Trends in Appalachian Health

KEY FINDINGS | Trends in Appalachian Health

- Although the Appalachian Region experienced improvements in seven of the eight variables considered in this section, the improvements made by the nation overall frequently outpace those made by the Region. Since Appalachia is already behind the United States as a whole, this signifies a widening gap.
- Between 1989–1995 and 2008–2014, the Region saw improvements (decreases) in the following measures, although each of these lagged behind the improvement experienced by the nation overall:
  - Years of Potential Life Lost (8 percent decline in Applachia vs. 24 percent in the U.S.)
  - Cancer Mortality Rates (14 percent decline vs. 21 percent)
  - Heart Disease Mortality Rates (39 percent decline vs. 43 percent)
  - Stroke Mortality Rates (35 percent decline vs. 40 percent)
  - Infant Mortality Rates (19 percent decline vs. 28 percent)
- Between 1990 and 2013, the Appalachian Region experienced a greater increase in the supply of Office-based Primary Care Physicians (31 percent) than the United States overall (27 percent).
- Between 1995 and 2014, the Appalachian Region saw a larger worsening in its household poverty rate (from 14.2 percent to 17.2 percent) than the United States as a whole (from 13.6 percent to 15.6 percent).
- Between 1990 and 2009–2013, the Region saw a substantial increase in the percentage of its population that had received a high school diploma (68.4 percent to 84.6 percent), which represents a significant reduction in the gap between the Region and the nation overall (the United States increased from 75.7 percent to 85.9 percent).

OVERVIEW

This section reviews the change in a few selected indicators over a period of approximately two decades. The changes in the Appalachian Region are compared to the United States as a whole for eight measures examining premature death, causes of death, child and maternal health, health care access, and socioeconomic status. Two of the indicators used in this section differ from those examined previously in the report as some variables were not available at the county level for the earlier time period.

In this section, maps display performance throughout the Region for both of the time periods, with national quintiles again dividing and ranking counties throughout Appalachia. For the mortality measures, both time periods consist of data gathered during two seven-year spans: 1989–1995 and 2008–2014. This has the effect of reducing suppressed values in low population counties, as well as smoothing single year spikes in mortality.

Although improvements have been made in most of these indicators over the past 20 years, the gains experienced by the Appalachian Region typically fall behind those made by the United States as a whole. This is not always the case, however, and there are two instances in which the improvements in the Region have outpaced those in the nation as a whole: the supply of primary care physicians and the percentage of the population with a high school diploma.

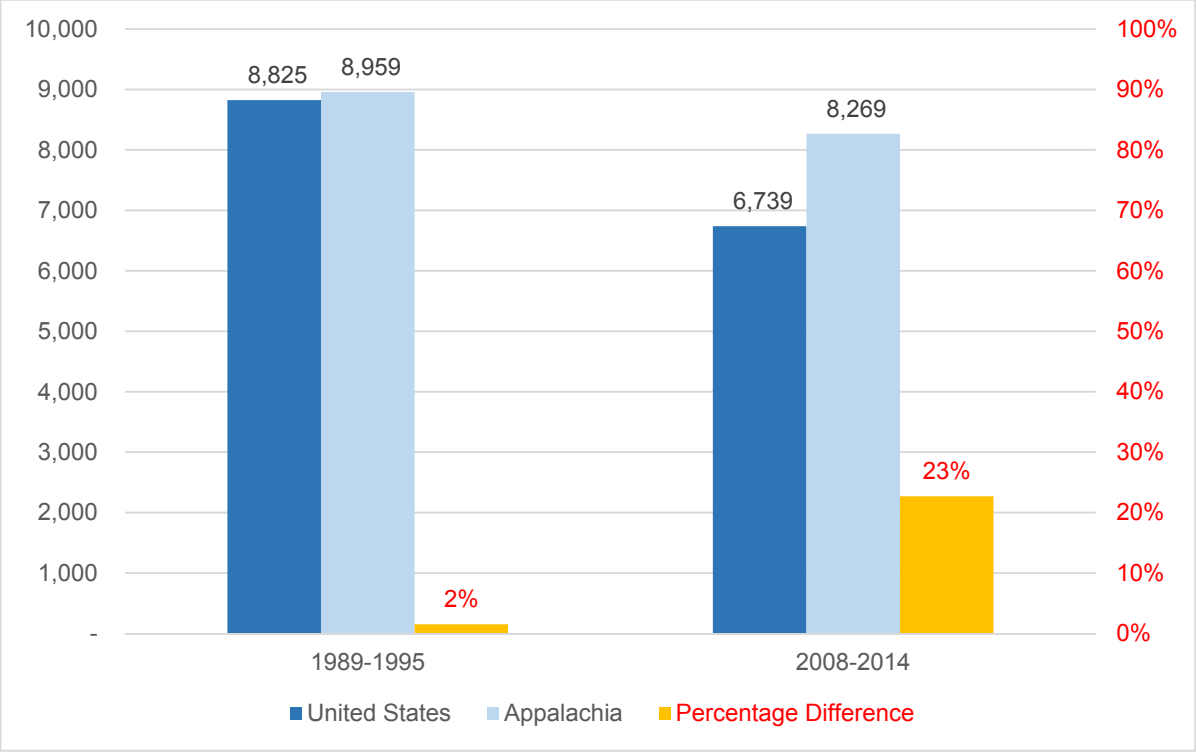
KEY TRENDS

Years of Potential Life Lost

Years of Potential Life Lost (YPLL) is a measure of premature death—higher values of YPLL indicate worse health. A decrease in this variable over time signifies an improvement in the health of a community.

Between 1989–1995 and 2008–2014,[5] the YPLL rate in the Appalachian Region decreased by 8 percent, while the United States as a whole experienced a much larger decline of 24 percent. Thus, despite the Region's improvement, the relative gap between Appalachia and the nation as a whole increased between the two time periods. As shown in Figure 173, during the 1989–1995 period, the YPLL rate in Appalachia was 2 percent higher than the rate in the United States overall, but by 2008–2014, the rate in the Region was 23 percent higher than the national rate—signifying a growing disparity.

Figure 173: Improvements in YPLL in the United States and Appalachia, 1989–1995 to 2008–2014

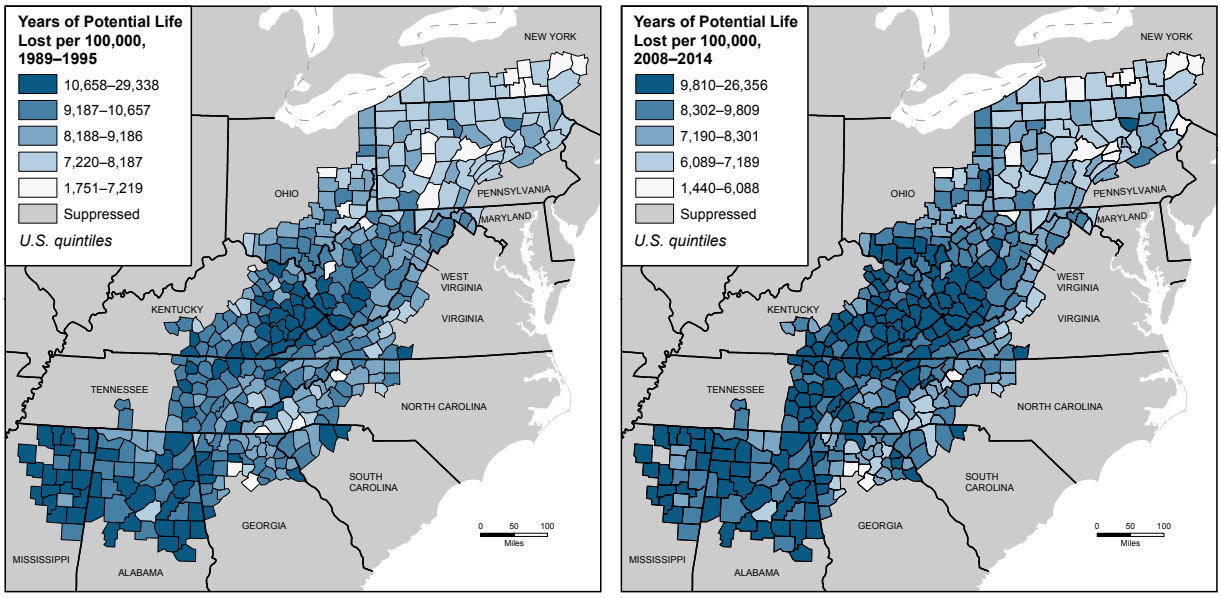


Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

[5] The data for the 2008–2014 period differ slightly from the data used for the YPLL measure found in the Mortality domain of this report. To produce an accurate trend metric and standardize the variable for the two time periods, an algorithm from County Health Rankings was used to develop a comparison measure for the period of 1989–1995, and then the same was done for the recent time span, 2008–2014.

Figure 174 maps YPLL rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate higher YPLL rates. In both time periods, the central and southern portions of the Region perform poorly, with large pockets of counties ranking in the worst national quintile. In 2008–2014, there is a considerable worsening of performance—relative to the nation overall—in the three central subregions of Appalachia, areas that were already performing poorly in 1989–1995.

Figure 174: Map of Years of Potential Life Lost per 100,000 Population in the Appalachian Region, 1989–1995 and 2008–2014



Data source: National Center for Health Statistics (2007). Compressed Mortality File, 1989-1998 (machine readable data file and documentation, CD-ROM Series 20, No. 2E) 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
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 changes in YPLL for the United States, Appalachia, and the Appalachian subregions are shown in Table 55. Central Appalachia saw a nine percent increase in its YPLL rate between the two time periods, indicating worsening health in the subregion over the past two decades. North Central Appalachia saw no change between the two time periods, and although the remaining three subregions experienced improvements, none matched the 24 percent decrease experienced by the nation as a whole.

Table 55: Change in Years of Potential Life Lost per 100,000 Population, 1989–1995 and 2008–2014

Geographic Area	1989–1995	2008–2014	Percent Change
United States	8,825	6,739	-24%
Appalachia	8,959	8,269	-8%
Rest of U.S.	8,814	6,604	-25%
Northern Appalachia	8,015	7,198	-10%
North Central Appalachia	9,078	9,033	0%
Central Appalachia	10,240	11,150	9%
South Central Appalachia	9,003	8,475	-6%
Southern Appalachia	9,584	8,347	-13%

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

The distributions of YPLL rates among national quintiles for Appalachian counties are shown in Table 56. Of the 420 counties in the Region, 89 (21 percent) ranked in the worst-performing national quintile in 1989–1995. By 2008–2014, this number jumped to 149 (35 percent). Each of the other national quintiles experienced declines in the number of Appalachian counties classified within in each. Given the darkening of the map in the central part of the Region between the two time periods, as well as the subregional trends noted above, it is clear that many of the 60 additional counties found in worst-performing national quintile are located in the three central subregions.

Table 56: Distribution of YPLL 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.*
YPLL, 1989–1995	20	*5%*	70	*17%*	103	*25%*	138	*33%*	89	*21%*
YPLL, 2008–2014	17	*4%*	51	*12%*	90	*21%*	113	*27%*	149	*35%*

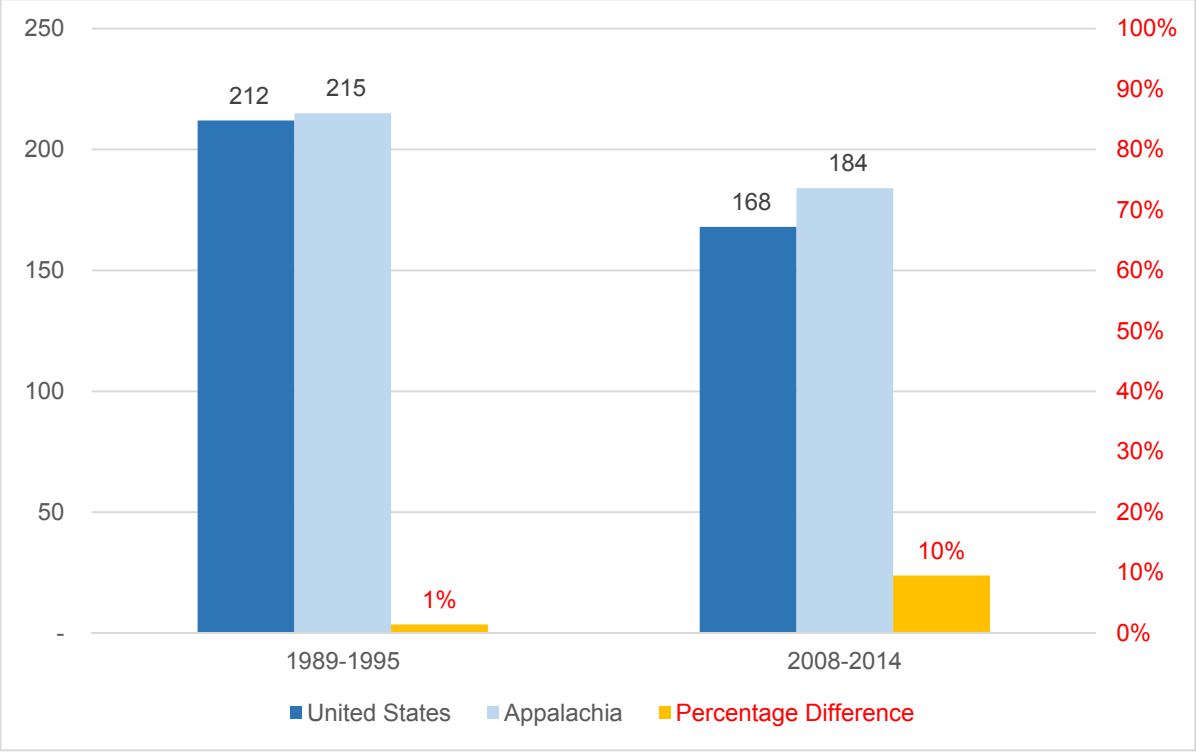
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Cancer Mortality

The cancer mortality rate is the number of deaths with cancer as the underlying cause per 100,000 population, per year. Higher values indicate worse health, so a decrease over time marks an improvement in the health of a community.

Between 1989–1995 and 2008–2014, the cancer mortality rate in the Appalachian Region decreased by 14 percent, an improvement smaller than the 21 percent decline experienced by the United States as a whole. Thus, despite the Region's improvement, the relative gap between Appalachia and the nation as a whole increased between the two time periods. As shown in Figure 175, during the 1989–1995 period, the cancer mortality rate in Appalachia was only 1 percent higher than the rate in the United States overall, but by 2008–2014, the rate in the Region was 10 percent higher than the national rate—signifying a growing disparity.

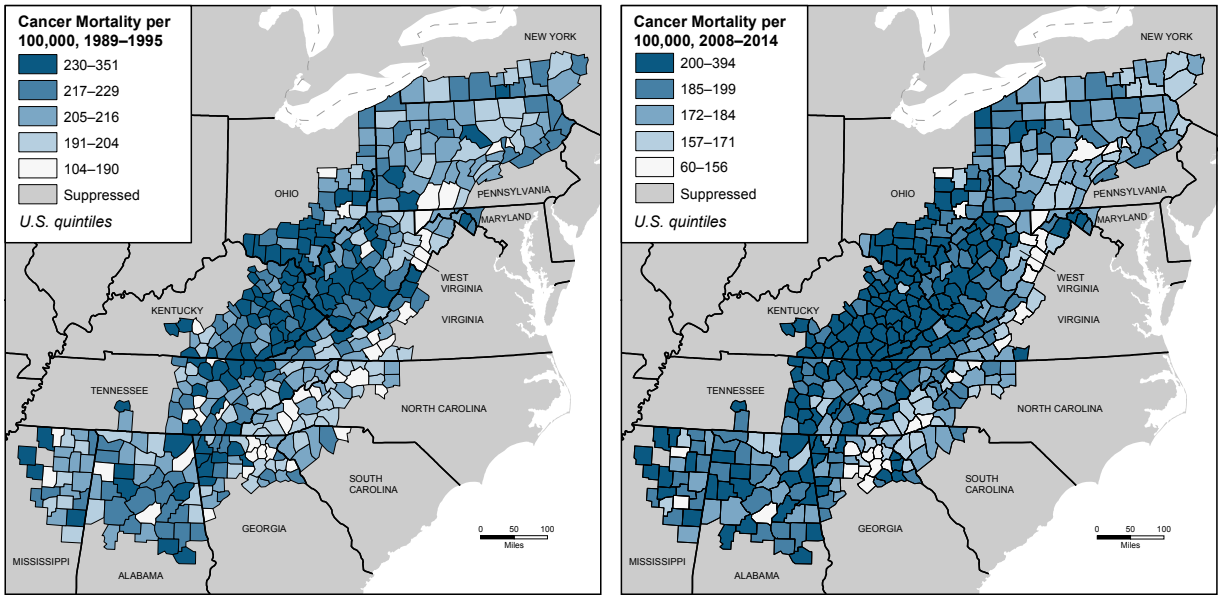
Figure 175: Improvements in Cancer Mortality in the United States and Appalachia, 1989–1995 to 2008–2014



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

Figure 176 maps cancer mortality rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate higher cancer rates. There is a widespread increase in the number of counties ranking in the worst-performing national quintiles between 1989–1995 and 2008–2014. There is a considerable darkening throughout Central Appalachia, and although counties with low cancer mortality rates are found in the easternmost reaches of the Region in both time periods, there are fewer well-performing counties in 2008–2014. The distribution of counties in Northern Appalachia among national quintiles remains largely unchanged.

Figure 176: Map of Cancer Mortality Rates per 100,000 Population in the Appalachian Region, 1989–1995 and 2008–2014



Data source: National Center for Health Statistics (2007). Compressed Mortality File, 1989-1998 (machine readable data file and documentation, CD-ROM Series 20, No. 2E) 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
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 changes in cancer mortality rates for the United States, Appalachia, and the Appalachian subregions are shown in Table 57. All five subregions experienced decreases in rates, although Central Appalachia's improvement of just six percent lags well behind the other subregions. Among the subregions, Northern Appalachia and Southern Appalachia had the largest decreases, although these still do not match the national decline experienced over the time period.

Table 57: Change in Cancer Mortality Rates per 100,000 Population, 1989–1995 and 2008–2014

Geographic Area	1989–1995	2008–2014	Percent Change
United States	212	168	-21%
Appalachia	215	184	-14%
Rest of United States	212	167	-21%
Northern Appalachia	217	180	-17%
North Central Appalachia	226	195	-14%
Central Appalachia	236	222	-6%
South Central Appalachia	209	181	-13%
Southern Appalachia	210	177	-16%

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

The distributions of cancer mortality rates among national quintiles for Appalachian counties are shown in Table 58. Of the 420 counties in the Region, 104 (25 percent) ranked in the worst-performing national quintile in 1989–1995. This number increased to 158 (38 percent) in 2008–2014. The trend is clear with regard to distribution in the Region: over two decades, the number of counties that rank in the two worst-performing national quintiles increased, while fewer counties rank in the other three quintiles. Given the darkening of the map in the central part of the Region between the two time periods, it is clear that many of these 61 additional Appalachian counties ranking in the two worst-performing national quintiles are found in North Central, Central, and South Central subregions.

Table 58: Distribution of Cancer 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.*
Cancer Mortality, 1989–1995	40	*10%*	77	*18%*	105	*25%*	94	*22%*	104	*25%*
Cancer Mortality, 2008–2014	29	*7%*	49	*12%*	83	*20%*	101	*24%*	158	*38%*

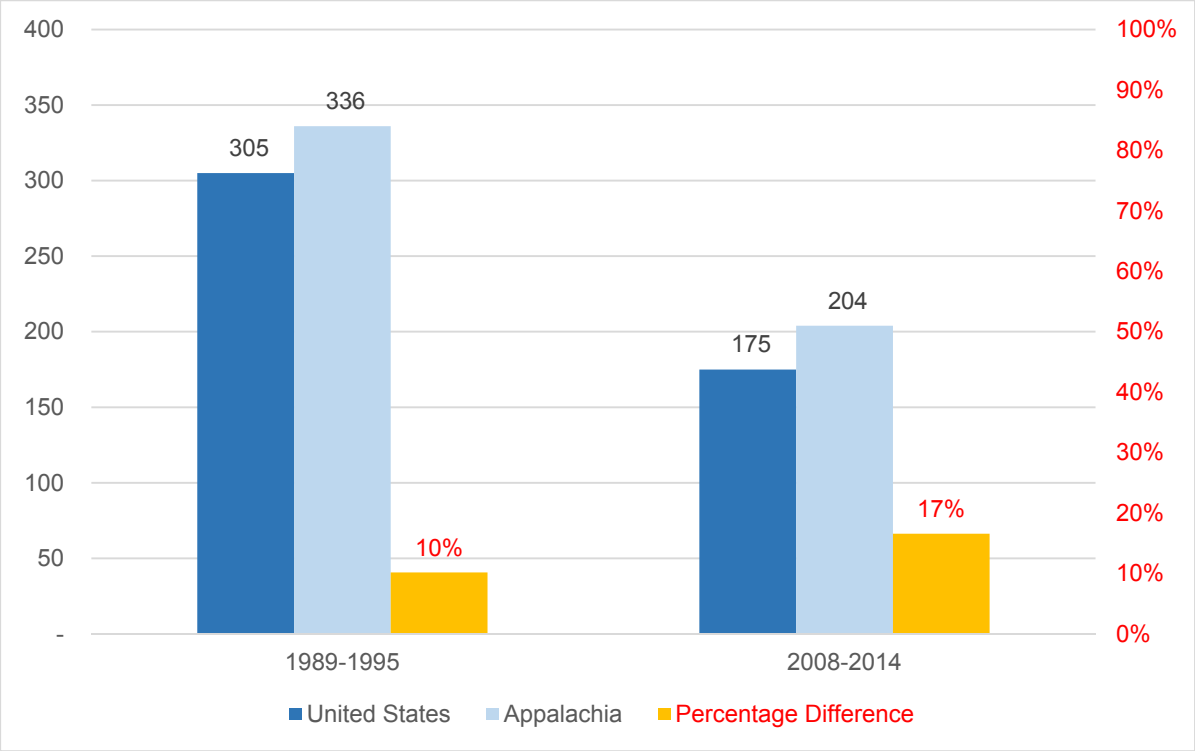
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Heart Disease Mortality

The heart disease mortality rate is the number of deaths from all forms of heart disease per 100,000 population, per year. Higher values indicate worse health, so a decrease over time marks an improvement in the health of a community.

Between 1989–1995 and 2008–2014, the heart disease mortality rate in the Appalachian Region decreased by 39 percent, an improvement slightly less than the 43 percent decline experienced by the United States as a whole. Thus, despite the Region's improvement, the relative gap between Appalachia and the nation as a whole increased between the two time periods. As shown in Figure 177, during the 1989–1995 period, the heart disease mortality rate in Appalachia was 10 percent higher than the rate in the United States overall, but by 2008–2014, the rate in the Region was 17 percent higher than the national rate—signifying a growing disparity.

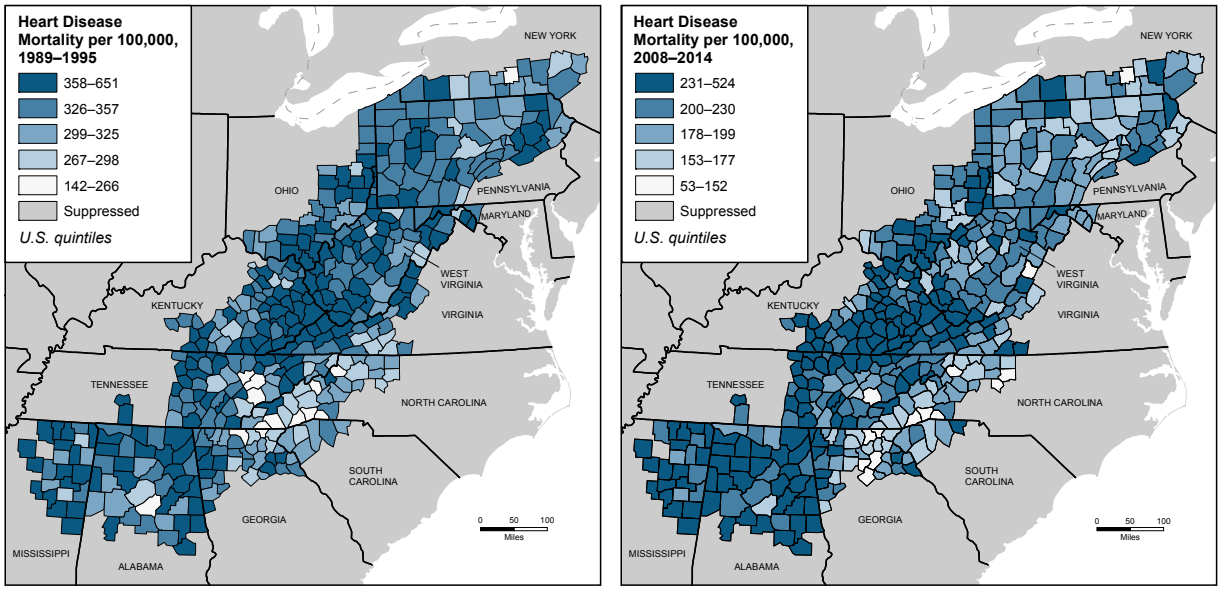
Figure 177: Improvements in Heart Disease Mortality in the United States and Appalachia, 1989–1995 to 2008–2014



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

Figure 178 maps heart disease mortality rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate higher rates. Between 1989–1995 and 2008–2014, it appears as though counties throughout Northern Appalachia improved in their standing relative to the nation overall while those in Southern Appalachia experienced a decline. North Central Appalachia also appears to have darkened over the two decades. Central Appalachia is home to many counties ranking in the worst-performing national quintile during both the earlier and later time periods.

Figure 178: Map of Heart Disease Mortality Rates per 100,000 Population in the Appalachian Region, 1989–1995 and 2008–2014



Data source: National Center for Health Statistics (2007). Compressed Mortality File, 1989-1998 (machine readable data file and documentation, CD-ROM Series 20, No. 2E) 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
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 changes in heart disease mortality rates for the United States, Appalachia, and the Appalachian subregions are shown in Table 59. All five regions experienced decreases in their rates, with Central Appalachia experiencing the smallest improvement—a decrease of just 33 percent. Northern and North Central Appalachia had the largest decreases, although these still come up just short of the improvement experienced by the nation.

Table 59: Change in Heart Disease Mortality Rates per 100,000 Population, 1989–1995 and 2008– 2014

Geographic Area	1989–1995	2008–2014	Percent Change
United States	305	175	-43%
Appalachia	336	204	-39%
Rest of United States	303	173	-43%
Northern Appalachia	343	201	-41%
North Central Appalachia	353	206	-42%
Central Appalachia	369	249	-33%
South Central Appalachia	311	193	-38%
Southern Appalachia	329	203	-38%

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

The distributions of heart disease mortality rates among national quintiles for Appalachian counties are shown in Table 60. Of the 420 counties in the Region, 168 (40 percent) ranked in the worst-performing national quintile in 1989–1995, a number slightly higher than the 158 (38 percent) in 2008–2014. Despite the widening gap between the Region and the United States as a whole, the distribution of poor-performing counties within the Region improved over the past two decades, with 23 fewer counties ranking in the two worst-performing national quintiles in 2008–2014 than in 1989–1995.

Table 60: Distribution of Heart Disease 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 Mortality, 1989–1995	14	*3%*	40	*10%*	70	*17%*	128	*30%*	168	*40%*
Heart Disease Mortality, 2008–2014	14	*3%*	57	*14%*	76	*18%*	115	*27%*	158	*38%*

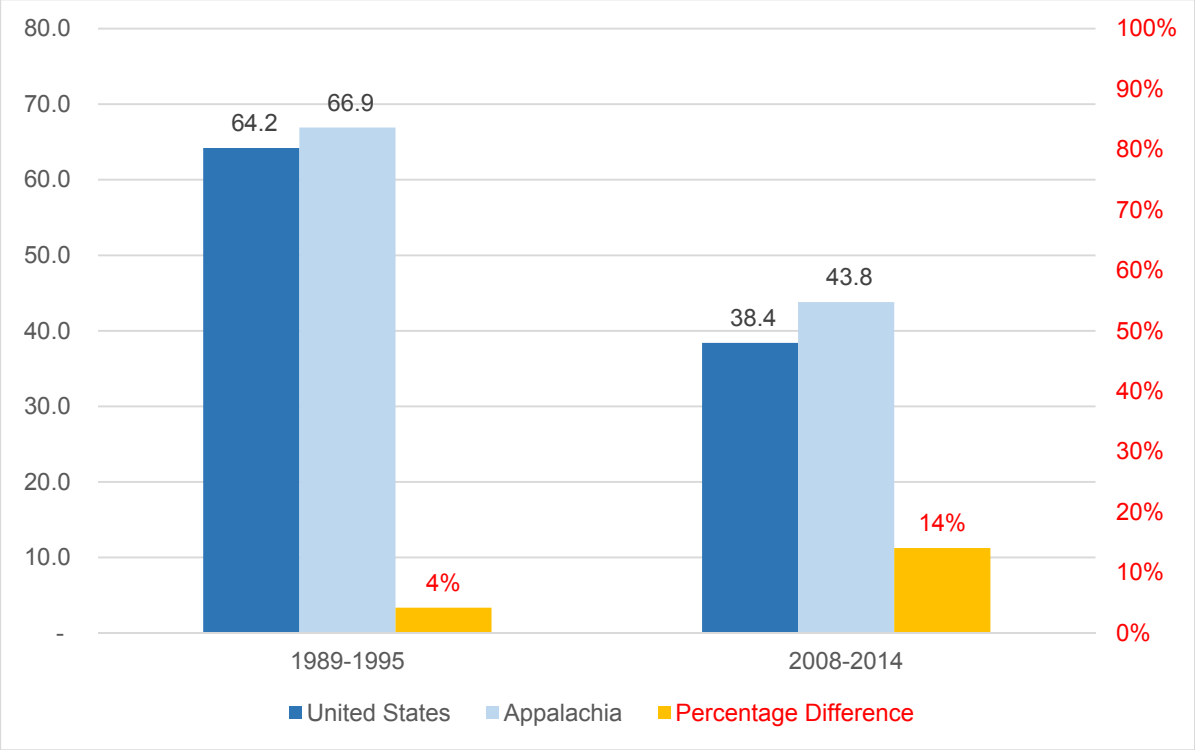
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Stroke Mortality

The stroke mortality rate is the number of deaths in which stroke is reported as the primary cause of death per 100,000 population, per year. Higher values indicate worse health, so a decrease over time marks an improvement in the health of a community.

Between 1989–1995 and 2008–2014, the stroke mortality rates in the Appalachian Region declined by 35 percent, a smaller improvement than the 40 percent decrease experienced by the United States as a whole. Thus, despite the Region's improvement, the relative gap between Appalachia and the nation as a whole increased between the two time periods. As shown Figure 179, during the 1989–1995 period, the stroke mortality rate in Appalachia was only 4 percent higher than the rate in the United States overall, but by 2008–2014, the rate in the Region was 14 percent higher than the national rate—signifying a growing disparity.

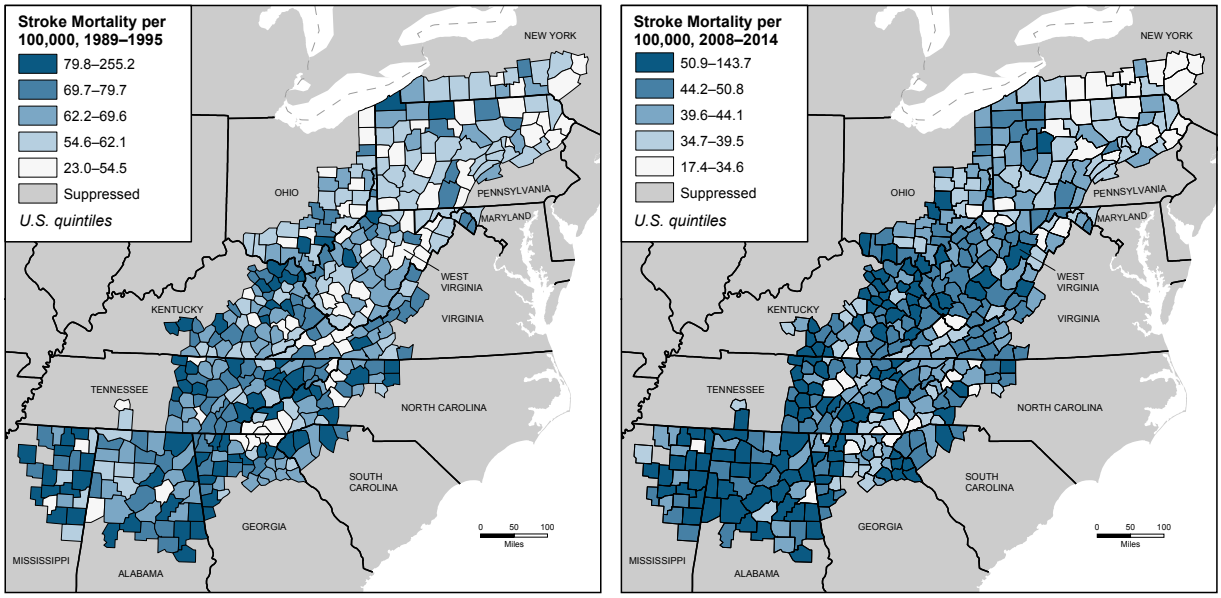
Figure 179: Improvements in Stroke Mortality in the United States and Appalachia, 1989–1995 to 2008–2014



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

Figure 180 maps stroke mortality rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate higher rates. Throughout much of the Region, there is a noticeable darkening that takes place between the two time periods. This is especially true in Central and Southern Appalachia, where there are large pockets of counties ranking in the worst-performing national quintile in 2008–2014. There are new areas of poor performance found in the western reaches of Northern Appalachia during the most recent time period, though many counties in New York rank in the best-performing national quintile.

Figure 180: Map of Stroke Mortality Rates per 100,000 Population in the Appalachian Region, 1989–1995 and 2008–2014



Data source: National Center for Health Statistics (2007). Compressed Mortality File, 1989-1998 (machine readable data file and documentation, CD-ROM Series 20, No. 2E) 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
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 changes in stroke mortality rates for the United States, Appalachia, and the Appalachian subregions are shown in Table 61. All five subregions experienced decreases in rates, with North Central Appalachia improving at the slowest pace—a decline of just 27 percent, which is well below the national trend. In 1989–1995, both Northern and North Central Appalachia had stroke mortality rates below the national average; in 2008–2014, however, the rates for both of the subregions were above the national mark.

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.

The distribution of stroke mortality rates among national quintiles for Appalachian counties is shown in Table 62. Of the 420 counties in the Region, 77 (18 percent) ranked in the worst-performing national quintile in 1989–1995, a number that increased to 113 (27 percent) in 2008–2014. The trend is clear throughout the Region, with 58 more counties ranking in the two worst-performing national quintiles in 2008–2014 than in 1989–1995. These counties—the ones reclassified into the two worst-performing national quintiles—are found throughout the Region, with noticeable concentrations found in Central and Southern Appalachia.

Table 62: Distribution of Stroke 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.*
Stroke Mortality, 1989–1995	67	*16%*	96	*23%*	93	*22%*	87	*21%*	77	*18%*
Stroke Mortality, 2008–2014	39	*9%*	67	*16%*	92	*22%*	109	*26%*	113	*27%*

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.

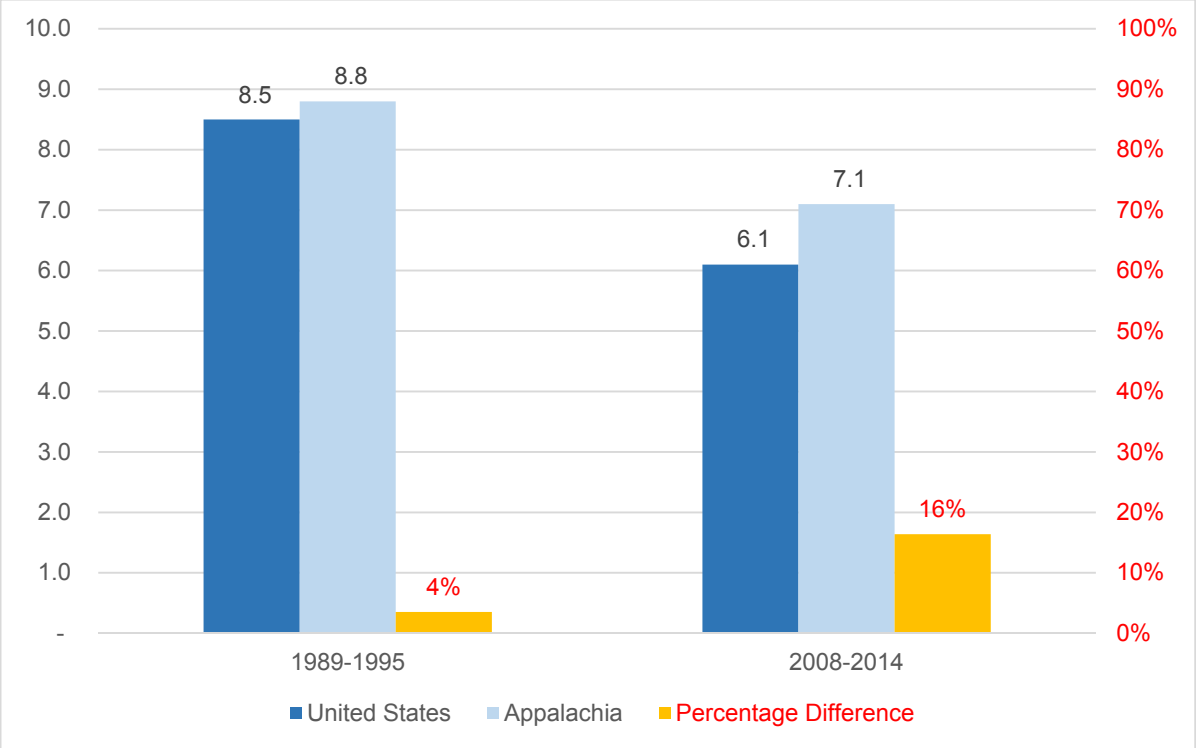
Infant Mortality

Infant mortality is the number of deaths of infants under one year old per 1,000 live births. Higher values indicate worse health, so a decrease over time marks an improvement in the health of a community.

Between 1989–1995 and 2008–2014, the infant mortality rate in the Appalachian Region decreased by 19 percent, a smaller improvement than the 28 percent decrease experienced by the United States as a whole. Thus, despite the Region's improvement, the gap between Appalachia and the nation as a whole increased between the two time periods. As shown in Figure 181, during the 1989–1995 period, the infant mortality rate in Appalachia was only 4 percent higher than the rate in the United States overall, but by 2008–2014, the rate in the Region was 16 percent higher than the national rate—signifying a growing disparity.

From 1989–1995 to 2008–2014, infant mortality rates improved in both the Appalachian Region and the United States as a whole. However, relative to the country overall (28 percent decrease), the Region experienced a smaller improvement (19 percent decrease). Among the subregions, Central Appalachia (13 percent decline) and North Central Appalachia (14 percent decline) experienced the least improvement.

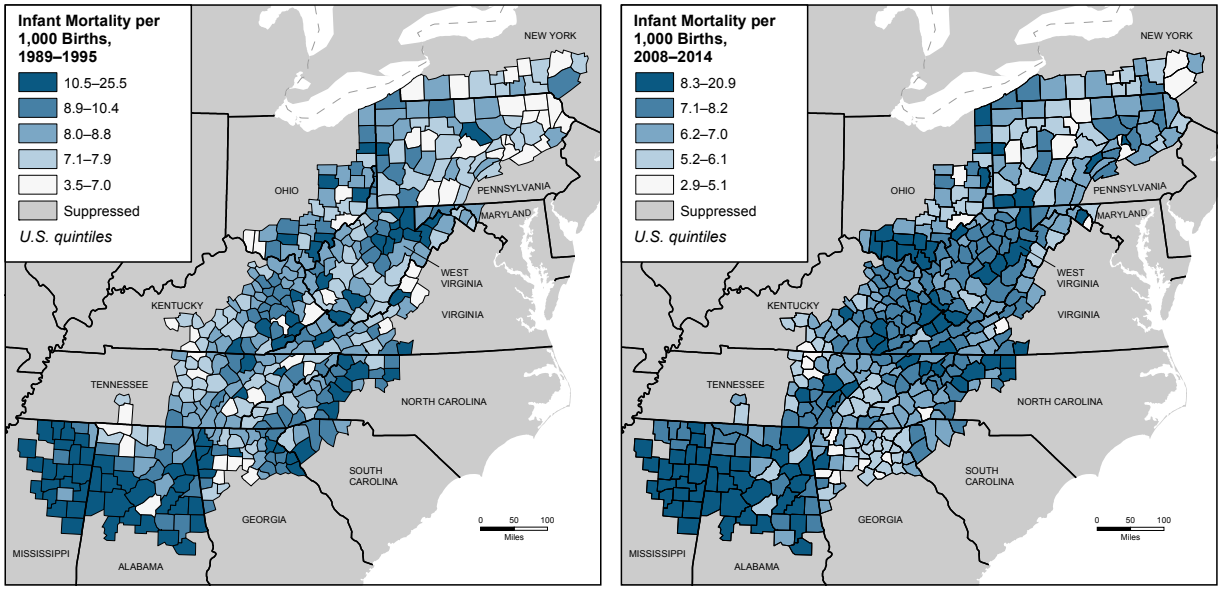
Figure 181: Improvements in Infant Mortality in the United States and Appalachia, 1989–1995 to 2008–2014



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

Figure 182 maps infant mortality rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate higher rates. There is a noticeable darkening in the three central Appalachian subregions over time, although Southern Appalachia has the largest concentration of counties ranking in the worst-performing national quintile in both time periods. The best-performing subregion in both time periods, Northern Appalachia, still lost a large number of counties ranking in the best national quintile between 1989–1995 and 2008–2014.

Figure 182: Map of Infant Mortality Rates in the Appalachian Region, 1989–1995 and 2008–2014



Data source: National Center for Health Statistics (2007). Compressed Mortality File, 1989-1998 (machine readable data file and documentation, CD-ROM Series 20, No. 2E) 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
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 changes in infant mortality rates for the United States, Appalachia, and the Appalachian subregions are shown in Table 64. All five subregions experienced decreases in their rates, although none of these matched the national decrease. The three central subregions experienced the smallest decreases, as each was well below the 28 percent experienced at the national level. Both Northern and Central Appalachia had lower infant mortality rates than the nation as a whole in 1989–1995; however, by 2008–2014, no Appalachian subregion had a lower rate than U.S. average.

Table 63: Change in Infant Mortality Rates, 1989–1995 and 2008–2014

Geographic Area	1989–1995	2008–2014	Percent Change
United States	8.5	6.1	-28%
Appalachia	8.8	7.1	-19%
Rest of United States	8.5	6.1	-28%
Northern Appalachia	8.3	6.6	-20%
North Central Appalachia	8.6	7.4	-14%
Central Appalachia	8.5	7.4	-13%
South Central Appalachia	8.7	7.2	-17%
Southern Appalachia	9.5	7.4	-22%

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

The distribution of infant mortality rates among national quintiles for Appalachian counties is shown in Table 64. Of the 420 counties in the Region, the number of counties ranking in the worst national quintile remained consistent between 1989–1995 and 2008–2014. However, the Region saw a large increase in the number of counties ranking in the second worst-performing national quintile (83 to 135) over the same period.

Table 64: Distribution of Infant 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.*
Infant Mortality, 1989–1995	33	*8%*	87	*21%*	124	*30%*	83	*20%*	93	*22%*
Infant Mortality, 1989–1995	8	*2%*	66	*16%*	117	*28%*	135	*32%*	94	*22%*

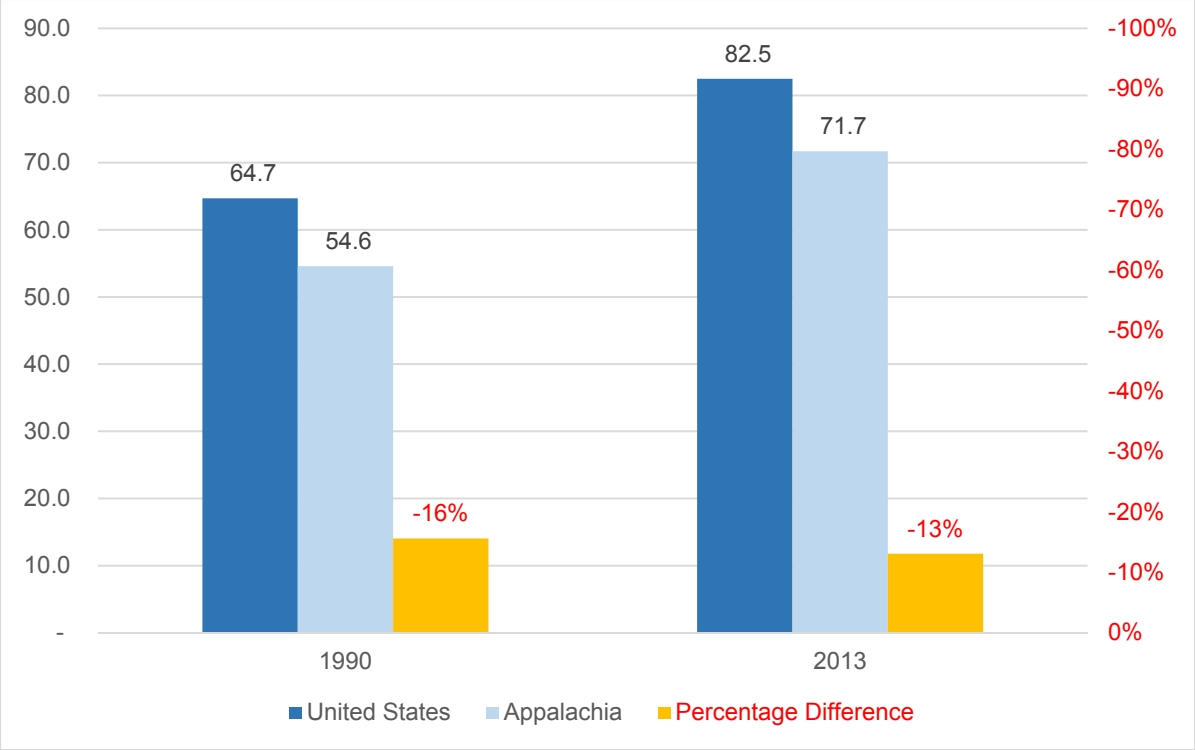
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Office-Based Primary Care Physicians

Office-based primary care physicians represent the number of providers per 100,000 population. Higher values indicate a greater availability of physician care and health care system quality, so higher values indicate better health in a community. It is important to note that this is a different measure than that used in the Health Care Systems domain of this report.[6] Due difference to national definitions changing between 1990 and 2013, this alternative was adopted to ensure comparability across the time periods.

Between 1990 and 2013, the number of primary care physicians per 100,000 population increased for both the Appalachian Region and the United States overall. The 31 percent increase in Appalachia is slightly greater than the 27 percent increase experienced at the national level, which indicates a slight improvement in the gap between the Region and the United States as a whole. As shown in Figure 183, in 1990, the supply of primary care physicians per 100,000 population in Appalachia was 16 percent lower than in the United States overall; in 2013, the supply in the Region was 13 percent lower.

Figure 183: Improvements in Office-Based Primary Care Physicians in the United States and Appalachia, 1990 to 2013

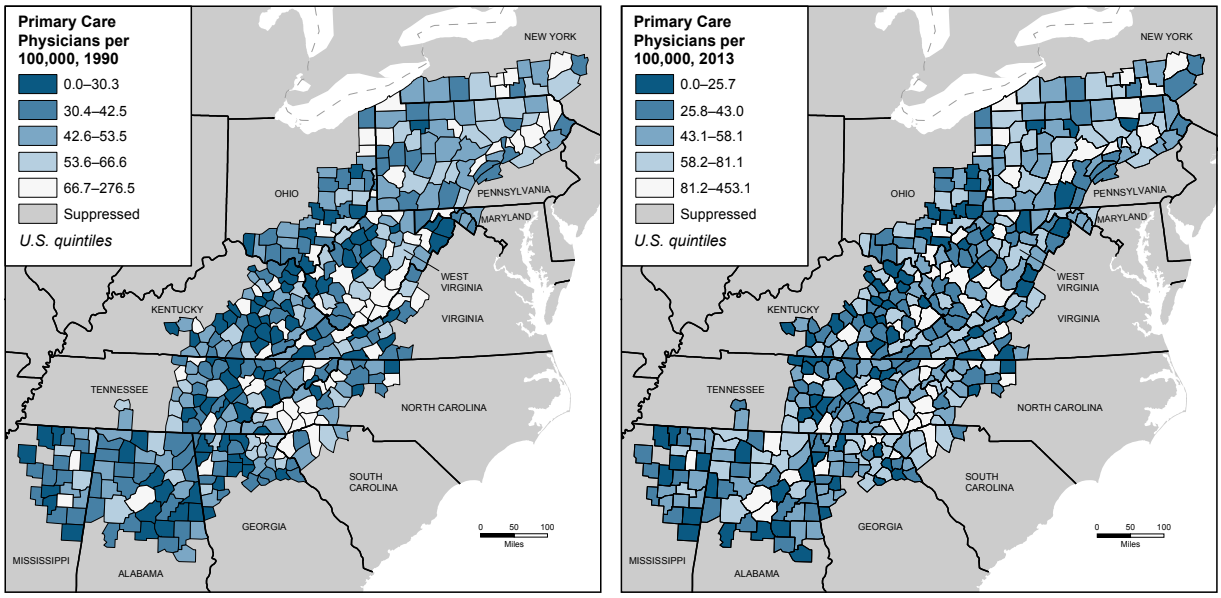


Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

[6] The data source for primary care physicians in the Trends section differs from the source used in the Health Care Systems domain. County Health Rankings, which began in 2010, is the source for the primary care physician measure in the Health Care Systems domain; the Area Health Resources Files (AHRF), which has county-level data on physician supply, are the source for the measure in the Trends section. The definitions in the two databases differ primarily on inclusion of General Obstetrics and Gynecology physicians (AHRF files include Ob/Gyn practitioners while County Health Rankings does not.

Figure 184 maps primary care physicians per 100,000 population for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate a lower supply. Between 1990 and 2013, there has been a perceptible lightening of the map of the Region, indicating slight improvement for each of the subregions. In particular, Southern and Central Appalachia each contain fewer counties ranking in the worst-performing national quintiles in 2013 than in 1990.

Figure 184: Map of Primary Care Physicians per 100,000 Population in the Appalachian Region, 1990 and 2013



Data source: Area Resource File (ARF) 1998; U.S. Department Of Health And Human Services, Health Resources And Services Administration, Bureau Of Health Professions, Office Of Research And Planning, February 1998. http://ahrf.hrsa.gov/
Area Health Resources File (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://ahrf.hrsa.gov/

The changes in the supply of primary care physicians per 100,000 population for the United States, Appalachia, and the Appalachian subregions are shown in Table 65. All five subregions experienced increases, although both Central Appalachia (18 percent increase) and Northern Appalachia (22 percent increase) came up short when compared to the 27 percent increase experienced in the nation as a whole. South Central Appalachia experienced the largest increase, and the subregion now has a higher supply of primary care physicians per 100,000 population than the nation overall, although each of the other four subregions remain well below the national average.

Table 65: Change in Primary Care Physicians per 100,000 population, 1990 to 2013

Geographic Area	1990	2013	Percent Change
United States	64.7	82.5	27%
Appalachia	54.6	71.7	31%
Rest of United States	65.6	83.5	27%
Northern Appalachia	60.9	74.4	22%
North Central Appalachia	56.7	76.4	35%
Central Appalachia	45.8	54.0	18%
South Central Appalachia	59.7	83.5	40%
Southern Appalachia	46.4	64.7	39%

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

The distribution of primary care physicians among national quintiles for Appalachian counties is shown in Table 66. Of the 420 counties in the Region, 92 (22 percent) ranked in the worst-performing national quintile in 1990, a number that decreased to 77 (18 percent) in 2013. There was also a slight decrease in the number of counties ranking in the second worst-performing quintile, going from 109 counties in 1990 to 102 in 2013. The slight redistribution of Appalachian counties among national quintiles—along with the data points noted above—indicates a subtle improvement in the supply of primary care physicians throughout the Region.

Table 66: Distribution of Primary Care Physicians 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, 1990	72	*17%*	60	*14%*	87	*21%*	109	*26%*	92	*22%*
Primary Care Physicians, 2013	58	*14%*	89	*21%*	94	*22%*	102	*24%*	77	*18%*

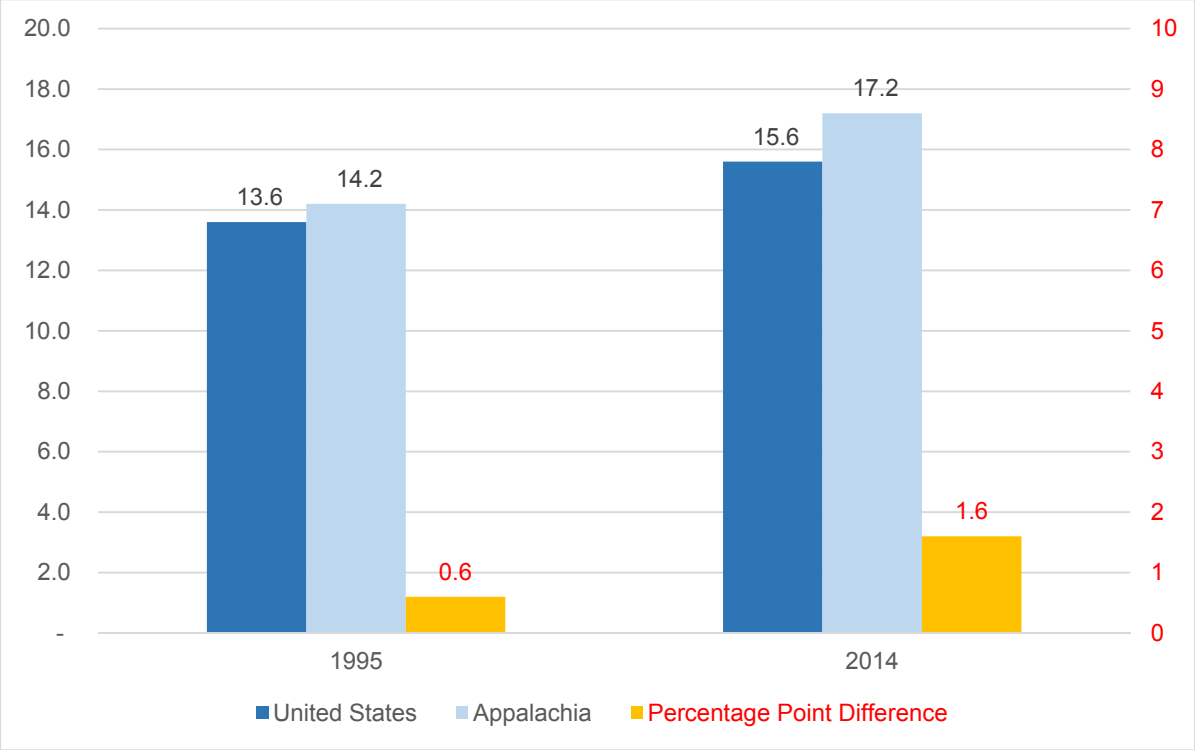
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Percentage of Households Living in Poverty

The household poverty rate is the percentage of households with incomes below the poverty line. Living in poverty can contribute to a number of poor health outcomes, so a decrease in these rates over time may contribute to improvements in a community's health.

Between 1995 and 2014, the household poverty rate in the Appalachian Region increased from 14.2 percent to 17.2 percent, whereas the nation as a whole went from 13.6 percent to 15.6 percent. Because the increase in the United States outpaced that experienced in Appalachia, the gap between the Region and the nation overall increased between the two time periods. As shown in Figure 185, in 1995, the household poverty rate in Appalachia was only 0.6 percentage points higher than the rate in the United States overall, but by 2014, the rate in the Region was 1.6 percentage points higher than the national rate—signifying a growing disparity.

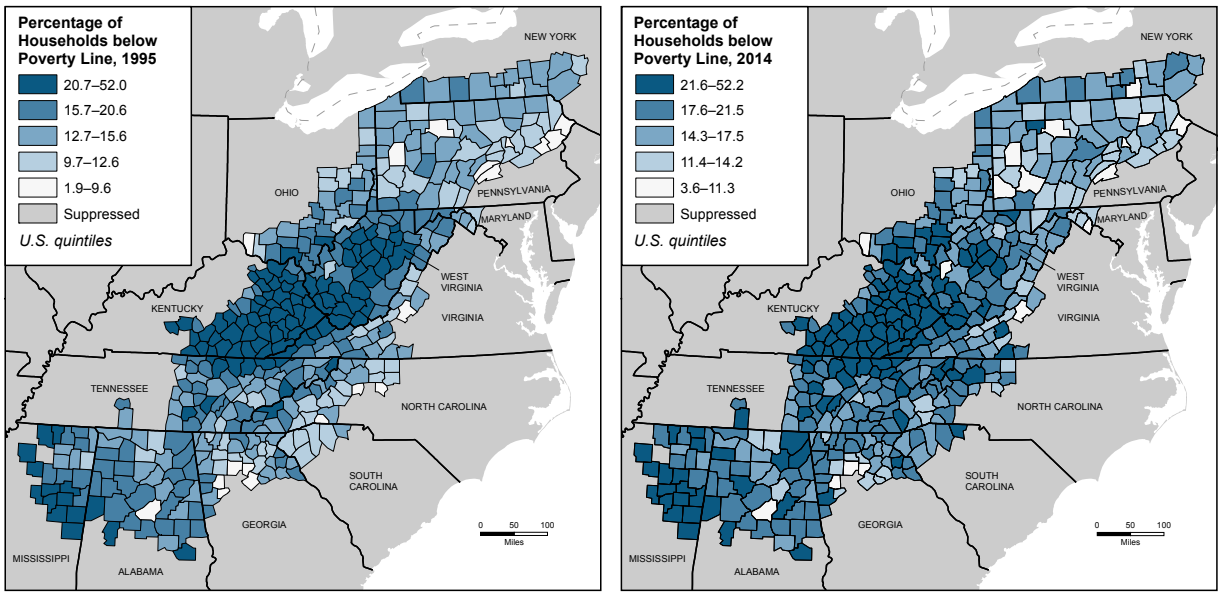
Figure 185: Changes in Household Poverty Rates in the United States and Appalachia, 1995 to 2014



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

Figure 186 maps household poverty rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate higher rates. The changes throughout the Region are subtle, though a noticeable darkening has taken place in both the South Central and Southern subregions. Central Appalachia—and particularly eastern Kentucky—largely consists of counties ranking in the worst-performing national quintile.

Figure 186: Map of Percentage of Household Poverty Rates in the Appalachian Region, 1995 and 2014



Data source: 1995 Poverty and Median Household Income Estimates - Counties, States, and National; Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program
http://www.census.gov/did/www/saipe/data/statecounty/data/1995.html
2014 Poverty and Median Household Income Estimates - Counties, States, and National; Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, Release date: December 2015
http://www.census.gov/did/www/saipe/data/statecounty/data/2014.html

The changes in household poverty rates for the United States, Appalachia, and the Appalachian subregions are shown in Table 67. All five regions experienced increases in rates, with South Central Appalachia (13.5 percent to 18.2 percent) and Southern Appalachia (12.9 percent to 16.9 percent) experiencing the biggest jumps. These two subregions had household poverty rates lower than the national average in 1995; in 2014, both were well above the national rate. Central Appalachia's household poverty rate was the highest in 1995 (24.7 percent) and remains as such in 2014 (24.9 percent).

Table 67: Change in Household Poverty Rates, 1995 to 2014

Geographic Area	1995	2014	Percentage Point Change
United States	13.6	15.6	+2.0
Appalachia	14.2	17.2	+3.0
Rest of United States	13.6	15.4	+1.8
Northern Appalachia	12.4	14.8	+2.4
North Central Appalachia	17.4	18.2	+0.8
Central Appalachia	24.7	24.9	+0.2
South Central Appalachia	13.5	18.2	+4.7
Southern Appalachia	12.9	16.9	+4.0

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

The distribution of household poverty rates among national quintiles for Appalachian counties is shown in Table 68. Of the 420 counties in the Region, 104 (25 percent) ranked in the worst-performing national quintile in 1995, a number that increased to 122 (29 percent) in 2014. There was an also increase in the number of counties ranking in the second worst-performing national quintile, going from 113 counties in 1995 to 131 counties in 2014. Based on the maps and subregional trends noted above, much of this redistribution has taken place in the South Central and Southern subregions.

Table 68: Distribution of Household Poverty 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.*
Household Poverty, 1995	19	*5%*	62	*15%*	122	*29%*	113	*27%*	104	*25%*
Household Poverty, 2014	17	*4%*	52	*12%*	98	*23%*	131	*31%*	122	*29%*

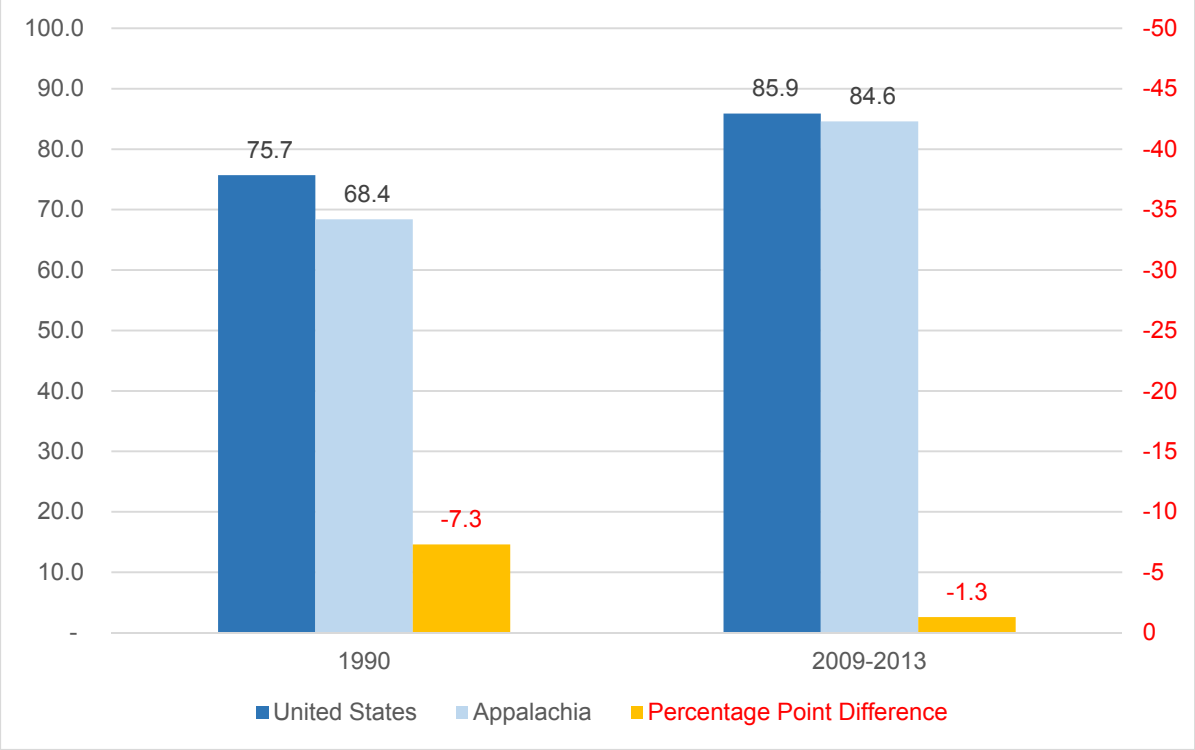
Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx. The number of counties across all five quintiles for this indicator may not sum to 420 due to missing or suppressed values.

Percentage of Adults with at Least a High School Diploma

The percentage with at least a high school diploma is the proportion of the adult population that has earned a high school diploma. Increases in these percentages over time may signify improvement in a community's overall health, as higher education levels are associated with increased health literacy and, in turn, improved health outcomes. This measure differs from the education variable used in the Social Determinants domain of the report that looks at the percentage of a population that has attended a postsecondary educational institution.[7] A number of factors influence postsecondary attendance—including a general trend towards increased attendance in recent years—whereas high school diploma rates capture a long-standing baseline.

Between 1990 and 2009–2013, the Appalachian Region experienced a large increase in the percentage of its population that had earned a high school diploma, increasing from 68.4 percent to 84.6 percent. The United States also experienced an increase over the same time period, going from 75.7 percent to 85.9 percent. As such, the gap between Appalachia and the nation overall shrunk during this time. As shown in Figure 187, the percentage of adults with a high school diploma in Appalachia was 7.3 percentage points lower than the percentage in the United States overall in 1990, but by 2013, the rate in the Region was just 1.3 percentage points lower—signifying a decreasing disparity.

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

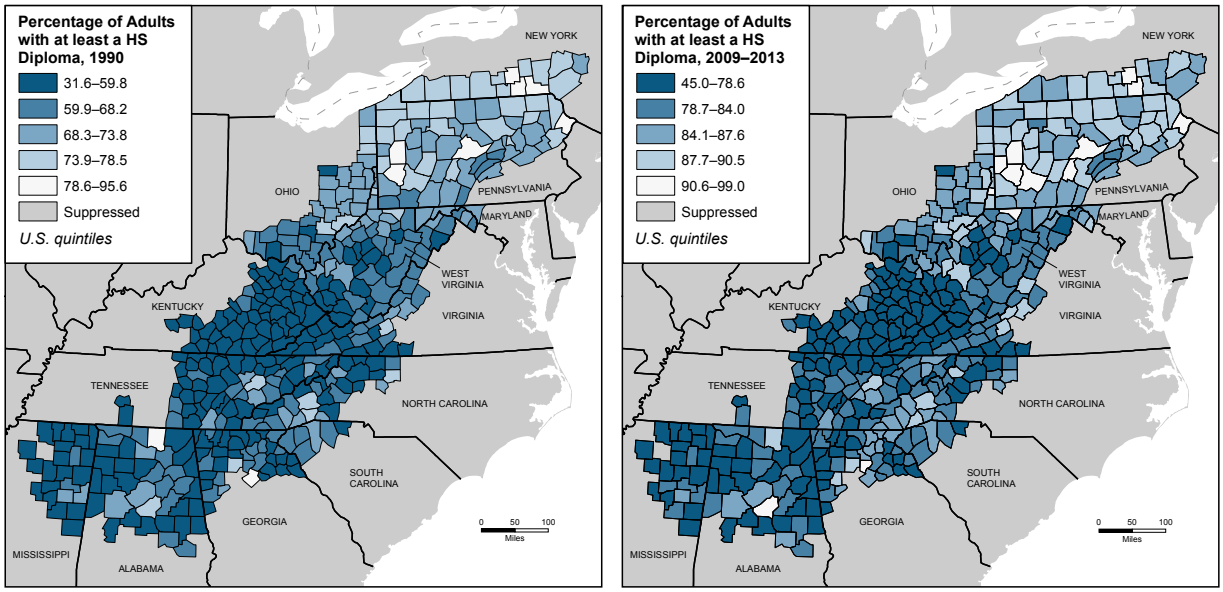


Data source for authors' calculations shown above: Appalachian_Health_Disparities_Data.xlsx.

[7] This indicator measures the percentage of adults that have at least high school diploma, while the indicator in the Social Determinants domain measures the percentage of adults that have attended a postsecondary institution.

Figure 188 maps household poverty rates for Appalachian counties during the two time periods, grouped by national quintiles. Darker colors indicate lower percentages. Although the South Central and Southern subregions still contain many counties ranking in the worst-performing national quintile, improvement has been made over the past two decades. However, many counties throughout the Region—and particularly those in Central Appalachia—remain in the bottom national quintile.

Figure 188: Map of Percentage of Adults with at least a High School Diploma in the Appalachian Region, 1990 and 2013



Data source: Area Resource File (ARF) 1998; U.S. Department Of Health And Human Services, Health Resources And Services Administration, Bureau Of Health Professions, Office Of Research And Planning, February 1998. http://ahrf.hrsa.gov/
Area Health Resources File (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://ahrf.hrsa.gov/

The changes in the percentage of adults with at least a high school diploma for the United States, Appalachia, and the Appalachian subregions are shown in Table 69. Each of the five subregions experienced increases that outpace the nation as a whole, though it should be noted that only Northern Appalachia has a higher percentage than the national average. Central Appalachia improved the most among the subregions: from 52.1 percent in 1990 to 75.0 percent in 2013, although this recent figure still lags well behind the other subregions.

Table 69: Change in Percentage of Adults with at least a High School Diploma, 1990 and 2009–2013

Geographic Area	1990	2013	Percentage Point Change
United States	75.7	85.9	+10.2
Appalachia	68.4	84.6	+16.2
Rest of United States	76.3	86.0	+9.7
Northern Appalachia	74.7	89.0	+14.3
North Central Appalachia	67.8	84.8	+17.0
Central Appalachia	52.1	75.0	+22.9
South Central Appalachia	65.6	83.6	+18.0
Southern Appalachia	67.4	82.8	+15.4

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

The distribution of the percentage of adults with at least a high school diploma among national quintiles for Appalachian counties is shown in Table 70. Of the 420 counties in the Region, 197 (47 percent) ranked in the worst-performing national quintile in 1990, a number that decreased to 161 (38 percent) in 2013. Although progress has been made, the distribution of low education levels throughout Appalachia remains disproportionate, with 65 percent of Appalachian counties ranking in the two worst-performing national quintiles.

Table 70: Distribution of Percentage of Adults with at least a High School Diploma among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
High School Diploma, 1990	9	*2%*	41	*10%*	76	*18%*	97	*23%*	197	*47%*
High School Diploma, 2009-2013	13	*3%*	57	*14%*	77	*18%*	112	*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.