

Mortality Trends in Beaufort and Hyde Counties, NC

All Causes of Death, All Causes of Premature Mortality
and Ten Leading Causes of Death; 1979-2001



A Resource for Healthy Communities

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Introduction

Health Indicators Series: A Resource for Healthy Communities October 2003

Report Series #2: Mortality Trends for Beaufort and Hyde Counties

Health Indicators is a series of reports describing community health at the state and county level. *Health Indicators* supplements the *Eastern North Carolina Health Care Atlas* published by the Center for Health Services 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 North Carolina and its local communities, evaluating the effectiveness of existing services, and envisioning and planning new interventions. The reports in this periodically published series can be used in conjunction with the *County Health Data Book*, produced by the North Carolina Office of Healthy Carolinians, as part of the Community Health Assessment Process. Individual reports in ECU's Health Indicator Series are custom made for the counties of North Carolina. Reports in this series will describe trends in mortality, including premature mortality for all causes of death, true (crude) and age-adjusted mortality for leading causes of death, and measures of rate disparities or inequalities.

Report Series #2 of the series focuses attention on the two overarching goals of *Healthy People 2010*, 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 Carolinians 2010* has also embraced these two goals.

Report Series #2 is a tool to help evaluate how well Beaufort and Hyde Counties and North Carolina are doing in relation to the goals set forth in *Healthy People 2010* and *Healthy Carolinians 2010* as well as important differences in life span. Using rate comparisons, this report describes the inequalities between Beaufort and Hyde Counties and North Carolina, between whites and non-whites, and between males and females. 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 twenty years. 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 second section presents overall and five leading contributors to mortality for the state as a whole and by race and gender. Pie charts describe the relative contribution of each of five leading contributors to the overall rate. The charts also provide comparisons to the nation. Making the area of each pie chart equivalent to the rate for the population group conveys the dimension of disparity across population groups. The last section charts recent trends in mortality and disparities in early death and provides projections to the year 2010. These charts place Beaufort and Hyde Counties' health status in a historical context and provide a glimpse into the future.

Data Highlights

Leading causes of death in Beaufort County, 1999-2001

The five leading causes of death are:

1. Heart Disease
2. Cancer (all sites)
3. Stroke
4. COPD
5. Pneumonia and Influenza

Twenty-two year trends in mortality rates

- 21% increase in its true mortality rate over the last 22 years
- 10% decrease in age-adjusted mortality rate
- the age-adjusted rate for non-white females increased by 18%
- white males saw a large decrease in mortality (22%) over the same time period, and the line reliably fits the data
- white females also saw a 13% decrease in mortality rate, as described by a trend line that moderately fit the data, and the data for non-white males is too unstable to discern a trend
- racial disparity in mortality rates increased drastically by 1,639%

Premature Mortality Rates

- while premature mortality is declining, it is roughly half the decline shown by the region and the state
- slightly lower (1%) in 1979 than the region's rate, yet higher than the state's and the nation's rates
- by 2001 Beaufort County's rate is 12% higher than the region's
- whites in Beaufort County have experienced a decrease in age-adjusted premature mortality rates
- non-whites have experienced an increase, but the data is too unstable to discern a reliable trend
- 217% increase in the average percentage difference in disparities over the time period

Leading Contributors to Mortality in Beaufort County, NC

- Heart Disease is the leading contributor to mortality in Beaufort County, for all races and genders in the population
- Cancer is the second leading contributor to mortality for all people
- Stroke is the third leading contributor to mortality for the population together, but the fourth leading cause for white males
- Chronic Obstructive Pulmonary Disease and Allied Conditions are the fourth leading cause for all people together, and the third leading cause for white males
- Pneumonia and Influenza are the fifth leading cause of mortality for all people together, and the fifth leading cause for white and non-

white females

- Other Unintentional Injuries (other than motor vehicle crashes) are the fourth leading cause of mortality for non-white males
- Nephritis, Nephrotic Syndrome, and Nephrosis are the fourth leading cause among non-white females
- Suicide is the fifth leading cause of mortality for white males

Mortality rate comparison by race and gender

- Non-white male rate is 20% higher than the white male rate
- Non-white female rate is 9% lower than the white female rate
- Non-white rate is 4% higher than white rate

Comparison of county to state rates of age-adjusted mortality by 10 leading contributors in 2001

Higher than the state rate

- Heart Disease – 35%
- TLB Cancer – 20%
- Stroke – 11%
- COPD – 11%
- CRA Cancer – 13%
- Influenza and Pneumonia – 4%
- All other Unintentional Injuries – 15%
- Unintentional Motor Vehicle Injuries - 37%

Lower than the state rate

- Diabetes – 1%
- Alzheimers – 36%

Heart Disease

- an increase (10%) in county mortality rate due to heart disease over the time period, while the region and the state have experienced decreases (15% and 21%, respectively) in their rates
- white males in Beaufort County had a 35% decrease in age-adjusted mortality rates due to heart disease
- non-white males, non-white females, and white females also experienced decreases, but the trends were too unstable to observe a trend
- trends in race disparities in mortality due to heart disease were also too unstable to observe a trend

Cancer – Trachea, Bronchus, and Lung (TLB)

- county’s rate of mortality due to TLB cancer in 1979 was 10% greater than ENC’s; in 2001, it is 53% greater
- twice the rate of change in the positive direction in age-adjusted rates for the county, compared to the region and the state
- non-white males have seen a huge increase in mortality due to TLB cancer (240%), experiencing a rate four times as large as any of the other race and gender quartiles

- white females have also seen a strong increase in rate of age-adjusted mortality, with a 92% rate increase

Stroke

- A strong decrease in mortality rates due to stroke (31%) was observed in the county
- All gender and race groups experienced decreases
- Largest decreases in white population (66%), smaller decreases experienced by non-white population
- Dramatic racial disparity (increases 2278%) over the time period

Chronic Lower Respiratory Disease

- Mortality rate compared to the region declined, but sizeable increase over time period observed
- County has twice the rate of the US in COPD
- White females experience a strong increase in COPD (494%) over the time period
- Racial disparities trends too unstable to observe a trend

Cancer – Colon, Rectum and Anus

- the county rate of CRA cancers increased at double the rate of the region and at quadruple the rate of the state
- none of the trends in race and gender quartiles reliable
- racial disparity data does not correlate

Influenza and Pneumonia

- Rates far above the region and state rates, small decrease observed, not statistically reliable
- Age-adjusted line shows strong decrease, which may be more indicative of the trend among the population (moderately reliable)
- Non-white males show a strong, moderately reliable decrease (63%) in age-adjusted mortality rates
- Racial disparities graph too unstable to observe a trend

All Other Unintentional Injuries and Adverse Effects

- rates of unintentional injury far above those of the state and region
- non-white males show a moderately reliable downward trend in age-adjusted mortality trends due to unintentional injuries
- all other trends were too unstable to observe a trend
- the racial disparities data were also too unstable to observe a trend

Unintentional Motor Vehicle Injuries

- rate of unintentional motor vehicle injuries has stayed roughly the same, while rates in the region and state have dropped considerably
- non-white females experienced a large increase in the number of deaths due to unintentional motor vehicle injuries, but the trend line is only moderately reliable
- none of the other trend lines are reliable
- racial disparity data were too unstable to observe a trend

Diabetes Mellitus

- No significant trends shown in the data

Alzheimer's Disease

- large, reliable increase in the true rate of mortality for Alzheimer's disease
- age-adjusted Alzheimer's rate of change is lower than the region's or the state's, but all three continue to increase.
- White females (in a reliable trend) and non-white females (in a moderately reliable trend) have seen the biggest increases in age-adjusted mortality rates
- Racial disparities are also on the rise in Alzheimer's cases
- data suggest that these extremely small numbers make obtaining accurate data trends difficult

Methods, Interpretation, and References

Methods and Interpretation

Data Sources

The data for mortality and premature mortality in Beaufort and Hyde Counties 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 type is based on the density of deaths per population for a given area over a specified time interval. This type includes the true or “crude” mortality and age-adjusted mortality rates. These mortality rates are typically used in discerning where deaths are occurring and for comparing mortality among areas. The second type of mortality measure is years of life lost before age 75 (YLL-75). The YLL-75 measures include the death density component of both types of mortality rate measures, but they are further weighted by the number of years of life lost before age 75. Like mortality rates, they can either be true (crude) or age-adjusted. These measures provide an indication of the burden of premature mortality in a population or community, much like a count of the number of deaths. In this report the first type of mortality measures—true and age-adjusted rates—are emphasized. Premature mortality (YLL-75) is considered only for general mortality or deaths by all causes. Premature mortality is the focus of report #1.

A simple count of the number of deaths occurring within an area for a given time period is useful for identifying potential problems or issues of public concern—particularly if the deaths result from a rare cause or are deemed an emerging problem for at-risk socio-demographic groups. In this sense, simple count data act as harbingers. Because nothing is known about the underlying population base from which health events arise, the analytical or even political utility of simple count data is limited. The size of the underlying population will have a natural influence on the observed number of health events. The observed influence can be measured as the density of deaths per underlying population. When measured over a given unit of time (usually 1 to 5 years), the density becomes a rate. (The rate is typically multiplied by 100,000 for ease in interpreting the usually small resultant value.) This is the actual observed or true rate for an area and it is an improvement over simple count data because it accounts for the relative size of the underlying population. The chief advantage of the true rate is that it is useful for focusing attention on potential public health problems more rigorously than simple counts data. However, the number health events such as mortality are influenced by more than just the underlying size of the population. The composition of the population will have additional effects on the number of health events that occur and for the analysis of mortality the most important effect is that of the population’s age structure.

Because aging is the greatest risk for mortality, the age structure (composition) of a population will have an effect on the true mortality rate. For example, two counties may have similar population sizes but one has a larger proportion of people over the age of 45 than the other. It is more likely that the older population will experience more deaths over the course of time, which will be reflected in a higher true mortality rate. Age structure, therefore, has a direct effect on the true mortality rate and in order to make meaningful comparisons population age structures need to be controlled.

Age-adjustment or controlling 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 is used in age adjusting populations for comparisons.) The weighting scheme redistributes the age group sizes of the observed population as if it had the same structure as the standard reference population. The standardized age group population is then applied the number of deaths found in the corresponding age group of the observed population to produce an expected number of deaths for that age group. The expected number of deaths are summed and then divided by the weighted total population yielding an age-adjusted death rate. Once age structure is controlled, analysis of the effects of selected diseases on mortality is more tractable and the effects of race and gender can be studied more effectively.

The study of premature mortality focuses on the burden of disease and death in a population. The amount of burden is measured in the accumulated amount of years of life lost (YLL) 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. To calculate the number of years lost, the age of each person who dies before age 75 is subtracted from 75 and the lost years are summed. The YLL for each person who dies before age 75 is first aggregated and then the result divided by the population under 75 years of age. Again, the value will be relatively small and so a further multiplication of 10,000 magnifies the number into a more understandable rate. The true YLL for an area, like the true mortality rate, is not readily comparable to other areas but it is useful for assessing community health, evaluating health services, and for health planning. Comparisons are possible when age-adjustment with a standard reference population is used.

Age-adjusted rates for both mortality and premature mortality have little intrinsic meaning, however, and can mask the burden and trends of health events 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 true rate first, and then use the adjusted rate only if one wishes to factor out age in understanding the health of a population. All of the statistics presented are for the three-year period (1999 to 2001). A three-year period was 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 and they also 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. With the exception of the second pie chart figure, all rates are true (or crude). The area of each pie is based on the true mortality rate for the population over a three-year period (1999-2001), with larger pie charts representing higher true mortality rates. For purposes of presentation, we set a limit on the smallest possible area of a circle and assigned this area to the population with the smallest rate. (This lower limit is based on the age-adjusted rate for white females in North Carolina.) We then scaled up the circles for all other groups proportionately based on their rates.

The first two pie chart figures compare the proportions of leading causes of death across regions at the national, state, and county level. The first figure in this set allows comparisons using true rates, which illustrates the relative burden of disease intrinsic to each region. The second figure, which is age-adjusted, allows for direct comparisons among regions. The following two figures use proportions based on true mortality rates to show the relative burden of disease intrinsic within race/gender groups and within two major racial groups.

While comparing the pie charts, the reader should remember that the slices of the pie show differences in how much of the total true or age-adjusted mortality rate is accounted for by a specific contributor, not the absolute differences in magnitude of the disease-specific true mortality

rate. Finally, the reader will see that some pies are composed of different leading contributors to 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 different types of figures are created to show trends in mortality by all causes and for each of the leading causes in the county over a twenty-one year period. True and age-adjusted mortality rate trends are shown for deaths by all causes in addition to the ten leading causes of death. Premature mortality is described for deaths by all causes only. The first figure in the trend series illustrates the true mortality rates for the county, region, and state. Here, the magnitude of each region's mortality pattern for each time interval can be examined. The second figure shows age-adjusted mortality rates for the county, region, state, and nation. In this figure, these geographical entities can be compared directly, because their age structures have been controlled. The third figure compares trends in age-adjusted mortality rates by race and gender. Again, age structure is controlled for each group, which permits observation of the effects of race and gender on these groups. The last figure depicts racial differentials based on true mortality over the twenty-one year time period. True mortality is used here so that the percent differences of the actual number of deaths, or the relative mortality experience for, can be examined for potential disparities. Trend lines provide historical depth to mortality processes as well as a basis for 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, then there is less dependence and less of a trend in the observations. The purpose of trend lines is to uncover patterns in the data, which will assist the investigator in determining and understanding the underlying processes which generate them.

Mathematically, an equation of the line can be 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 theoretical rates to the year 2010 from historical values (1979 to 2001) 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—a rate on the trend line—for a given year. The variable " x " is the equation of the line represents the ordinal year in the series. For example, 1990 represents the 12th year in the time series. When the number 12 is substituted for x in the equation of the line describing ENC's age-adjusted mortality rate for cancer of lung, trachea, and bronchus for the years 1979 to 2001, the calculated fitted rate approaches 63 persons dying per 100,000 people from this disease. The observed age-adjusted rate for 1990 is 69 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.) For the year 1990, the expected mortality rate is 63 per 100,000 people compared to the observed rate of 69—an underestimate of six people for that year. Each previous and subsequent year's difference between the expected and observed rates will vary by a greater or lesser degree. The amount of variation can be measured to determine how well the line fits or models the observed data.

The time series figures include coefficients of determination (R^2), to note when the trend lines are significant, and the percent increase or decrease from 1979 to 2001. The coefficients of determination are included in order to show how well the trend lines fit the data. R-square can

range from 0 to 1, with higher scores representing a better fit. The trend lines are generally unreliable when R^2 is less than 0.11, moderately reliable when R^2 is between 0.11 and 0.35, and most reliable when R^2 is greater than 0.35. Graphically, data points, data lines and trend lines are weighted according to their significance. The thinnest, dotted trend lines are for those where R^2 is less than 0.11 and should be considered non-significant. The thickest dotted lines are used for trends where the R^2 is 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 some instances a non-linear trend may be present; however, the theoretical basis with which to explore non-linear trends is beyond the scope of this publication. The percent change provides a quantitative measure of the projected rate of change as well as an indication of whether the trend is increasing or decreasing. Percentage increase or decrease is provided on the graphs for trends where R^2 is greater than 0.11. The reader should evaluate all available data carefully before drawing conclusions about mortality patterns.

The reader will 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.

Each figure, with the exception of the one showing disparity, is accompanied by two comparison tables located in the lower portion of the page. These tables are structured so that the reader can compare the rates derived from the equation of the line (i.e., the fitted rates) among different regions or demographic groups. The 1979 and 2001 tables compare the fitted rates calculated for the beginning and end of the observed time series in terms of percent difference. For example, ENC's fitted rate for cancer of the lung, trachea, and bronchus in 1979 is 12% greater than (GT) Beaufort County's fitted rate. In 2001, ENC's fitted rate is 17% less than (LT) Beaufort County's fitted rate. The tables permit a quick assessment of trends calculated from observed time series data.

Caveats about the Concepts of Race, Gender, and Geography

We also offer several caveats 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 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 2010*, 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.

References

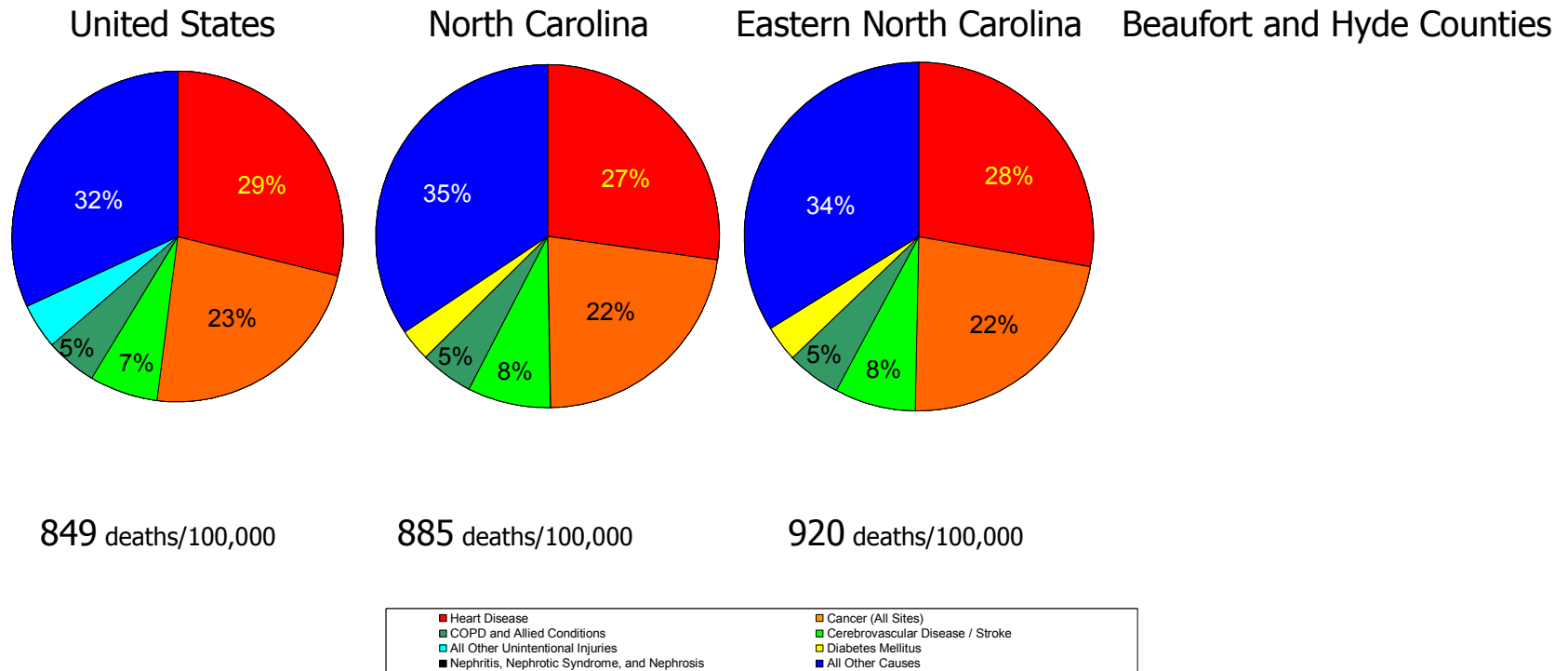
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Leading Causes of Death in Beaufort and Hyde Counties, NC

Figure 1. Leading causes of death for Pitt County, the United States, North Carolina, and Eastern North Carolina, (1999-2001). True Mortality rate per 100,000 population.

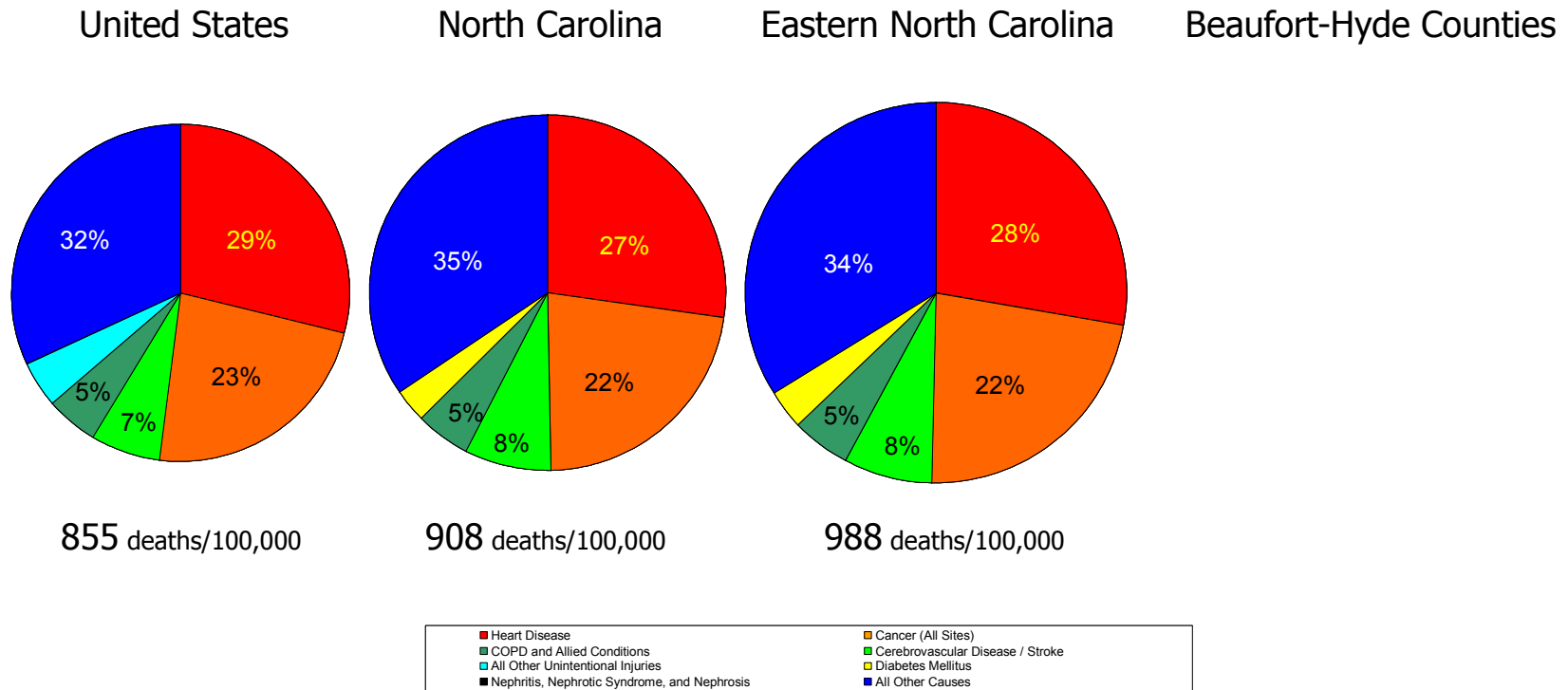


NC rate is 4% higher than US rate.

ENC rate is 4% higher than NC rate.

Pie charts are proportionally scaled using the state age-adjusted mortality rate of white-females (718 deaths / 100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

Figure 2. Leading causes of death for Pitt County, the United States, North Carolina, and Eastern North Carolina, (1999-2001). Age-Adjusted Mortality rate per 100,000 population.



NC rate is 6% higher than US rate.

ENC rate is 9% higher than NC rate.

Pie charts are proportionally scaled using the state age-adjusted mortality rate of white-females (718 deaths / 100,000 pop) as a standard. The areas are proportional to the rates. Slices without percentages constitute less than 5% of the deaths within that chart.

Ten Leading Causes of Death

Heart Disease

Cancer - Trachea, Bronchus, and Lung

Stroke

Chronic Lower Respiratory Disease

Cancer - Colon, Rectum, and Anus

Influenza and Pneumonia

All Other Unintentional Injuries and Adverse Effects

Unintentional Motor Vehicle Injuries

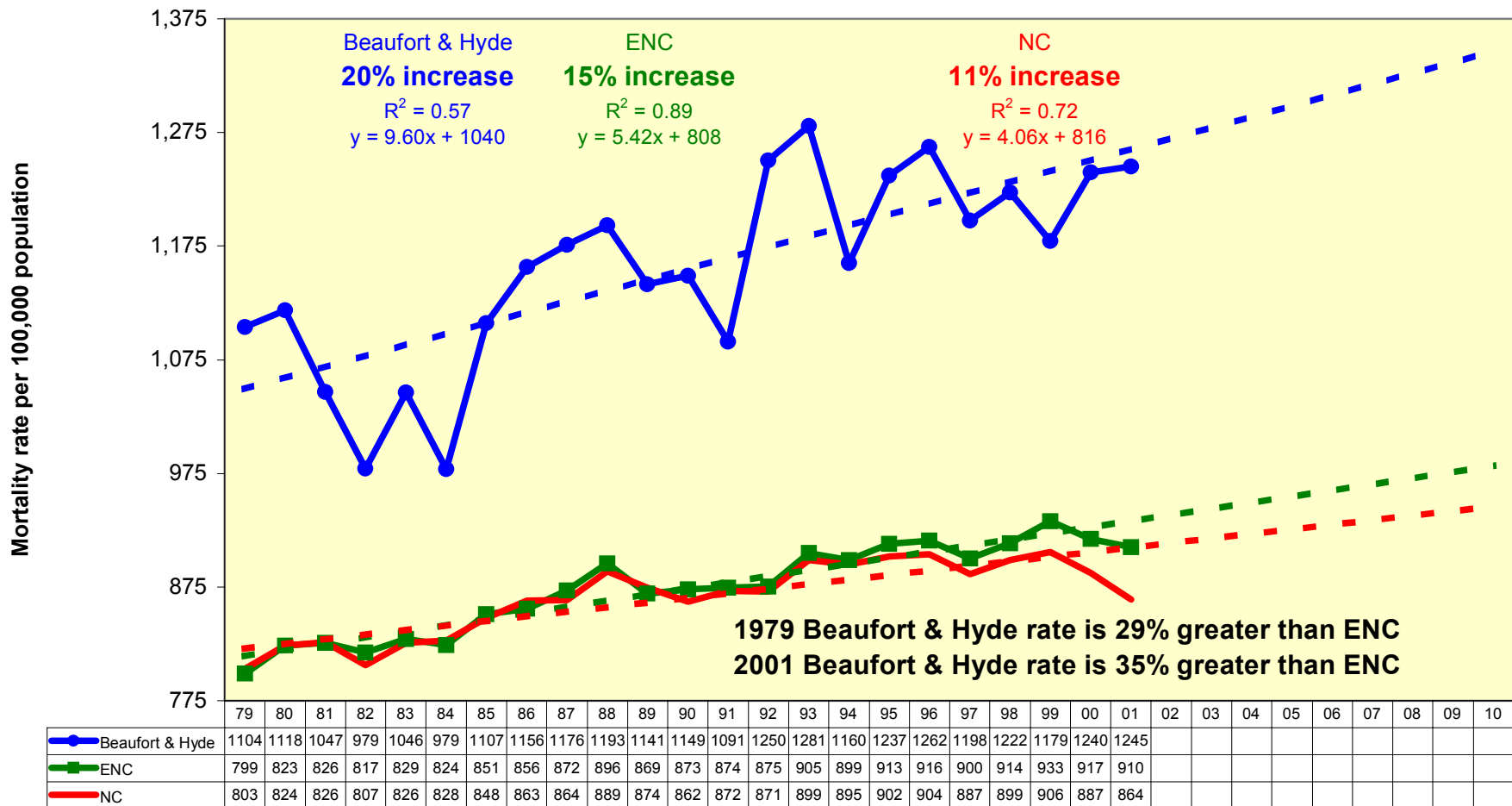
Diabetes Mellitus

Nephritis, Nephrotic Syndrome, and Nephrosis

Trends and Disparities in Mortality
in Beaufort and Hyde Counties, NC:
All Causes of Death,
All Causes of Premature Mortality, and
Ten Leading Causes of Death;
1979-2001

All Causes of Death

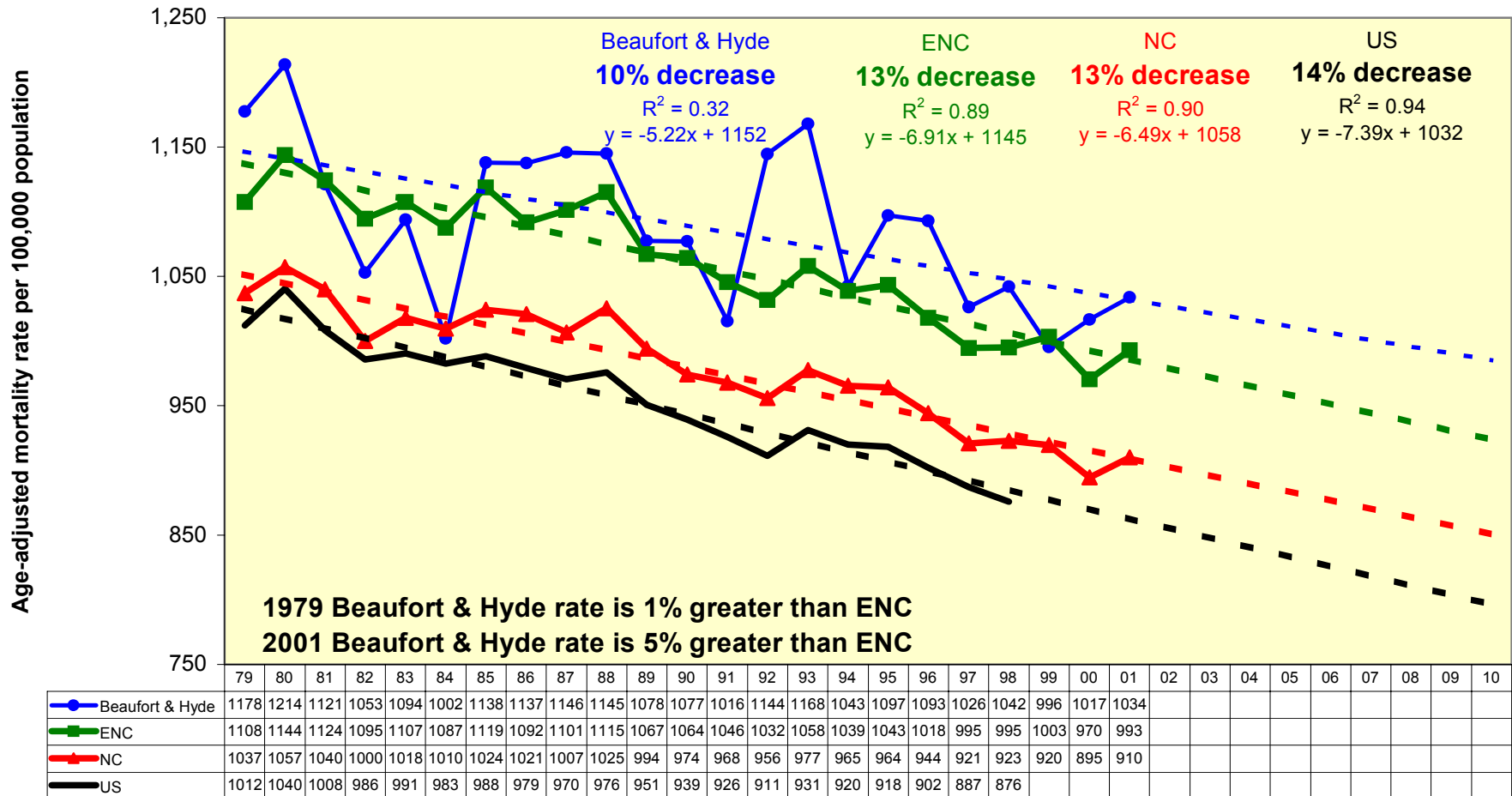
Figure 5. All Causes of Death:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	22%LT	21%LT	Beaufort & Hyde
29%GT		1%GT	ENC
27%GT	1%LT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	26%LT	28%LT	Beaufort & Hyde
35%GT		2%LT	ENC
38%GT	2%GT		NC

Figure 6. All Causes of Death:
Trends in age-adjusted mortality rates by county, region, state, and nation, 1979-2001 with projections to 2010



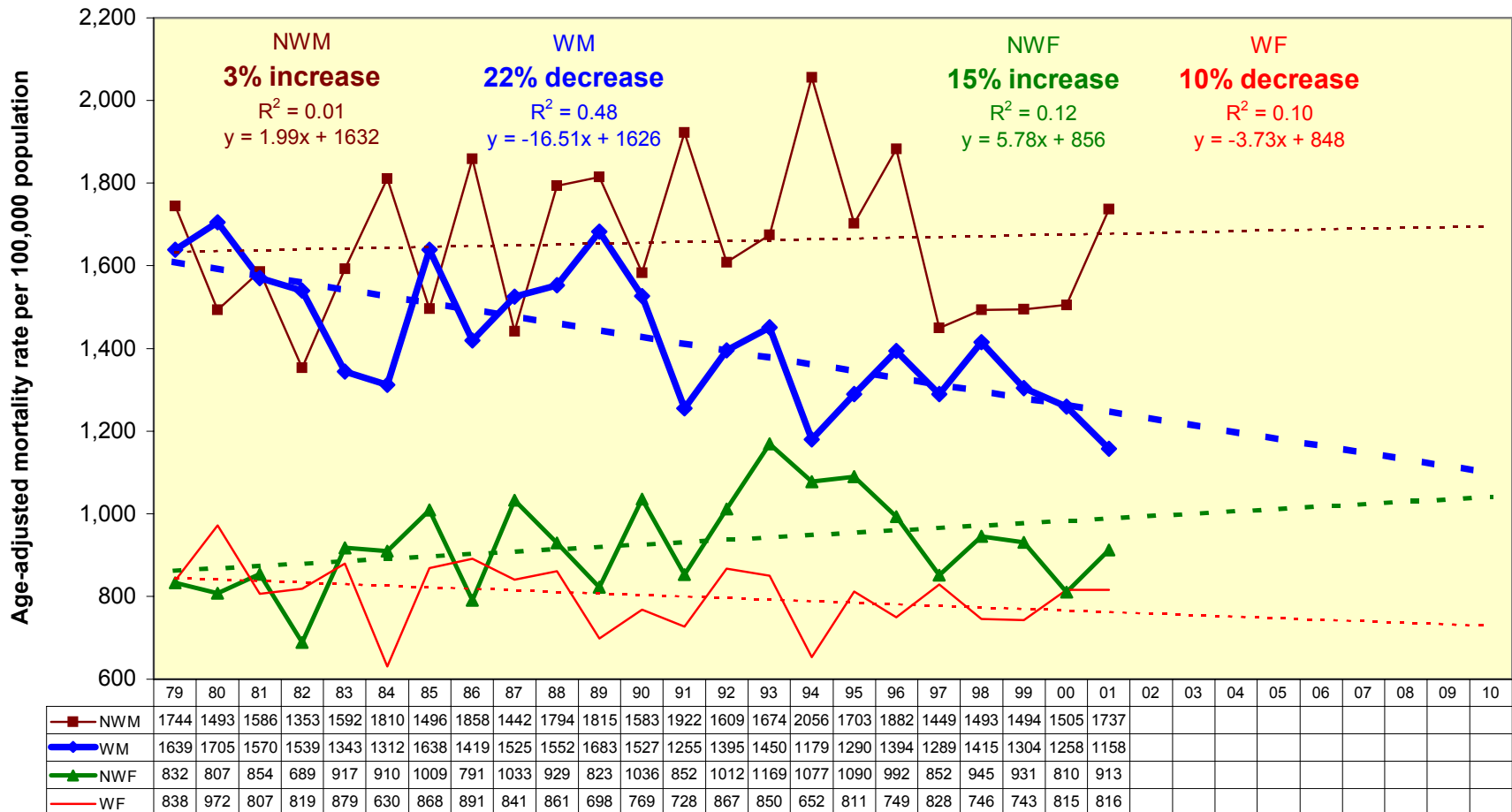
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	1%LT	8%LT	10%LT	Beaufort & Hyde
1%GT		8%LT	10%LT	ENC
9%GT	8%GT		2%LT	NC
12%GT	11%GT	3%GT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	4%LT	12%LT	16%LT	Beaufort & Hyde
5%GT		8%LT	12%LT	ENC
13%GT	8%GT		5%LT	NC
19%GT	14%GT	5%GT		US

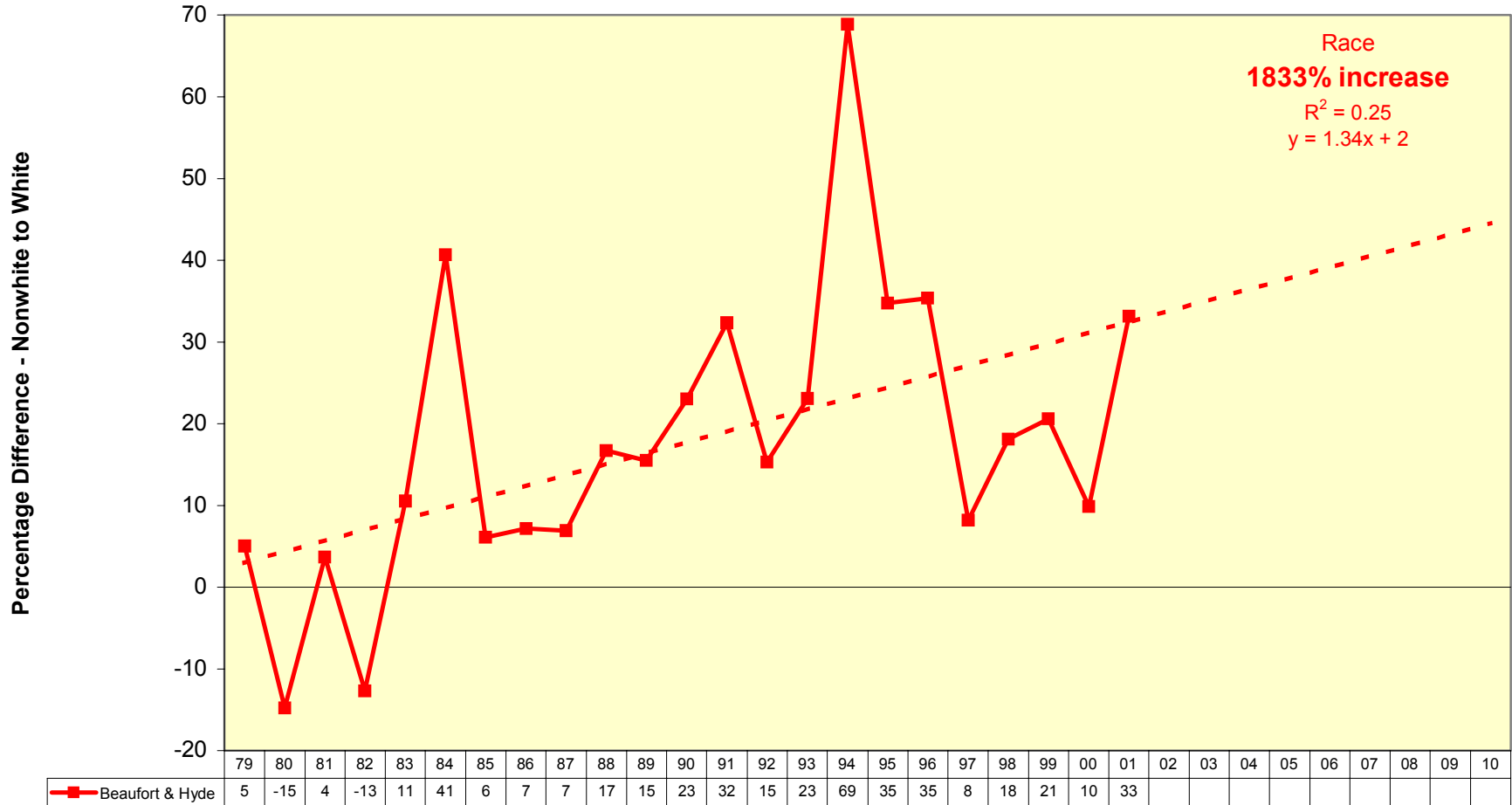
Figure 7. All Causes of Death:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	0%	48% LT	48% LT	NWM
0%		47% LT	48% LT	WM
91% GT	90% GT		1% LT	NWF
92% GT	92% GT	1% GT		WF

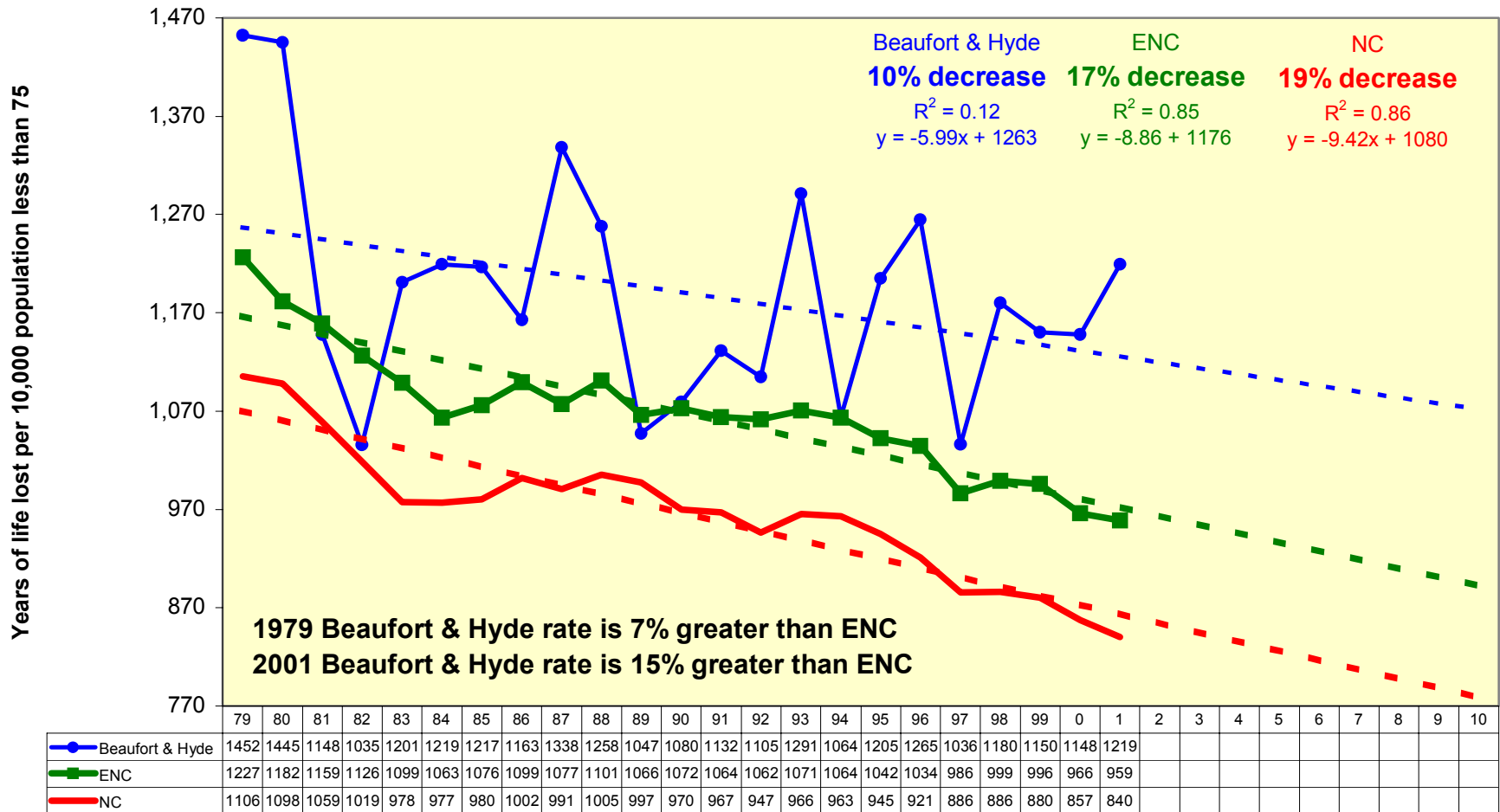
Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	25% LT	41% LT	54% LT	NWM
33% GT		22% LT	39% LT	WM
71% GT	28% GT		22% LT	NWF
119% GT	65% GT	28% GT		WF

Figure 8. All Causes of Death:
Disparity in mortality rates by race,
1979-2001 with projections to 2010



All Causes of Premature Mortality

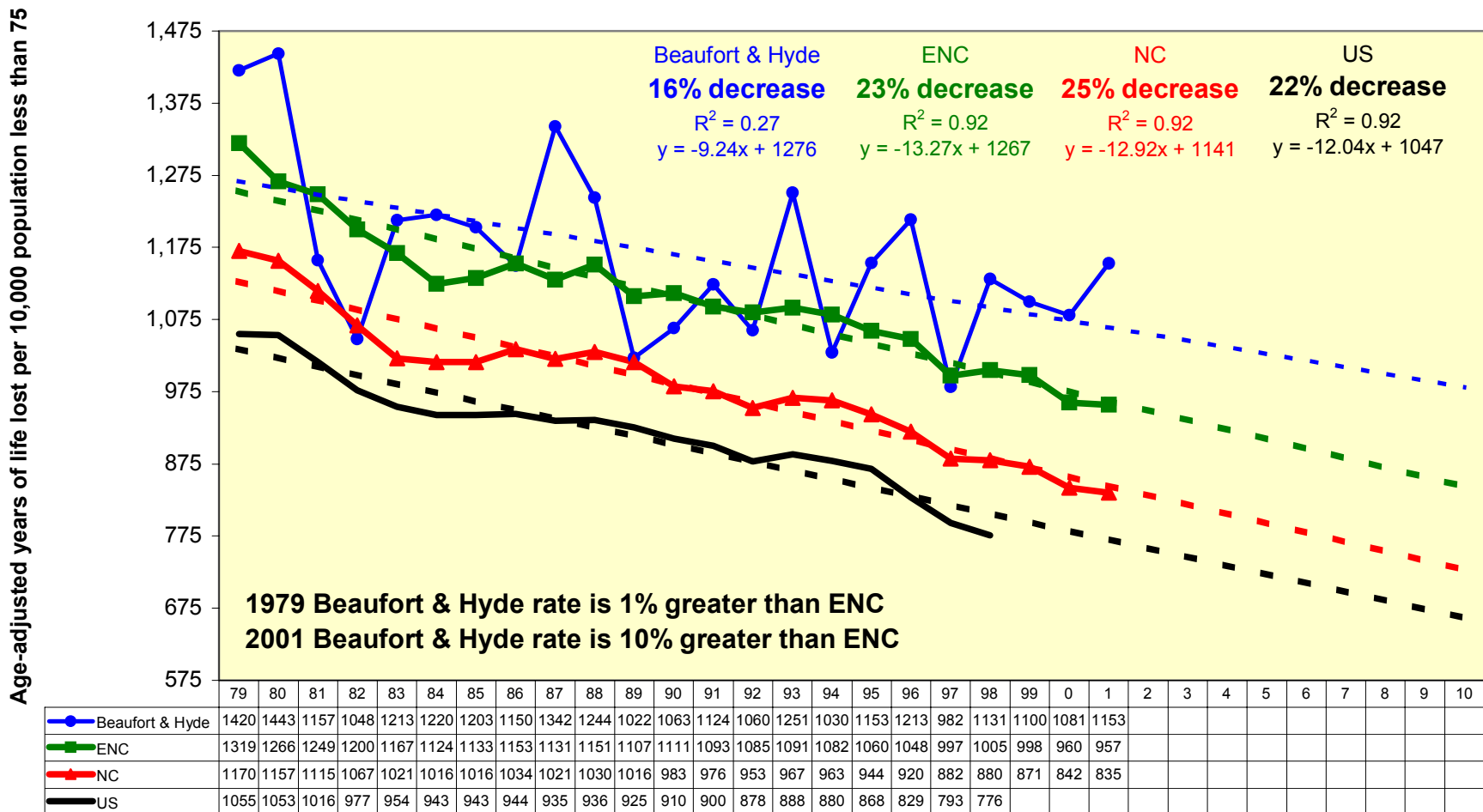
Figure 9. All Causes of Premature Mortality:
Trends in premature mortality rates by county, region, and state,
1979-2001 with projections to 2010



Beaufort & Hyde	ENC	NC	
	7%LT	14%LT	Beaufort & Hyde
7%GT		8%LT	ENC
17%GT	9%GT		NC

Beaufort & Hyde	ENC	NC	
	13%LT	23%LT	Beaufort & Hyde
15%GT		11%LT	ENC
30%GT	12%GT		NC

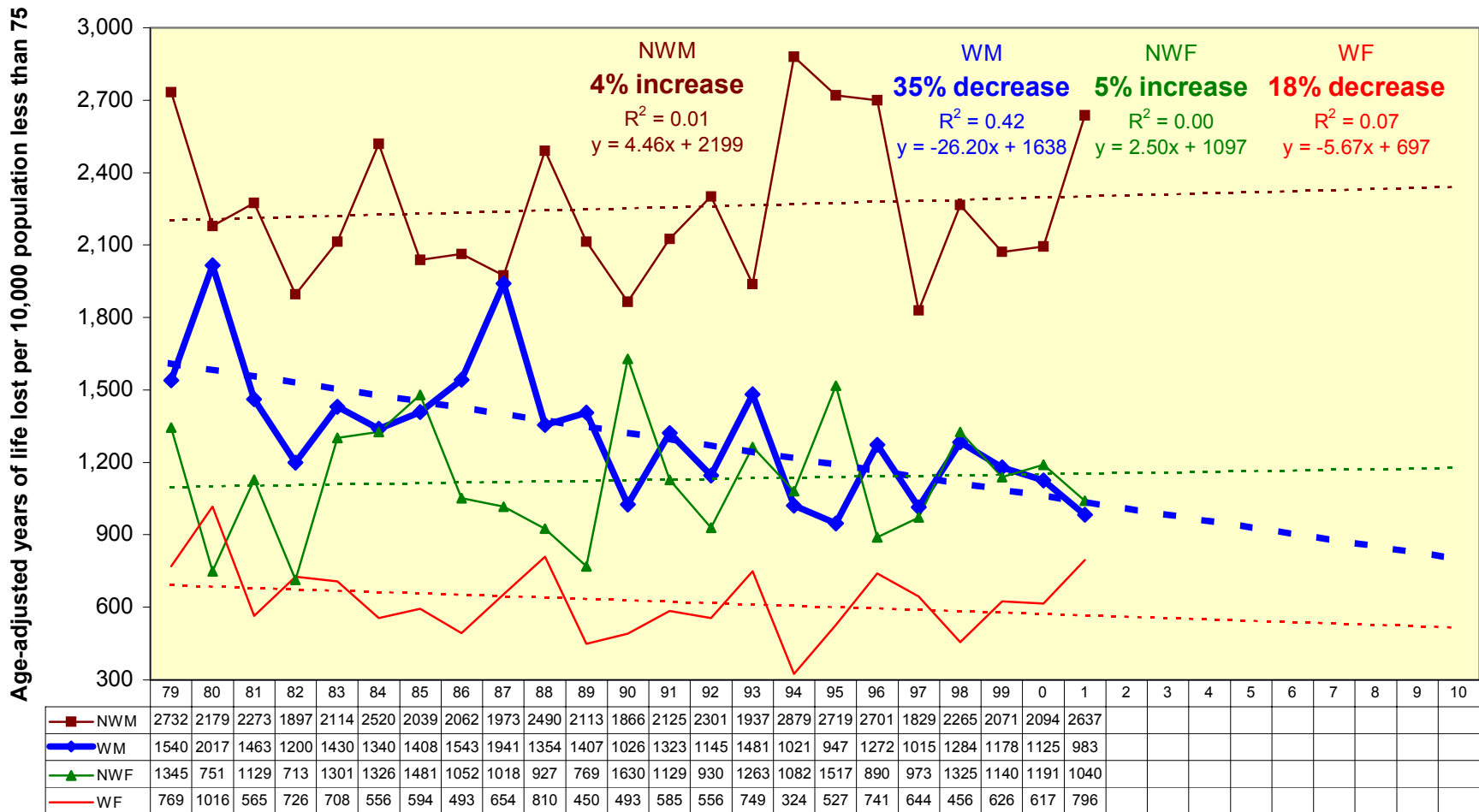
Figure 10. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by county, region, state, and nation, 1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
Beaufort & Hyde	ENC	NC	US	
	1%LT	11%LT	18%LT	Beaufort & Hyde
1%GT		10%LT	17%LT	ENC
12%GT	11%GT	8%LT		NC
22%GT	21%GT	9%GT		US

Disparity of Fitted Rates in 2001				
Beaufort & Hyde	ENC	NC	US	
	9%LT	20%LT	27%LT	Beaufort & Hyde
10%GT		12%LT	20%LT	ENC
25%GT	14%GT	9%LT		NC
37%GT	25%GT	10%GT		US

Figure 11. All Causes of Premature Mortality:
Trends in age-adjusted premature mortality rates by race and gender,
1979-2001 with projections to 2010



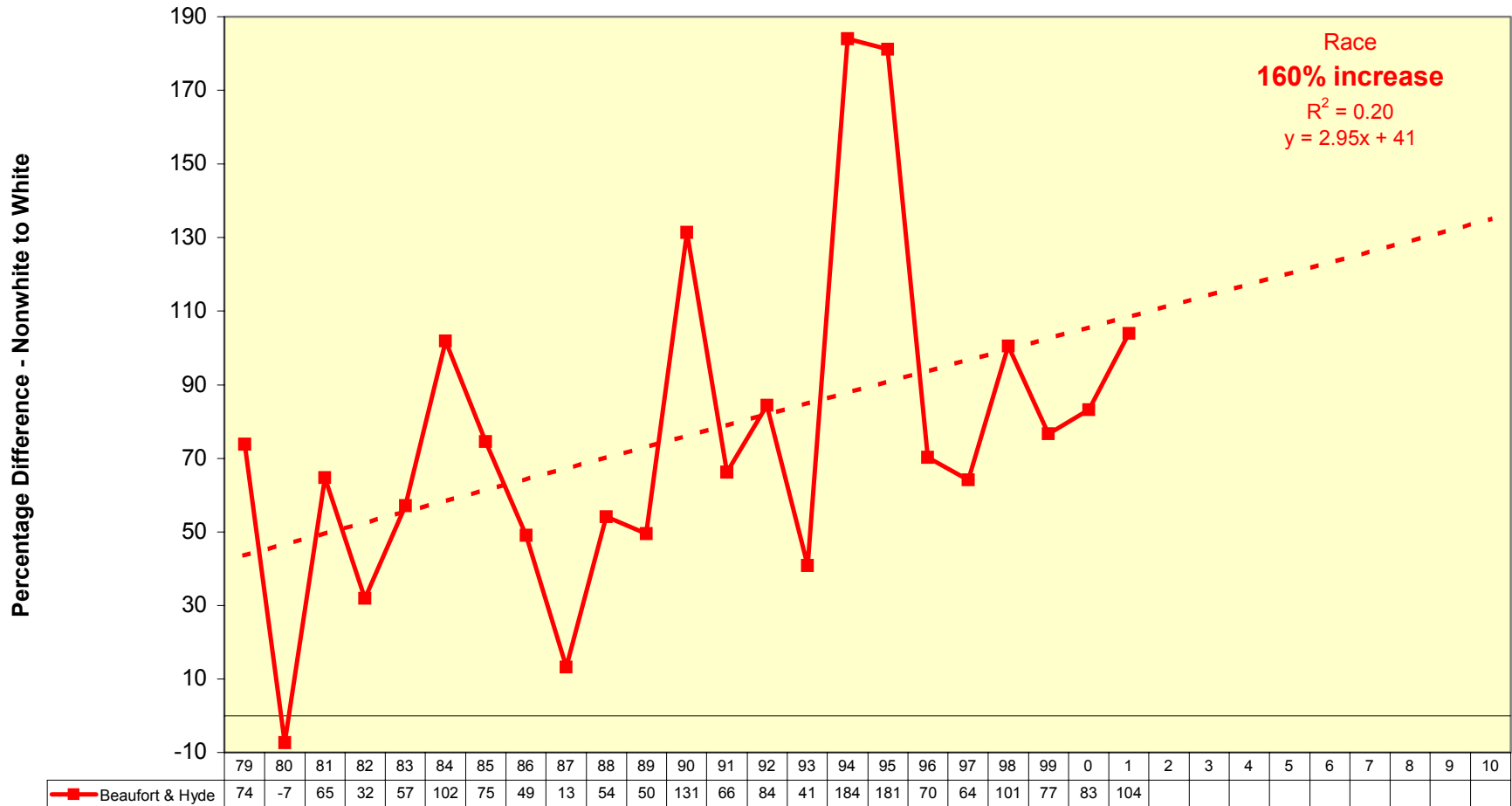
Disparity of Fitted Rates in 1979

NWM	WM	NWF	WF	
	26% LT	50% LT	68% LT	NWM
34% GT		33% LT	57% LT	WM
101% GT	49% GT		36% LT	NWF
216% GT	135% GT	57% GT		WF

Disparity of Fitted Rates in 2001

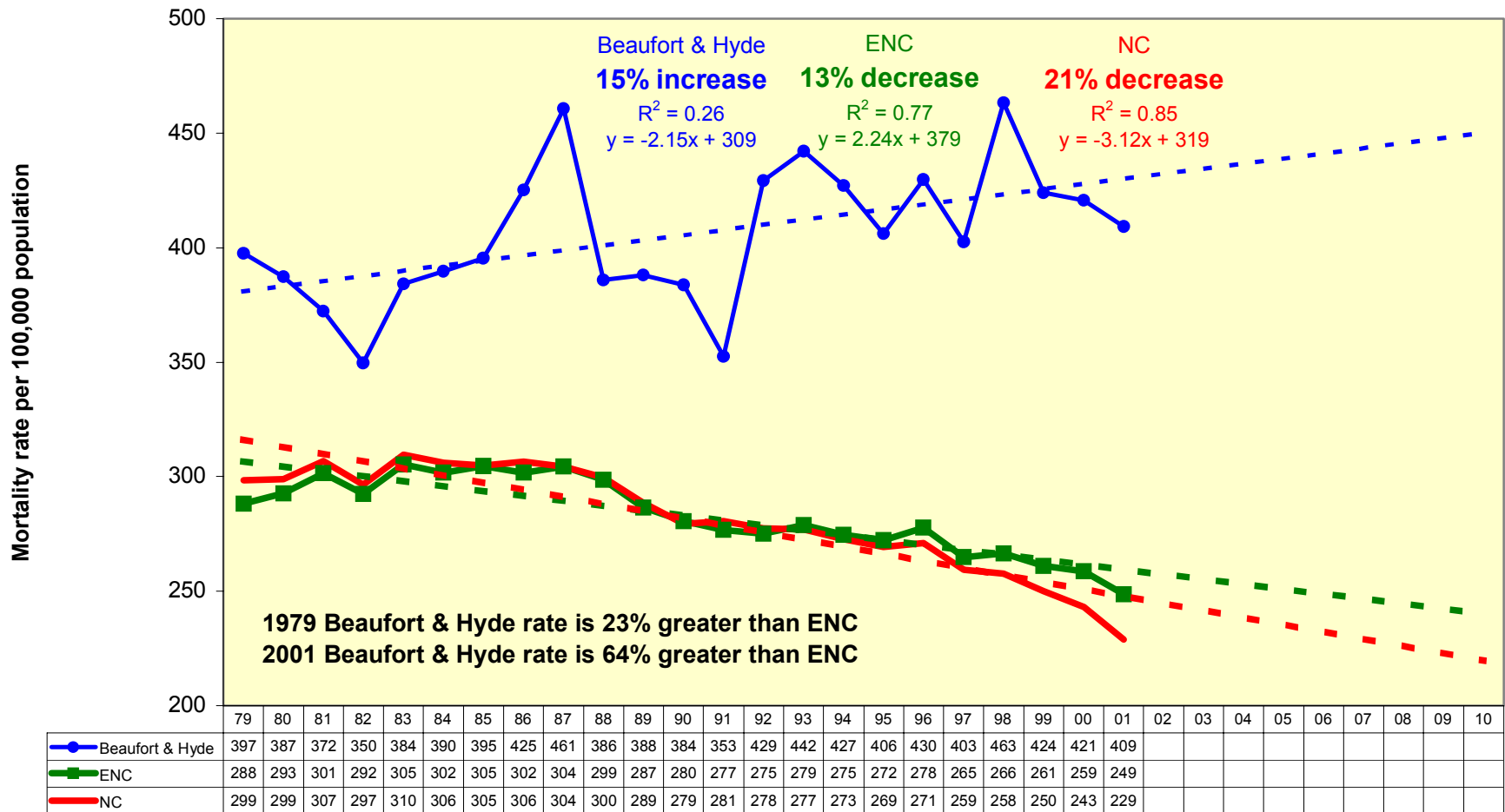
NWM	WM	NWF	WF	
	54% LT	50% LT	75% LT	NWM
116% GT		9% GT	46% LT	WM
99% GT	8% LT		50% LT	NWF
302% GT	86% GT	101% GT		WF

Figure 12. All Causes of Premature Mortality:
 Disparity in premature mortality rates by race,
 1979-2001 with projections to 2010



Heart Disease

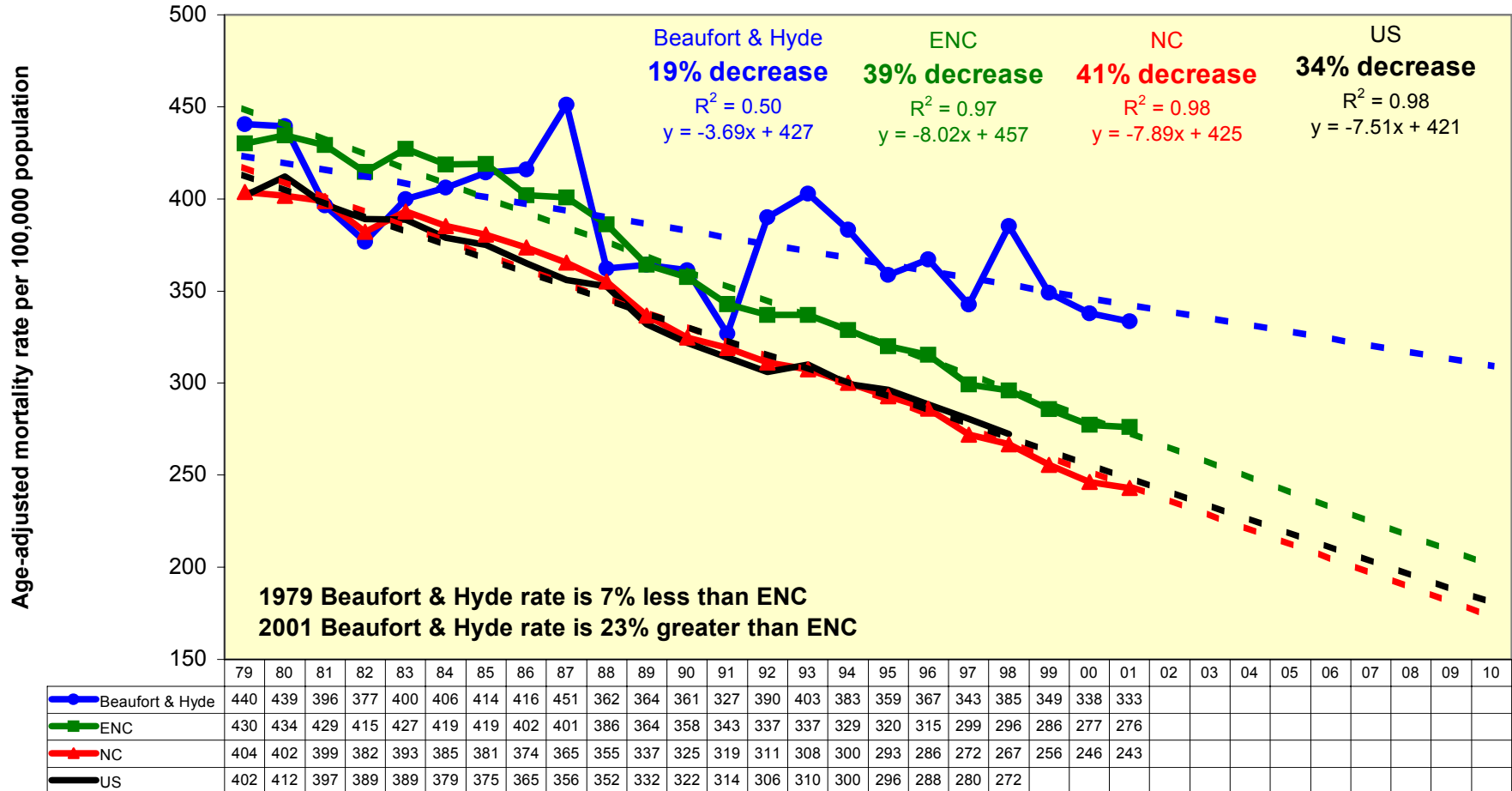
Figure 13. Heart Disease:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	18%LT	16%LT	Beaufort & Hyde
23%GT		3%GT	ENC
19%GT	3%LT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	39%LT	41%LT	Beaufort & Hyde
64%GT		4%LT	ENC
71%GT	4%GT		NC

Figure 14. Heart Disease:
Trends in age-adjusted mortality rates by county, region, state, and nation, 1979-2001 with projections to 2010



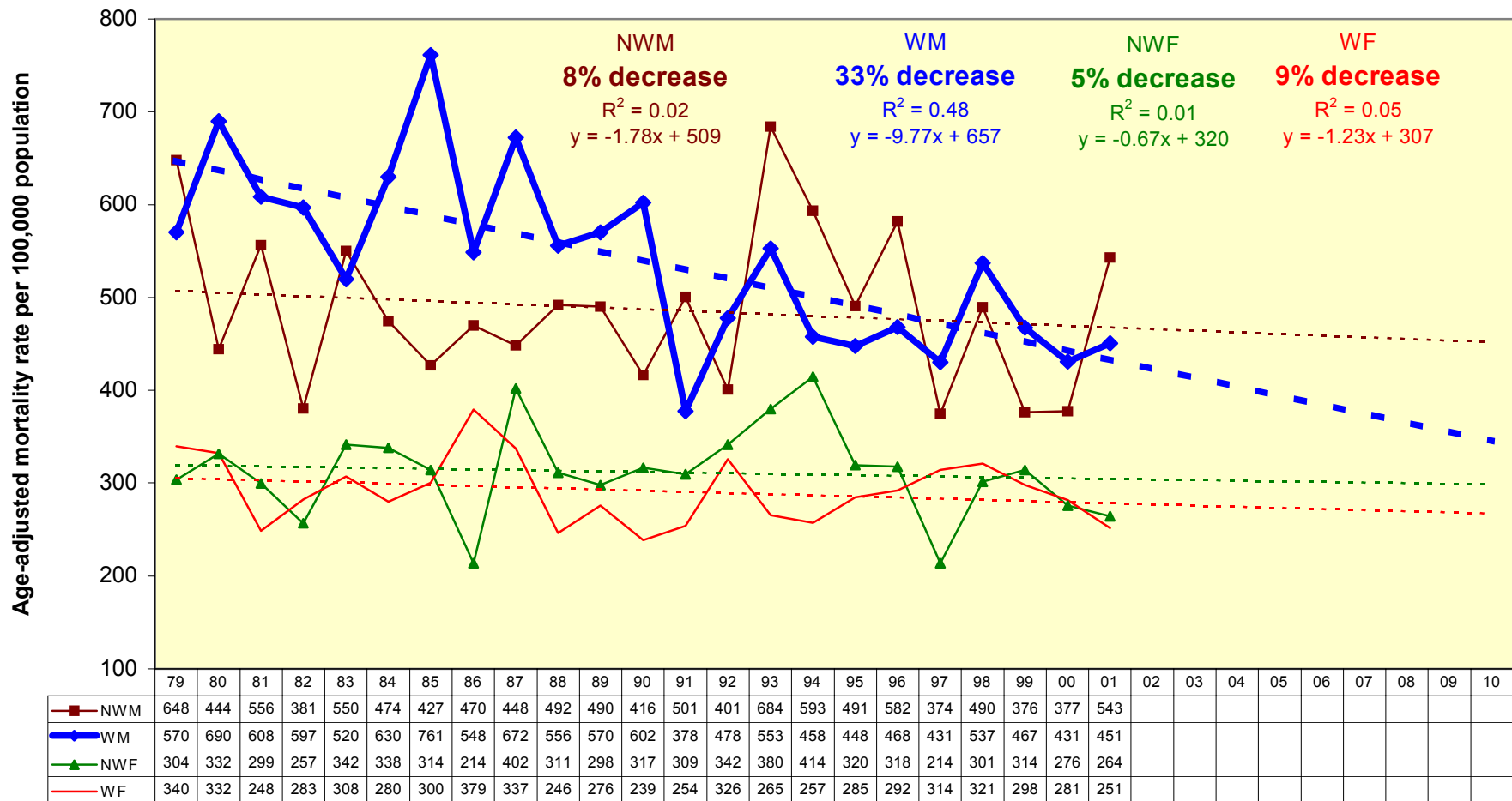
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	7%GT	0%	1%LT	Beaufort & Hyde
7%LT		7%LT	8%LT	ENC
0%	8%GT		1%LT	NC
2%GT	9%GT	1%GT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	19%LT	27%LT	26%LT	Beaufort & Hyde
23%GT		10%LT	9%LT	ENC
37%GT	12%GT		2%GT	NC
36%GT	10%GT	1%LT		US

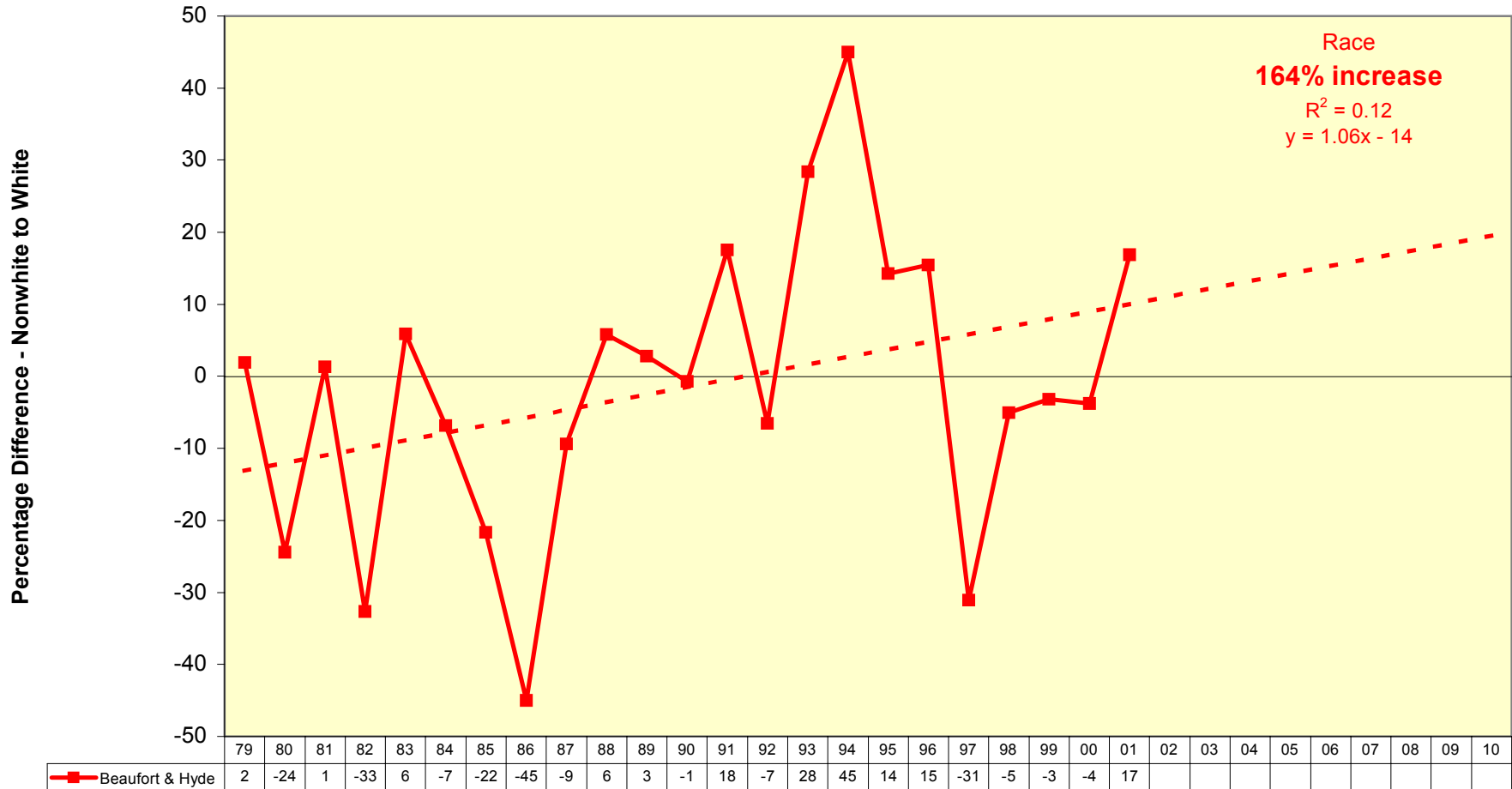
Figure 15. Heart Disease:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	29% GT	37% LT	40% LT	NWM
23% LT		51% LT	53% LT	WM
59% GT	105% GT		4% LT	NWF
66% GT	114% GT	4% GT		WF

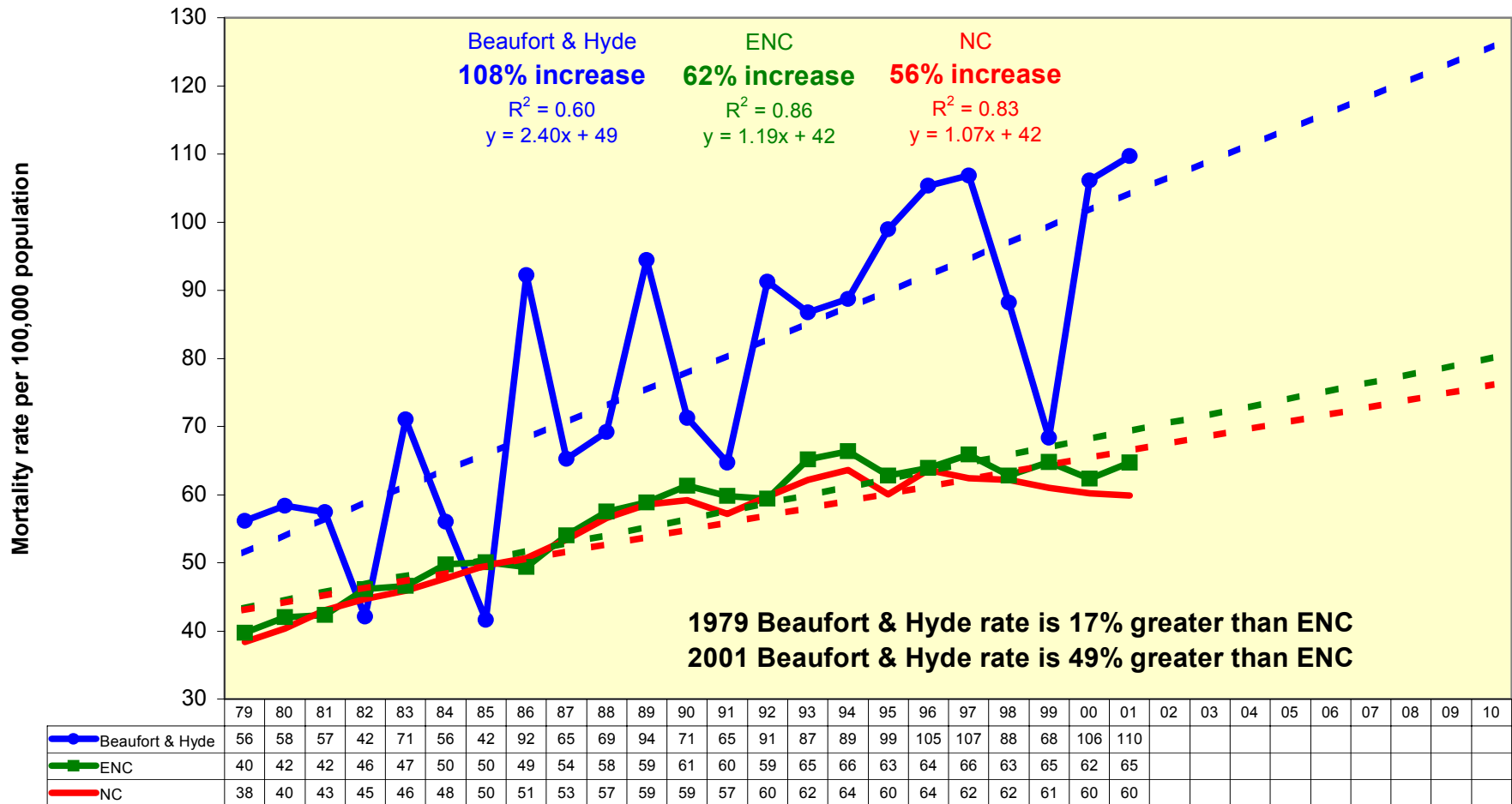
Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	6% LT	35% LT	40% LT	NWM
6% GT		31% LT	37% LT	WM
54% GT	45% GT		8% LT	NWF
68% GT	58% GT	9% GT		WF

Figure 16. Heart Disease:
Disparity in mortality rates by race,
1979-2001 with projections to 2010



Cancer - Trachea, Bronchus, and Lung

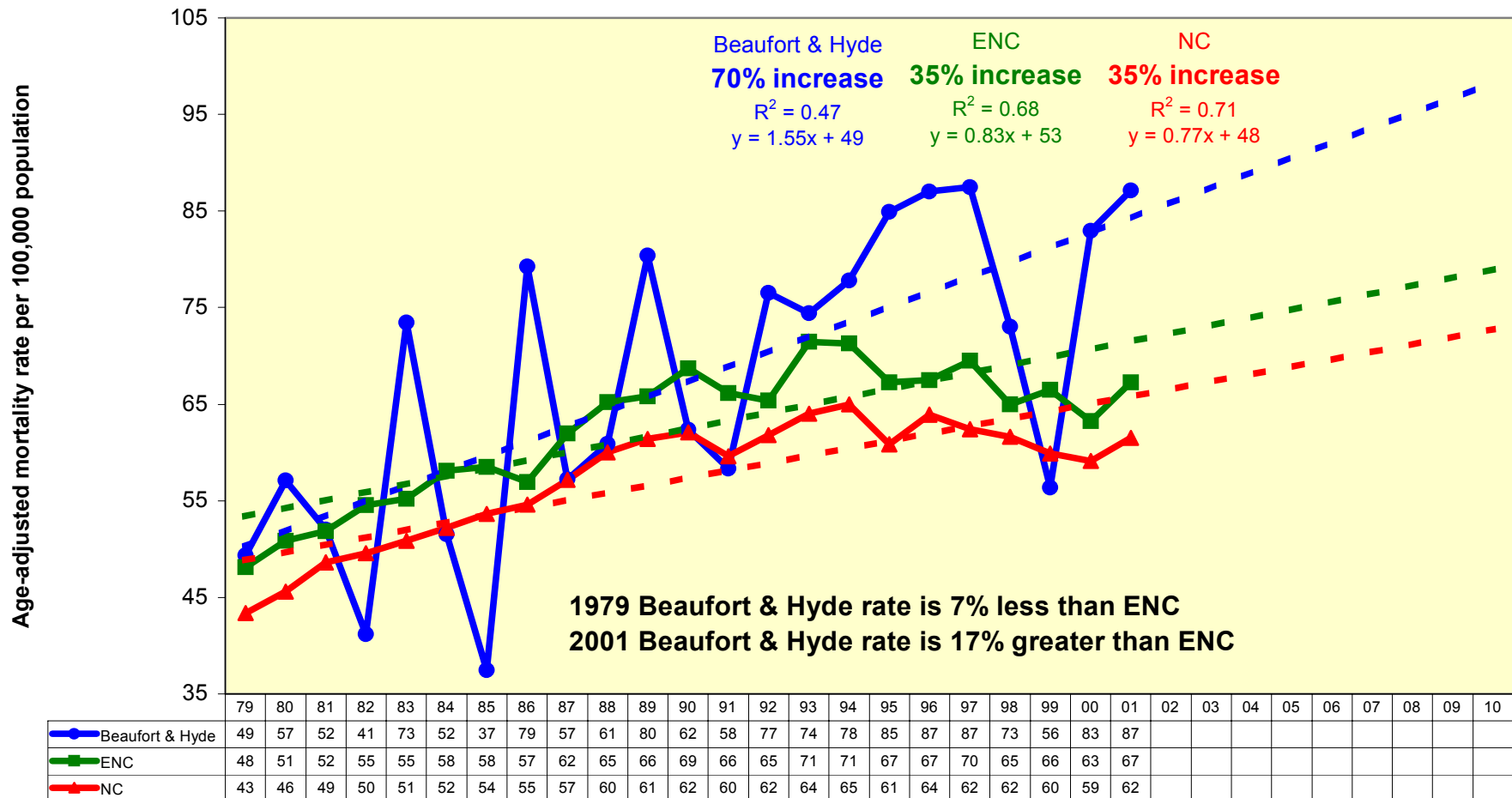
Figure 17. Cancer - Trachea, Bronchus, and Lung:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	14%LT	14%LT	Beaufort & Hyde
17%GT		0%	ENC
17%GT	0%		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	33%LT	36%LT	Beaufort & Hyde
49%GT		4%LT	ENC
56%GT	4%GT		NC

Figure 18. Cancer - Trachea, Bronchus and Lung:
Trends in age-adjusted mortality rates by county, region, and state,
1979-2001 with projections to 2010



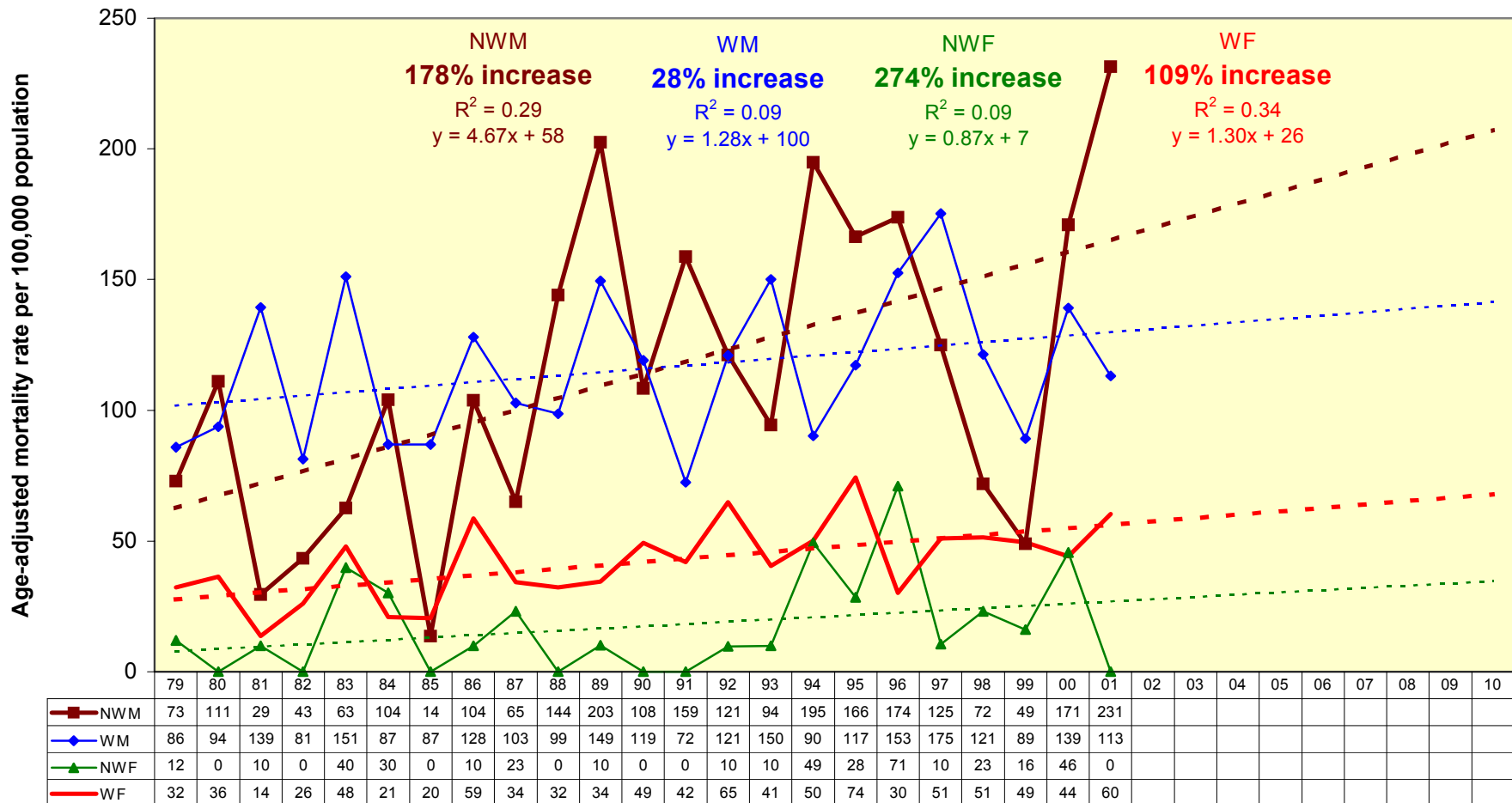
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	
	8%GT	1%LT	Beaufort & Hyde
7%LT		9%LT	ENC
1%GT	9%GT		NC

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	
	15%LT	21%LT	Beaufort & Hyde
17%GT		8%LT	ENC
27%GT	9%GT		NC

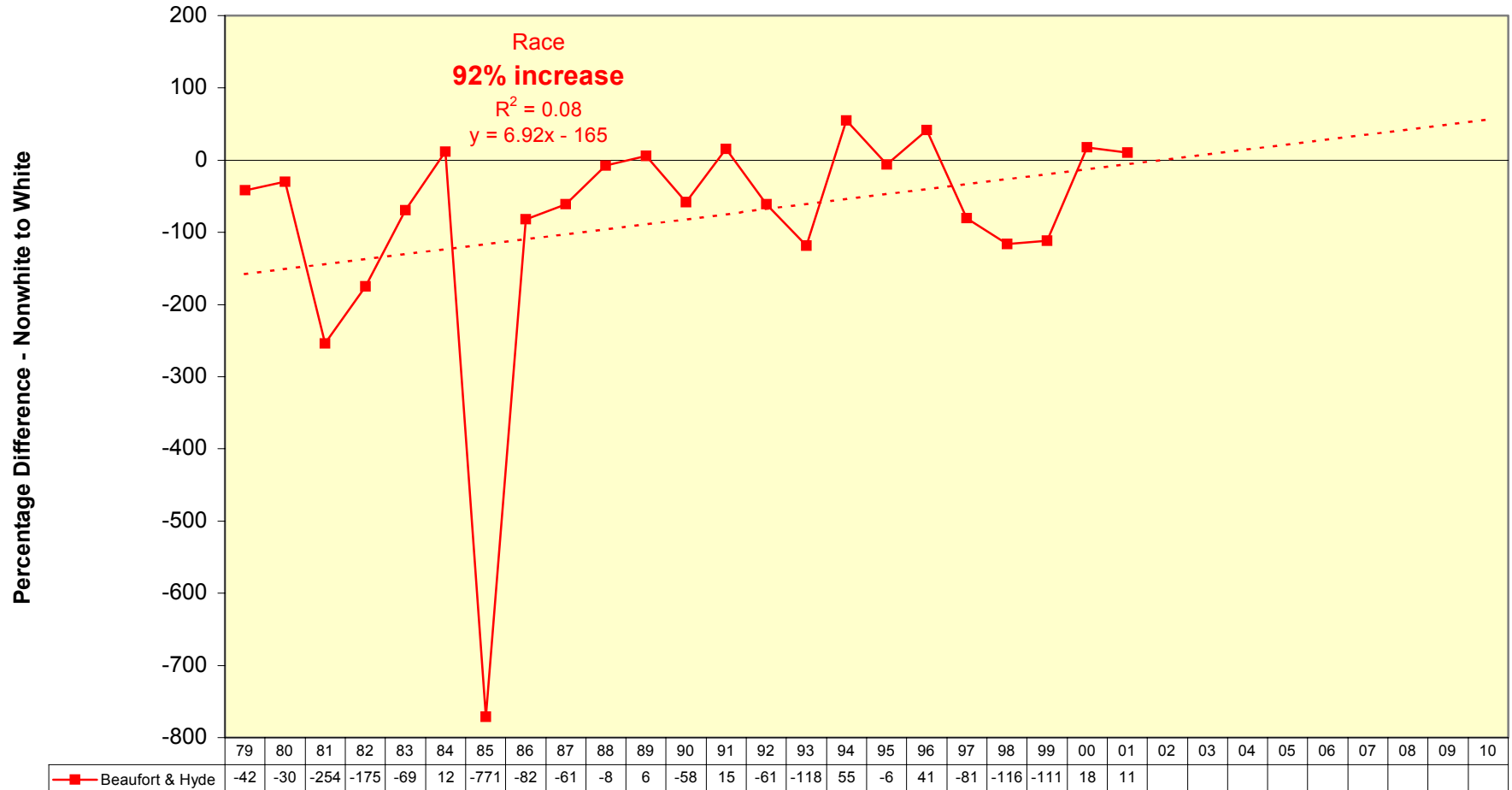
Figure 19. Cancer - Trachea, Bronchus and Lung:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010



NWM	WM	NWF	WF	
	74% GT	88% LT	55% LT	NWM
42% LT		93% LT	74% LT	WM
734% GT	1348% GT		279% GT	NWF
120% GT	282% GT	74% LT		WF

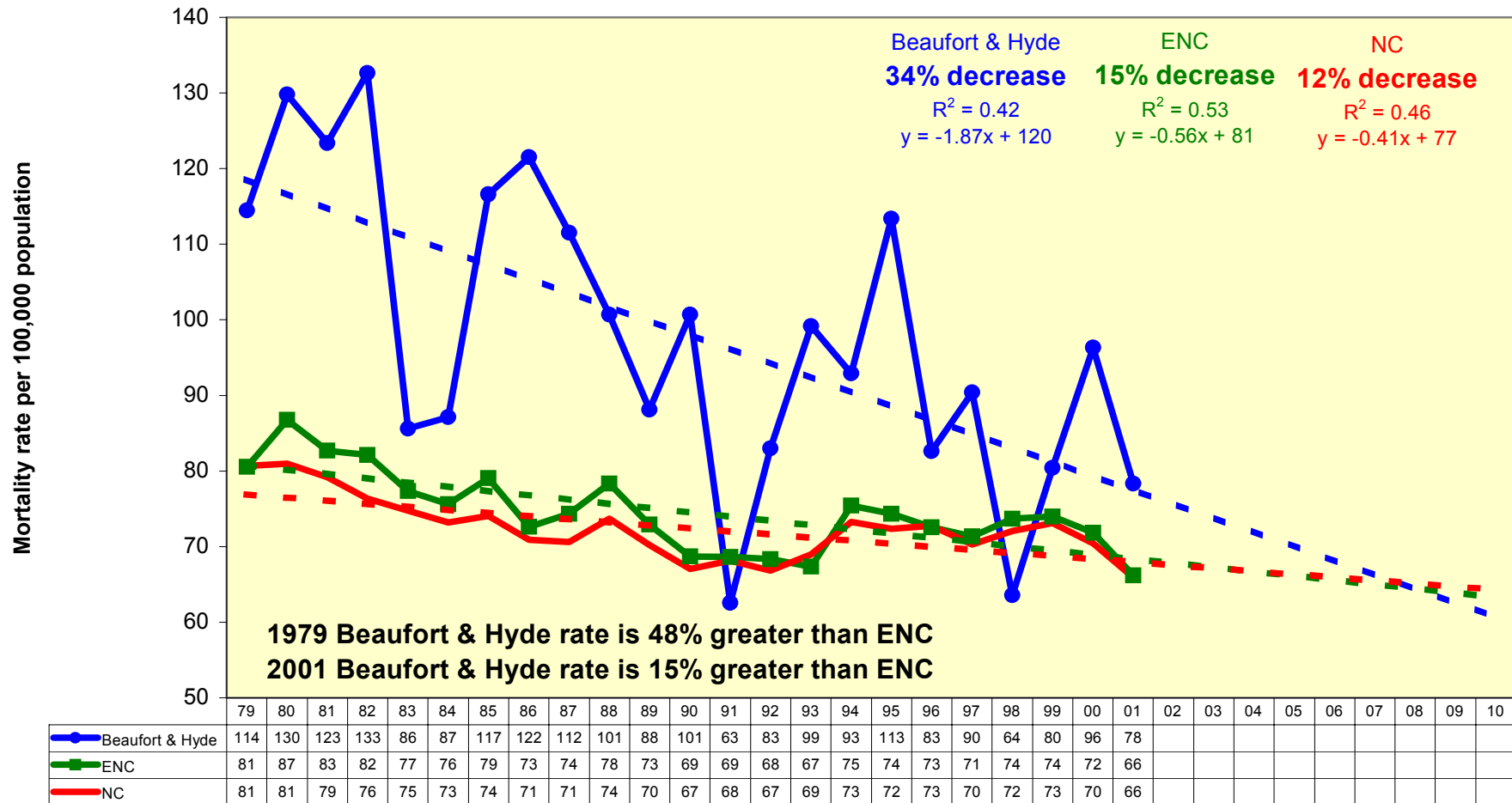
NWM	WM	NWF	WF	
	20% LT	84% LT	66% LT	NWM
25% GT		80% LT	57% LT	WM
518% GT	395% GT		112% GT	NWF
192% GT	134% GT	53% LT		WF

Figure 20. Cancer - Trachea, Bronchus, and Lung:
 Disparity in mortality rates by race,
 1979-2001 with projections to 2010



Stroke

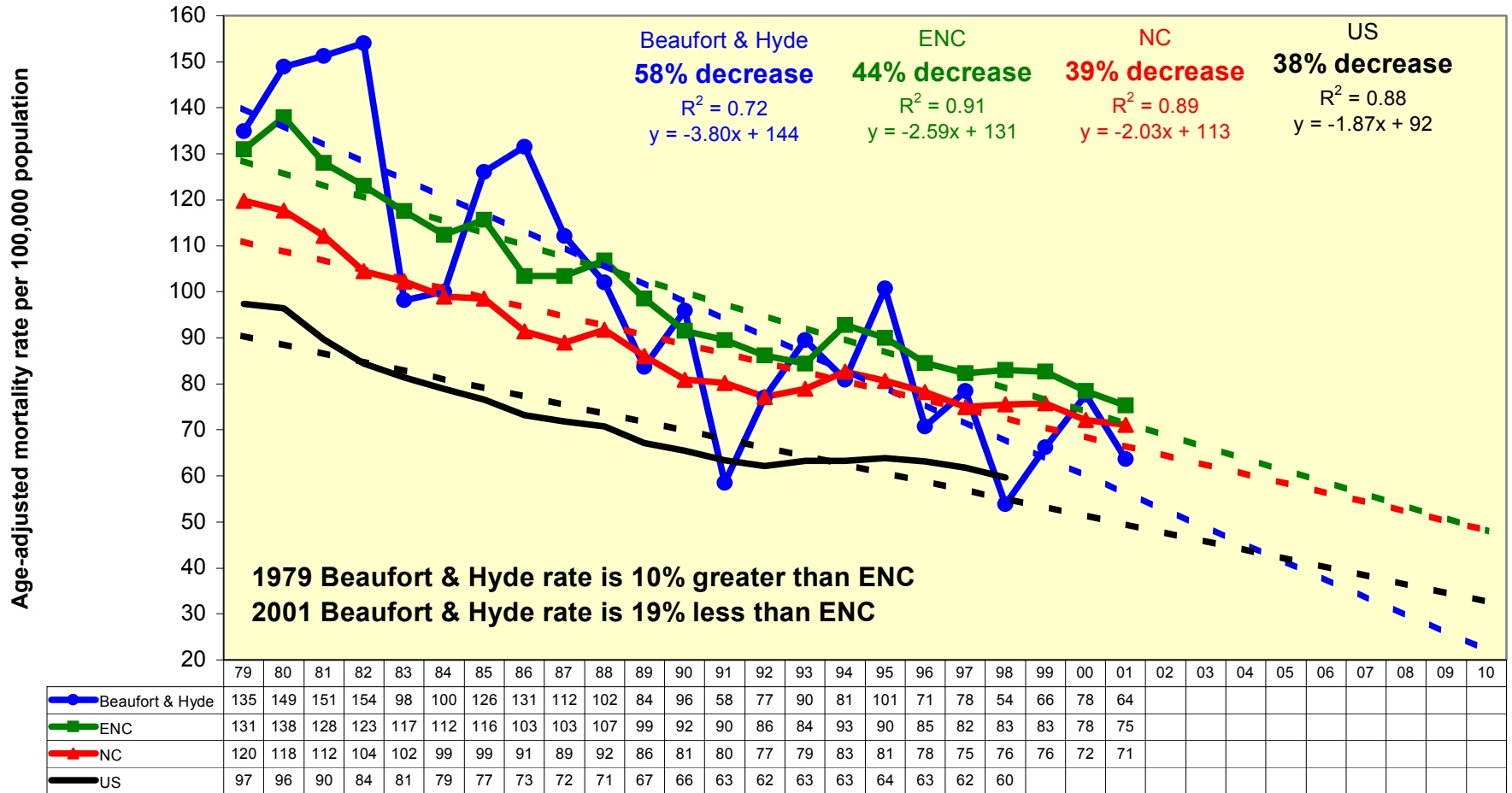
Figure 21. Stroke:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	33%LT	36%LT	Beaufort & Hyde
48%GT		5%LT	ENC
56%GT	5%GT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	13%LT	14%LT	Beaufort & Hyde
15%GT		1%LT	ENC
16%GT	1%GT		NC

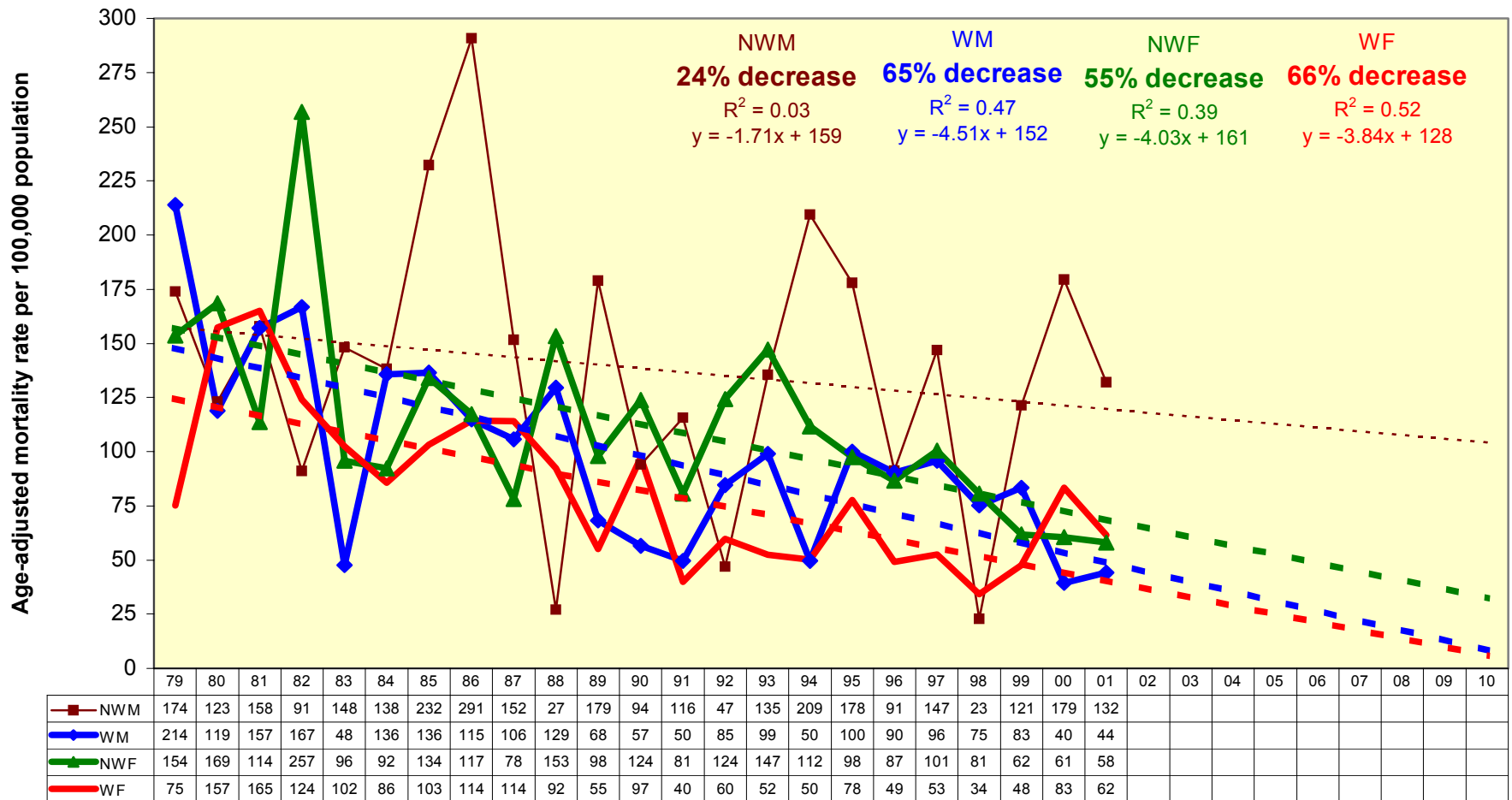
Figure 22. Stroke:
Trends in age-adjusted mortality rates by county, region, state, and nation, 1979-2001 with projections to 2010



Beaufort & Hyde	ENC	NC	US
	9%LT	21%LT	33%LT
10%GT		14%LT	30%LT
27%GT	18%GT		18%LT
53%GT	42%GT	23%GT	

Beaufort & Hyde	ENC	NC	US
	23%GT	14%GT	15%LT
19%LT		8%LT	31%LT
12%LT	8%GT		25%LT
17%GT	44%GT	34%GT	

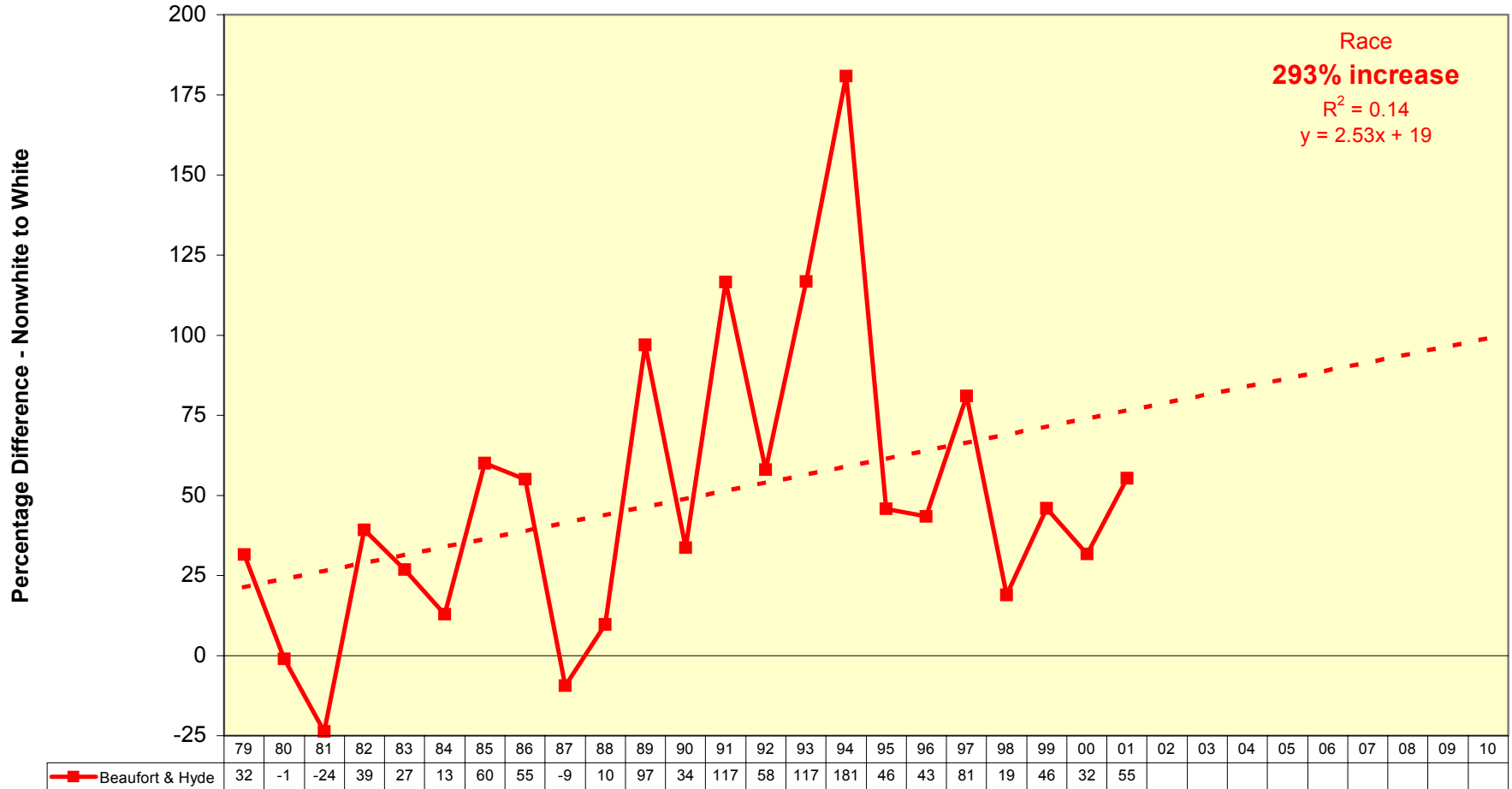
Figure 23. Stroke:
Trends in age-adjusted mortality rates by race and gender, 1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	4% LT	1% GT	19% LT	NWM
4% GT		6% GT	16% LT	WM
1% LT	5% LT		20% LT	NWF
24% GT	19% GT	26% GT		WF

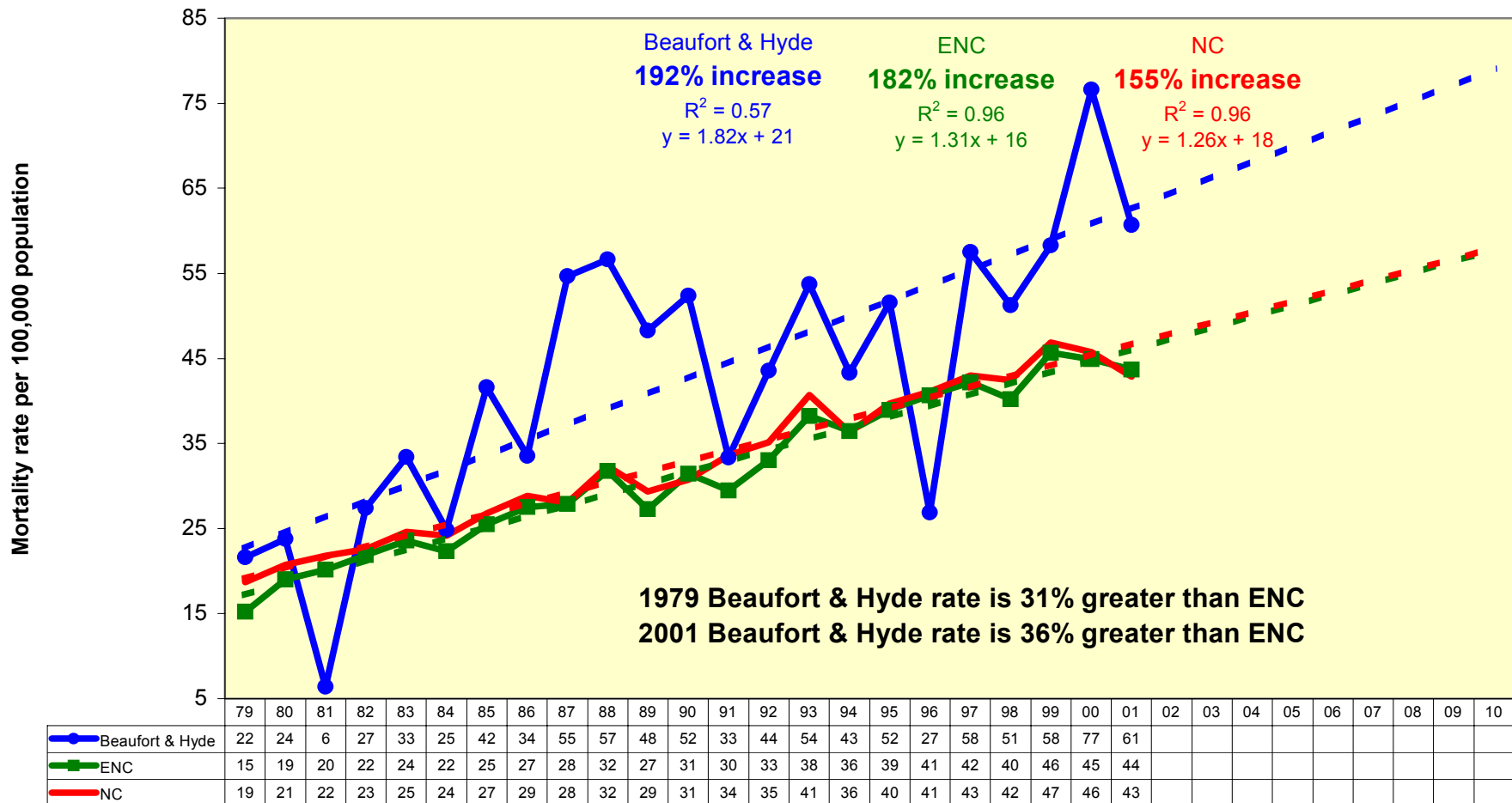
Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	56% LT	40% LT	64% LT	NWM
128% GT		36% GT	17% LT	WM
67% GT	26% LT		39% LT	NWF
176% GT	21% GT	65% GT		WF

Figure 24. Stroke:
Disparity in mortality rates by race,
1979-2001 with projections to 2010



Chronic Lower Respiratory Diseases

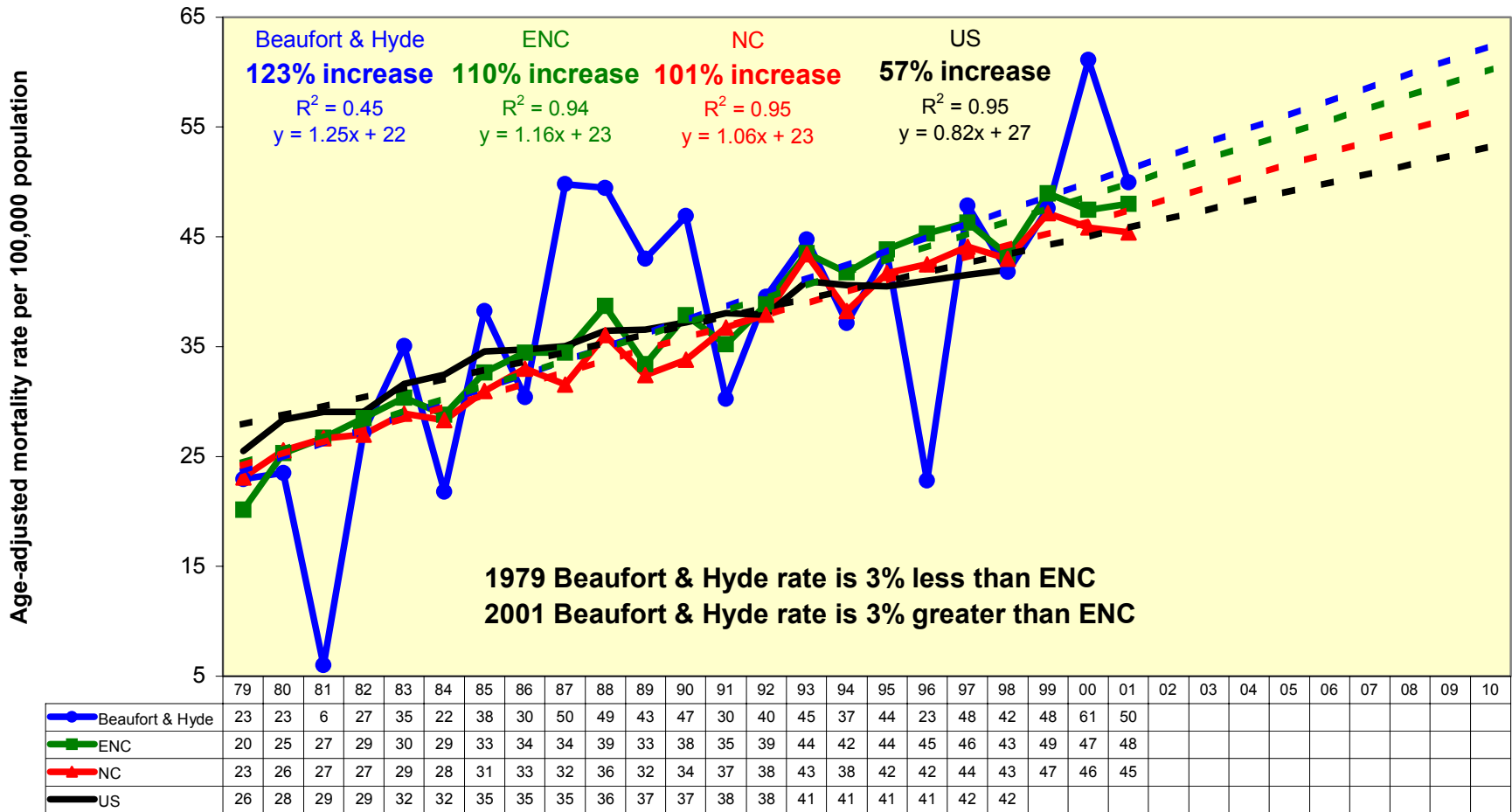
Figure 25. Chronic Lower Respiratory Diseases:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Beaufort & Hyde	ENC	NC	
	24%LT	15%LT	Beaufort & Hyde
31%GT		12%GT	ENC
17%GT	11%LT		NC

Beaufort & Hyde	ENC	NC	
	26%LT	25%LT	Beaufort & Hyde
36%GT		2%GT	ENC
34%GT	2%LT		NC

Figure 26. Chronic Lower Respiratory Diseases:
Trends in age-adjusted mortality rates by county, region, state, and nation,
1979-2001 with projections to 2010



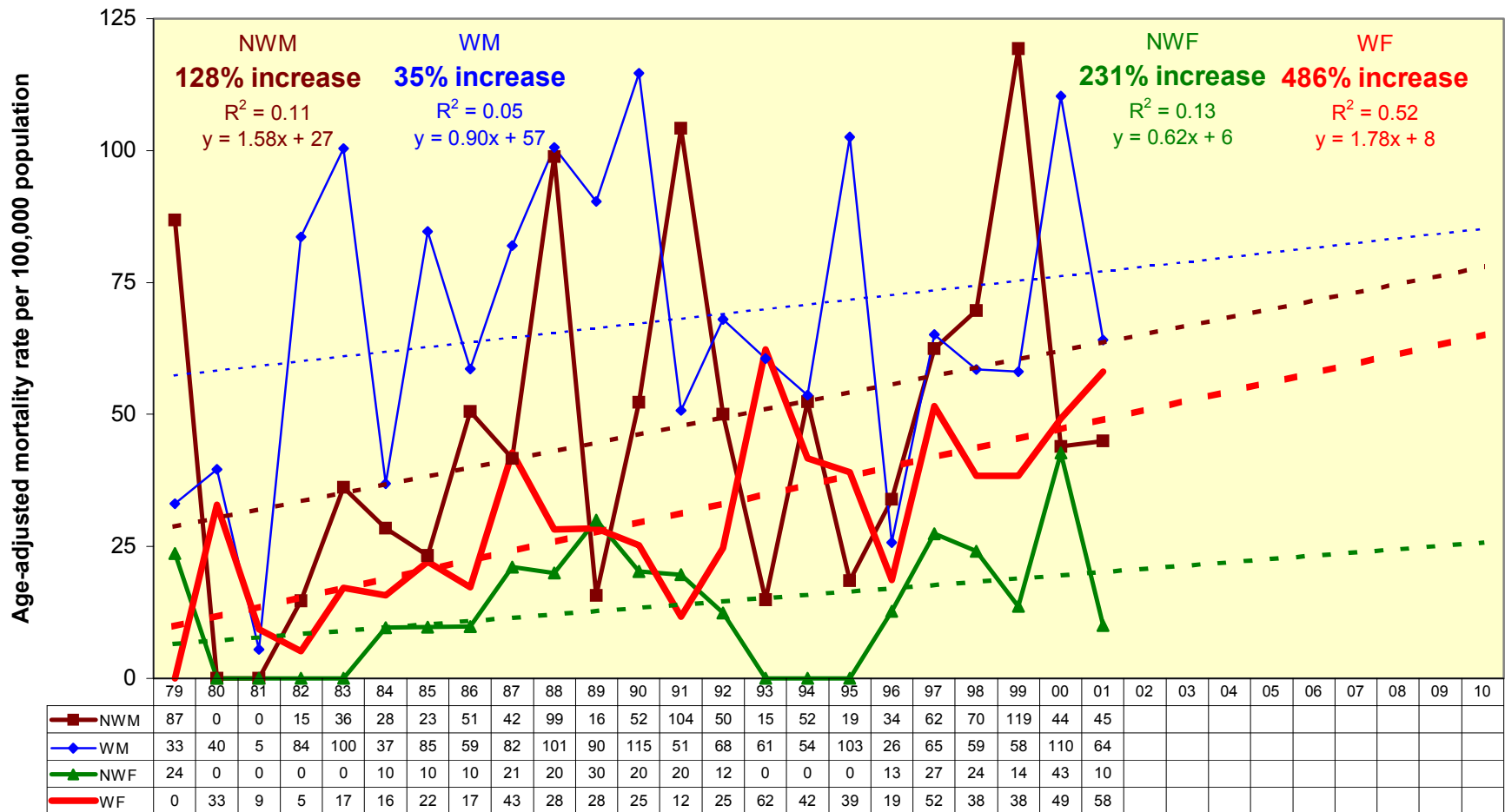
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	4%GT	3%GT	21%GT	Beaufort & Hyde
3%LT		1%LT	17%GT	ENC
3%LT	1%GT		17%GT	NC
17%LT	14%LT	15%LT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	2%LT	7%LT	10%LT	Beaufort & Hyde
2%GT		5%LT	7%LT	ENC
8%GT	5%GT		3%LT	NC
11%GT	8%GT	3%GT		US

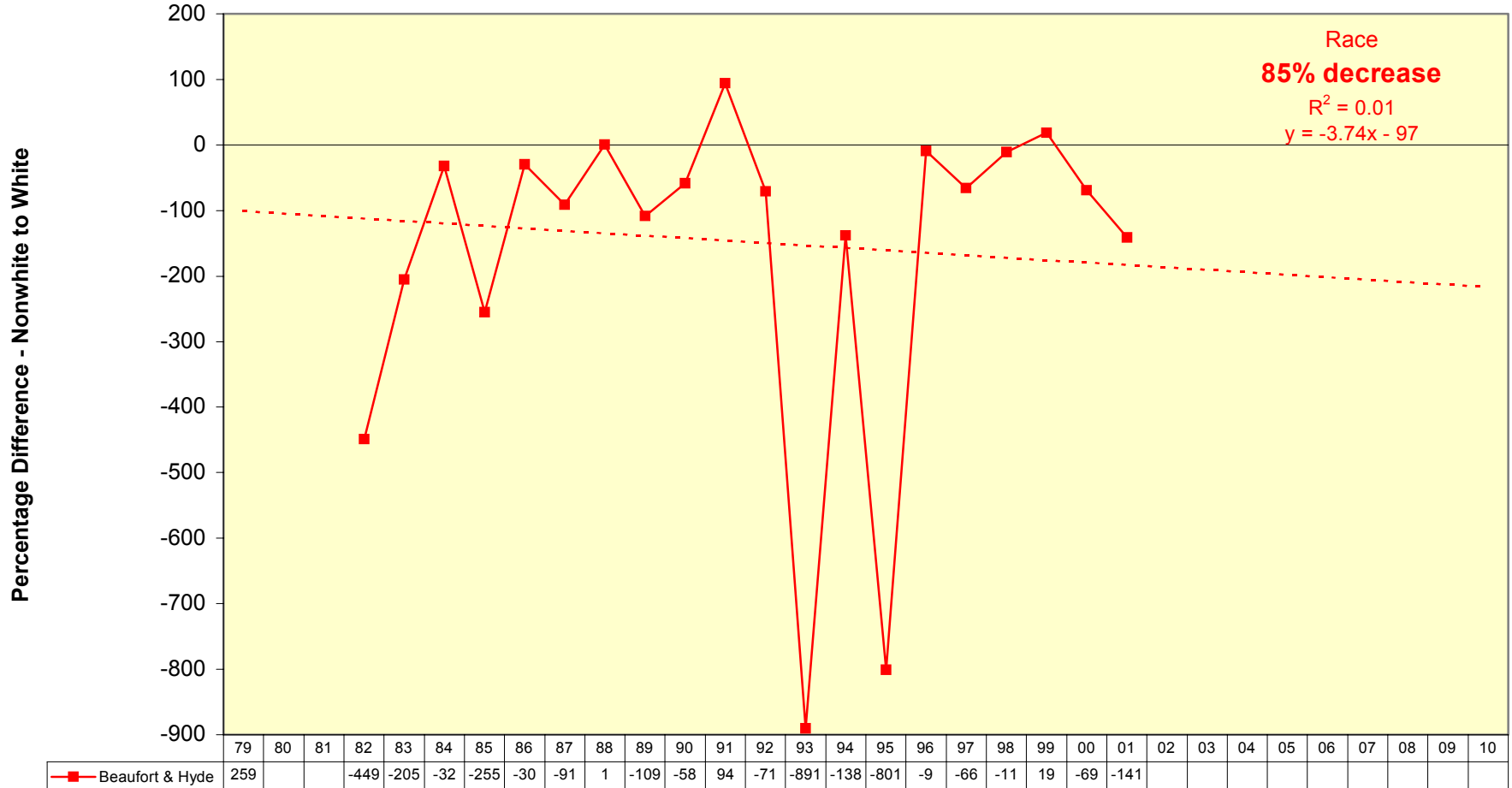
Figure 27. Chronic Lower Respiratory Diseases: Trends in age-adjusted mortality rates by race and gender, 1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	108% GT	78% LT	70% LT	NWM
52% LT		90% LT	86% LT	WM
361% GT	858% GT		37% GT	NWF
236% GT	599% GT	27% LT		WF

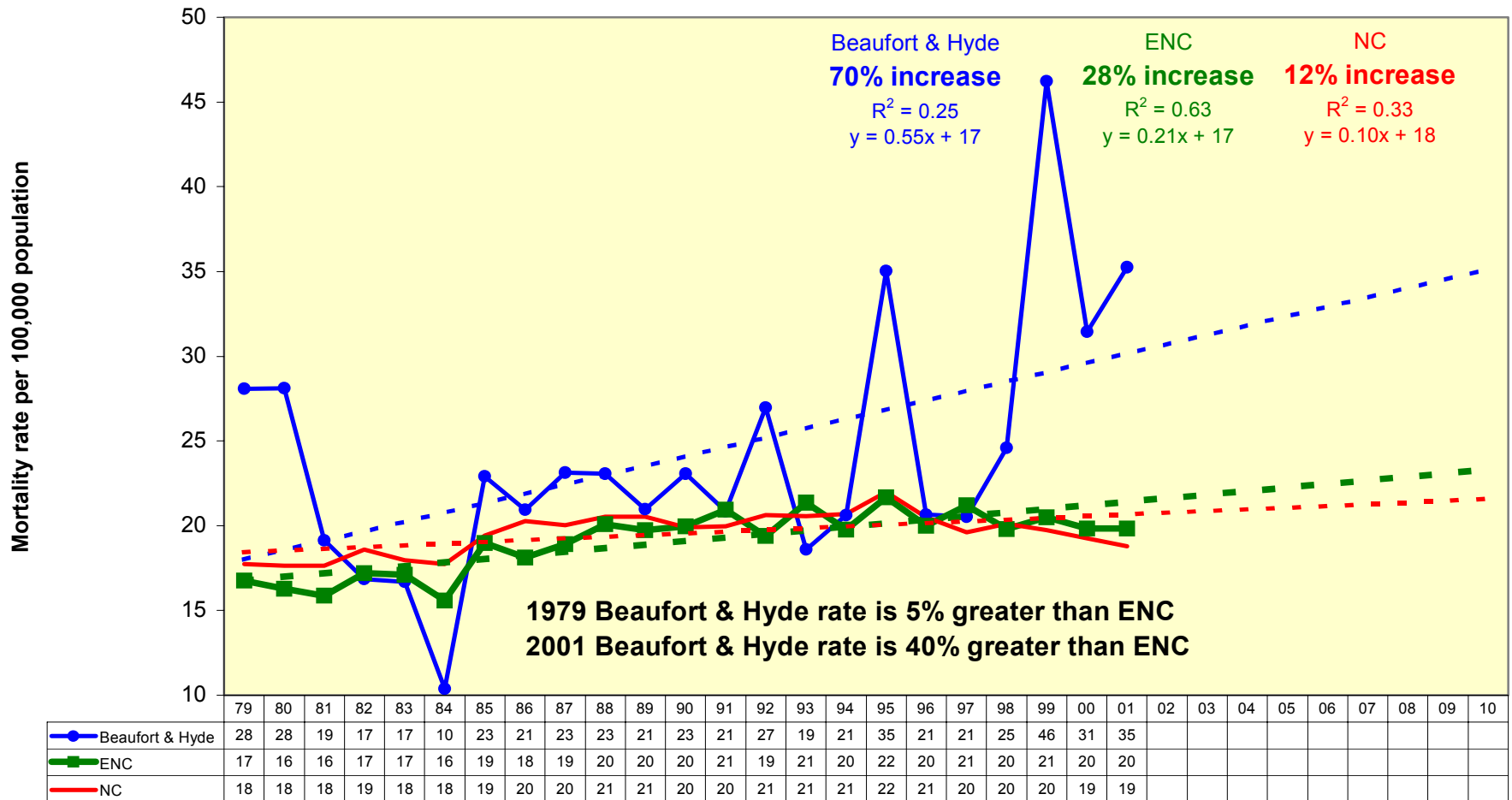
Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	23% GT	69% LT	24% LT	NWM
19% LT		74% LT	38% LT	WM
218% GT	291% GT		142% GT	NWF
31% GT	61% GT	59% LT		WF

Figure 28. Chronic Lower Respiratory Diseases:
Disparity in mortality rates by race,
1979-2001 with projections to 2010



Cancer — Colon, Rectum, and Anus

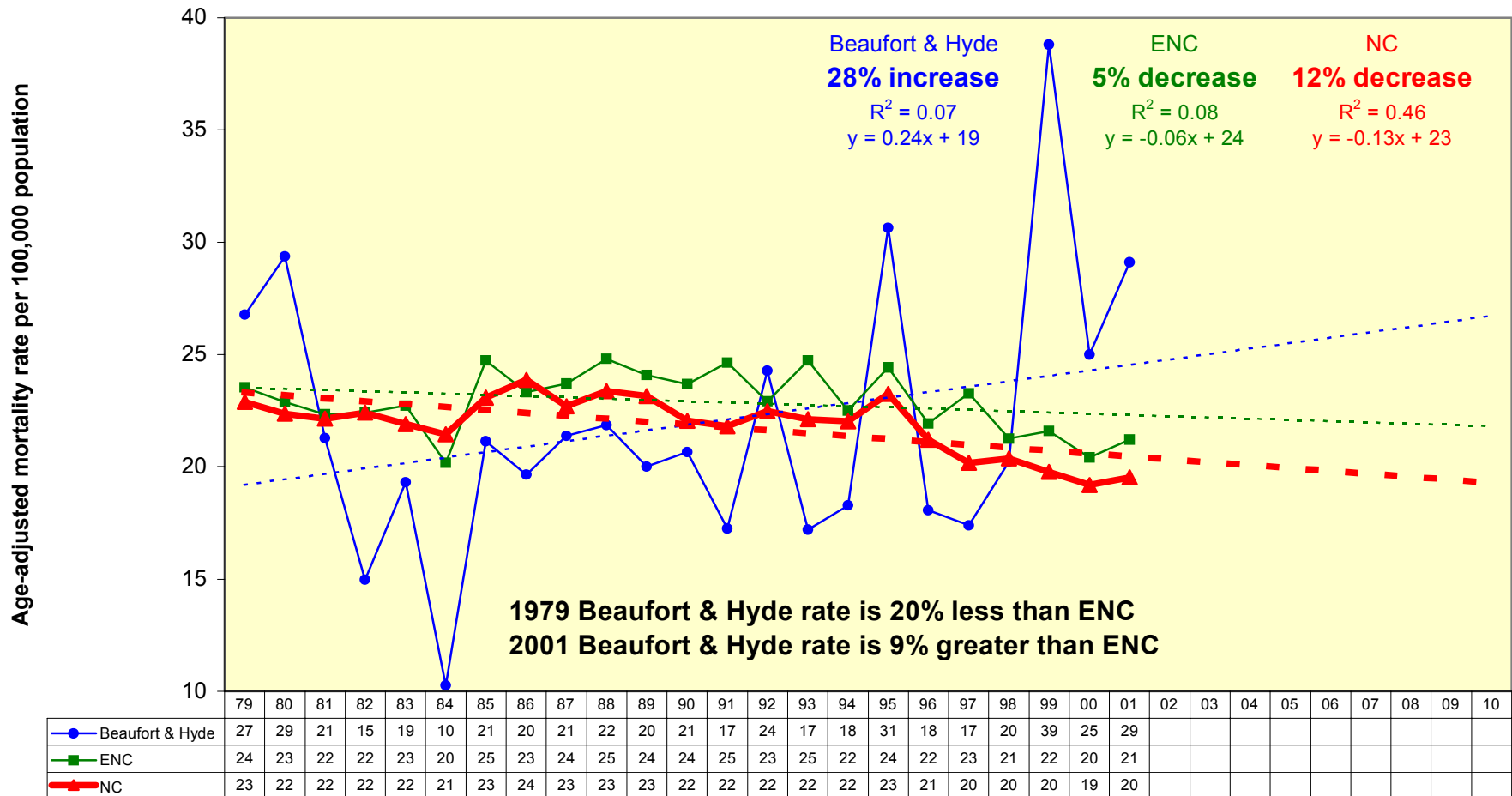
Figure 29. Cancer - Colon, Rectum, and Anus:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	5%LT	5%GT	Beaufort & Hyde
5%GT		11%GT	ENC
5%LT	10%LT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	28%LT	31%LT	Beaufort & Hyde
40%GT		3%LT	ENC
44%GT	3%GT		NC

Figure 30. Cancer - Colon, Rectum, and Anus:
Trends in age-adjusted mortality rates by county, region, state, and nation, 1979-2001 with projections to 2010



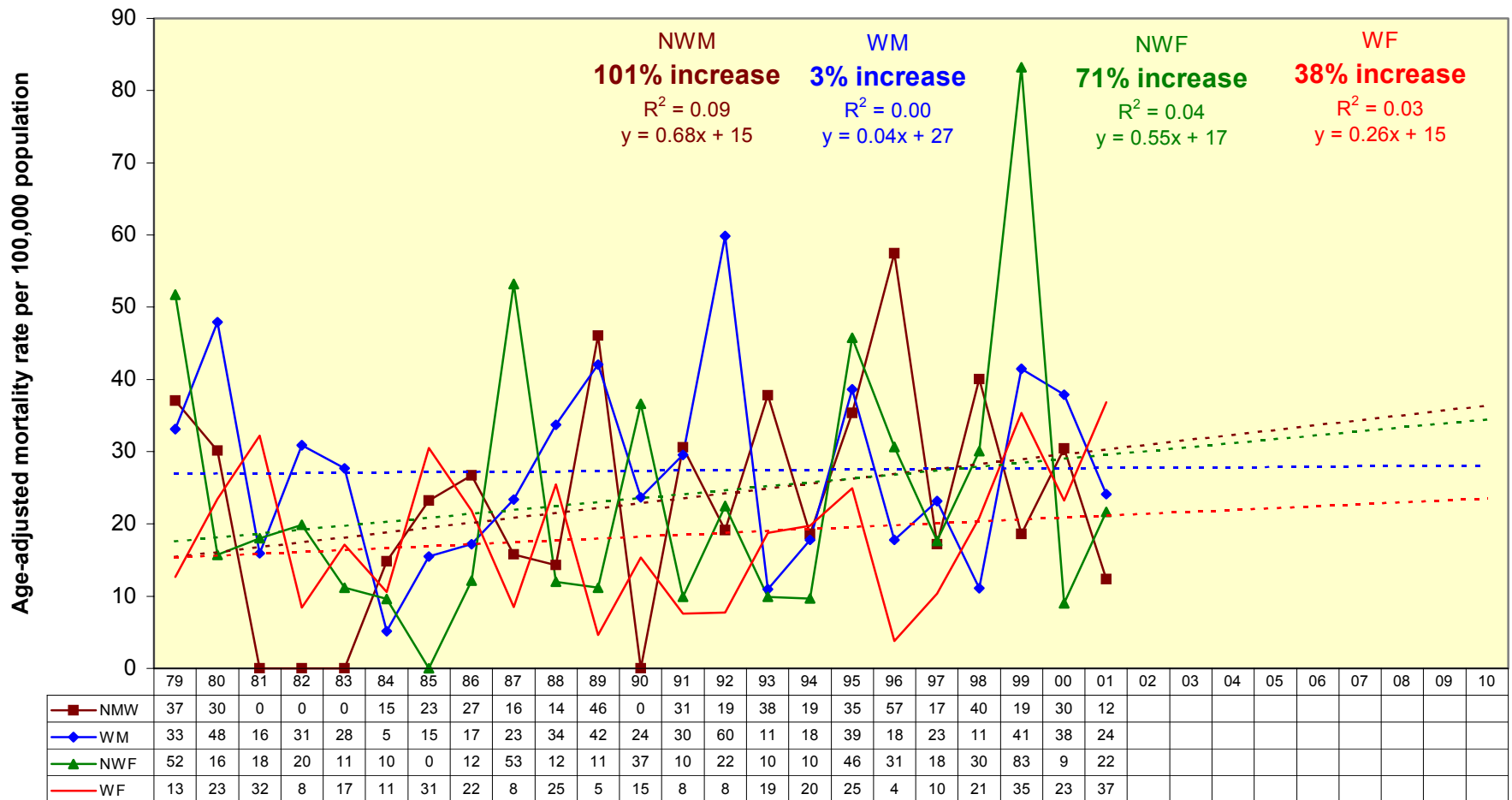
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	
	25% GT	24% GT	Beaufort & Hyde
20% LT		1% LT	ENC
19% LT	1% GT		NC

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	
	8% LT	15% LT	Beaufort & Hyde
9% GT		8% LT	ENC
18% GT	9% GT		NC

Figure 31. Cancer - Colon, Rectum, and Anus:
Trends in mortality rates by race and gender,
1979-2001 with projections to 2010

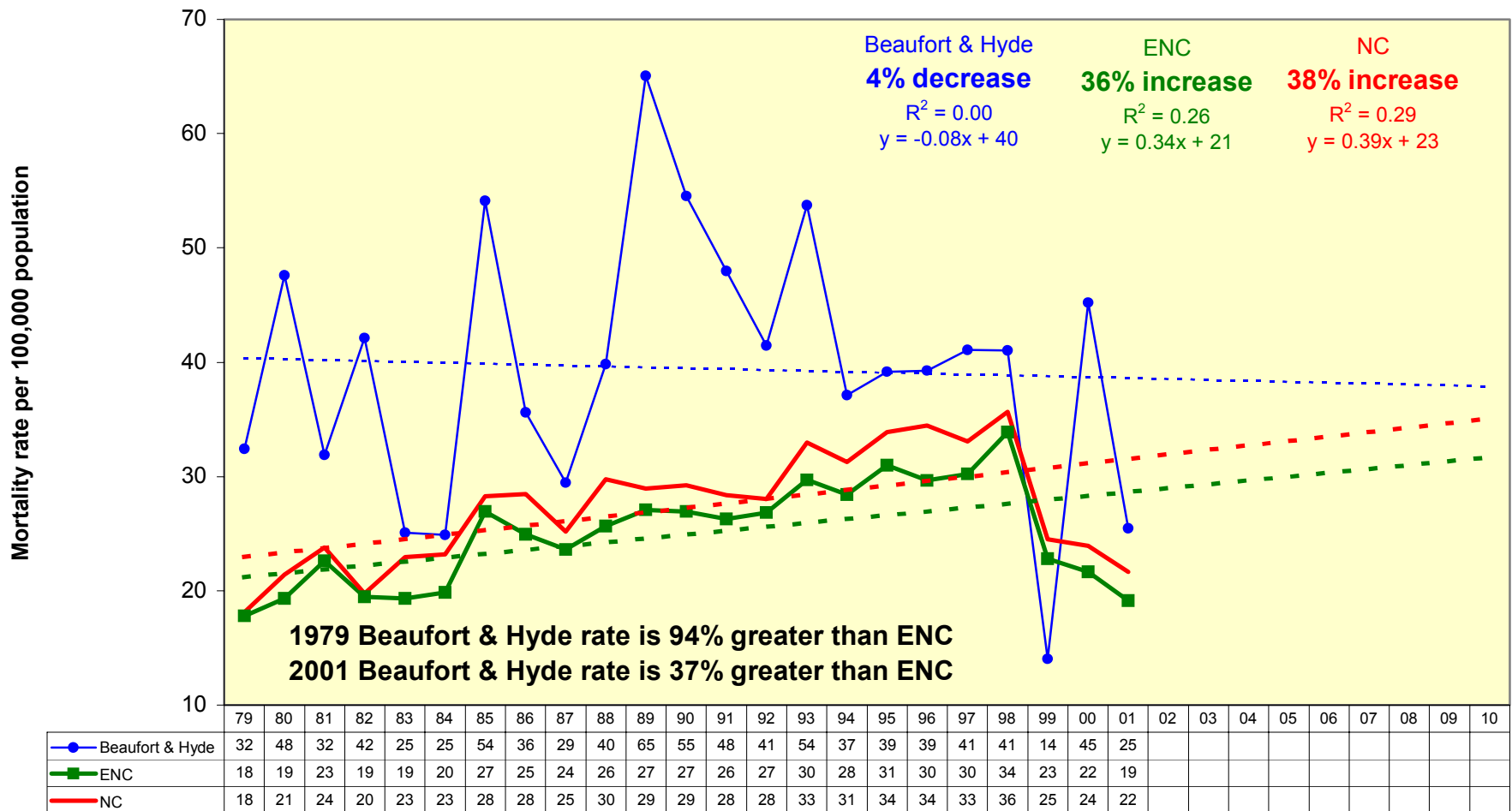


Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	82% GT	15% GT	2% GT	NWM
45% LT		37% LT	44% LT	WM
13% LT	58% GT		11% LT	NWF
2% LT	78% GT	12% GT		WF

Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	7% LT	2% LT	30% LT	NWM
7% GT		5% GT	25% LT	WM
2% GT	4% LT		28% LT	NWF
42% GT	33% GT	39% GT		WF

Influenza and Pneumonia

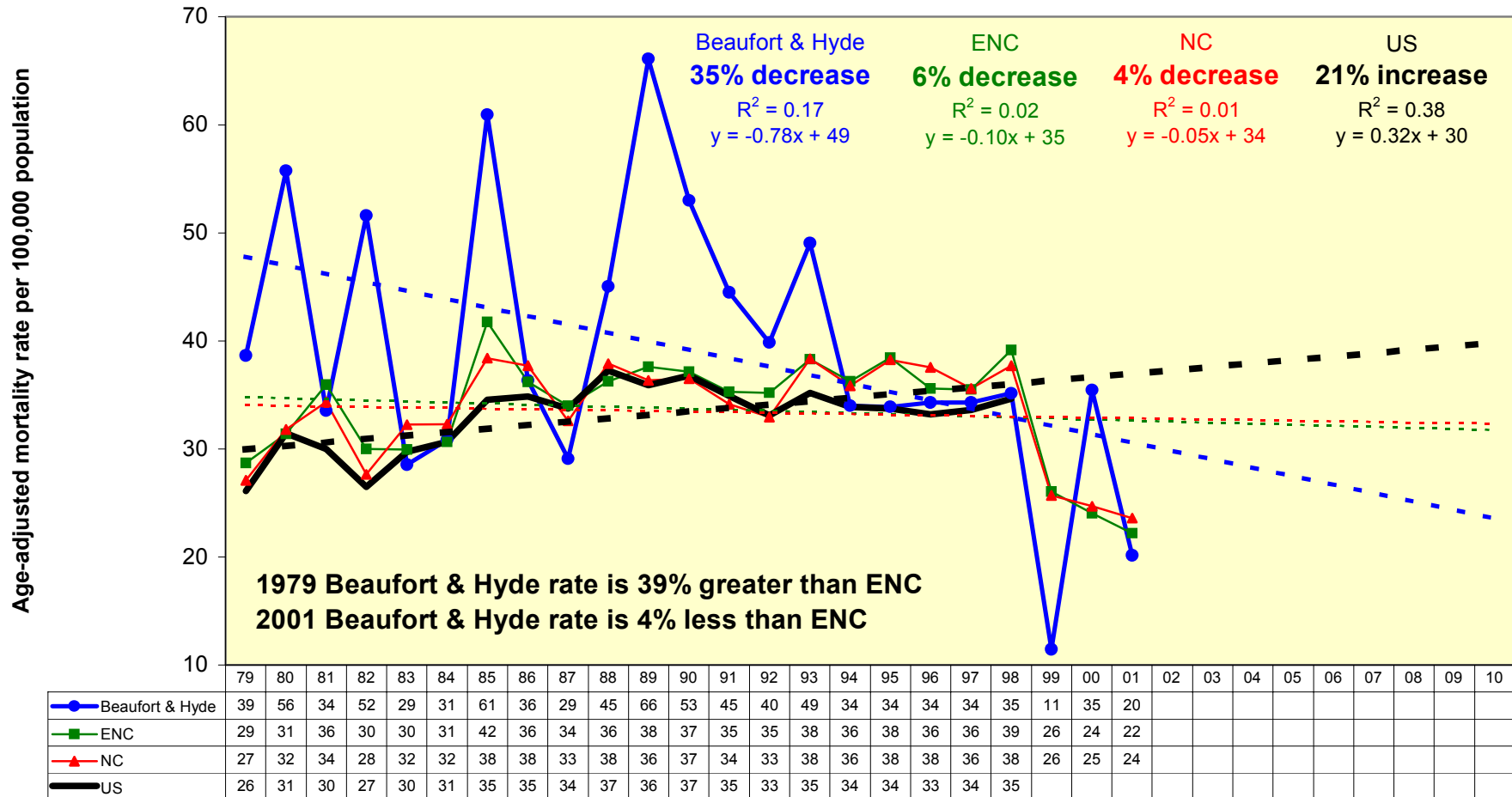
Figure 33. Influenza and Pneumonia:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	48%LT	44%LT	Beaufort & Hyde
94%GT		8%GT	ENC
79%GT	8%LT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	27%LT	19%LT	Beaufort & Hyde
37%GT		10%GT	ENC
24%GT	9%LT		NC

Figure 34. Influenza and Pneumonia:
Trends in age-adjusted mortality rates by county, region, state, and nation,
1979-2001 with projections to 2010



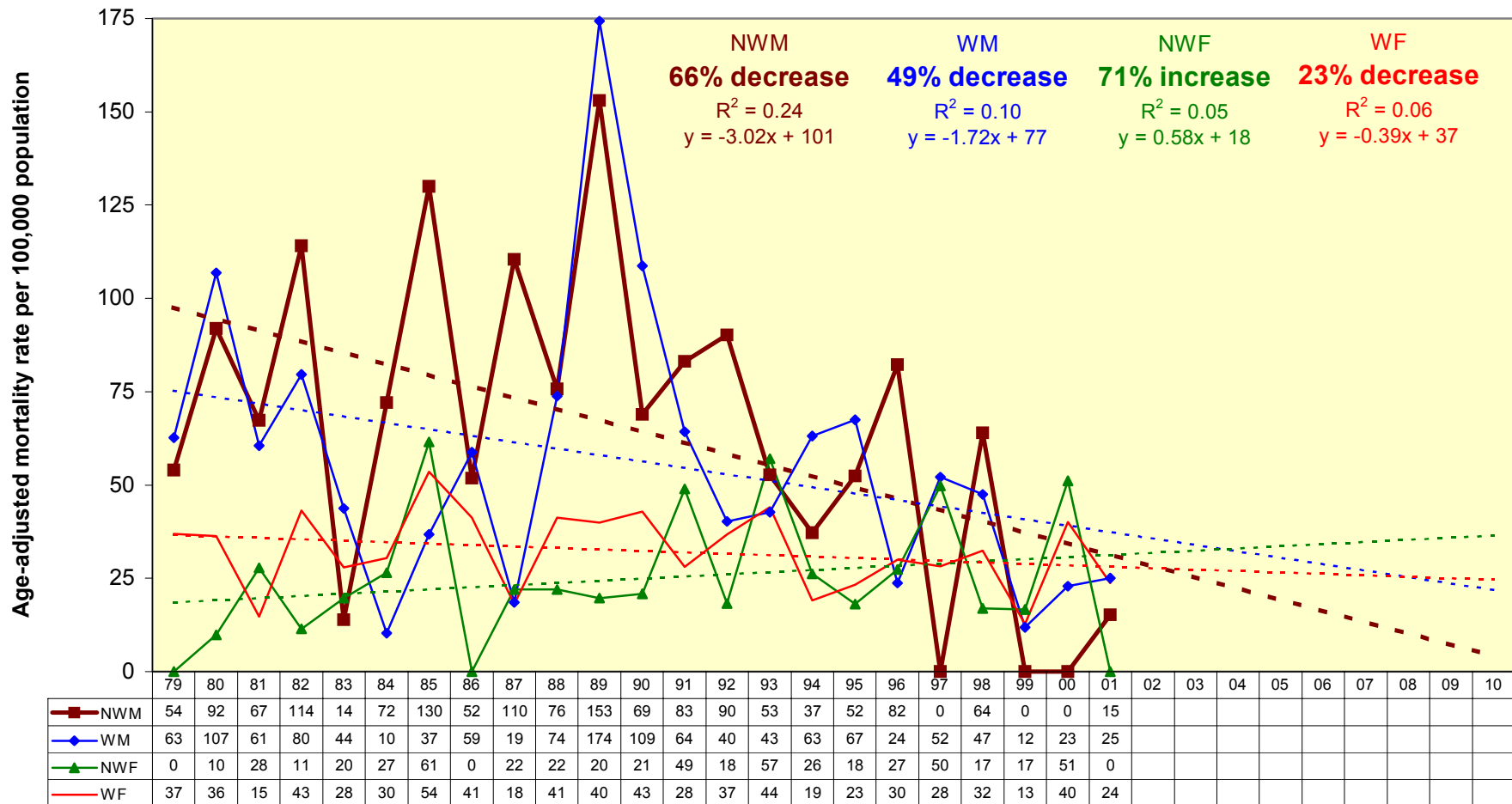
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	28%LT	30%LT	39%LT	Beaufort & Hyde
39%GT		2%LT	15%LT	ENC
43%GT	2%GT		13%LT	NC
64%GT	18%GT	15%GT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	4%GT	5%GT	17%GT	Beaufort & Hyde
4%LT		1%GT	12%GT	ENC
5%LT	1%LT		11%GT	NC
14%LT	11%LT	10%LT		US

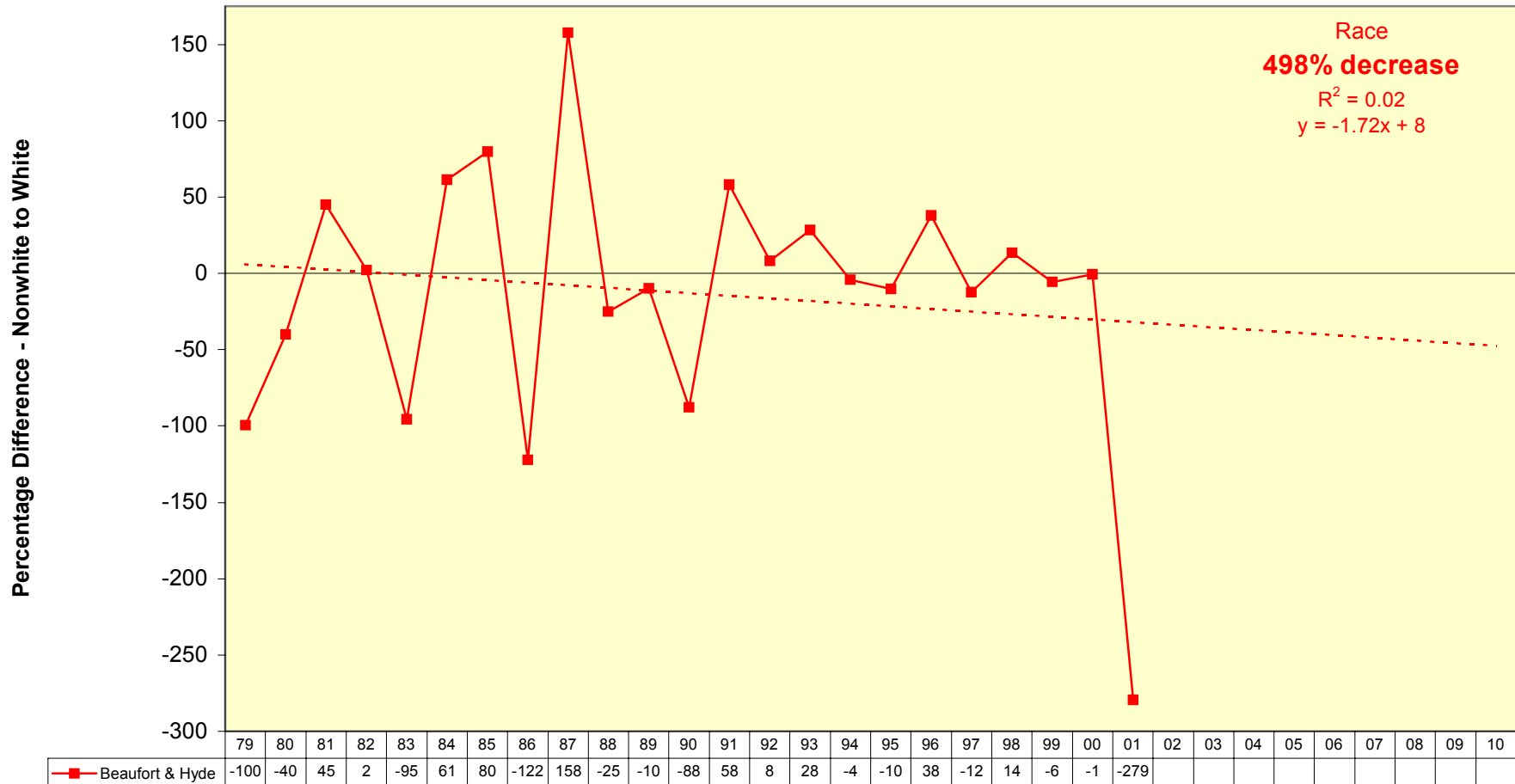
Figure 35. Influenza and Pneumonia:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	23% LT	82% LT	63% LT	NWM
31% GT		77% LT	52% LT	WM
461% GT	330% GT		107% GT	NWF
171% GT	108% GT	52% LT		WF

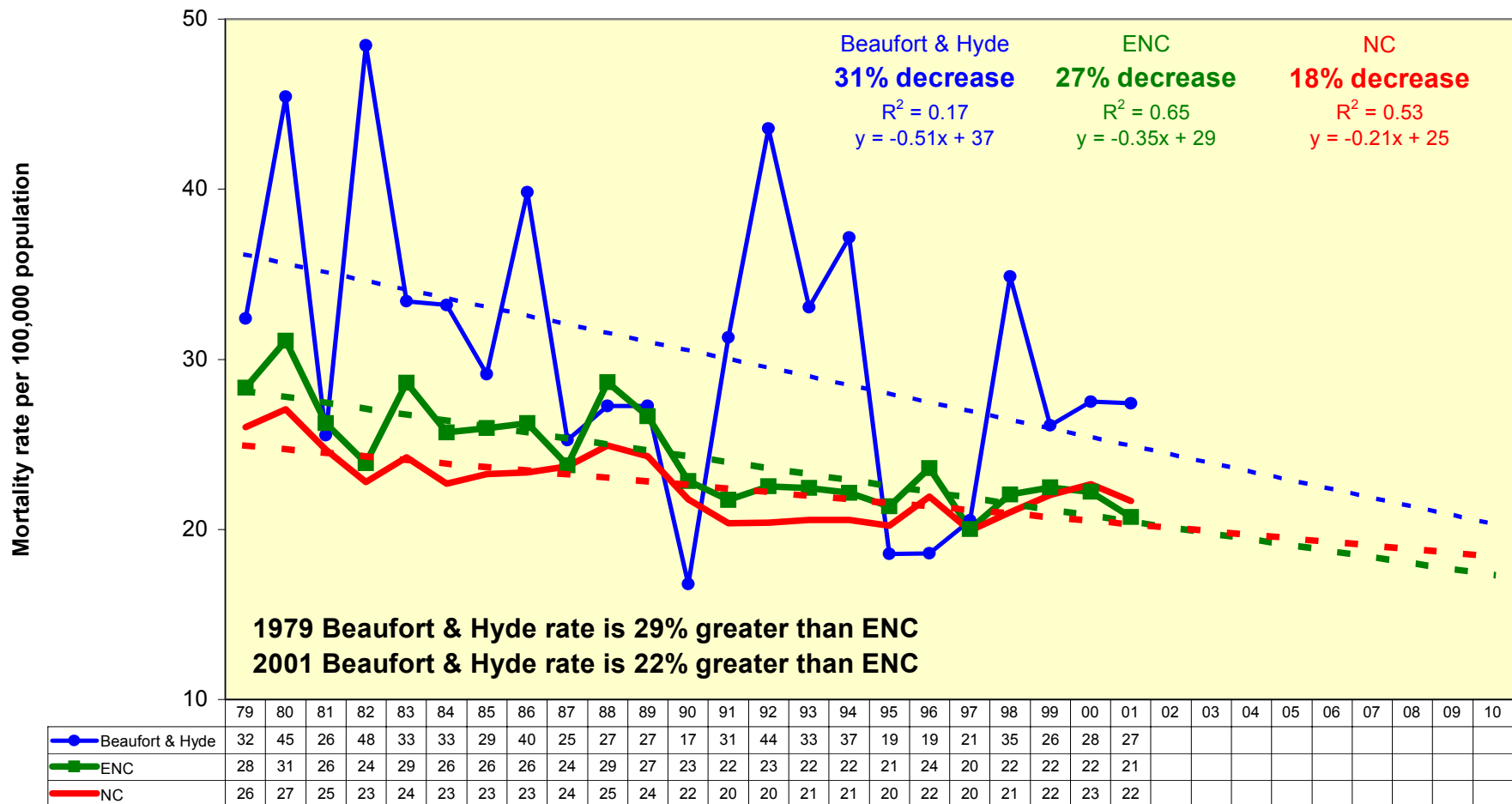
Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	14% GT	10% LT	17% LT	NWM
12% LT		22% LT	27% LT	WM
12% GT	28% GT		7% LT	NWF
20% GT	37% GT	8% GT		WF

Figure 36. Influenza and Pneumonia:
Disparity in mortality rates by race,
1979-2001 with projections to 2010



All Other Unintentional Injuries and Adverse Effects

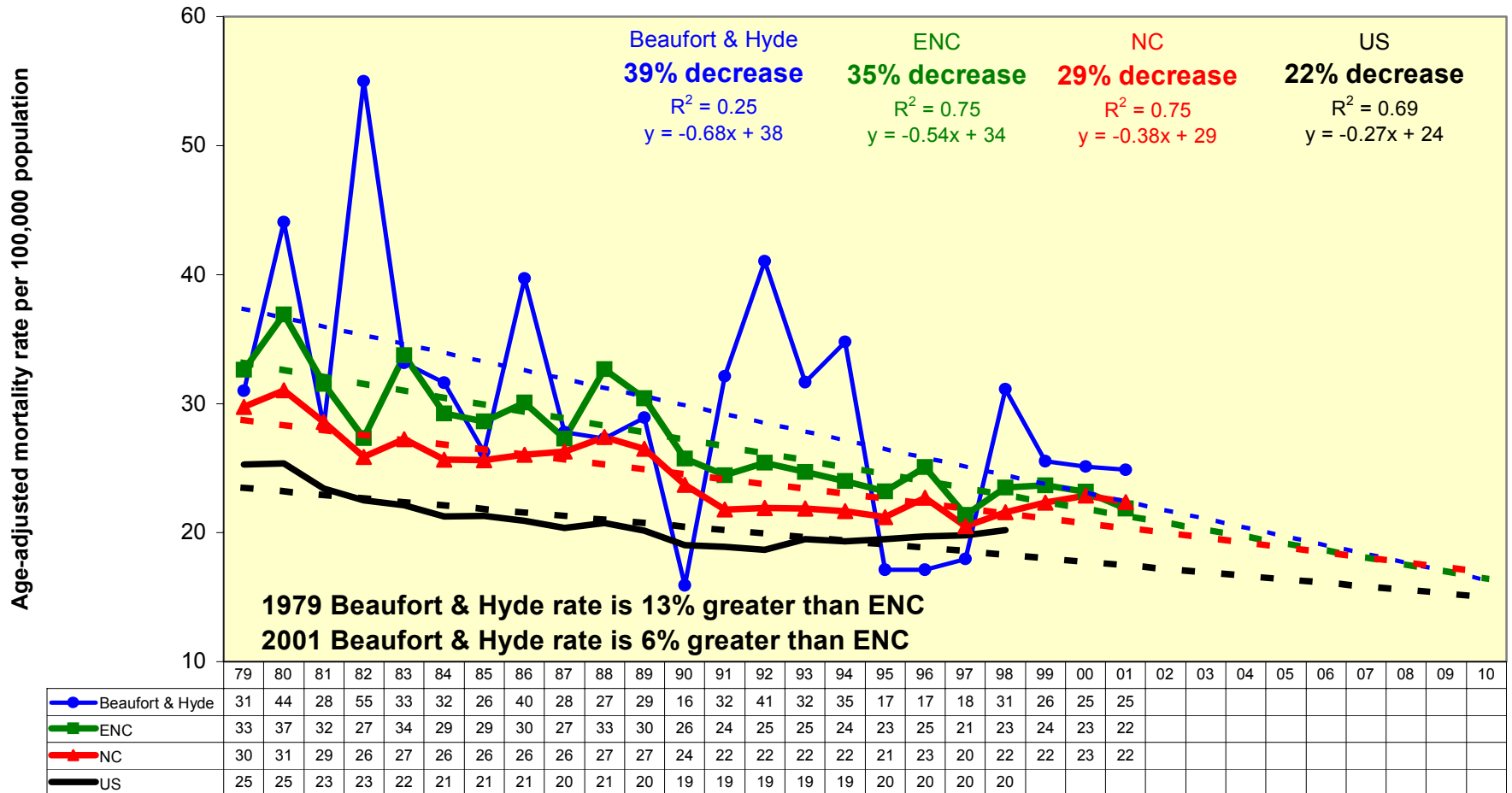
Figure 37. All Other Unintentional Injuries and Adverse Effects:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	22%LT	31%LT	Beaufort & Hyde
29%GT		12%LT	ENC
46%GT	13%GT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	18%LT	19%LT	Beaufort & Hyde
22%GT		1%LT	ENC
24%GT	1%GT		NC

Figure 38. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by county, region, state, and nation,
1979-2001 with projections to 2010



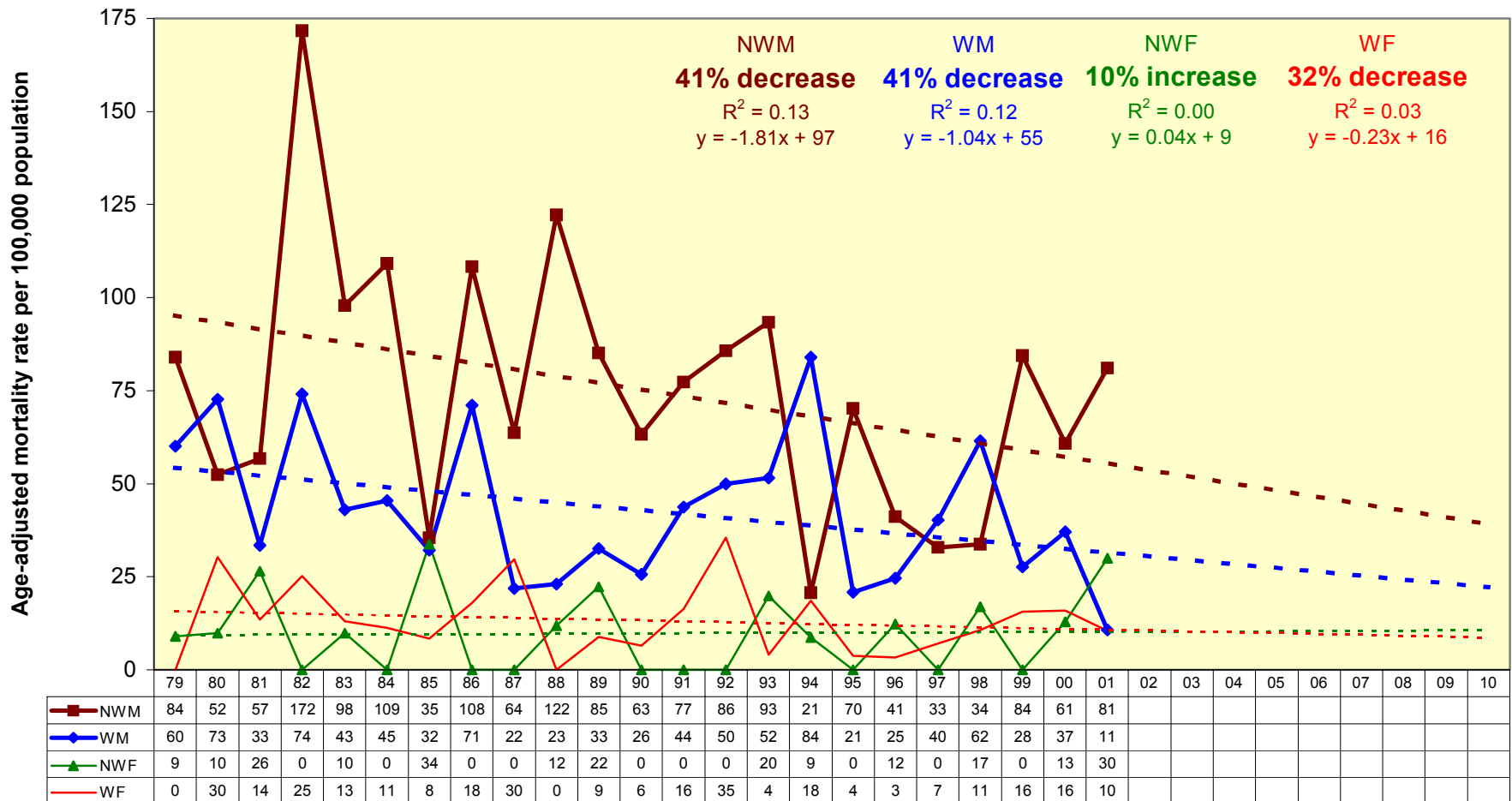
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	11%LT	23%LT	37%LT	Beaufort & Hyde
13%GT		14%LT	30%LT	ENC
31%GT	16%GT		18%LT	NC
60%GT	42%GT	22%GT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	5%LT	10%LT	23%LT	Beaufort & Hyde
6%GT		5%LT	19%LT	ENC
11%GT	5%GT		14%LT	NC
30%GT	23%GT	17%GT		US

Figure 39. All Other Unintentional Injuries and Adverse Effects:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010

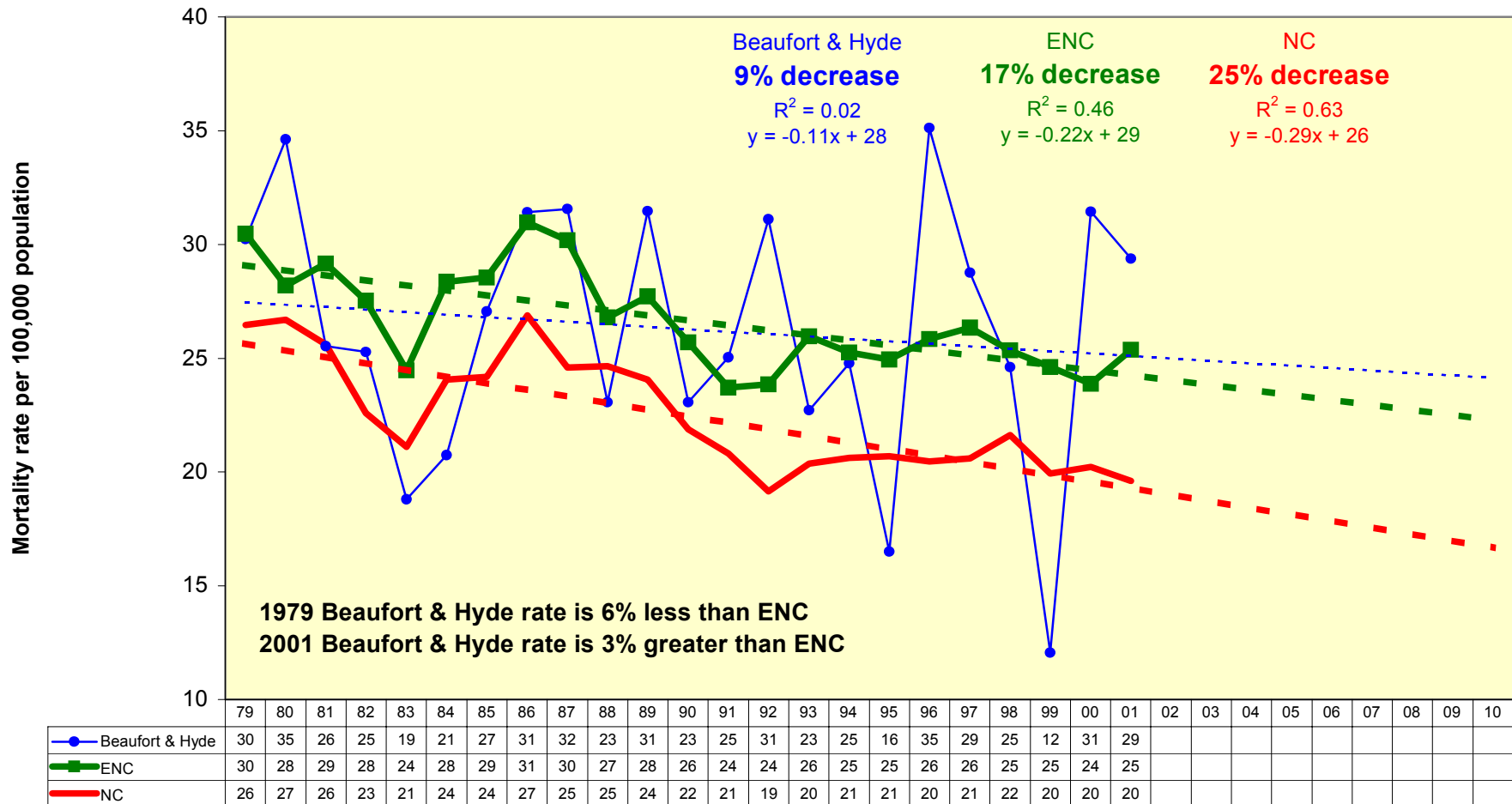


Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	43% LT	91% LT	83% LT	NWM
75% GT		83% LT	71% LT	WM
953% GT	501% GT		74% GT	NWF
504% GT	244% GT	43% LT		WF

Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	43% LT	82% LT	81% LT	NWM
75% GT		69% LT	66% LT	WM
463% GT	221% GT		8% GT	NWF
420% GT	196% GT	8% LT		WF

Unintentional Motor Vehicle Injuries

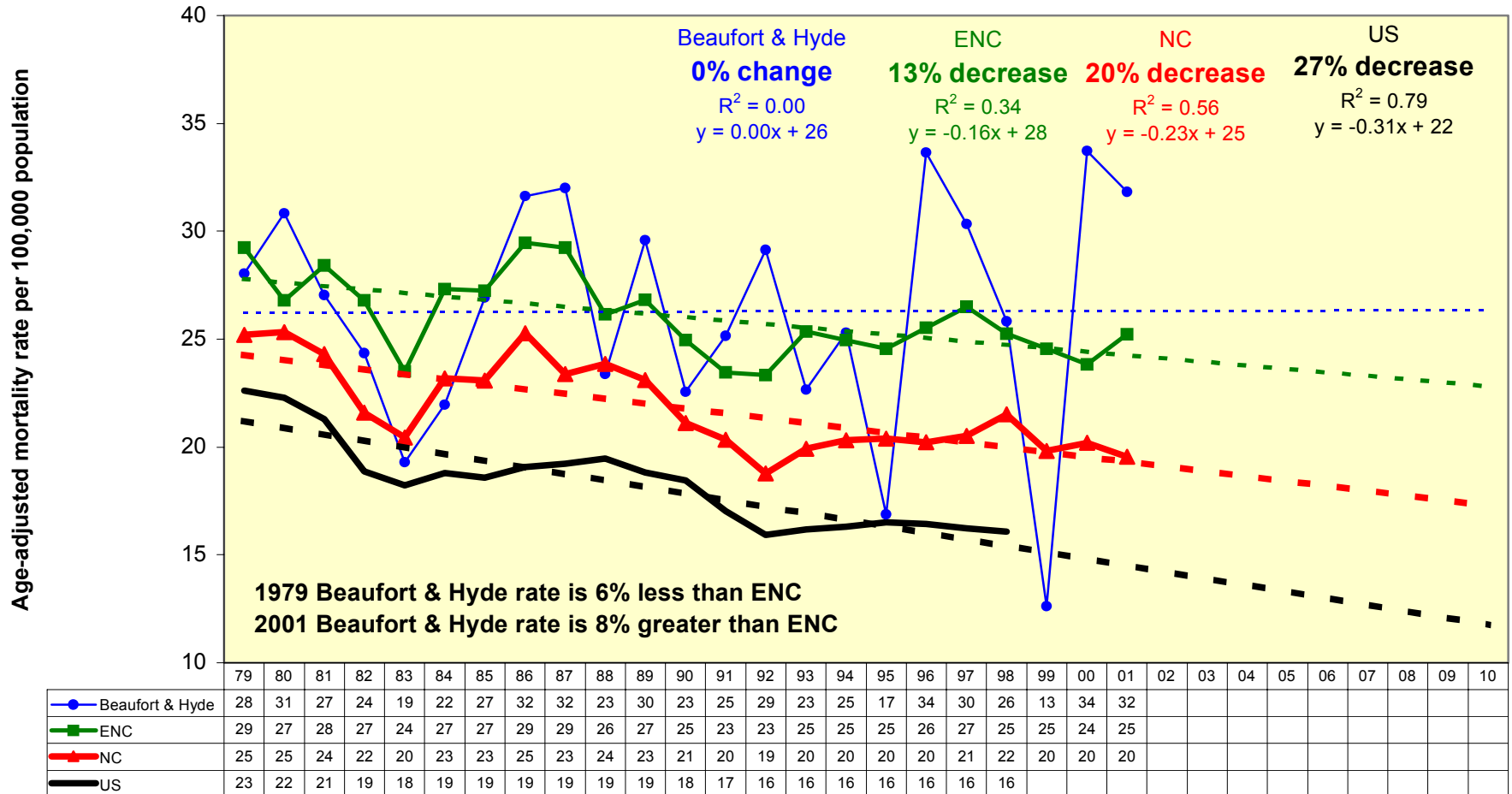
Figure 41. Unintentional Motor Vehicle Injuries: Trends in mortality rates by county, region, and state, 1979-2001 with projections to 2010



Beaufort & Hyde	ENC	NC	
	6%GT	6%LT	Beaufort & Hyde
6%LT		11%LT	ENC
6%GT	13%GT		NC

Beaufort & Hyde	ENC	NC	
	3%LT	22%LT	Beaufort & Hyde
3%GT		20%LT	ENC
29%GT	25%GT		NC

Figure 42. Unintentional Motor Vehicle Injuries:
Trends in age-adjusted mortality rates by county, region, state, and nation,
1979-2001 with projections to 2010



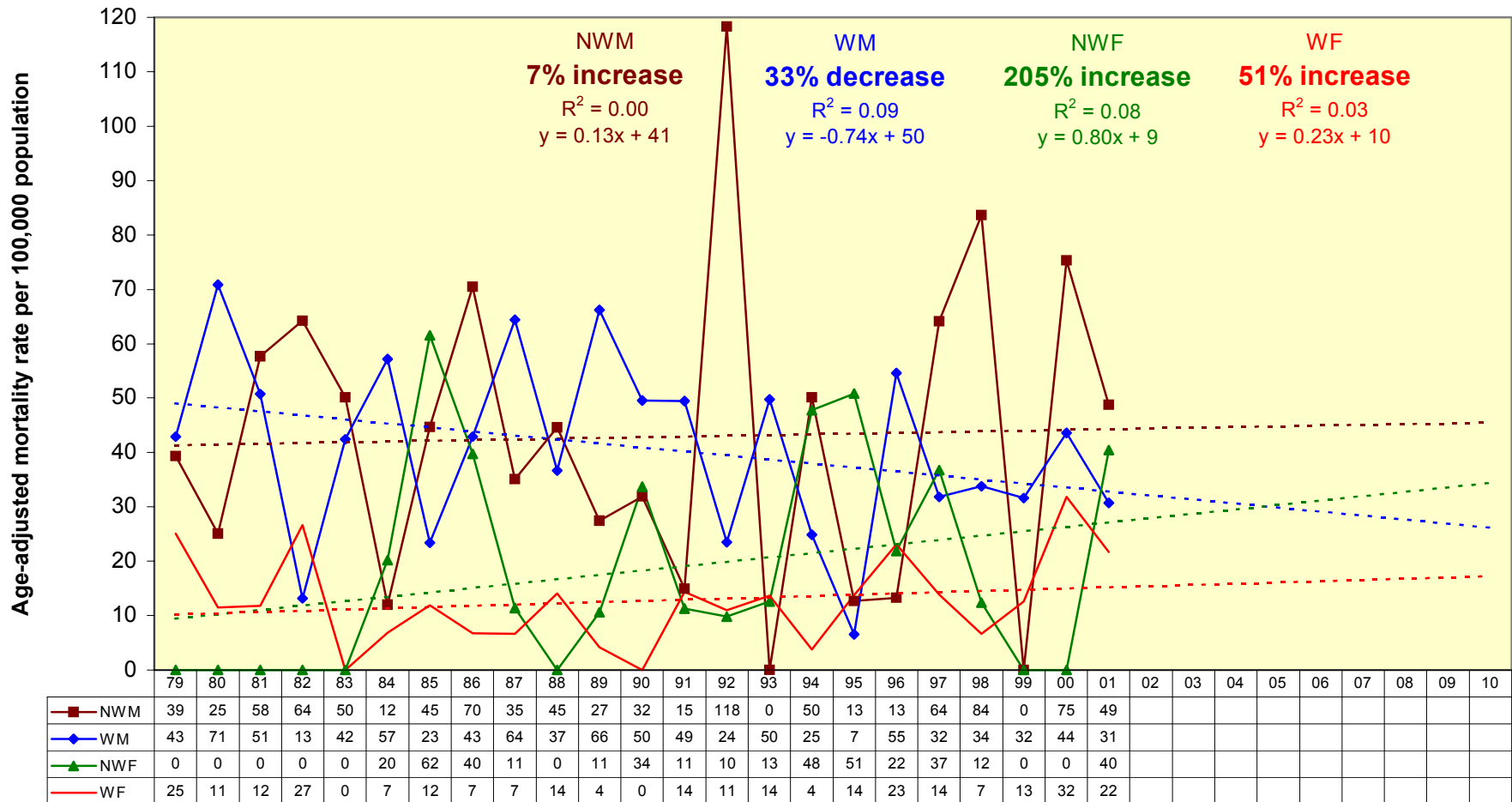
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	6%GT	7%LT	18%LT	Beaufort & Hyde
6%LT		12%LT	23%LT	ENC
7%GT	14%GT	12%LT		NC
22%GT	30%GT	14%GT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	7%LT	26%LT	44%LT	Beaufort & Hyde
8%GT		20%LT	39%LT	ENC
35%GT	25%GT	24%LT		NC
78%GT	66%GT	32%GT		US

Figure 43. Unintentional Motor Vehicle Injuries:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010



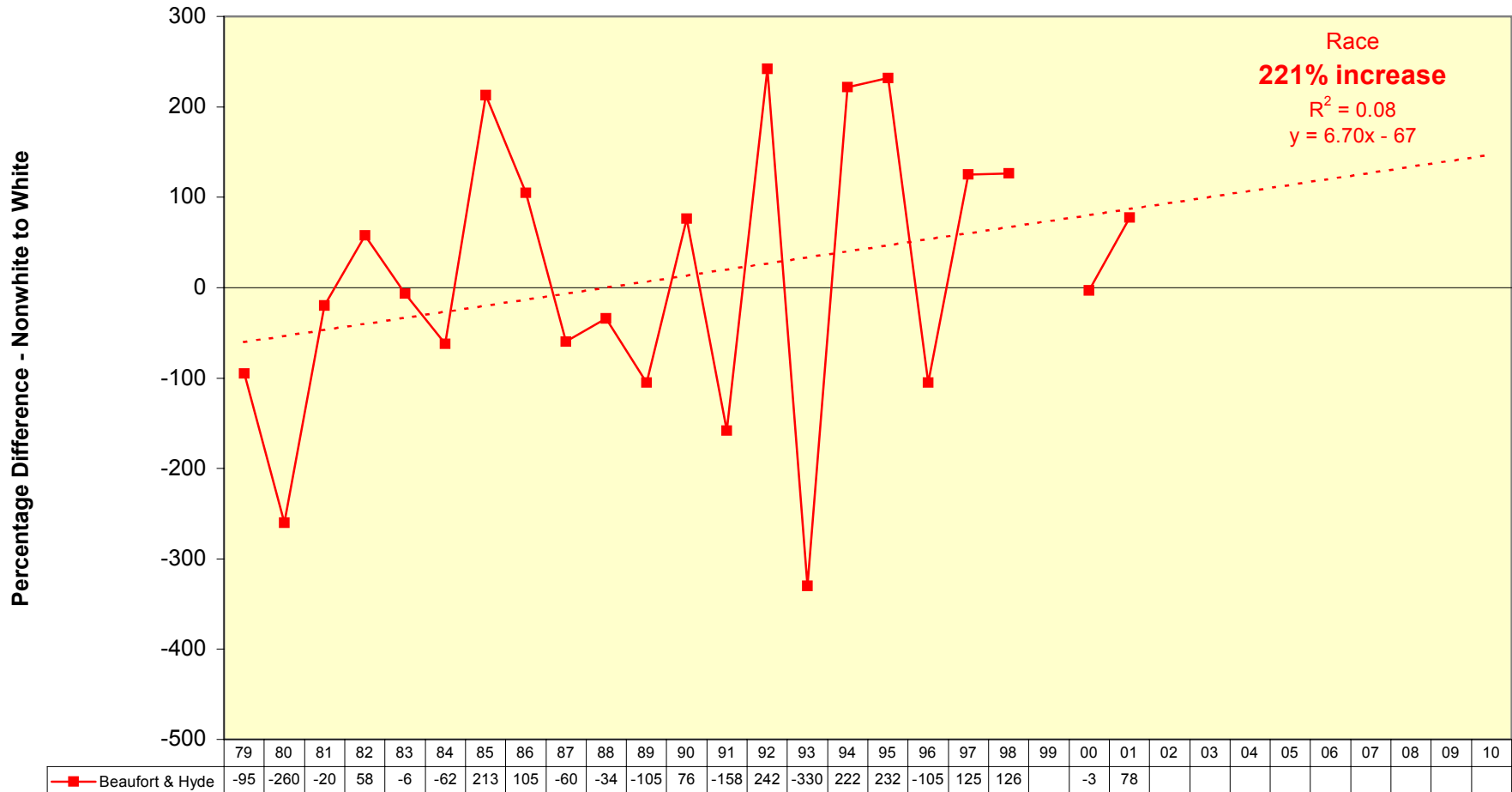
Disparity of Fitted Rates in 1979

NWM	WM	NWF	WF	
	21% GT	79% LT	76% LT	NWM
17% LT		83% LT	80% LT	WM
376% GT	475% GT		15% GT	NWF
314% GT	401% GT	13% LT		WF

Disparity of Fitted Rates in 2001

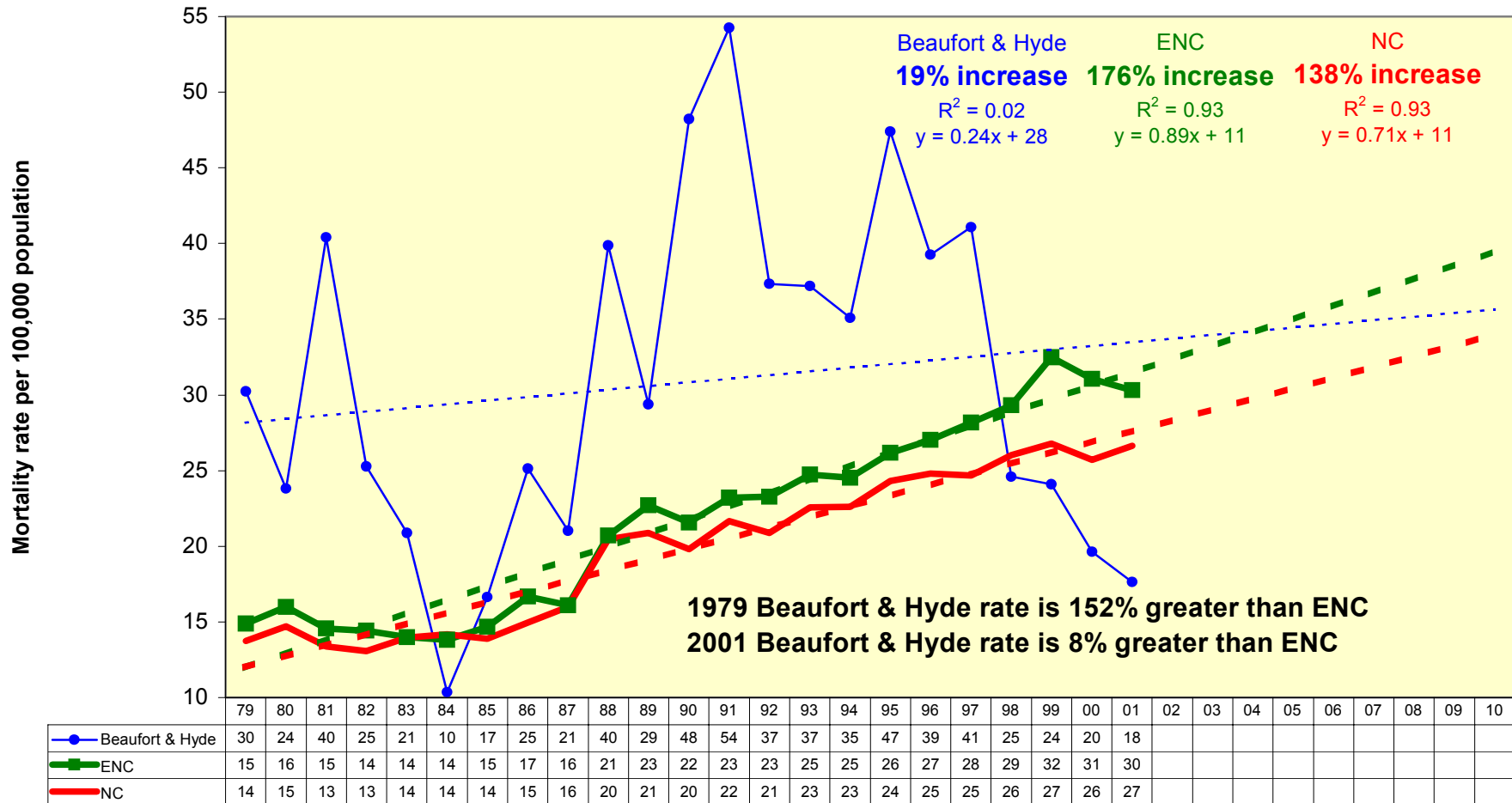
NWM	WM	NWF	WF	
	24% LT	40% LT	66% LT	NWM
32% GT		21% LT	55% LT	WM
68% GT	27% GT		43% LT	NWF
195% GT	124% GT	76% GT		WF

Figure 44. Unintentional Motor Vehicle Injuries:
 Disparity in mortality rates by race,
 1979-2001 with projections to 2010



Diabetes Mellitus

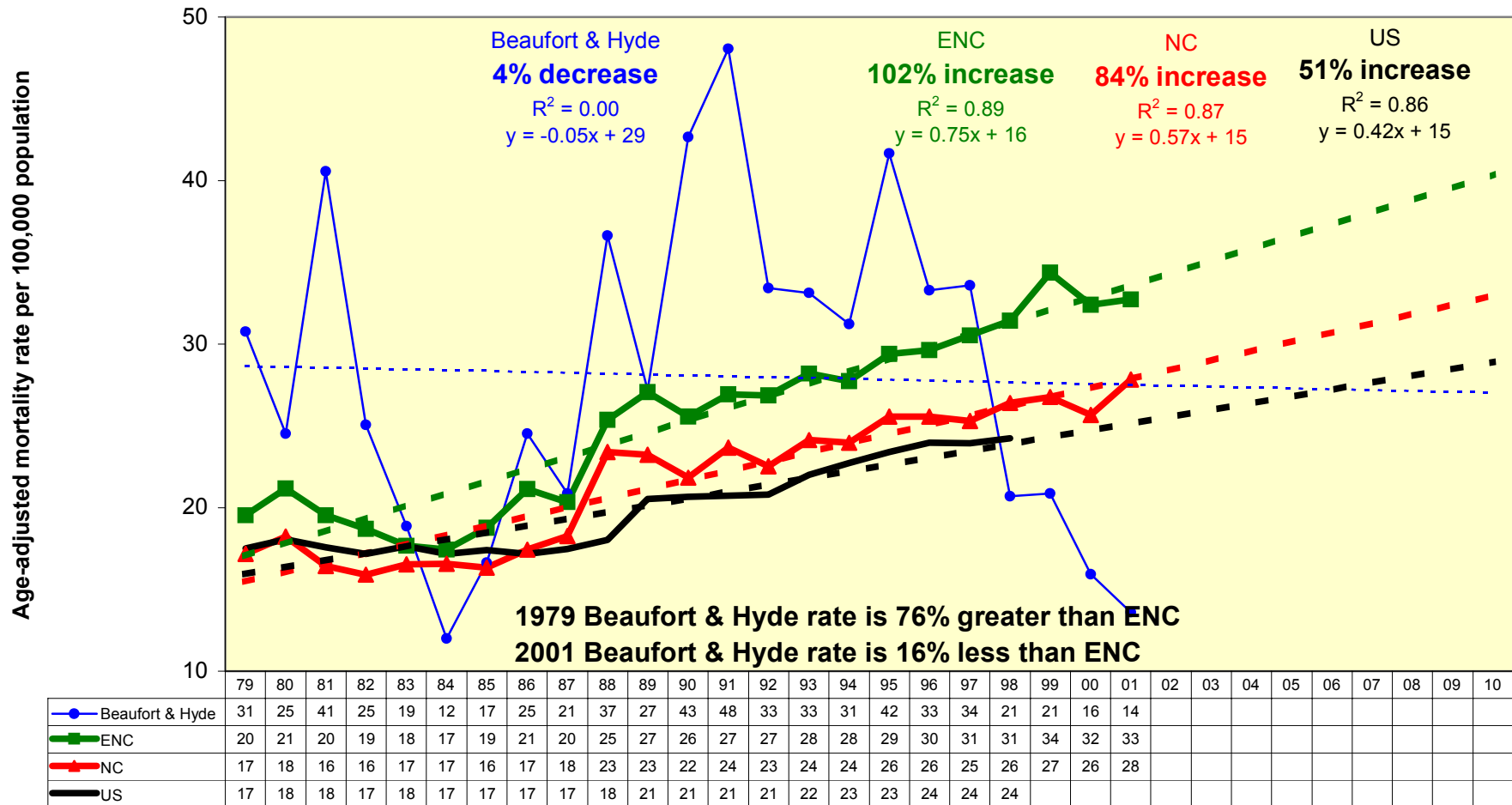
Figure 45. Diabetes Mellitus:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	60%LT	60%LT	Beaufort & Hyde
152%GT		2%GT	ENC
147%GT	2%LT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	8%LT	19%LT	Beaufort & Hyde
8%GT		12%LT	ENC
23%GT	14%GT		NC

Figure 46. Diabetes Mellitus:
Trends in age-adjusted mortality rates by county, region, state, and nation, 1979-2001 with projections to 2010



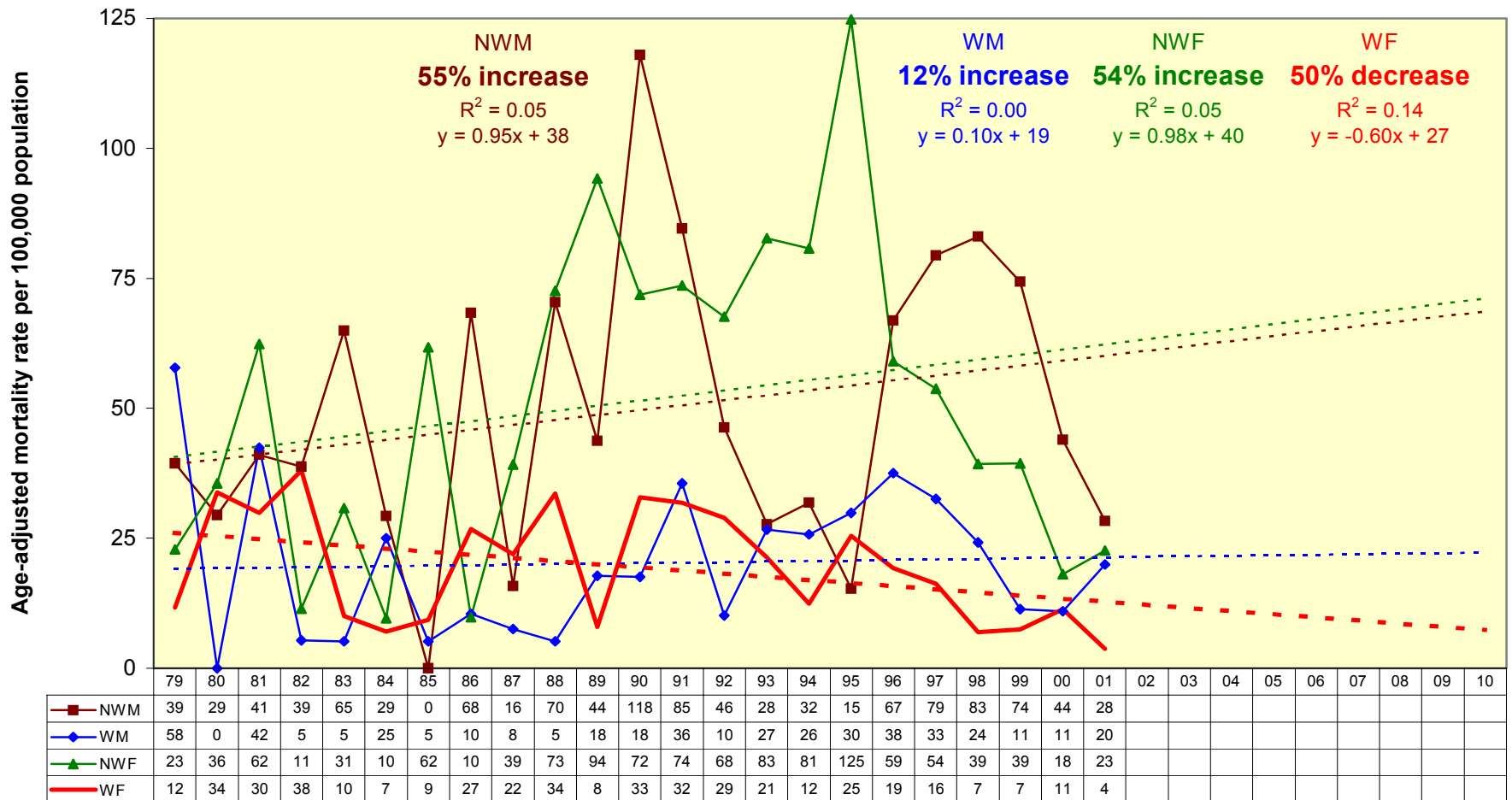
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	43%LT	48%LT	46%LT	Beaufort & Hyde
76%GT		9%LT	5%LT	ENC
93%GT	9%GT		4%GT	NC
88%GT	5%GT	4%LT		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	19%GT	1%LT	10%LT	Beaufort & Hyde
16%LT		17%LT	25%LT	ENC
1%GT	20%GT		10%LT	NC
11%GT	33%GT	11%GT		US

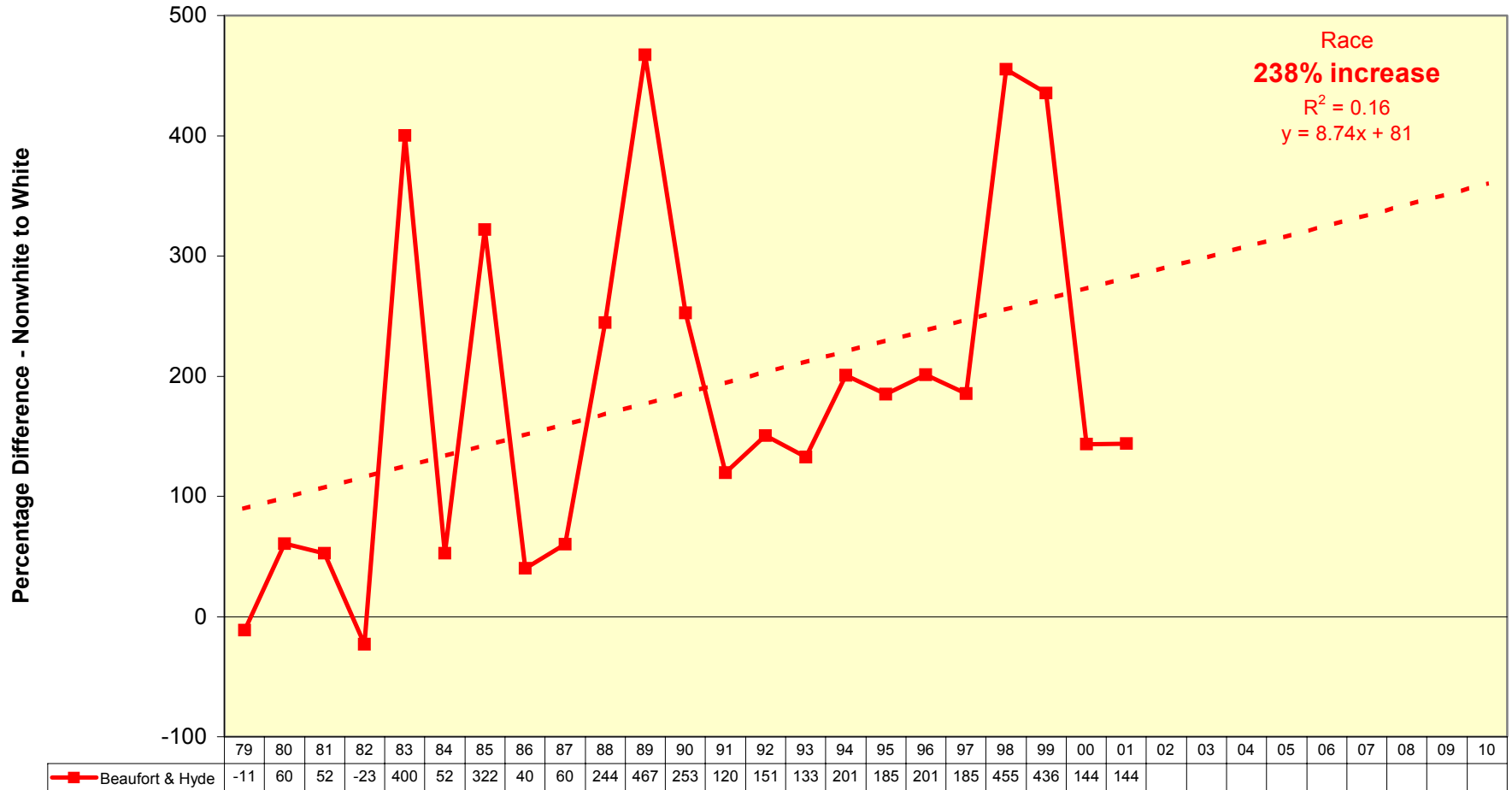
Figure 47. Diabetes Mellitus:
Trends in age-adjusted mortality rates by race and gender,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979				
NWM	WM	NWF	WF	
	50% LT	4% GT	30% LT	NWM
101% GT		109% GT	41% GT	WM
4% LT	52% LT		33% LT	NWF
43% GT	29% LT	49% GT		WF

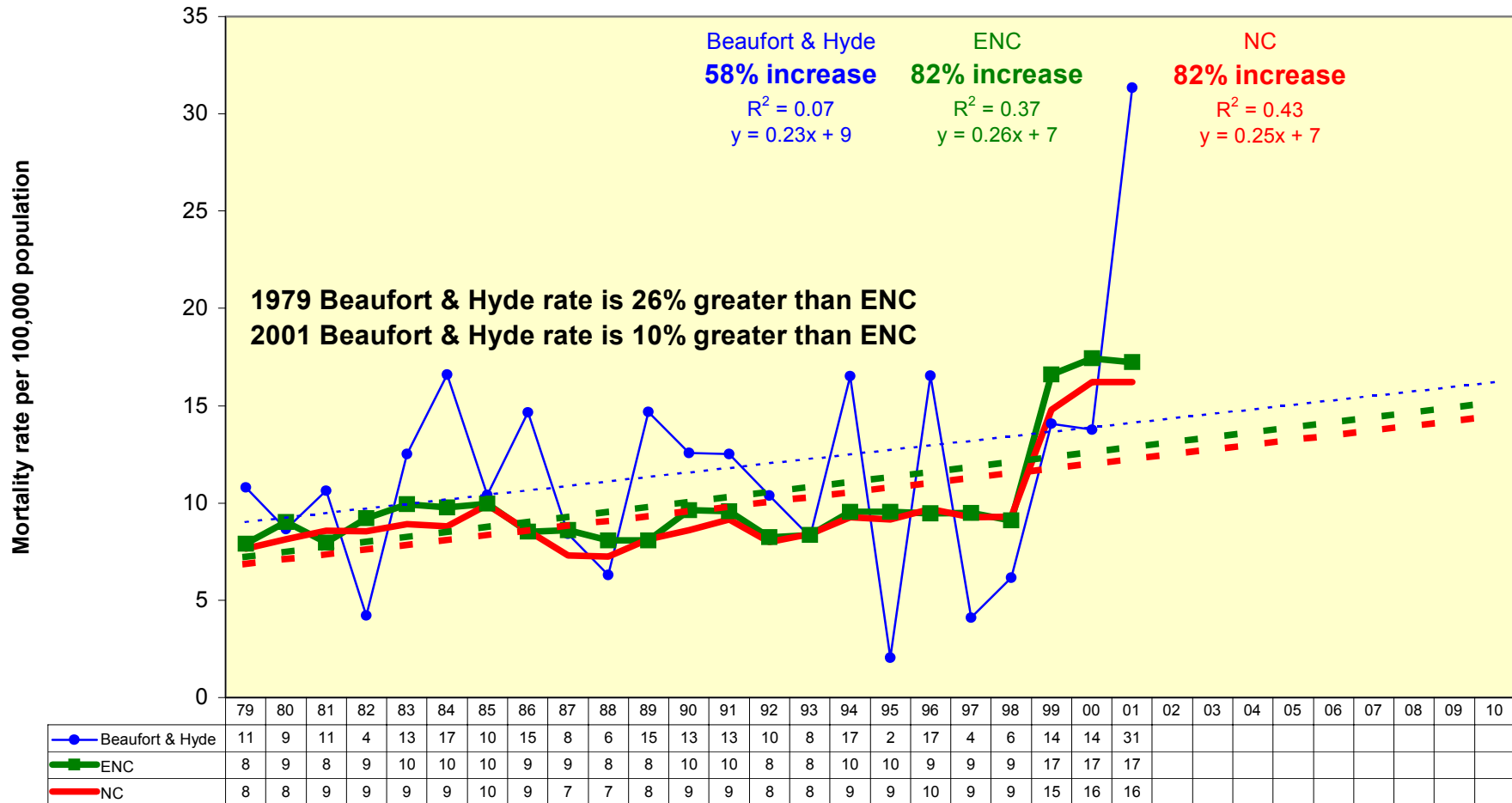
Disparity of Fitted Rates in 2001				
NWM	WM	NWF	WF	
	64% LT	4% GT	77% LT	NWM
179% GT		189% GT	37% LT	WM
4% LT	65% LT		78% LT	NWF
341% GT	58% GT	357% GT		WF

Figure 48. Diabetes Mellitus:
Disparity in mortality rates by race,
1979-2001 with projections to 2010



Nephritis, Nephrotic Syndrome, and Nephrosis

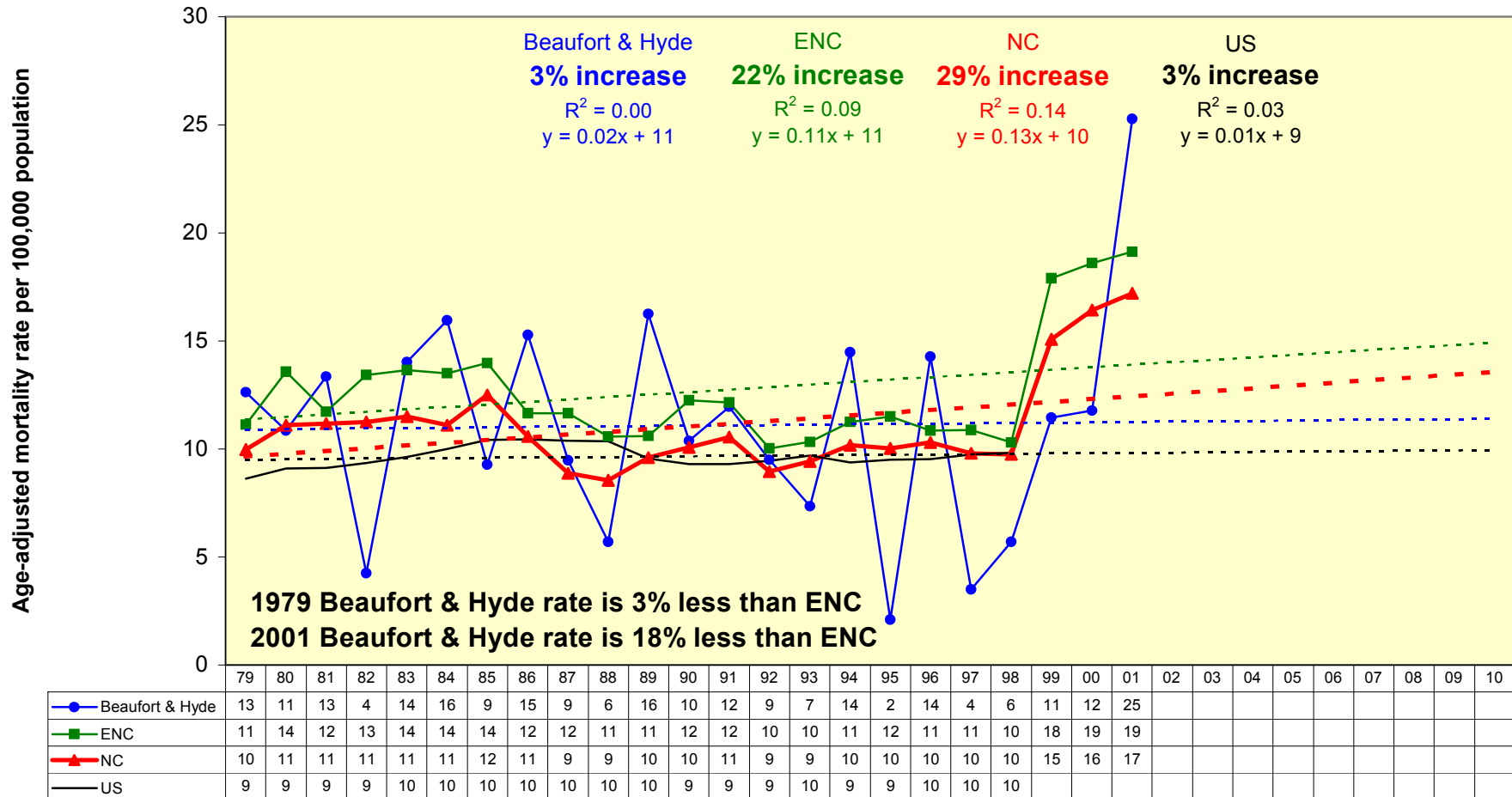
Figure 49. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in mortality rates by county, region, and state,
1979-2001 with projections to 2010



Disparity of Fitted Rates in 1979			
Beaufort & Hyde	ENC	NC	
	21%LT	25%LT	Beaufort & Hyde
26%GT		5%LT	ENC
33%GT	5%GT		NC

Disparity of Fitted Rates in 2001			
Beaufort & Hyde	ENC	NC	
	9%LT	13%LT	Beaufort & Hyde
10%GT		5%LT	ENC
16%GT	5%GT		NC

Figure 50. Nephritis, Nephrotic Syndrome, and Nephrosis:
Trends in age-adjusted mortality rates by county, region, state, and nation,
1979-2001 with projections to 2010



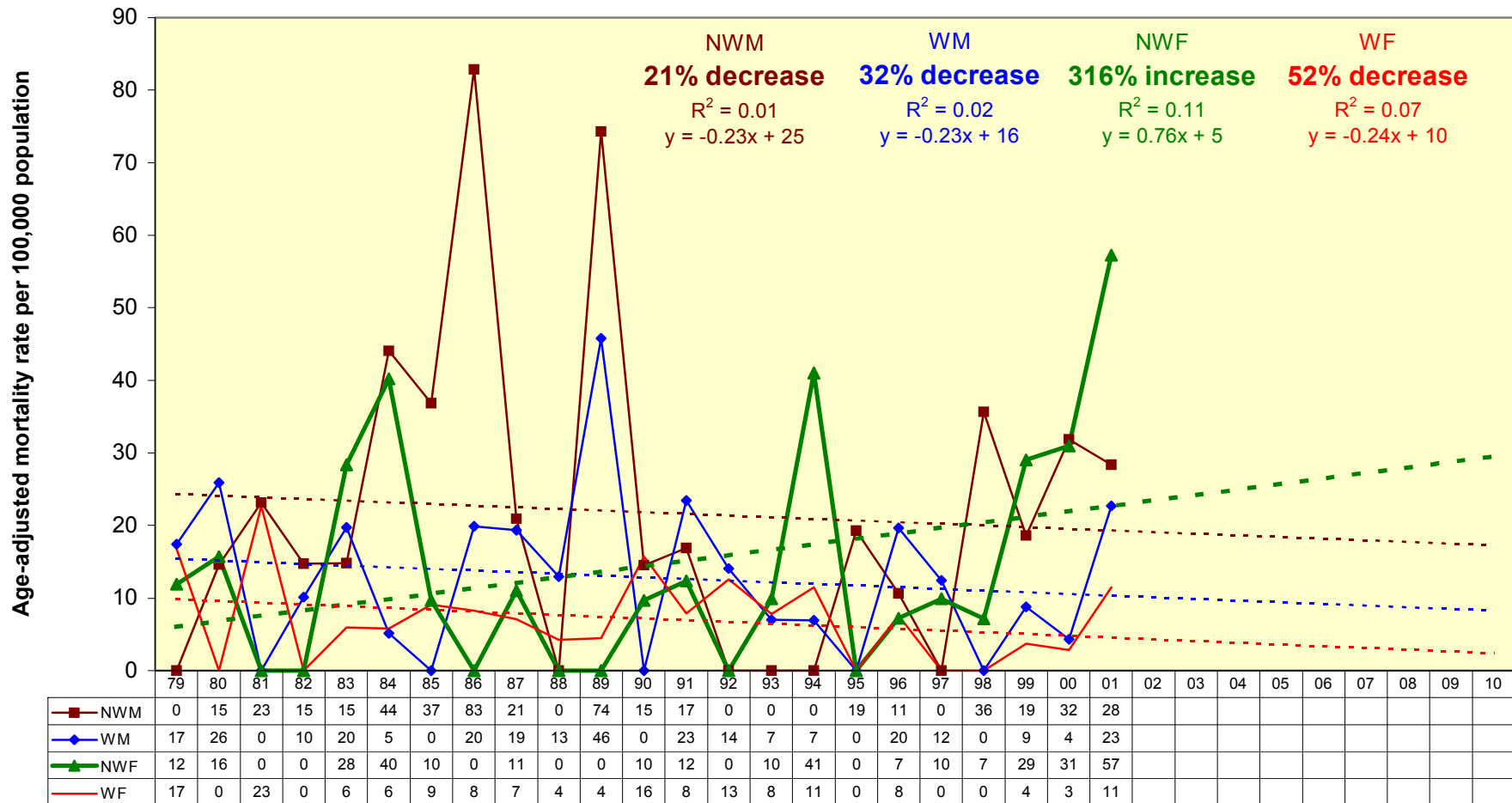
Disparity of Fitted Rates in 1979

Beaufort & Hyde	ENC	NC	US	
	4%GT	12%LT	13%LT	Beaufort & Hyde
3%LT		15%LT	16%LT	ENC
14%GT	18%GT	0%		NC
15%GT	19%GT	0%		US

Disparity of Fitted Rates in 2001

Beaufort & Hyde	ENC	NC	US	
	23%GT	10%GT	13%LT	Beaufort & Hyde
18%LT		11%LT	29%LT	ENC
9%LT	12%GT		20%LT	NC
15%GT	41%GT	26%GT		US

Figure 51. Nephritis, Nephrotic Syndrome, and Nephrosis: Trends in age-adjusted mortality rates by race and gender, 1979-2001 with projections to 2010



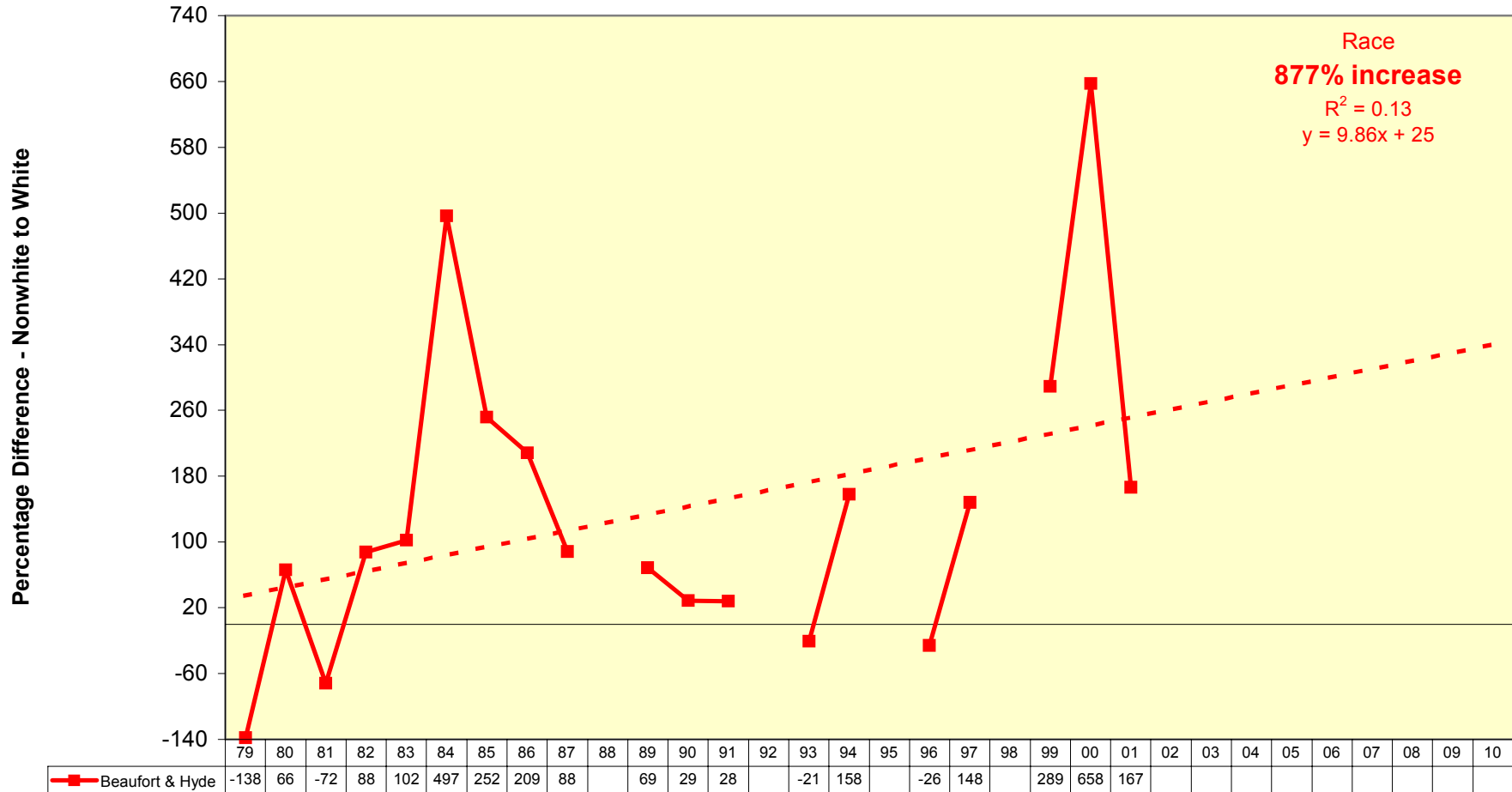
Disparity of Fitted Rates in 1979

NWM	WM	NWF	WF	
	36% LT	78% LT	59% LT	NWM
57% GT		66% LT	36% LT	WM
365% GT	195% GT		90% GT	NWF
144% GT	55% GT	48% LT		WF

Disparity of Fitted Rates in 2001

NWM	WM	NWF	WF	
	46% LT	13% GT	75% LT	NWM
85% GT		108% GT	55% LT	WM
11% LT	52% LT		78% LT	NWF
307% GT	120% GT	358% GT		WF

Figure 52. Nephritis, Nephrotic Syndrome, and Nephrosis:
 Disparity in mortality rates by race,
 1979-2001 with projections to 2010



Appendix

Heart Disease
Stroke
Atherosclerosis
Cancer - Lip, Oral Cavity, and Pharynx
Cancer - Stomach
 Cancer - Colon, Rectum, and Anus
 Cancer - Liver
 Cancer - Pancreas
 Cancer - Larynx
 Cancer - Trachea, Bronchus, and Lung
 Cancer - Malignant Melanoma of Skin
 Cancer - Breast
 Cancer - Cervix Uteri
 Cancer - Ovary
 Cancer - Prostate
 Cancer - Bladder
 Cancer - Brain
 Cancer - Non-Hodgkin's Lymphoma
 Cancer - Leukemia
 Human Immunodeficiency Virus (HIV) Disease
Septicemia
Diabetes Mellitus
Influenza and Pneumonia
Chronic Lower Respiratory Disease
Chronic Liver Disease and Cirrhosis
Nephritis, Nephrotic Syndrome, and Nephrosis
Unintentional Motor Vehicle Injuries
All Other Unintentional Injuries and Adverse Effects
Suicide
Homicide
Legal Intervention
Alzheimer's Disease