Supplemental Online Content

This supplemental material has been provided by the authors to give readers additional information about their work.

eFigure 1. Race and Ethnicity Distribution in the District of Columbia (A) by year, (B) by Ward in 2020

(A)
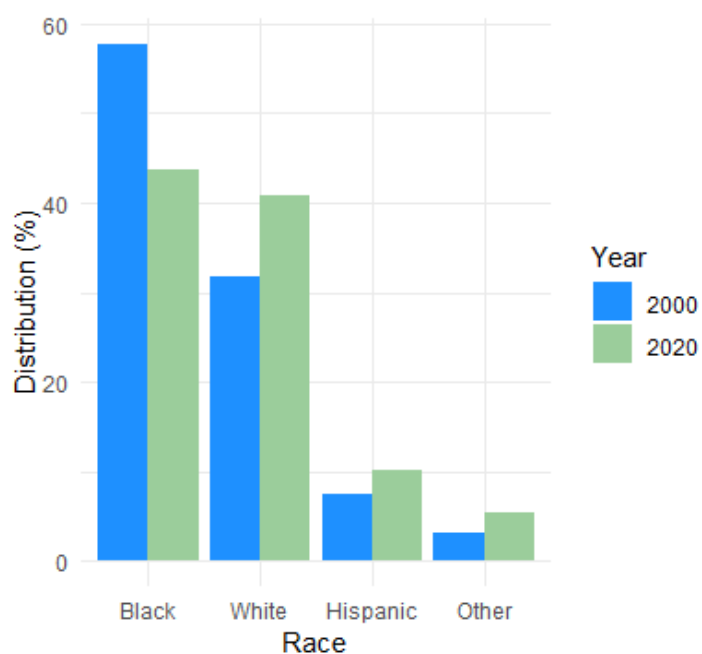
(B)
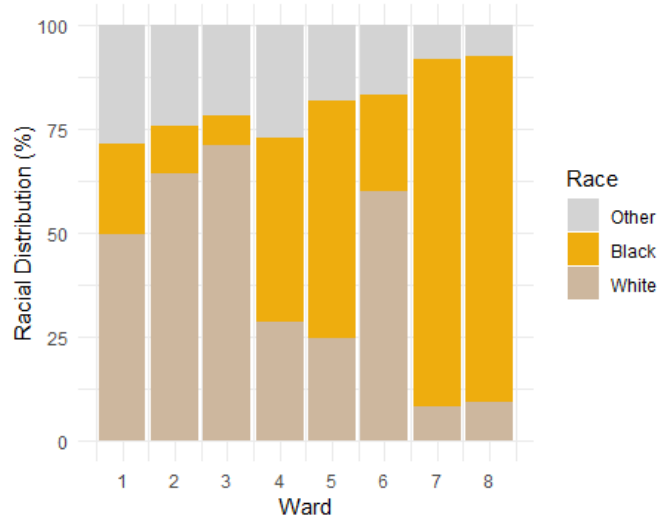
*Other: Hispanic or Latino, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, Other race, and Multiracial. Hispanics/Latinos can be of any race.

eFigure 2. The leading causes of death in the District of Columbia by Ward in 2020

eFigure 3, Age-adjusted mortality rate in Black, White, and overall population before and after excluding deaths occurred in 2020

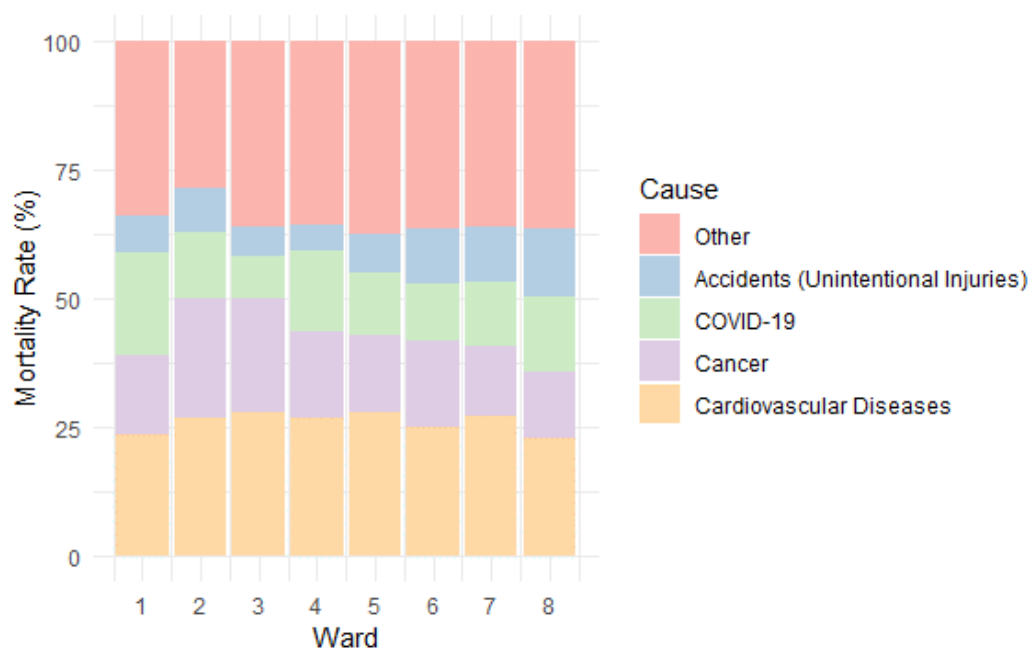*(A) All-cause mortality before (left) and after (right) excluding 2020*

Black Population: 2 Joinpoints

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 2 Joinpoints.

Black Population: 2 Joinpoints#

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
 # Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 2 Joinpoints.

White Population: 0 Joinpoints

Observed
2000.0-2020.0 APC = -3.28*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

White Population: 0 Joinpoints#

Observed
2000.0-2019.0 APC = -3.38*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 0 Joinpoints.

Overall Population: 2 Joinpoints

Observed
2000.0-2012.0 APC = -3.00*
2012.0-2018.0 APC = -0.72
2018.0-2020.0 APC = 7.90*
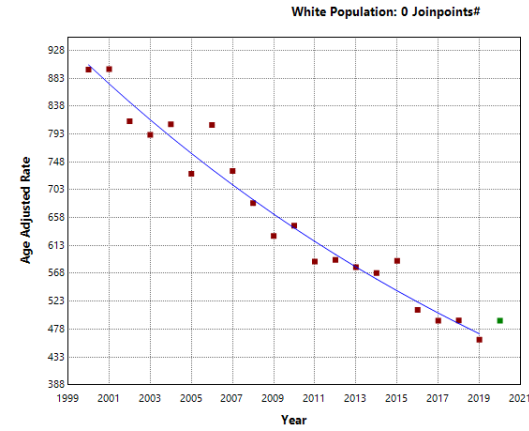
* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 2 Joinpoints.

Overall Population: 2 Joinpoints#

Observed
2000.0-2006.0 APC = -2.15*
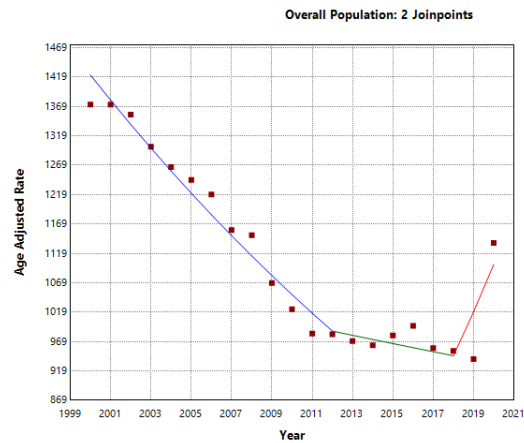2006.0-2011.0 APC = -4.18*
2011.0-2019.0 APC = -0.44

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 2 Joinpoints.

(B) CVD mortality before (left) and after (right) excluding 2020

Black Population: 1 Joinpoint

Legend:
- Observed
- 2000.0-2011.0 APC = -3.08*
- 2011.0-2020.0 APC = 0.14

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 1 Joinpoint.

Black Population: 1 Joinpoint#

Legend:
- Observed
- 2000.0-2011.0 APC = -3.04*
- 2011.0-2019.0 APC = -0.04

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
 # Observed Y Value 2020 was excluded from the model fitting.
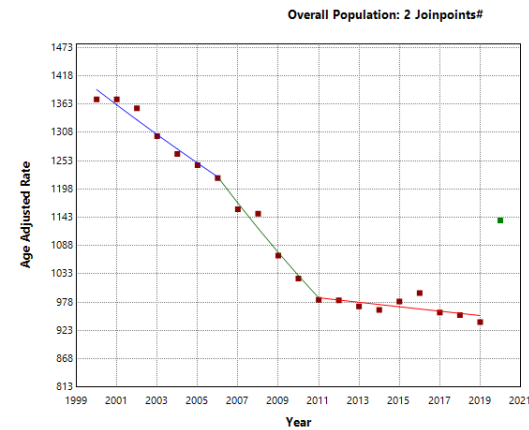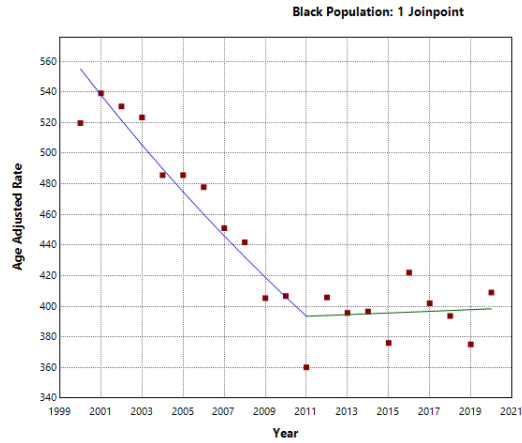Final Selected Model: 1 Joinpoint.

White Population: 0 Joinpoints

Legend:
- Observed
- 2000.0-2020.0 APC = -4.68*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

White Population: 0 Joinpoints#
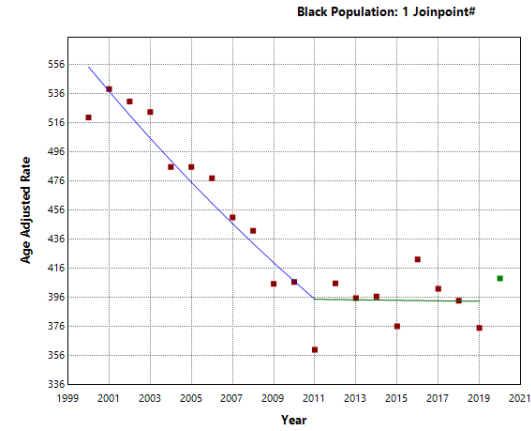

Legend:
- Observed
- 2000.0-2019.0 APC = -4.84*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
 # Observed Y Value 2020 was excluded from the model fitting.
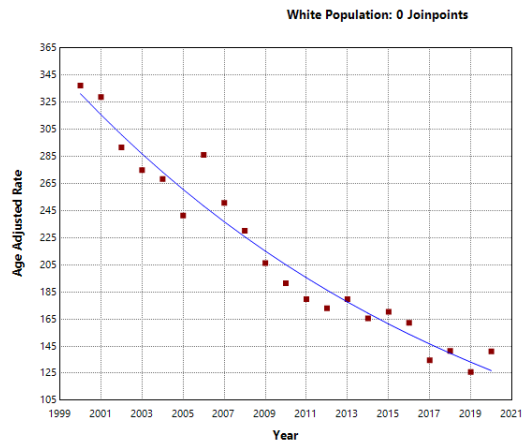Final Selected Model: 0 Joinpoints.

Overall Population: 1 Joinpoint

Legend:
- Observed
- 2000.0-2011.0 APC = -3.70*
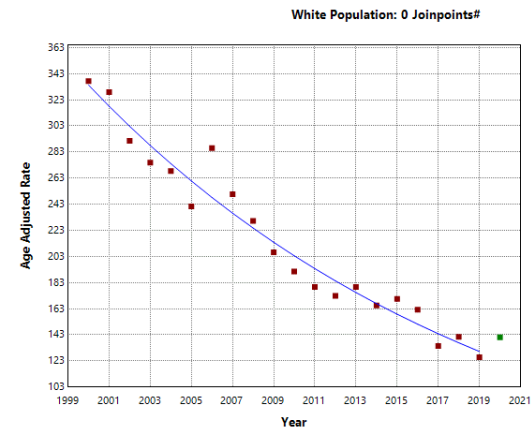- 2011.0-2020.0 APC = -1.05

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 1 Joinpoint.

Overall Population: 1 Joinpoint#

Legend:
- Observed
- 2000.0-2011.0 APC = -3.65*
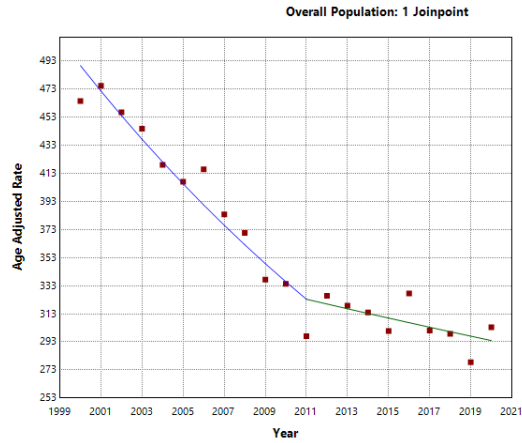- 2011.0-2019.0 APC = -1.27

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
\# Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 1 Joinpoint.

C) Cancer mortality before (left) and after (right) excluding 2020

Black Population: 0 Joinpoints

Legend:
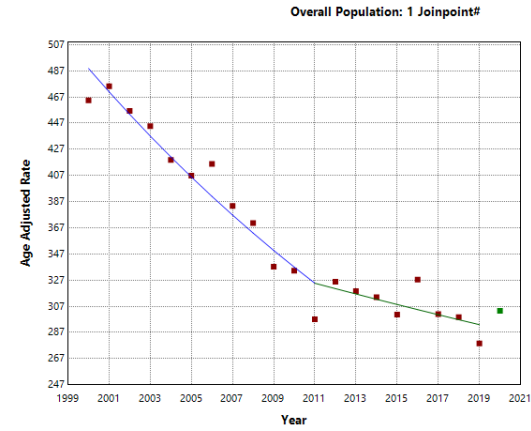- Observed
- 2000.0-2020.0 APC = -1.78*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Black Population: 0 Joinpoints#

Legend:
- Observed
- 2000.0-2019.0 APC = -1.74*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
\# Observed Y Value 2020 was excluded from the model fitting.
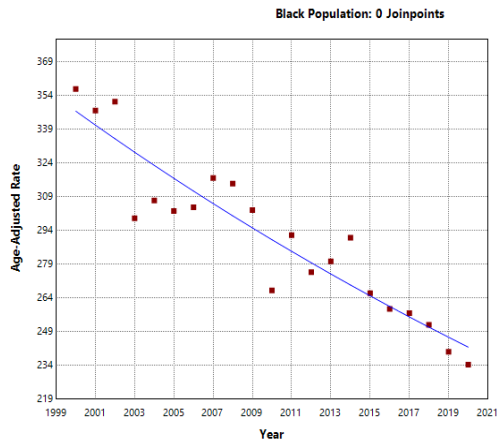Final Selected Model: 0 Joinpoints.

White Population: 0 Joinpoints

Observed
2000.0-2020.0 APC = -3.42*

Age-Adjusted Rate / Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

White Population: 0 Joinpoints#

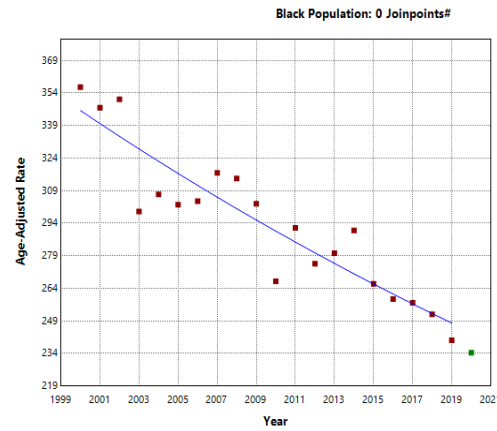Observed
2000.0-2019.0 APC = -3.35*

Age-Adjusted Rate / Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
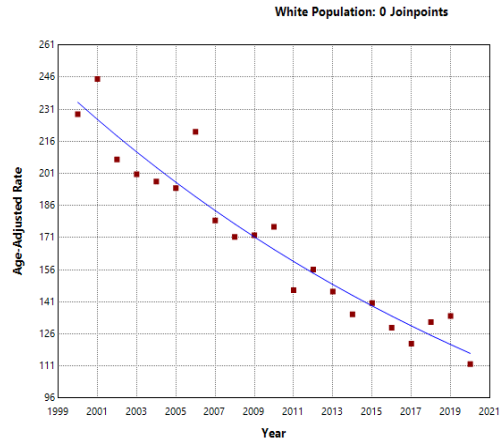Final Selected Model: 0 Joinpoints.

Overall Population: 0 Joinpoints

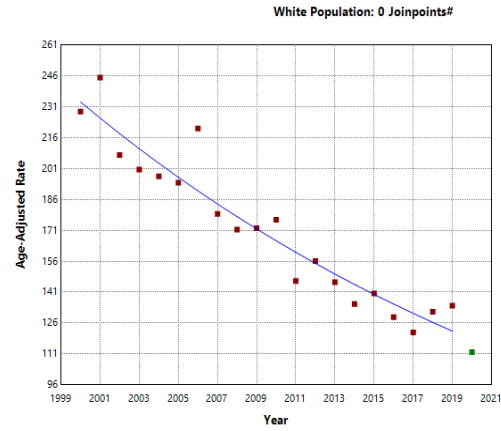Observed
2000.0-2020.0 APC = -2.37*

Age-Adjusted Rate / Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Overall Population: 0 Joinpoints#

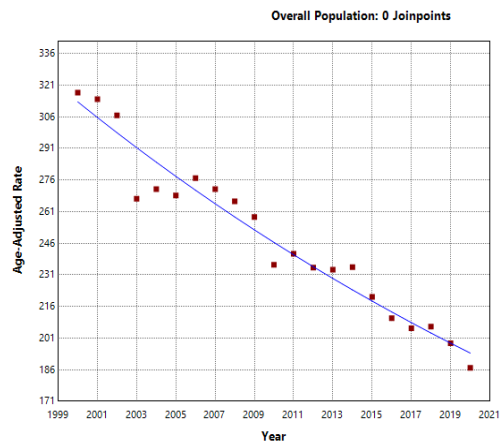Observed
2000.0-2019.0 APC = -2.32*

Age-Adjusted Rate / Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
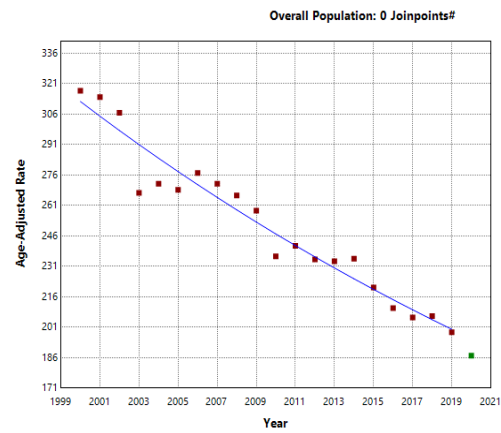Final Selected Model: 0 Joinpoints.

© 2025 Hashemian M et al. *JAMA Network Open*.

eFigure 4, Rate ratios comparing Black individuals to White individuals before and after excluding deaths occurred in 2020

(A) All-cause, CVD, Cancer mortality before (left) and after (right) excluding 2020

All-cause: 1 Joinpoint

Observed
2000.0-2015.0 APC = 1.07
2015.0-2020.0 APC = 7.75*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 1 Joinpoint.

All-cause: 1 Joinpoint#

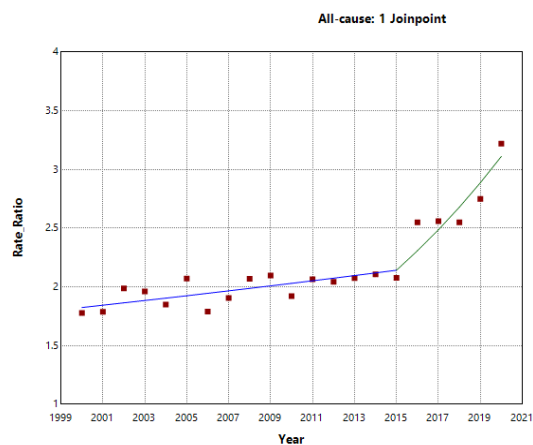Observed
2000.0-2014.0 APC = 0.98
2014.0-2019.0 APC = 5.75*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
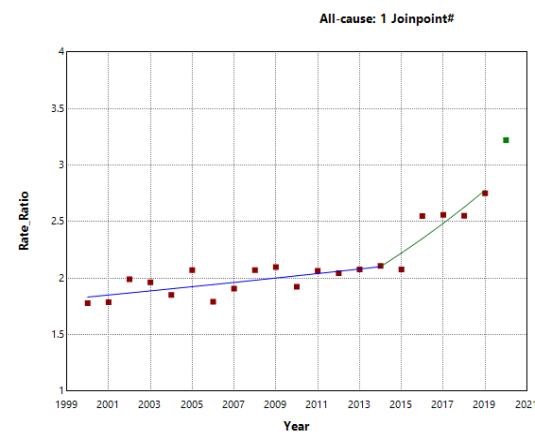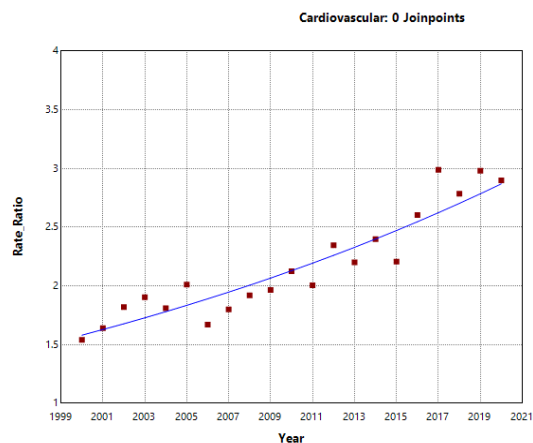Final Selected Model: 1 Joinpoint.

Cardiovascular: 0 Joinpoints

Observed
2000.0-2020.0 APC = 3.03*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Cardiovascular: 0 Joinpoints#

Observed
2000.0-2019.0 APC = 3.01*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 0 Joinpoints.

Cancer: 0 Joinpoints
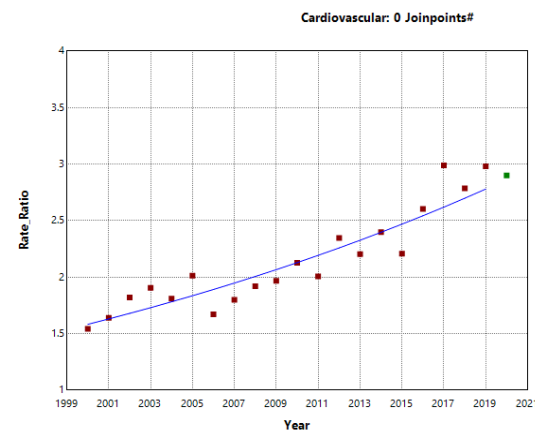
Rate_Ratio

Year

Observed
2000.0-2020.0 APC = 1.69*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Cancer: 0 Joinpoints#
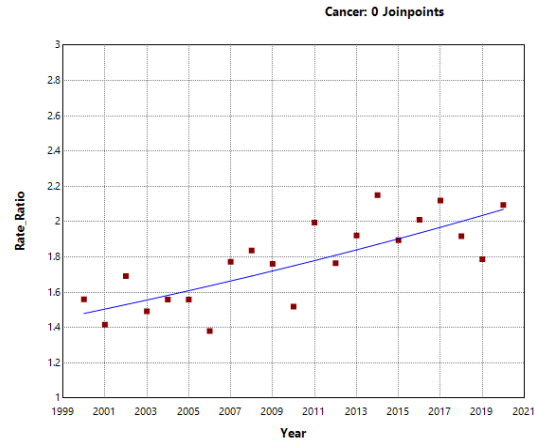
Rate_Ratio

Year

Observed
2000.0-2019.0 APC = 1.68*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
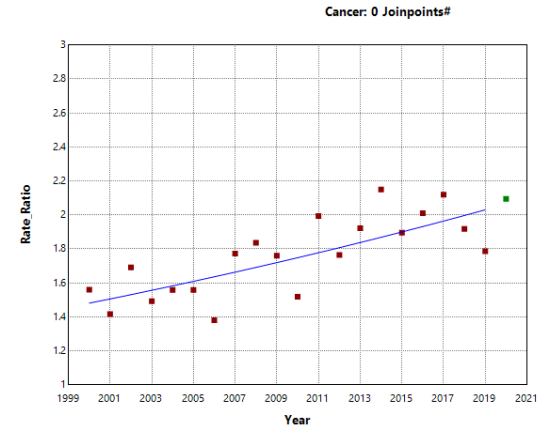Final Selected Model: 0 Joinpoints.

eFigure 5, Rate ratios comparing Black individuals to White individuals by sex before and after excluding deaths occurred in 2020

(B) Rate Ratio for All-cause mortality by gender before (left) and after (right) excluding 2020

Men: 1 Joinpoint

Observed
2000.0-2015.0 APC = 1.22
2015.0-2020.0 APC = 9.75*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 1 Joinpoint.

Men: 1 Joinpoint#

Observed
2000.0-2013.0 APC = 0.95
2013.0-2019.0 APC = 6.02*

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
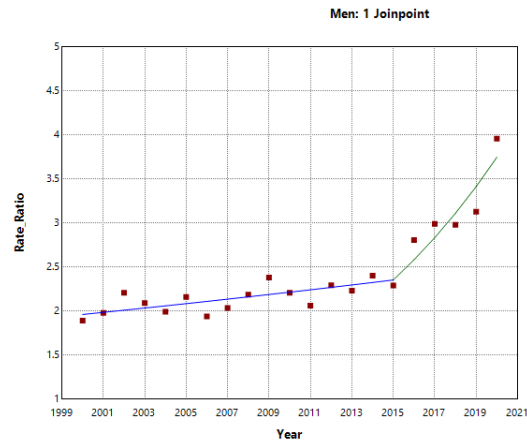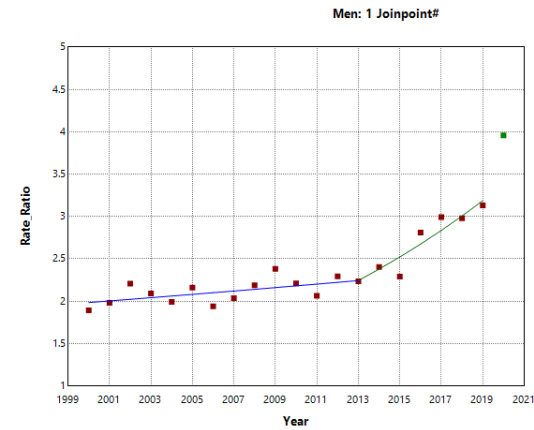Final Selected Model: 1 Joinpoint.

Women: 1 Joinpoint

Legend:
- Observed
- 2000.0-2015.0 APC = 1.04
- 2015.0-2020.0 APC = 5.63*

Rate_Ratio (y-axis: 1, 1.5, 2, 2.5, 3, 3.5, 4)
Year (x-axis: 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021)

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 1 Joinpoint.

Women: 0 Joinpoints#

Legend:
- Observed
- 2000.0-2019.0 APC = 1.55*

Rate_Ratio (y-axis: 1, 1.5, 2, 2.5, 3, 3.5, 4)
Year (x-axis: 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021)

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 0 Joinpoints.

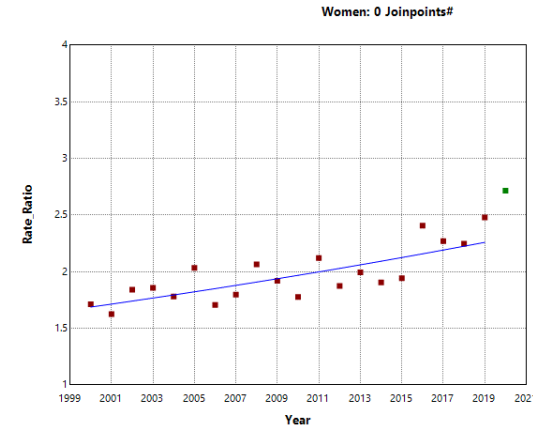**(C) Rate Ratio for CVD mortality by gender before (left) and after (right) excluding 2020**

Men: 1 Joinpoint

Legend:
- Observed
- 2000.0-2011.0 APC = 1.93
- 2011.0-2020.0 APC = 6.38*

Rate_Ratio (y-axis: 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5)
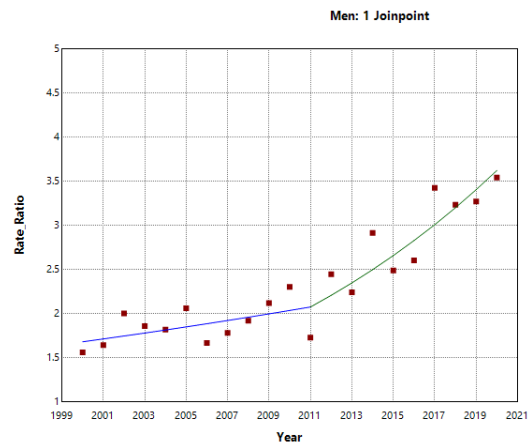Year (x-axis: 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021)

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 1 Joinpoint.

Men: 1 Joinpoint#

Legend:
- Observed
- 2000.0-2011.0 APC = 1.90
- 2011.0-2019.0 APC = 6.54

Rate_Ratio (y-axis: 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5)
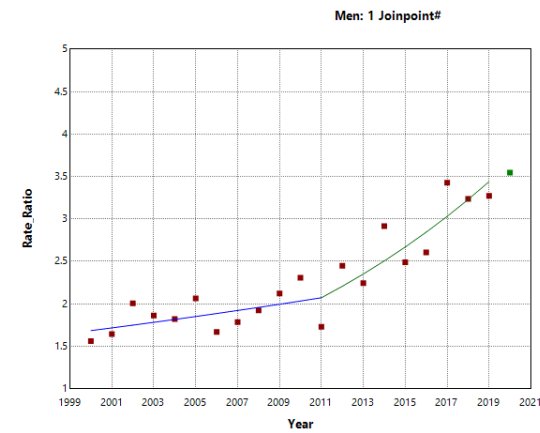Year (x-axis: 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021)

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
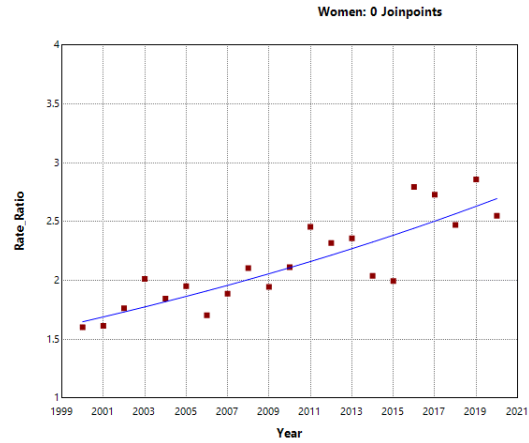Final Selected Model: 1 Joinpoint.

Women: 0 Joinpoints

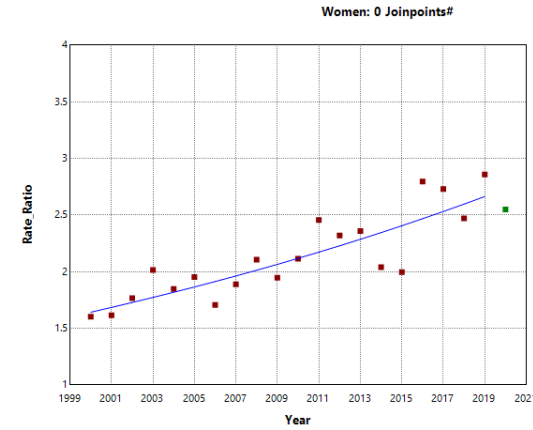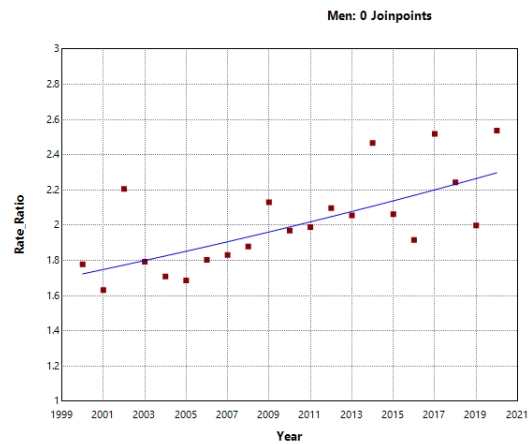- Observed
- 2000.0-2020.0 APC = 2.49*

Rate_Ratio

Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Women: 0 Joinpoints#
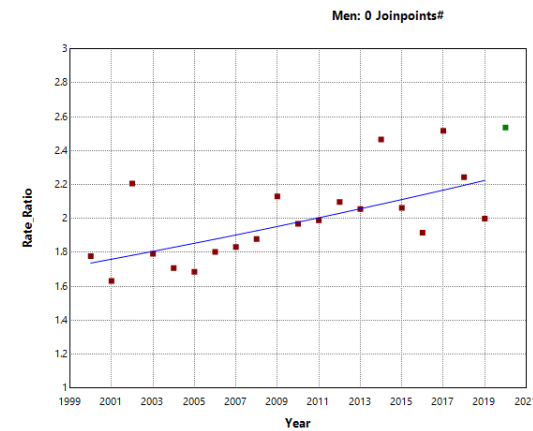
- Observed
- 2000.0-2019.0 APC = 2.58*

Rate_Ratio

Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 0 Joinpoints.

(C) *Rate Ratio for Cancer mortality by gender before (left) and after (right) excluding 2020*

Men: 0 Joinpoints

- Observed
- 2000.0-2020.0 APC = 1.45*

Rate_Ratio

Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Men: 0 Joinpoints#

- Observed
- 2000.0-2019.0 APC = 1.31*

Rate_Ratio

Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
# Observed Y Value 2020 was excluded from the model fitting.
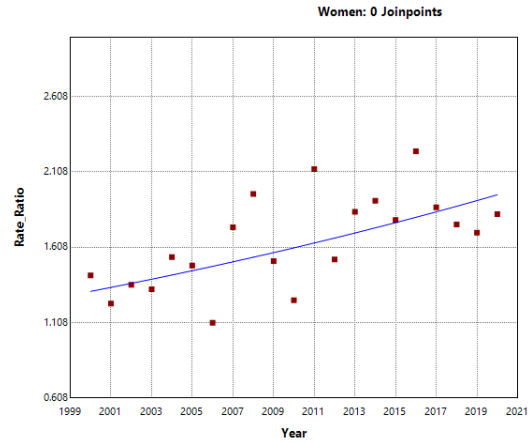Final Selected Model: 0 Joinpoints.

Women: 0 Joinpoints
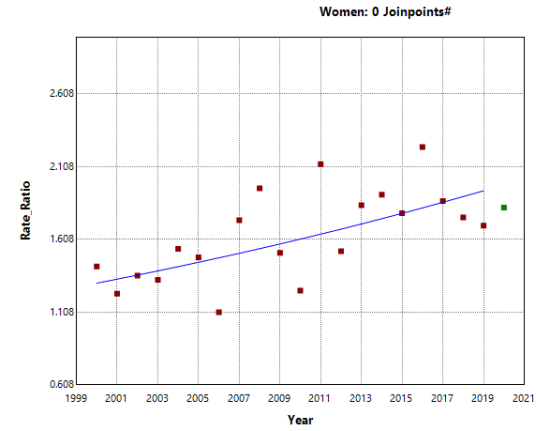
Observed
2000.0-2020.0 APC = 2.00*

Rate_Ratio

Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
Final Selected Model: 0 Joinpoints.

Women: 0 Joinpoints#

Observed
2000.0-2019.0 APC = 2.11*

Rate_Ratio

Year

* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level.
 # Observed Y Value 2020 was excluded from the model fitting.
Final Selected Model: 0 Joinpoints.

eFigure 6, Joinpoint analysis without (top) and with (bottom) considering autocorrelated errors for age-adjusted mortality rate in Black, White, and overall population after excluding deaths occurred in 2020.