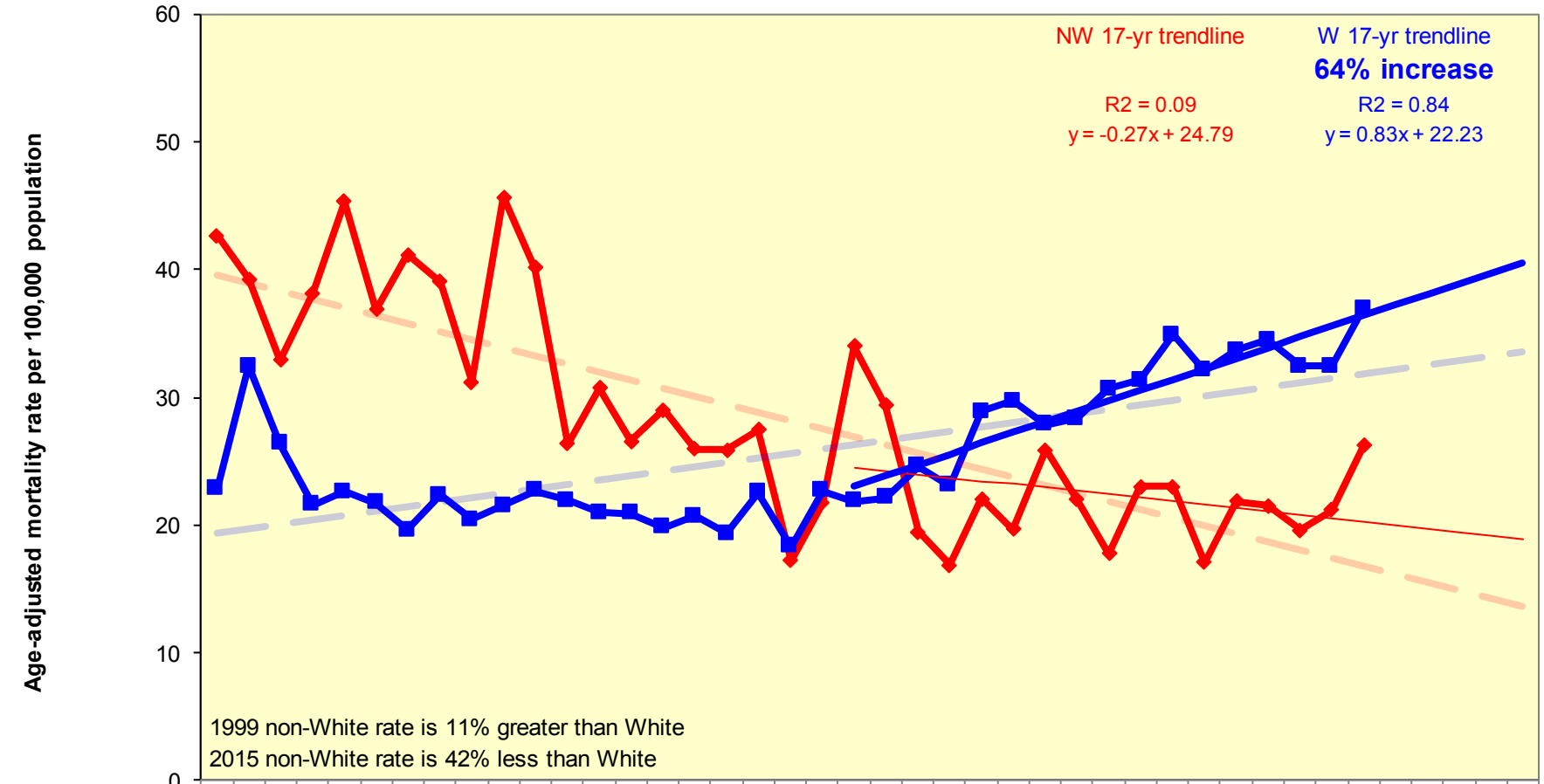


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	64	70	54	66	76	63	69	73	55	82	67	45	52	48	50	42	43	50	29	40	55	49	31	25	35	30	40	32	29	34	39	28	31	34	29	33	41					
WM	37	47	37	34	36	33	29	41	27	32	30	31	30	29	30	30	26	34	26	32	33	29	33	30	38	38	33	36	37	41	46	40	45	45	41	37	48					
NWF	25	16	16	17	22	17	20	14	12	18	21	13	14	11	12	15	14	11	8	8	18	15	11	11	13	11	16	14	11	15	13	8	14	13	14	13	14					
WF	10	18	17	11	11	11	11	10	13	12	17	14	14	14	11	12	13	11	11	15	13	15	16	16	20	21	22	20	24	23	25	24	23	26	24	27	26					

Comparison of Fitted Rates in 1999					
NWM	WM	NWF	WF		
	25% LT	66% LT	63% LT	NWM	
33% GT		55% LT	51% LT	WM	
197% GT	124% GT		9% GT	NWF	
173% GT	106% GT	8% LT		WF	

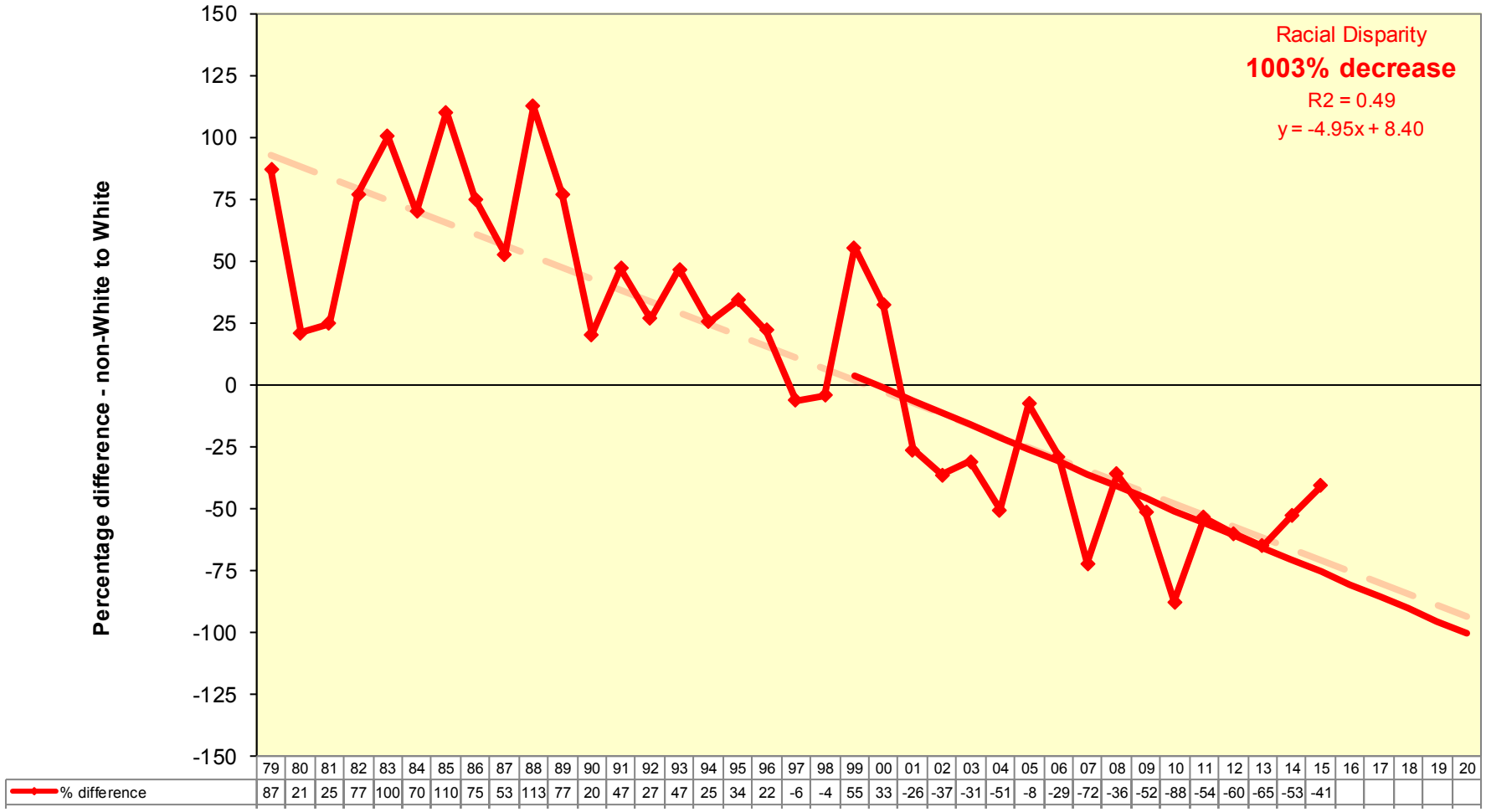
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	42% GT	59% LT	14% LT	NWM
30% LT		71% LT	40% LT	WM
146% GT	251% GT		112% GT	NWF
16% GT	65% GT	53% LT		WF

Figure 6.6 iv. All Other Unintentional Injuries and Adverse Effects: Trends in age-adjusted mortality rates by race for ENC29, 1979-201 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	43	39	33	38	45	37	41	39	31	46	40	26	31	27	29	26	26	27	17	22	34	29	19	17	22	20	26	22	18	23	23	17	22	22	20	21	26					
W	23	32	26	22	23	22	20	22	20	21	23	22	21	21	20	21	19	23	18	23	22	22	25	23	29	30	28	28	31	31	35	32	34	34	32	32	37					

Figure 6.6 v. All Other Unintentional Injuries and Adverse Effects: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



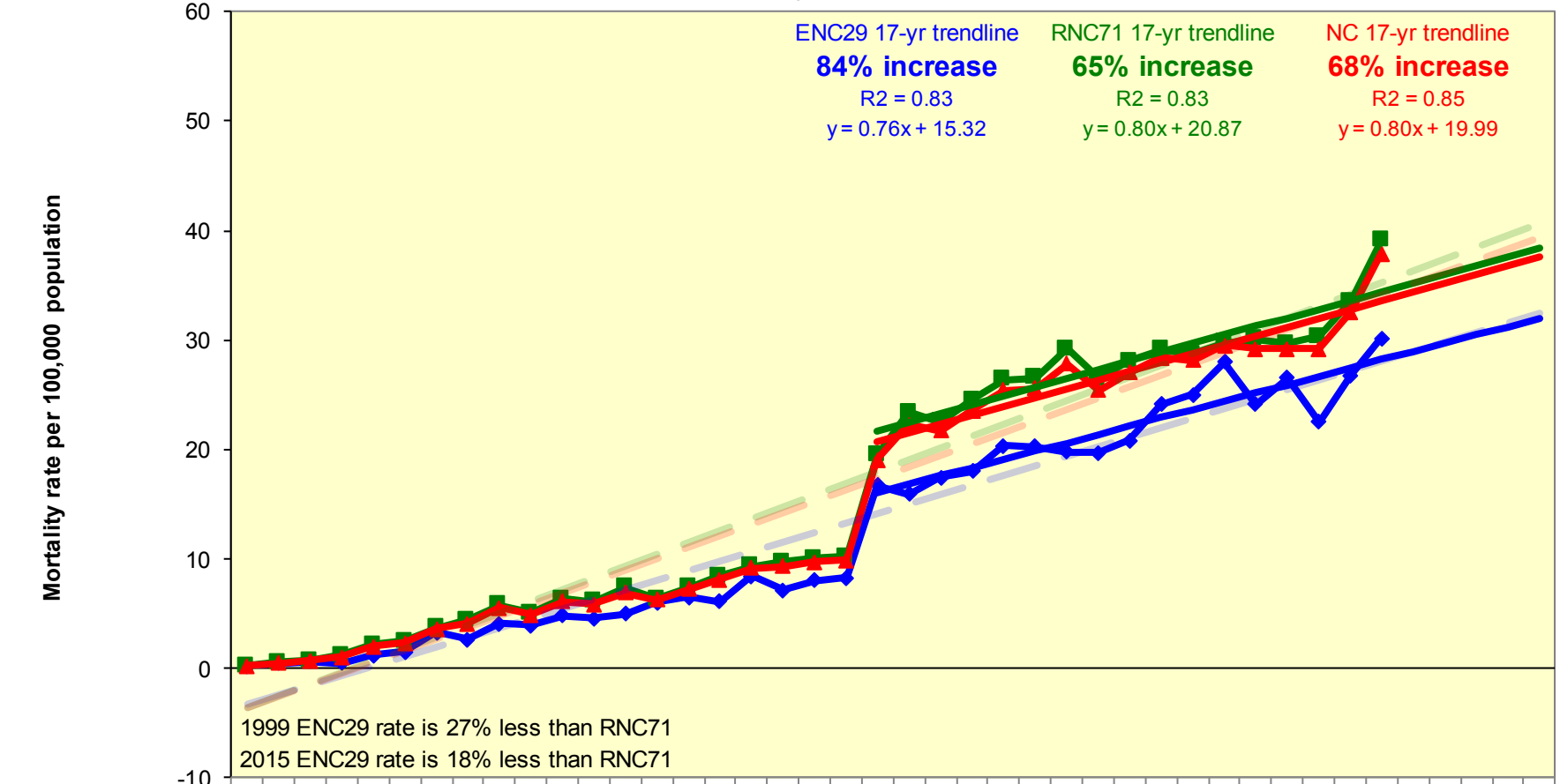
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	87	21	25	77	100	70	110	75	53	113	77	20	47	27	47	25	34	22	-6	-4	55	33	-26	-37	-31	-51	-8	-29	-72	-36	-52	-88	-54	-60	-65	-53	-41					

Alzheimer's Disease

- The Alzheimer's mortality rate trend for ENC shows a 84% increase over the 17 year period. ENC's rate of increase was larger than RNC and NC but the rate for ENC is 18% less than RNC.
- In 2015, the age-adjusted rate trend for ENC is 6% below the US rate, but has increased 38% over the 17-year period. The ENC rate is 24% less than RNC.
- The 17-year mortality rate trends for White and non-White females are greater than White males and non-White males. Rate trends for all demographic groups are increasing but non-White males are increasing the most and will soon converge with non -White females.
- The non-White mortality rate trend line for Alzheimer's remains 4% less than the White mortality rate in 2015 but the 17-year trend is increasing for both and suggests convergence.
- The 17-year moderately-reliable trend suggests 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 6.7 i. Alzheimer's Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

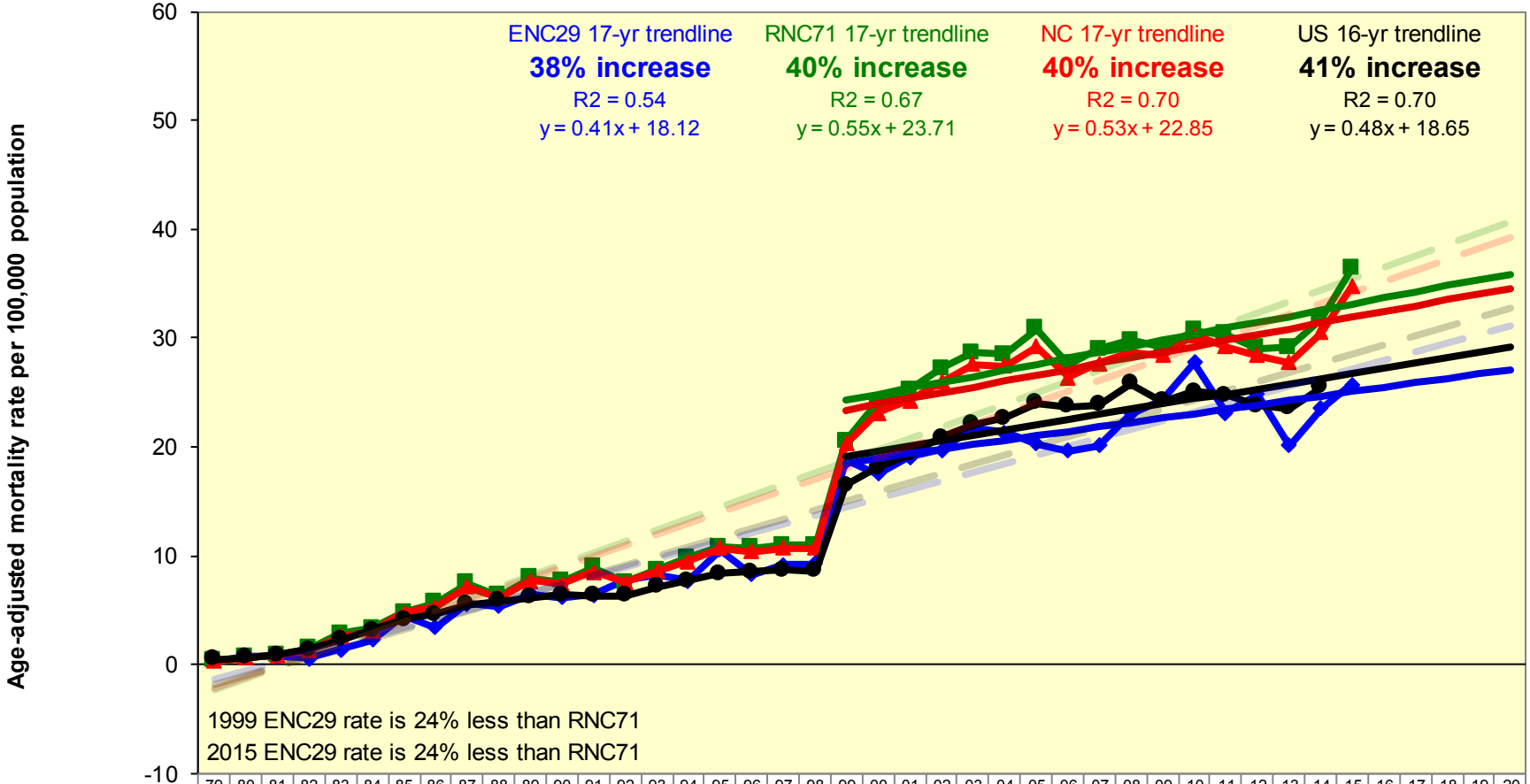


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	0	0	1	0	1	2	3	3	4	4	5	5	5	6	7	6	8	7	8	8	17	16	17	18	20	20	20	20	21	24	25	28	24	27	22	27	30					
RNC71	0	1	1	1	2	3	4	4	6	5	6	6	7	6	7	8	9	10	10	10	19	23	23	25	26	27	29	26	28	29	29	30	30	30	30	34	39					
NC	0	1	1	1	2	2	4	4	6	5	6	6	7	6	7	8	9	9	10	10	19	22	22	24	25	26	28	25	27	28	28	30	29	29	29	33	38					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	36% GT	30% GT	ENC29
27% LT		4% LT	RNC71
23% LT	4% GT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	23% GT	19% GT	ENC29
18% LT		3% LT	RNC71
16% LT	3% GT		NC

Figure 6.7 ii. Alzheimer's Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

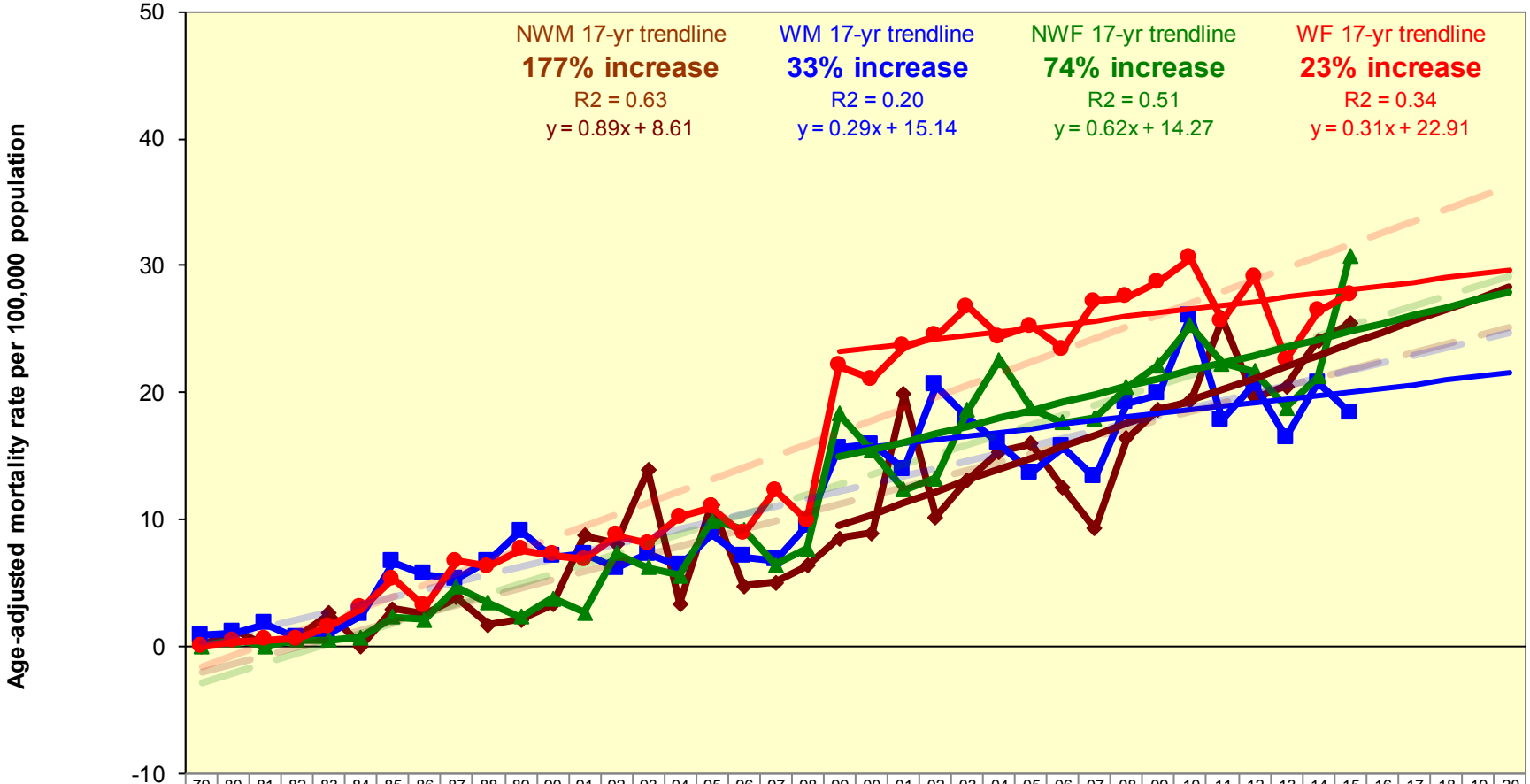


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	0	1	1	1	1	2	5	3	6	5	6	6	6	8	8	8	10	8	9	9	19	18	19	20	22	21	20	20	20	23	24	28	23	25	20	24	26					
RNC71	0	1	1	1	3	3	5	6	7	6	8	8	9	8	9	10	11	11	11	11	21	24	25	27	29	28	31	28	29	30	29	31	30	29	29	32	36					
NC	0	1	1	1	3	3	5	5	7	6	8	7	9	8	9	9	11	10	11	11	20	23	24	26	28	27	29	26	28	29	28	30	29	28	28	30	35					
US	0	1	1	1	2	3	4	5	5	6	6	6	6	6	7	8	8	8	9	9	16	18	19	21	22	23	24	24	24	26	24	25	25	24	24	25						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	31% GT	26% GT	3% GT	ENC29
24% LT		4% LT	21% LT	RNC71
21% LT	4% GT		18% LT	NC
3% LT	27% GT	23% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	32% GT	27% GT	7% GT	ENC29
24% LT		4% LT	19% LT	RNC71
21% LT	4% GT		16% LT	NC
6% LT	24% GT	19% GT		US

Figure 6.7 iii. Alzheimer's Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	0	1	0	1	3	0	3	2	4	2	2	3	9	8	14	3	11	5	5	6	8	9	20	10	13	15	16	12	9	16	19	19	26	20	21	24	25					
WM	1	1	2	1	1	2	7	6	5	7	9	7	7	6	7	6	9	7	7	9	16	16	14	21	18	16	14	16	13	19	20	26	18	21	16	21	18					
NWF	0	1	0	1	1	1	2	2	5	3	2	4	3	7	6	6	10	9	6	8	18	15	12	13	19	23	19	18	18	20	22	25	22	22	19	21	31					
WF	0	0	0	1	2	3	5	3	7	6	8	7	7	9	8	10	11	9	12	10	22	21	24	24	27	24	25	23	27	28	29	31	26	29	23	26	28					

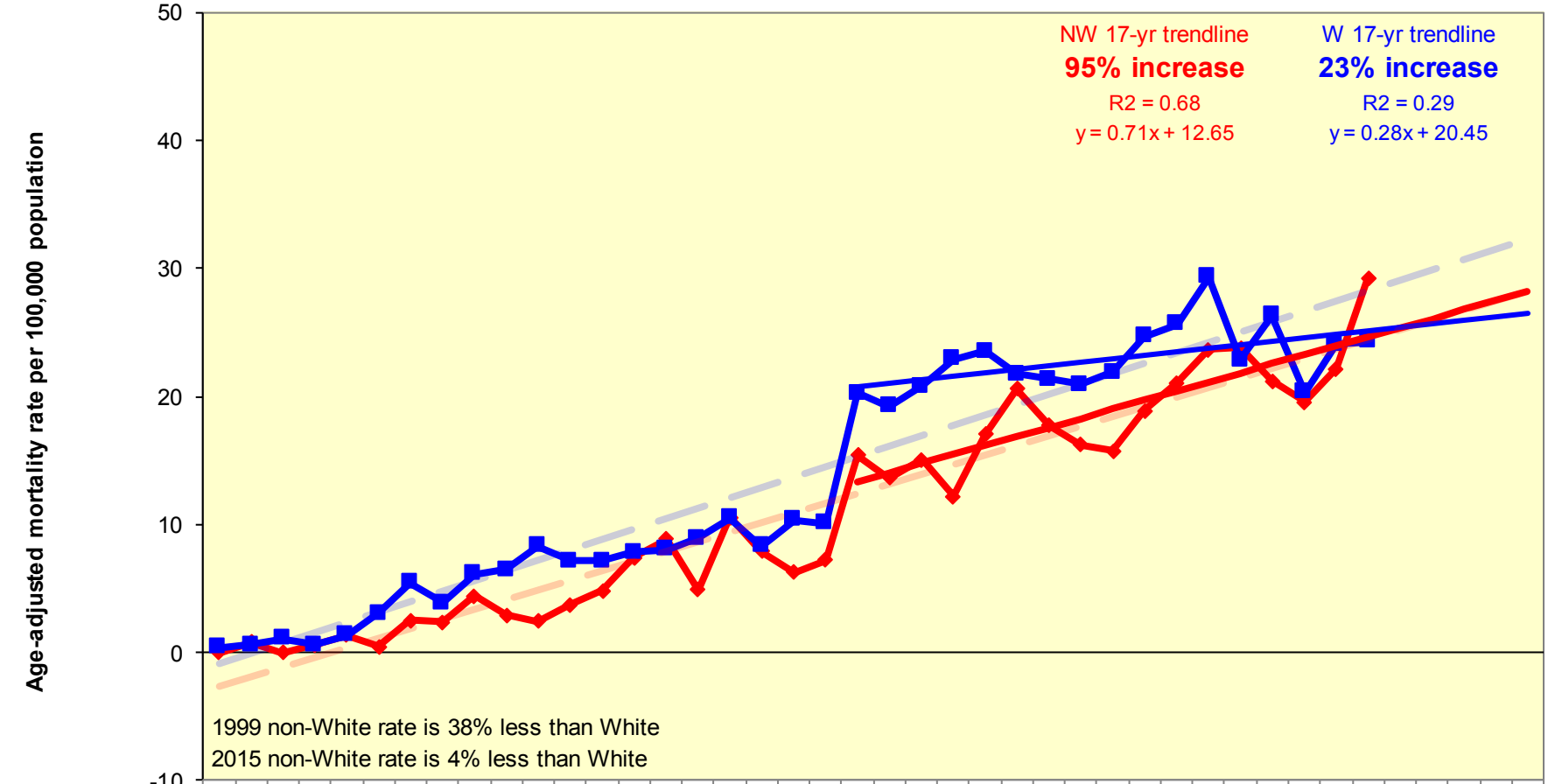
Comparison of Fitted Rates in 1999

NWM	WM	NWF	WF	
	76% GT	66% GT	166% GT	NWM
43% LT		6% LT	51% GT	WM
40% LT	6% GT		61% GT	NWF
62% LT	34% LT	38% LT		WF

Comparison of Fitted Rates in 2015

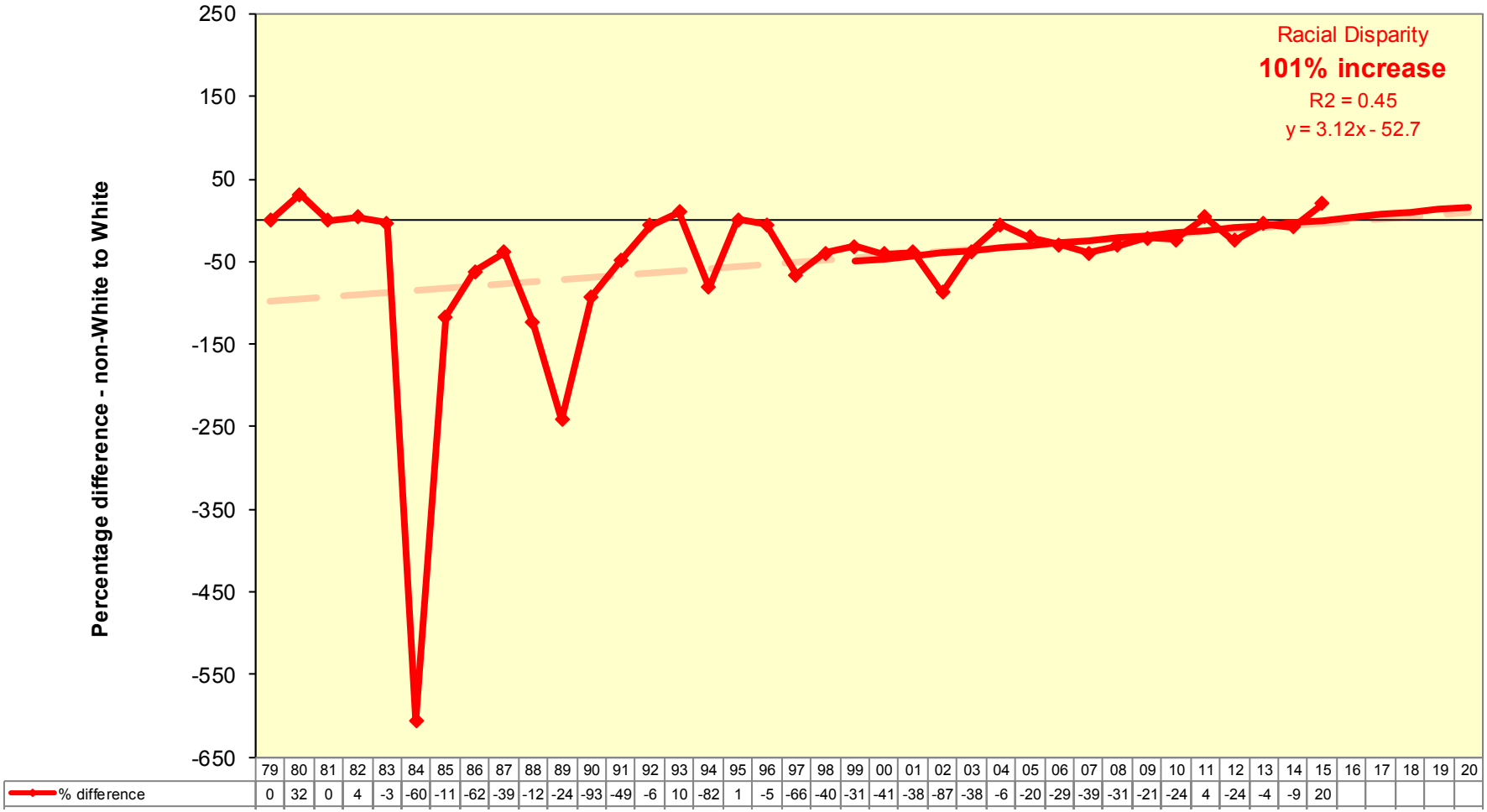
NWM	WM	NWF	WF	
	14% LT	5% GT	21% GT	NWM
16% GT		22% GT	41% GT	WM
5% LT	18% LT		15% GT	NWF
18% LT	29% LT	13% LT		WF

Figure 6.7 iv. Alzheimer's Disease:
Trends in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	0	1	0	1	1	0	3	2	4	3	2	4	5	7	9	5	11	8	6	7	15	14	15	12	17	21	18	16	16	19	21	24	24	21	20	22	29					
W	0	1	1	1	1	3	5	4	6	6	8	7	7	8	8	9	10	8	10	10	20	19	21	23	24	22	21	21	22	25	26	29	23	26	20	24	24					

Figure 6.7 v. Alzheimer's Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



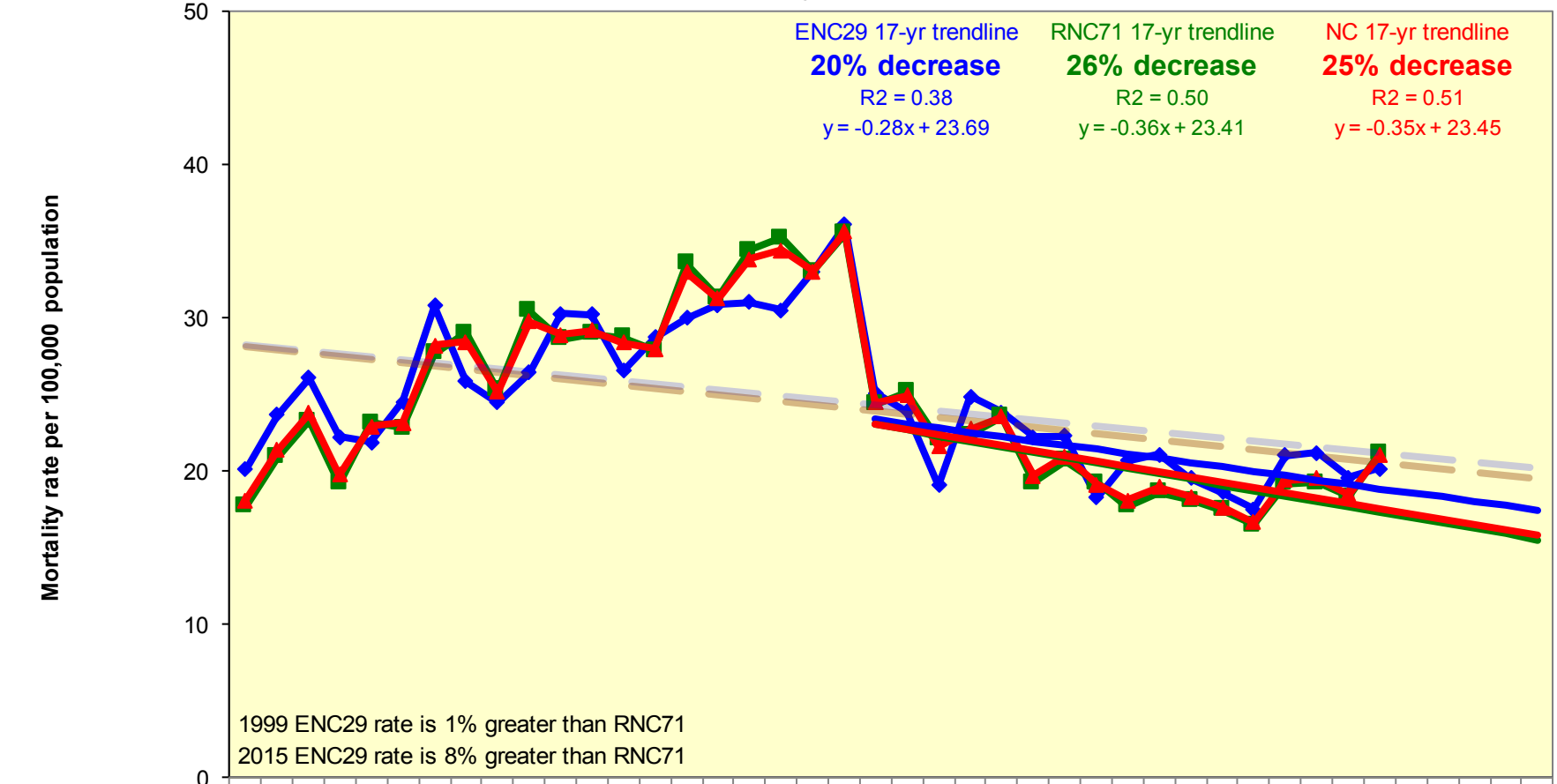
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	0	32	0	4	-3	-60	-11	-62	-39	-12	-24	-93	-49	-6	10	-82	1	-5	-66	-40	-31	-41	-38	-87	-38	-6	-20	-29	-39	-31	-21	-24	4	-24	-4	-9	20					

Pneumonia and Influenza

- The mortality rate trend for pneumonia and influenza for ENC, RNC and NC have all declined over the 17 year period. The ENC rate in 2015 is 8% higher than the RNC rate.
- The age-adjusted mortality rate trends for all NC regions are similar and are decreasing at about the same pace. The ENC rate is 22% higher than the US rate.
- The age-adjusted mortality rate trend for all four demographics are decreasing. The trends for non-White males and White males are the highest. Trend lines predict convergence of all four groups in the future.
- The Non-White mortality rate is 14% less than the White rate in 2015. Both are decreasing.
- The 17-year decreasing 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, 1979-2015 with projections to 2020

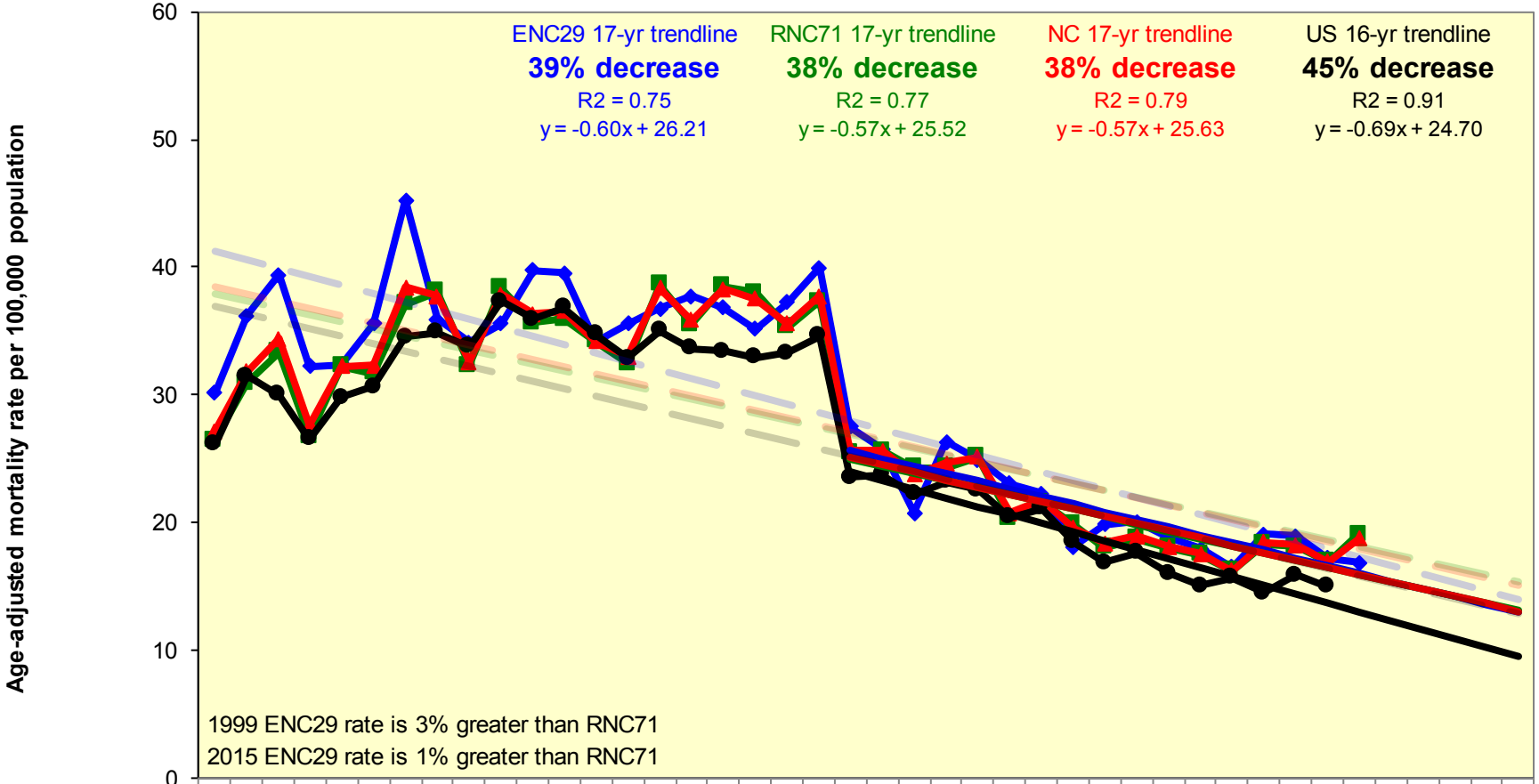


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	20	24	26	22	22	25	31	26	24	26	30	30	27	29	30	31	31	31	33	36	25	24	19	25	24	22	22	18	21	21	20	19	18	21	21	20	20					
RNC71	18	21	23	19	23	23	28	29	25	30	29	29	29	28	34	31	34	35	33	36	24	25	22	22	24	19	21	19	18	19	18	17	17	19	19	18	21					
NC	18	21	24	20	23	23	28	28	25	30	29	29	28	28	33	31	34	34	33	36	25	25	22	23	24	20	21	19	18	19	18	18	17	19	20	19	21					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	1% LT	1% LT	ENC29
1% GT		0% GT	RNC71
1% GT	0% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	8% LT	7% LT	ENC29
8% GT		1% GT	RNC71
7% GT	1% LT		NC

Figure 6.8 ii. Pneumonia and Influenza: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

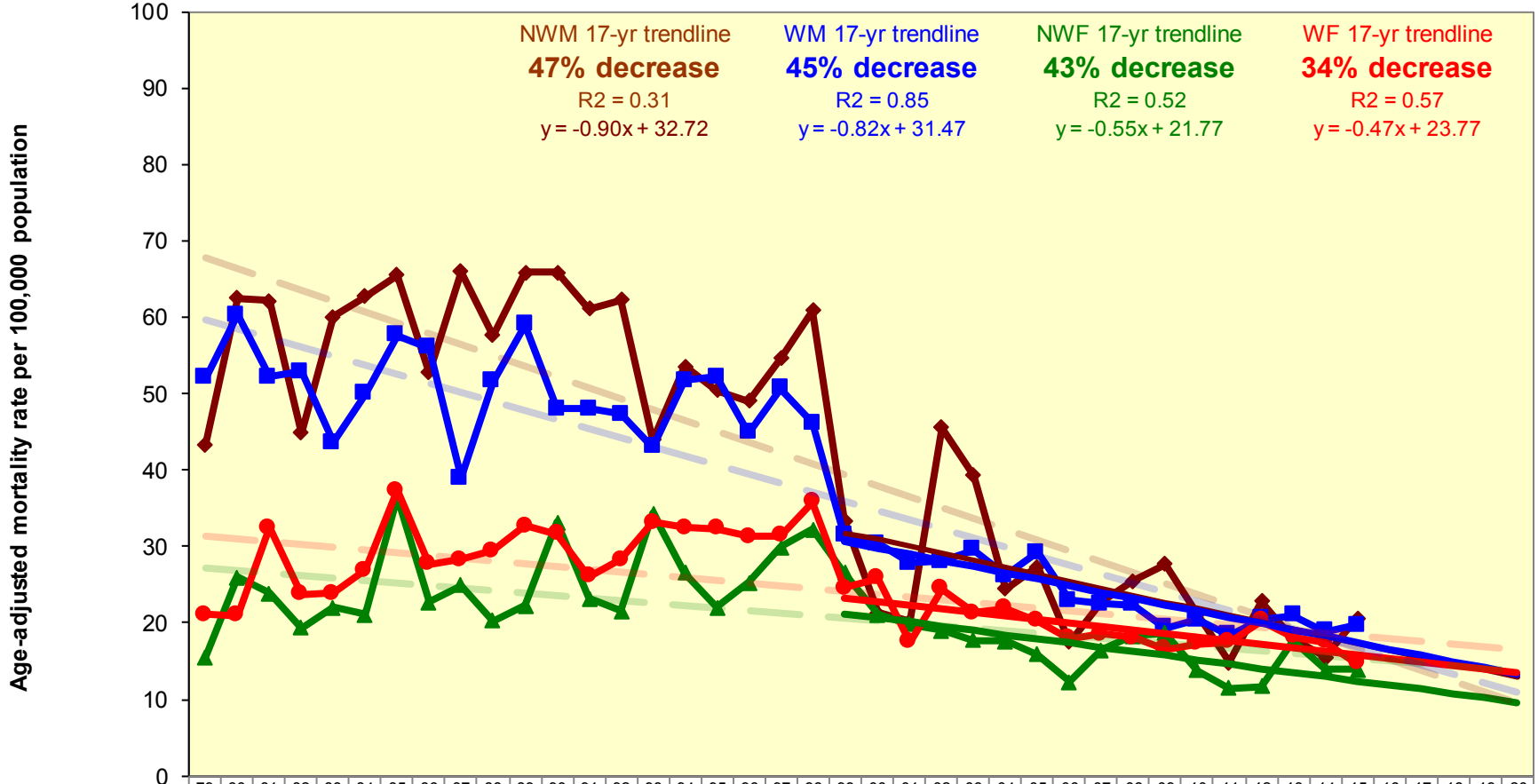


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	30	36	39	32	32	36	45	36	34	36	40	40	34	36	37	38	37	35	37	40	27	26	21	26	25	23	22	18	20	20	19	18	16	19	19	17	17					
RNC71	26	31	33	27	32	32	37	38	32	38	36	36	34	32	39	36	39	38	35	37	25	26	24	24	25	20	22	20	18	19	18	17	16	18	18	17	19					
NC	27	32	34	28	32	32	38	38	33	38	36	37	34	33	38	36	38	38	36	38	26	26	24	25	25	21	22	20	18	19	18	18	16	18	18	17	19					
US	26	31	30	27	30	31	35	35	34	37	36	37	35	33	35	34	33	33	33	35	24	24	22	23	23	20	21	18	17	18	16	15	16	14	16	15						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	3% LT	2% LT	6% LT	ENC29
3% GT		0% GT	3% LT	RNC71
2% GT	0% LT		4% LT	NC
6% GT	3% GT	4% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	1% LT	1% LT	18% LT	ENC29
1% GT		0% GT	17% LT	RNC71
1% GT	0% LT		17% LT	NC
22% GT	21% GT	21% GT		US

Figure 6.8 iii. Pneumonia and Influenza: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	43	63	62	45	60	63	66	53	66	58	66	66	61	62	44	54	50	49	55	61	33	21	20	46	39	24	27	17	23	26	28	21	15	23	18	15	21					
WM	52	60	52	53	44	50	58	56	39	52	59	48	48	47	43	52	52	45	51	46	31	30	28	28	30	26	29	23	23	22	19	20	18	21	21	19	20					
NWF	15	26	24	19	22	21	36	23	25	20	22	33	23	22	34	27	22	25	30	32	27	21	20	19	18	18	16	12	16	18	19	14	11	12	18	14	14					
WF	21	21	32	24	24	27	37	28	28	29	33	32	26	28	33	32	32	31	31	36	25	26	17	25	21	22	20	18	19	18	17	17	18	20	18	17	15					

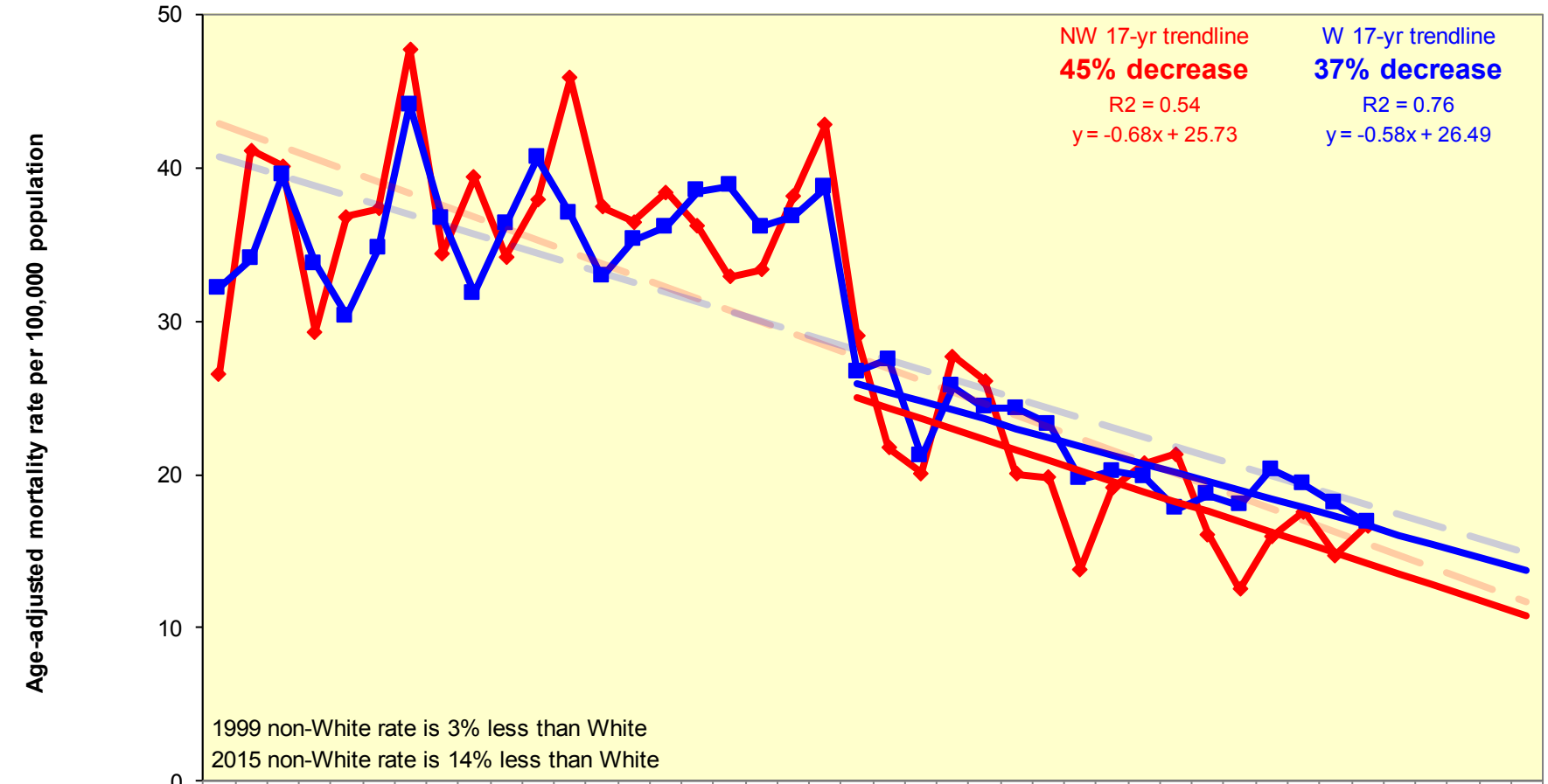
Comparison of Fitted Rates in 1999

NWM	WM	NWF	WF	
	4% LT	33% LT	27% LT	NWM
4% GT		31% LT	24% LT	WM
50% GT	45% GT		9% GT	NWF
38% GT	32% GT	8% LT		WF

Comparison of Fitted Rates in 2015

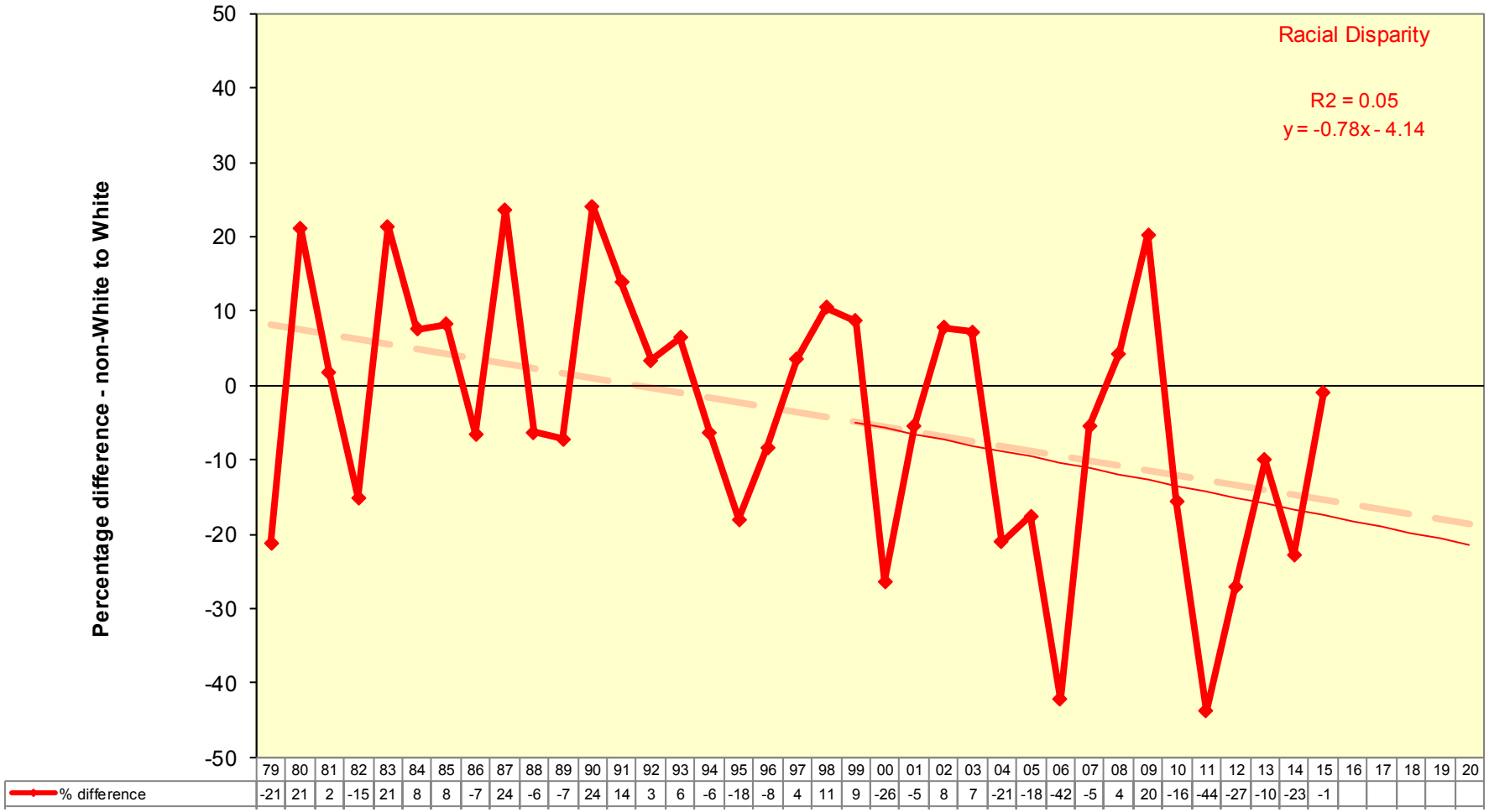
NWM	WM	NWF	WF	
	0% GT	29% LT	11% LT	NWM
0% LT		29% LT	11% LT	WM
41% GT	41% GT		26% GT	NWF
12% GT	12% GT	20% LT		WF

Figure 6.8 iv. Pneumonia and Influenza: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	27	41	40	29	37	37	48	34	39	34	38	46	37	36	38	36	33	33	38	43	29	22	20	28	26	20	20	14	19	21	21	16	12	16	18	15	17					
W	32	34	39	34	30	35	44	37	32	36	41	37	33	35	36	38	39	36	37	39	27	27	21	26	24	24	23	20	20	20	18	19	18	20	19	18	17					

Figure 6.8 v. Pneumonia and Influenza: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



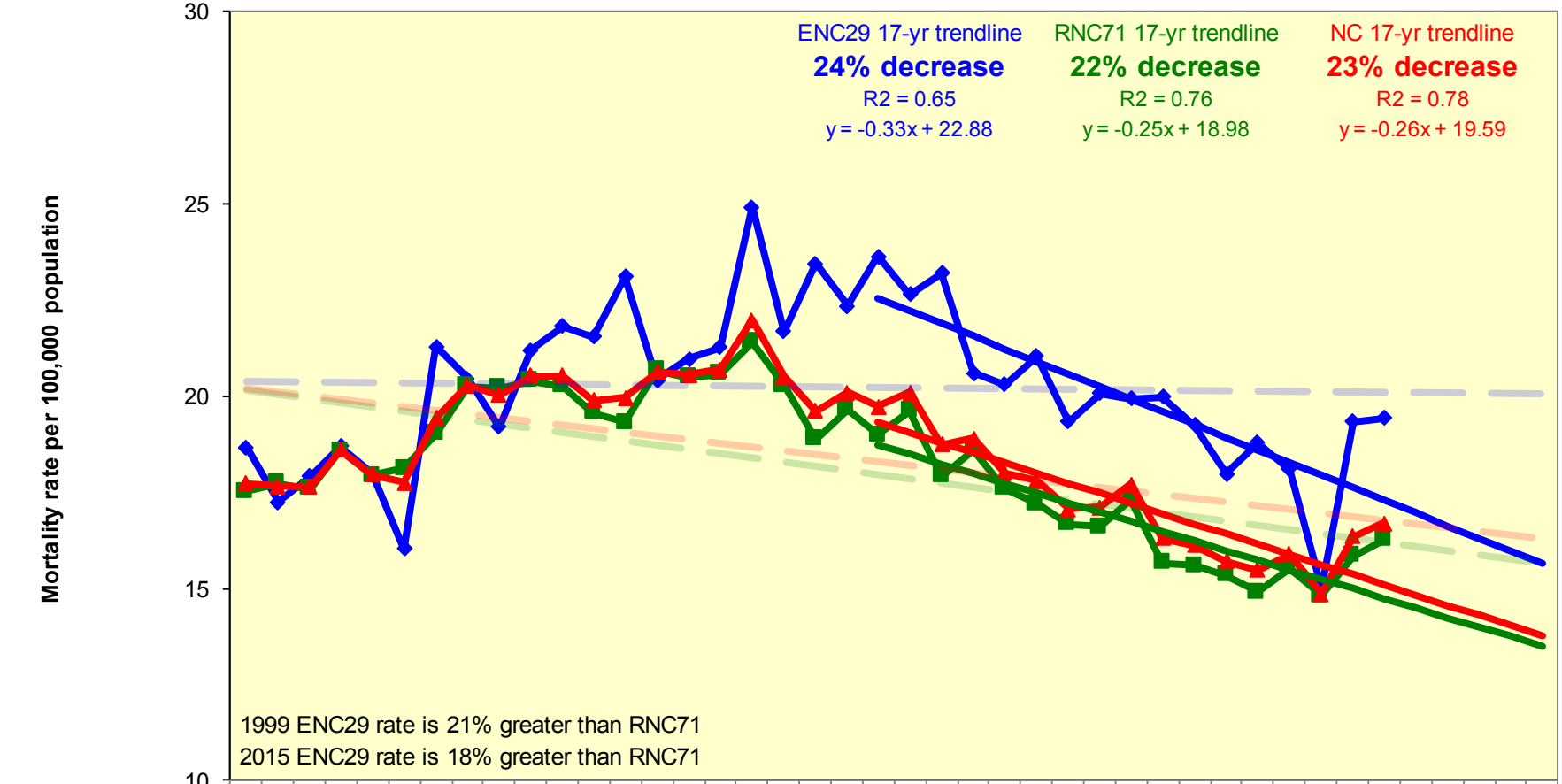
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	-21	21	2	-15	21	8	8	-7	24	-6	-7	24	14	3	6	-6	-18	-8	4	11	9	-26	-5	8	7	-21	-18	-42	-5	4	20	-16	-44	-27	-10	-23	-1					

Cancer - Colon, Rectum, Anus

- The 17-year rate trends for colon cancer for ENC, RNC and NC have all declined over the period. In 2015 ENC's rate was 18% greater than RNC.
- The age-adjusted mortality rate trend for colon cancer for ENC has declined 39% over the 17-year period. The ENC rate is the highest (10% greater than RNC) but is projected to converge with the NC and RNC trends.
- The non-White male mortality rate trend is the highest of the demographic groups and is decreasing the most slowly. White males and non-White females are about 39% and 46% less than non-White males, respectively. White females have the lowest rate trend.
- The non-White rate in 2015 is 43% greater than the White rate, but both are declining.
- 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 6.9 i. Cancer - Colon, Rectum, Anus: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

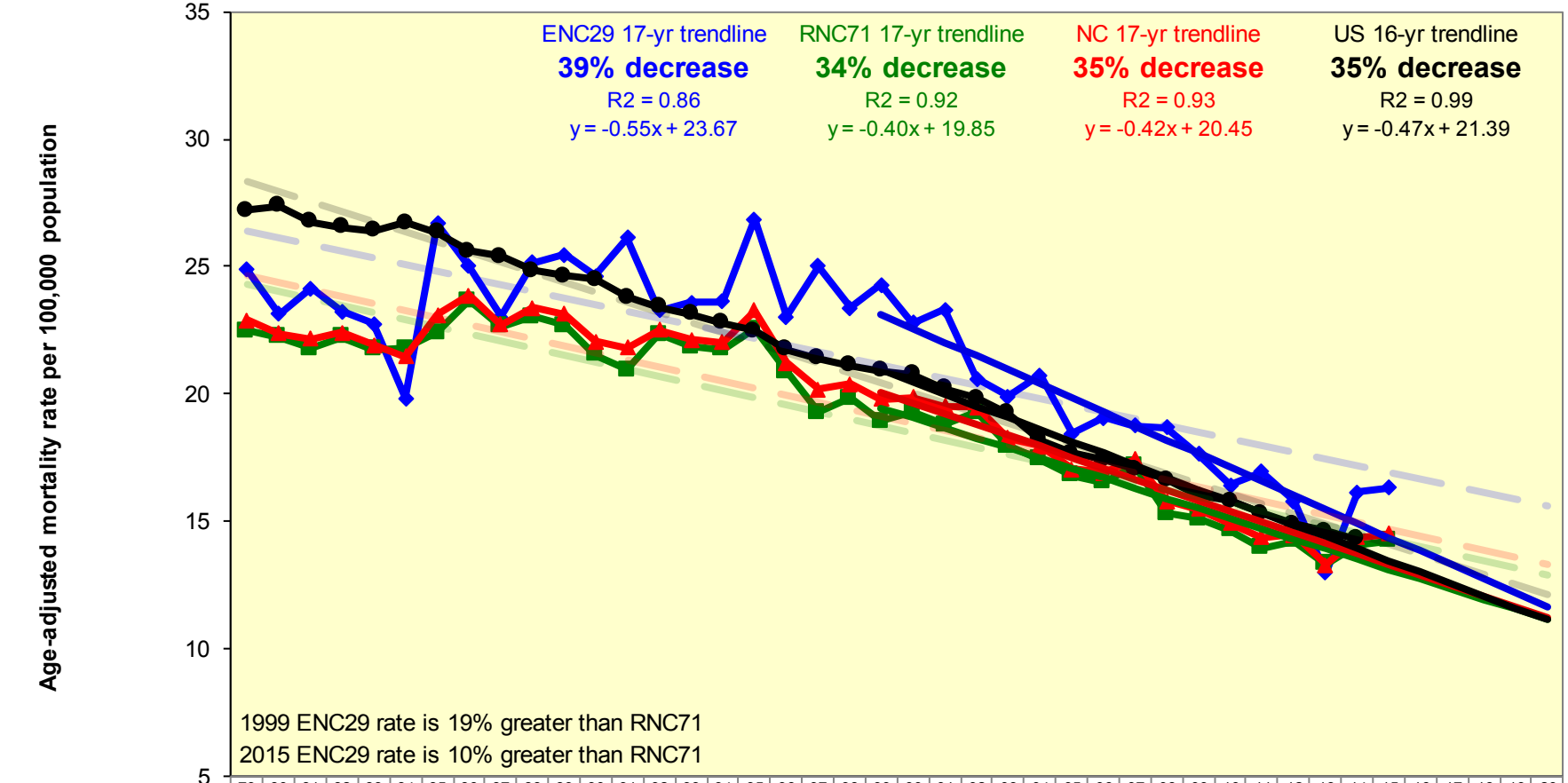


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	19	17	18	19	18	16	21	20	19	21	22	22	23	20	21	21	25	22	23	22	24	23	23	21	20	21	19	20	20	20	19	18	19	18	15	19	19					
RNC71	18	18	18	19	18	18	19	20	20	20	20	20	19	21	20	21	21	20	19	20	19	20	18	19	18	17	17	17	17	16	16	15	15	16	15	16	16					
NC	18	18	18	19	18	18	19	20	20	21	21	20	20	21	21	21	22	21	20	20	20	20	19	19	18	18	17	17	18	16	16	16	15	16	15	16	17					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	17% LT	14% LT	ENC29
21% GT		3% GT	RNC71
17% GT	3% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	15% LT	13% LT	ENC29
18% GT		2% GT	RNC71
15% GT	2% LT		NC

Figure 6.9 ii. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

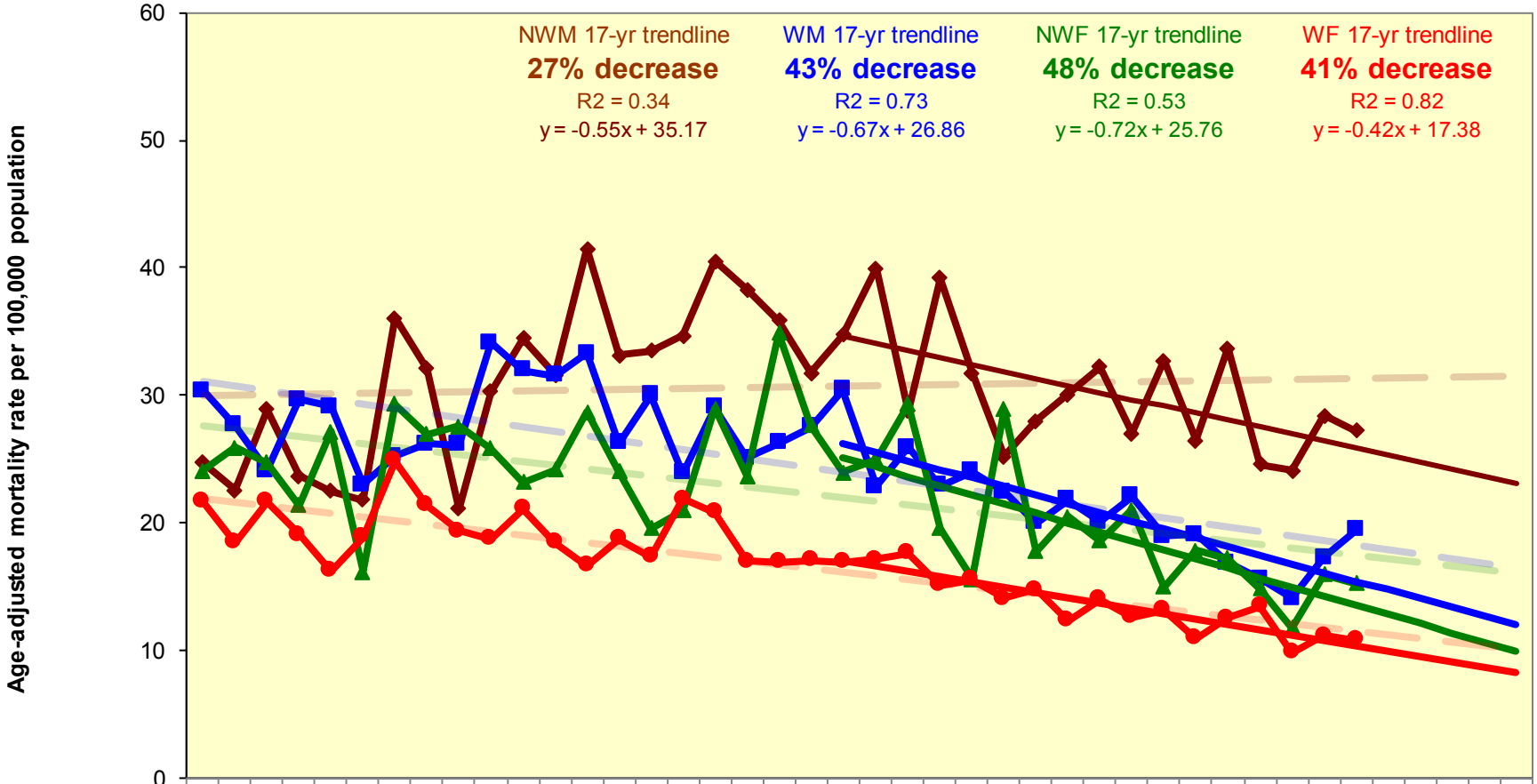


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	25	23	24	23	23	20	27	25	23	25	25	25	26	23	24	24	27	23	25	23	24	23	23	21	20	21	18	19	19	19	18	16	17	16	13	16	16					
RNC71	22	22	22	22	22	22	22	24	23	23	23	22	21	22	22	22	23	21	19	20	19	19	19	19	18	17	17	17	17	15	15	15	14	14	13	14	14					
NC	23	22	22	22	22	21	23	24	23	23	23	22	22	22	22	22	23	21	20	20	20	20	19	19	18	18	17	17	17	16	15	15	14	14	13	14	14					
US	27	27	27	27	26	27	26	26	25	25	25	24	24	23	23	23	22	22	21	21	21	21	20	20	19	18	18	17	17	17	16	16	15	15	15	14						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	16% LT	14% LT	10% LT	ENC29
19% GT		3% GT	8% GT	RNC71
16% GT	3% LT		5% GT	NC
11% GT	7% LT	4% LT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	9% LT	8% LT	7% LT	ENC29
10% GT		1% GT	3% GT	RNC71
9% GT	1% LT		1% GT	NC
7% GT	3% LT	1% LT		US

Figure 6.9 iii. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	25	23	29	24	23	22	36	32	21	30	34	32	42	33	33	35	41	38	36	32	35	40	29	39	32	25	28	30	32	27	33	26	34	25	24	28	27					
WM	30	28	24	30	29	23	25	26	26	34	32	32	33	26	30	24	29	25	26	27	30	23	26	23	24	22	20	22	20	22	19	19	17	16	14	17	19					
NWF	24	26	25	21	27	16	29	27	28	26	23	24	29	24	20	21	29	24	35	28	24	25	29	20	16	29	18	20	19	21	15	18	17	15	12	16	15					
WF	22	18	22	19	16	19	25	21	19	19	21	18	17	19	17	22	21	17	17	17	17	17	18	15	16	14	15	12	14	13	13	11	13	13	10	11	11					

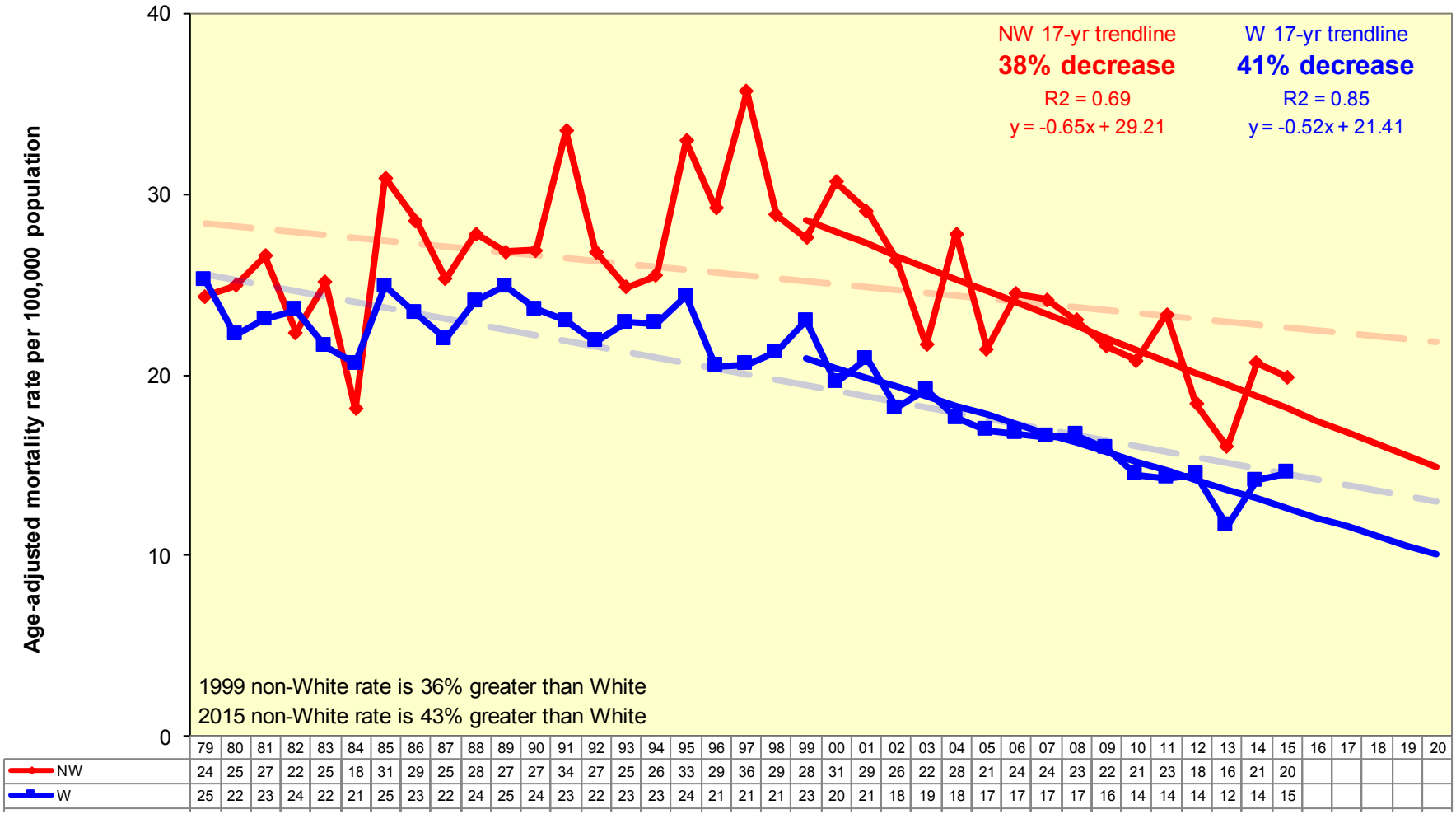
Comparison of Fitted Rates in 1999

NWM	WM	NWF	WF	
	24% LT	27% LT	51% LT	NWM
31% GT		4% LT	35% LT	WM
37% GT	4% GT		33% LT	NWF
102% GT	55% GT	48% GT		WF

Comparison of Fitted Rates in 2015

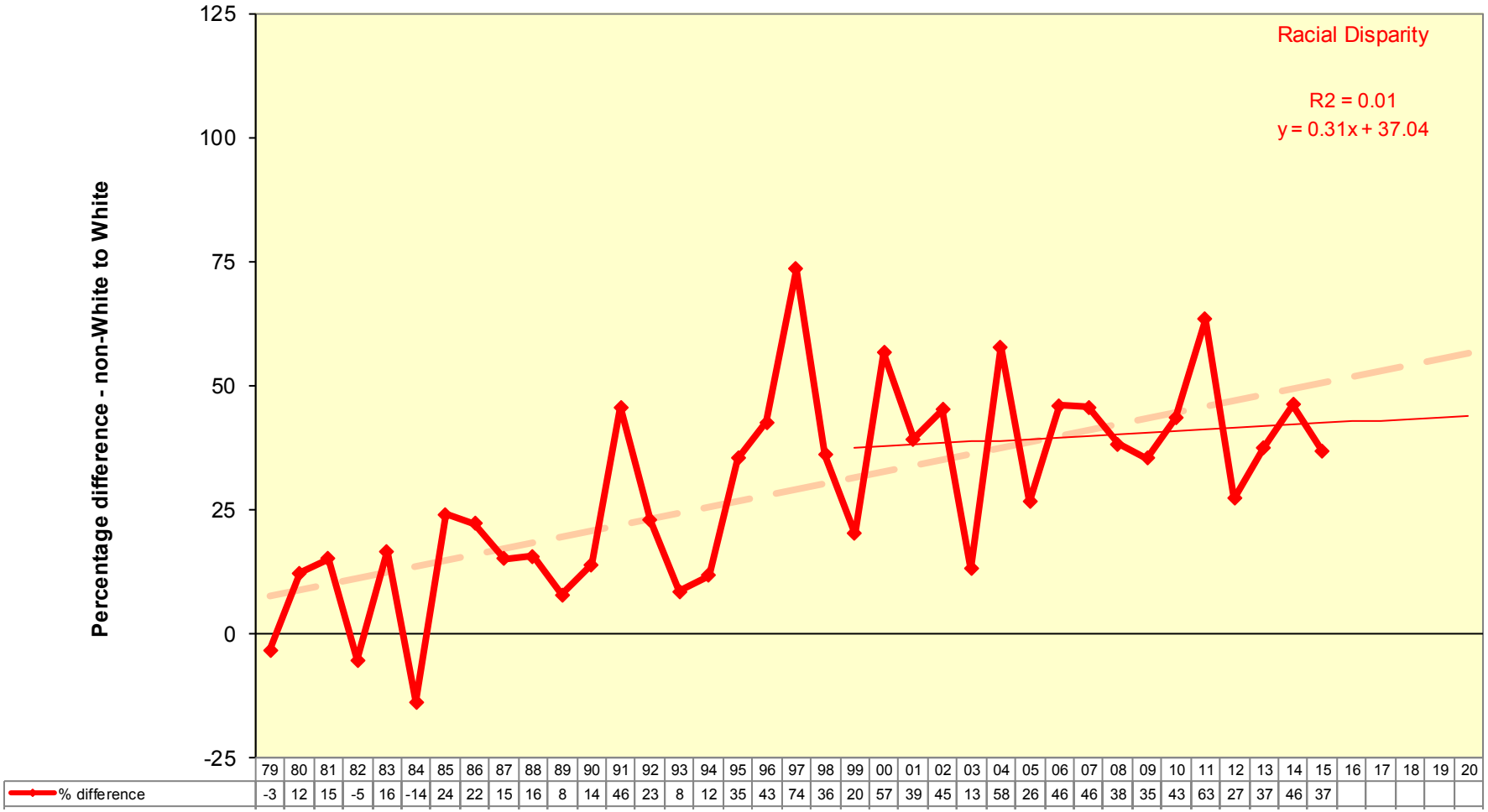
NWM	WM	NWF	WF	
	39% LT	46% LT	59% LT	NWM
64% GT		11% LT	33% LT	WM
85% GT	13% GT		25% LT	NWF
147% GT	50% GT	33% GT		WF

Figure 6.9 iv. Cancer - Colon, Rectum, Anus: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	24	25	27	22	25	18	31	29	25	28	27	27	34	27	25	26	33	29	36	29	28	31	29	26	22	28	21	24	24	23	22	21	23	18	16	21	20					
W	25	22	23	24	22	21	25	23	22	24	25	24	23	22	23	23	24	21	21	21	23	20	21	18	19	18	17	17	17	17	16	14	14	14	12	14	15					

Figure 6.9 v. Cancer - Colon, Rectum, Anus: Measuring disparity in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



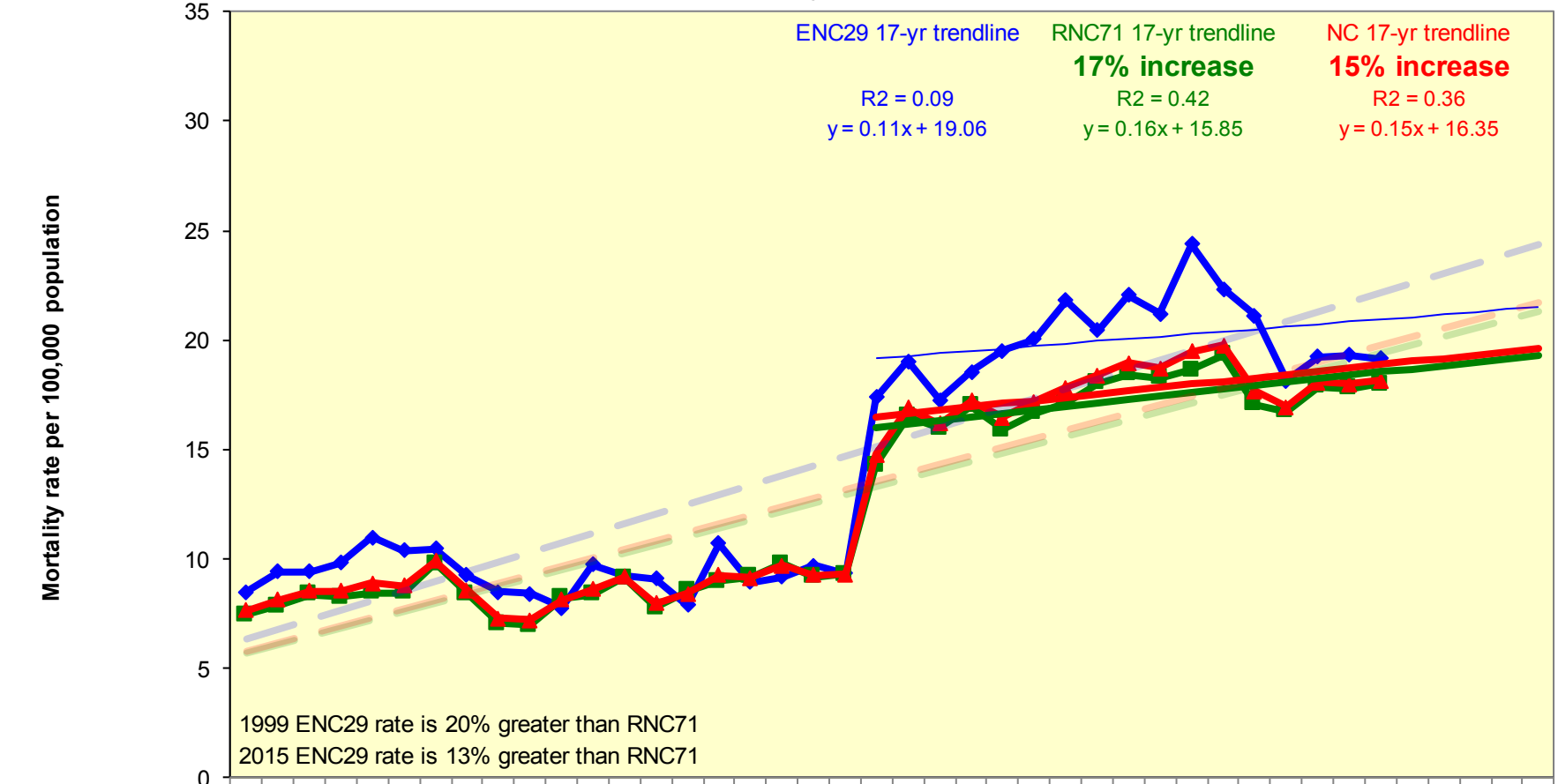
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	-3	12	15	-5	16	-14	24	22	15	16	8	14	46	23	8	12	35	43	74	36	20	57	39	45	13	58	26	46	46	38	35	43	63	27	37	46	37					

Nephritis, Nephrotic Syndrome, and Nephrosis

- The mortality rate trend for nephritis, nephrotic syndrome, and nephrosis in ENC is unreliable. The rate trends for RNC and NC have increased. In 2015 ENC's rate is 13% greater than RNC.
- With age-adjustment, ENC is 6% greater than RNC, and 30% greater than the US rate trend. The ENC trend is moderately reliable. The other trends are not reliable.
- The 17 year trend for non-White males is the highest. The trends for White males and White females are flat. The trend for non-White females is declining and is the only trend that is reliable.
- In 2015, the non-White rate was 122% greater than the White rate. The White rate is flat but is unreliable, the non-White rate is decreasing.
- The racial disparity trend 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 6.10 i. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

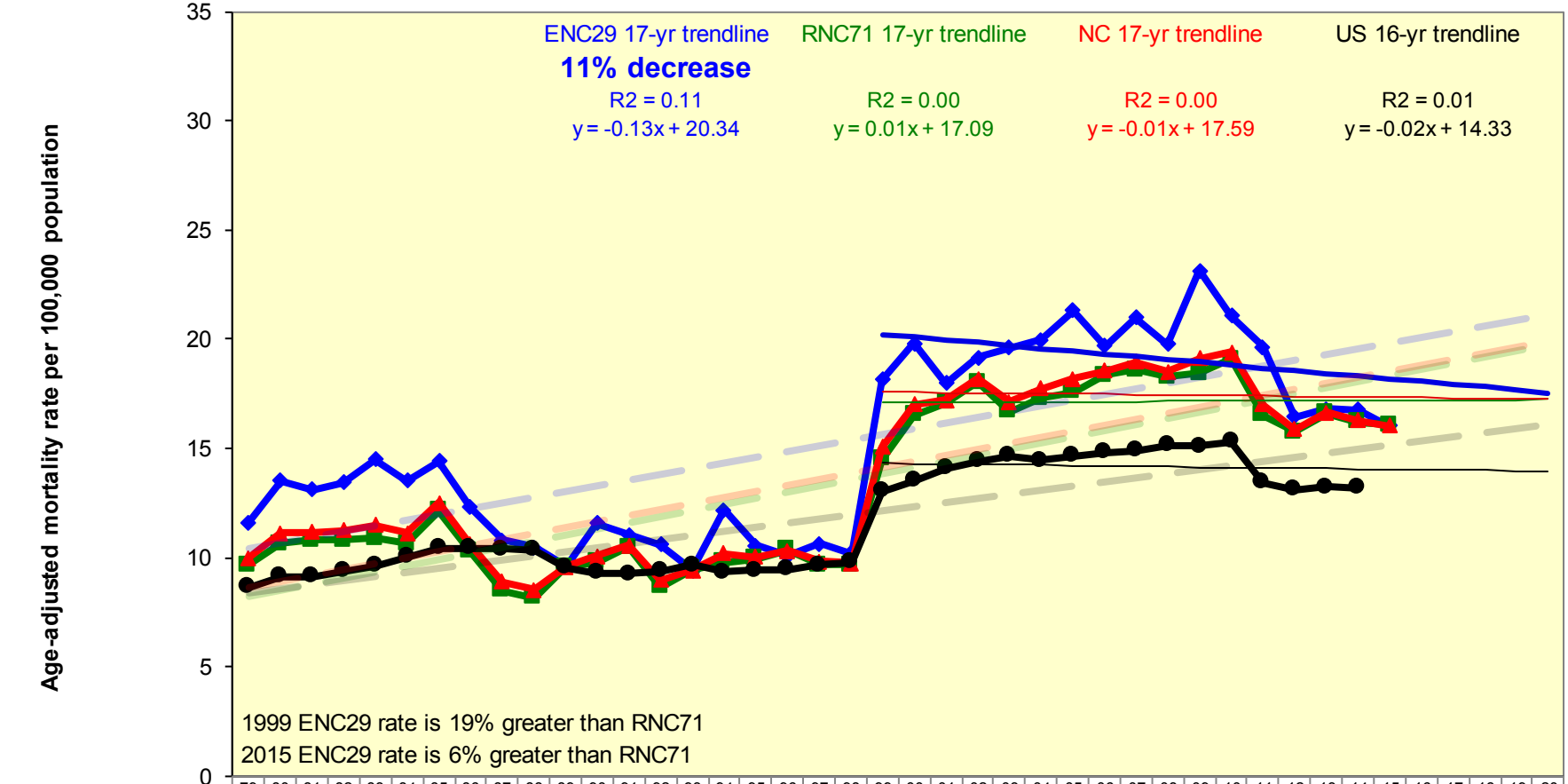


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	9	9	9	10	11	10	10	9	8	8	8	10	9	9	8	11	9	9	10	9	17	19	17	19	20	20	22	20	22	21	24	22	21	18	19	19	19					
RNC71	7	8	8	8	8	8	10	8	7	7	8	8	9	8	9	9	9	10	9	9	14	17	16	17	16	17	17	18	18	18	19	19	17	17	18	18	18					
NC	8	8	9	9	9	9	10	9	7	7	8	9	9	8	8	9	9	10	9	9	15	17	16	17	16	17	18	18	19	19	19	20	18	17	18	18	18					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	17% LT	14% LT	ENC29
20% GT		3% GT	RNC71
17% GT	3% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	12% LT	10% LT	ENC29
13% GT		2% GT	RNC71
11% GT	2% LT		NC

Figure 6.10 ii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

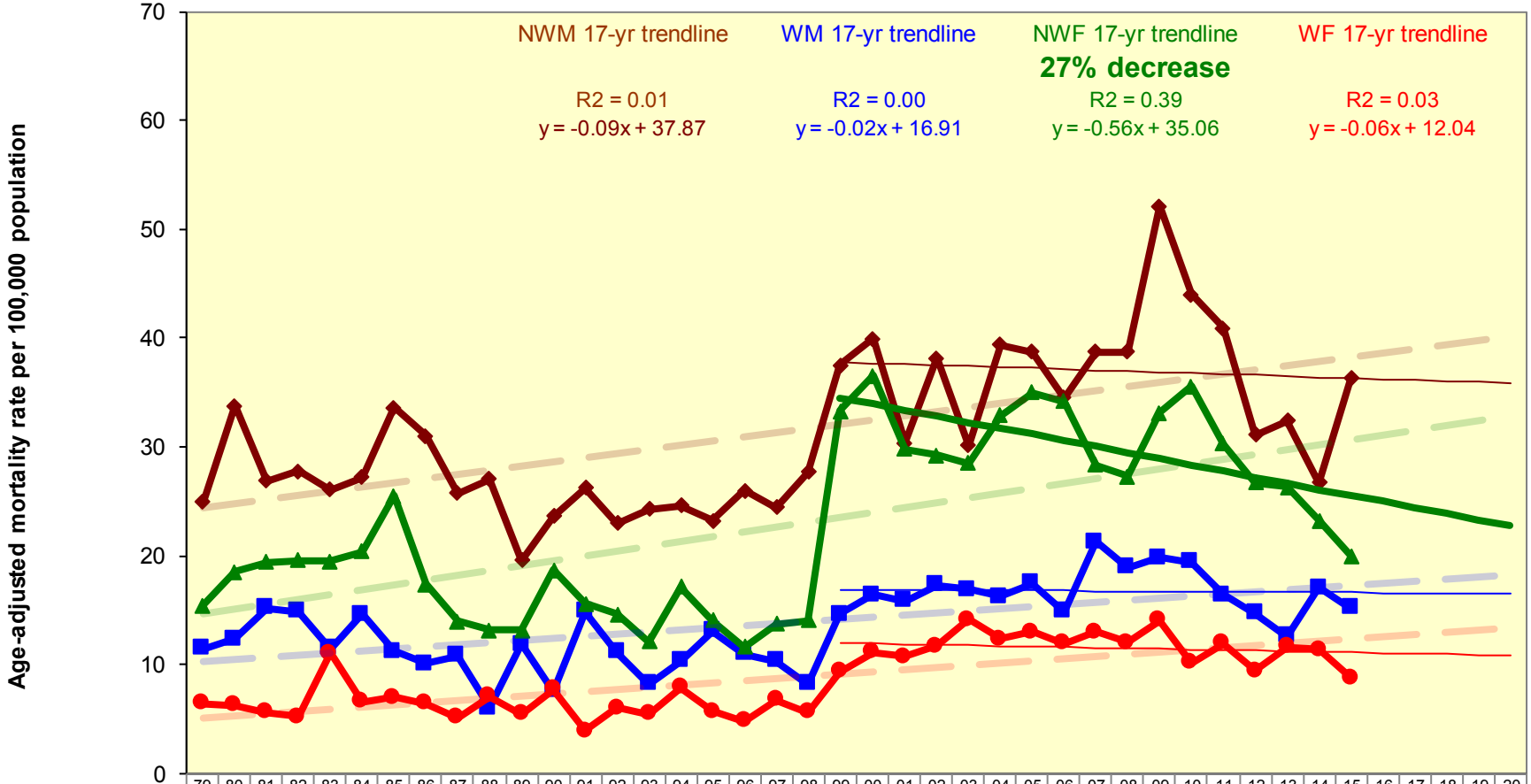


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	12	14	13	13	15	14	14	12	11	10	10	12	11	11	9	12	11	10	11	10	18	20	18	19	20	20	21	20	21	20	23	21	20	16	17	17	16					
RNC71	10	11	11	11	11	11	12	10	8	8	10	10	10	9	9	10	10	10	10	10	14	17	17	18	17	17	18	18	19	18	18	19	17	16	17	16	16					
NC	10	11	11	11	11	11	12	11	9	9	10	10	11	9	9	10	10	10	10	10	15	17	17	18	17	18	18	19	19	19	19	19	17	16	17	16	16					
US	9	9	9	9	10	10	10	10	10	10	10	9	9	9	10	9	9	9	10	10	13	13	14	14	15	14	15	15	15	15	15	15	13	13	13	13						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	16% LT	14% LT	30% LT	ENC29
19% GT		3% GT	16% LT	RNC71
16% GT	3% LT		19% LT	NC
42% GT	19% GT	23% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	6% LT	5% LT	23% LT	ENC29
6% GT		1% GT	18% LT	RNC71
5% GT	1% LT		19% LT	NC
30% GT	22% GT	23% GT		US

Figure 6.10 iii. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

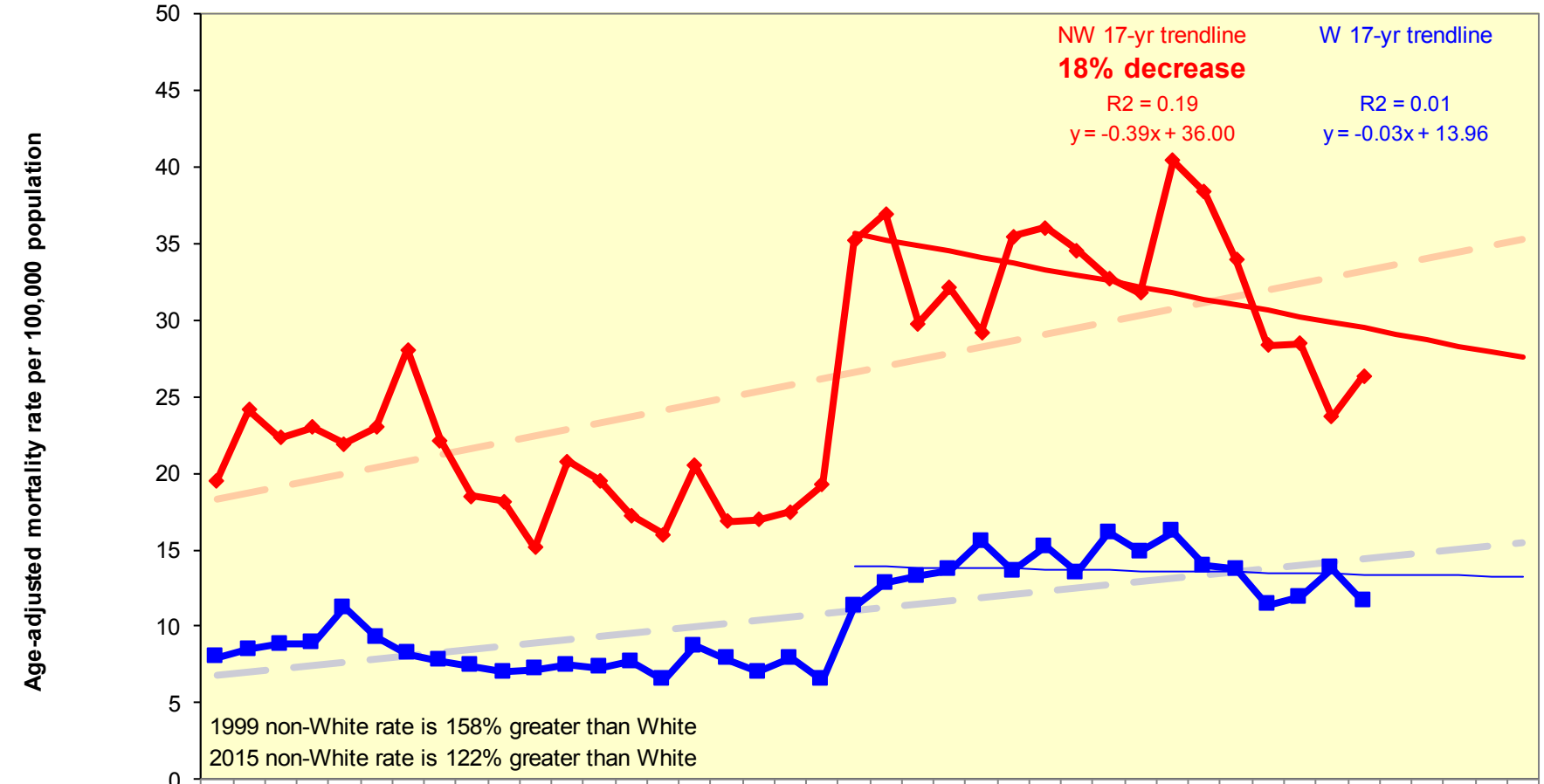


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	25	34	27	28	26	27	34	31	26	27	20	24	26	23	24	25	23	26	24	28	38	40	30	38	30	39	39	34	39	39	52	44	41	31	32	27	36					
WM	11	12	15	15	11	15	11	10	11	6	12	8	15	11	8	10	13	11	10	8	15	16	16	17	17	16	17	15	21	19	20	19	16	15	13	17	15					
NWF	15	18	19	20	19	20	25	17	14	13	13	19	16	15	12	17	14	12	14	14	33	37	30	29	28	33	35	34	28	27	33	36	30	27	26	23	20					
WF	6	6	6	5	11	7	7	6	5	7	5	8	4	6	5	8	6	5	7	6	9	11	11	12	14	12	13	12	13	12	14	10	12	9	12	11	9					

Comparison of Fitted Rates in 1999					
NWM	WM	NWF	WF		
	55% LT	7% LT	68% LT	NWM	
124% GT		107% GT	29% LT	WM	
8% GT	52% LT		66% LT	NWF	
214% GT	40% GT	191% GT		WF	

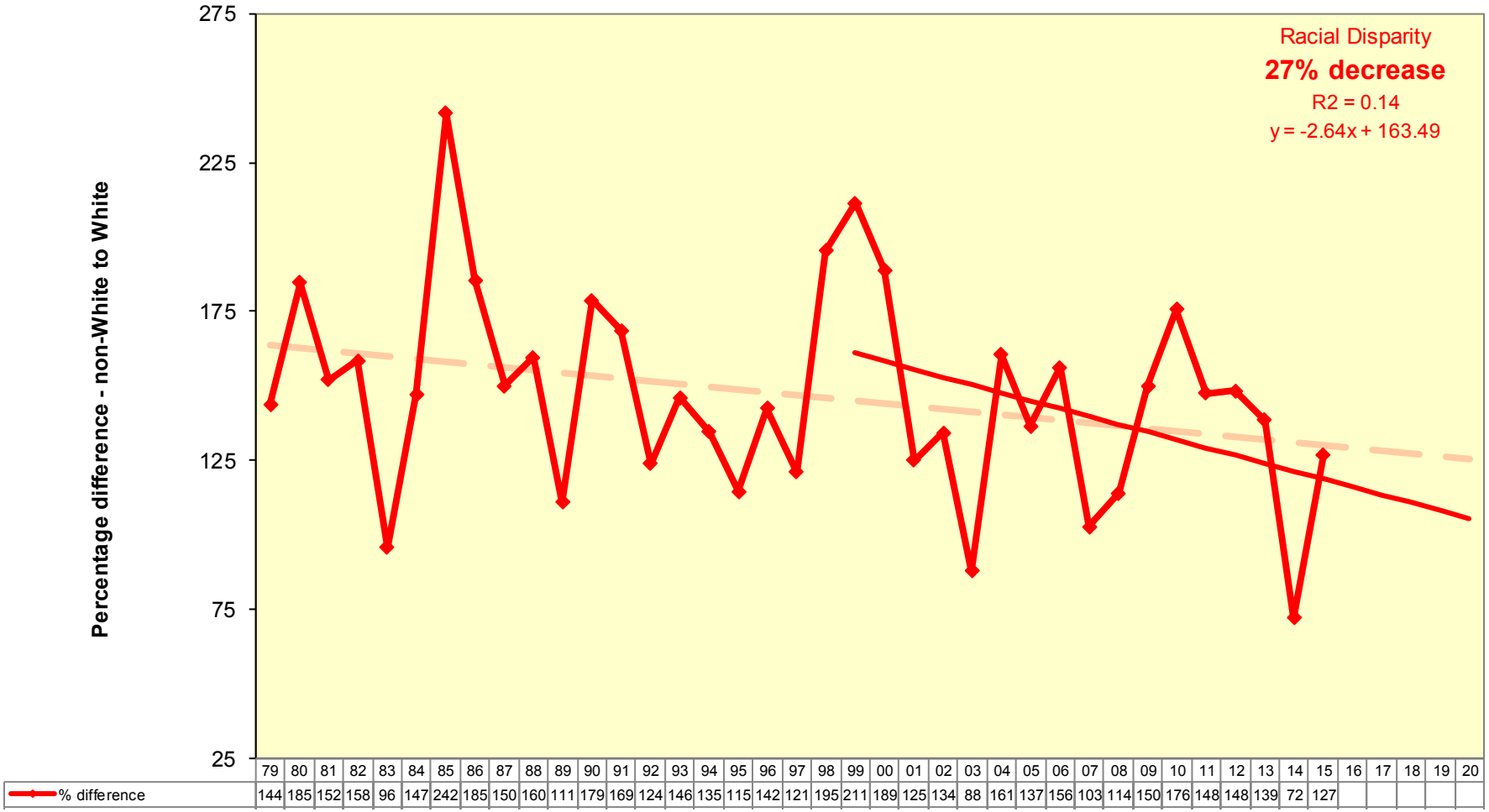
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	54% LT	28% LT	69% LT	NWM
119% GT		57% GT	33% LT	WM
40% GT	36% LT		57% LT	NWF
226% GT	49% GT	134% GT		WF

Figure 6.10 iv. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	20	24	22	23	22	23	28	22	18	18	15	21	20	17	16	20	17	17	17	19	35	37	30	32	29	35	36	35	33	32	40	38	34	28	28	24	26					
W	8	8	9	9	11	9	8	8	7	7	7	7	7	8	6	9	8	7	8	7	11	13	13	14	16	14	15	13	16	15	16	14	14	11	12	14	12					

Figure 6.10 v. Nephritis, Nephrotic Syndrome, and Nephrosis:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



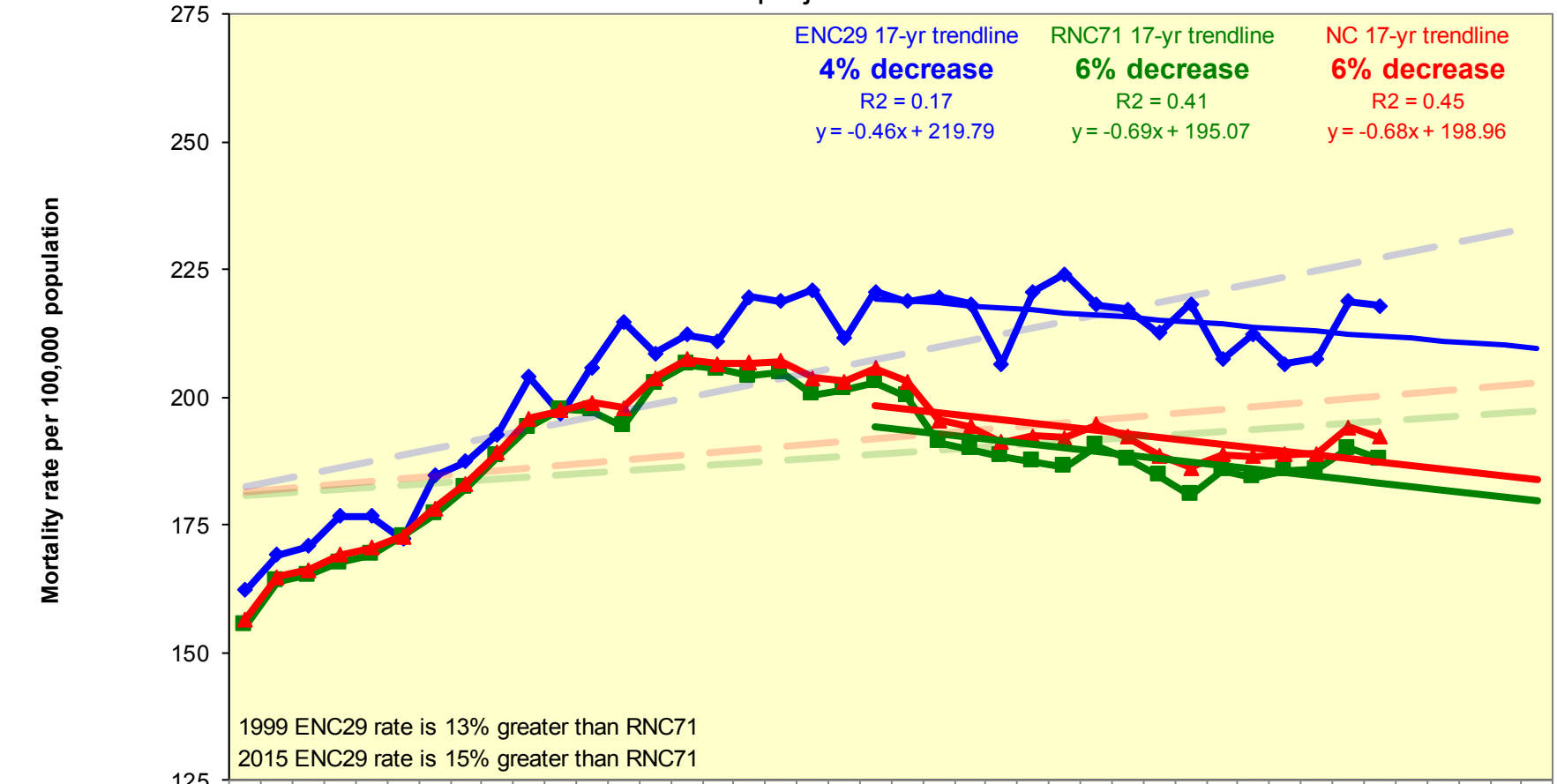
7. Trends and Disparities in Mortality in ENC29: Cancer - All Sites and HIV Disease; 1979-2015

Cancer - All Sites

- The cancer – all sites mortality rate trend for ENC has decreased slightly (4%) over 17 years. The RNC and NC rates are lower, and have decreased more than ENC.
- The age-adjusted cancer – all sites mortality rate trend for ENC, NC and RNC are all decreasing, although the ENC rate is 8% greater than the RNC rate.
- The rate trend is decreasing for all groups. The rate for non-White males is the highest but is decreasing the most. White and non-White females show smaller decreases.
- Both White and non-White cancer mortality trends are decreasing over the 17 year period. The Non-White rate decreased 30% and the White rate decreased 20%. The non-White rate remains 10% greater than the White rate in 2015, but they are converging.
- The moderately reliable 17-year trend for racial disparity shows a 62% 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, 1979-2015 with projections to 2020

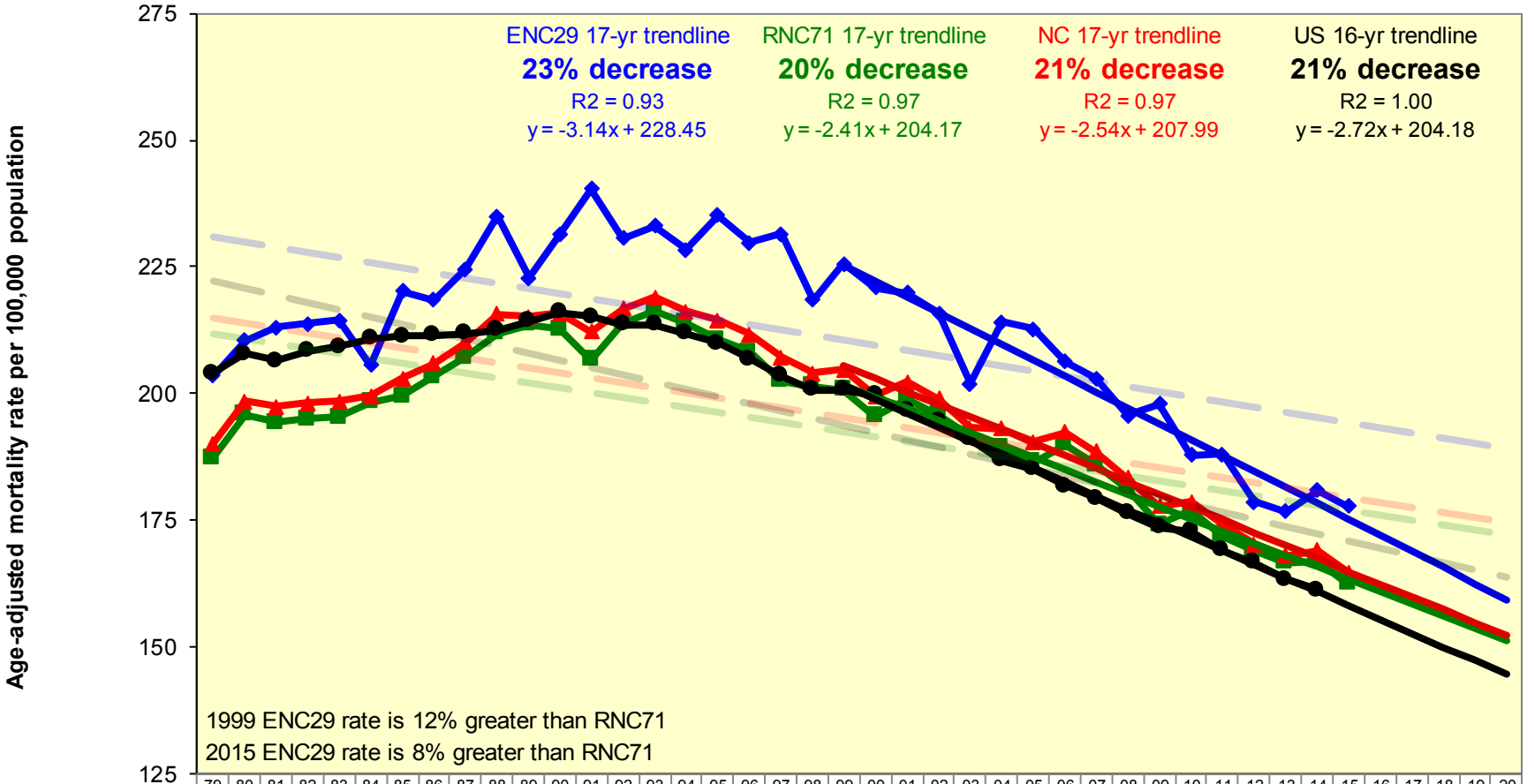


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	162	169	171	177	177	172	185	188	193	204	197	206	215	209	212	211	220	219	221	212	221	219	220	218	207	221	224	218	217	213	218	207	212	207	208	219	218					
RNC71	155	164	165	168	169	173	177	182	188	194	198	198	194	203	206	206	204	205	201	202	203	200	191	190	189	187	186	191	188	185	181	186	184	186	186	190	188					
NC	157	165	166	169	171	173	178	183	189	196	197	199	198	204	207	207	207	207	204	203	206	203	196	194	191	192	192	195	192	189	186	189	188	189	189	194	192					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	11% LT	9% LT	ENC29
13% GT		2% GT	RNC71
10% GT	2% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	13% LT	11% LT	ENC29
15% GT		2% GT	RNC71
13% GT	2% LT		NC

Figure 7.1 ii. Cancer - All Sites: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

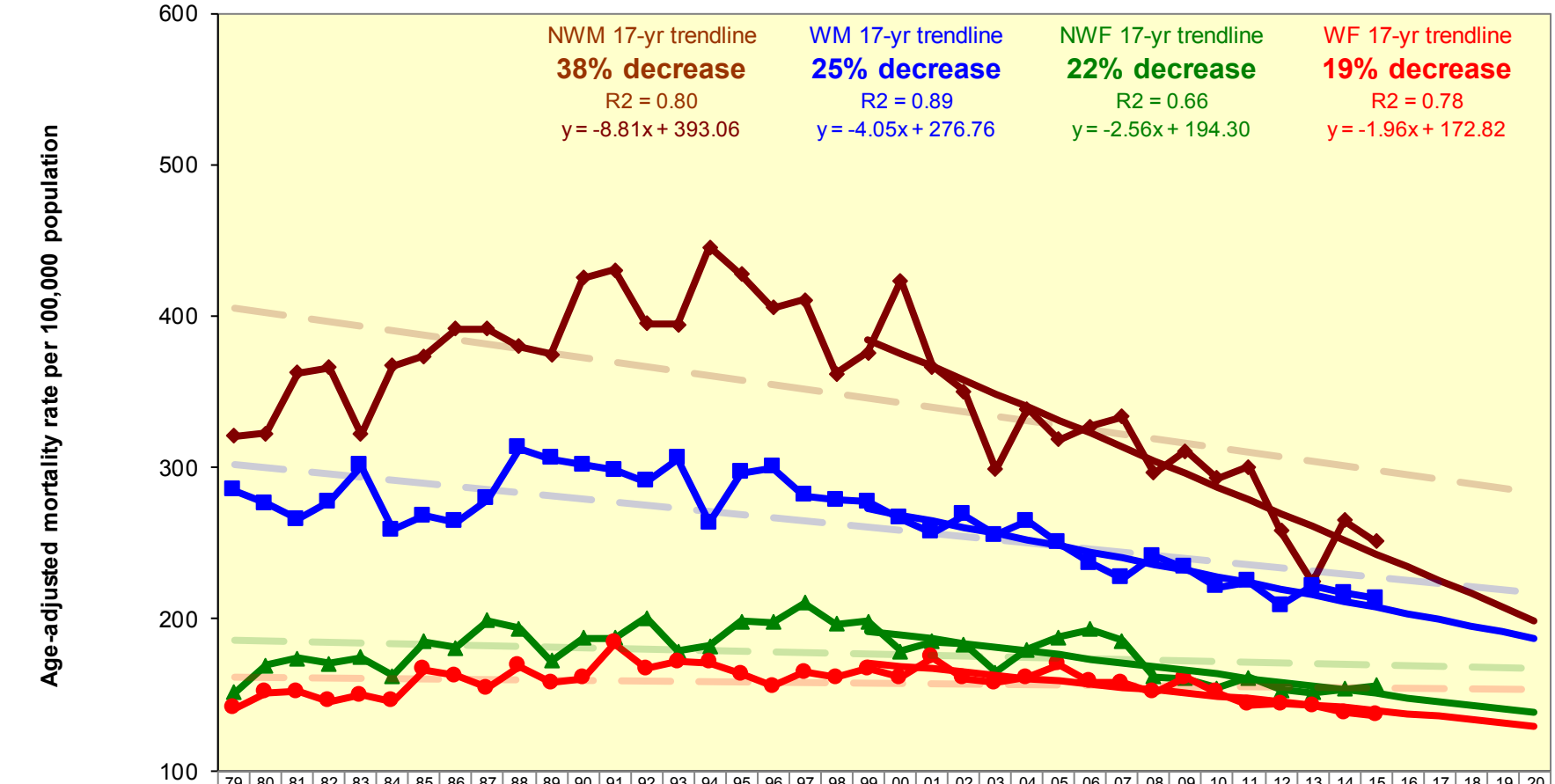


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	203	210	213	214	214	206	220	218	225	235	223	231	240	231	233	228	235	230	231	218	225	221	220	216	202	214	213	206	203	196	198	188	188	179	177	181	178					
RNC71	187	196	194	195	195	198	199	203	207	212	214	213	207	214	216	214	211	208	202	201	201	195	199	196	192	189	186	190	186	181	174	177	172	169	167	167	162					
NC	190	198	197	198	198	199	203	206	210	216	215	216	212	217	219	216	214	212	207	204	205	199	202	199	193	193	190	192	188	183	178	178	174	170	168	169	165					
US	204	208	206	208	209	211	211	212	212	212	214	216	215	214	214	212	210	207	203	201	201	200	196	194	191	187	185	182	179	176	174	173	169	166	163	161						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	11% LT	9% LT	11% LT	ENC29
12% GT		2% GT	0	RNC71
10% GT	2% LT		2% LT	NC
12% GT	0	2% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	7% LT	6% LT	10% LT	ENC29
8% GT		1% GT	3% LT	RNC71
6% GT	1% LT		4% LT	NC
11% GT	3% GT	4% GT		US

Figure 7.1 iii. Cancer - All Sites: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	321	322	362	366	322	367	373	392	392	380	375	425	430	395	395	446	428	406	411	362	376	424	367	350	299	339	318	327	334	296	311	293	301	258	225	265	251					
WM	285	276	266	277	301	259	268	264	279	313	306	302	298	291	306	264	297	300	281	279	277	267	257	269	255	265	250	237	227	241	234	221	224	209	222	217	213					
NWF	151	169	174	171	175	162	185	181	199	194	172	187	187	201	179	182	198	198	211	197	199	179	185	183	165	180	188	193	186	162	161	155	161	154	151	154	156					
WF	141	152	152	146	150	146	167	163	155	169	158	161	184	167	172	171	164	156	165	161	167	162	174	161	158	162	170	159	158	152	161	151	143	144	143	138	136					

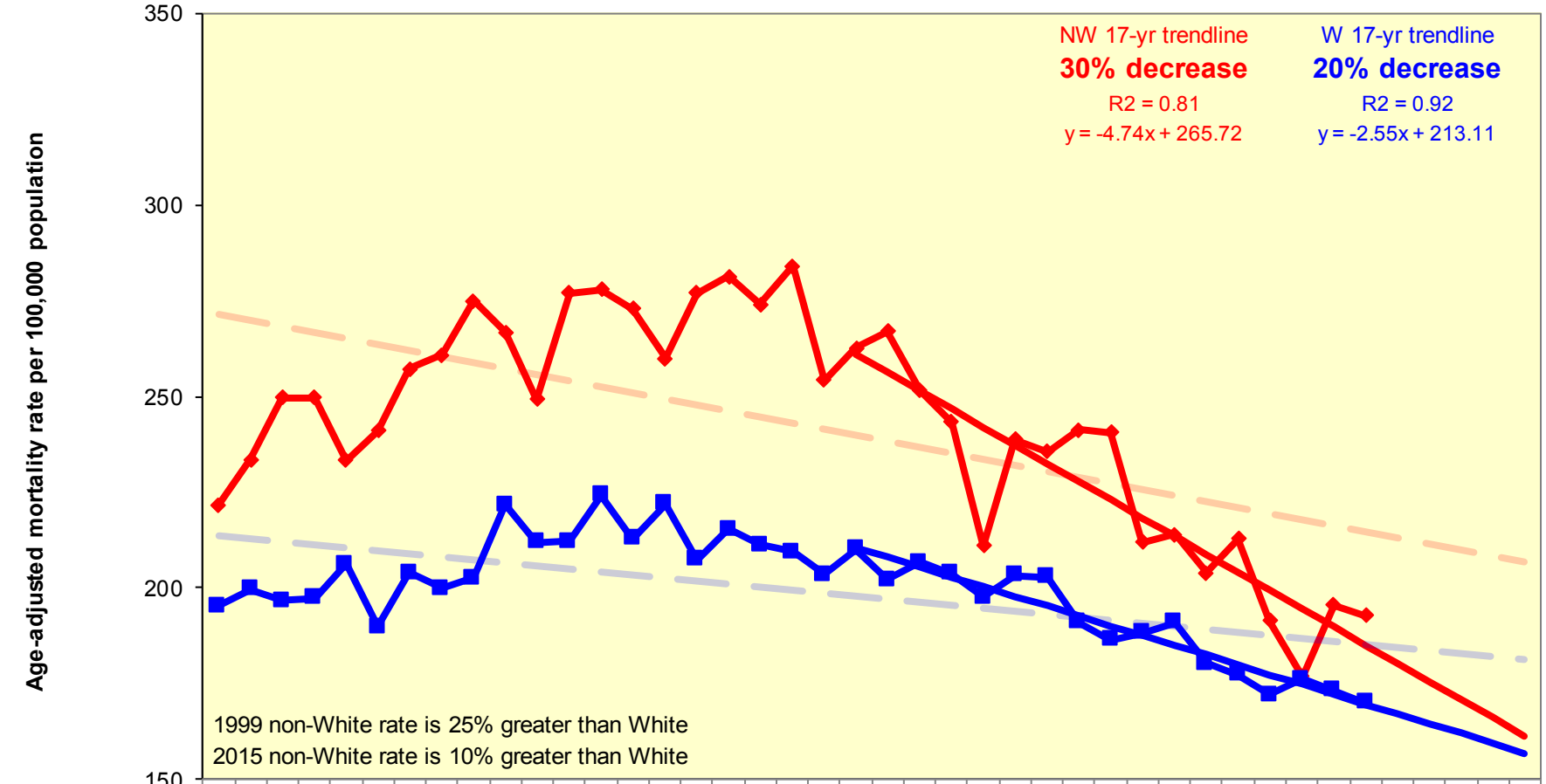
Comparison of Fitted Rates in 1999

NWM	WM	NWF	WF	
	30% LT	51% LT	56% LT	NWM
42% GT		30% LT	38% LT	WM
102% GT	42% GT		11% LT	NWF
127% GT	60% GT	12% GT		WF

Comparison of Fitted Rates in 2015

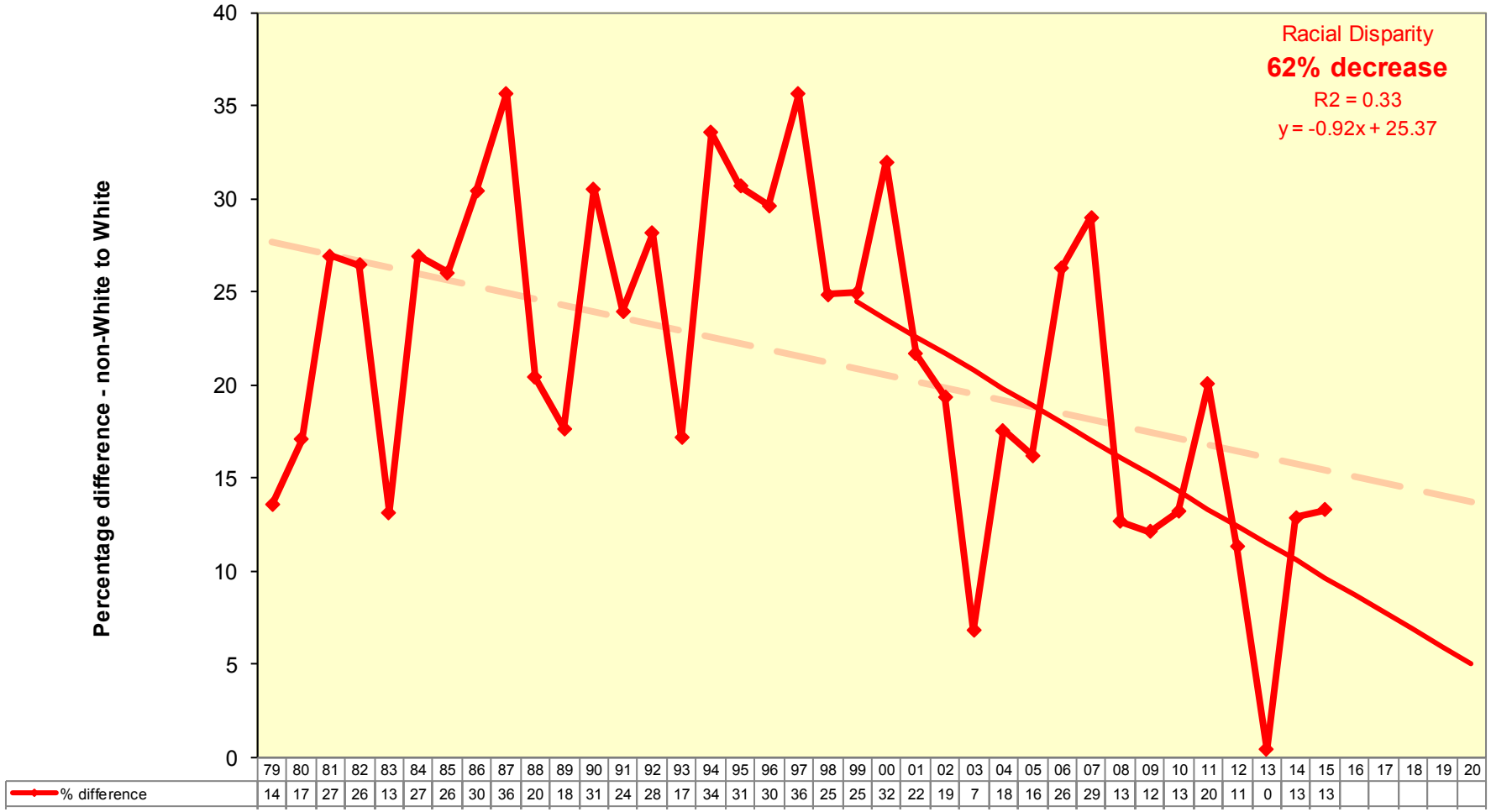
NWM	WM	NWF	WF	
	16% LT	39% LT	44% LT	NWM
19% GT		28% LT	33% LT	WM
64% GT	38% GT		8% LT	NWF
78% GT	50% GT	8% GT		WF

Figure 7.1 iv. Cancer - All Sites: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	222	234	250	250	233	241	257	261	275	267	249	277	278	273	260	277	281	274	284	254	263	267	251	243	211	239	236	241	241	212	214	204	213	191	177	196	193					
W	195	200	197	197	206	190	204	200	203	222	212	212	224	213	222	207	215	211	209	204	210	202	207	204	198	203	203	191	186	188	191	180	177	172	176	173	170					

Figure 7.1 v. Cancer - All Sites:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



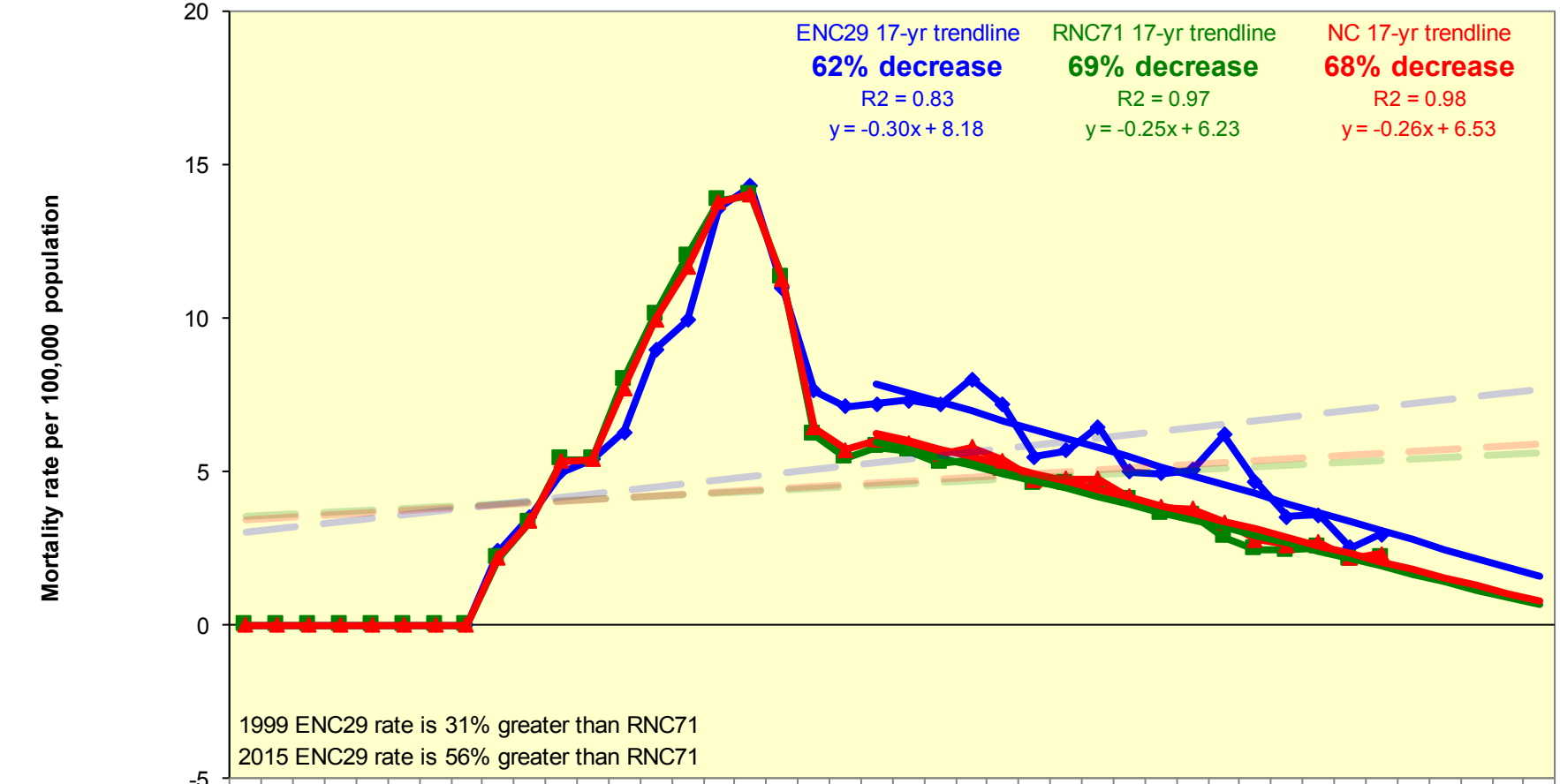
	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	14	17	27	26	13	27	26	30	36	20	18	31	24	28	17	34	31	30	36	25	25	32	22	19	7	18	16	26	29	13	12	13	20	11	0	13	13					

HIV Disease

- The fitted HIV mortality rates for ENC have been decreasing over the past 17 years, but are still 56% greater than RNC in 2015.
- The age-adjusted rate trend for ENC, RNC and the US are all decreasing. The ENC rate is 63% greater than RNC in 2015.
- Non-White males continue to have the highest rates of age-adjusted mortality, but these rates have also decreased 73% in a 17-year reliable trend. Non-White females have the second highest rate, but it has also declined over the 17-year period. The rate for White males is lower but has also decreased. The White female rate is not reliable.
- The 17-year age-adjusted HIV mortality rates have decreased for both Whites and non-Whites by 49% and 69% respectively. The non-White rate is still 720% greater than the White rate.
- 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 7.2 i. HIV Disease: Trends in mortality rates for ENC29, RNC71, and NC, 1979-2015 with projections to 2020

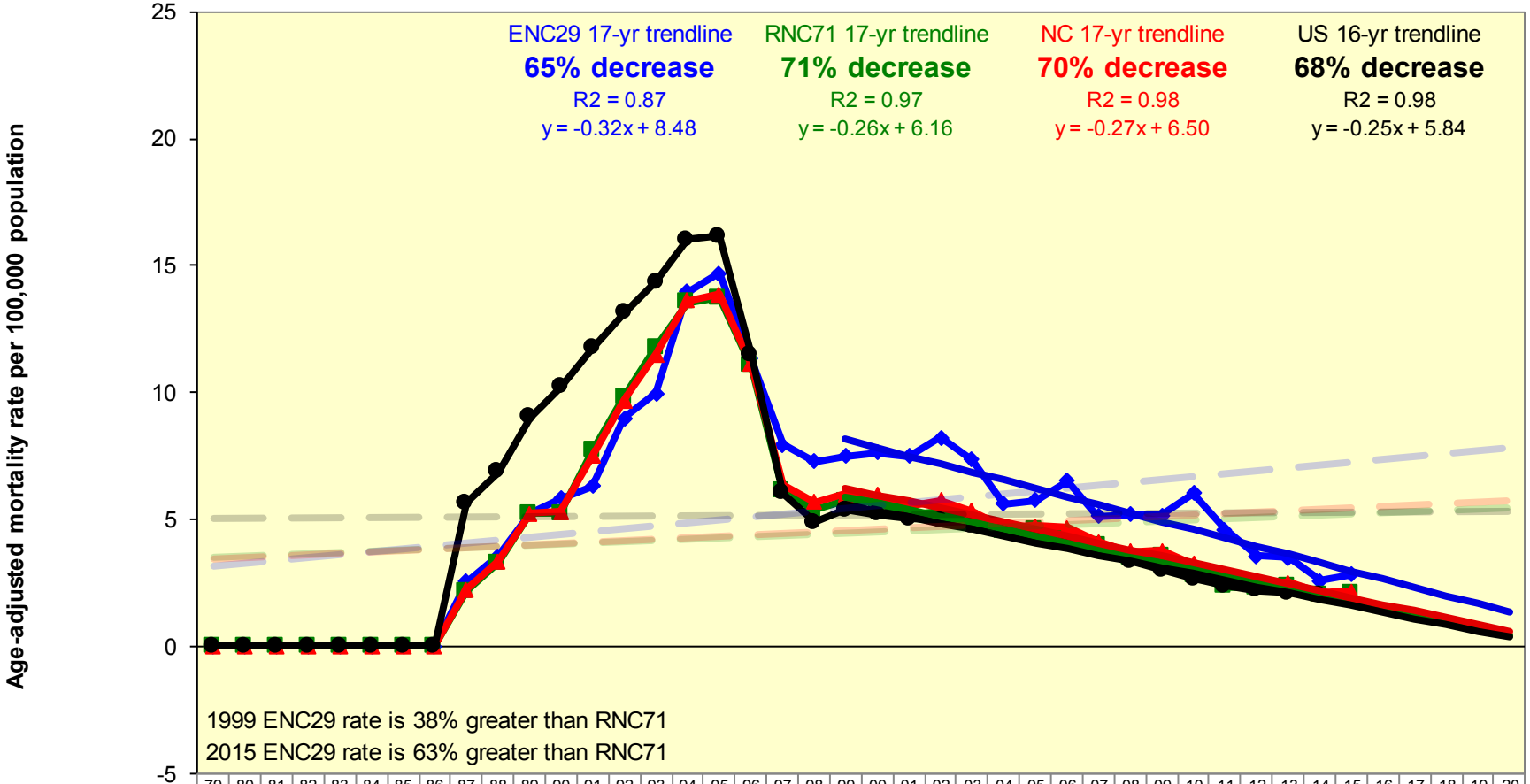


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	0	0	0	0	0	0	0	0	2	4	5	5	6	9	10	14	14	11	8	7	7	7	7	8	7	5	6	6	5	5	5	6	5	4	4	3	3					
RNC71	0	0	0	0	0	0	0	0	2	3	5	5	8	10	12	14	14	11	6	5	6	6	5	5	5	5	5	4	4	4	4	3	2	2	3	2	2					
NC	0	0	0	0	0	0	0	0	2	3	5	5	8	10	12	14	14	11	6	6	6	6	6	6	5	5	5	5	4	4	4	3	3	3	3	2	2					

Comparison of Fitted Rates in 1999			
ENC29	RNC71	NC	
	24% LT	20% LT	ENC29
31% GT		5% GT	RNC71
25% GT	5% LT		NC

Comparison of Fitted Rates in 2015			
ENC29	RNC71	NC	
	36% LT	31% LT	ENC29
56% GT		8% GT	RNC71
44% GT	7% LT		NC

Figure 7.2 ii. HIV Disease: Trends in age-adjusted mortality rates for ENC29, RNC71, NC, and US, 1979-2015 with projections to 2020

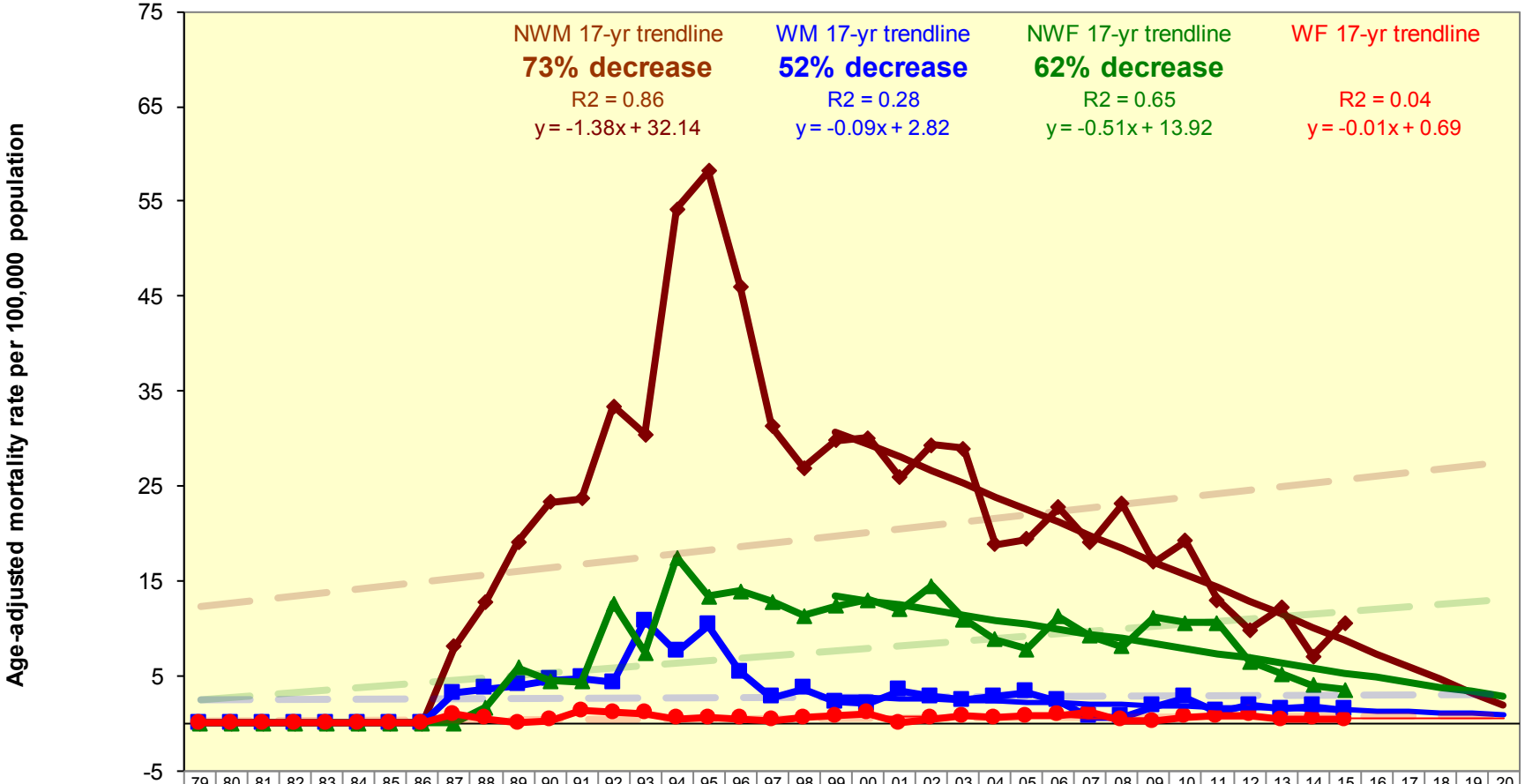


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
ENC29	0	0	0	0	0	0	0	0	3	4	5	6	6	9	10	14	15	11	8	7	7	8	7	8	7	6	6	7	5	5	5	6	5	4	3	3	3					
RNC71	0	0	0	0	0	0	0	0	2	3	5	5	8	10	12	14	14	11	6	5	6	6	5	5	5	5	5	4	4	3	4	3	2	2	2	2	2					
NC	0	0	0	0	0	0	0	0	2	3	5	5	7	10	11	14	14	11	6	6	6	6	6	6	5	5	5	5	4	4	4	3	3	2	3	2	2					
US	0	0	0	0	0	0	0	0	6	7	9	10	12	13	14	16	16	12	6	5	5	5	5	5	5	4	4	4	4	3	3	3	2	2	2	2						

Comparison of Fitted Rates in 1999				
ENC29	RNC71	NC	US	
	27% LT	23% LT	31% LT	ENC29
38% GT		6% GT	5% LT	RNC71
30% GT	5% LT		10% LT	NC
45% GT	5% GT	11% GT		US

Comparison of Fitted Rates in 2015				
ENC29	RNC71	NC	US	
	39% LT	34% LT	44% LT	ENC29
63% GT		8% GT	9% LT	RNC71
50% GT	8% LT		16% LT	NC
79% GT	10% GT	19% GT		US

Figure 7.2 iii. HIV Disease: Trends in age-adjusted mortality rates by race and gender for ENC29, 1979-2015 with projections to 2020

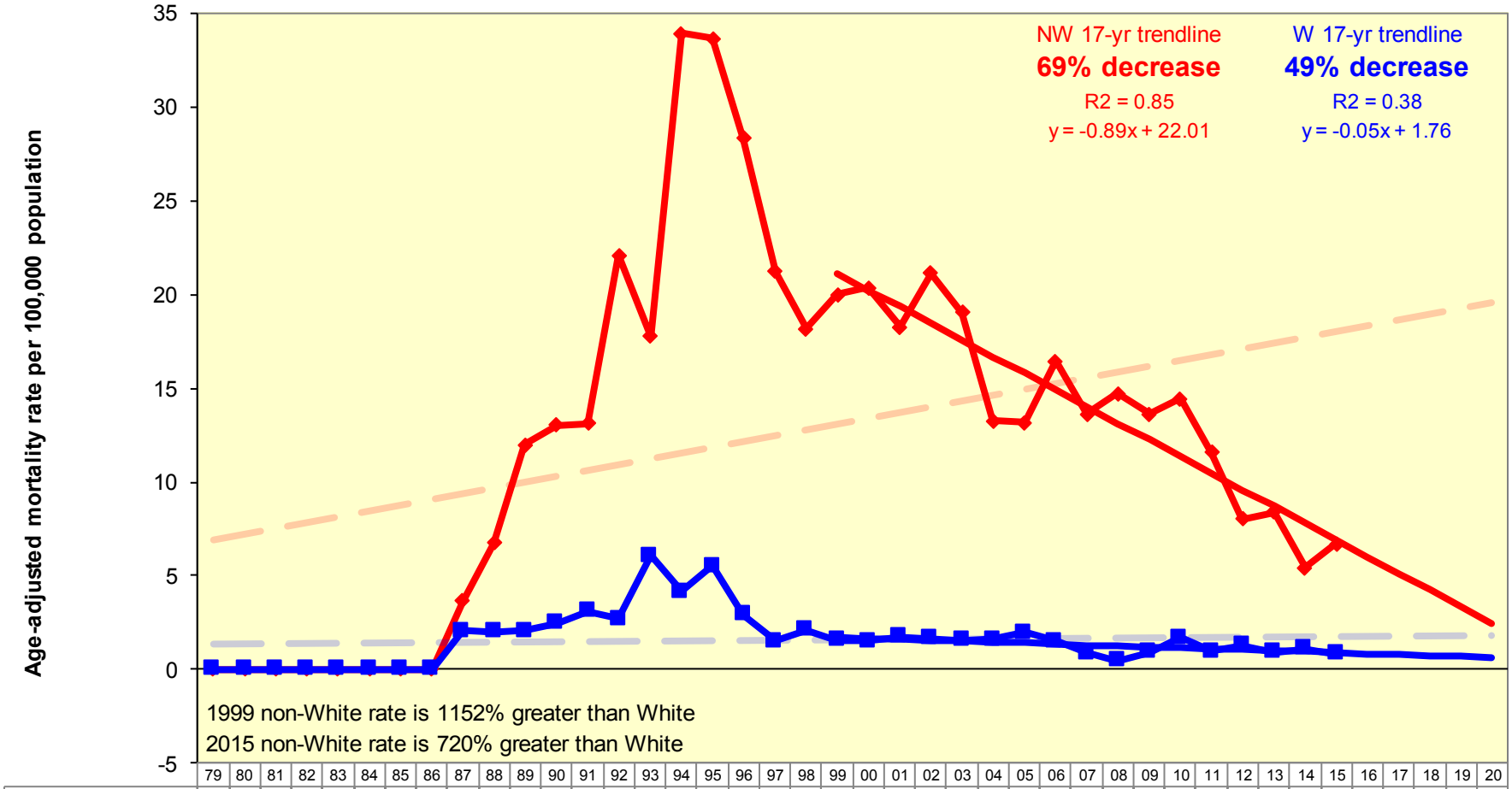


	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NWM	0	0	0	0	0	0	0	0	8	13	19	23	24	33	30	54	58	46	31	27	30	30	26	29	29	19	19	23	19	23	17	19	13	10	12	7	11					
WM	0	0	0	0	0	0	0	0	3	4	4	5	5	4	11	8	10	5	3	4	2	2	3	3	2	3	3	2	1	1	2	3	1	2	2	2	1					
NWF	0	0	0	0	0	0	0	0	0	2	6	4	4	13	7	17	13	14	13	11	12	13	12	15	11	9	8	11	9	8	11	11	11	6	5	4	4					
WF	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1	0	0	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1	0	0	0					

Comparison of Fitted Rates in 1999					
NWM	WM	NWF	WF		
	91% LT	57% LT	98% LT	NWM	
1041% GT		394% GT	76% LT	WM	
131% GT	80% LT		95% LT	NWF	
4586% GT	311% GT	1930% GT		WF	

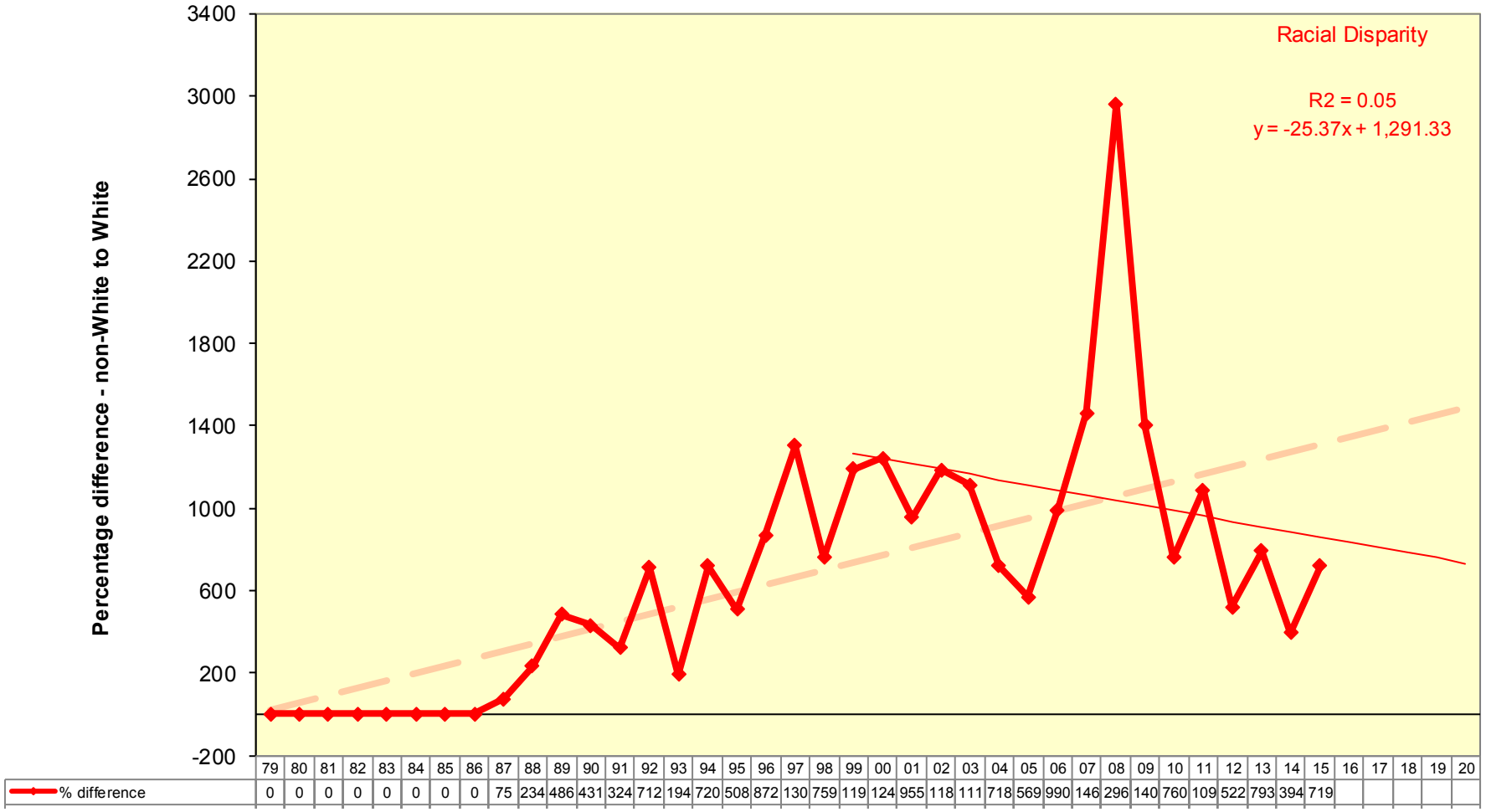
Comparison of Fitted Rates in 2015				
NWM	WM	NWF	WF	
	86% LT	42% LT	95% LT	NWM
603% GT		304% GT	65% LT	WM
74% GT	75% LT		91% LT	NWF
1893% GT	183% GT	1046% GT		WF

Figure 7.2 iv. HIV Disease: Trends in age-adjusted mortality rates by race for ENC29, 1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
NW	0	0	0	0	0	0	0	0	4	7	12	13	13	22	18	34	34	28	21	18	20	20	18	21	19	13	13	16	14	15	14	14	12	8	8	5	7					
W	0	0	0	0	0	0	0	0	2	2	2	2	3	3	6	4	6	3	2	2	2	2	2	2	2	2	2	2	1	0	1	2	1	1	1	1	1					

Figure 7.2 v. HIV Disease:
Measuring disparity in age-adjusted mortality rates by race for ENC29,
1979-2015 with projections to 2020



	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
% difference	0	0	0	0	0	0	0	0	75	234	486	431	324	712	194	720	508	872	130	759	119	124	955	118	111	718	569	990	146	296	140	760	109	522	793	394	719					

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