Health Statistics by Congressional District: A foundation for political epidemiology to inform health policy

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Introduction

- US has an excellent system for producing health statistics but data are not aggregated at a fundamental level, the US Congressional District.

- Health statistics are aggregated at the county level while congressional districts are aggregates of census blocks.

- 97% of congressional districts do not follow county boundaries.

- Can we estimate vital statistics to fit gerrymandered congressional districts?

- Can linking mortality data to congressional districts make a stronger connection between public health and politics?

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Topics to be covered

- What is gerrymandering? How does it work? What is its effect on democracy? How is it related to health policy?

- How can vital statistics be approximately aggregated to describe mortality rates in units other than counties?

- What is the degree of disparity in mortality across congressional districts?

- How do mortality disparities correlate with important policy decisions, e.g. votes on the recent proposal to expand the SCHIP program?

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Background

James Madison - House conceived as a **"numerous and changeable body"** - small districts and two-year terms to generate regular turnover. The body most closely attuned to the mood of the country. Federalist Papers.
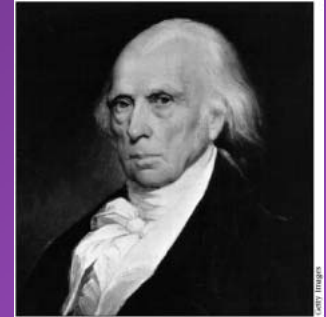
U.S. Constitution, 1787

Article 1. Section 2. The House of Representatives ... chosen every second year by the People of the several States ... apportioned according to their respective Numbers, ... [*by adding to the whole Number of free Persons, including those bound to Service for a Term of Years, and excluding Indians not taxed, three fifths of all other persons.*]* The actual Enumeration shall be made...every...ten years ... each state shall have at Least one Representative.

* Changed by Fourteenth Amendment. 1868 [*counting the whole number of persons in each state, excluding Indians not taxed.*]

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Congress:

- requires districts to be *nearly equal in population* (1872)

- *compact* (1901) but compactness ignored after 1929.

- Sets the membership of the U.S. House of Representatives at 435 (1910)

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- 435 seats to be divided up to assure each state gets at least one and large states get an even share.

- Dividing the power, a process called apportionment subject to politics and tricks.

- Gerrymandering named to mock Massachusetts Governor Elbridge Gerry who approved an election district in 1811 said to look like a salamander.

The term gerrymander was coined after Massachusetts Gov. Elbridge Gerry approved an irregularly shaped legislative district in 1812 that a critic said resembled "a salamander," another critic promptly dubbed it "a gerrymander." This cartoon-map first appeared in the Boston Gazette on March 26, 1812.

Library of Congress

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Designer districts. How are they created? Are they legal? What is the effect on democracy?

How are they created?

Data from:
- census
- election returns
- sophisticated GIS mapping

to design the makeup of congressional districts to the advantage of the parties in control of the process at the time.

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Designer districts, are they legal?

Supreme Court Rulings and Administrative Law:

- 1962, *Baker v. Carr.* Redistricting challenges based on equal protection clause are "justiciable". Establishes *equal population requirement.* Forces states to redraw lines, shifts power to cities.

- 1986, *Davis v. Bandemer.* Sets standards for "*minority vote dilution*" under Federal Voting Rights Act but signals little interest in cases involving political gerrymandering.

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- 1st Bush administration interprets Voting Rights Act to require states to maximize majority-minority congressional and state legislative districts to prevent minority vote dilution. Serves Republican interests by <u>packing minority voters</u>, overwhelmingly Democrat, into a few districts.

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- 1993 *Shaw v. Reno*. Race could not be a predominant factor

- 2001 *Hunt v. Cromartie*. State may have legitimate political reason for creating a district on racial grounds.

Jost K. Redistricting Disputes. *CQ Researcher.* 4/12/2004 2004;14(10):221-248.

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108th Congress of the United States
North Carolina - Congressional District 12
Representative Melvin L. Watt
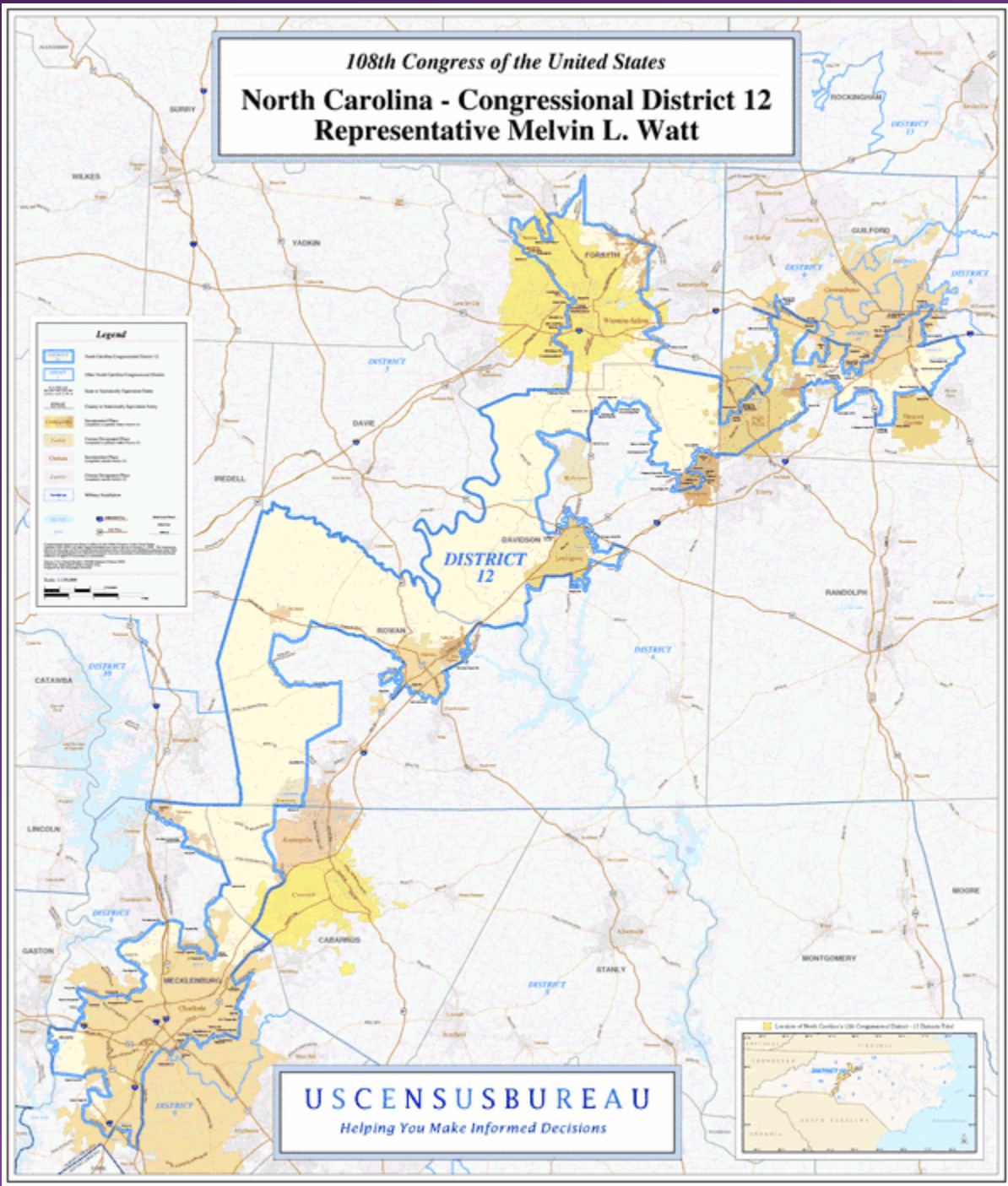
DISTRICT 12

USCENSUSBUREAU
Helping You Make Informed Decisions

Minorities Gained in Redistricting

Race-conscious redistricting in the 1990s contributed to a marked increase in the number of blacks and Hispanics elected to the U.S. House of Representatives. But recent Supreme Court decisions now limit legislatures' discretion to create so-called "majority-minority" districts.

African-American and Hispanic Members of U.S. House of Representatives

Year	Blacks	Hispanics
1991	26	11
2001	37	19
2003	37	22

Sources: CQ.com, *CQ Weekly, American Political Leaders: 1789-2000,* CQ Press.

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2000 to present – Partisan conflicts

- 2004 *Vieth v. Jubelirer.* Constitution entrusts the issue to political branches of the government and "involves no judicially enforceable rights" (Justice Scalia).

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Background

What is the effect on democracy?

Pack minority voters into minority- majority "safe" districts

Pack Republican and Democrat voters into "safe party" districts

Less turnover, incumbents stay in office for long terms

- – Less responsive to electorate?
- – More responsive to special interests with money?
- – More driven by ideology of the dominant party in the district?

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What is the effect on democracy?

Pack minority voters into minority- majority "safe" districts

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- – Less responsive to electorate?
- – More responsive to special interests with money?
- – More driven by ideology of the dominant party in the district?

- In 2002, only 16 incumbents lost.

- In 2006, 57 incumbents (13%) lost
    - – 22 uncontested
    - – 70% elected with over 60% of vote

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CQ 2006 Election Results Map

(Best viewed in Macromedia Flash Player 8.0 Download it here.)

| House | Senate | Governors |

THE HOUSE
Election Results

Results | 109th Congress

MAP NAVIGATION

Election Scorecard

Party	109th	110th	Pickup
D	203	233	+30
R	232	202	-30

218 needed for majority
Count for 109th includes four vacant
seats: 3 GOP; 1 Democrat.

Click on a district for race results, news and statistics.

KEY

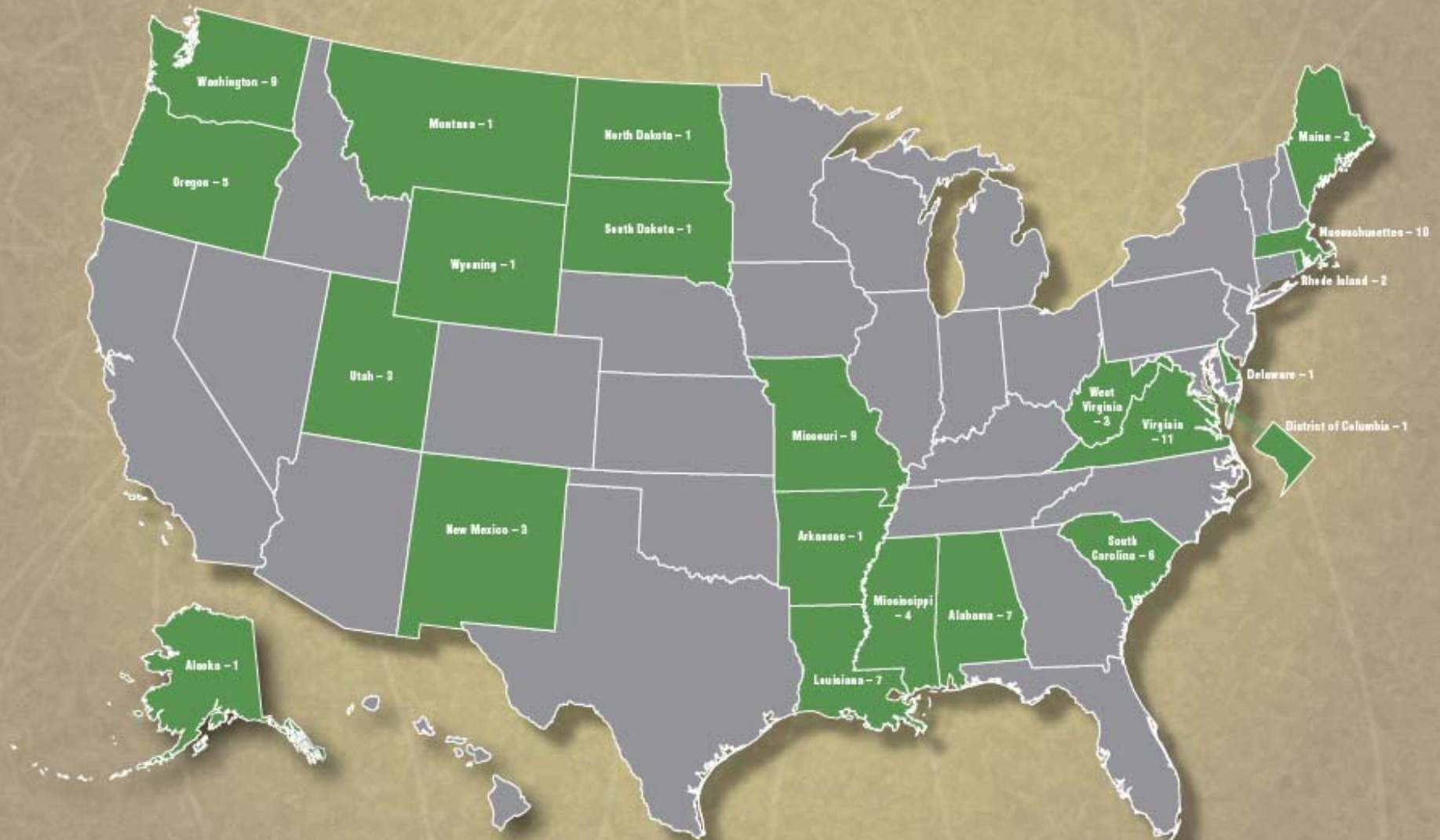Republicans Held Seat | Republican Pickup | Race Not Called | Democrat Pickup | Democrats Held Seat

http://www.cqpolitics.com/06map.html

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2006 U.S. House Delegations: States in Which All Incumbents Sought Re-Election and Won

Washington – 9
Montana – 1
North Dakota – 1
Maine – 2
Oregon – 5
South Dakota – 1
Massachusettes – 10
Wyoming – 1
Rhode Island – 2
Utah – 3
West Virginia – 3
Virginia – 11
Delaware – 1
Missouri – 9
District of Columbia – 1
New Mexico – 3
Arkansas – 1
South Carolina – 6
Mississippi – 4
Alabama – 7
Alaska – 1
Louisiana – 7

What is the effect on democracy?

- "It used to be … once every two years voters elected their representatives, and now, instead, it's every ten years, the representatives choose their constituents." [1]

- "Congressmen are more likely to die or be indicted than they are to lose a seat." Pamela Karlan.[1]

1. In Toobin J. Drawing the Line. *New Yorker.* Vol 82; 2006:32-37.

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Background

What is the effect on health policy?

- No synthesis of the wills, ideas and values of a racially and politically diverse electorate.

- Important issues get overlooked or framed by the ideology of one party.

- Issues in Congress become more partisan.

- The link to important data has been lost.

- Health issues considered in ideological rather than logical dialogue, especially in the absence of information.

- Can we estimate vital statistics to fit gerrymandered congressional districts?

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Methods

- In the absence of data on deaths geocoded so they could be assigned to any areal unit or polygon, we used an areal interpolation method, outlined in Hao et al. 2006*.

- This dasymetric approach is an improvement over simple choroplethic mapping in that it can provide more information about the spatial distribution of the variable of interest within an area.

- In many instances US congressional district (CD) areas intersect county areas. Practically all US Census Blocks are co-extensive with CDs and are co-extensive with counties and states (and a few other Census defined units).

- Age-adjusted rates for counties were assigned to blocks with weighting by white and non-white proportions.

*Yongping Hao, Elizabeth M Ward, Ahmedin Jemal, Linda W Pickle and Michael J Thun. U.S. congressional district cancer death rates. *International Journal of Health Geographics*, 2006 5:28.

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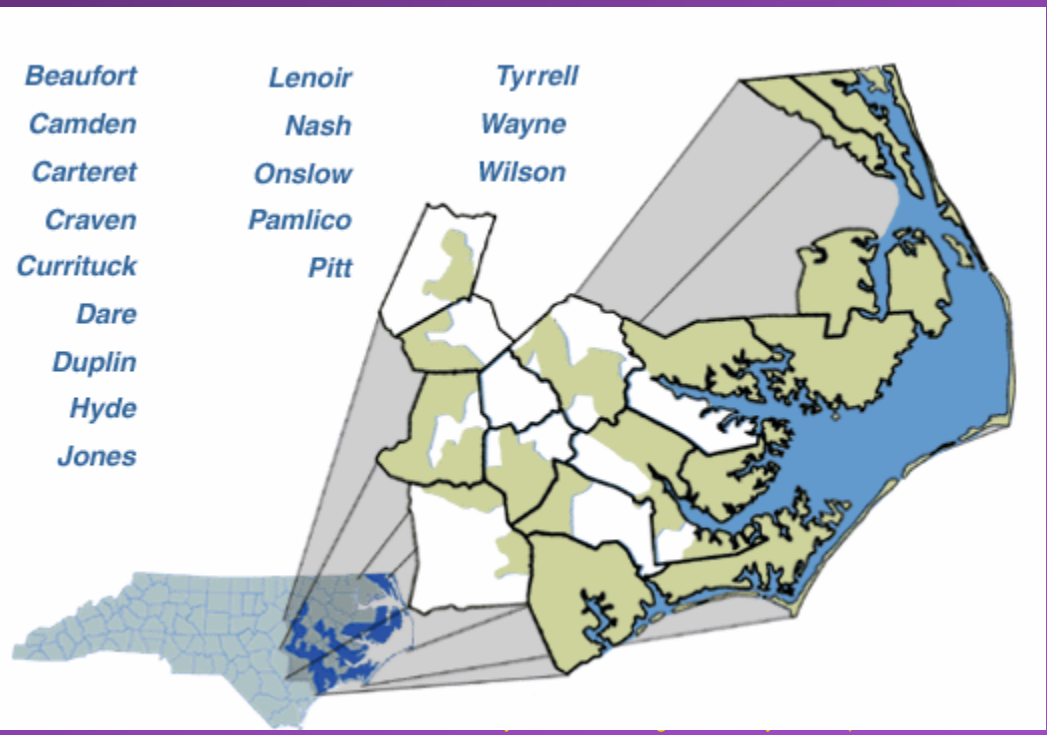CAROLINA
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N C 1st District

Northwest Region
Northeast Region
Southern Region

Gates, Pasquotank, Northampton, Hertford, Perquimans, Warren, Chowan, Vance, Halifax, Bertie, Granville, Nash, Edgecombe, Washington, Martin, Beaufort, Wilson, Pitt, Greene, Wayne, Lenoir, Craven, Jones
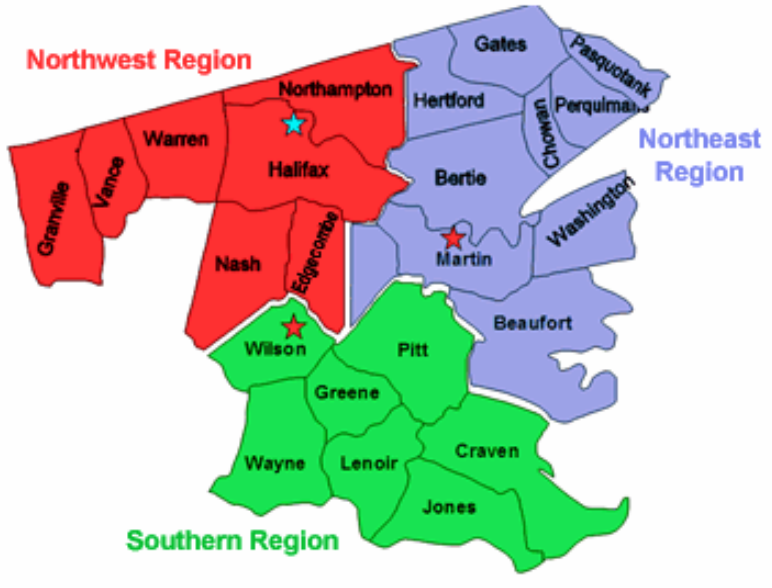
23 counties
17 whole counties
 6 partial counties
54% minority
$14,864 per cap income
100% of vote in 2006

- Beaufort
- Bertie
- Chowan
- Craven
- Edgecombe
- Gates
- Granville
- Greene
- Halifax
- Hertford
- Jones
- Lenoir
- Martin
- Nash
- Northampton
- Pasquotank
- Perquimans
- Pitt
- Vance
- Warren
- Washington
- Wayne
- Wilson

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N C 3rd District

Beaufort, Lenoir, Tyrrell
Camden, Nash, Wayne
Carteret, Onslow, Wilson
Craven, Pamlico
Currituck, Pitt
Dare
Duplin
Hyde
Jones

17 counties
 9 whole counties
 6 partial counties
22% minority
$18,799 per cap income
69% of vote in 2006

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Census 2000 Blocks, and County and 110th Congressional District Boundaries
Centered on Pitt County, North Carolina

1st Congressional District
G.K. Butterfield (D)
54.6% Minority
45.4% White

3rd Congressional District
Walter B. Jones (R)
22.1% Minority
77.9% White

110th Congressional District Boundary

County Boundary

Census Block Boundary

Congressional Districts

Counties

Census Tracts

Block Groups
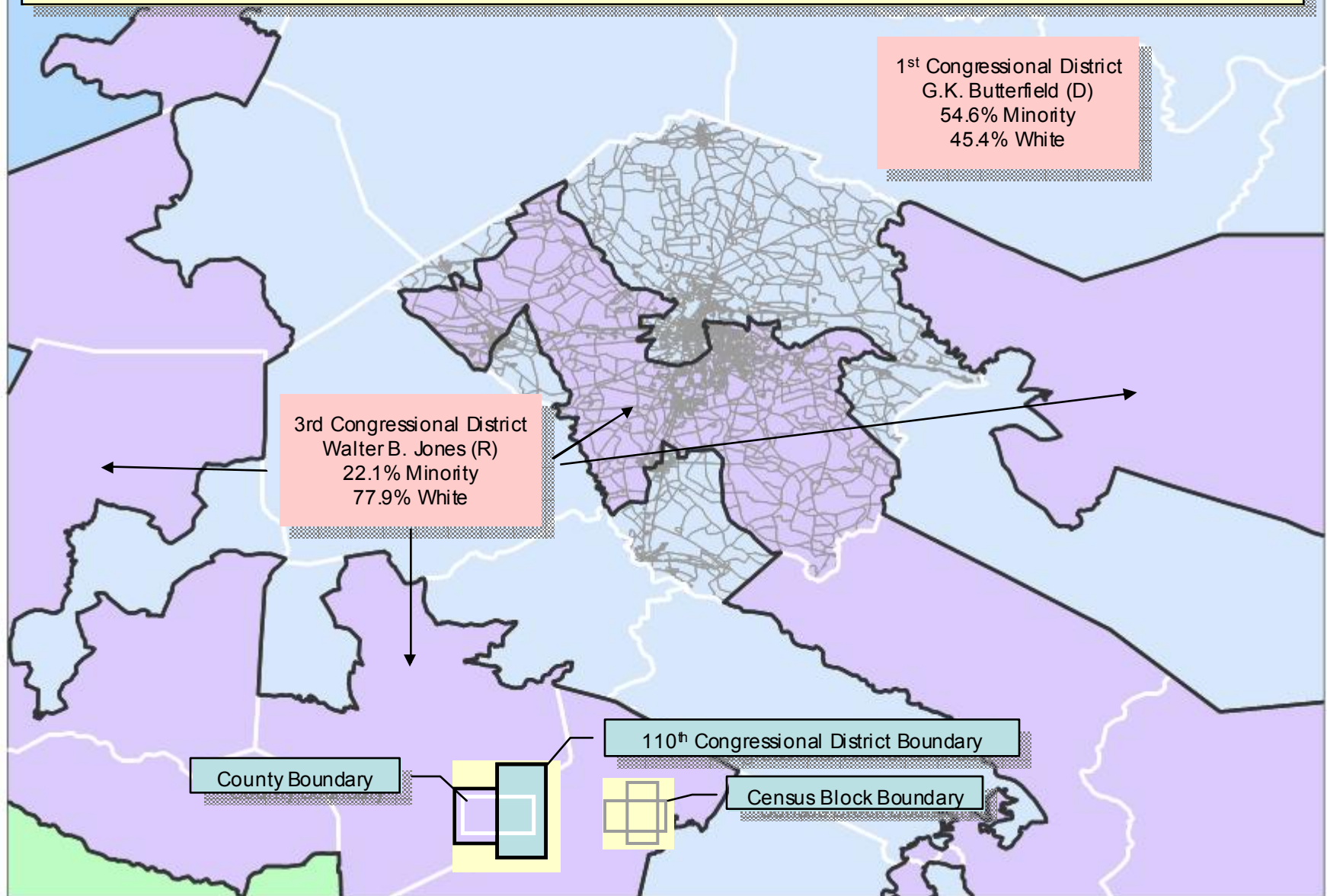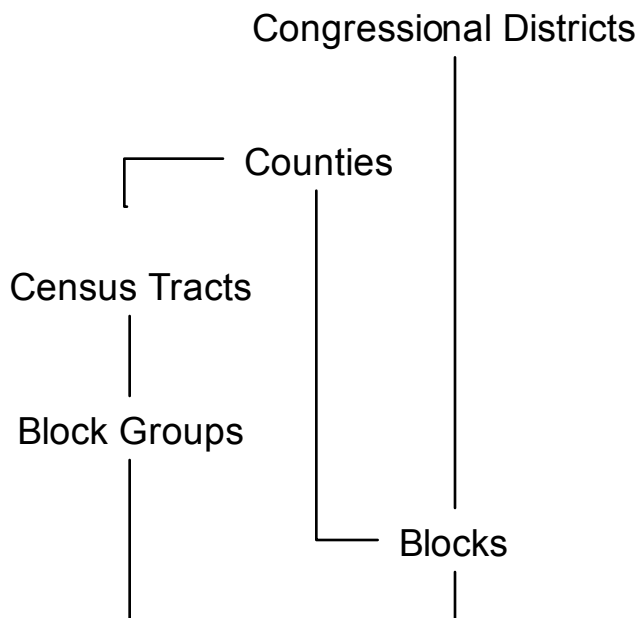
Blocks

Method:

Source   Ancillary Information

Step 1:   County Rate   ×   County Block population proportion of total CD population   =   County Block rate proportion for CD

Target

Step 2: $\sum$ County Block rate proportions for CD   =   CD Rate

(Over each CD)

Tools

SAS
ArcMap (ESRI)

Data

NCHS Compressed Mortality Files (1999-2004)
US Census: SF1 (2000), Tiger/Line files, Boundary Files, and 110th Congressional District updates

Error

Validated by comparing rates calculated directly from the CMF to aggregated block rates for whole states and multi-county regions.
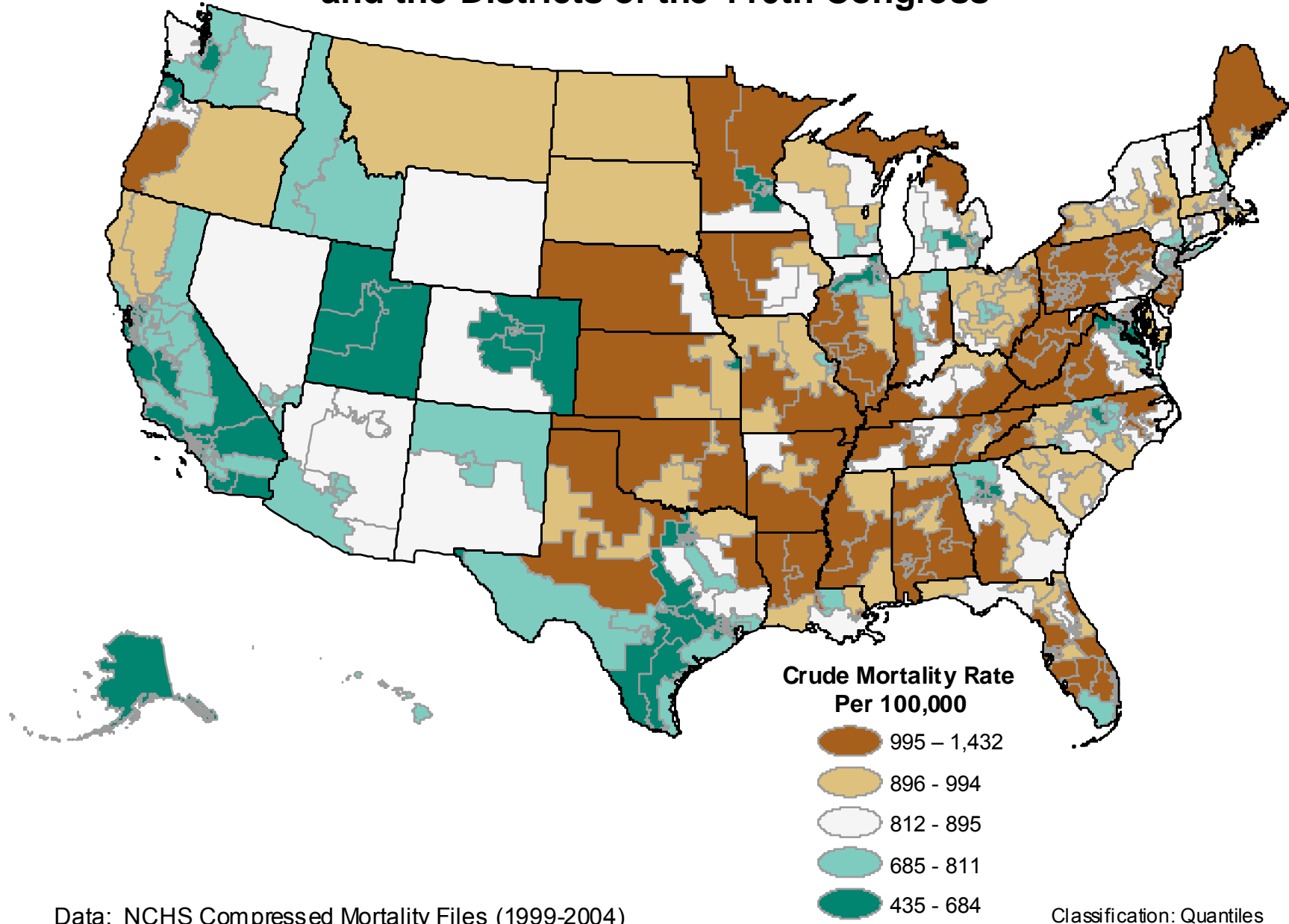
Results
Apportioned Mortality Rates for Congressional Districts: Means

	Mean of 236 C Ds		
Crude Mortality – All deaths	844.1		
Crude Heart Disease Mortality	240.3		
Crude Premature Mortality	753.2		
Age-adjusted Premature Mortality	751.6		

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Crude Mortality—All Deaths (2000-2004) and the Districts of the 110th Congress

Crude Mortality Rate Per 100,000

- 995 – 1,432
- 896 - 994
- 812 - 895
- 685 - 811
- 435 - 684

Data: NCHS Compressed Mortality Files (1999-2004)

Classification: Quantiles

Crude Mortality—Heart Disease (2000-2004)
and the Districts of the 110th Congress
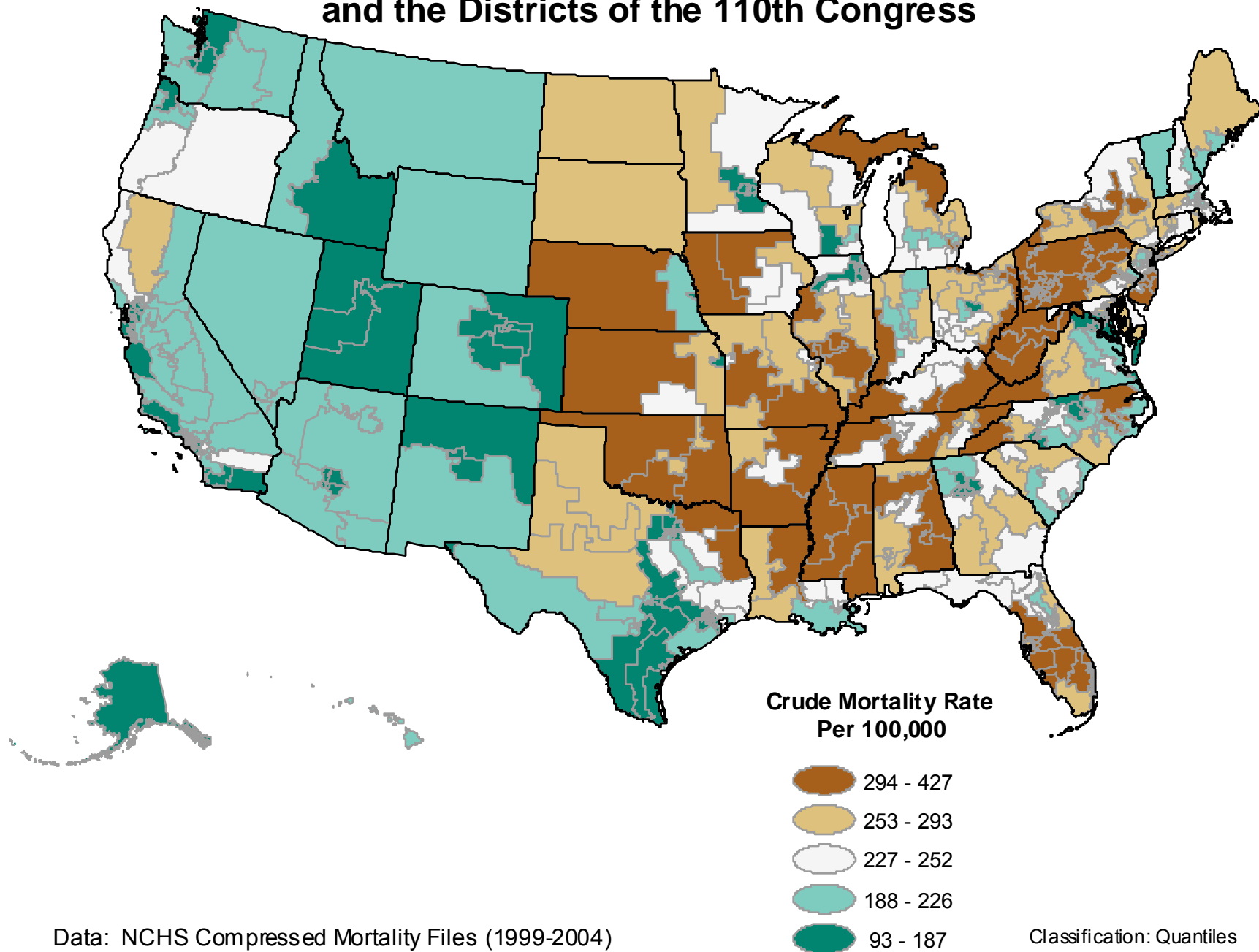
**Crude Mortality Rate
Per 100,000**

294 - 427

253 - 293

227 - 252

188 - 226

93 - 187

Data: NCHS Compressed Mortality Files (1999-2004)

Classification: Quantiles

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Crude Premature Mortality—All Deaths (2000-2004) and the Districts of the 110th Congress

Premature Mortality
Years of Life Lost before
Age 75 per 10,000

- 881 – 1,312
- 782 - 880
- 699 - 781
- 614 - 698
- 450 - 613
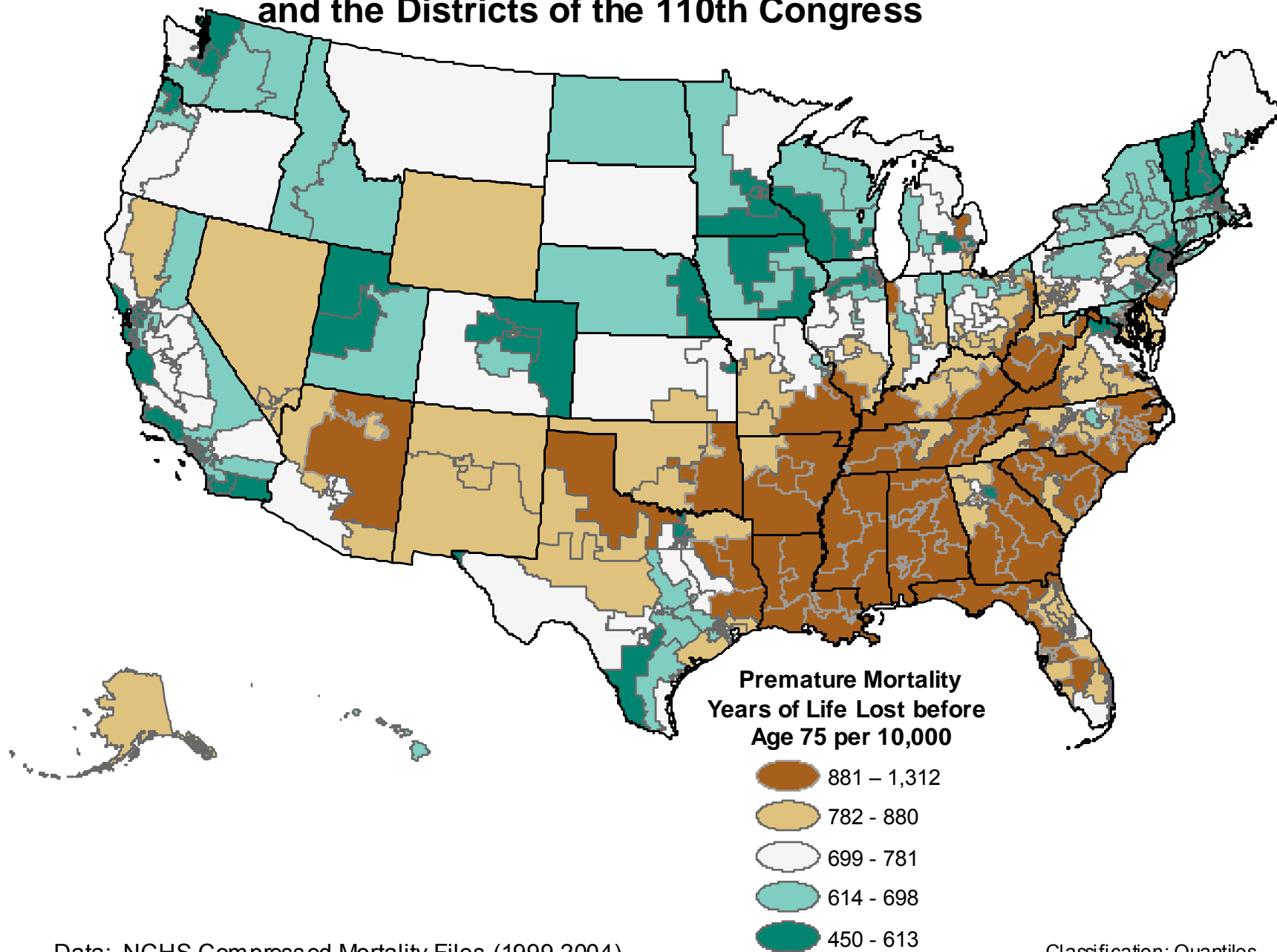
Data: NCHS Compressed Mortality Files (1999-2004)

Classification: Quantiles

Age-adjusted Premature Mortality—All Deaths (2000-2004) and the Districts of the 110th Congress

**Premature Mortality
Years of Life Lost before
Age 75 per 10,000**

- 871 – 1,313
- 780 - 870
- 702 - 779
- 624 - 701
- 453 - 623

Data: NCHS Compressed Mortality Files (1999-2004)

Classification: Quantiles

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Age-adjusted Premature Mortality—All Deaths (2000-2004) Disparity: Minority/White Alone and the Districts of the 110th Congress

**Premature Mortality
Years of Life Lost before
Age 75 per 10,000 Ratio M/WA**

2.1 - 3.7

1.6 - 2.0

1.1 - 1.5

0.4 - 1.0
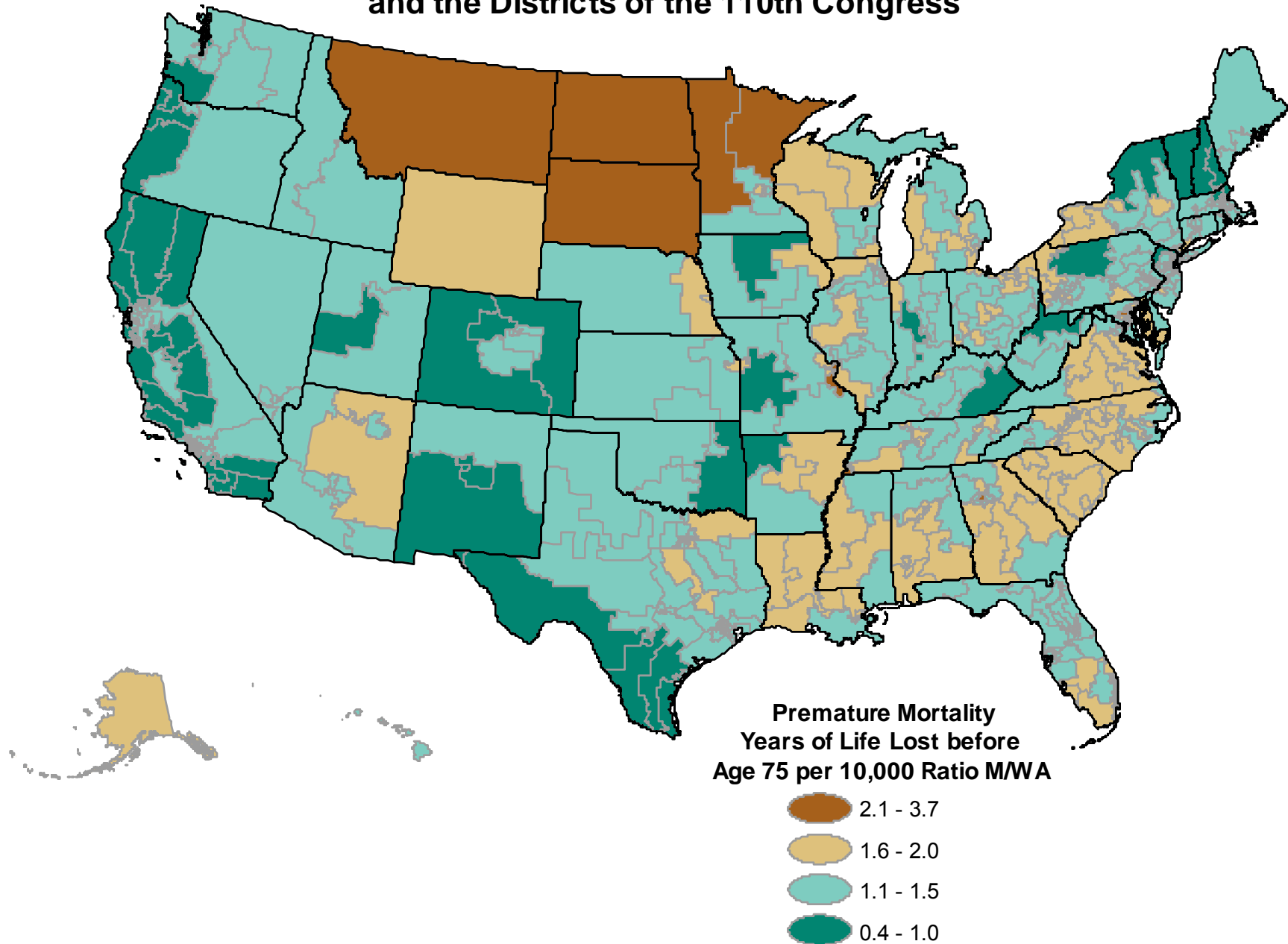
Data: NCHS Compressed Mortality Files (1999-2004)

Results

Apportioned Mortality Rates for Congressional Districts: means all districts and by party affiliation

	Mean of 236 C Ds	Mean of 202 Republican	Mean of 234 Democrat
Crude Mortality – All deaths	844.1	<u>850.5</u>	838.6
Crude Heart Disease Mortality	240.3	238.7	241.6
Crude Premature Mortality	753.2	<u>758.4</u>	748.7
Age-adjusted Premature Mortality	751.6	<u>756.2</u>	747.6

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Ranking of Congressional Districts by Estimated Premature Mortality, Representatives of 110th Congress, Party, Premature Mortality Rate, and Vote to Over Ride Presidential Veto of SCHIP Legislation

(Premature Mortality Measured as Years of Life Lost Before Age 75 per 10,000 Population Aged 75 Years or Less)

Rank	State	CD	Representative	Party	Premature Mortality Rate	Vote SCHIP 982
1	Minnesota	02	John Kline	R	450.0	Nay
2	Virginia	08	James P. Moran	D	453.4	Yea
3	California	16	Zoe Lofgren	D	453.7	Yea
4	California	15	Michael M. Honda	D	453.7	Yea
5	Virginia	11	Tom Davis	R	470.9	Yea
6	California	47	Loretta Sanchez	D	471.0	Yea
7	California	40	Edward R. Royce	R	471.0	Nay
8	California	48	John Campbell	R	471.0	Nay
9	Maryland	08	Chris Van Hollen	D	473.2	Yea
10	California	14	Anna G. Eshoo	D	476.0	Yea
11	Minnesota	06	Michele Bachmann	R	477.2	Nay

Rank	State	CD	Representative	Party	Premature Mortality Rate	Vote SCHIP 982
422	North Carolina	01	G. K. Butterfield	D	1076.4	Yea
423	Mississippi	03	Charles W. Pickering	R	1079.4	Nay
424	Michigan	14	John Conyers, Jr.	D	1084.1	Yea
425	Michigan	13	Carolyn C. Kilpatrick	D	1084.1	Yea
426	Alabama	04	Robert B. Aderholt	R	1084.9	Nay
427	Arkansas	01	Marion Berry	D	1102.3	Yea
428	West Virginia	03	Nick J. Rahall II	D	1110.1	Yea
429	Alabama	07	Artur Davis	D	1110.2	Yea
430	Pennsylvania	01	Robert A. Brady	D	1156.1	Yea
431	Kentucky	05	Harold Rogers	R	1169.0	Nay
432	Pennsylvania	02	Chaka Fattah	D	1176.0	Yea
433	Mississippi	02	Bennie G. Thompson	D	1199.2	Yea
434	Maryland	07	Elijah E. Cummings	D	1204.9	Yea
435	Louisiana	02	William J. Jefferson	D	1256.7	Yea
436	District of Columbia		Eleanore Holmes Norton	D	1312.2	

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Correlation of Premature Mortality with SES Characteristics of Congressional Districts

	Crude Premature Mortality	% White	% 65+	% female household	% < HS	% < 200% pov
Crude Premature Mortality	1	-.174	.230	.403	.360	.465
% White		1	.416	-.771	-.543	-.514
% 65+			1	-.330	-.191	-.106
% female household				1	.614	.680
% < HS					1	.867
% < 200% pov						1

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Premature Mortality Rate by Vote to Over ride veto on SCHIP

Party * Override vote Crosstabulation

Count

		Override vote			Total
		Nay	Yea	Not Voting	
Party	Republican	154	44	2	200
	Democrat	2	229	2	233
Total		156	273	4	433

Group Statistics

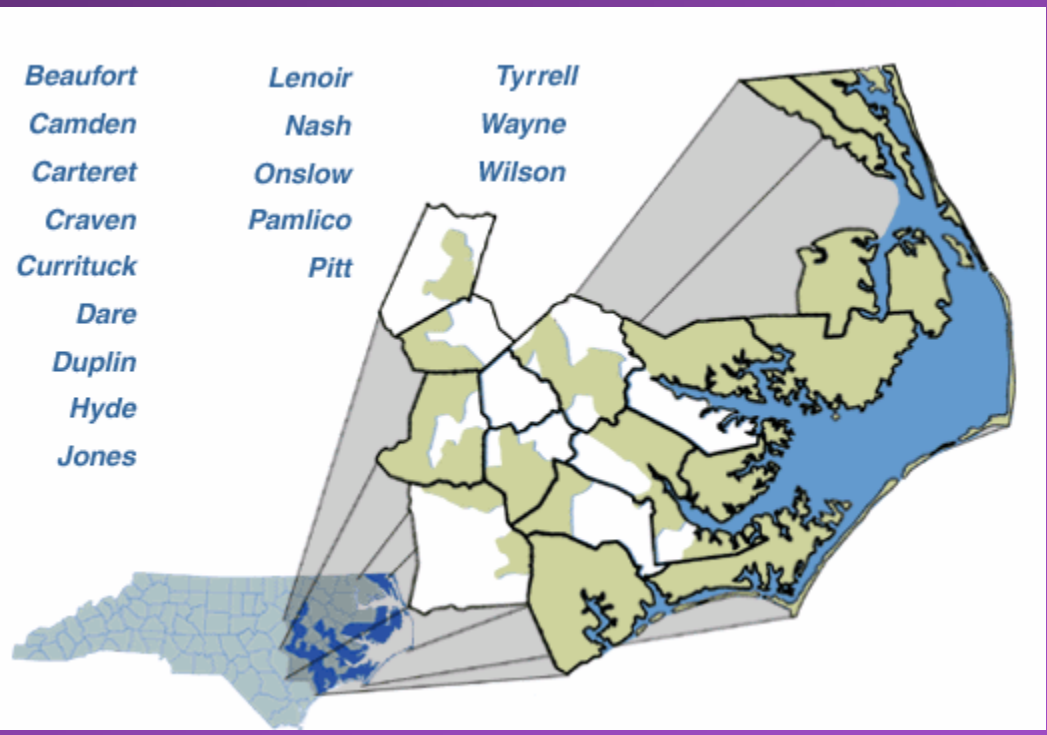|	Override vote	N	Mean	
Crude PM Rate	Nay	156	773.17702	5% higher
	Yea	273	739.18098	

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N C 1st District

Crude Mortality Rate
Not apportioned – 1029.7
Apportioned – 1092.5
6% higher

N C 3rd District

Crude Mortality Rate
Not apportioned – 901.6
Apportioned – 865.7
4% lower

Conclusions

Results are consistent with expectations and are considered reliable and useful.

While calculations rely on well maintained data, they are not complex.

The method may be used for estimation of rates in state legislative districts as well.

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Discussion

Limitations:

- Method does not include weighting for variation in age or gender in district but crude rates differed by < 1%. Age-adjusted rates were generally under 2%, except for Wyoming at about 4%. Differences may be attributable to differences in the bridged populations used in the CMF based rate calculations and the unweighted SF1 block populations.

- Rates of multiple districts within a single county may not be adequately differentiated.

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Discussion

There is substantial variation in death rates across congressional districts. These apportioned data can:

1) inform public policy analysts and policy makers about the relative burden of mortality at the local level, politically so defined.

2) empower individual members of congress to advocate for their constituents.

3) guide allocation of resources.

There are inherent limitations in the existing data collection system. Approximation of mortality rates by congressional district is useful but accuracy would be better. Examples shown here provide support for the recommendation of the National Committee on Vital and Statistic's to "Geocode all ongoing data sets that feed the health statistics enterprise to the census block level."*

* Shaping a Health Statistics Vision for the 21st Century. National Committee on Vital Statistics. Final Report. November 2002. CDC, NCHS

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