Behavioral Health

KEY FINDINGS | Depression Prevalence

- The prevalence of depression among fee-for-service Medicare beneficiaries in the Appalachian Region is 16.7 percent, compared to 15.4 percent for the United States as a whole.
- The prevalence of depression among fee-for-service Medicare beneficiaries is the highest in both North Central and Central Appalachia, at approximately 19 percent.
- There is a small difference in depression prevalence among fee-for-service Medicare beneficiaries in the Appalachian Region's rural counties (16.9 percent) and large metro counties (15.6 percent).
- There is a slight difference in depression prevalence among fee-for-service Medicare beneficiaries in the Appalachian Region's distressed counties (17.6 percent) and non-distressed counties (16.6 percent).

Background

The depression prevalence measure is the percentage of Medicare beneficiaries in the fee-for-service option who received treatment for depression in 2012 at least once. These data come from the CMS Chronic Conditions Warehouse, which is maintained by the Centers for Medicare & Medicaid Services. Technically the indicator measures "the percentage of fee-for-service Medicare beneficiaries who had at least one Medicare visit for which depression was listed as a diagnosis." Untreated depression could also be captured by this value—such as an initial office visit for symptoms diagnosed as depression without any subsequent follow-up—and there is evidence that a large portion of adults with depression do not seek treatment for it (Olfson, Blanco, & Marcus, 2016). Nevertheless, for ease of discussion, we refer to this as "prevalence" in this report. This indicator provides information on beneficiaries in Medicare's fee-for-service option only, and it does not include Medicare's managed care beneficiaries. Therefore, this measure captures only a subset of the Medicare population and represents approximately 12 percent of the total population in the nation (Kaiser Family Foundation, 2015); (Centers for Medicare & Medicaid Services, 2017).

Depression is a serious medical illness as well as an important public health issue. According to the National Institute of Mental Health, depression—also called major depressive disorder or clinical 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 (National Institute of Mental Health, 2016). Diagnosis of depression requires the symptoms to be present for at least two weeks. Depression not only causes suffering for depressed individuals but can also have negative impacts on their families and their communities. Depression is associated with significant healthcare needs, loss of work or problems in school, and premature mortality (Centers for Disease Control and Prevention, Depression, 2016).

Risk factors for depression include a personal or family history of depression, major life changes, trauma, stress, certain physical conditions, and medications (National Institute of Mental Health, 2016). Depression itself is also a risk factor for opioid abuse, suicide, and mortality from a number of other conditions (Centers for Disease Control and Prevention, Depression, 2016).

Because depression often occurs alongside other chronic conditions, managing the condition is complex. Treatment options typically include both medication and psychotherapy, with therapy a particular challenge in some parts of the Appalachian Region due to a shortage of mental health providers (see the section on Mental Health Providers in the Healthcare Systems domain of this report). The individual nature of depression means treatment may require a "trial and error" approach, making it more challenging to successfully treat than many other common conditions (National Institute of Mental Health, 2016).

The interpretation of this indicator may be approached from several viewpoints. While the indicator may simply capture the prevalence of depression among fee-for-service Medicare beneficiaries in an area, it must be considered with an important caveat: identification and diagnosis varies significantly across counties, states, and regions. As such, low values in this measure could be interpreted as representing less success in the identification, diagnosis, and treatment of depression, rather than a lower prevalence. For this study, high depression prevalence is simply interpreted as an indicator of poor health, although this caveat should be kept in mind.

Overview: Depression Prevalence in the Appalachian Region

In the Appalachian Region, the prevalence of depression in fee-for-service Medicare beneficiaries is 16.7 percent, compared with 15.4 percent of beneficiaries throughout the United States as a whole. The prevalence of beneficiaries with depression in both North Central (18.8 percent) and Central Appalachia (19.2 percent) are both higher than the national figure. Depression prevalence among Medicare fee-for-service beneficiaries in Southern Appalachia is 15.1 percent, which is slightly better than the national average.

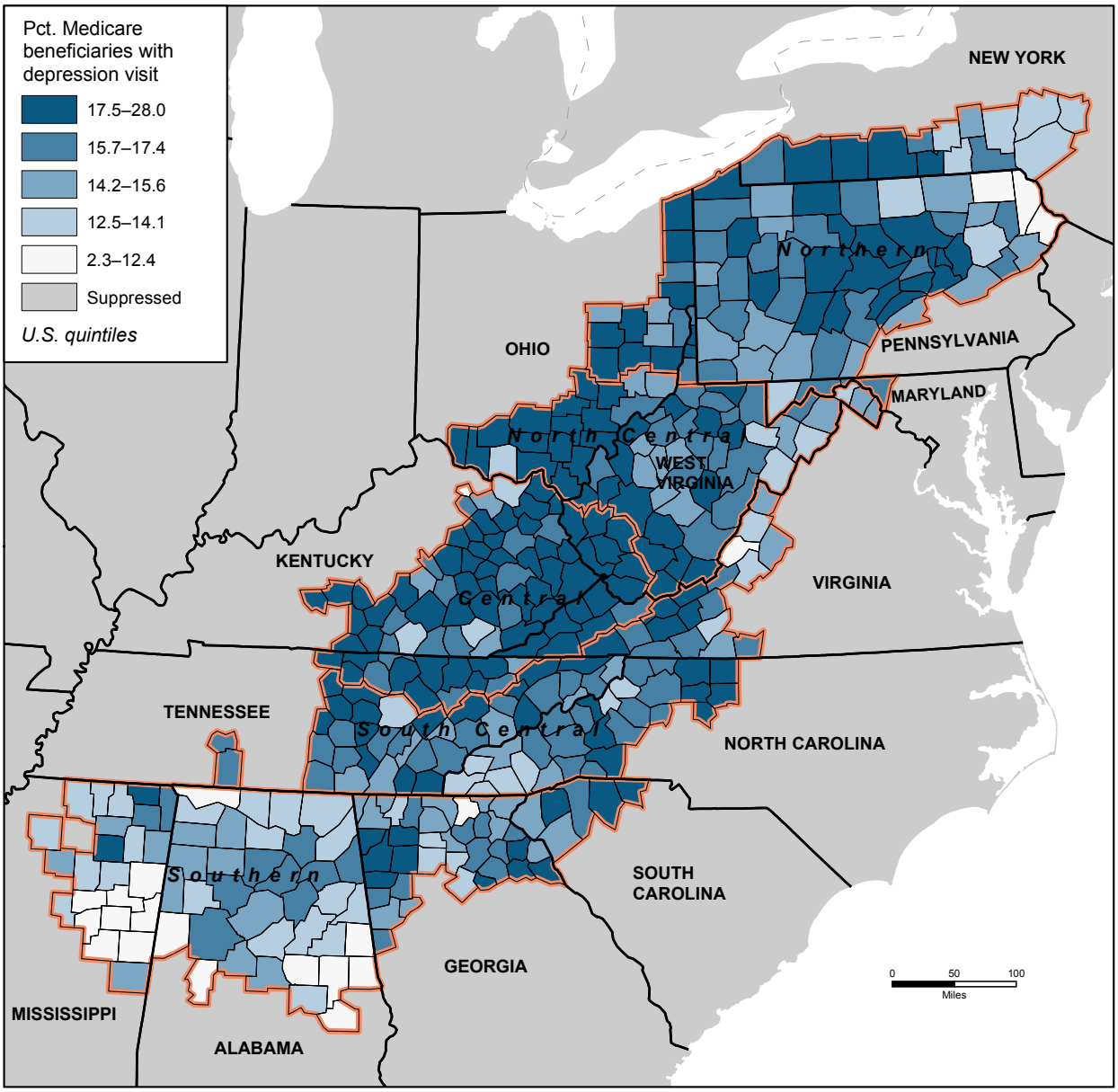
There is a slight difference in the prevalence of depression in Medicare beneficiaries between the Appalachian Region's rural counties (16.9 percent) and its large metro counties (15.6 percent). Likewise, there is little difference in depression prevalence in distressed and non-distressed counties in the Region: depression occurs in 17.6 percent of Medicare beneficiaries in economically distressed counties, compared to 16.6 percent of beneficiaries in non-distressed counties.

With the exceptions of Virginia and South Carolina, there is little intrastate disparity between the Appalachian and non-Appalachian portions of each state. Among the Appalachian portions of states, depression prevalence is highest in Appalachian Ohio, at 18.7 percent of Medicare beneficiaries. West Virginia and the Appalachian portions of Kentucky, Tennessee, and Virginia all report a depression prevalence of approximately 18 percent of their Medicare fee-for-service beneficiaries.

Figure 57 shows the percentage of Medicare fee-for-service beneficiaries in Appalachian counties with depression, grouped by national quintiles. Darker colors indicate higher percentages of depression, and therefore, worse health. Central Appalachia and North Central Appalachia have the highest percentages in the Region, and many of the counties in Central Appalachia are in the worst-performing national quintile. Southern Appalachia has the lowest prevalence of depression among Medicare fee-for-service beneficiaries.

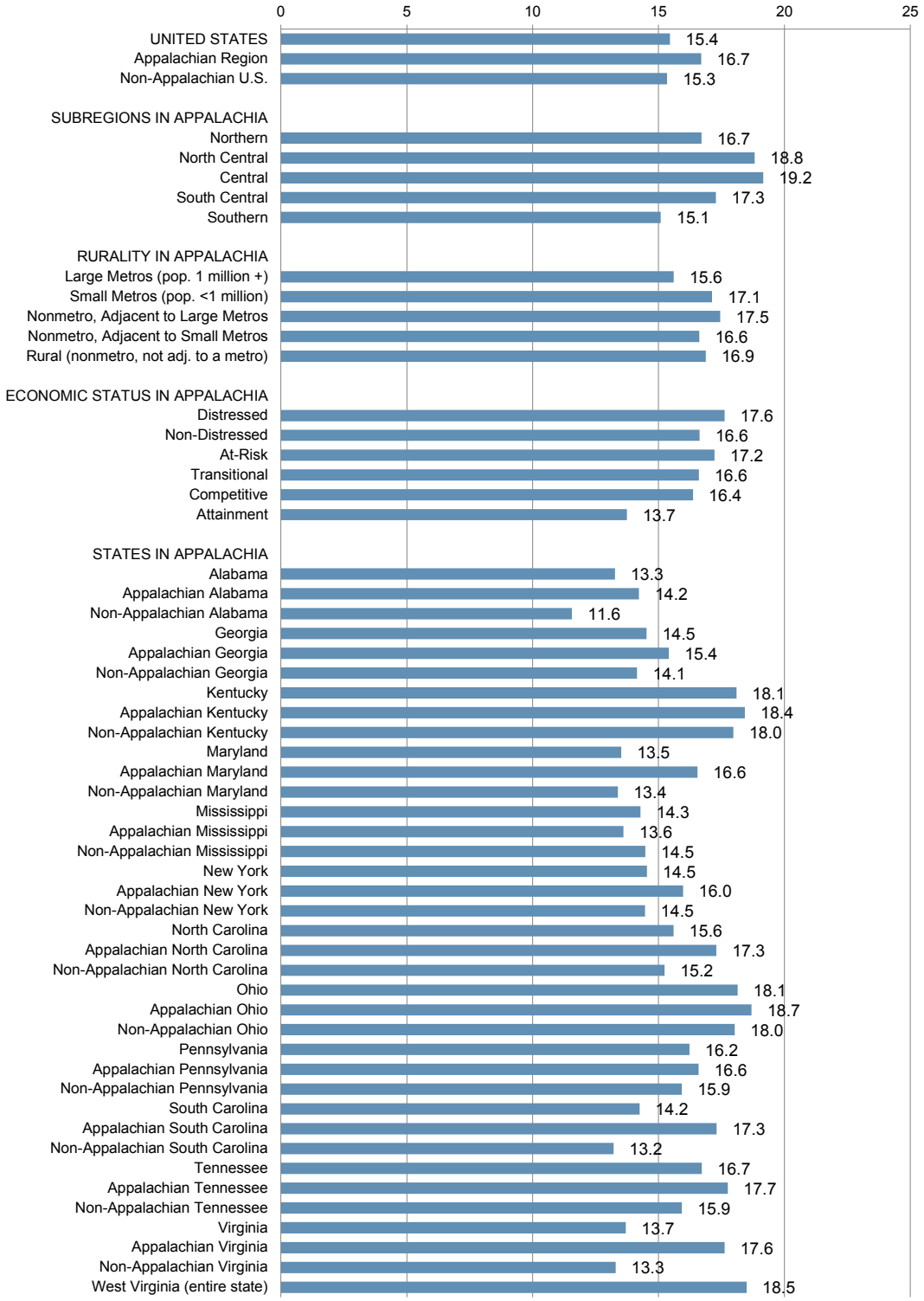
Figure 58 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

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.ccwdata.org/web/guest/interactive-data/ams-dashboard.

Figure 58: Chart of Percentage of Medicare Beneficiaries that had a Depression-Related Office Visit, 2012

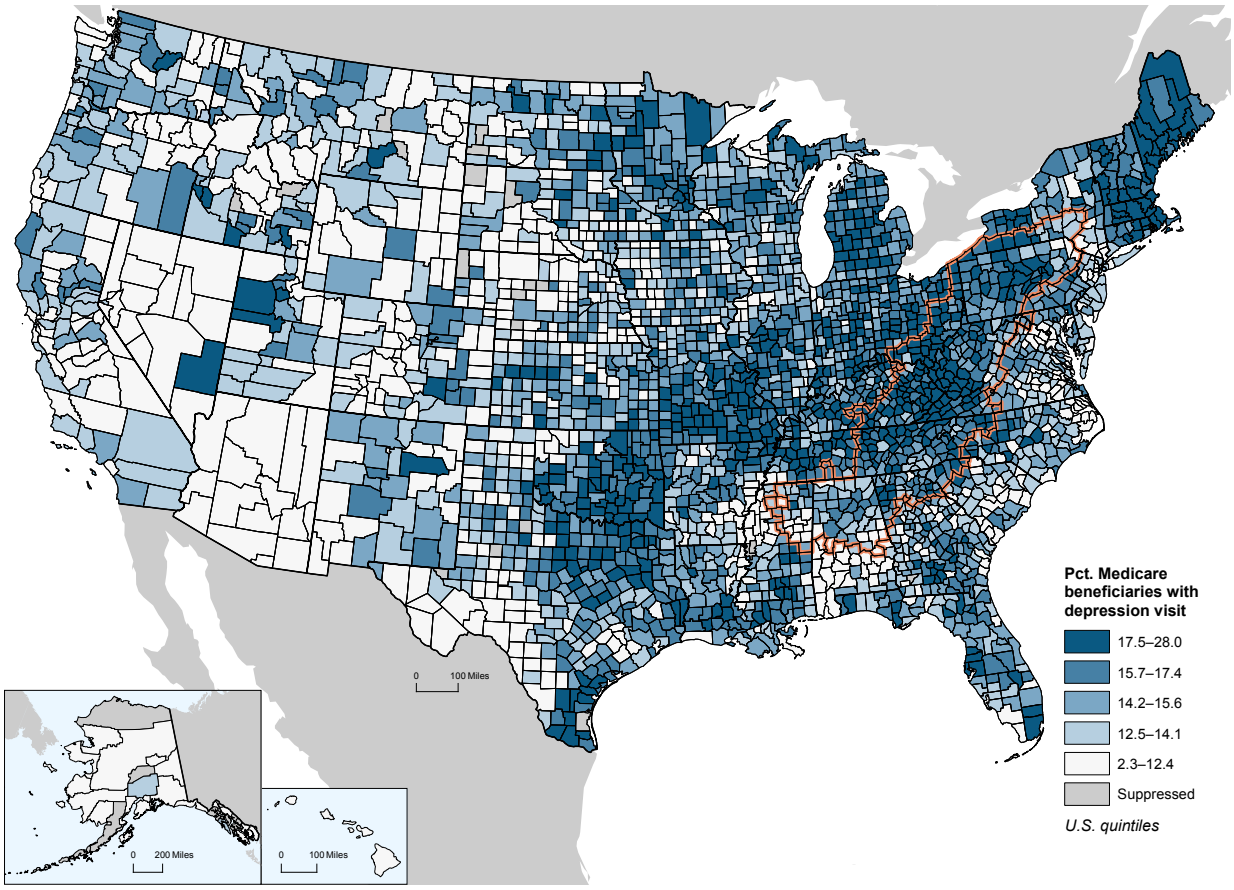


Data source: CMS Chronic Conditions Warehouse. Centers for Medicare & Medicaid Services. https://www.ccwdata.org/web/guest/interactive-data/ams-dashboard.

Overview: Depression Prevalence in the United States

Figure 59 shows the variation in depression prevalence across the United States. Prevalence is highest in New England, Appalachia, and throughout much of the Midwest. Northern Texas and Oklahoma also have high levels, as do many counties in the Upper Midwest. Counties throughout the western half of the country are more likely to have low levels of depression prevalence. Each county in Arizona ranks in the best-performing national quintile.

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

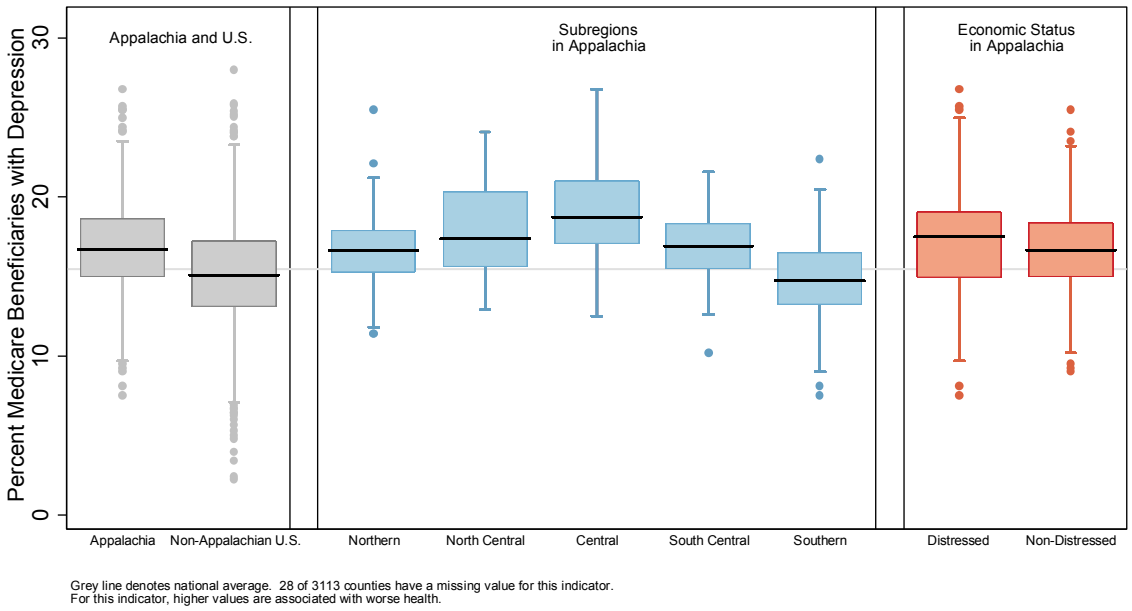


Data source: CMS Chronic Conditions Warehouse. Centers for Medicare & Medicaid Services.
https://www.ccwdata.org/web/guest/interactive-data/ams-dashboard.

Distribution of Depression Prevalence

Figure 60 shows the distribution of depression prevalence in Medicare beneficiaries by geography and economic status. The shaded boxes show the middle 50 percent of all values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, 28 have a missing value for this indicator.

Figure 60: Box Plot of Percentage of Medicare Beneficiaries that had a Depression-Related Office Visit by Geography and Economic Status, 2012



Grey line denotes national average. 28 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with worse health.

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

The distribution of the percentage of Medicare beneficiaries that had a depression-related office visit among national quintiles for Appalachian counties is shown in Table 26. Of the 420 counties in the Region, 161 (38 percent) rank in the worst-performing national quintile, while 22 (5 percent) rank in the best-performing national quintile.

Table 26: Distribution of Medicare Beneficiaries that had a Depression-Related Office Visit 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%*

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

KEY FINDINGS | Suicide Rates

- The suicide rate in the Appalachian Region is 17 percent higher than the national rate.
- All five Appalachian subregions report suicide rates higher than the nation as a whole, with Central Appalachia reporting an incidence 31 percent higher than the national rate.
- Residents in the Appalachian Region's rural counties are 21 percent more likely to commit suicide than those living in the Region's large metro areas.
- Residents living in the Appalachian Region's distressed counties are 14 percent more likely to commit suicide than those living in the Region's non-distressed counties.

Background

The suicide rate is the number of suicides per 100,000 population, per year. The data for this measure come from the Compressed Mortality file provided by the National Center for Health Statistics. The data have been age-adjusted and cover the 2008–2014 period. Suicides were the tenth-leading cause of death in the United States in 2014 (National Center for Health Statistics, 2017).

There are a number of factors that contribute to suicide, such as: family history of suicide, previous suicide attempts, history of mental health disorders such as depression, history of alcohol and substance abuse, feelings of hopelessness, local epidemics of suicide, isolation, lack of access to mental health providers, and physical illness (Centers for Disease Control and Prevention,Violence Prevention, Suicide: Risk and Protective Factors, 2016). Individuals who are opioid-dependent are at increased risk of suicide, suggesting that as the opioid dependence epidemic is addressed, it will be important to monitor suicide risk among this population (Dragisic, Dickov, Dickov, & Mijatovic, 2015).

There are a number of measures that may help individuals experiencing suicidal thoughts and behavior, including: effective clinical care for mental, physical, and substance abuse disorders; access to a variety of clinical interventions and support; family and community support; support from ongoing medical and mental health care relationships; and skills in problem solving, conflict resolution, and nonviolent ways of handling disputes (Centers for Disease Control and Prevention,Violence Prevention, Suicide: Risk and Protective Factors, 2016).

Firearms accounted for more than 50 percent of male suicides, and recent work identified the suicide rate as a major component of the "deaths of despair," a leading driver of the increased death rate among middle-aged white males (Centers for Disease Control and Prevention, Suicide, 2017); (Case & Deaton, 2015). Suicide rates in the United States have increased since 1999 (Curtin, Warner, & Hedegaard, 2016). Rural areas have higher rates of suicide among youth, and the gap between rural and urban areas is growing (Fontanella, et al., 2015).

Overview: Suicide Rates in the Appalachian Region

The suicide rate in the Appalachian Region is 14.5 per 100,000 population, which is 17 percent higher than the national rate of 12.4 per 100,000. All five Appalachian subregions have higher suicide rates than the national rate. The North Central (15.5 per 100,000), Central (16.3), and South Central (16.0) subregions have the highest suicide rates in the Region.

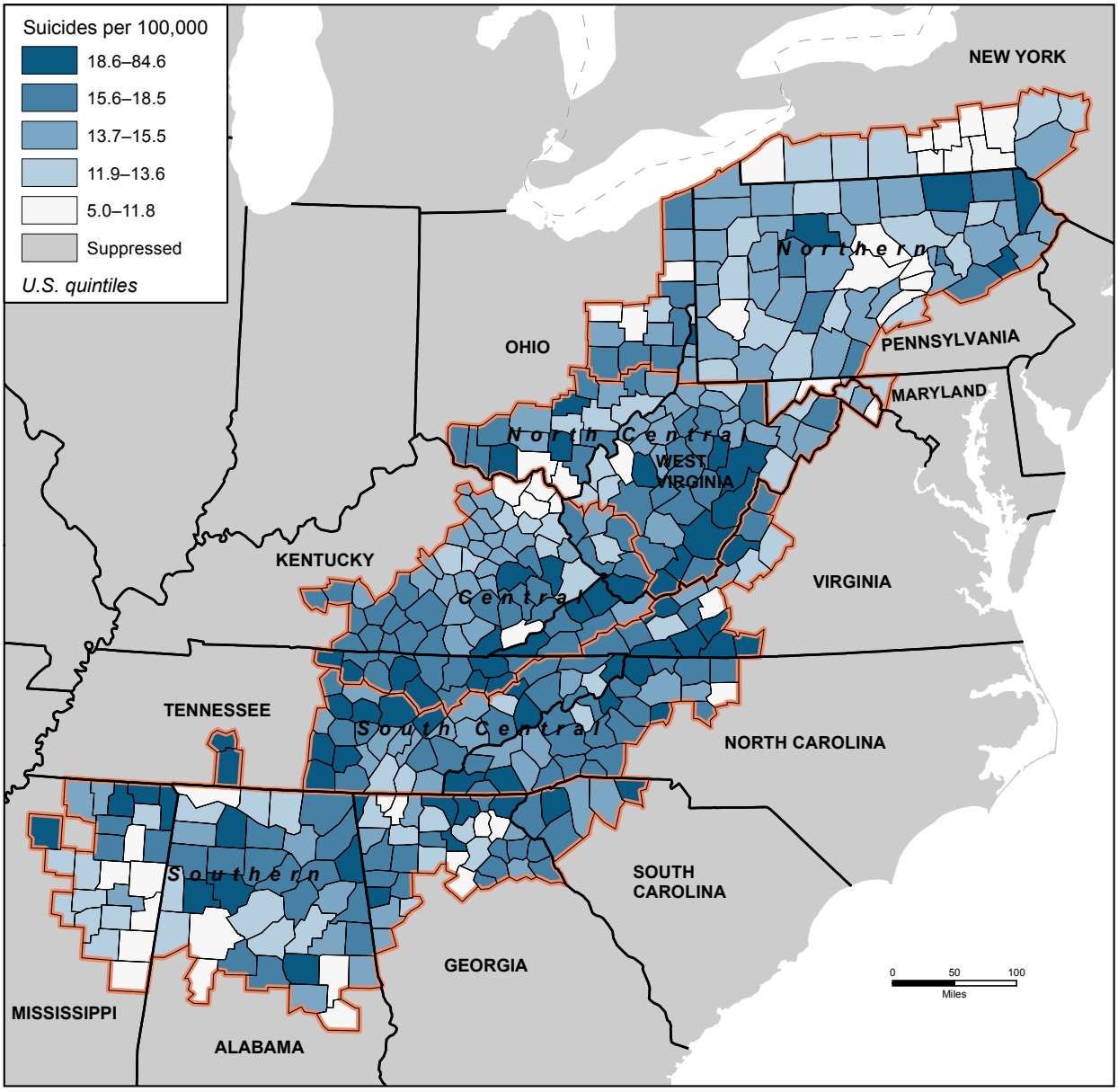
The suicide rate in the Appalachian Region's rural counties is 15.9 per 100,000 population, which is 21 percent higher than the rate of 13.1 per 100,000 population in the Region's large metro counties. Economically distressed counties throughout Appalachia have a suicide rate of 16.4 per 100,000 population, which is 14 percent higher than the non-distressed county rate of 14.4 per 100,000, and 32 percent higher than the national rate.

The states with the greatest disparities between their Appalachian and non-Appalachian portions are Maryland, New York, North Carolina, Ohio, and Virginia. In each of these states, the Appalachian portions report suicide rates more than 25 percent higher than the non-Appalachian portions. The suicide rate in Appalachian New York (11.7 per 100,000), for example, is 54 percent higher than that found in the non-Appalachian portion of the state (7.6). With the exception of Kentucky, all states have higher suicide rates in the Appalachian portions than in the non-Appalachian portions.

Figure 61 shows suicide rates for Appalachian counties, grouped by national quintiles. Darker colors indicate higher suicide rates. Although there are many areas of the Region with suicide rates in the worst-performing national quintile, a number of areas—including parts of Appalachian Kentucky, Appalachian Mississippi, and Appalachian North Carolina—have counties in the best-performing quintile.

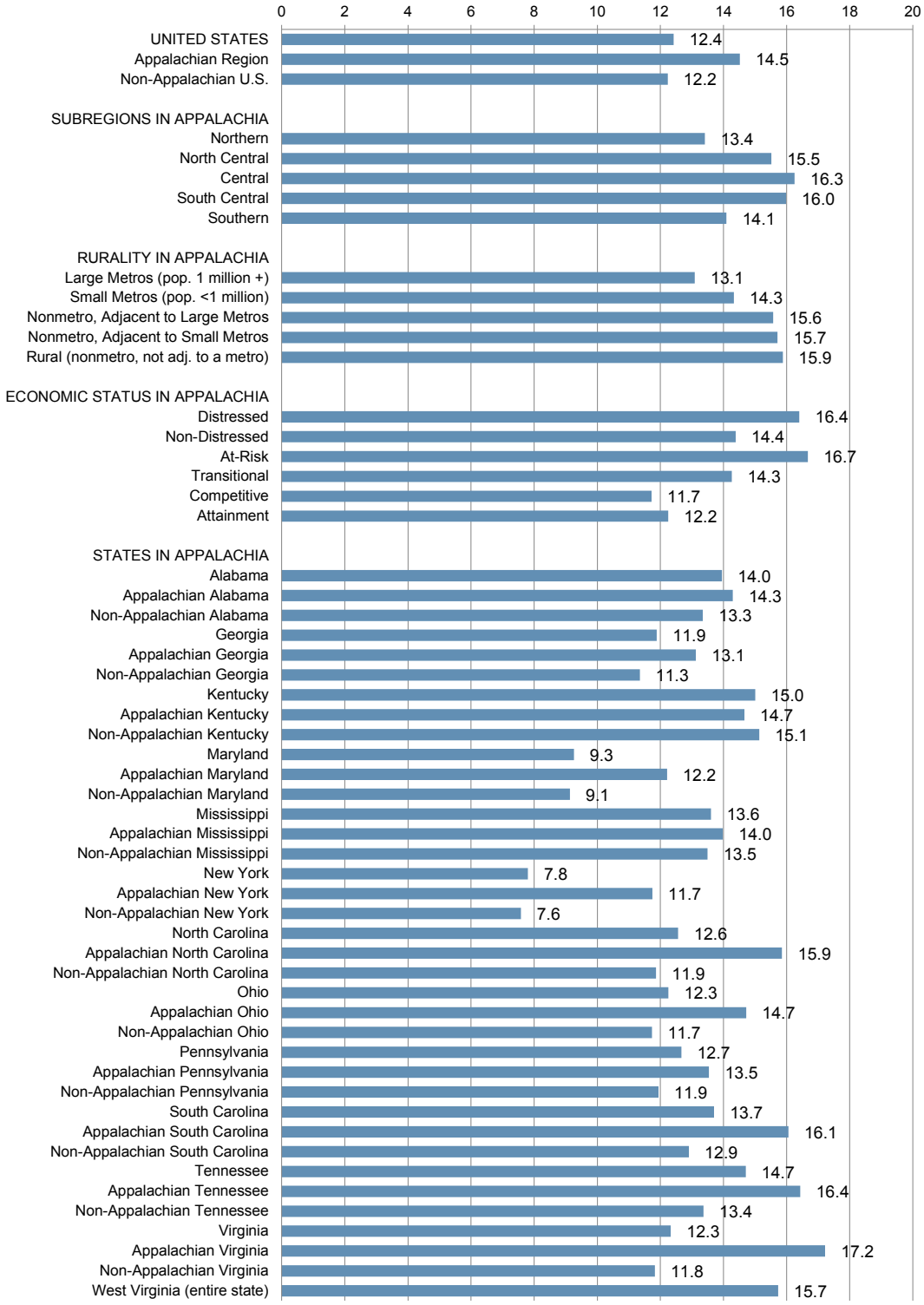
Figure 62 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

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 62: Chart of Suicide Rates per 100,000 Population, 2008–2014

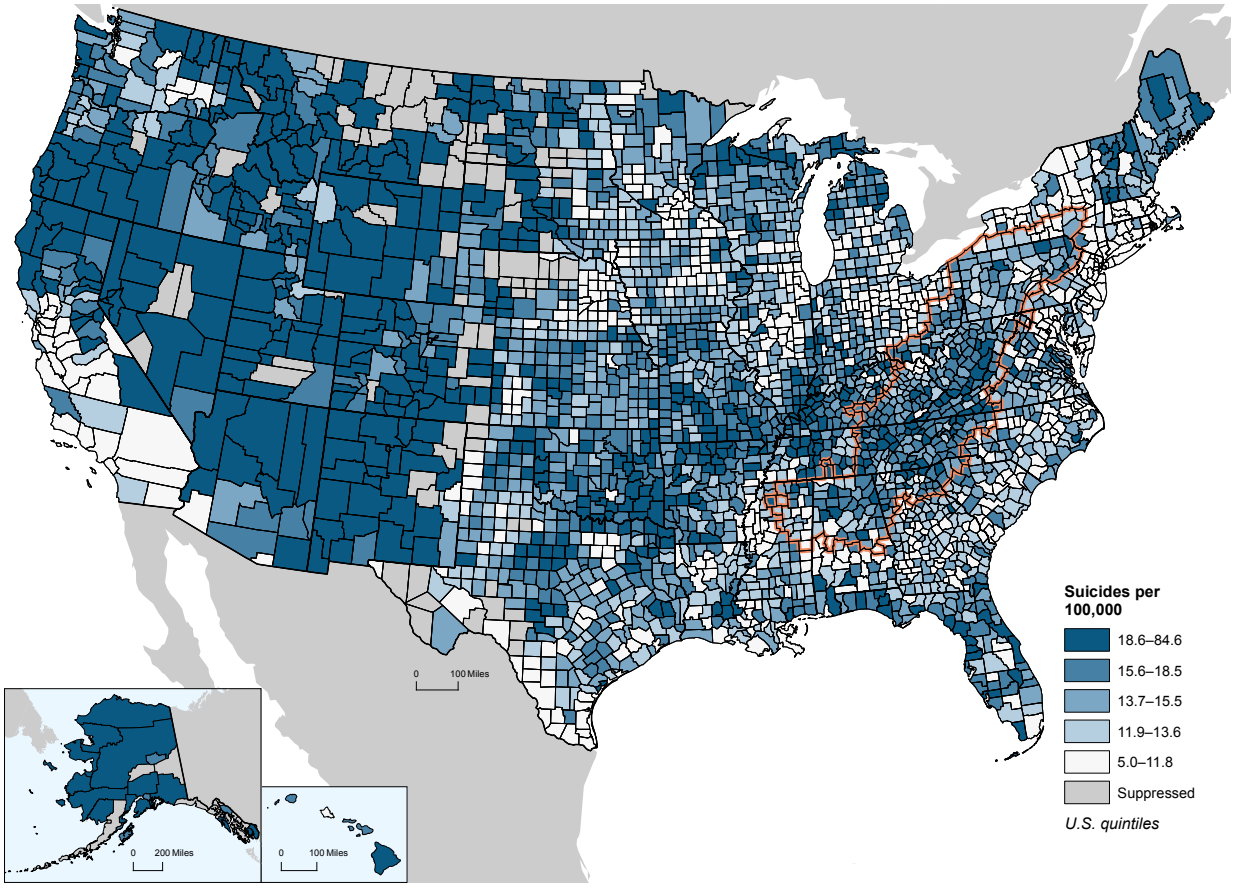


Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD□ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland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

Overview: Suicide Rates in the United States

Figure 63 shows the variation in suicide rates across the United States. The Appalachian Region stands out relative to other regions in the eastern half of the country due to its high rates, although high suicide incidence stretches west into parts of the Midwest. The central part of the country, including Kansas, Oklahoma, and Missouri, report high suicide rates, as do several counties in the northern reaches of the Upper Midwest. Outside of southern California, many counties throughout the western United States report suicide rates ranking in the worst-performing national quintile. Although poor-performing counties are found in nearly every state, parts of the Northeast, Southeast, and Midwest have groups of counties with low suicide rates. A few pockets in the Mississippi Delta region perform strongly on this measure, as well.

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

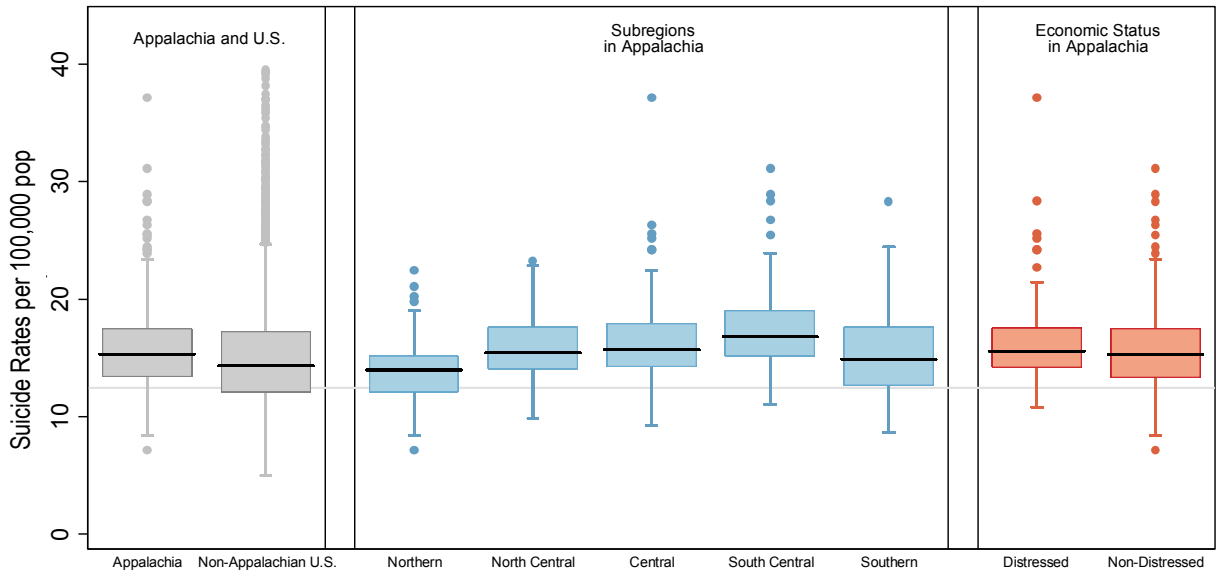


Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD□ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland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

Distribution of Suicide Rates

Figure 64 shows the distribution of suicide rates by geography and economic status. The shaded boxes show the middle 50 percent of all values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, 104 have a missing value for this indicator and 16 counties with values greater than 40 are not represented in the box plot.

Figure 64: Box Plot of Suicide Rates per 100,000 Population by Geography, and Economic Status, 2008–2014



Grey line denotes national average. 104 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with worse health.
16 counties with values greater than 40 not shown.

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.

The distribution of the percentage of suicide rates among national quintiles for Appalachian counties is shown in Table 27. Of the 420 counties in the Region, 70 (17 percent) rank in the worst-performing national quintile, while 46 (11 percent) rank in the best-performing national quintile.

Table 27: Distribution of Suicide Rates per 100,000 Population among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
Suicide incidence	46	*11%*	69	*16%*	108	*26%*	127	*30%*	70	*17%*

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

KEY FINDINGS | Excessive Drinking

- A lower percentage of adults in the Appalachian Region report excessive drinking (15.2 percent) than in the nation as a whole (17.7 percent).
- Four of the five Appalachian subregions have lower percentages of adults reporting excessive drinking than the nation as a whole. The lone subregion above the national mark is Northern Appalachia, and the difference is minor (17.8 percent in the subregion compared to 17.7 percent in the nation as a whole).
- Adults living in the Appalachian Region's rural counties report less excessive drinking (13.3 percent) than those living in the Region's large metro areas (17.3 percent).
- Adults living in the Appalachian Region's distressed counties report less excessive drinking (12.3 percent) than those living in the Region's non-distressed counties (15.4 percent).

Background

Excessive drinking is defined as the percentage of the population who report at least one binge drinking episode involving five or more drinks for men and four or more for women over the past 30 days, or heavy drinking involving more than two drinks per day for men and more than one per day for women, over the same time period. The data come from County Health Rankings and are based on 2014 data CDC collects through its Behavioral Risk Factor Surveillance System (BRFSS).

Alcohol use is a behavioral health issue that is also a risk factor for a number of negative health outcomes, including: physical injuries related to motor vehicle accidents, stroke, chronic diseases such as heart disease and cancer, and mental health conditions such as depression and suicide. There are a number of evidence-based interventions that may reduce excessive/binge drinking; examples include raising taxes on alcoholic beverages, restricting access to alcohol by limiting days and hours of retail sales, and screening and counseling for alcohol abuse (Centers for Disease Control and Prevention, Alcohol Use, 2016).

Residents of the Appalachian Region, and particularly those in Southern Appalachia, have historically reported lower rates of alcohol use than the nation as a whole (Centers for Disease Control and Prevention, Alcohol and Public Health, 2016). For example, in 2011, in 7 of the 13 Appalachian states—Alabama, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, West Virginia—the percentage of adults who reported consuming at least one drink in the previous 30 days ranked in the lowest quartile in the country (Kanny, Liu, Brewer, & Lu, 2013). Likewise, a study examining alcoholic beverage sales from 1977 to 2009 concluded that among all 50 states, Georgia, Kentucky, Tennessee, and West Virginia had some of the lowest alcohol consumption rates in the nation (LaVallee & Yi, 2011).

Overview: Excessive Drinking in the Appalachian Region

A lower percentage of adults in Appalachia report excessive drinking (15.2 percent) than the national average (17.7 percent). Four of the five Appalachian subregions have lower percentages of adults reporting excessive drinking than the national average. In Central Appalachia, 11.5 percent of adults report excessive drinking—the lowest in the Region—compared to 17.8 percent in Northern Appalachia.

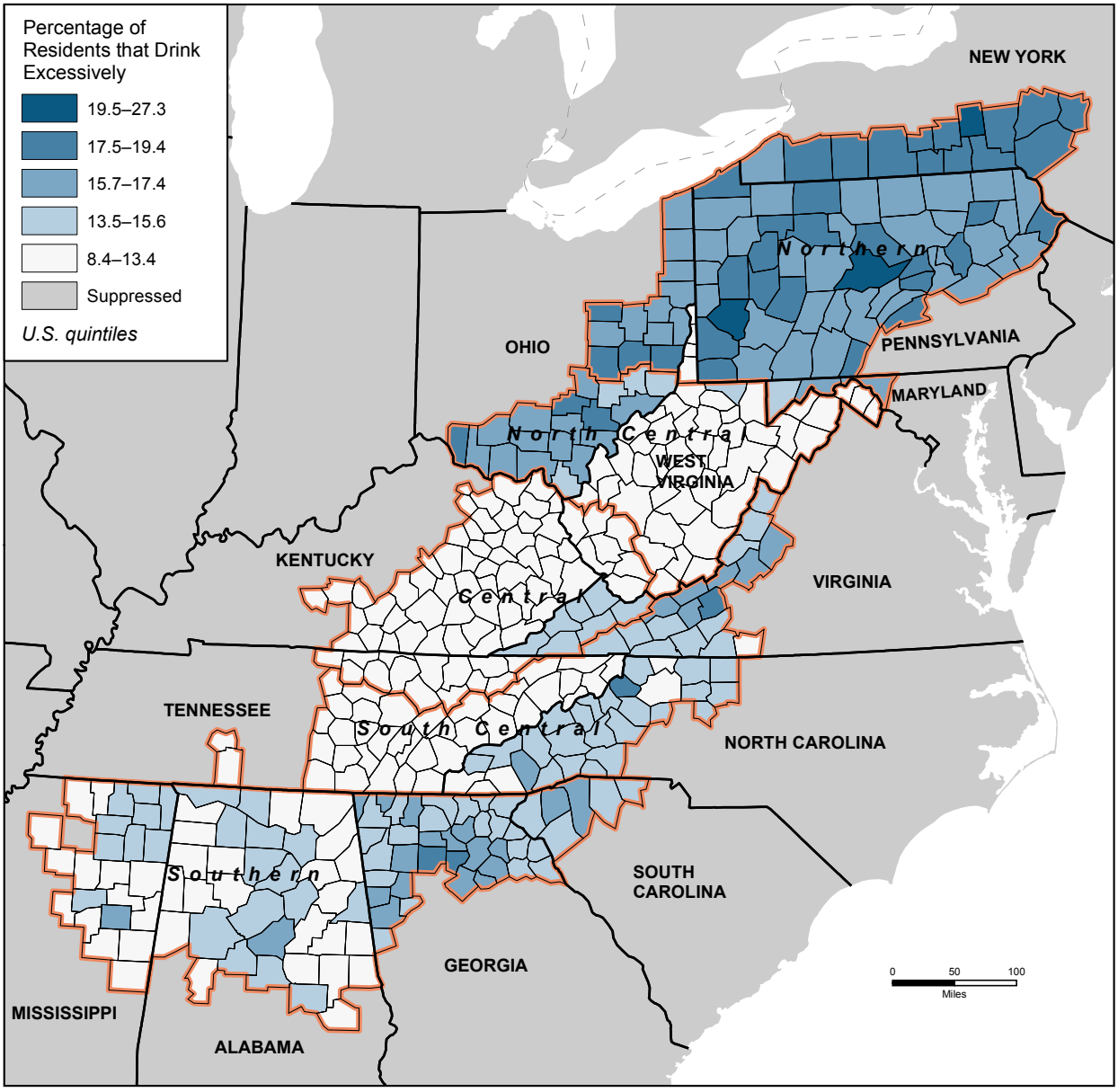
There is an urban-rural disparity in the Region, with 13.3 percent of adults in rural counties reporting excessive drinking, compared to 17.3 percent of adults in large metro counties. There is also a difference in excessive drinking percentages based on a county's economic status. Distressed counties in the Appalachian Region have lower percentages of adults who report drinking excessively (12.3 percent) than the Region's non-distressed counties (15.4 percent).

West Virginia (11.4 percent) and the Appalachian portions of Kentucky (11.1 percent) and Tennessee (11.7 percent) report the lowest percentages of excessive drinking—well below the national average of 17.7 percent. These three states also report the lowest excessive drinking percentages in the Region when considering both Appalachian and non-Appalachian portions of states. The Appalachian portions of New York (18.4 percent) and Pennsylvania (18.2 percent) report the highest percentages of excessive drinking in the Region, both of which are above the national average.

Figure 65 shows the variation in the percentage of adults who report excessive drinking in the Appalachian Region. In this figure, there are sharp state border effects—this can be seen in the difference between West Virginia and Appalachian Pennsylvania and Appalachian Ohio counties—and is largely due to a smoothing estimation technique used by CDC (see the Methodology section in Appendix B for more details on estimation procedures.) Northern Appalachia is the only subregion with a large number of counties ranking in the worst-performing national quintiles.

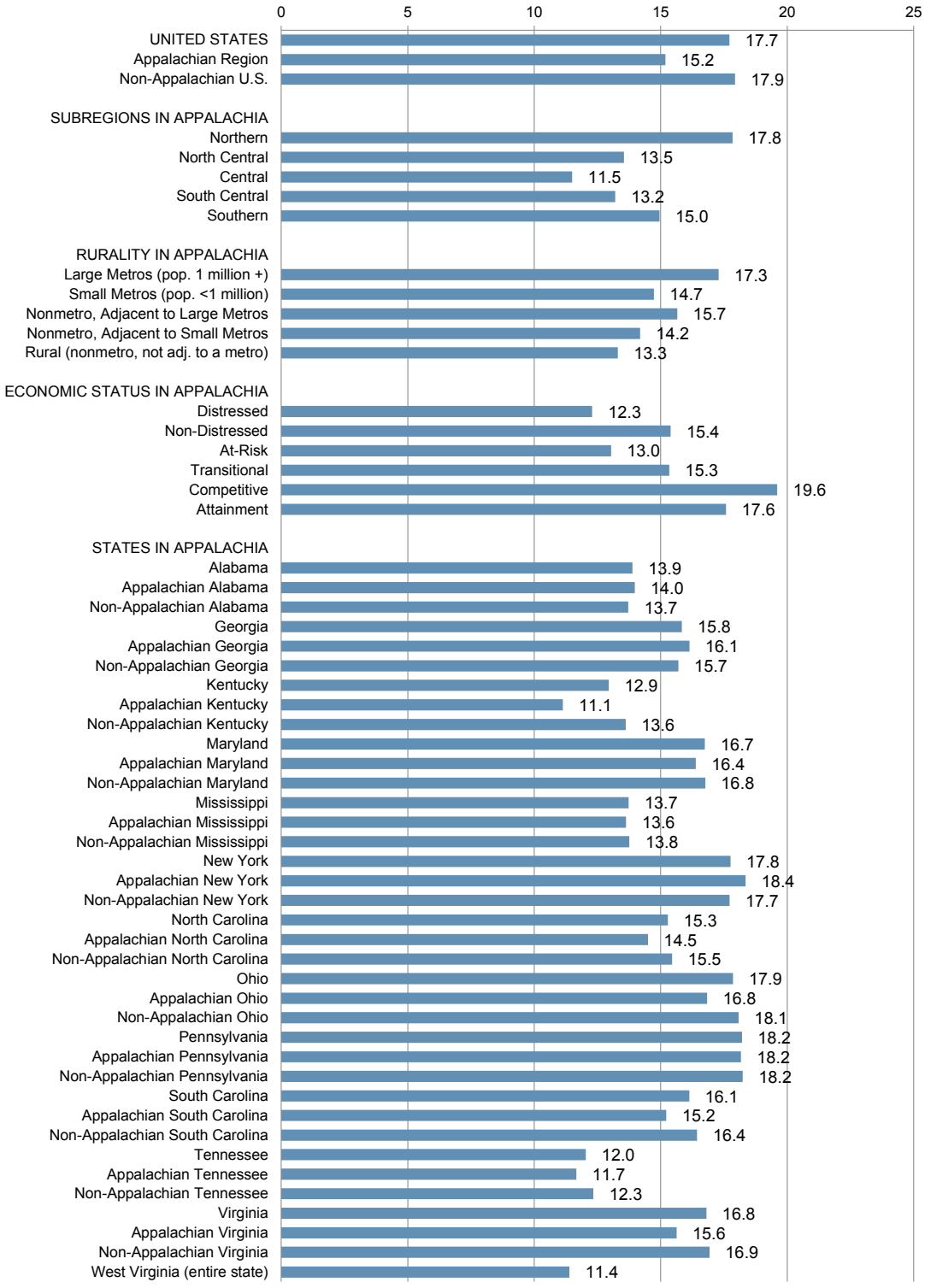
Figure 66 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 65: Map of Percentage of Residents that Report Excessive Drinking in the Appalachian Region, 2014



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

Figure 66: Chart of Percentage of Residents that Report Excessive Drinking, 2014

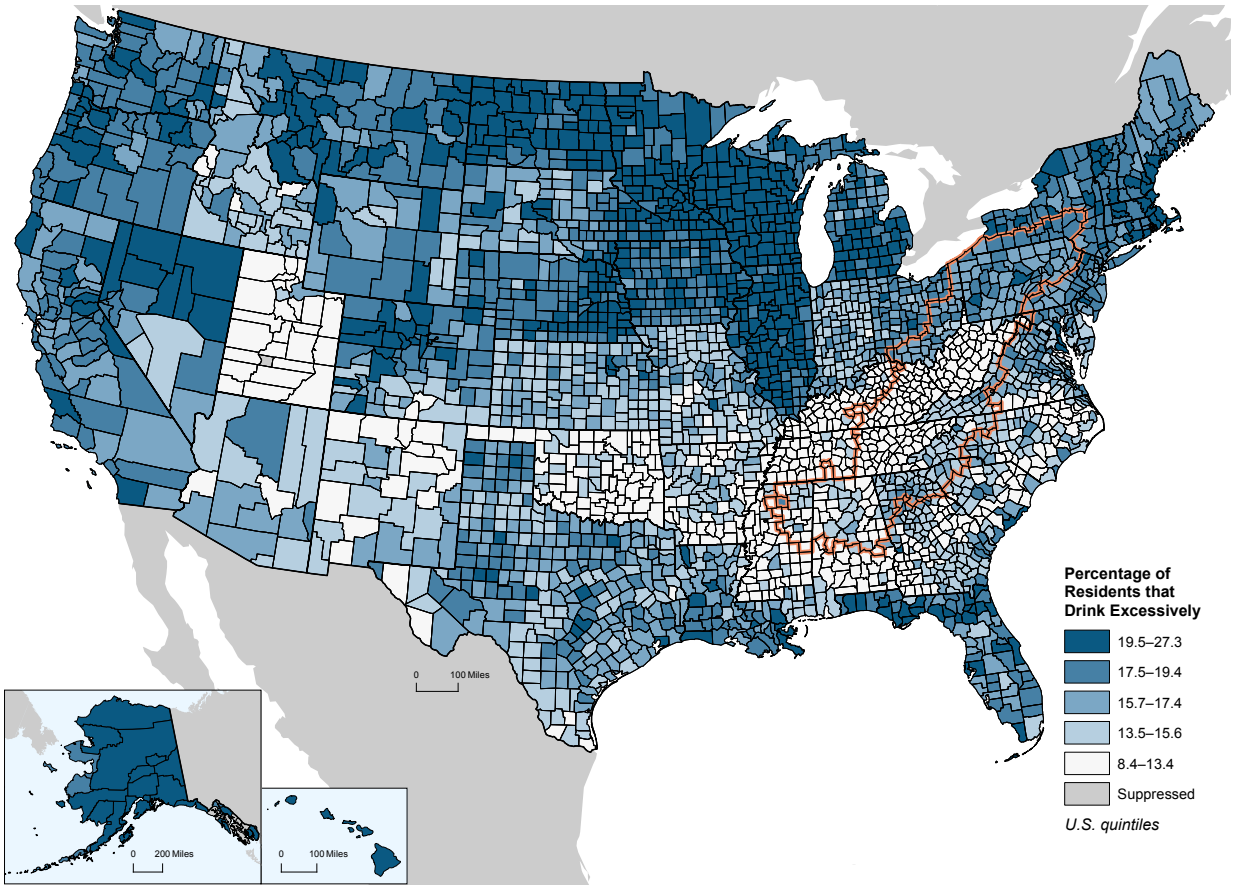


Data source: County Health Rankings & Roadmaps, 2016. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation http://www.countyhealthrankings.org/rankings/data.

Overview: Excessive Drinking in the United States

Figure 67 shows the variation in the percentage of the adult population reporting excessive drinking across the United States. The low percentages in Appalachia stand out compared to the rest of the country, and these low levels stretch into much of the Southeast and Mississippi Delta regions. Both Oklahoma and Utah stand out for the large number of counties in each state that rank in the best-performing national quintile. The Upper Midwest is home to a large number of counties ranking in the worst-performing national quintile. Counties throughout the Pacific Coast and Northeast, as well as Florida, also report higher percentages of excessive drinking.

Figure 67: Map of Percentage of Residents that Report Excessive Drinking in the United States, 2014

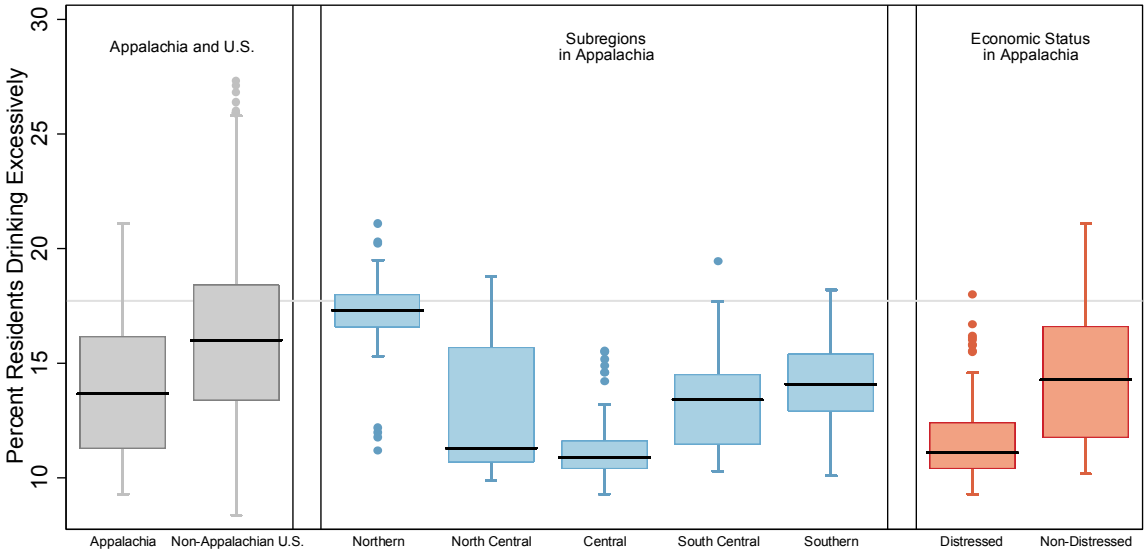


Data source: County Health Rankings & Roadmaps, 2016. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation http://www.countyhealthrankings.org/rankings/data.

Distribution of Excessive Drinking

Figure 68 shows the distribution of excessive drinking percentages by geography and economic status. The shaded boxes show the middle 50 percent of all values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, five have a missing value for this indicator.

Figure 68: Box Plot of Percentage of Residents that Report Excessive Drinking by Geography and Economic Status, 2014



Grey line denotes national average. 5 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with worse health.

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

The distribution of the percentage of residents that report excessive drinking among national quintiles for Appalachian counties is shown in Table 28. Of the 420 counties in the Region, just 3 (1 percent) rank in the worst-performing national quintile, while 202 (48 percent) rank in the best-performing national quintile.

Table 28: Distribution of Percentage of Residents that Report Excessive Drinking among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
Excessive drinking	202	*48%*	92	*22%*	82	*20%*	41	*10%*	3	*1%*

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

KEY FINDINGS | Poisoning Mortality Rates

- The poisoning mortality rate in the Appalachian Region is 37 percent higher than the national rate.
- All five Appalachian subregions have higher poisoning mortality rates than the national rate. The poisoning mortality rate in Central Appalachia is 146 percent higher than the nation as a whole.
- The poisoning mortality rate for the Appalachian Region's rural counties is 40 percent higher than the rate for the Region's large metro counties—and 76 percent higher than the national rate.
- The poisoning mortality rate for the Region's distressed counties is 63 percent higher than the rate for the Region's non-distressed counties—and more than double the national rate.

Background

Poisoning mortality is the number of deaths with poisoning as the primary cause per 100,000 population, per year. The data for this measure come from the Compressed Mortality File provided by the National Center for Health Statistics. The data have been age-adjusted and cover the 2008–2014 period. Death from poisoning includes deaths associated with medication abuse, both pharmaceutical and illicit. Although it is natural to think of a child ingesting a household cleaner as poisoning, these incidents are rare relative to unintentional deaths due to overdose of medications or other drugs.

Death from poisoning or overdose is more likely to impact males, the non-Hispanic white population, and the U.S. population ages 45–54 (Centers for Disease Control and Prevention, NCHS Data on Drug-poisoning Deaths, 2016). Among poisoning deaths nationally, 85 percent were due to deaths from narcotics, hallucinogens, unspecified drugs, medications, or some other type of biological substance, and less than one percent were from exposure to other unspecified chemicals (Fingerhut, 2010). Because self-poisoning is a common method of suicide and depression is frequently a factor in suicide, this measure is included as part of the Behavioral Health domain (Hawton, 2010).

In the Appalachian Region, 64 percent of deaths due to poisoning were from accidental poisoning by narcotics and psychodysleptics[3] or by "other and unspecified drugs, medicaments, or biological substances."[4] The struggle of many Appalachian communities in addressing drug dependence and other related issues—especially in southern West Virginia and eastern Kentucky—has been well-documented by the national media (Park & Bloch, 2016).

[3] (ICD-10 code X42)
[4] (ICD-10 code X44)

Overview: Poisoning Mortality in the Appalachian Region

The poisoning mortality rate in the Appalachian Region is 20.4 per 100,000 population, which is 37 percent higher than the national rate of 14.9 per 100,000 population. All five of the Appalachian subregions have rates above the national rate. With a poisoning mortality rate of 15.5 per 100,000 population, Southern Appalachia is the only subregion that approaches the national rate. The Central Appalachian poisoning mortality rate of 36.6 per 100,000 population is 146 percent higher than the national rate, and the rate in North Central Appalachia of 26.7 per 100,000 population is 79 percent higher than the nation as a whole.

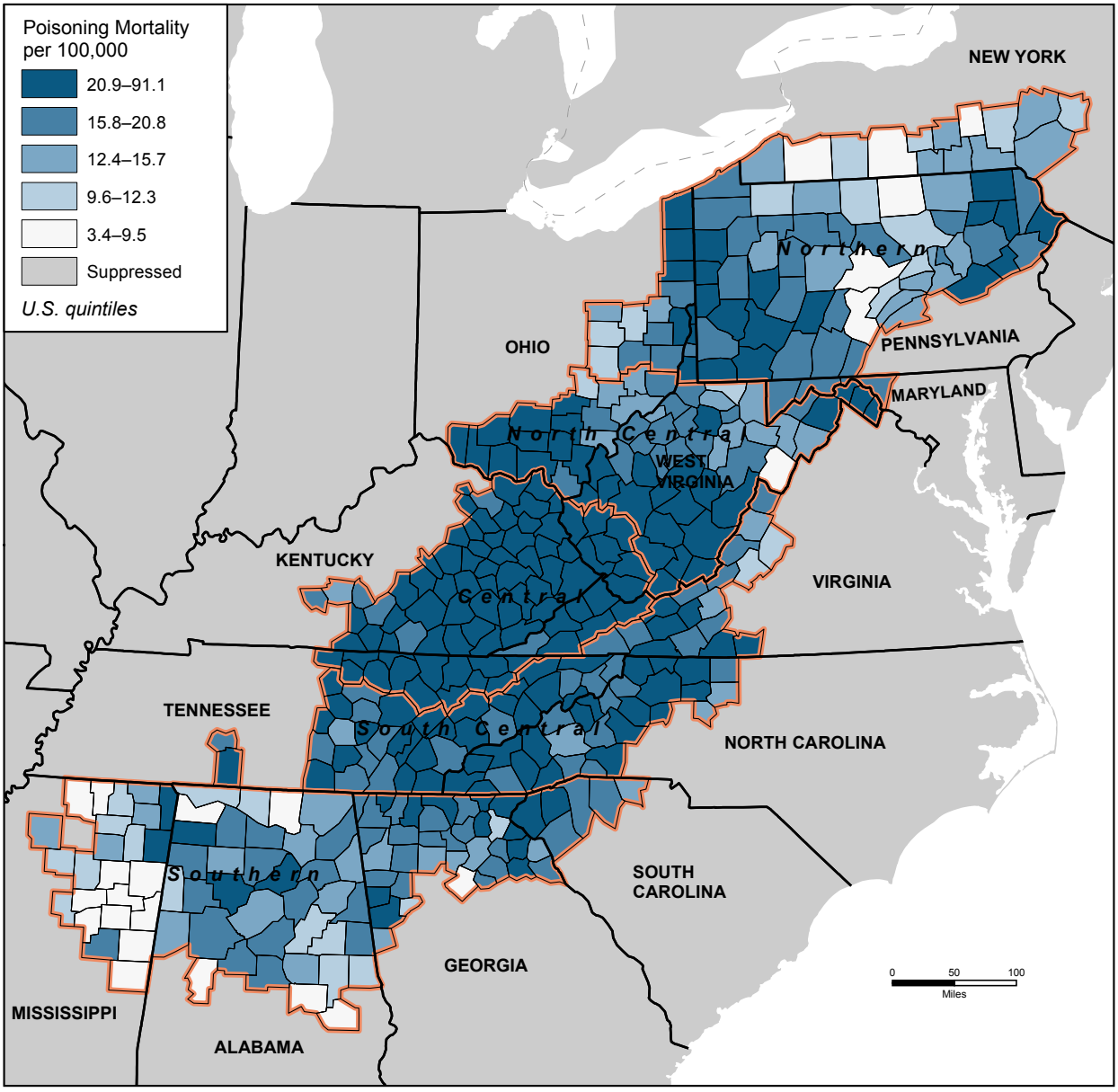
There is a stark difference in poisoning mortality between rural and metro areas in Appalachia. The poisoning mortality rate for rural counties in the Appalachian Region is 26.2 per 100,000 population—40 percent higher than the Region's large metro rate of 18.7 per 100,000—and 76 percent higher than the national rate. Likewise, distressed counties have a higher poisoning mortality rate than non-distressed counties. The poisoning mortality rate for distressed counties in the Appalachian Region is 31.9 per 100,000 population, which is 63 percent higher than the rate for the Region's non-distressed counties of 19.6 per 100,000—and more than double the national rate.

Appalachian Kentucky has a poisoning mortality rate of 35.9 per 100,000 population, the highest among the Appalachian portions of states in the Region and more than double the national rate. Likewise, the rate in West Virginia is also more than double the national rate at 31.3 per 100,000 population. The Appalachian portions of three states report rates lower than the national rate: Appalachian Georgia, Appalachian Mississippi, and Appalachian New York. There are a few states with significant disparities between their Appalachian portions and non-Appalachian portions: Appalachian Kentucky's poisoning mortality rate is 68 percent higher than the rate in the non-Appalachian portion of the state, and, likewise, Appalachian North Carolina's rate is 53 percent higher than the non-Appalachian portion. Other states show smaller differences between the Appalachian and non-Appalachian portions.

Figure 69 shows poisoning mortality rates for Appalachian counties, grouped by national quintiles. Darker colors indicate higher rates of poisoning mortality; for this measure, higher rates are associated with worse health. North Central, Central, and South Central Appalachia all show high concentrations of counties with poisoning mortality rates ranking in the worst-performing national quintile.

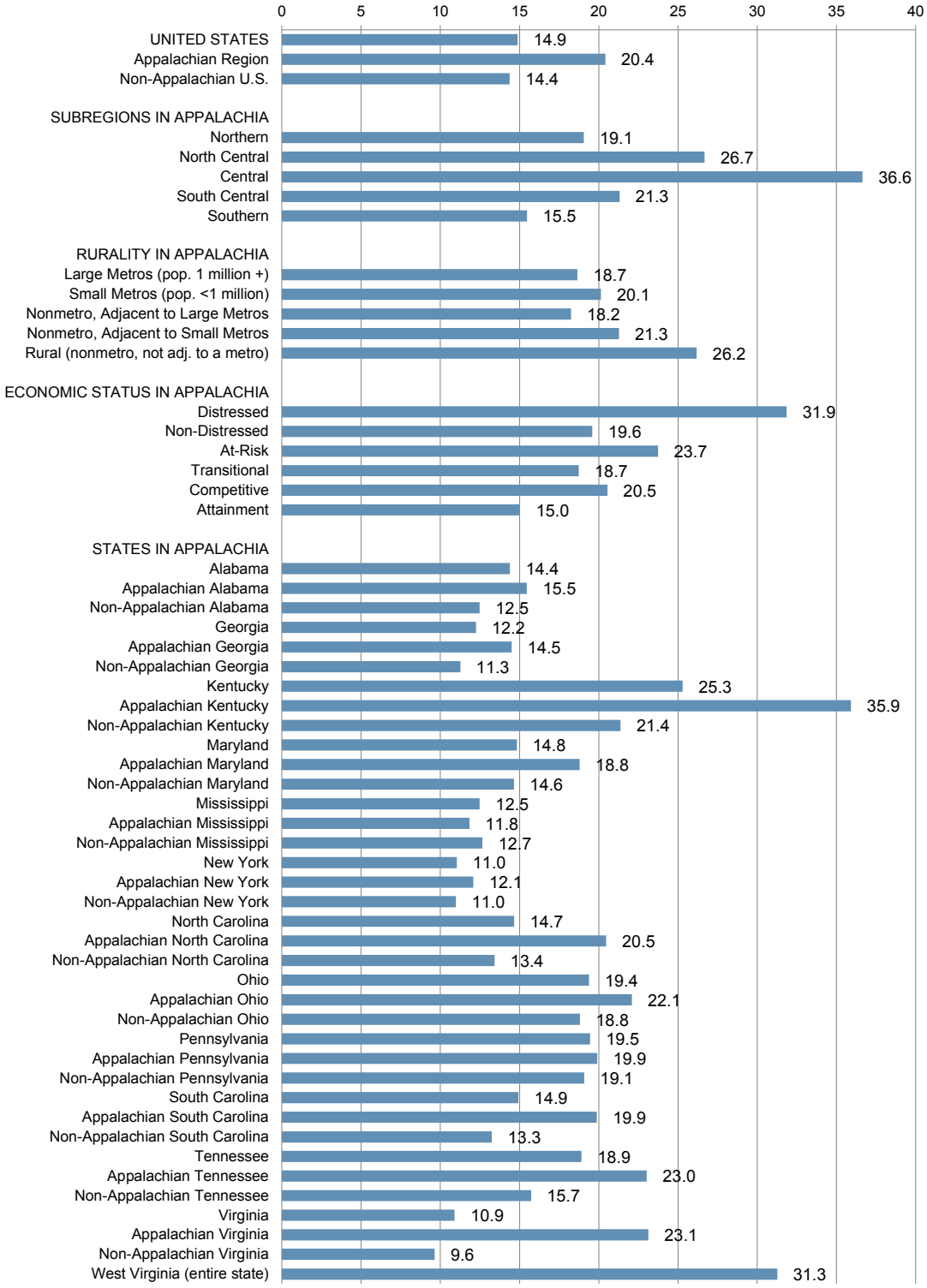
Figure 70 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

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 70: Chart of Poisoning Mortality Rates per 100,000 Population, 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.

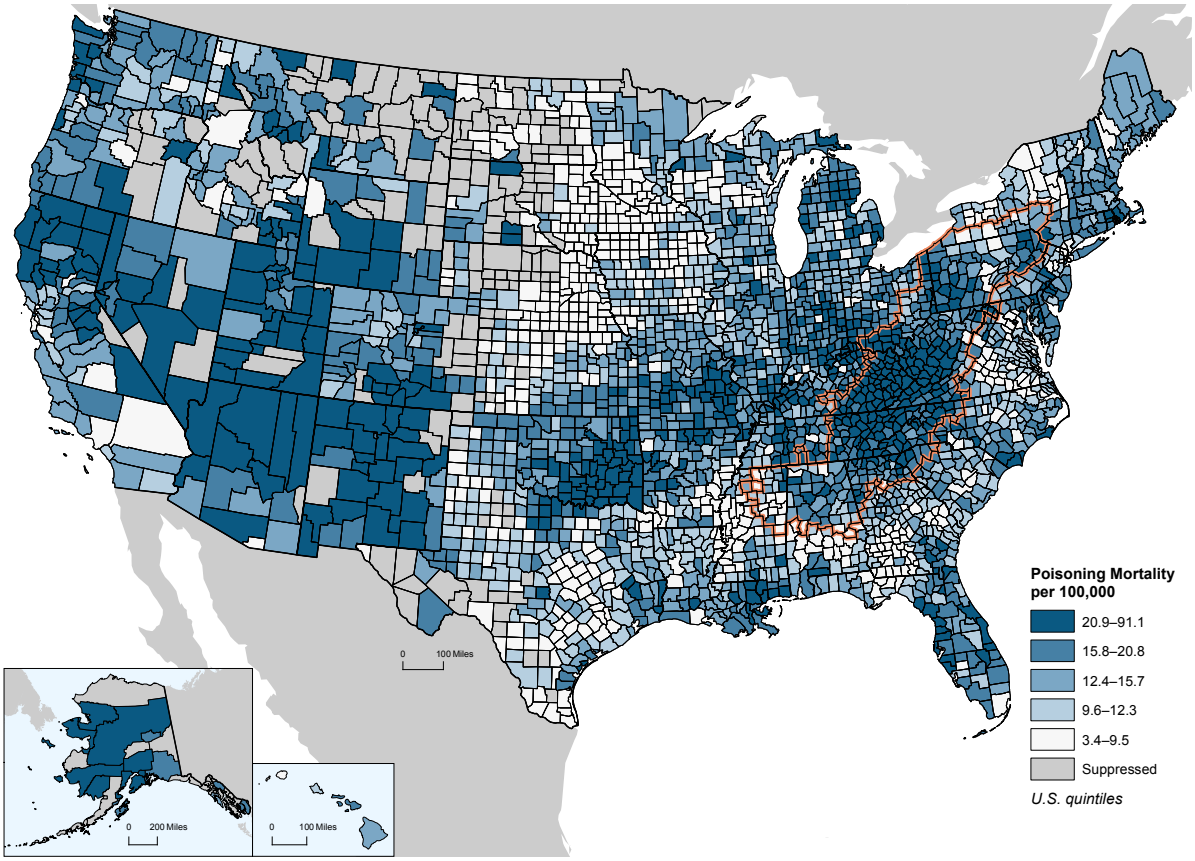
Overview: Poisoning Mortality in the United States

Figure 71 shows the variation in poisoning mortality across the United States. There is a concentration of higher poisoning mortality in the Appalachian Region, as well as in several Western states. There are also pockets of higher rates in upper New England, the Gulf Coast, and a strip extending from Oklahoma through Arkansas to Missouri. Higher rates also appear in the Florida peninsula, upper Michigan, and the New Jersey/Delaware area.

There is a band along the East Coast—running from the Tidewater area of Virginia down through Georgia, then through Alabama, Mississippi, and Louisiana—that generally has rates lower than the national average. The Upper Midwest has many counties ranking in the best-performing national quintile, and these low rates extend down through the Central Plains and into parts of Texas.

All states west of the Central Plains area have noticeably high poisoning mortality rates, with almost every county in New Mexico ranking in the worst-performing quintile. Alaska also reports much higher rates compared to the rest of the nation. The rates for a number of counties in the Upper Midwest is suppressed due to insufficient sample size.

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

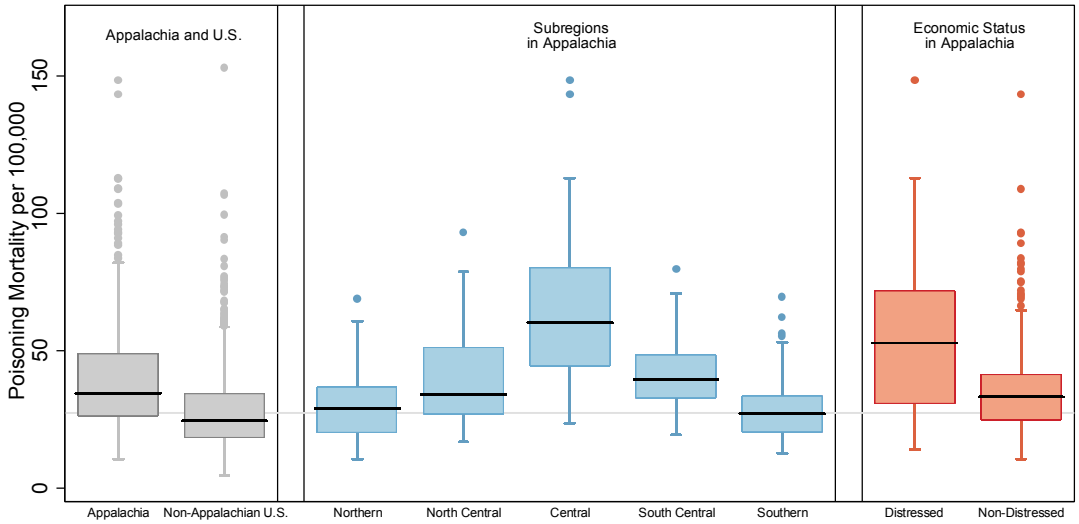


Data source: National Center for Health Statistics. Compressed Mortality File, 1999–2014 (machine-readable data file and documentation, CD-ROM Series 20, No. 2T) as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Hyattsville, Maryland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

Distribution of Poisoning Mortality Rates

Figure 72 shows the distribution of poisoning mortality rates by geography and economic status. The shaded boxes show the middle 50 percent of all values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, 113 have a missing value for this indicator.

Figure 72: Box Plot of Poisoning Mortality Rates per 100,000 Population by Geography and Economic Status, 2008–2014



Grey line denotes national average. 113 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with worse health.

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.

The distribution of poisoning mortality rates among national quintiles for Appalachian counties is shown in Table 29. Of the 420 counties in the Region, 195 (46 percent) rank in the worst-performing national quintile, while 24 (6 percent) rank in the best-performing national quintile.

Table 29: Distribution of Poisoning 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.*
Poisoning mortality	24	*6%*	31	*7%*	56	*13%*	114	*27%*	195	*46%*

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

KEY FINDINGS | Opioid Prescription Claims

- Six percent of all Medicare prescription claims in the Appalachian Region are for opioids, compared to 5.3 percent for the United States as a whole.
- In four of the five Appalachian subregions, the percentage of Medicare prescriptions for opioids is above the national average. Northern Appalachia, at 4.8 percent, is the only subregion with Medicare opioid prescriptions below the national mark.
- There is no significant urban-rural divide in opioid prescription levels, as Appalachia's rural counties have opioid prescription claims of 5.8 percent of total claims, compared with 5.7 percent for the Region's large metro counties.
- The Appalachian Region's distressed counties have Medicare opioid prescription claims of 6.1 percent of total claims, compared with 6.0 percent for the Region's non-distressed counties.

Background

The opioid prescriptions indicator is the percentage of all prescriptions filled by fee-for-service Medicare beneficiaries in 2013 that were for an opioid. These data come from the Chronic Conditions Warehouse maintained by the Centers for Medicare & Medicaid Services. This indicator only provides information on beneficiaries in Medicare's fee-for-service option, and does not include Medicare's managed care beneficiaries. This measure captures only a subset of the Medicare population and represents approximately 12 percent of the total population in the nation (Kaiser Family Foundation, 2015); (Centers for Medicare & Medicaid Services, 2017). However, this measure is one of the few available indicators that show county-level opioid use.

Prescribed opioids are natural analgesics, which include morphine and codeine, and semi-synthetic opioid analgesics such as oxycodone, hydrocodone, hydromorphone, and oxymorphone. Other opioids include synthetic opioids (methadone, tramadol, and fentanyl) and heroin. More than two million people suffer from opioid-related substance abuse disorders in the United States, and nearly 500,000 are addicted to heroin (Substance Abuse and Mental Health Services Administration, 2013).

There are a number of factors that place people at greater risk for opioid abuse and addiction, such as: obtaining overlapping prescriptions from multiple providers and pharmacies; taking high daily dosages of prescription pain relievers; mental illness; a history of alcohol or other substance abuse; residing in rural areas, and low income (Centers for Disease Control and Prevention, Prescription Opioids, 2016).

Deaths due to prescription opioid overdoses have increased over the past few years (Centers for Disease Control and Prevention, Opioid Overdose-Understanding the Epidemic, 2016). About 52 people die every

day from opioid pain medications, although this is likely an underestimate, as the type of drug is not always listed on a death certificate (National Safety Council, 2016). Drug use, and opioids in particular, has been blamed for the declines in life expectancies among middle-aged white Americans (Case & Deaton, 2015). In March 2015, the Secretary of the U.S. Department of Health and Human Services made reversal of the opioid epidemic a national priority, selecting three targets: prescription practices, expanding access to medication-assisted treatment for persons using opioids, and expanding the use of naloxone, an opioid antidote (U.S. Department of Health and Human Services, The Opioid Epidemic: By the Numbers, 2016).

Although these data do not capture the entire population, they serve as a proxy for overuse of opioids. The increased access to opioids made possible by the Medicare Part D prescription drug benefit program has been linked to increased abuse in non-Medicare populations, suggesting a significant spillover effect (Powell, Pacula, & Taylor, 2015).

Overview: Opioid Prescriptions in the Appalachian Region

Six percent of all Medicare prescription claims in the Appalachian Region are for opioids, a figure slightly higher than that for the nation overall (5.3 percent). In four of the five Appalachian subregions, the percentage of Medicare opioid prescription claims is above the national average. Northern Appalachia, at 4.8 percent, is the only subregion with Medicare opioid prescriptions below the national mark. Southern Appalachia's Medicare opioid claims percentage of 6.8 percent is the highest in the Region.

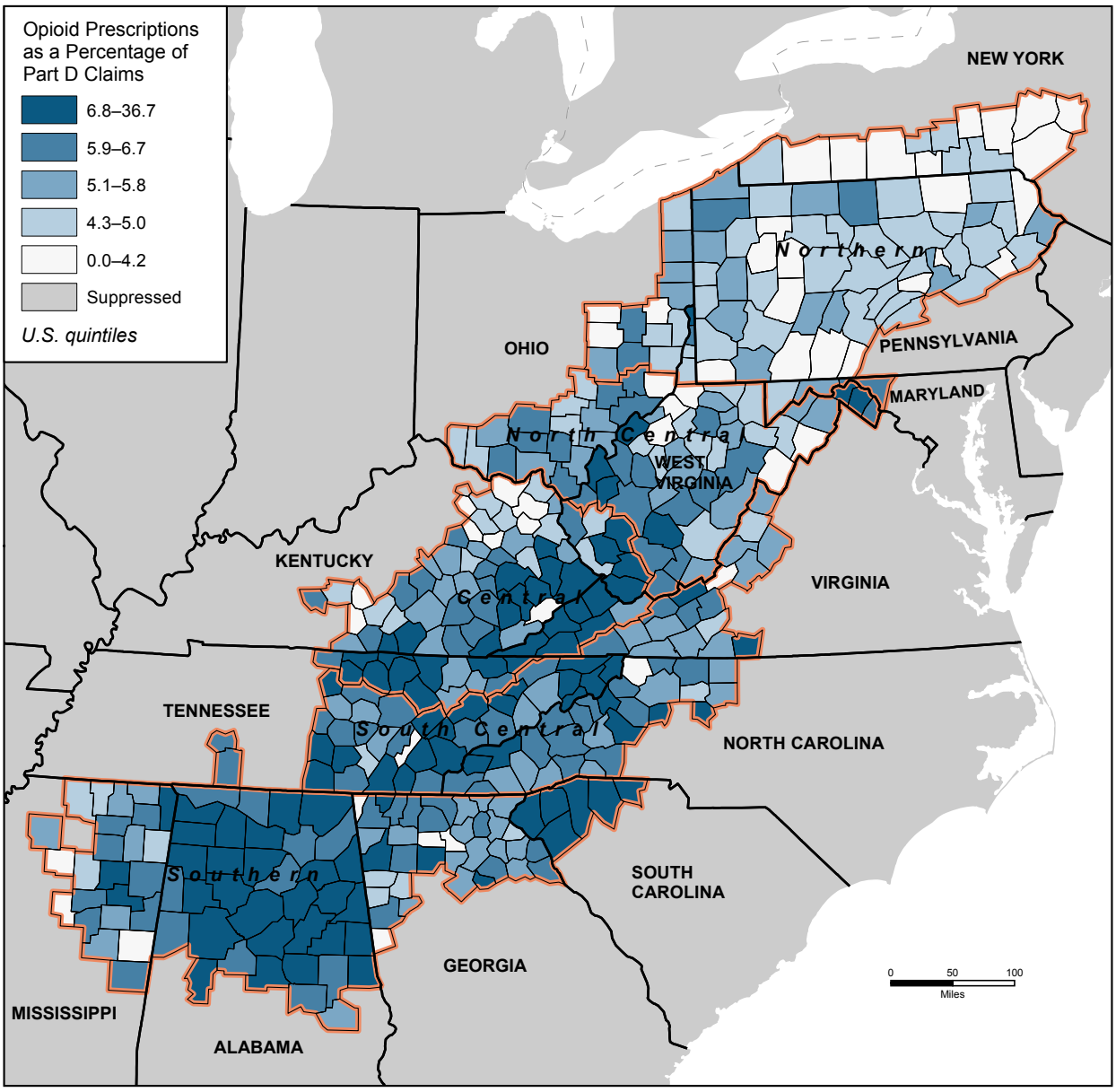
There is little difference in Medicare opioid prescription claims between rural and urban counties. Rural Appalachian counties have opioid prescription claims of 5.8 percent, compared with 5.7 percent for the Region's large metro counties. Likewise, there is little difference in the percentage of Medicare opioid prescription claims by economic status. The Appalachian Region's distressed counties have Medicare opioid prescription claims of 6.1 percent, compared with 6.0 percent for the Region's non-distressed counties.

Among the Appalachian states, there is significant variation in opioid prescriptions. Appalachian South Carolina and Appalachian Alabama have the highest percentages in the Region, at 7.8 percent and 7.5 percent, respectively, which are both far higher than the national average. Among the Appalachian portions of states throughout the Region, only Appalachian New York (4.0 percent) and Appalachian Pennsylvania (4.8 percent) have percentages lower than the national average.

Figure 73 shows the percentage of Medicare Part D prescription claims for opioids across the Appalachian Region. Darker blue indicates higher percentages of opioid prescription claims, with higher values for this measure indicating worse health. The map shows how percentages increase as one moves from north to south throughout the Region. Appalachian Alabama stands out for having the majority of its counties ranking in the worst-performing national quintile.

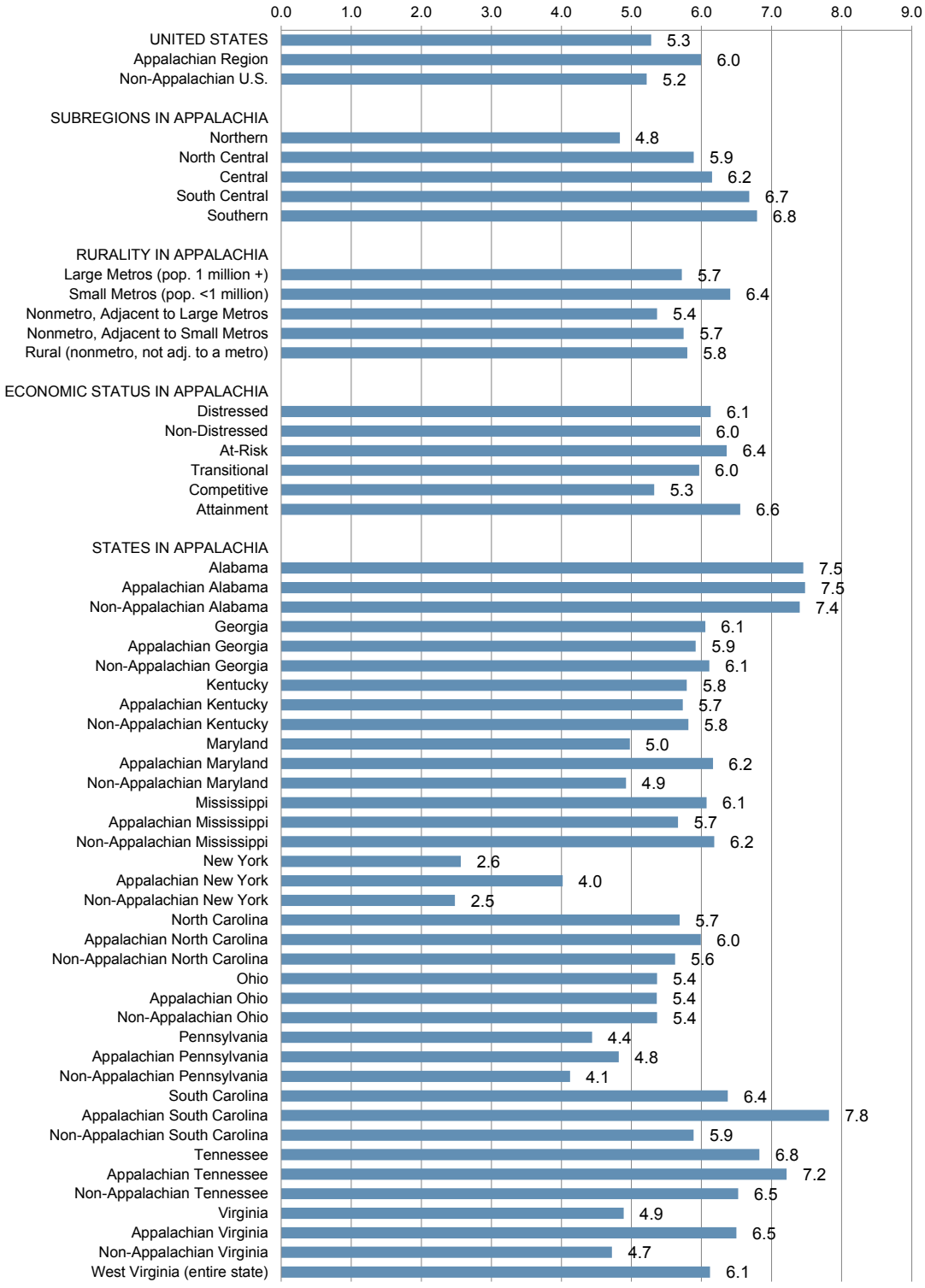
Figure 74 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

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 74: Chart of Opioid Prescriptions as a Percentage of Medicare Part D Claims, 2013

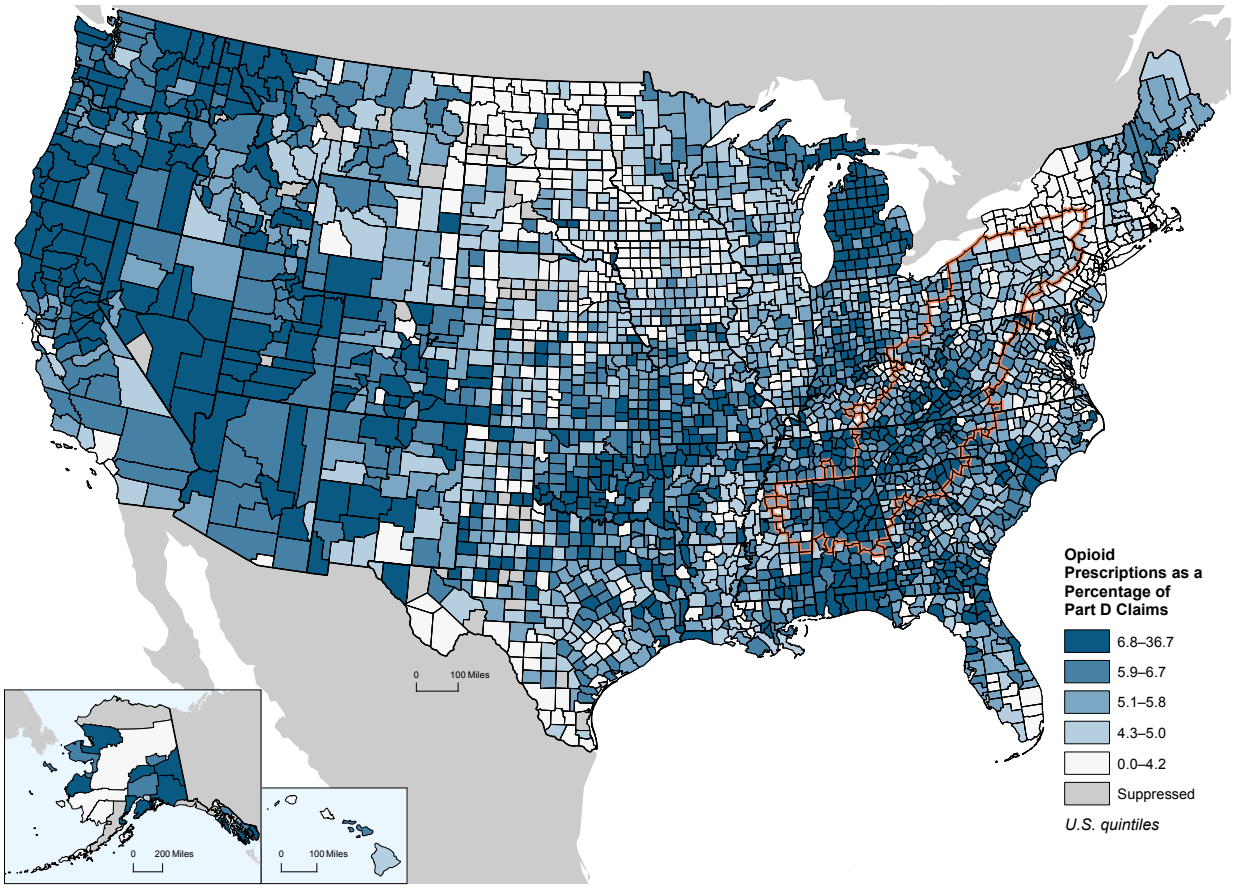


Data source: Medicare Part D Opioid Drug Mapping Tool, Centers for Medicare & Medicaid Services https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/OpioidMap.html.

Overview: Opioid Prescriptions in the United States

Figure 75 shows the variation in opioid prescription claims across the United States. Groupings of counties with high percentages occur throughout parts of the South, Midwest, and West. In the eastern half of the country, both Michigan and Alabama stand out for having nearly all of their counties ranking in the worst-performing national quintile. There is also a pocket of counties centered on Oklahoma—and stretching into surrounding states—ranking in the worst-performing national quintile. Much of the western half of the country has high opioid prescription percentages, particularly in northern California and other parts of the Pacific Northwest.

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

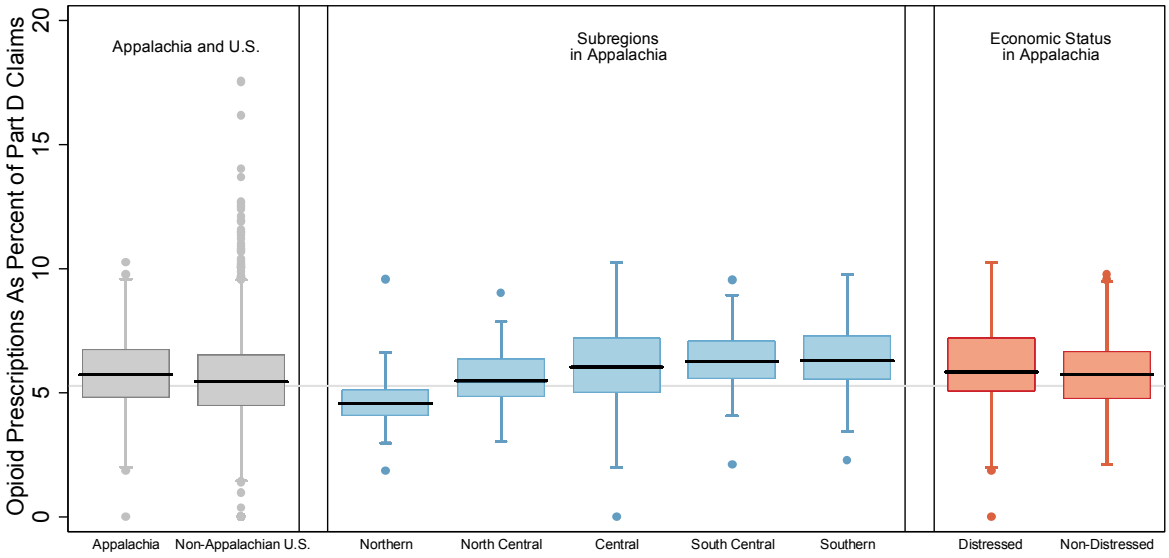


Data source: Medicare Part D Opioid Drug Mapping Tool, Centers for Medicare & Medicaid Services
https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/OpioidMap.html.

Distribution of Opioid Prescriptions

Figure 76 shows the distribution of opioid prescription rates by geography and economic status. The shaded boxes show the middle 50 percent of all values for each group, with dots representing unusually high or low values. The gray line stretching across the width of the graph indicates the national average, and the black lines inside the shaded boxes indicate the median for each respective group. Of all 3,113 counties in the nation, one has a missing value for this indicator, and one county with a value greater than 20 is not represented in this box plot.

Figure 76: Box Plot of Opioid Prescriptions as a Percentage of Medicare Part D Claims by Geography and Economic Status, 2013



Grey line denotes national average. 1 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with worse health.
1 counties with values greater than 20 not shown.

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.

The distribution of opioid prescriptions as a percentage of Medicare Part D claims among national quintiles for Appalachian counties is shown in Table 30. Of the 420 counties in the Region, 101 (24 percent) rank in the worst-performing national quintile, while 51 (12 percent) rank in the best-performing national quintile.

Table 30: Distribution of Opioid Prescriptions as a Percentage of Medicare Part D Claims among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
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 this indicator may not sum to 420 due to missing or suppressed values.

Depression Prevalence

"Depression is Not a Normal Part of Growing Older"
https://www.cms.gov/Medicare/Prevention/PrevntionGenInfo/Health-Observance-Mesages-New-Items/2015-05-14-depression.html

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