



Health Care in Appalachia

Foundations of Modern Health Care, Lecture 12
Anyia K. Cope, DO

Learning Objectives:

- At the completion of this exercise, learners should be able to:
 - Discuss the mortality rates of heart disease, cancer, and chronic obstructive pulmonary disease (COPD) in the Appalachian Region vs. the United States.
 - Discuss how Appalachian mental health status compares to the United States.
 - Discuss how poverty levels and the economy in Appalachia can impact access to health care services.

CREATING A CULTURE OF HEALTH IN APPALACHIA

Disparities and Bright Spots



HEALTH DISPARITIES IN APPALACHIA

The first report in a series exploring health
issues in Appalachia

Photo: Brian Stansberry

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APPALACHIAN REGIONAL COMMISSION
Washington, D.C.

Where is the Appalachian Region?

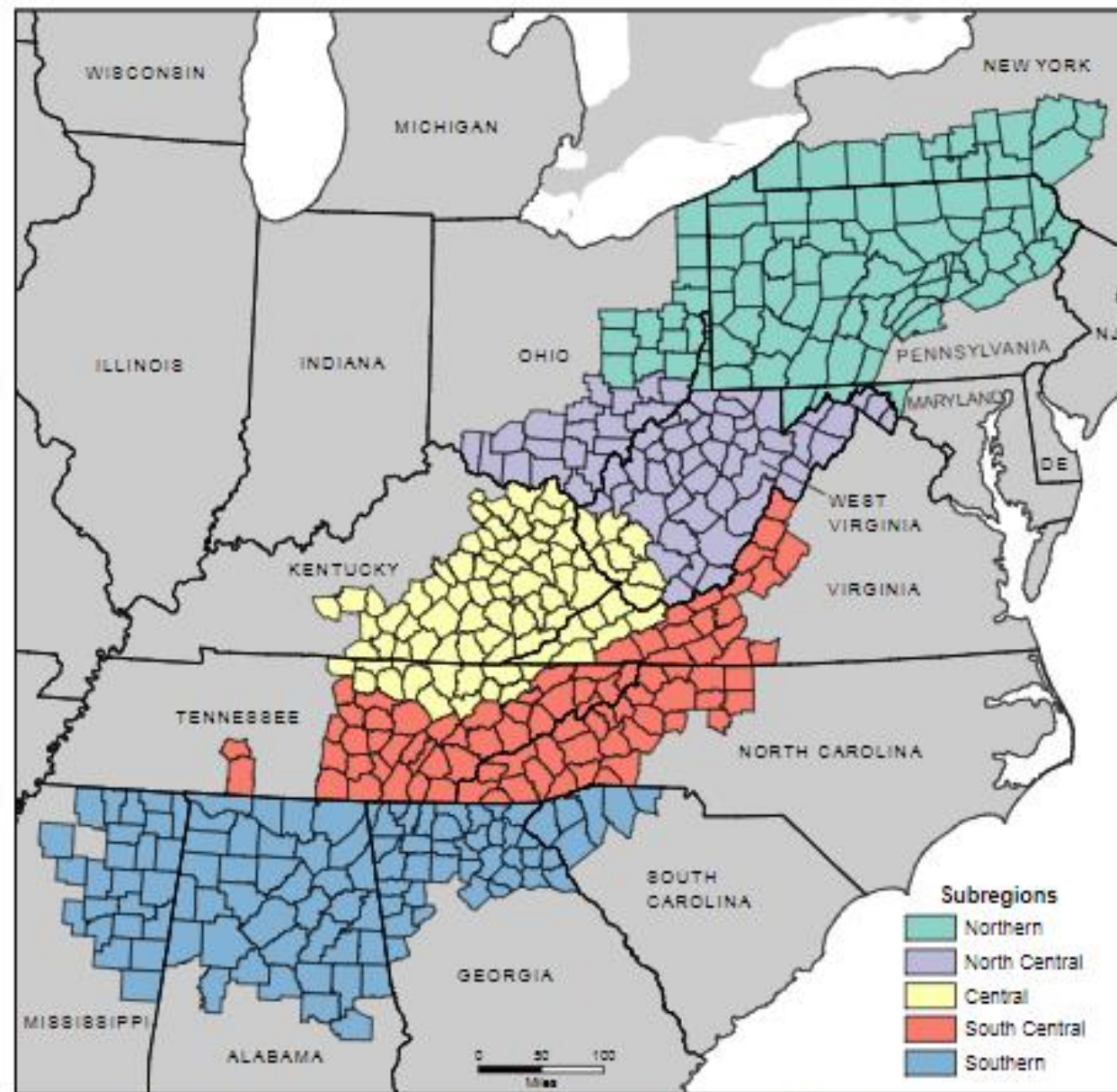
Figure 1: Map of the Appalachian Region



Source: Appalachian Regional Commission

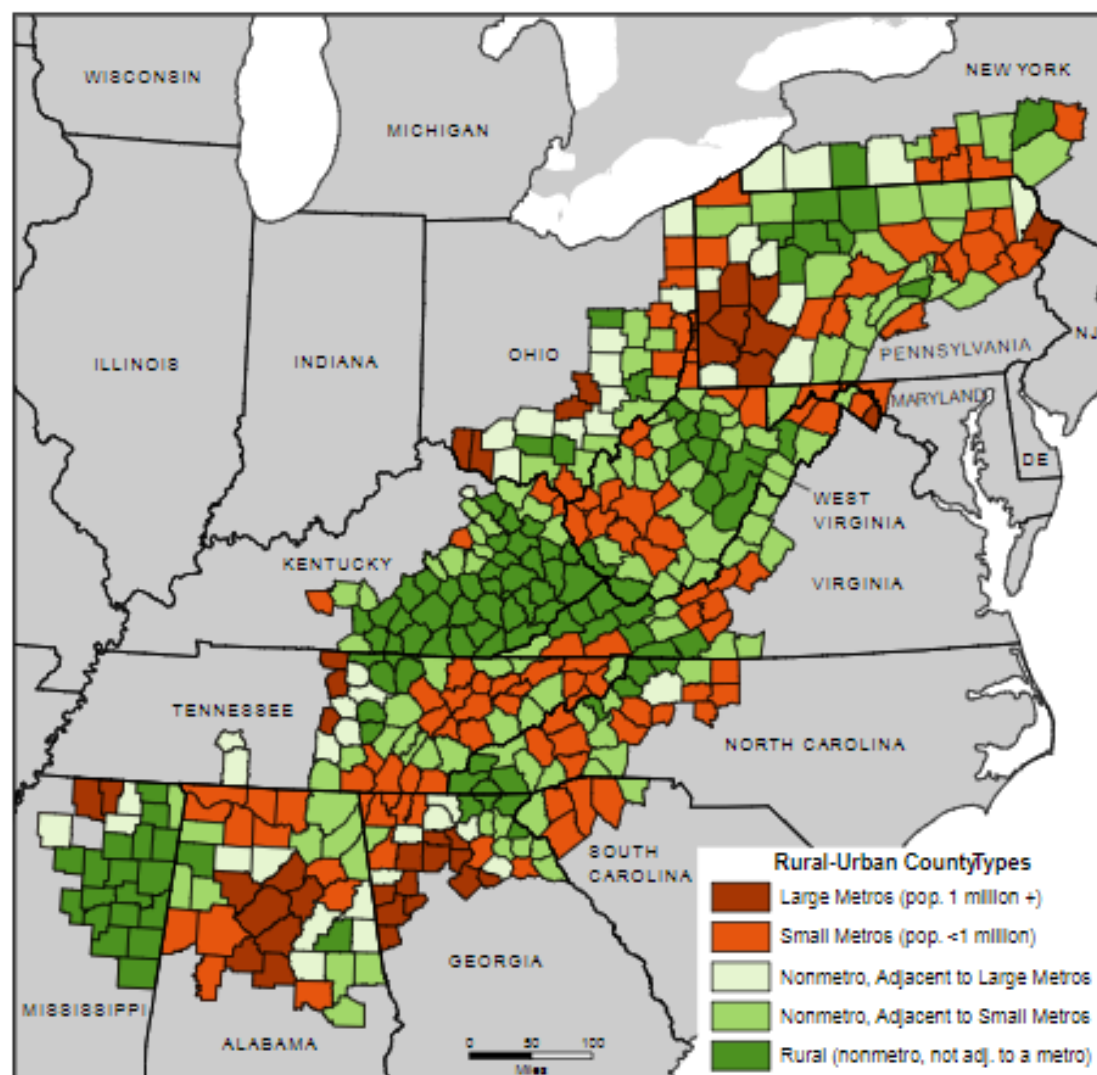
October 8, 2008

Figure 3: Appalachian Subregions



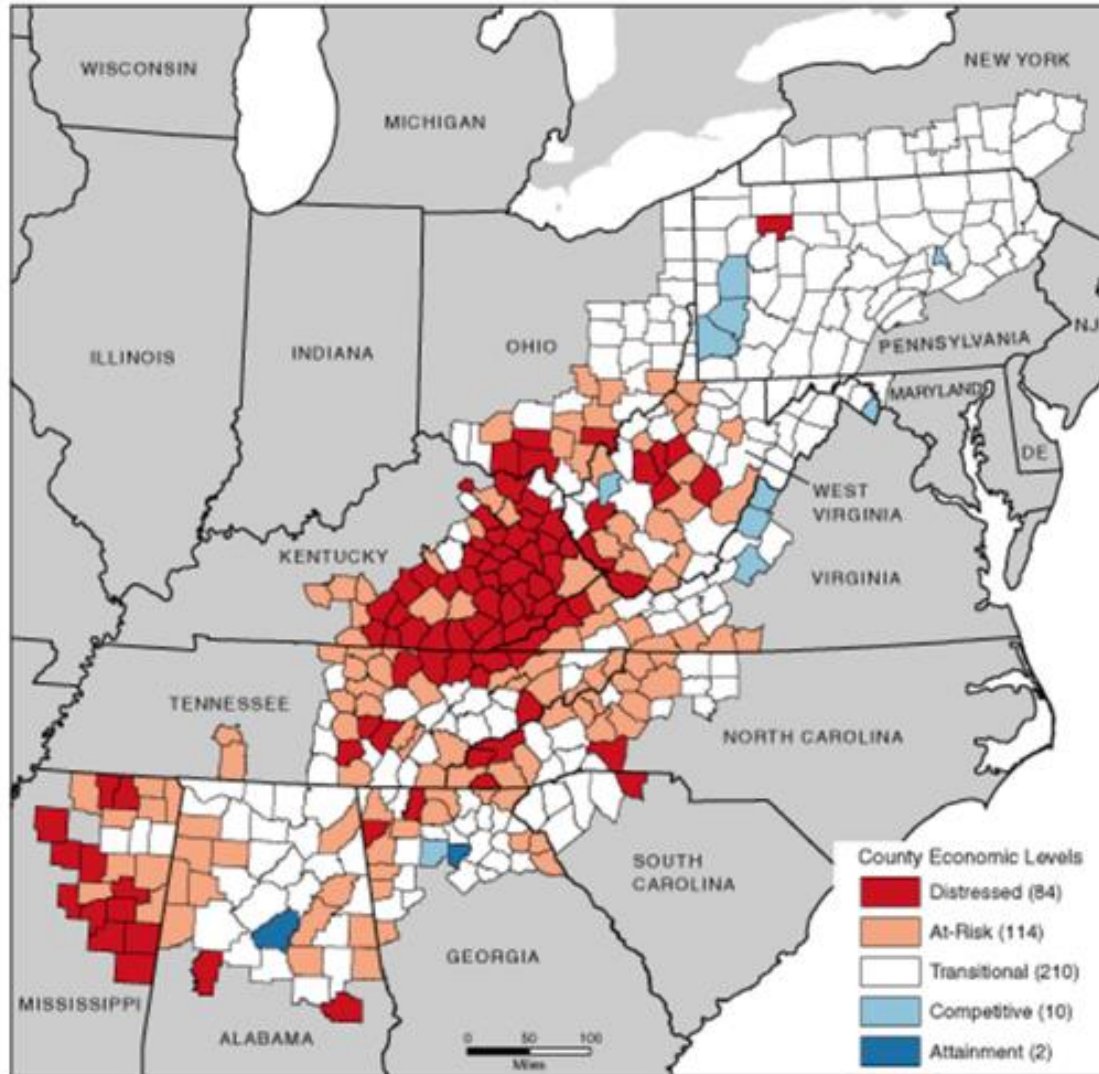
Source: Appalachian Regional Commission, Created November 2009

Figure 4: Rurality by County in Appalachia



Source: USDA, Economic Research Service, 2013 Urban Influence Codes. Condensed by ARC. Figure created by ARC, October 2016.

Figure 5: County Economic Status in Appalachia, FY 2017



Created by the Appalachian Regional Commission, March 2016

Data Sources:

Unemployment data: U.S. Bureau of Labor Statistics, LAUS, 2012–2014

Income data: U.S. Bureau of Economic Analysis, REIS, 2014

Poverty data: U.S. Census Bureau, American Community Survey, 2010–2014

Effective October 1, 2016
through September 30, 2017

Economy

- Distressed: “the most economically depressed counties. Rank in the worst 10% of the nation’s counties.”
- At-Risk: “those at risk of becoming economically distressed. Rank in the worst 10-25%.”
- Transitional: “transitioning between strong and weak economies.”
- Competitive: “those that are able to compete in the national economy but are not in the highest 10% of the nation’s counties.”
- Attainment: “Economically strongest counties. Counties ranking in the best 10% of the nation’s counties.”

Poverty in the Region:

- Poverty rate
 - 1960: 31%
 - 2010-2014: 17.2%
- High-poverty counties
 - poverty rate is 1.5 times the US average:
 - 1960: 295
 - 2010-2014: 91



(Nov. 2016 image by author)

<http://www.coalcampusa.com/swva/southwestern/dante-virginia-coal-mine/dante-virginia-coal-mine.htm>



coalcampusa.com

More coal camp houses. (Nov. 2016 image by author)

Measurable Outcomes:

- Current Health Status Determined By:
 - Mortality
 - Morbidity
 - Behavioral Health
- Generational Health and Health Care Determined By:
 - Child Health
 - Health Care Systems
 - Quality of Care

- Risk Factors and Health Determinants:
 - Lifestyle
 - Community Characteristics
 - Social Determinants

Appalachian Region Performs Better:

- HIV Prevalence
- Travel Time to Work
- Excessive Drinking
- Student-Teacher Ratio
- Chlamydia Prevalence
- Percentage of the Population Under age 65 Uninsured
- Diabetes Monitoring Among Medicare Patients

Appalachia's Poor Mortality Performance:

- Causes of Mortality
 - Heart Disease (17% higher than national average in Region, **27% higher in rural**)
 - Cancer (10% higher in Region, **15% higher in rural**)
 - Chronic Obstructive Pulmonary Disease (27% higher in Region, **55% higher in rural**)
 - Injury (33% higher in Region, **47% higher in rural**)
 - Stroke (**14% higher in Region**, 8% higher in rural)
 - Diabetes (11% higher in Region, **36% higher in rural**)
 - Suicide (17% higher in Region, **21% higher in rural**)
 - Poisoning (drug overdoses included) (37% higher in Region, **40% higher in rural**)
 - Years of Potential Life Lost (25% higher in Region, **40% higher in rural**)

Table 1: Distributions of Mortality Rates among National Quintiles for Appalachian Counties

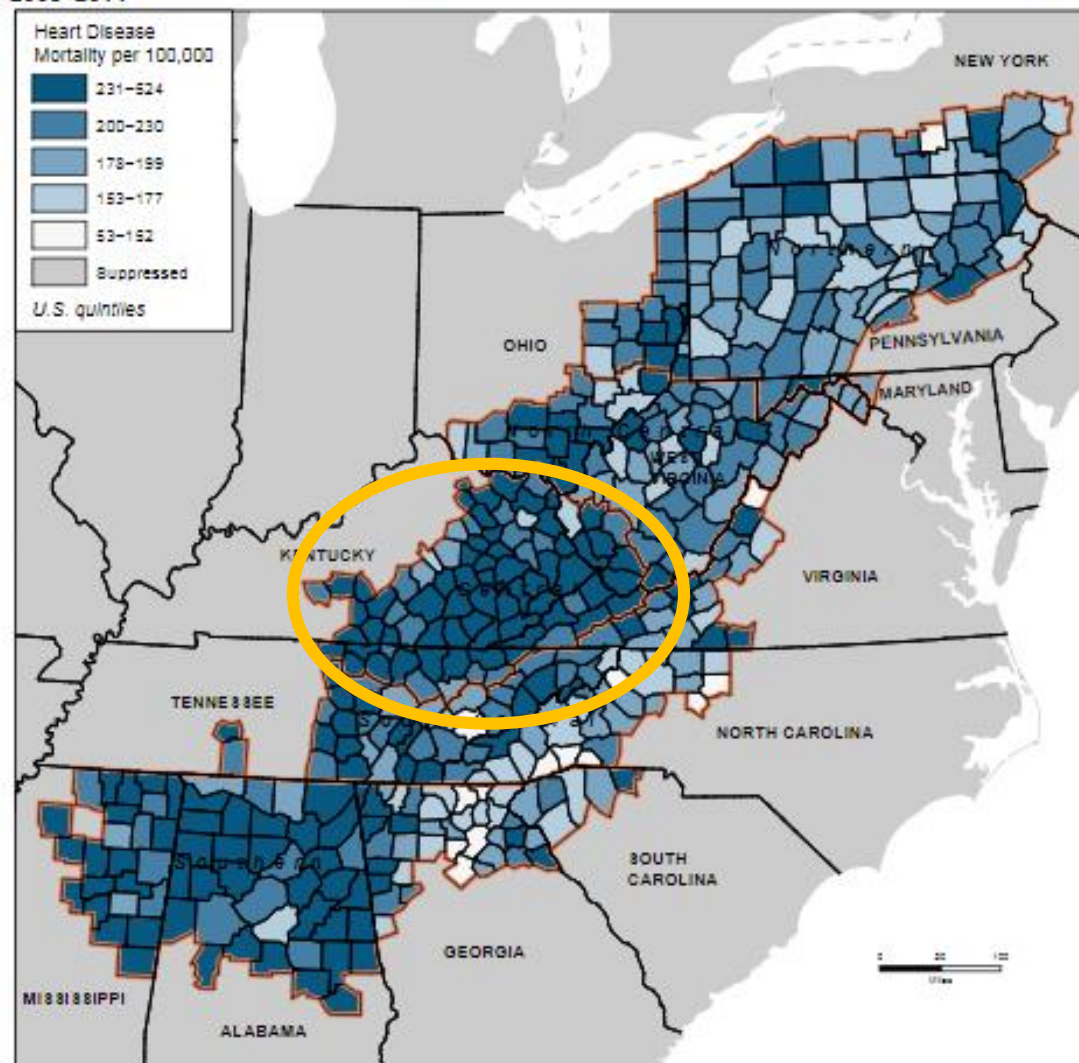
Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Heart disease deaths	15	4%	56	13%	76	18%	115	27%	158	38%
Cancer deaths	29	7%	49	12%	83	20%	101	24%	158	38%
COPD deaths	27	6%	54	13%	83	20%	93	22%	163	39%
Injury deaths	28	7%	59	14%	80	19%	106	25%	147	35%
Stroke deaths	40	10%	69	16%	90	21%	111	26%	110	26%
Diabetes deaths	60	14%	70	17%	91	22%	100	24%	99	24%
YPLL	13	3%	63	15%	81	19%	105	25%	156	37%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for each indicator may not sum to 420 due to missing or suppressed values.

Heart Disease Mortality Rates (2008-2014)

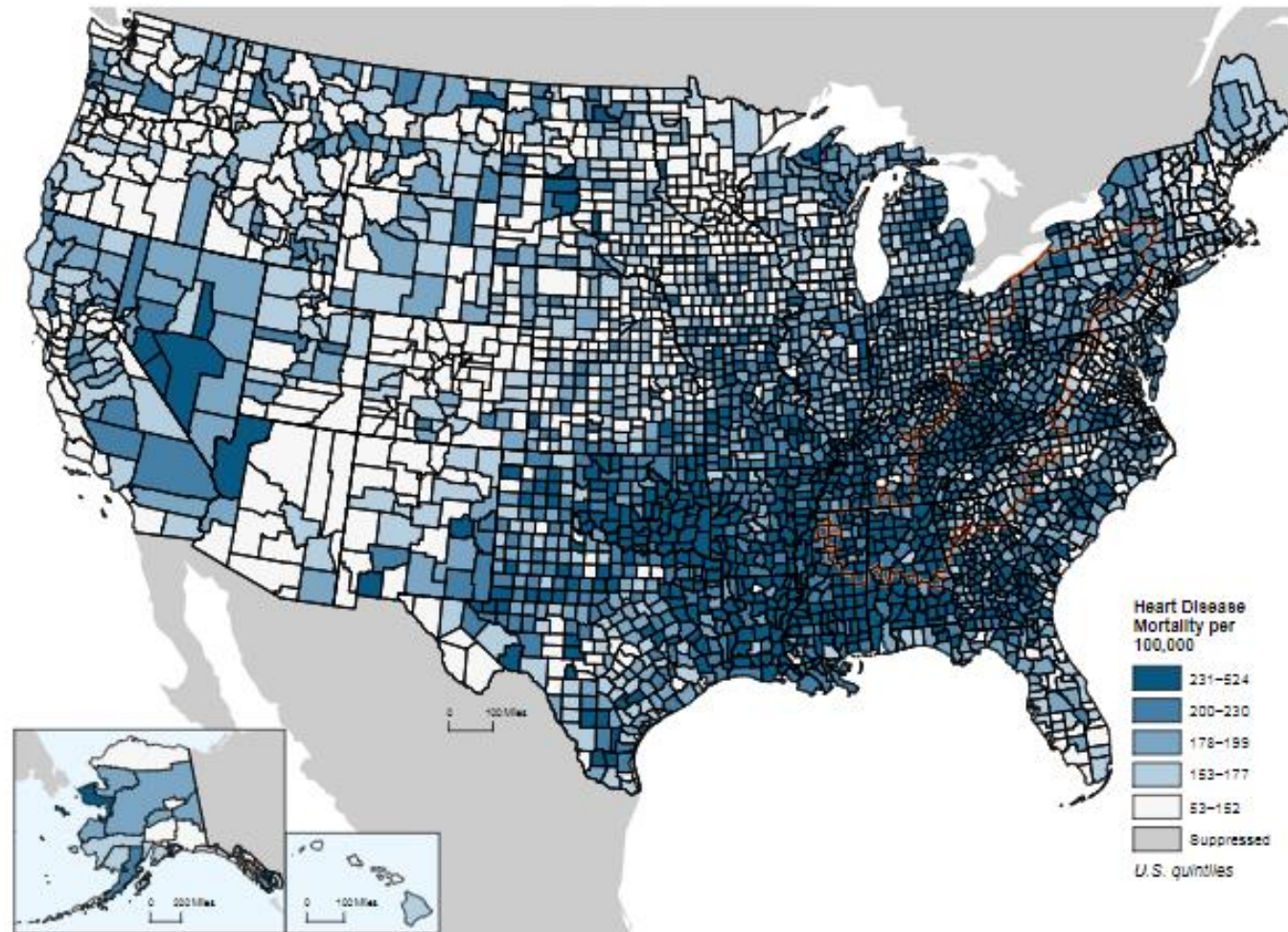
- Defined as:
 - “number of deaths from all forms of heart disease per 100,000 population, per year.”
- Leading cause of death of adults in US
- Risk Factors for Heart Disease:
 - Physical Inactivity
 - Smoking
 - Diabetes
 - Obesity
- Incidence is 17% higher than national average in Region, **27% higher in rural.**

Figure 9: Map of Heart Disease Mortality Rates per 100,000 Population in the Appalachian Region, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland. 2015. http://www.odc.gov/nchs/data_access/cmf.htm

Figure 11: Map of Heart Disease Mortality Rates per 100,000 Population in the United States, 2008–2014

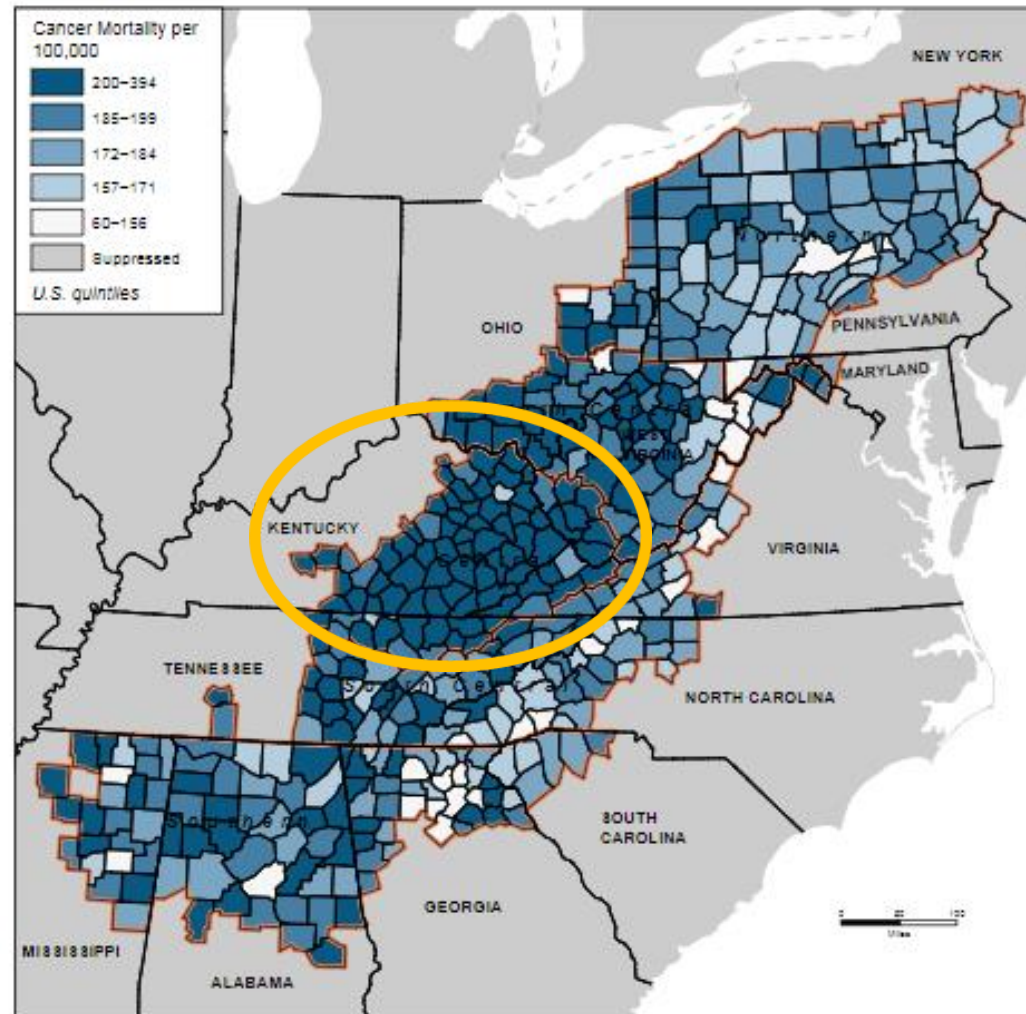


Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland. 2015. http://www.cdc.gov/nchs/data_access/cmf.htm

Cancer Mortality Rates:

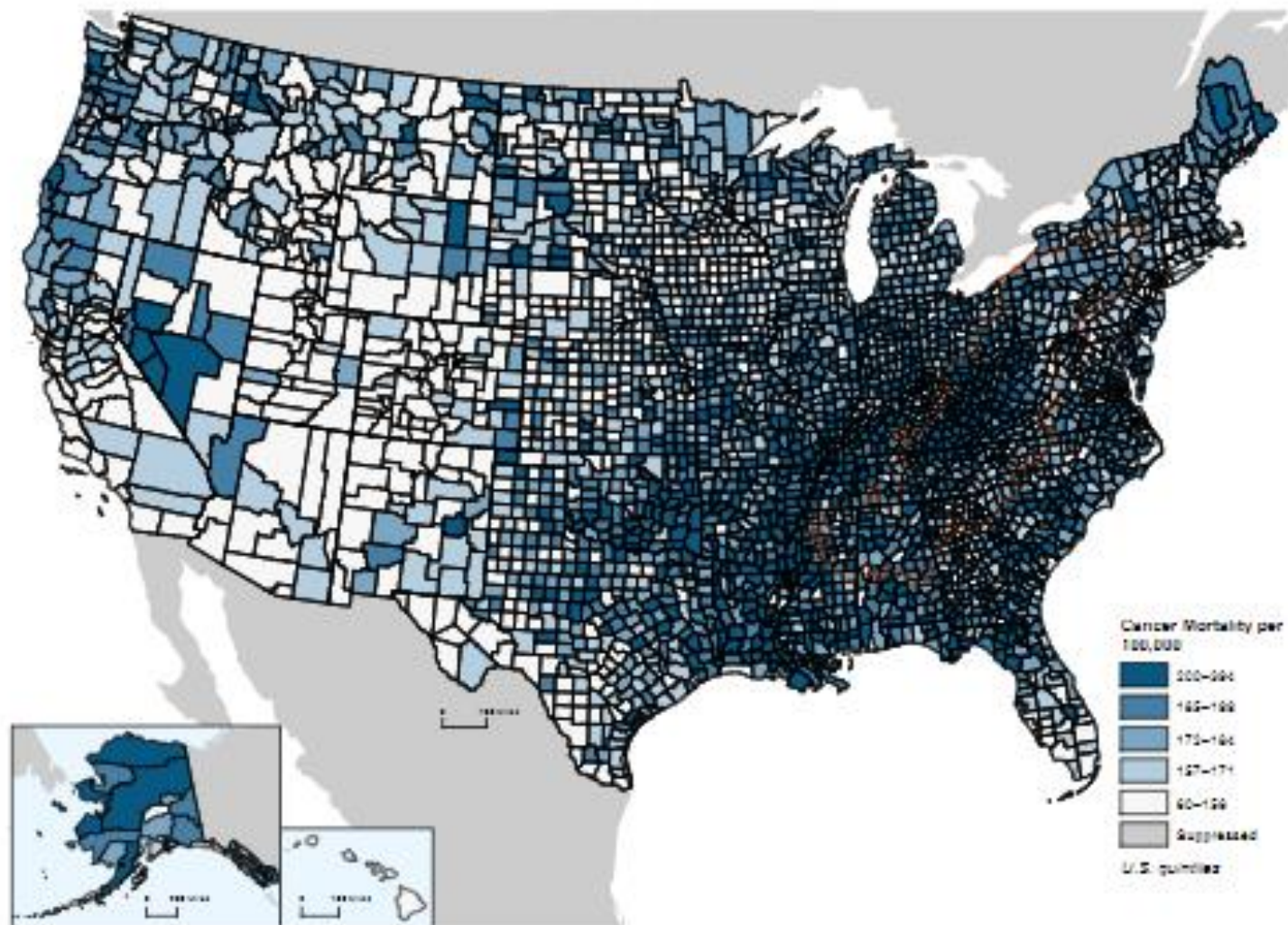
- Defined as:
 - “number of deaths with malignant neoplasm (cancer) as the underlying cause per 100,000 population, per year.”
- Risk of Cancer Can be Decreased By:
 - Avoiding smoke exposure
 - Protecting skin
 - Limiting Alcohol use
 - Healthy body weight
- Cancer mortality rate is 10% higher in Region, **15% higher in rural.**

Figure 13: Map of Cancer Mortality Rates per 100,000 Population in the Appalachian Region, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD ROM Series 20, No. 27) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland. 2015. http://www.cdc.gov/nchs/data_access/cmf.htm

Figure 15: Map of Cancer Mortality Rates per 100,000 Population in the United States, 2008–2014

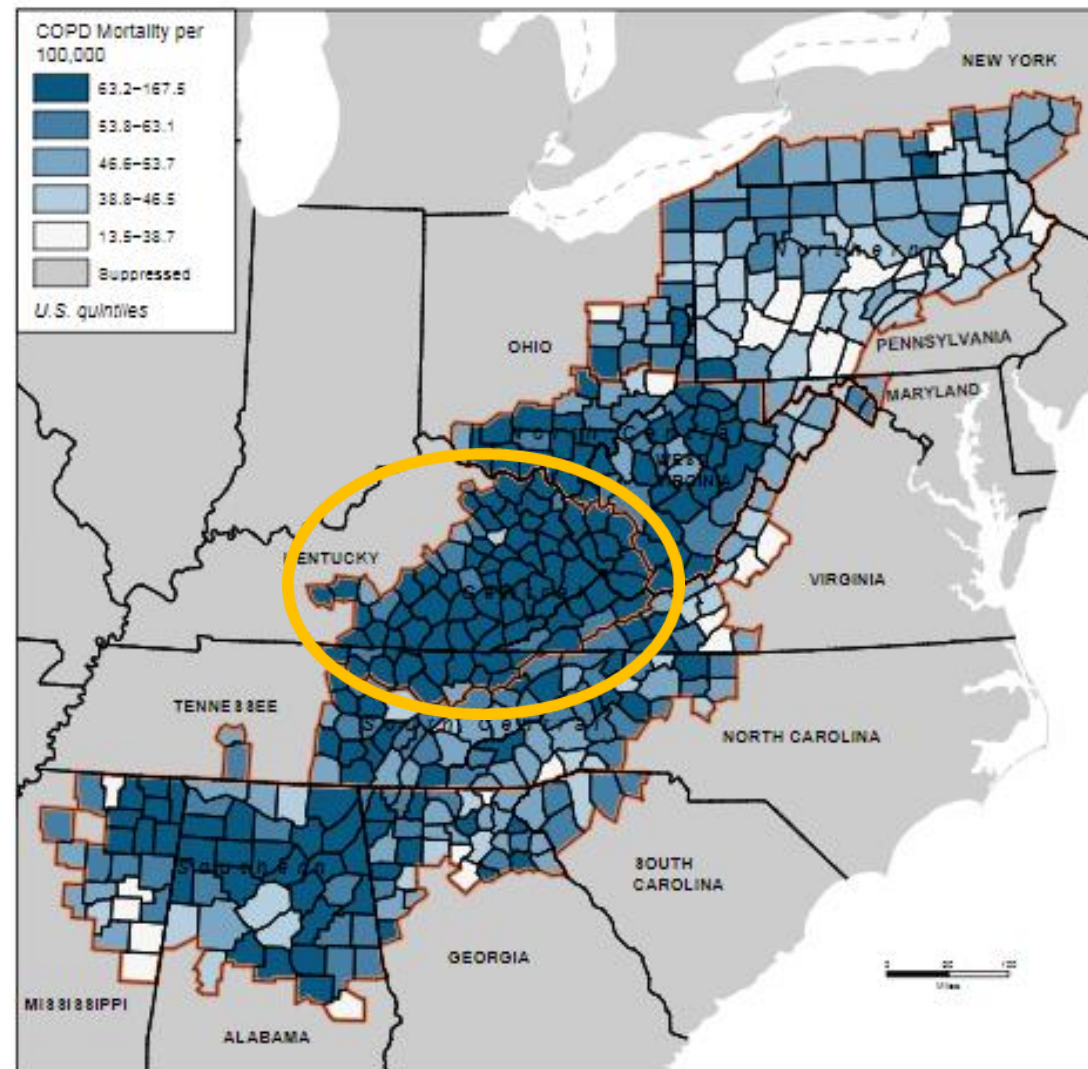


Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland. 2015. http://www.odc.gov/nchs/data_access/cmf.htm

Chronic Obstructive Pulmonary Disease (COPD) Mortality Rates

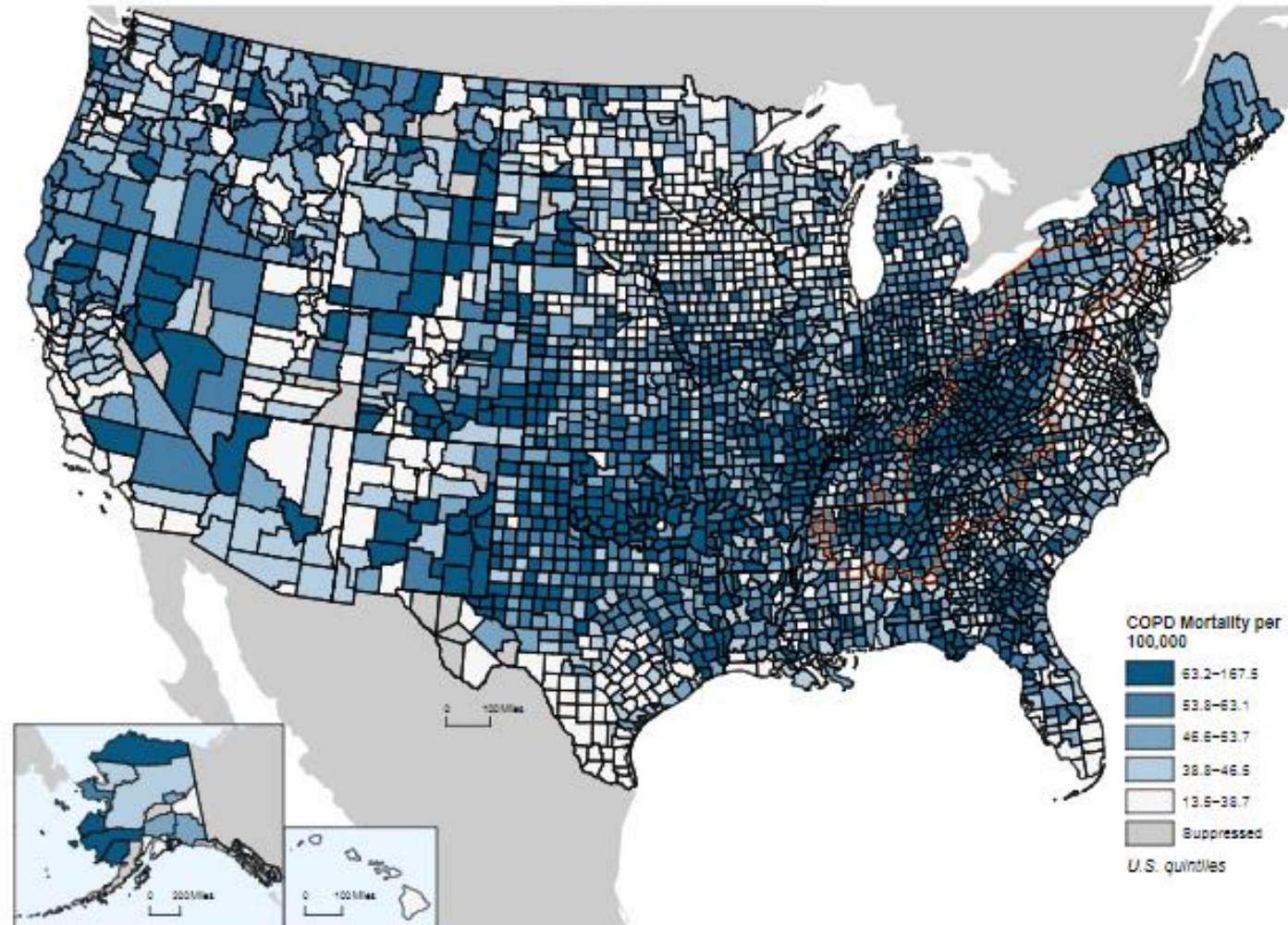
- Defined as:
 - “number of deaths with COPD as the primary cause, per 100,000 population, per year.”
 - Data includes chronic bronchitis and emphysema.
- 3rd leading cause of death in the US.
- Risk Factors:
 - Smoking
 - Air Quality
 - Genetic Factors
 - Respiratory Infections
 - Cumulative Lifetime Exposure to Coal Mine Dust
- COPD incidence is 27% higher in Region, **55% higher in rural**
 - 86% higher in Central Appalachia compared to US.

Figure 17: Map of COPD Mortality Rates per 100,000 Population in the Appalachian Region, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD ROM Series 20, No. 27) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland. 2015. http://www.odc.gov/nchs/data_access/cmf.htm

Figure 19: Map of COPD Mortality Rates per 100,000 Population in the United States, 2008–2014

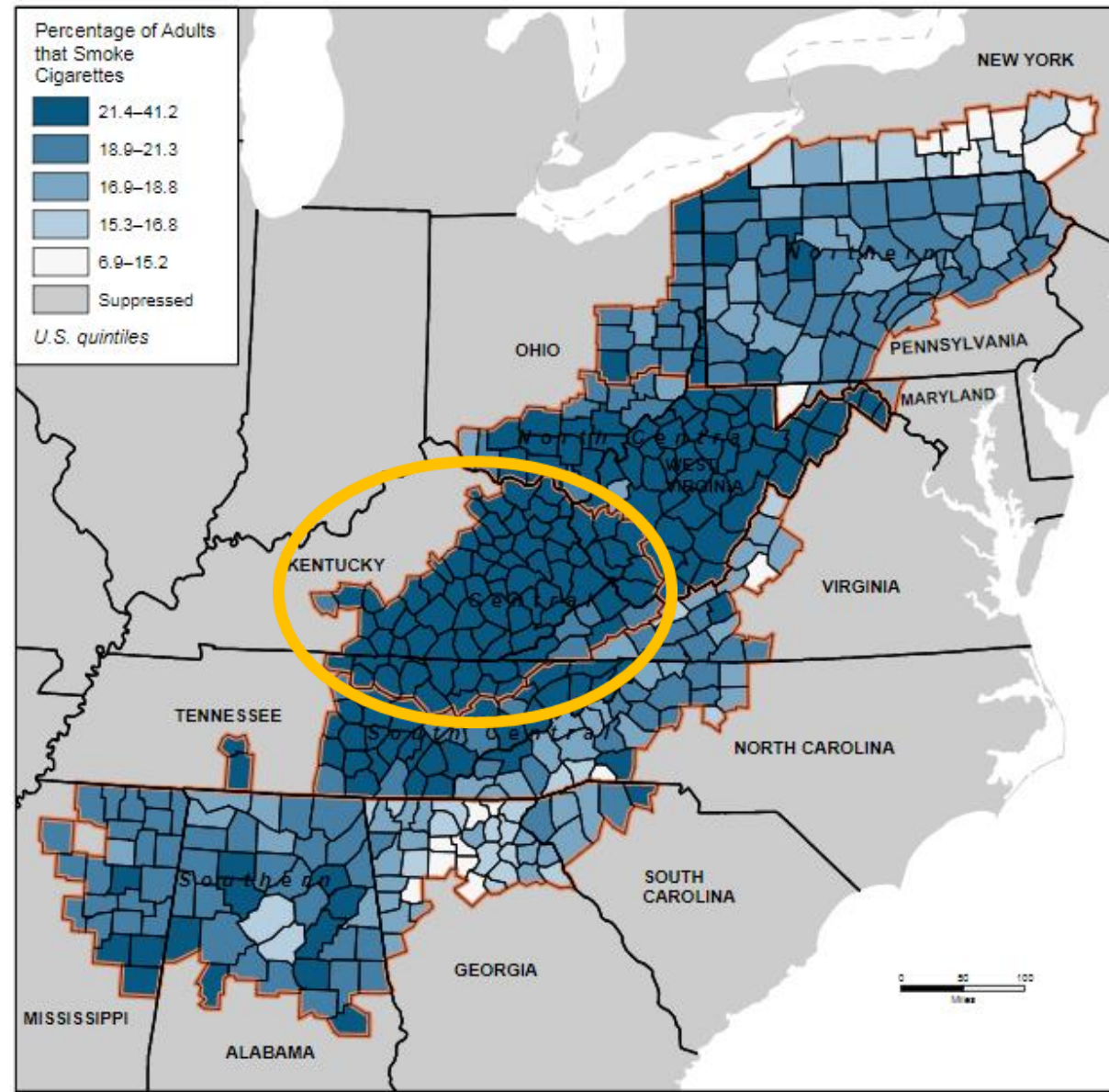


Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland. 2015. http://www.cdc.gov/nchs/data_access/cmf.htm

Adult Smoking Prevalence

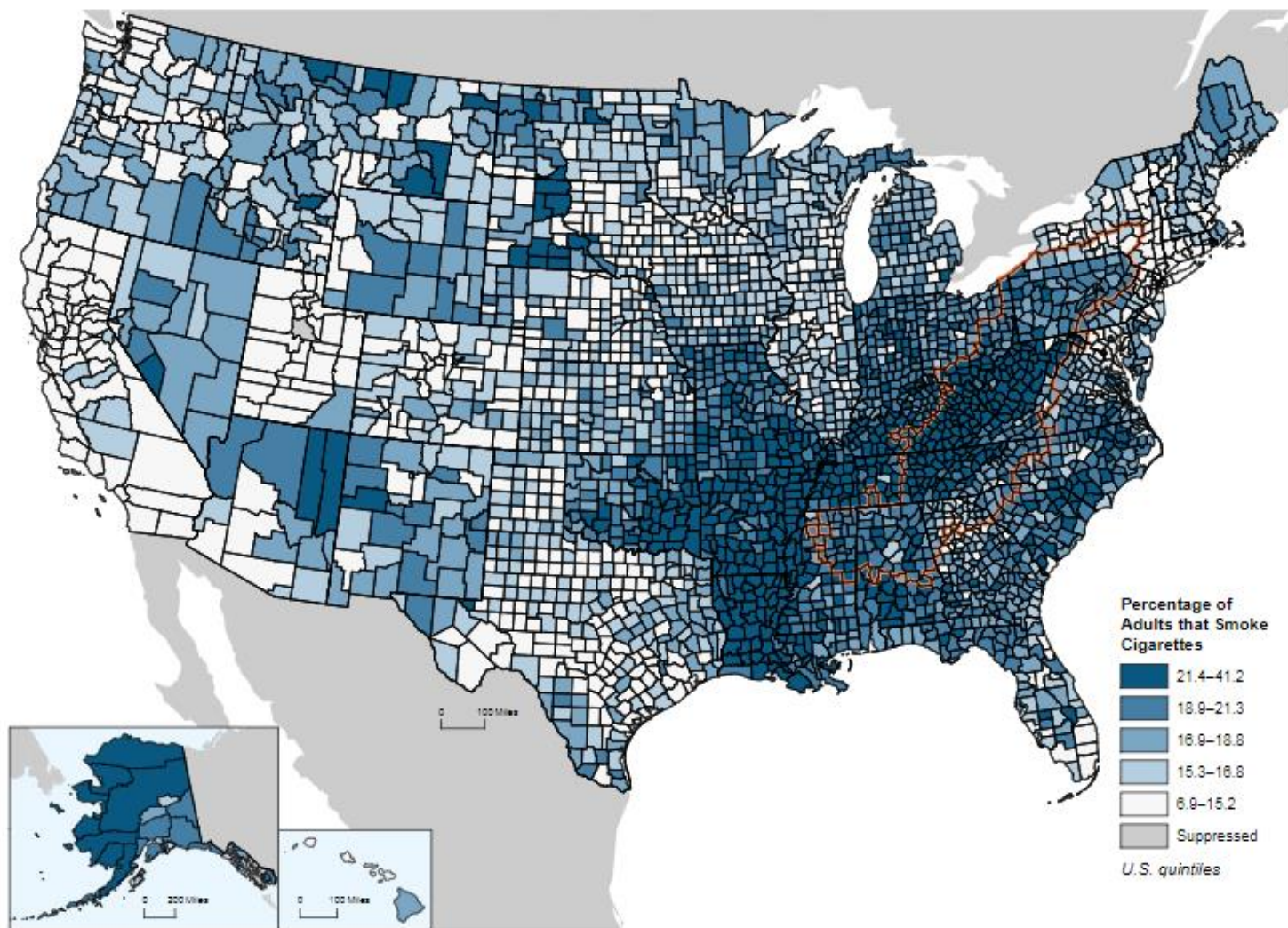
- Defined as:
 - “percentage of adults age 18 and over that report that they currently smoke cigarettes.”
- Smokers:
 - 16.3% in US total
 - 20% in Appalachian Region
 - 25.2% in Central Appalachia
- Smoking is a Risk Factor For:
 - COPD
 - Heart Disease
 - Cancer
 - Stroke
- Smoking Also Impacts:
 - Pregnancy and Infant Health
 - Bone Health
 - Oral Health

Figure 105: Map of Percentage of Adults that Smoke Cigarettes in the Appalachian Region, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Figure 107: Map of Percentage of Adults that Smoke Cigarettes in the United States, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Other Poor Performers of the Region:

- Number of Physically Unhealthy Days (14% higher in Region, **24% in rural**)
- Mentally Unhealthy Days (**14% higher in Region**)
- Prevalence of Depression
- Adult Obesity (**3.6 % higher in Region**)
- Physical Inactivity (**28.4% in Region** vs. 23.1% in US)
- Lower Supplies of Healthcare Providers in Region vs. US:
 - Primary Care Physicians
 - Mental Health Providers
 - Specialty Physicians
 - Dentists

Table 2: Distributions of Morbidity Indicators among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Physically unhealthy days	5	1%	39	9%	93	22%	106	25%	177	42%
Mentally unhealthy days	2	0%	19	5%	96	23%	93	22%	210	50%
HIV prevalence	89	21%	109	26%	104	25%	61	15%	20	5%
Diabetes prevalence	12	3%	32	8%	68	16%	128	30%	180	43%
Obesity prevalence	45	11%	69	16%	74	18%	106	25%	126	30%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for each indicator may not sum to 420 due to missing or suppressed values.

Table 3: Distributions of Behavioral Health Indicators among National Quintiles for Appalachian Counties

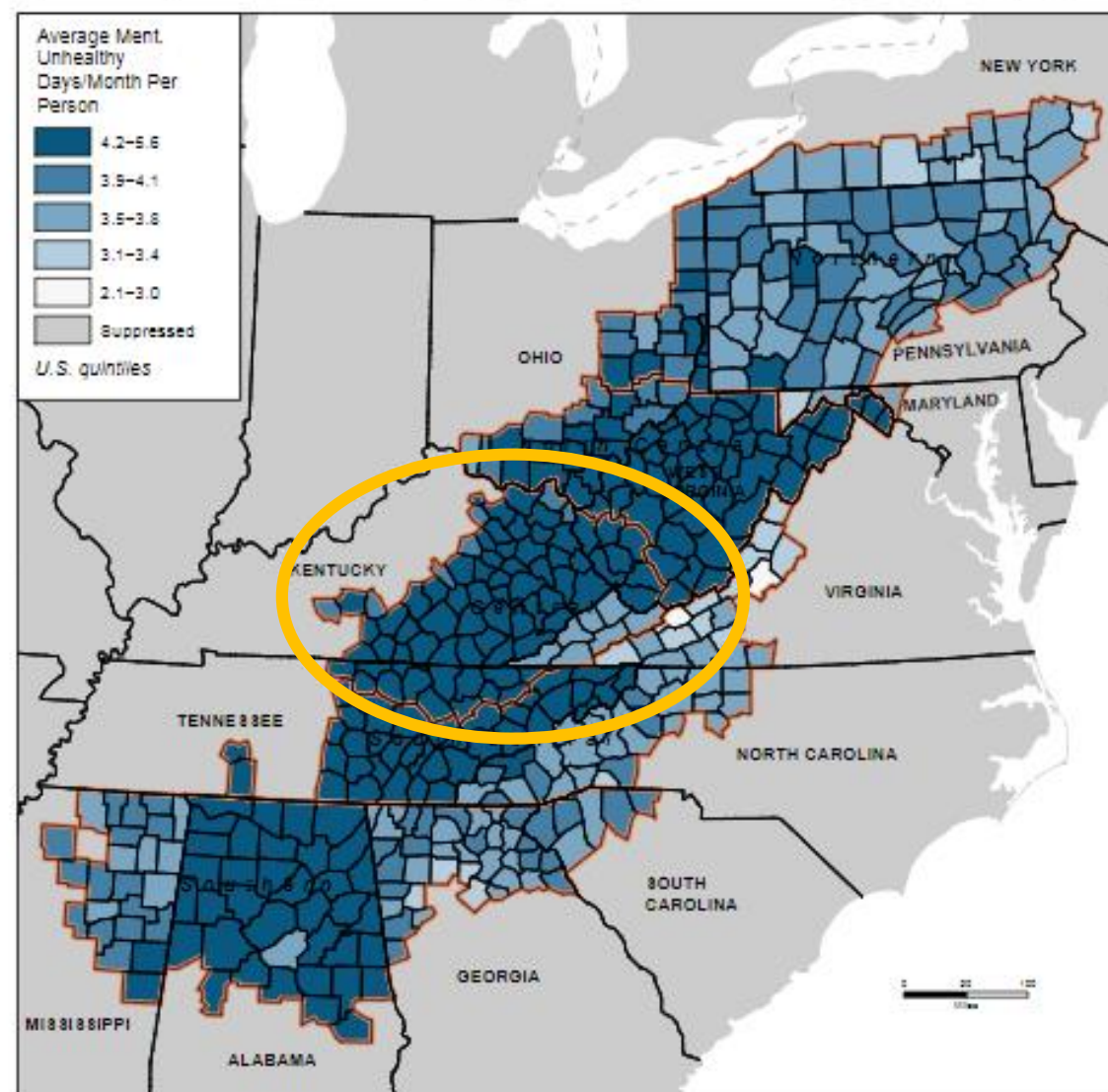
Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Depression prevalence	22	5%	54	13%	69	16%	114	27%	161	38%
Suicide incidence	46	11%	69	16%	108	26%	127	30%	70	17%
Excessive drinking	202	48%	92	22%	82	20%	41	10%	3	1%
Poisoning mortality	24	6%	31	7%	56	13%	114	27%	195	46%
Opioid prescriptions	51	12%	77	18%	91	22%	100	24%	101	24%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for each indicator may not sum to 420 due to missing or suppressed values.

Mentally Unhealthy Days

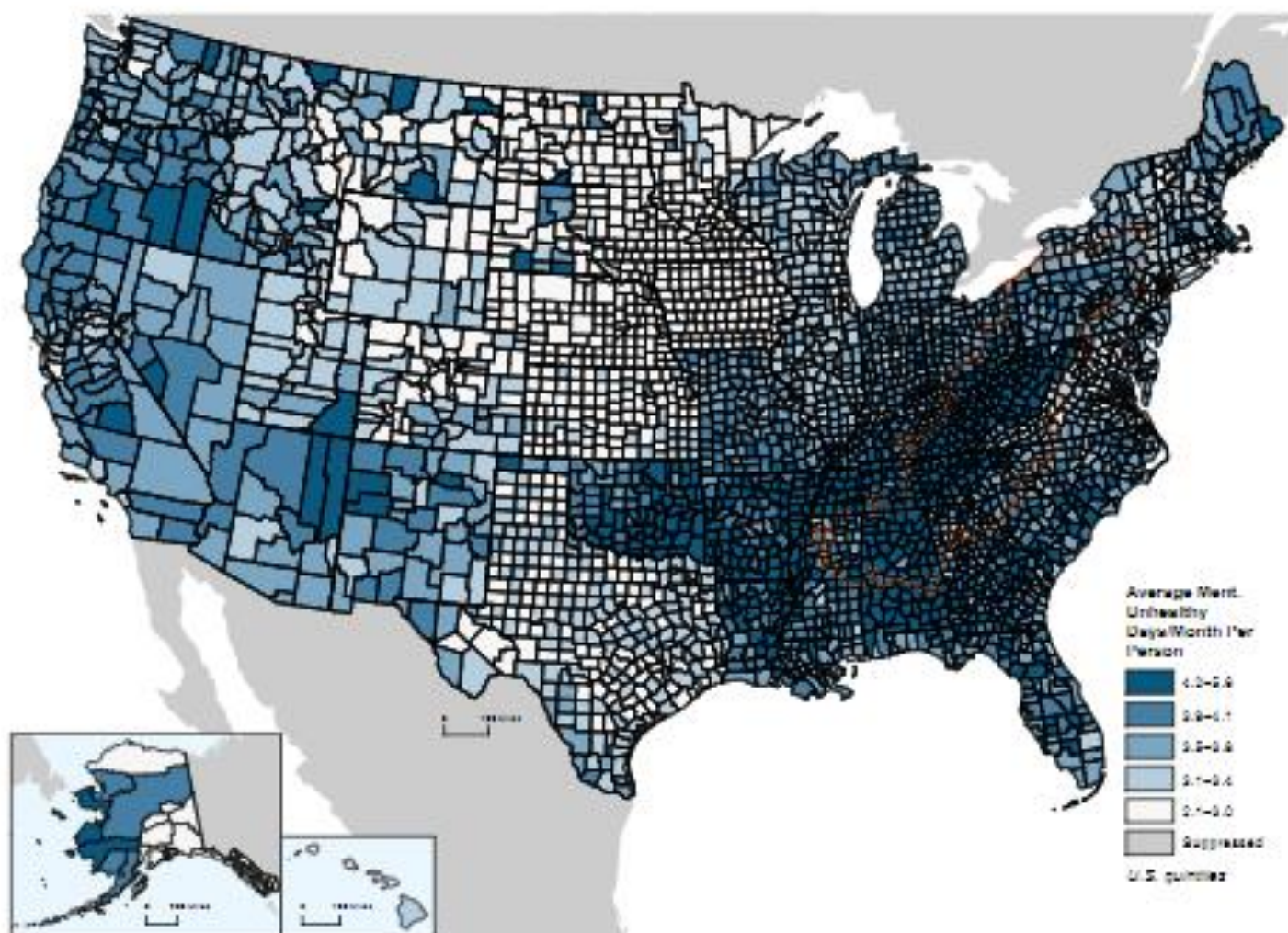
- Defined as:
 - “number of days per month the average adult aged 18 and older reports feeling mentally unhealthy or of poor mental health.”
 - Examples of Conditions:
 - Grief
 - Temporary anxiety
 - Temporary stress
 - Depression
- Appalachian residents report 0.5 more mentally unhealthy days per month
- Areas with Increased Mentally Unhealthy Days Also Have:
 - Higher Unemployment
 - Higher Poverty
 - Higher Disability
 - Higher Mortality Rates
 - Lower High School Completion Rates

Figure 41: Map of Mentally Unhealthy Days per Person per Month in the Appalachian Region, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Figure 43: Map of Mentally Unhealthy Days per Person per Month in the United States, 2014



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

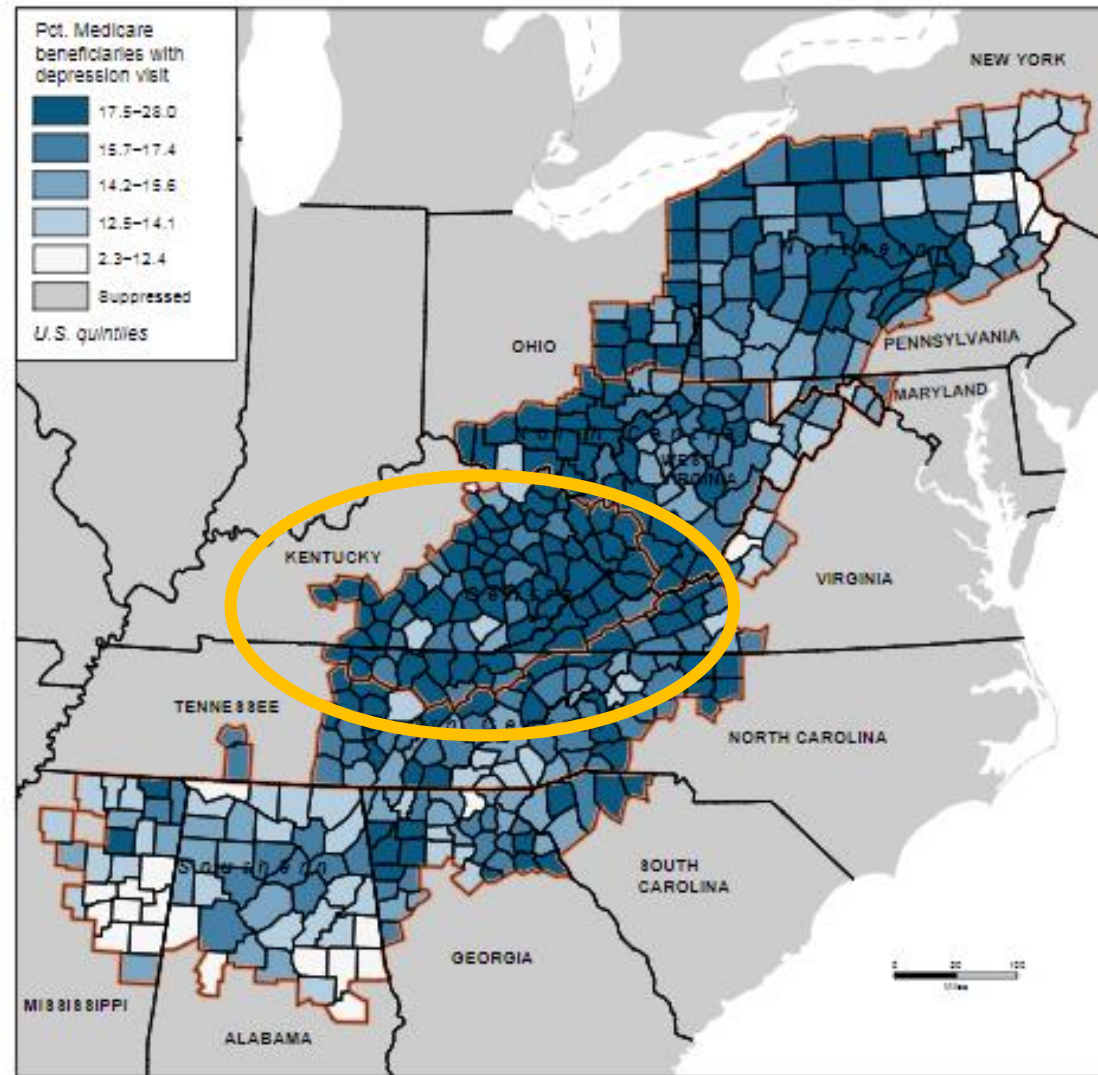
Depression Prevalence:

- National Institute of Mental Health:
 - “Depression is a common but serious mood disorder that causes severe symptoms that affect how one feels, thinks, and handles daily activities, such as eating, working or sleeping (NIMH, 2016).
 - Symptoms must be present x 2 weeks.
- Many adults do not seek help for depression and the subsequent symptoms.
- Depression is Associated With:
 - Significant Health Care Needs
 - Loss of Work
 - Premature Mortality
- Rates in the Appalachian Region are 16.7% vs 15.4% in US
 - Rural occurrence: 16.9%
 - Metro occurrence: 15.6%

Depression Continued:

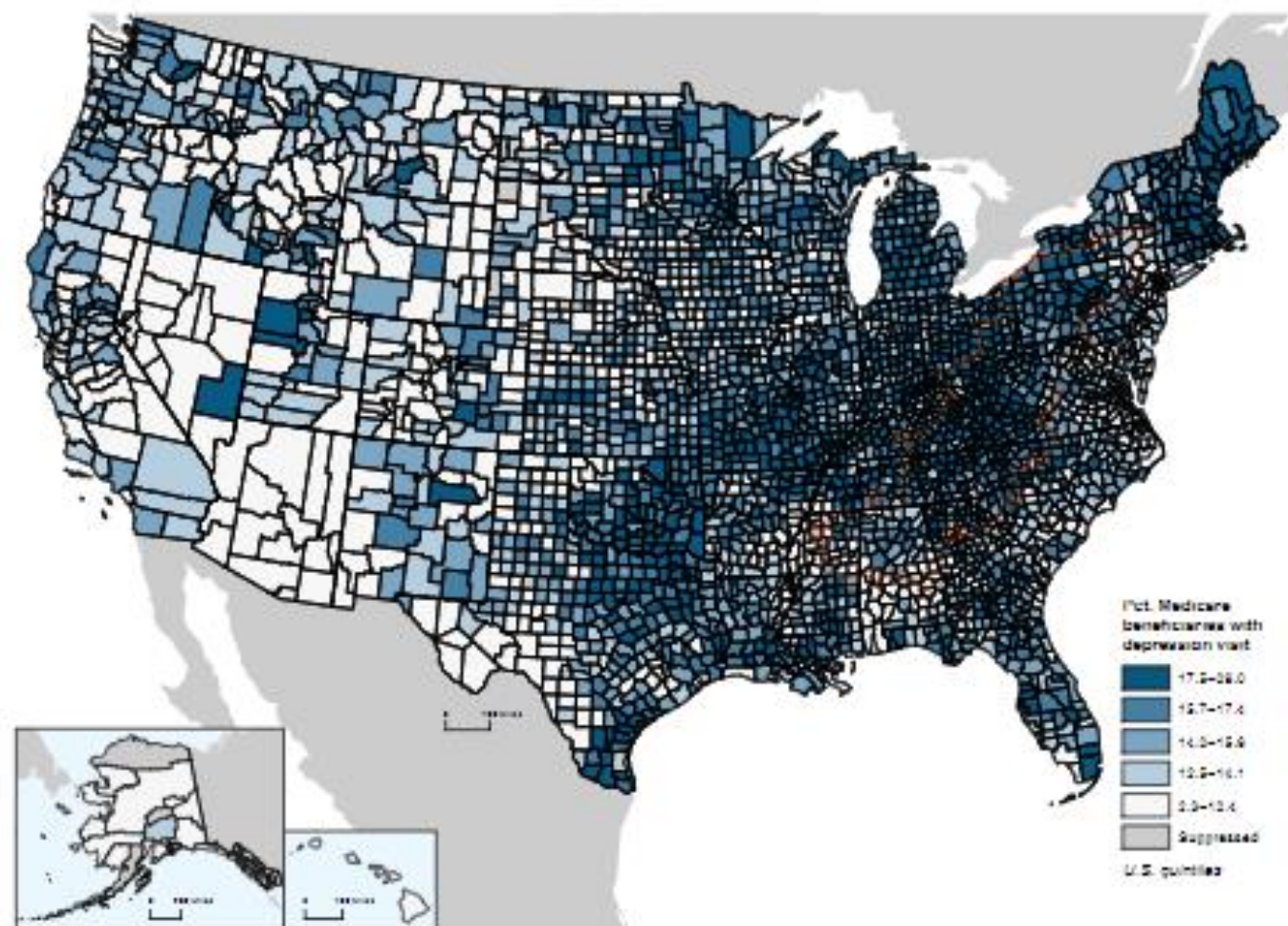
- Risk Factors Include:
 - Personal History
 - Family History
 - Trauma
 - Stress
 - Major Life Changes

Figure 57: Map of Percentage of Medicare Beneficiaries that had a Depression-Related Office Visit in the Appalachian Region, 2012



Data source: CMS Chronic Conditions Warehouse, Centers for Medicare & Medicaid Services.
<https://www.cdwdata.org/web/guest/interactive-data/ame-dashboard>.

Figure 59: Map of Medicare Beneficiaries that had a Depression-Related Office Visit in the United States, 2012

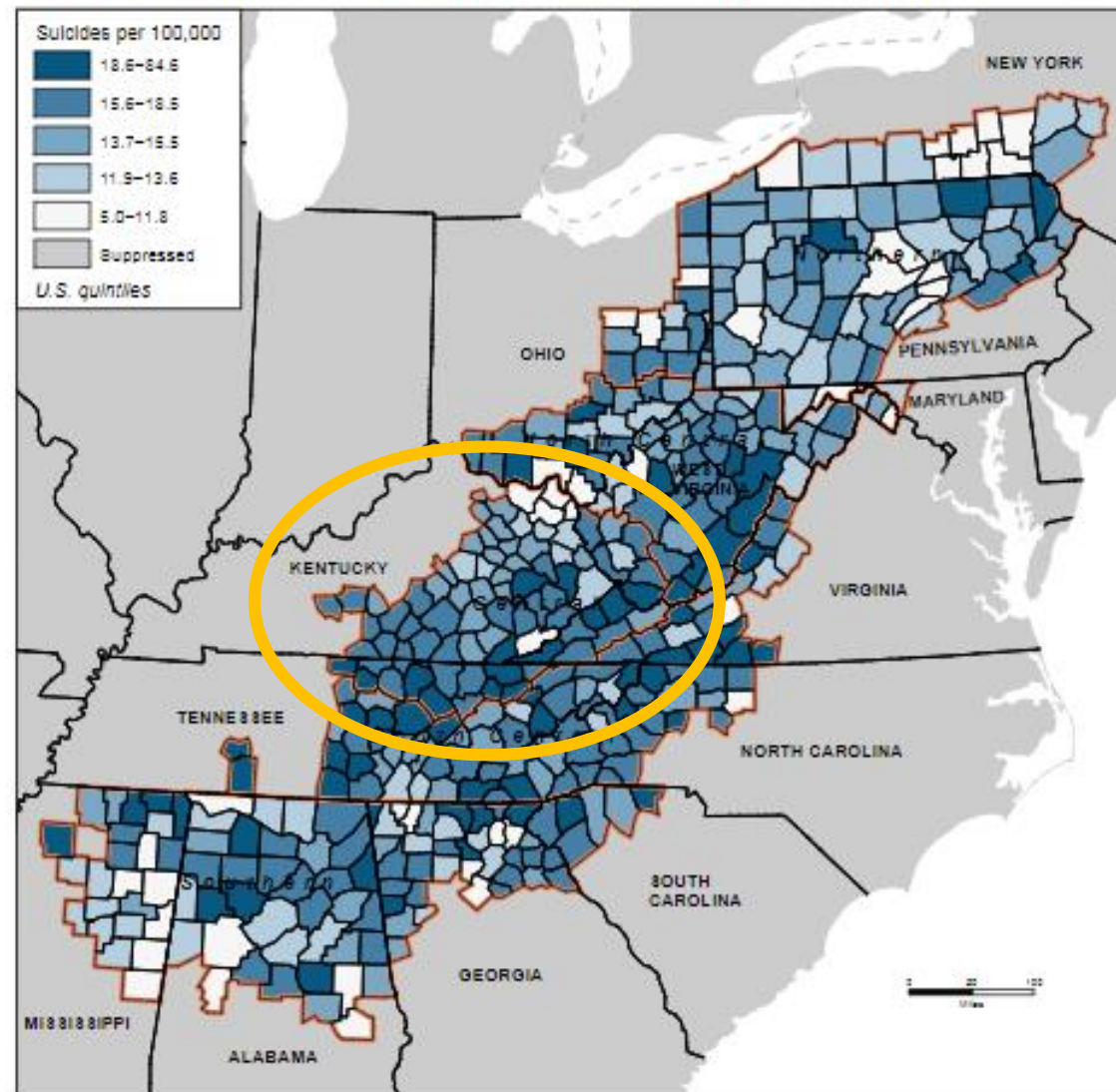


Data source: CMS Chronic Conditions Warehouse, Centers for Medicare & Medicaid Services.
<https://www.cowdata.org/web/guest/interactive-data/ams-dashboard>

Suicide Rates

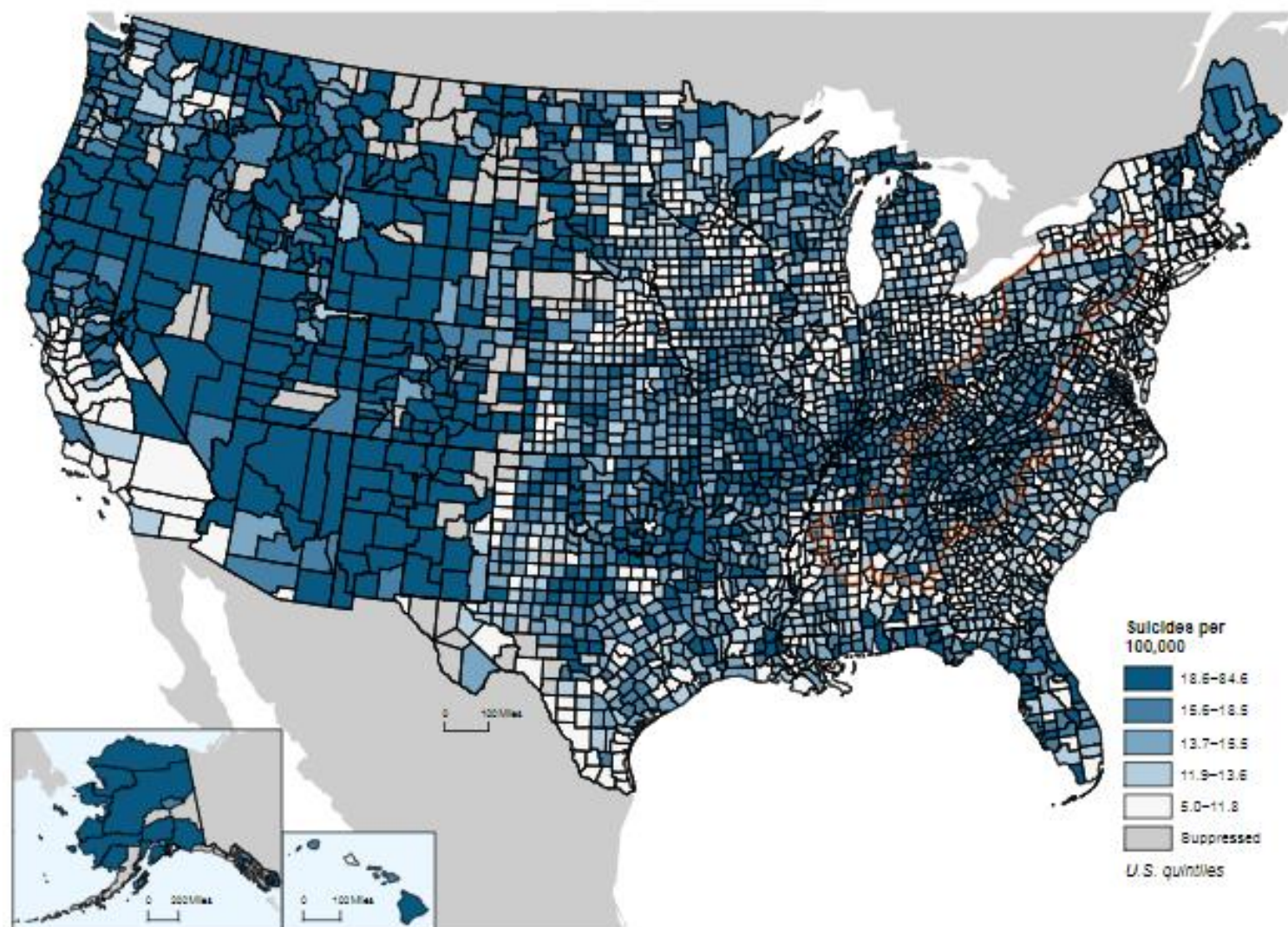
- Defined as:
 - “the number of suicides per 100,000 population, per year.”
- Rate in Region is 17% higher than US (**14.5** vs. 12.4)
 - 21% higher in rural compared to metro areas in the Region (**15.9** vs. 13.1)
- What Factors Help Those with Suicidal Thought?
 - Appropriate care for mental health in the area
 - Access to interventions
 - Family and community support
 - Skills in problem solving and conflict resolution

Figure 61: Map of Suicide Rates per 100,000 Population in the Appalachian Region, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD-ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland 2015. http://www.cdc.gov/nchs/data_access/cmf.htm.

Figure 63: Map of Suicide Rates per 100,000 Population in the United States, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD-ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland 2015. http://www.cdc.gov/nchs/data_access/cmf.htm.

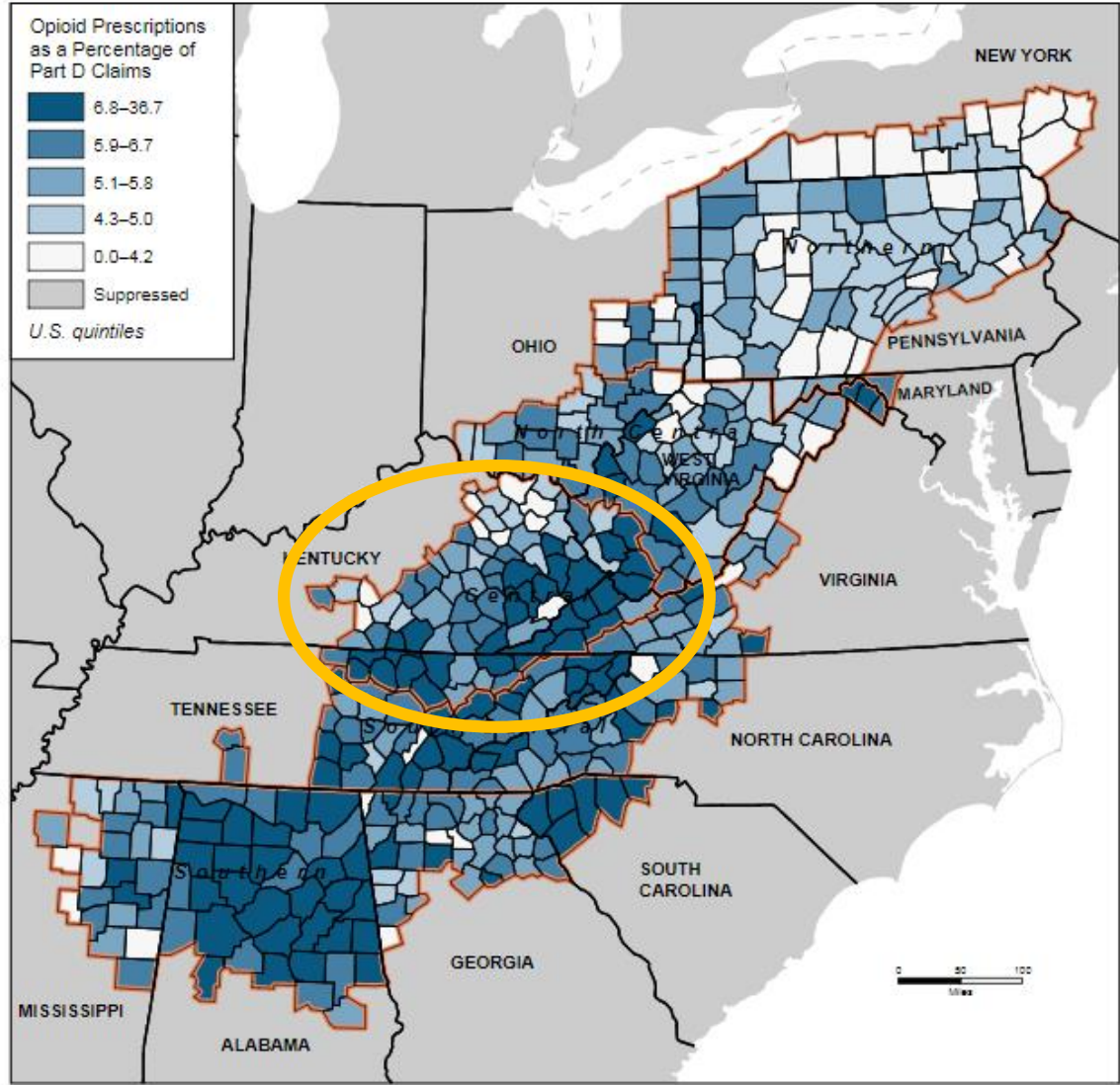


<https://suicidepreventionlifeline.org/talk-to-someone-now/>

Opioid Prescription Claims

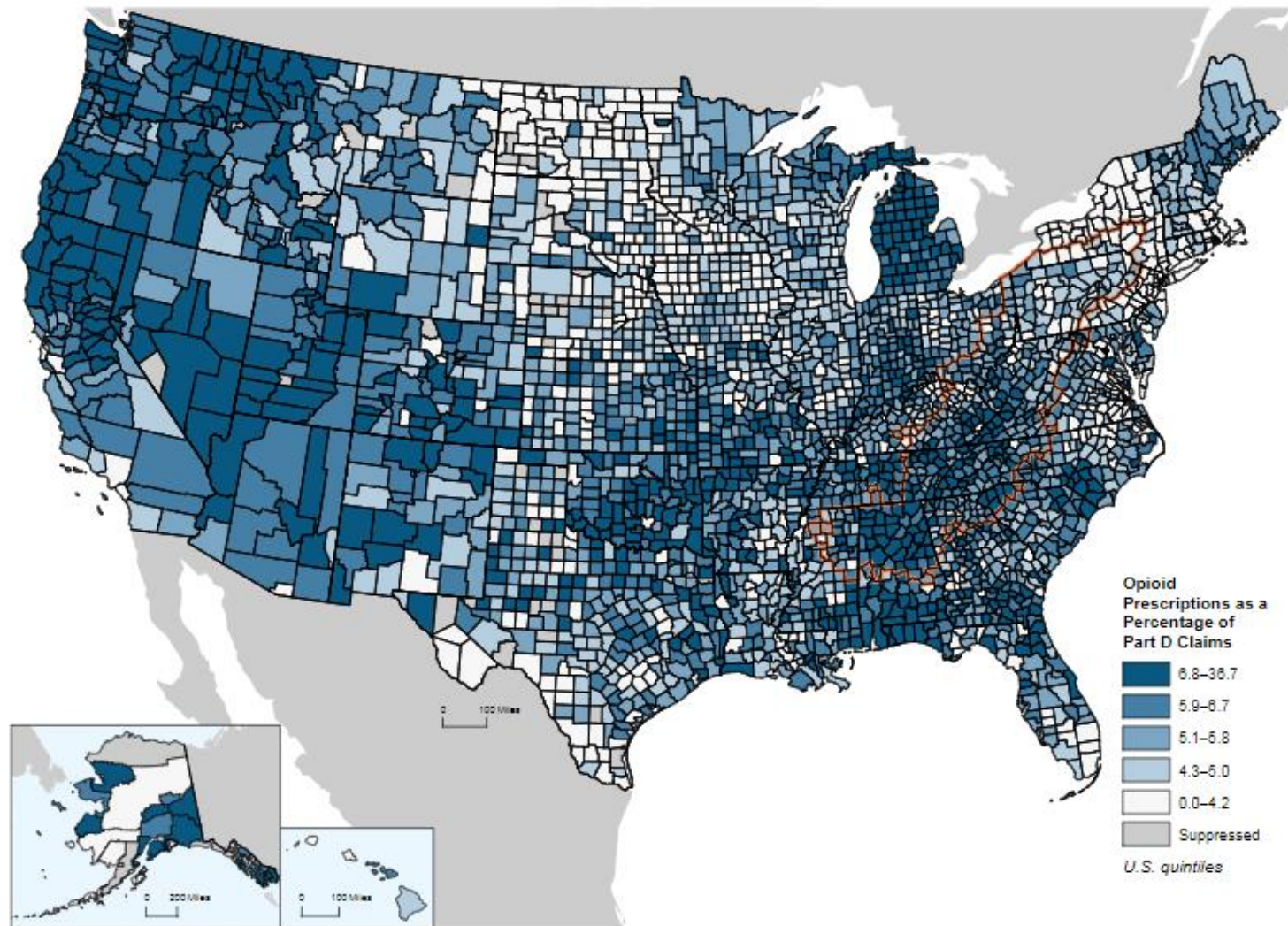
- Defined as:
 - “percentage of all prescriptions filled by fee-for-service Medicare beneficiaries (12 percent of the total population in the nation) in 2013 that were for an opioid.”
- 6% of all Medicare prescription claims in Appalachian Region are for opioids vs. 5.3% of entire US.
- More than 2 million people have opioid abuse disorders
- Higher Risk for Abuse:
 - Mental illness
 - History of alcohol or other substance abuse
 - Residing in rural areas
 - Low income
 - Overlapping Rx from multiple providers
 - High daily dosages of prescription
- 52 people die every day from opioids

Figure 73: Map of Opioid Prescriptions as a Percentage of Medicare Part D Claims in the Appalachian Region, 2013



Data source: Medicare Part D Opioid Drug Mapping Tool, Centers for Medicare & Medicaid Services
<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/OpioidMap.html>

Figure 75: Map of Opioid Prescriptions as a Percentage of Medicare Part D Claims in the United States, 2013

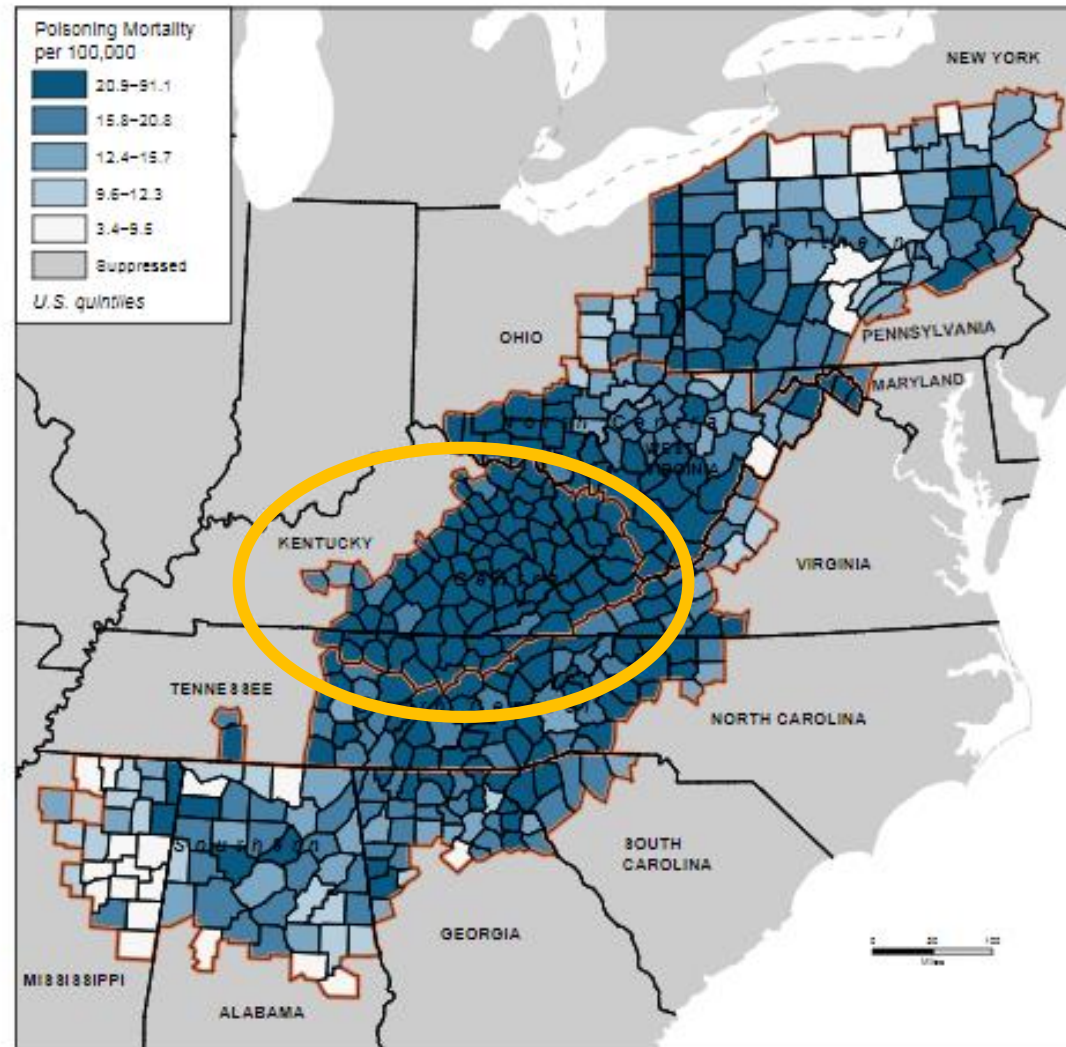


Data source: Medicare Part D Opioid Drug Mapping Tool, Centers for Medicare & Medicaid Services
<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/OpioidMap.html>

Poisoning Deaths

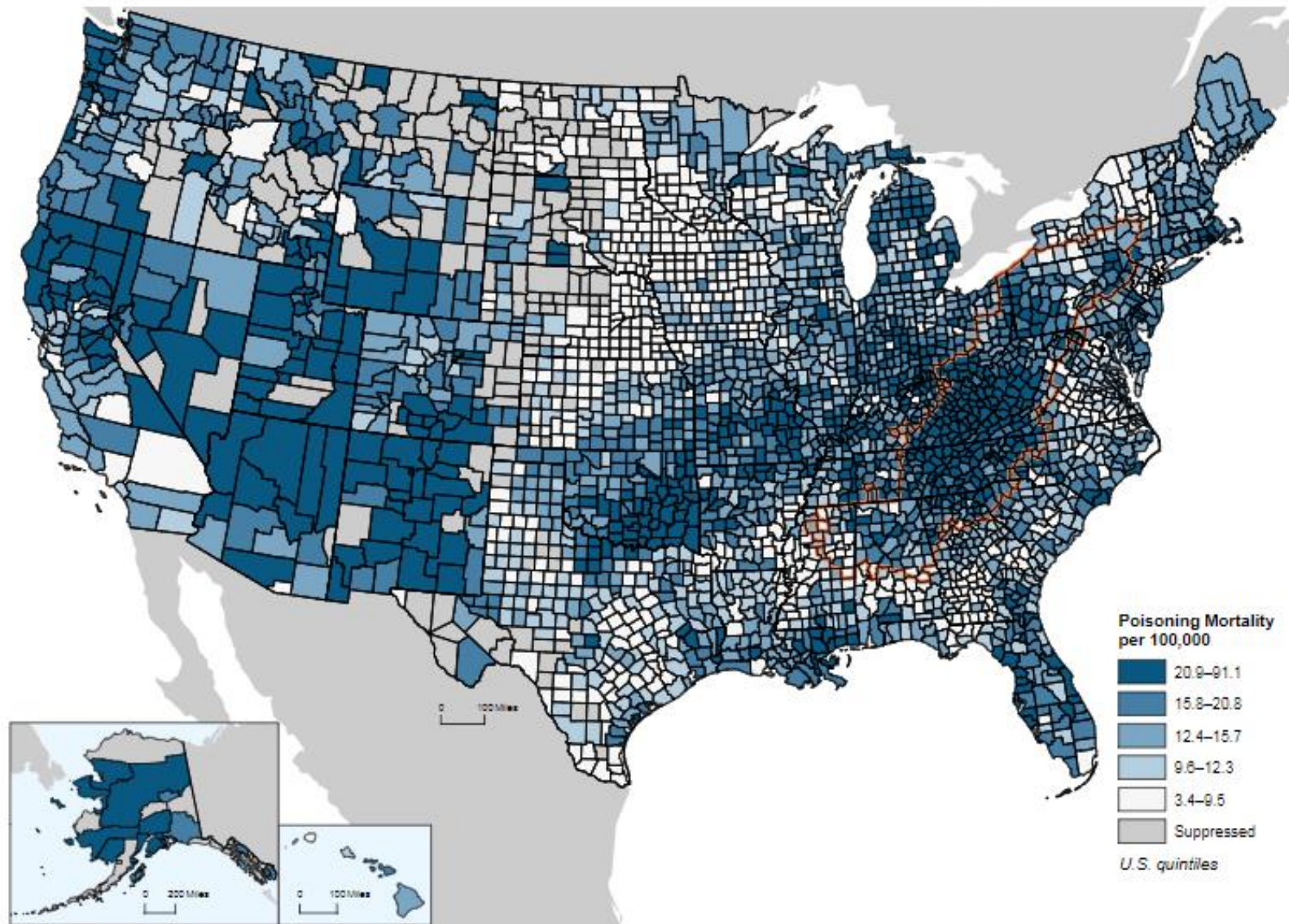
- Defined as:
 - “number of deaths with poisoning as the primary cause per 100,000 population, per year.”
- Includes deaths from medications (prescribed and illicit)
- More likely to occur in:
 - Male
 - Non-Hispanic white
 - Ages 45-54
- Poisoning in Appalachian Region:
 - 37% higher rates than US total
 - Central Appalachia has 146% higher rate than US as a whole.
 - Distressed counties have 63% higher rate than non-distressed counties.

Figure 69: Map of Poisoning Mortality Rates per 100,000 Population in the Appalachian Region, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD-ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland 2015. http://www.cdc.gov/nchs/data_access/cmf.htm.

Figure 71: Map of Poisoning Mortality Rates per 100,000 Population in the United States, 2008–2014



Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD-ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland 2015. http://www.cdc.gov/nchs/data_access/cmf.htm.

Child Health in Appalachia

- Infant Mortality
 - **(16% higher in Region)**
- Low Birth Weight
 - **(8.7% in Region vs. 8.1% in US)**
- Teen Births
 - 10% higher in Region, **72% higher in rural areas**
 - Children of Teenage Mothers More Likely To:
 - Have lower school achievement
 - Drop out of high school
 - Have more health problems
 - Be incarcerated during adolescence
 - Give birth as a teenager
 - Face unemployment

Health Care Systems

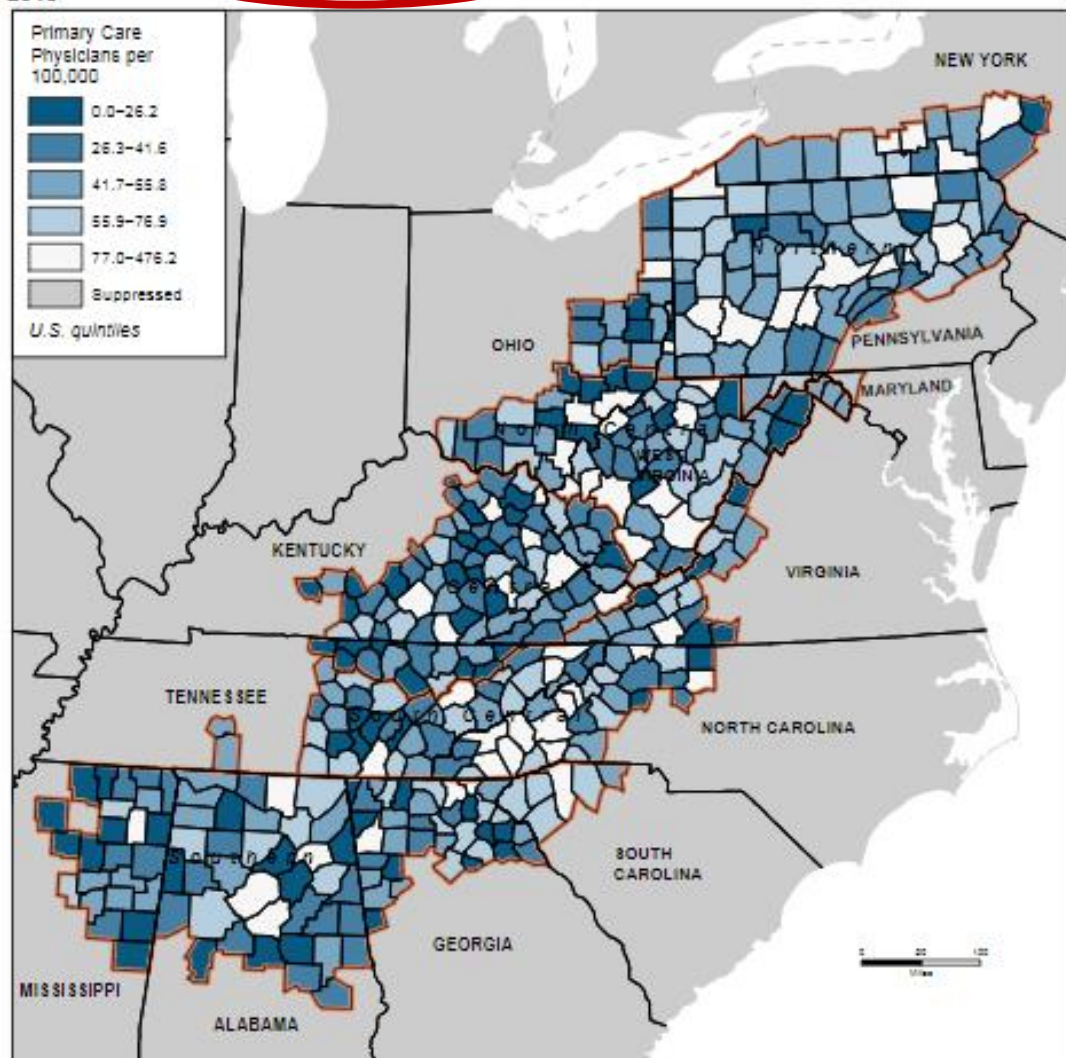
- Supply of Primary Care Physicians
 - 12% lower in the Appalachian Region
 - 33% lower in Central Appalachia, 21% lower in Southern Appalachia
- Mental Health Providers
 - 35% lower in Appalachian Region
 - 50% lower in North Central Appalachia and Southern Appalachia
- Specialty Physicians
 - 28% lower in Appalachian Region
 - 57% lower in rural areas
- Dentists
 - 26% lower in Appalachian Region
 - 36% lower in rural areas (46% in Central Appalachia)

Table 7: Distributions of Health Care Systems Indicators among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Primary care physicians	56	13%	84	20%	106	25%	95	23%	79	19%
Mental health providers	42	10%	81	19%	105	25%	116	28%	76	18%
Specialist physicians	67	16%	103	25%	94	22%	100	24%	56	13%
Dentists	35	8%	80	19%	99	24%	115	27%	91	22%
Uninsured population	53	13%	91	22%	117	28%	111	26%	48	11%
Heart disease hospitalizations	7	2%	43	10%	74	18%	117	28%	179	43%
COPD hospitalizations	12	3%	29	7%	75	18%	101	24%	203	48%

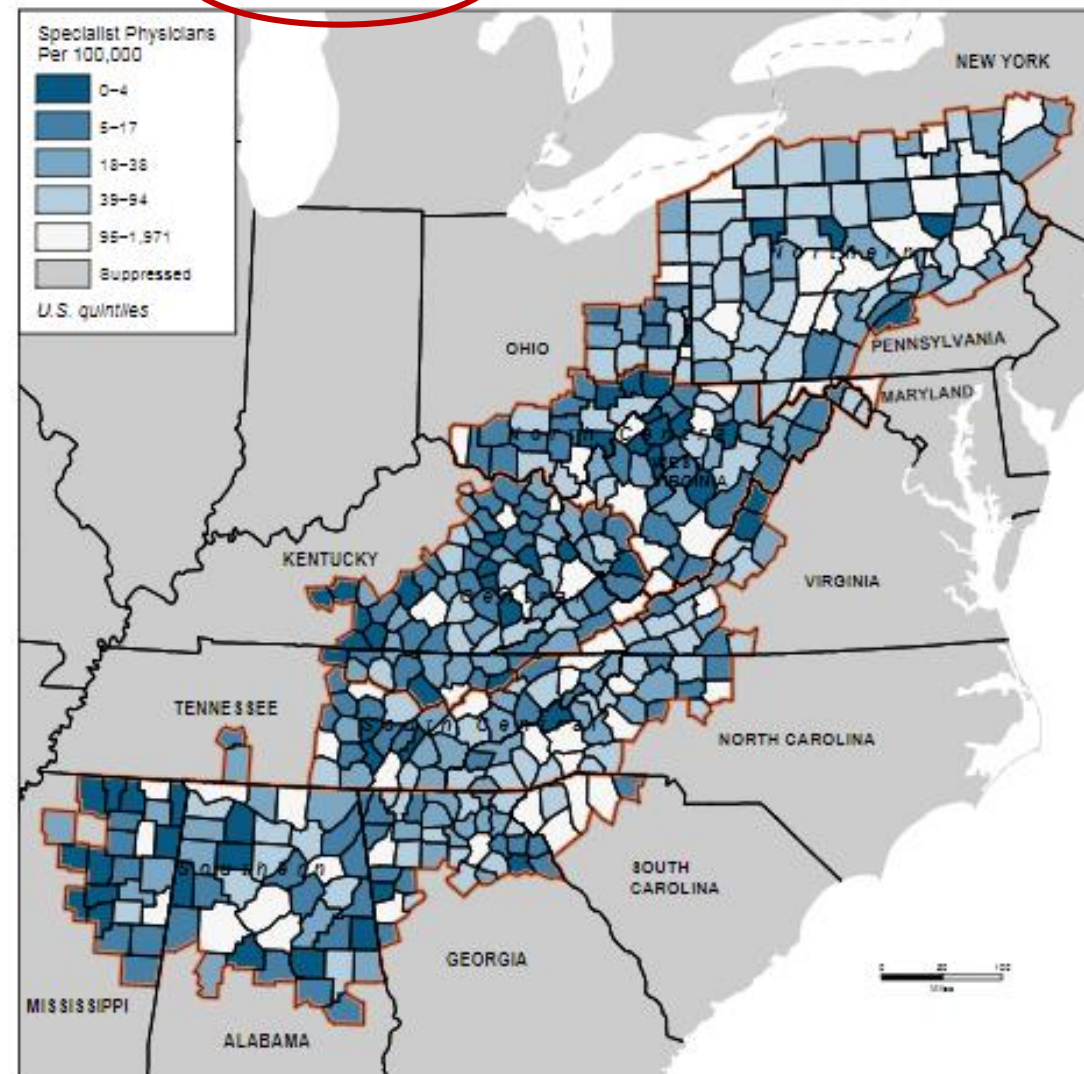
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for each indicator may not sum to 420 due to missing or suppressed values.

Figure 113: Map of Primary Care Physicians per 100,000 Population in the Appalachian Region, 2013



Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation <http://www.countyhealthrankings.org/rankings/data>.

Figure 121: Map of Specialty Physicians per 100,000 Population in the Appalachian Region, 2013

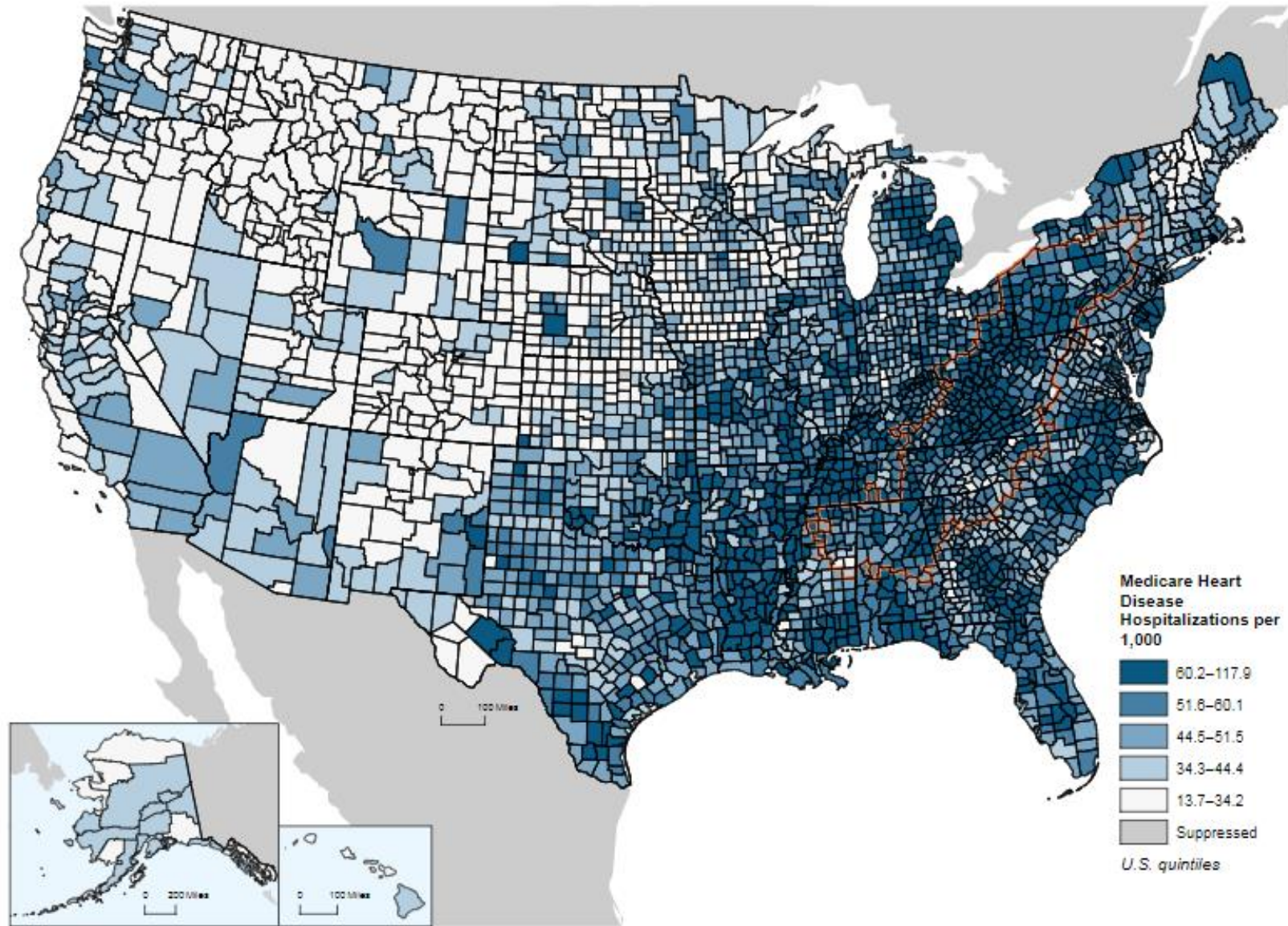


Data source: Area Health Resources Files (AHRF) 2014-2015 Release; U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Workforce, National Center for Health Workforce Analysis, June 2015. <http://ahrh.hrsa.gov/>

Hospitalizations

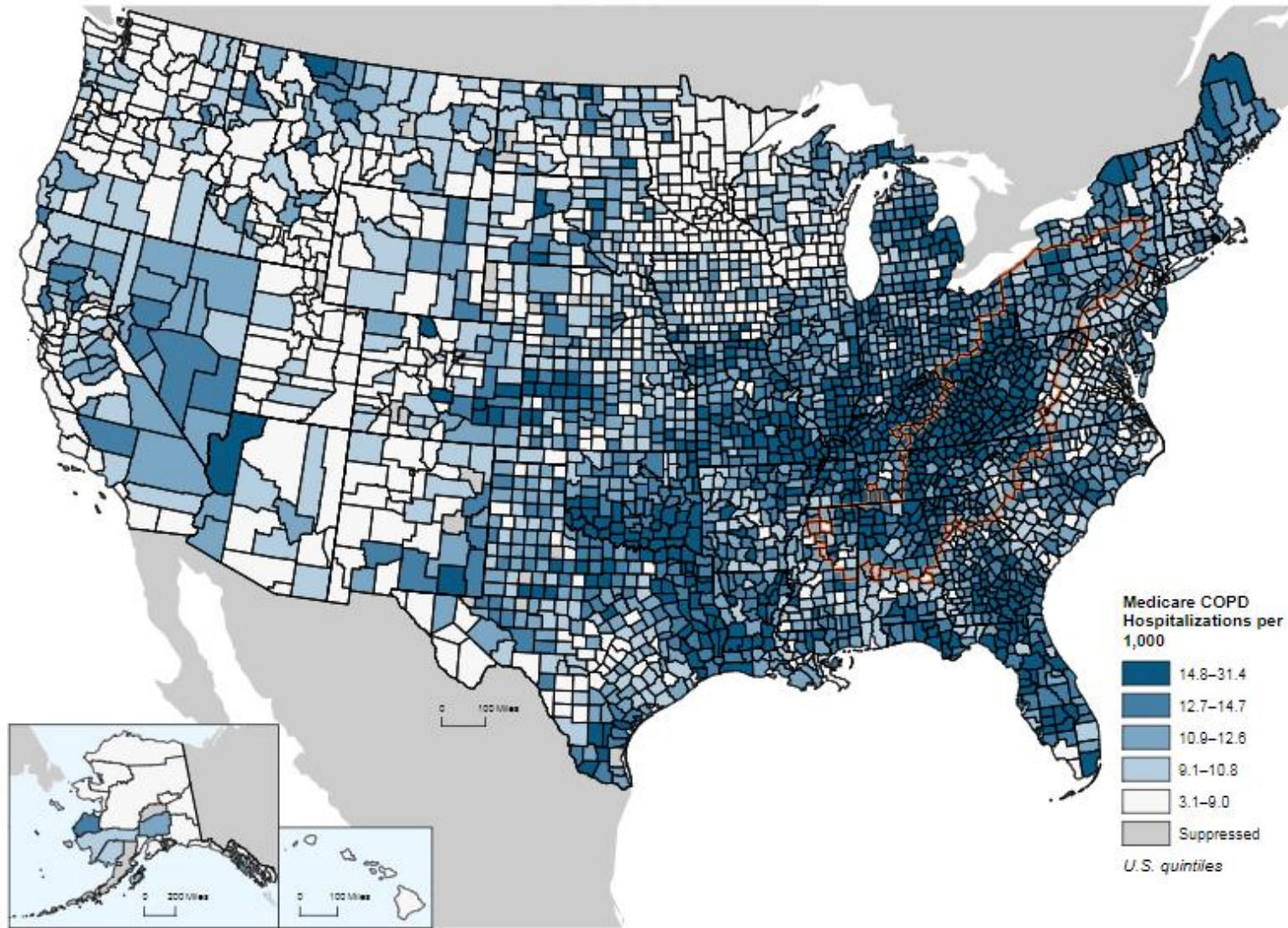
- Admission for COPD
 - 23% higher in Appalachian Region
 - 39% higher in rural areas vs metro
- Admission for Heart Disease
 - 17% higher in Appalachian Region
 - 13% higher in rural areas vs metro
- Rates of Uninsured:
 - 14.7% in metro areas
 - 18.2 % in rural areas

Figure 135: Map of Heart Disease Hospitalizations per 1,000 Medicare Beneficiaries in the United States, 2012



Data source: CDC Atlas of Heart Disease and Stroke. Centers for Disease Control and Prevention. <http://nccd.cdc.gov/dhdspatlas/>.

Figure 139: Map of COPD Hospitalizations per 1,000 Medicare Beneficiaries in the United States, 2012



Data source: CDC Atlas of Heart Disease and Stroke. Centers for Disease Control and Prevention. <http://nccd.cdc.gov/dhdspatlas/>.

Quality of Care

- Similar in Appalachian Region compared to US
 - Percentage of medical doctors using electronic prescribing
 - Percentage of Medicare beneficiaries (67-69 years old) who recently received mammogram
 - Diabetes monitoring (Medicare beneficiaries)

Table 8: Distributions of Quality of Care Indicators among National Quintiles for Appalachian Counties

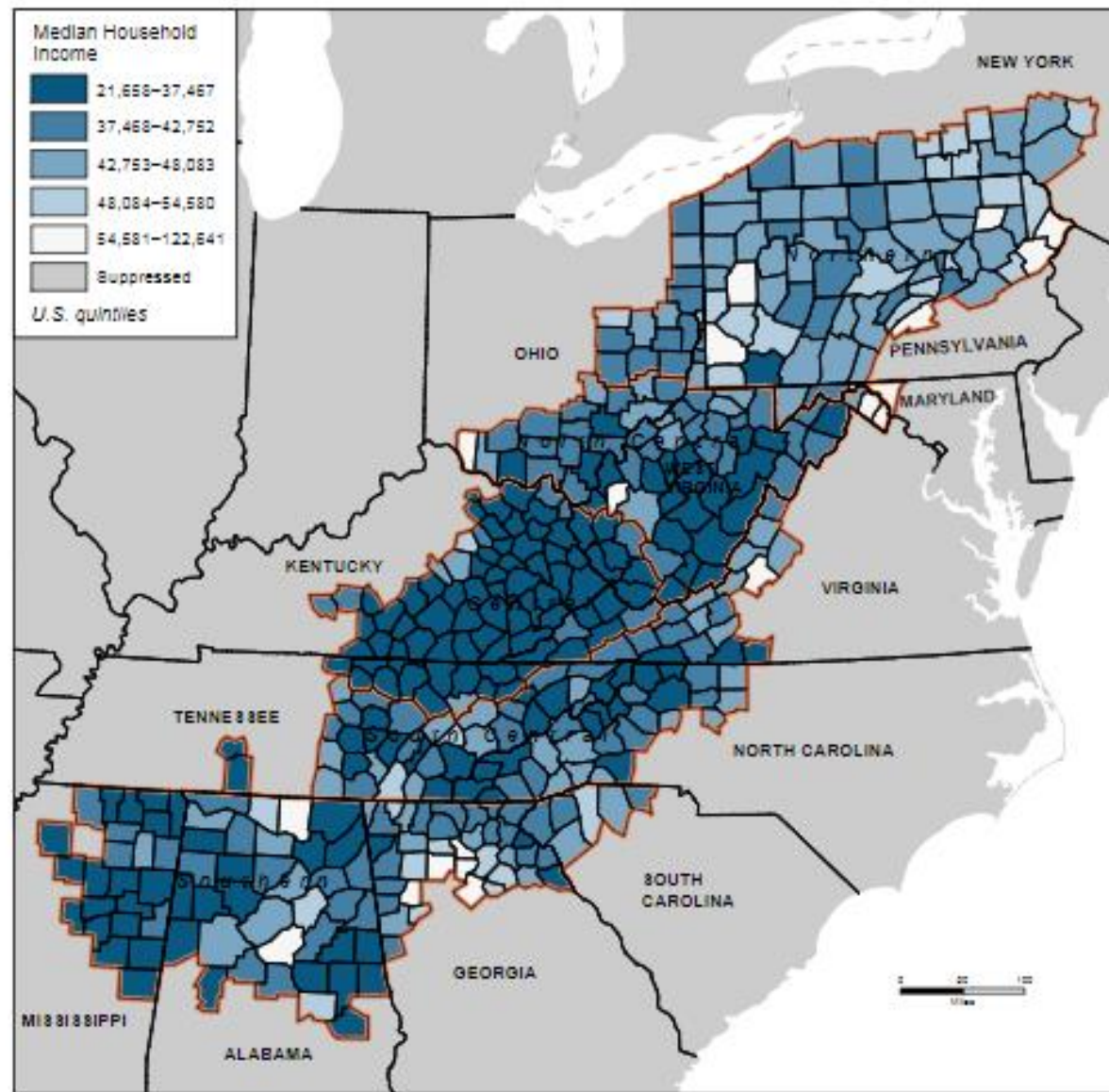
Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Electronic prescriptions	58	14%	74	18%	94	22%	107	25%	82	20%
Mammogram screenings	56	13%	69	16%	91	22%	99	24%	104	25%
Diabetes monitoring	74	18%	103	25%	120	29%	85	20%	38	9%

Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for each indicator may not sum to 420 due to missing or suppressed values.

Social Determinants

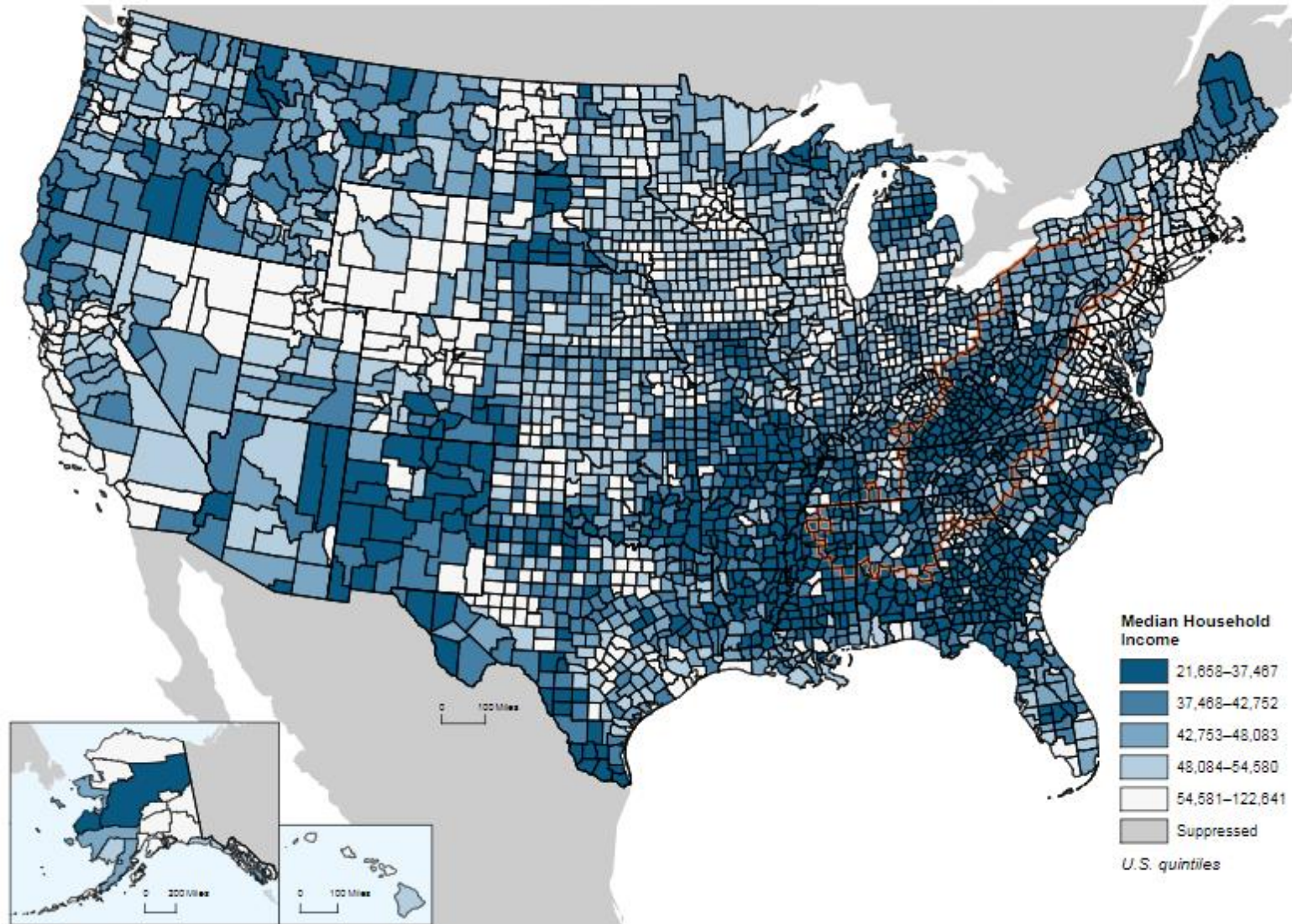
- Median Household Income
 - Defined as: “value at which half of the households in an area earn more and half earn less.”
 - 19% lower in Region (Central Appalachia 38% less than national)
 - \$45,585 vs. \$56,135
 - 34% lower in rural compared to metro areas
 - \$34,628 vs. \$54,743
- Household Poverty Rate
 - 23% in rural Appalachia
 - 13.6% in metro Appalachia
 - 15.6% in the US
- Percentage of the Population Receiving Disability Benefits
 - 11.2% in rural Appalachia
 - 5.5% in metro Appalachia
 - 5.1% in US
- Percentage of the Population with Some Level of College Education
 - 49% in rural Appalachia
 - 65.1 % in metro Appalachia
 - 63.3% in the US

Figure 153: Map of Median Household Income in the Appalachian Region, 2010–2014



Data source: United States Census Bureau. "Summary Files." 2010–2014 American Community Survey. U.S. Census Bureau's American Community Survey Office, 2015. Web. 13 January 2016 <http://ftp2.census.gov/>.

Figure 155: Map of Median Household Income in the United States, 2010–2014



Data source: United States Census Bureau. "Summary File." 2010–2014 American Community Survey. U.S. Census Bureau's American Community Survey Office, 2015. Web. 13 January 2016 <http://ftp2.census.gov/>.

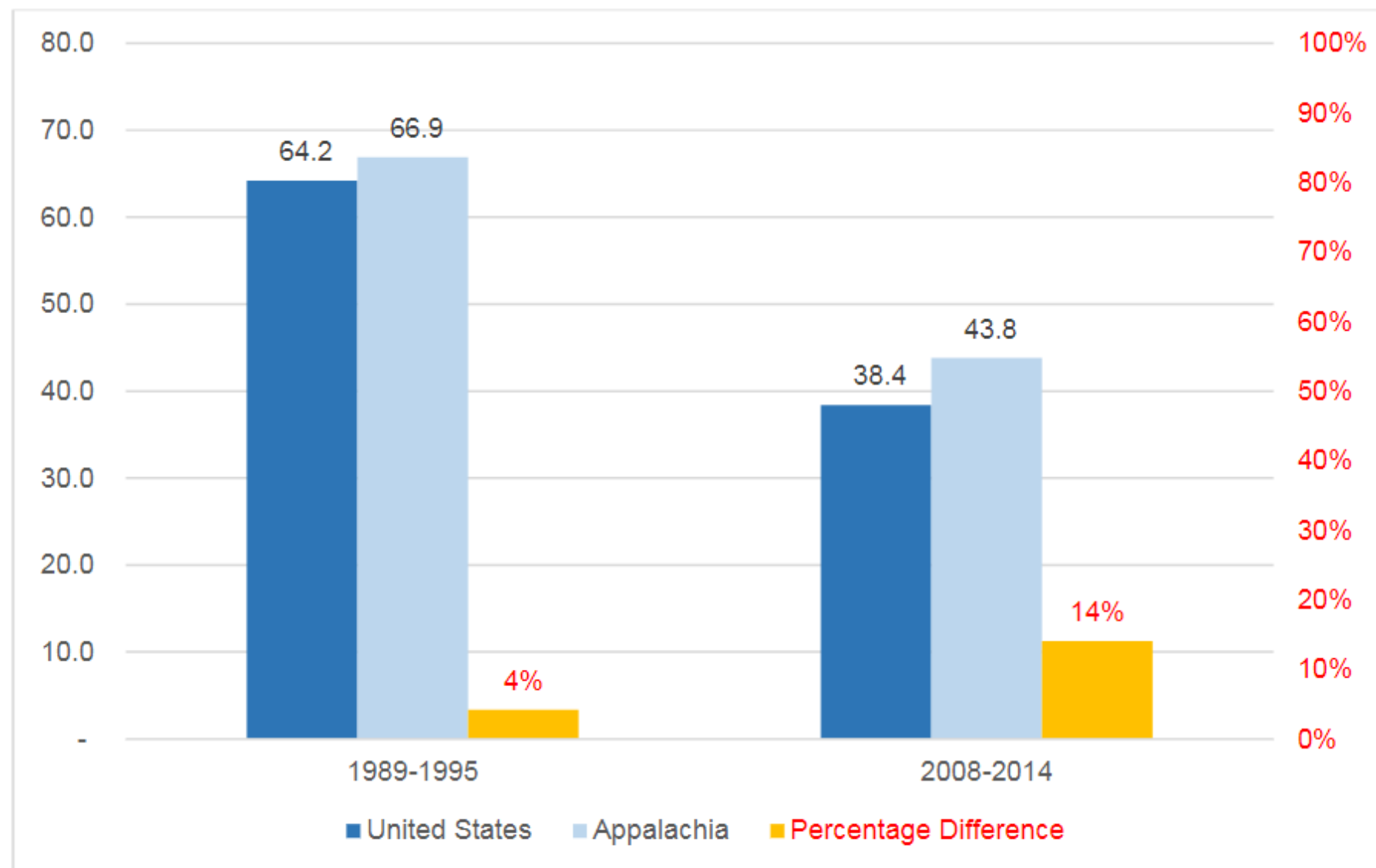
Has This Changed With Time?

Table 10: Percentage change in selected measures, the United States and Appalachia

Indicator	United States	Appalachia
<i>Change between 1989–1995 and 2008–2014:</i>		
YPLL	-24%	-8%
Stroke mortality	-40%	-35%
Cancer mortality	-21%	-14%
Heart disease mortality	-43%	-39%
Infant mortality	-28%	-19%
<i>Change between 1990 and 2013:</i>		
Primary care physicians	27%	31%

Data source for authors' calculations shown above: [Appalachian_Health_Disparities_Data.xlsx](#). The number of counties across all five quintiles for each indicator may not sum to 420 due to missing or suppressed values.

Figure 179: Improvements in Stroke Mortality in the United States and Appalachia, 1989–1995 to 2008–2014



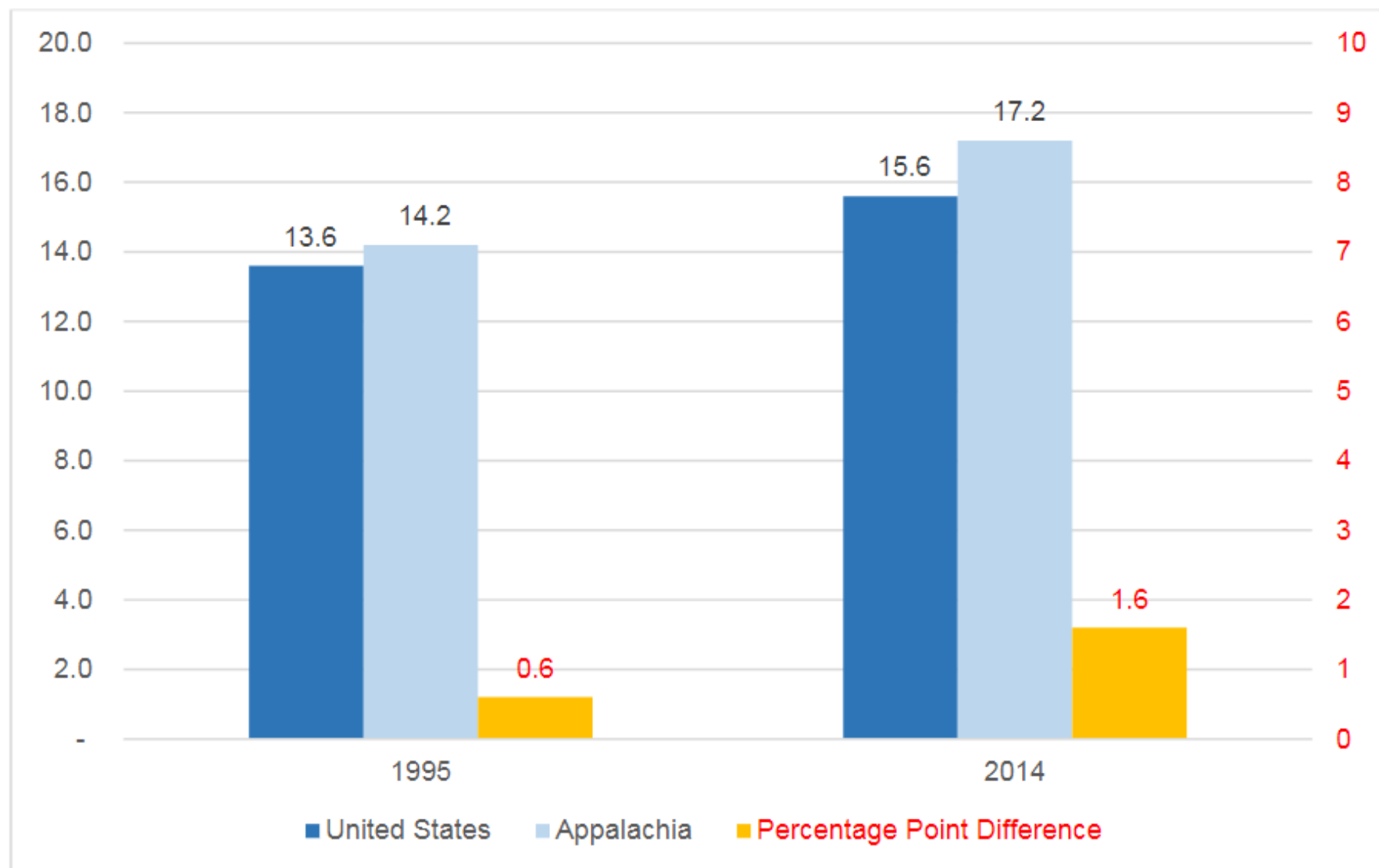
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

Table 61: Change in Stroke Mortality Rates per 100,000 population, 1989–1995 and 2008–2014

Geographic Area	1989–1995	2008–2014	Percent Change
United States	64.2	38.4	-40%
Appalachia	66.9	43.8	-35%
Rest of United States	64.0	38.0	-41%
Northern Appalachia	59.2	38.9	-34%
North Central Appalachia	62.5	45.8	-27%
Central Appalachia	68.1	47.2	-31%
South Central Appalachia	72.6	44.5	-39%
Southern Appalachia	72.5	47.3	-35%

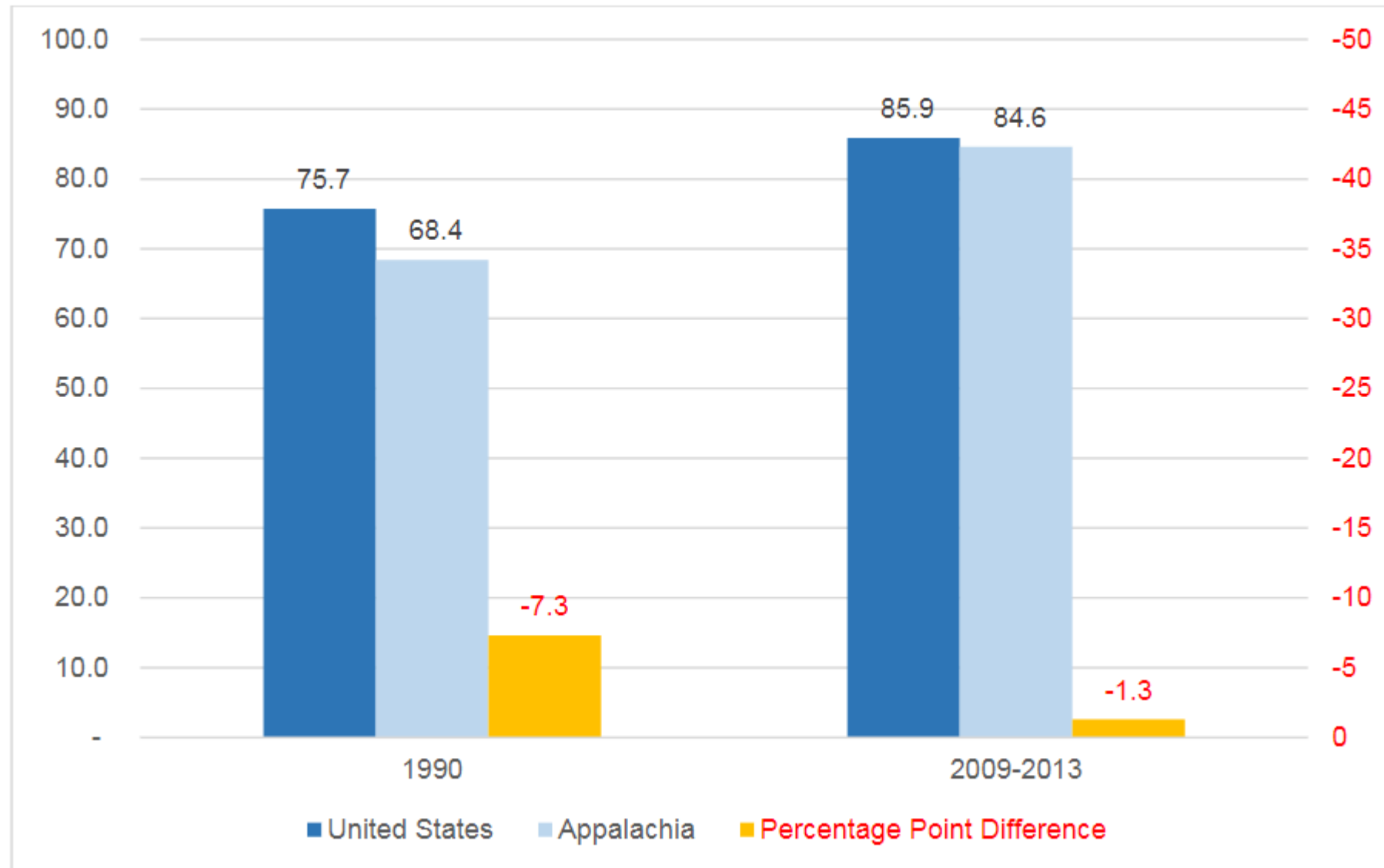
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

Figure 185: Changes in Household Poverty Rates in the United States and Appalachia, 1995 to 2014



Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

Figure 187: Improvements in the Percentage of Adults with a High School Diploma in the United States and Appalachia, 1990 to 2013



Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

There are “Bright Spots”

CREATING A CULTURE OF HEALTH IN APPALACHIA Disparities and Bright Spots



Identifying Bright Spots in Appalachian Health: Statistical Analysis Executive Summary

STATISTICAL
ANALYSIS

- Bright Spot county defined:
 - A county whose average of all 19 standardized outcome residuals scored in the top decile.
- https://www.arc.gov/assets/research_reports/BrightSpotsStatisticalAnalysis-ExecutiveSummaryJuly2018.pdf

Figure 2: Map of the Bright Spot Counties in Appalachia

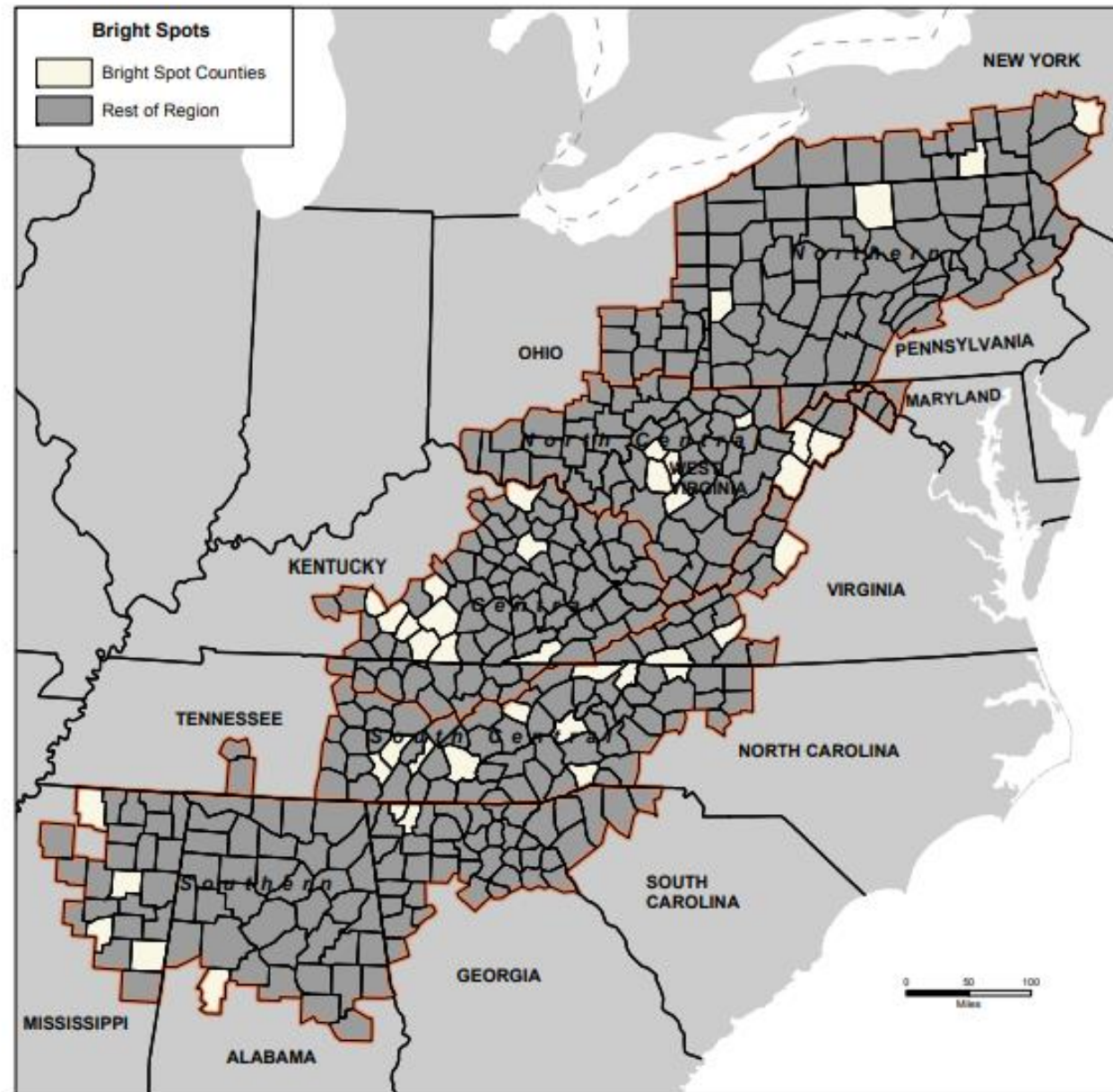


Table 4: Nonmetropolitan Appalachian Bright Spot Counties, Ranked by Average Outcome Residual

Rank	County	State	Average Standardized Residual Score ^a	Highest Individual Residual ^b	
1	Wayne	Kentucky	0.72	Stroke mortality	1.79
2	Noxubee	Mississippi	0.58	COPD mortality	2.19
3	Calhoun	West Virginia	0.58	Injury mortality	2.02
4	Grant	West Virginia	0.49	Cancer mortality	1.88
5	McCreary	Kentucky	0.45	Poisoning mortality	1.94
6	Potter	Pennsylvania	0.45	Heart disease mortality	1.44
7	Taylor	West Virginia	0.42	Heart disease hospitalizations	1.20
8	Rockbridge	Virginia	0.41	Heart disease hospitalizations	1.37
9	Pulaski	Kentucky	0.40	Poisoning mortality	1.64
10	Green	Kentucky	0.40	YPLL	1.38
11	Lee	Virginia	0.40	Poisoning mortality	2.29
12	Russell	Kentucky	0.40	Heart disease hospitalizations	1.68
13	Bledsoe	Tennessee	0.39	Cancer mortality	1.88
14	Grayson	Virginia	0.39	Injury mortality	1.83
15	Hardy	West Virginia	0.38	% opioid Rx claims	1.21
16	Johnson	Tennessee	0.38	Poisoning mortality	1.52
17	Lincoln	Kentucky	0.37	% obese adults	1.37
18	Meigs	Tennessee	0.36	% opioid Rx claims	2.17
19	Pendleton	West Virginia	0.36	Poisoning mortality	1.48
20	Choctaw	Mississippi	0.35	Cancer mortality	1.69
21	Adair	Kentucky	0.35	Injury mortality	1.57
22	Lewis	Kentucky	0.34	Depression prevalence	1.78
23	Roane	West Virginia	0.33	Heart disease hospitalizations	1.35
24	Monroe	Tennessee	0.32	COPD mortality	1.18
25	Alleghany	North Carolina	0.31	YPLL	1.18
26	Chickasaw	Mississippi	0.31	Stroke mortality	1.61
27	Morgan	Kentucky	0.28	Injury mortality	0.92

Notes: a. Average residual score for the regression analysis involving 268 Appalachian nonmetro counties
b. Highest of the 19 standardized residual outcome scores for each county

Where Should We Focus Efforts For Improvements?

- Median income
- ARC Economic Index value
- Poverty rate
- Percentage of adults that smoke
- Percentage of adults that are physically inactive
- Percentage of the population receiving disability payments
- Teen birth rates

Resources:

Health Disparities in Appalachia. PDA, Inc. (2017, August). Retrieved September, 7, from https://www.arc.gov/assets/research_reports/Health_Disparities_in_Appalachia_August_2017.pdf

Identifying Bright Spots in Appalachian Health: Statistical Analysis Executive Summary. PDA, Inc. (2018, July). Retrieved September 10, from https://www.arc.gov/assets/research_reports/BrightSpotsStatisticalAnalysisJuly2018.pdf

- Centers for Disease Control and Prevention Fast Facts Topics:

- Heart Disease
 - <https://www.cdc.gov/nchs/fastats/heart-disease.htm>
- COPD
 - <https://www.cdc.gov/nchs/fastats/copd.htm>
- Cancer
 - <https://www.cdc.gov/nchs/fastats/cancer.htm>
- Depression
 - <https://www.cdc.gov/nchs/fastats/depression.htm>
- Teen Pregnancy
 - <https://www.cdc.gov/nchs/data/nhsr/nhsr104.pdf>
- Suicide in Rural America
 - <https://www.cdc.gov/ruralhealth/Suicide.html>
- Child Health
 - <https://www.cdc.gov/ruralhealth/child-health.html>
- Opioid Overdose
 - <http://www.cdc.gov/drugoverdose/data/analysis.html>
- Opioid Prescription Guidelines:
 - <https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm>