Trends in U.S. Heart Disease Mortality by Race, Urbanicity, and Region

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Background

- Heart disease has been the leading cause of death in the U.S. since 1910 (excluding 1918-1920 flu pandemic).*
- Heart disease death rates vary by geographic region, race/ethnicity, and urban/rural status.
- Heart disease death rates have declined dramatically in the past 40 years, but the magnitude of decline may be variable.

* http://www.cdc.gov/nchs/data/dvs/lead1900_98.pdf

Objective

- To explore variation in declining heart disease death rates by geographic region and urbanicity from 1973 to 2010.

Study Parameters

Years:	1973 - 2010
Ages:	35 and older
Population:	All residents of contiguous U.S.
Geographic Unit:	County
Cause of Death:	All diseases of the heart
Urbanicity:	USDA Rural-Urban Continuum Codes – status over time
Data Sources:	National Vital Statistics System U.S. Census Bureau

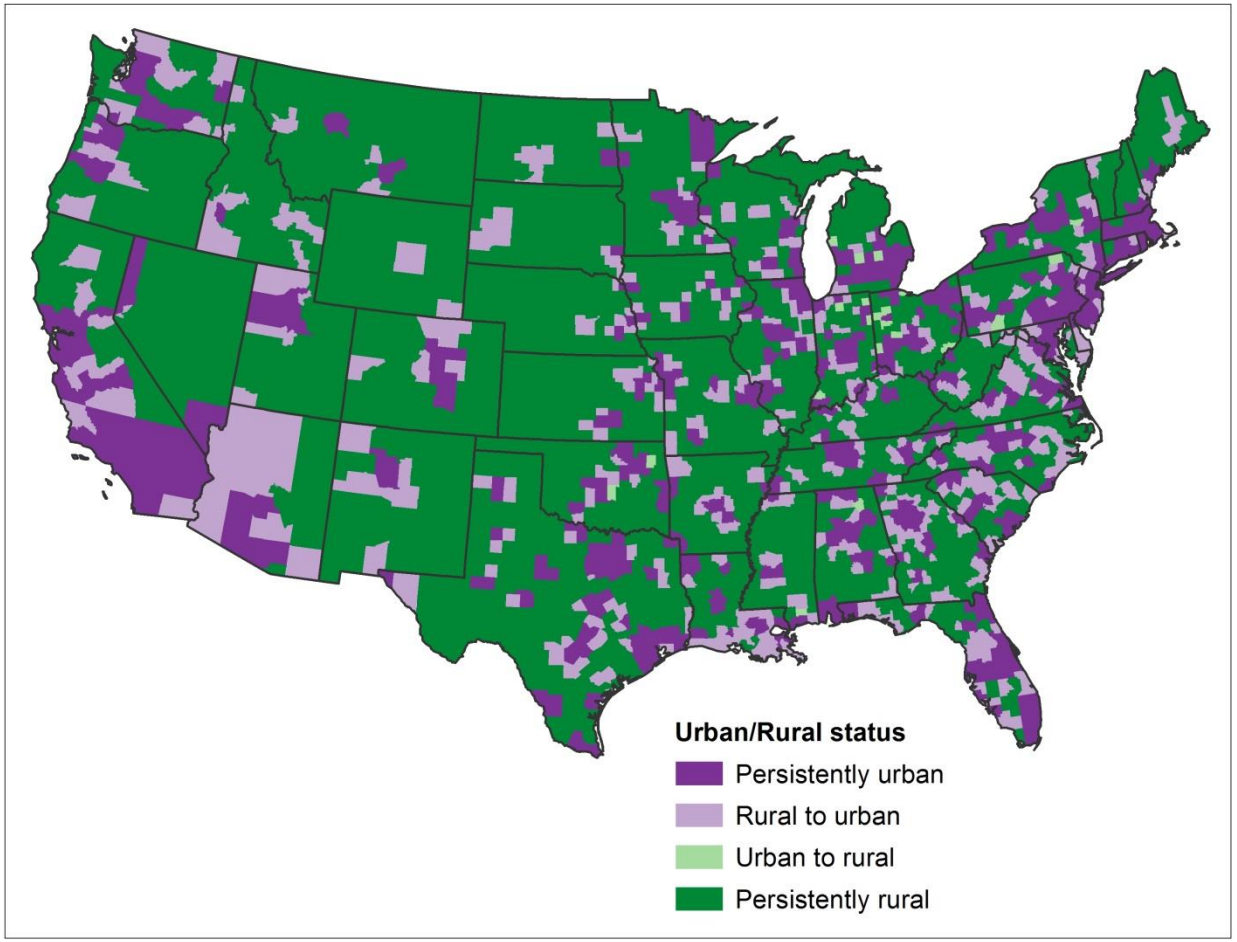
Methods

- Spatiotemporal Bayes modeling to stabilize rates. (R)
- Direct age-adjustment to 2000 U.S. standard population.
- Percent decline in heart disease death rates estimated as the percent difference between 1973 and 2010.
- Generalized linear models to assess correlates. (SAS)

Categories of Urbanicity

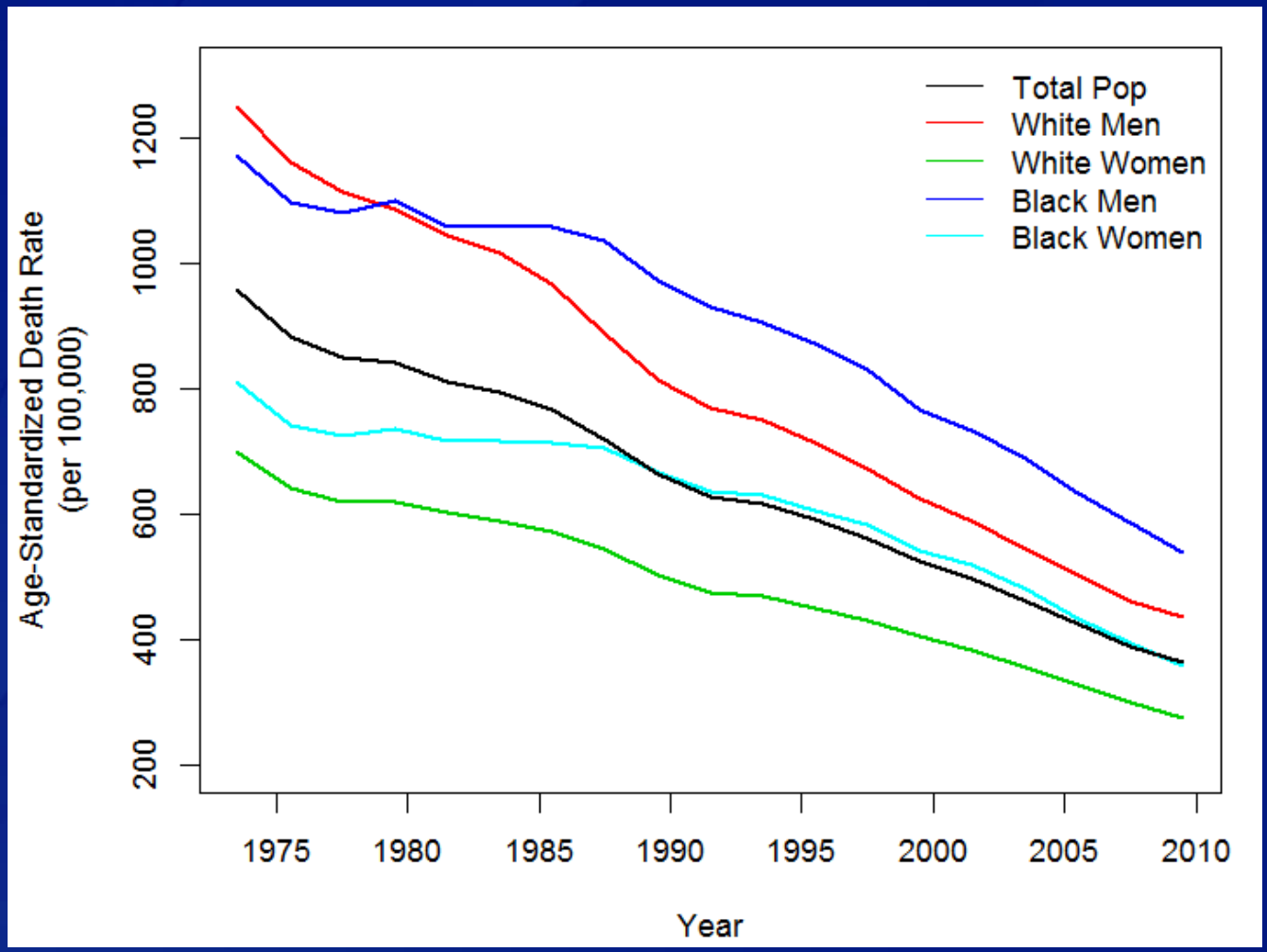
	Persistently Urban	Persistently Rural	Rural to Urban	Urban to Rural
1974 RUCC	Metro counties (1-3)	Nonmetro counties (4-9)	Nonmetro counties (4-9)	Metro counties (1-3)
2013 RUCC	Metro counties	Nonmetro counties	Metro counties	Nonmetro counties
Total # of Counties	617	1,925	536	21

Urbanicity Categories
1974 to 2013

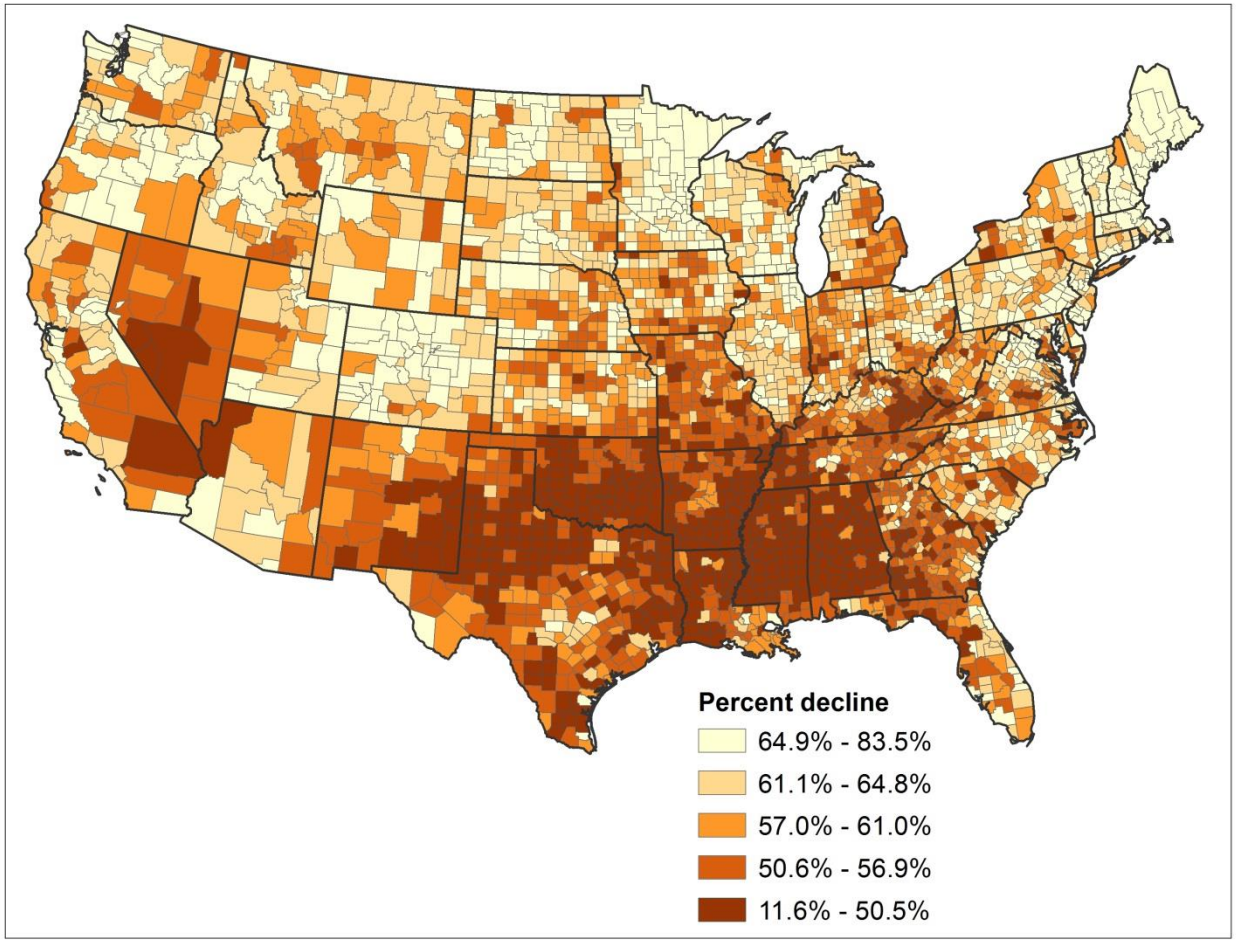


Results

Temporal Trends in Heart Disease Death Rates, 1973 to 2010



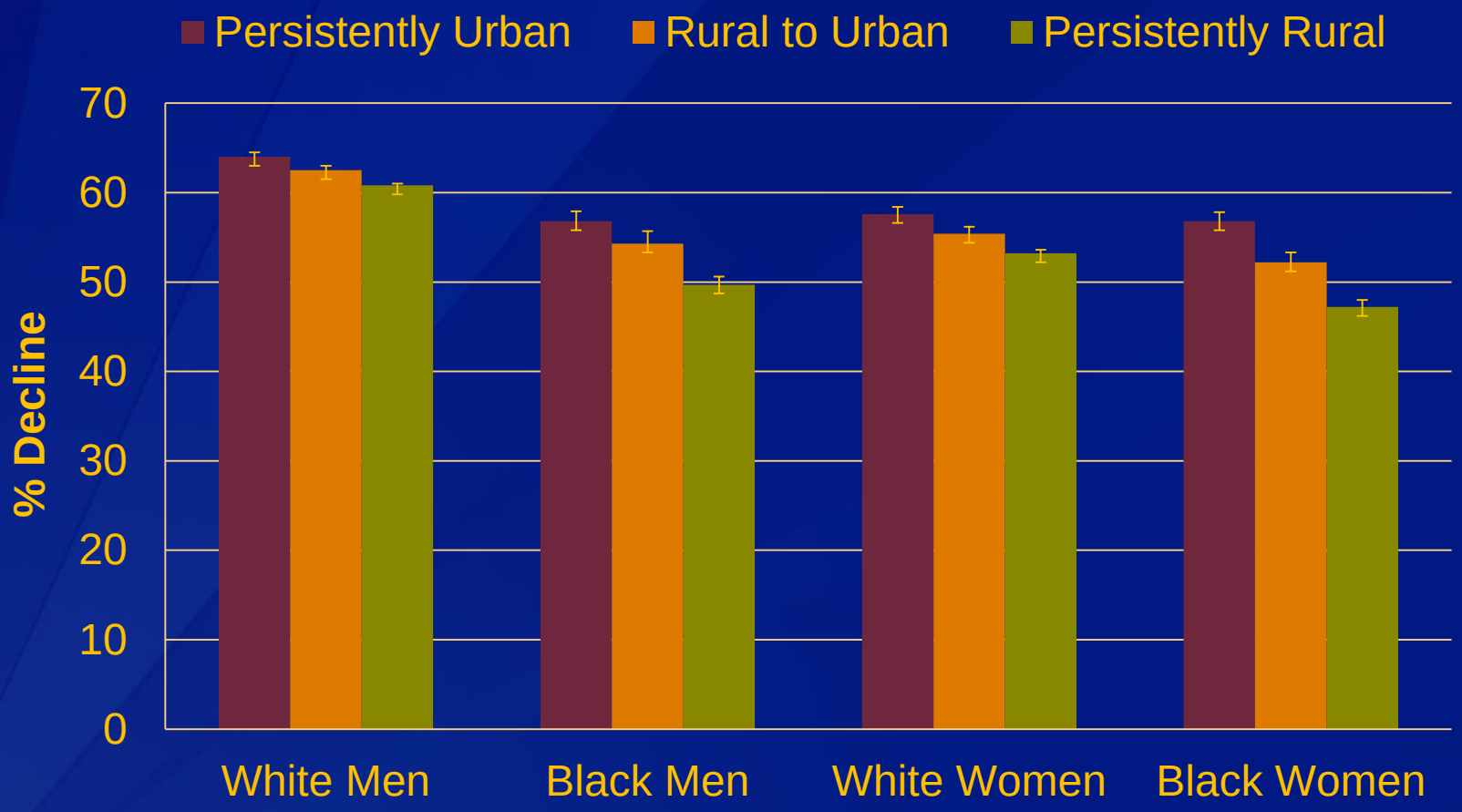
Percent Decline in Heart Disease Death Rate, 1973 to 2010



Slower Decline in Heart Disease Death Rates in Persistently Rural Areas

Urban/Rural Status	Estimated % Decline in Death Rate	95% Confidence Interval	p value
Persistently Urban	60.3	(59.6, 60.9)	<0.001
Rural to Urban	58.3	(57.5, 59.0)	<0.001
Urban to Rural	57.3	(53.5, 61.0)	0.64
Persistently Rural	56.4	(56.0, 56.7)	REF

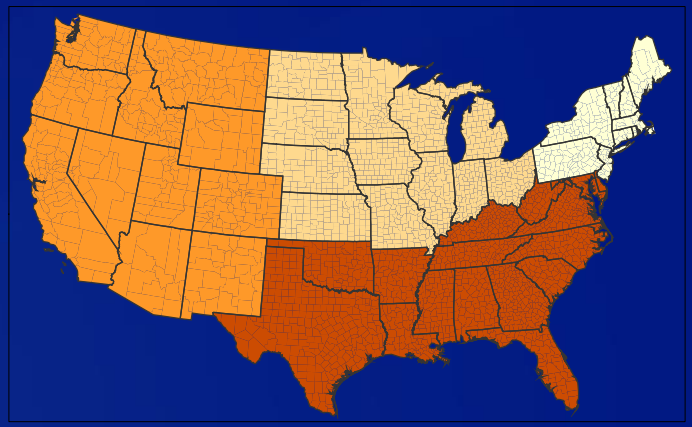
Percent Decline in Heart Disease Death Rate by Race/Gender and Urbanicity



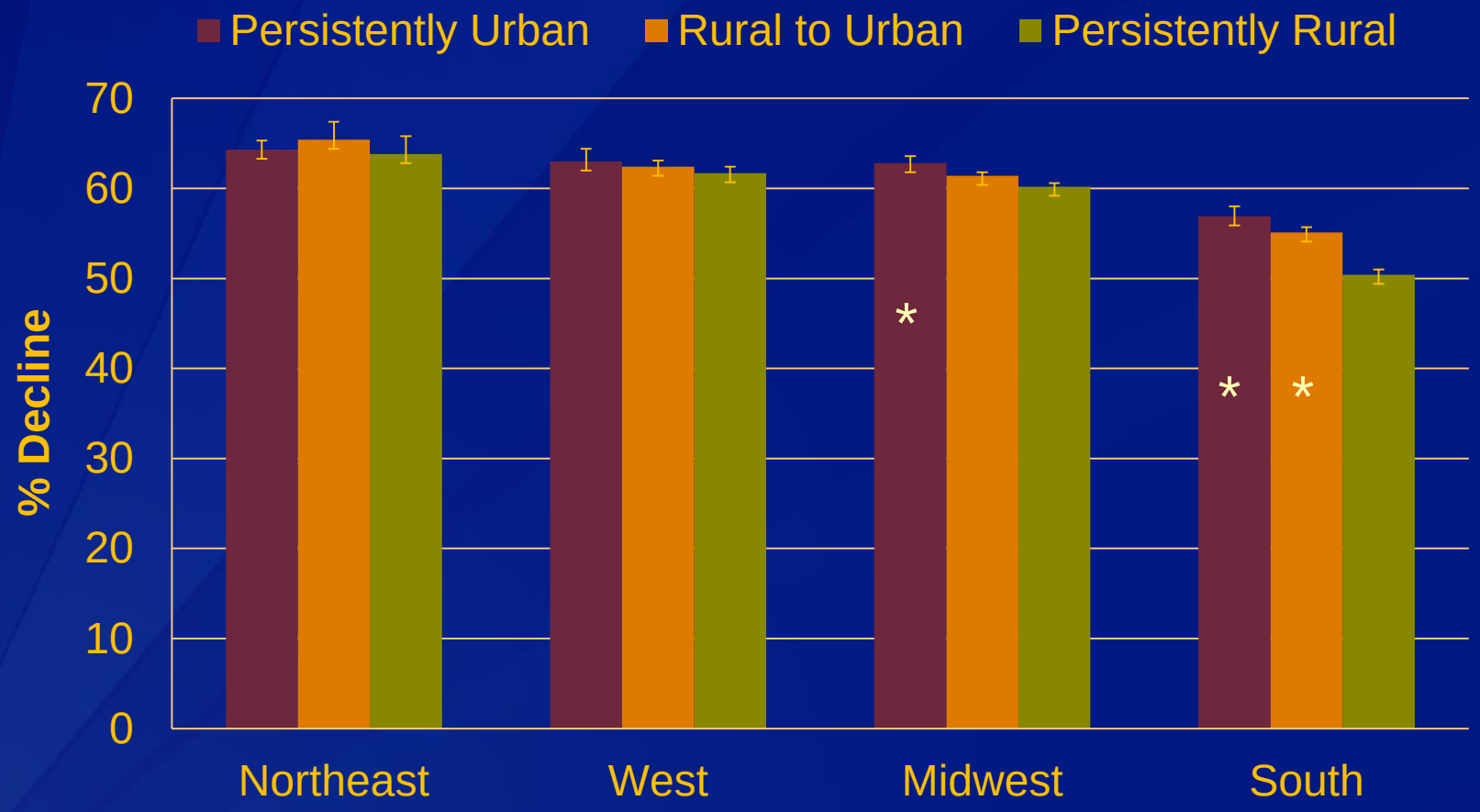
Note: "Persistently Urban" and "Rural to Urban" were significantly different than "Persistently Rural" at alpha =0.05 for all race/gender groups.

Slower Decline in Heart Disease Death Rates in the South

Region	Estimated % Decline in Death Rate	95% Confidence Interval	p value
Northeast	64.2	(63.1, 65.2)	<0.001
West	62.0	(61.3, 62.8)	<0.001
Midwest	60.8	(60.3, 61.2)	<0.001
South	52.7	(52.3, 53.1)	REF



Percent Decline in Heart Disease Death Rate by Region and Urban/Rural Status



* Different than "Persistently Rural" at alpha =0.05

Limitations

- Death certificate data may misclassify cause of death.
- Limited to analyzing deaths, not incident cases.
- Death rate data are based on residency at time of death and not on the county or state in which a person spent the majority of his or her life.

Strengths

- Robust and precise county level estimates generated with spatiotemporal Bayesian methods.
- Patterns studied over a long period of time.

Summary

- Region:

  Heart disease death rate declines were slowest in the South.

- Urbanicity:

  Nationally, declines were slower in persistently rural counties than in persistently urban counties; true for all race/gender groups.

- Region*Urbanicity:

  After stratifying by region, persistently rural counties declined significantly more slowly only in the South and Midwest.

Conclusions and Next Steps

- The magnitude of declining heart disease death rates varies by region and urbanicity.
- These results highlight the need to understand why Southern counties and persistently rural counties (especially in the South and Midwest) have not benefitted equally.
- We will be exploring other county-level variables that may help to explain these disparities in declining rates.

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Visit our Interactive Atlas of Heart Disease and Stroke

http://nccd.cdc.gov/DHDSPAtlas

For more information please contact Centers for Disease Control and Prevention

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