Quality of Care

KEY FINDINGS | Electronic Prescribing

- Electronic prescribing is less common in the Appalachian Region (63.8 percent of prescriptions) than in the nation as a whole (65.8 percent).
- Use of electronic prescriptions is higher in North Central (68.5 percent) and Northern Appalachia (67.1 percent) than in the nation as a whole, while Central Appalachia (53.3 percent) lags far behind.
- There is an urban-rural divide in the use of electronic prescribing throughout the Region, with large metro areas (64.7 percent) and small metro areas (65.6 percent) reporting a higher rate than rural areas (60.6 percent).
- Health care providers in the Appalachian Region's non-distressed counties are more likely to utilize electronic prescribing than those in the Region's distressed counties (64.2 percent compared to 57.7 percent).

Background

Electronic prescribing measures the percentage of physicians who use electronic delivery technology when writing and sending their patients' prescriptions to pharmacies. The figures for this measure come from 2014 data released by the Office of the National Coordinator for Health Information Technology. These data analyze the usage of the Surescripts network, an e-prescription service utilized by most community pharmacies throughout the United States. The measure includes both new and renewal prescriptions, excluding controlled substances.

Electronic prescribing is a method of delivering a patient's prescription directly from the provider to the pharmacy rather than relying on the patient to transport the prescription. A review of the practice concluded that in addition to being more efficient and convenient, e-prescribing reduced the risk of adverse drug events and medication errors (Ammenwerth, Schnell-Inderst, Machan, & Siebert, 2008).

There is variation among communities in the use of electronic health records, of which e-prescribing is one component (Samuel, 2014). Because this is a relatively new development from a public health standpoint, community impact and determinants of e-prescribing are not yet well known. E-prescribing requires broadband access to carry the level and type of data associated with this technology, and patterns of low use may simply reflect a lack of access to broadband.

Overview: Electronic Prescribing in the Appalachian Region

Electronic prescribing is less commonly used in the Appalachian Region than in the United States as a whole, although the difference is modest: 63.8 percent in the Region compared to 65.8 percent at the national level. There is a great deal of variation among the subregions, however, with North Central (68.5 percent) and Northern Appalachia (67.1 percent) reporting numbers much higher than Central (53.3 percent) and Southern Appalachia (61.5 percent). South Central Appalachia reports that 63.5 percent of its prescriptions are filled electronically, a figure similar to the overall Regional mark.

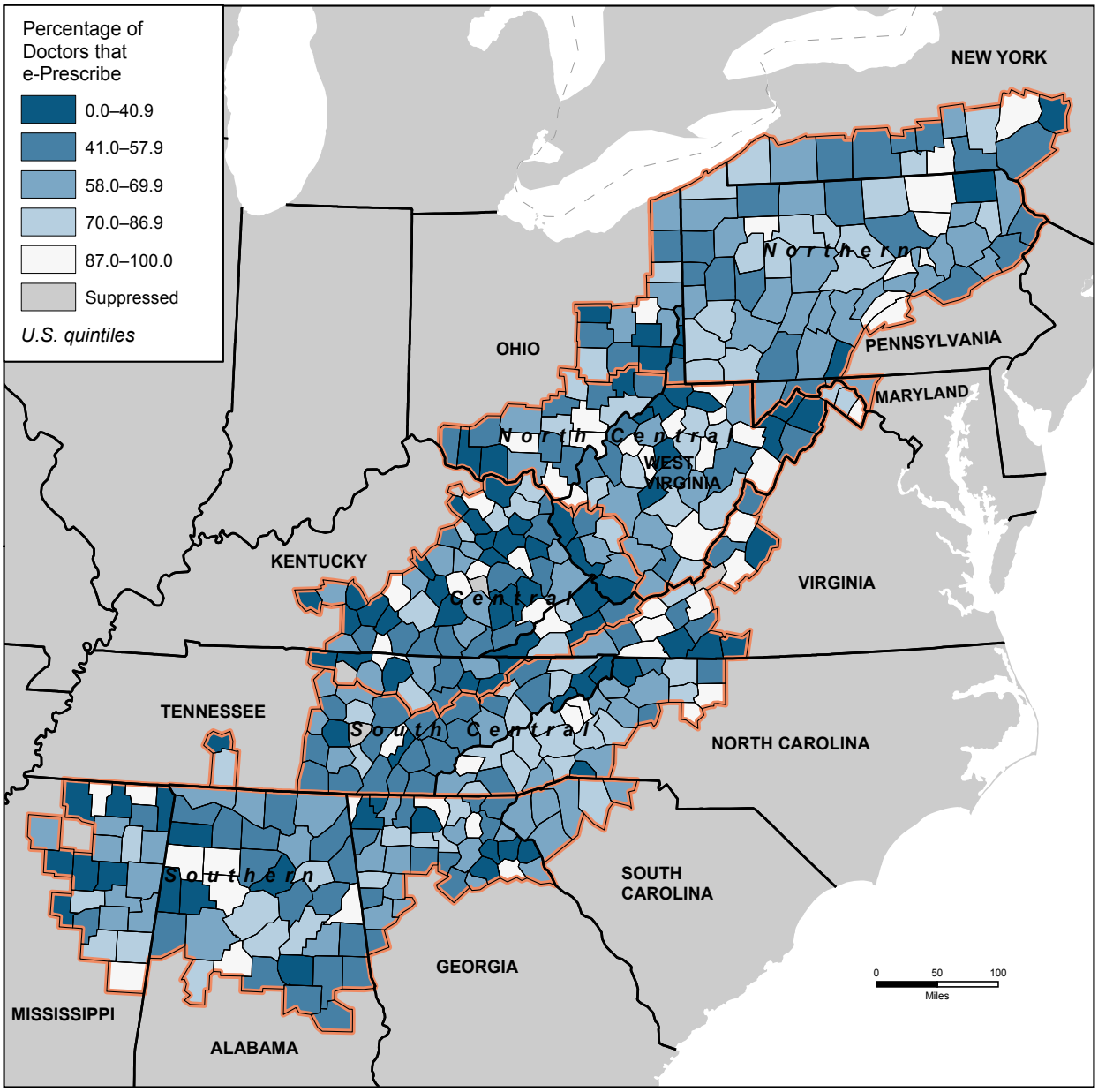
There is an urban-rural divide in the prevalence of electronic prescribing throughout the Region, with large metro areas (64.7 percent) and small metro areas (65.6 percent) reporting higher percentages than rural areas (60.6 percent). There is also a divide based on a county's economic status, as health care providers in non-distressed Appalachian counties (64.2 percent) are more likely to utilize electronic prescribing than those in the Region's distressed counties (57.7 percent).

Unlike many other measures included in this report, e-prescribing appears to be largely localized in nature, with few concentrated areas of counties ranking in the same national quintile. Each of the five subregions contains multiple counties in both the best- and worst-performing national quintiles. The same can be said for many of the states throughout the Region, with many instances of counties in the bottom quintile bordering those in the top quintile. The Appalachian portions of Tennessee (54.7 percent), Kentucky (56.1 percent), and Virginia (57.7) all report low levels of e-prescription usage, all of which are well below the numbers reported by the non-Appalachian portions of the three states. Both Appalachian North Carolina (76.3 percent) and Appalachian South Carolina (70.5 percent) report percentages higher than both the national figure, as well as the non-Appalachian portions of the two states.

Figure 141 shows the variation in the use of e-prescriptions across the Appalachian Region, grouped by national quintiles. Darker colors indicate lower usage; for this measure, higher values are associated with better health. The checkerboard nature of the map suggests that the measure is highly variable at a local level.

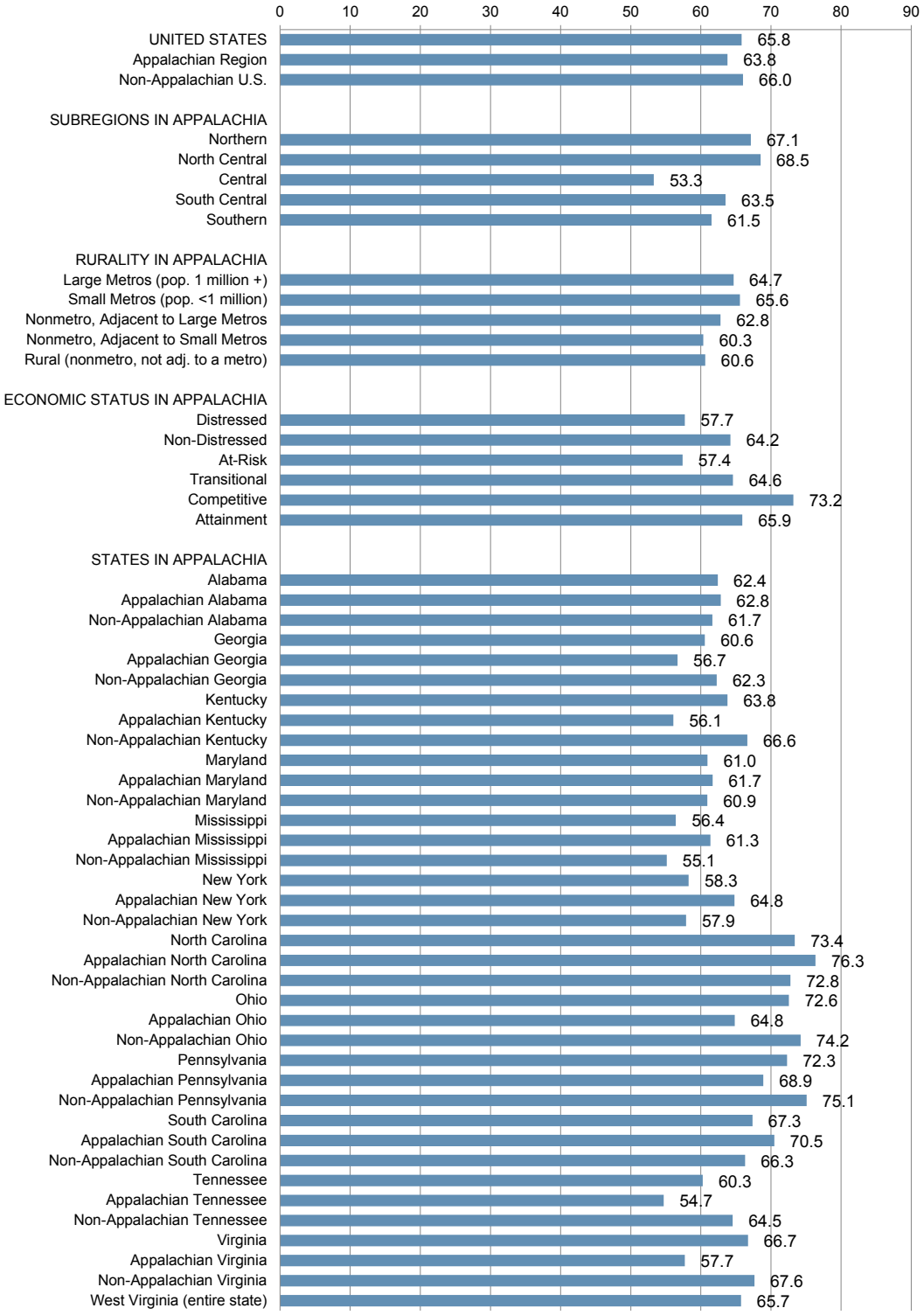
Figure 142 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 141: Map of Percentage of Physicians that e-Prescribe in the Appalachian Region, 2014



Data source: The Office of the National Coordinator for Health Information Technology. U.S. Department of Health and Human Services. http://dashboard.healthit.gov/datadashboard/documentation/electronic-prescribing-adoption-use-data-documentation.php.

Figure 142: Chart of Percentage of Physicians that e-Prescribe, 2014

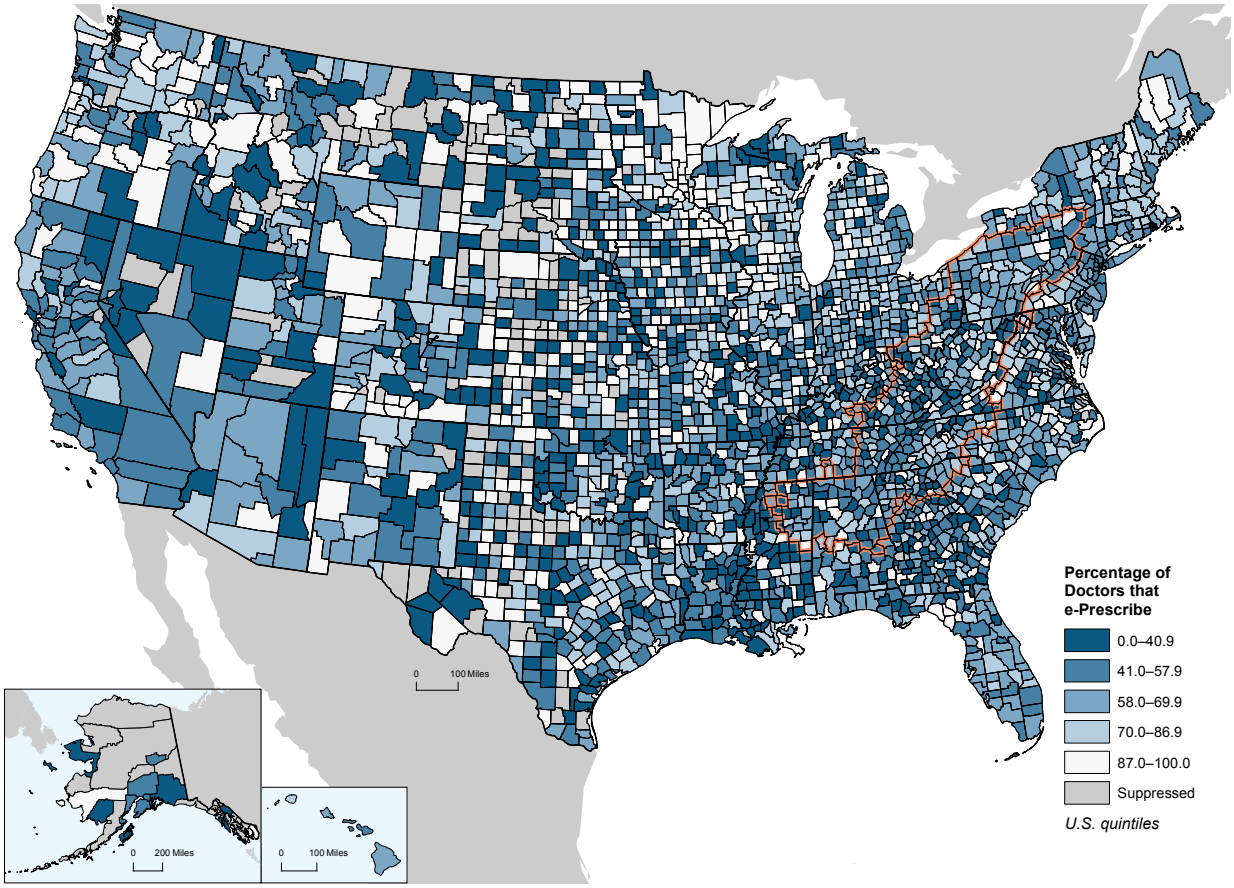


Data source: The Office of the National Coordinator for Health Information Technology. U.S. Department of Health and Human Services. http://dashboard.healthit.gov/datadashboard/documentation/electronic-prescribing-adoption-use-data-documentation.php.

Overview: Electronic Prescribing in the United States

Figure 143 shows the variation in the prevalence of electronic prescribing across the United States. Similar to the map of the Appalachian Region, the national map resembles a checkerboard, with few regional patterns discernible. Areas throughout the upper Midwest and Northeast tend to display higher percentages than elsewhere, although many counties ranking in the worst-performing quintiles can still be found. The Mississippi Delta and parts of the Southeast, meanwhile, tend to have larger numbers of counties ranking in the worst-performing quintile, although counties ranking in the top-performing quintile can still be found. Overall, there is significant variation across the country, including within both regions and states.

Figure 143: Map of Percentage of Physicians that e-Prescribe in the United States, 2014

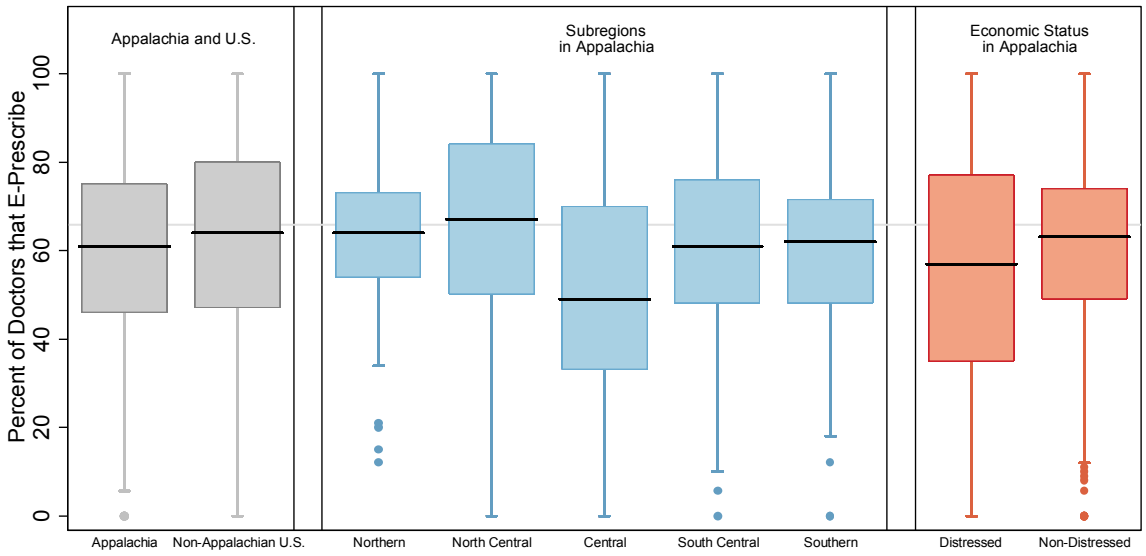


Data source: The Office of the National Coordinator for Health Information Technology. U.S. Department of Health and Human Services. http://dashboard.healthit.gov/datadashboard/documentation/electronic-prescribing-adoption-use-data-documentation.php.

Distribution of Electronic Prescribing

Figure 144 shows the distribution of e-prescribing percentages by geography and economic status. The shaded boxes show the middle 50 percent of 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, 199 have a missing value for this indicator.

Figure 144: Box Plot of Percentage of Physicians that e-Prescribe by Geography and Economic Status, 2014



Grey line denotes national average. 199 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with better health.

Data source: The Office of the National Coordinator for Health Information Technology. U.S. Department of Health and Human Services. http://dashboard.healthit.gov/datadashboard/documentation/electronic-prescribing-adoption-use-data-documentation.php.

The distribution of e-prescribing percentages among national quintiles for Appalachian counties is shown in Table 47. Of the 420 counties in the Region, 82 (20 percent) rank in the worst-performing national quintile, while 58 (14 percent) rank in the best-performing national quintile.

Table 47: Distribution of Percentage of Physicians that e-Prescribe among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
Electronic prescriptions	58	*14%*	74	*18%*	94	*22%*	107	*25%*	82	*20%*

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 | Medicare Mammogram Screenings

- The percentage of Medicare-covered women undergoing mammogram screenings in the Appalachian Region is comparable to the percentage at the national level. In the Region, 61.4 percent of Medicare-covered women ages 67 to 69 have had a recent mammogram, a number similar to the 62.1 percent reported in the nation as a whole.
- Mammogram screenings are not nearly as prevalent in Central Appalachia, where only 53.7 percent of Medicare-covered women ages 67 to 69 have had a recent screening.
- There is little difference in mammogram screening percentages of Medicare-covered women in terms of rurality in the Appalachian Region, with large metro areas (58.9 percent) and rural areas (57.3 percent) reporting similar figures.
- A county's economic status is an indicator of mammogram screening prevalence, with Medicare-covered women in the Appalachian Region's non-distressed counties (61.9) reporting a much higher screening percentage than the Region's distressed counties (53.9 percent).

Background

This indicator measures the percentage of female fee-for-service Medicare beneficiaries ages 67 to 69 that have received a mammogram in the past two years. The figures for this measure are based on 2013 data provided to County Health Rankings from the Dartmouth Atlas of Health Care. In general, a higher percentage of women undergoing mammogram screenings reflects a better quality of care available in a community.

Breast cancer is the second most common cause of cancer death among females in the United States, and getting regular mammograms can lower a woman's risk of dying from the disease (Centers for Disease Control and Prevention, Breast Cancer, 2017). The national mortality rate from breast cancer has been declining since 1990, and some estimates suggest that the rate has dropped approximately 10 percent due in large part to screening and early detection (National Cancer Institute, 2017). The U.S. Preventive Services Task Force recommends regular mammograms every two years for women ages 50 to 74 (U.S. Preventive Services Task Force, Final Recommendation Statement: Breast Cancer: Screening, 2016). Past research based in several Appalachian states found that counties with lower socioeconomic statuses and lower mammogram screening percentages had, in turn, higher rates of late stage breast cancer (Anderson, et al., 2014).

While the measure itself represents only a subset of women recommended for screening, it may be useful as a proxy for the delivery system for breast cancer screenings available to all women. With nearly all women ages 67 to 69 eligible for or covered by Medicare, and Medicare covering one mammogram

screening every 12 months, lack of health insurance is not an access barrier for this group. Hence, this indicator attempts to capture the quality of the delivery system and its ability to provide procedures to all qualified beneficiaries, an important indicator of overall health care system quality.

Overview: Medicare Mammogram Screening Rates in the Appalachian Region

Overall, 61.4 percent of all Medicare-covered women ages 67 to 69 in the Appalachian Region have received a recent mammogram, compared to 62.1 percent in the nation as a whole. While both South Central Appalachia (65.0 percent) and Southern Appalachia (62.8 percent) have figures marginally above the national mark, Central Appalachia has a large number of counties ranking in the worst-performing quintile, with the mammogram screening percentage in the subregion at 53.7 percent.

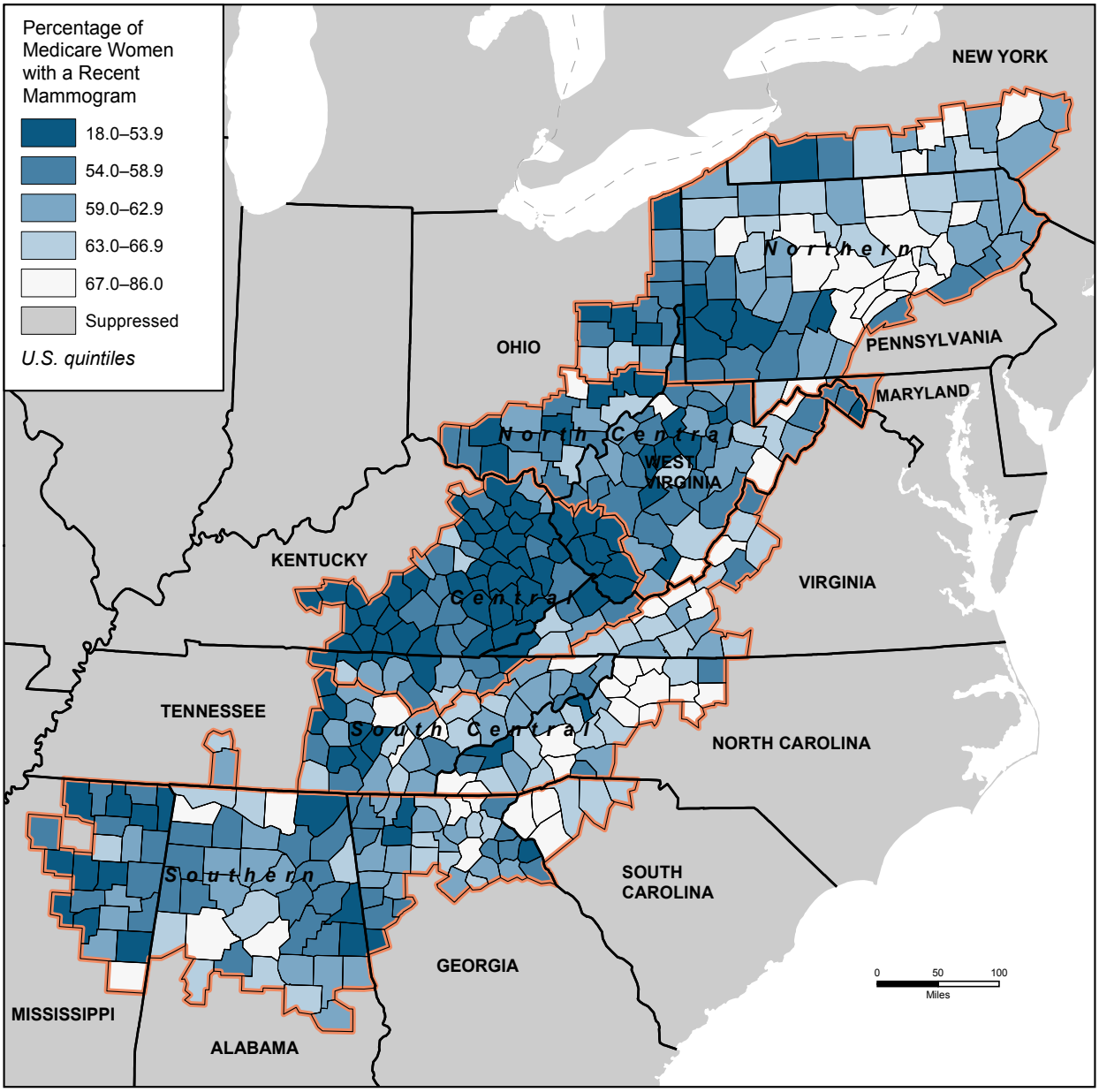
Unlike many other measures included in this report, there is no stark urban-rural divide in terms of mammogram screening prevalence throughout the Region. Of the five urban-rural classifications, the two ends of the spectrum—large metro areas (58.9 percent) and rural areas (57.3 percent)—have similar percentages. The three classifications found within the large metro and rural areas all have percentages above these figures, with small metro areas (63.8 percent) reporting the highest. Similar to many other measures in this report, a county's economic status is an indicator of mammogram screening prevalence, as non-distressed Appalachian counties report a much higher percentage than the Region's distressed counties (61.9 percent compared to 53.9 percent).

Following the subregional trends, Appalachian Kentucky reports the lowest mammogram screening percentage in the Region at 52.2 percent. Seven of the Appalachian portions of states report figures higher than the national mark: South Carolina (67.6 percent), North Carolina (67.0 percent), Maryland (65.8 percent), New York (64.8 percent), Alabama (63.6 percent), Virginia (63.1 percent), and Tennessee (63.1 percent).

Figure 145 shows the variation in mammogram screenings among female Medicare beneficiaries ages 67 to 69, grouped by national quintiles. Darker blue indicates that a lower percentage of women have had this screening; for this measure, higher values are associated with better health. The map displays a high level of variation within each subregion and within states. Central Appalachia and Appalachian Kentucky are noticeable for having a large number of counties classified in the worst-performing national quintile.

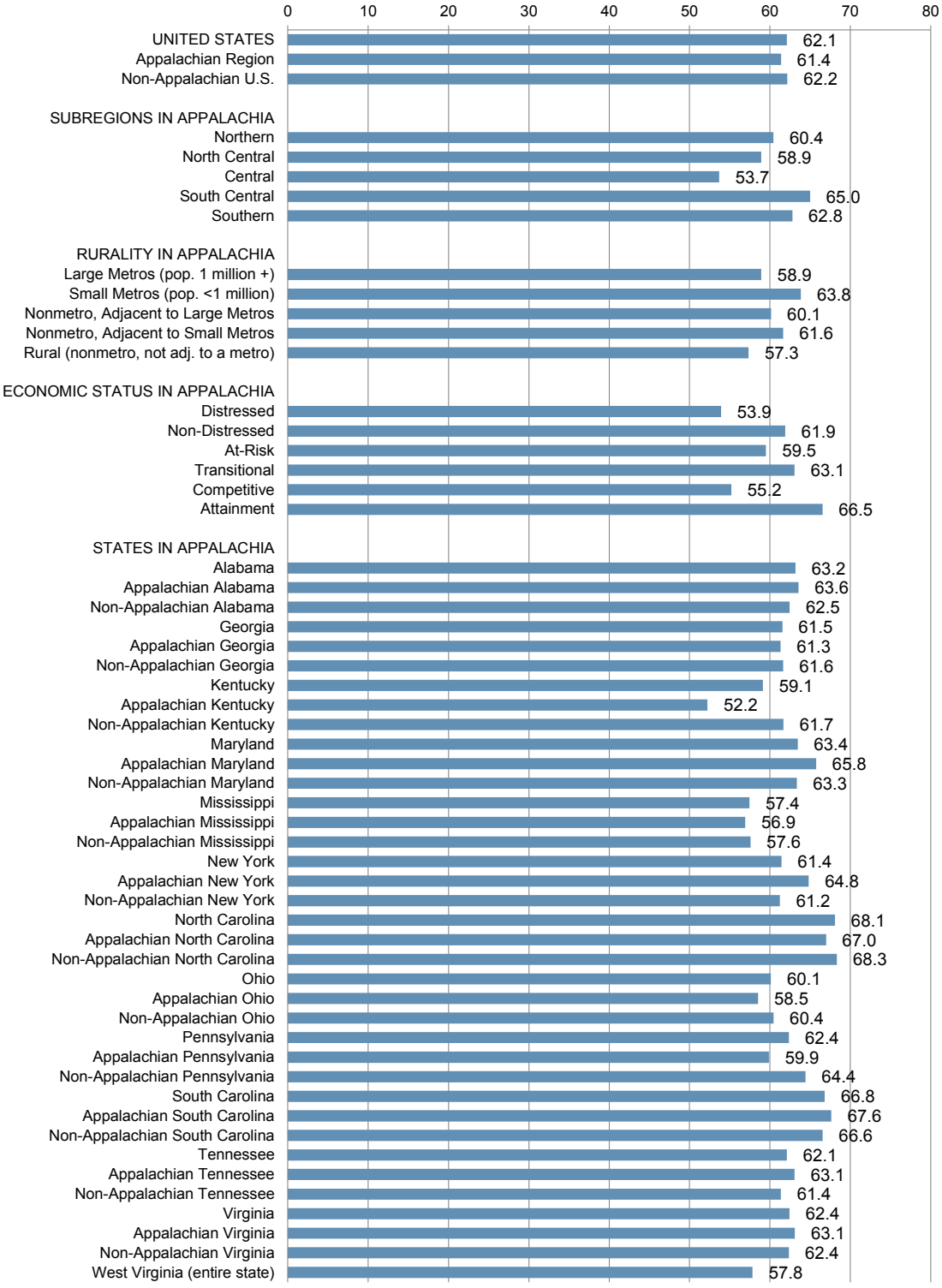
Figure 146 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 145: Map of Percentage of Medicare-covered Women Ages 67 to 69 with a Recent Mammogram Screening in the Appalachian Region, 2013



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

Figure 146: Chart of Percentage of Medicare-covered Women Ages 67 to 69 with a Recent Mammogram Screening, 2013

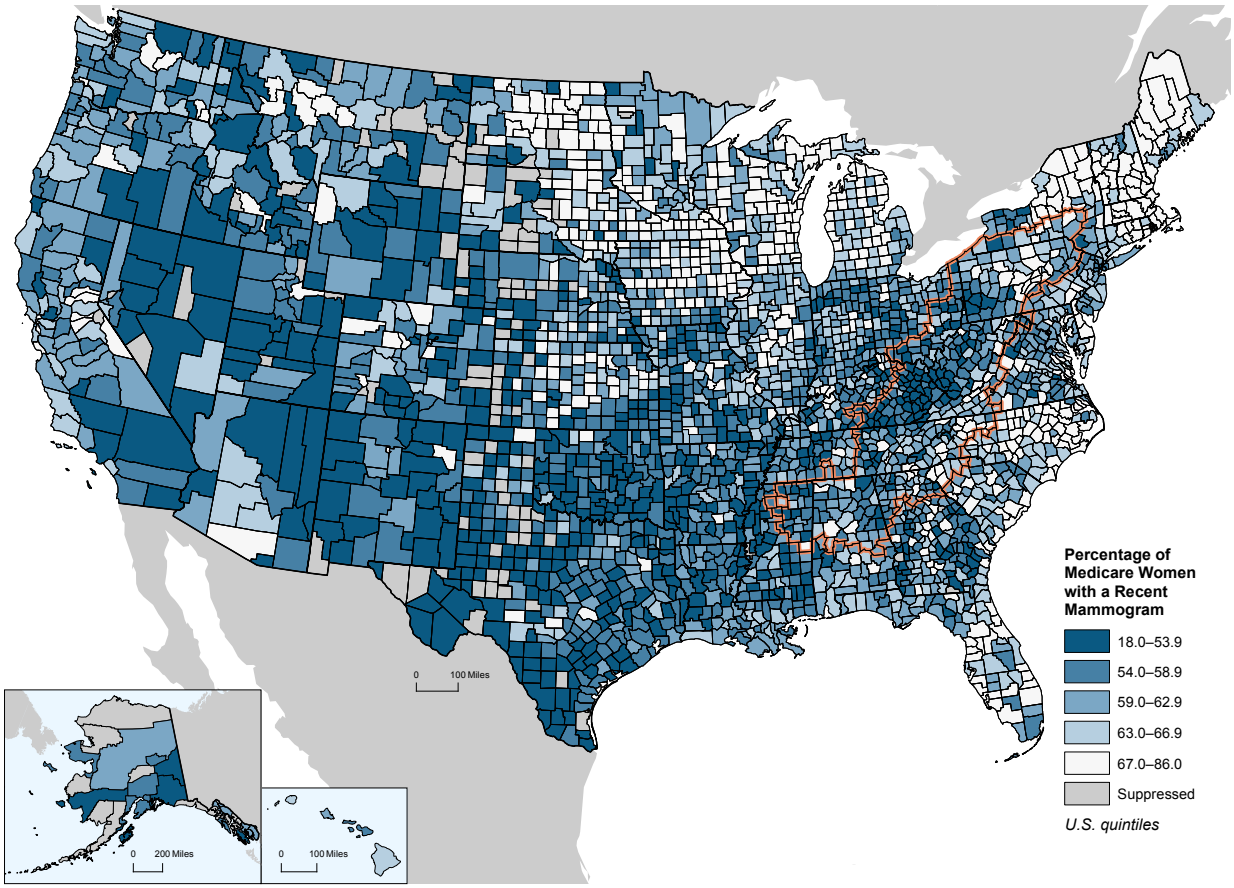


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation. http://www.countyhealthrankings.org/rankings/data

Overview: Medicare Mammogram Screening Rates in the United States

Figure 147 shows the variation in mammogram screening percentages across the United States for Medicare-covered women ages 67 to 69. Much of the East Coast reports high levels, with counties in the top-performing quintile stretching from Maine to Florida. The upper Midwest also contains a large number of counties ranking in the top-performing quintile. The concentration of poor-performing counties in Central Appalachia is noticeable in the otherwise well-performing eastern part of the country. Percentages are low in the Mississippi Delta and stretch across the country to many areas throughout the West.

Figure 147: Map of Percentage of Medicare-covered Women Ages 67 to 69 with a Recent Mammogram Screening in the United States, 2013

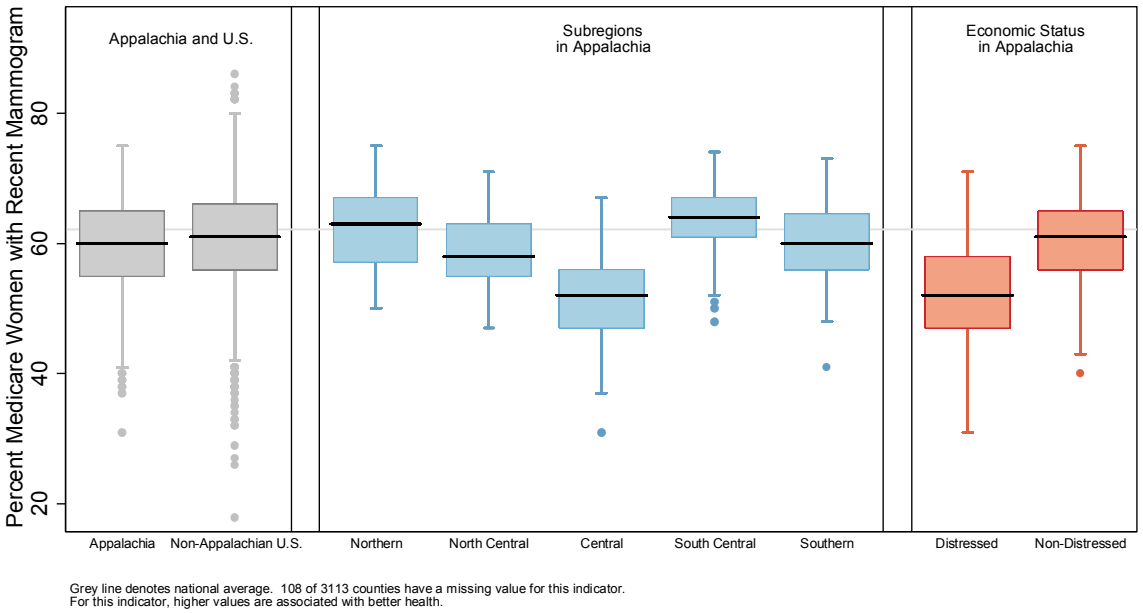


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation. http://www.countyhealthrankings.org/rankings/data

Distribution of Mammogram Screening Rates

Figure 148 shows the distribution of mammogram screenings by geography and economic status. The shaded boxes show the middle 50 percent of 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, 108 have a missing value for this indicator.

Figure 148: Box Plot of Percentage of Medicare-covered Women Ages 67 to 69 with a Recent Mammogram Screening by Geography and Economic Status, 2013



Grey line denotes national average. 108 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with better health.

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

The distribution of mammogram screening levels among national quintiles for Appalachian counties is shown in Table 48. Of the 420 counties in the Region, 104 (25 percent) rank in the worst-performing national quintile, while 56 (13 percent) rank in the top-performing national quintile.

Table 48: Distribution of Percentage of Medicare-covered Women Ages 67 to 69 with a Recent Mammogram Screening among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
Mammogram screenings	56	*13%*	69	*16%*	91	*22%*	99	*24%*	104	*25%*

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 | Medicare Diabetes Monitoring

- Diabetes monitoring is slightly higher among Medicare patients in the Appalachian Region (85.9 percent) than among Medicare patients in the United States as a whole (84.7 percent).
- There is little variation in diabetes monitoring across the subregions, with the lowest figure (North Central, 84.3 percent) and the highest (South Central, 88.0) separated by less than four percentage points.
- There is not a clear urban-rural divide in diabetes monitoring, with all five rurality classifications reporting percentages between 84.9 percent and 86.4 percent.
- There is a marginal difference in diabetes monitoring percentages based on a county's economic status. The Appalachian Region's non-distressed counties (85.9 percent) and distressed counties (84.6 percent) report similar rates.

Background

Diabetes monitoring measures the percentage of diabetic fee-for-service Medicare patients ages 65 to 75 that have tested their glycated hemoglobin (HbA1c) levels in the past year. The figures for this measure are based on 2012 data provided to County Health Rankings from the Dartmouth Atlas of Health Care. This indicator provides information on beneficiaries in Medicare's fee-for-service option only, and 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).

The successful management of diabetes requires a multi-faceted approach and includes healthy eating, staying active, reducing risk factors, and preventing complications. Elevated HbA1c levels are a risk factor for further complications from diabetes, such as heart attack, kidney disease, and neuropathy.

More frequent monitoring enables healthcare providers to better manage a patient's diabetes and potentially avoid the complications of poor management, such as amputation. This measure captures the *monitoring* of HbA1c—not the control of it. A county with a high monitoring percentage may very well have either a high or low incidence of elevated levels of HbA1c throughout its population (National Center for Health Statistics, HbA1c Test: Diabetic Medicare Beneficiaries, 2016).

Diabetes is 22 percent more prevalent among adults in Appalachia than in the nation as a whole, and the mortality rate from the disease is nearly 11 percent higher in Appalachia than the national rate. As such, regular monitoring of HbA1c levels in the population is an especially important issue for the Region.

Even after accounting for access barriers, research shows that older diabetics living in rural areas are less likely to receive adequate care compared to the non-rural, elderly diabetics (Lutfiyya, 2011).

Diabetes mortality and the prevalence of diabetes in the Region are profiled elsewhere in this report.

Overview: Medicare Diabetes Monitoring in the Appalachian Region

The Appalachian Region reports that 85.9 percent of Medicare fee-for-service patients with diabetes undergo HbA1c monitoring, a figure higher than the national mark of 84.7 percent. Four of the five subregions are at or above the national percentage, and the lone subregion below this number—North Central Appalachia (84.3 percent)—is less than one percentage point off the national mark.

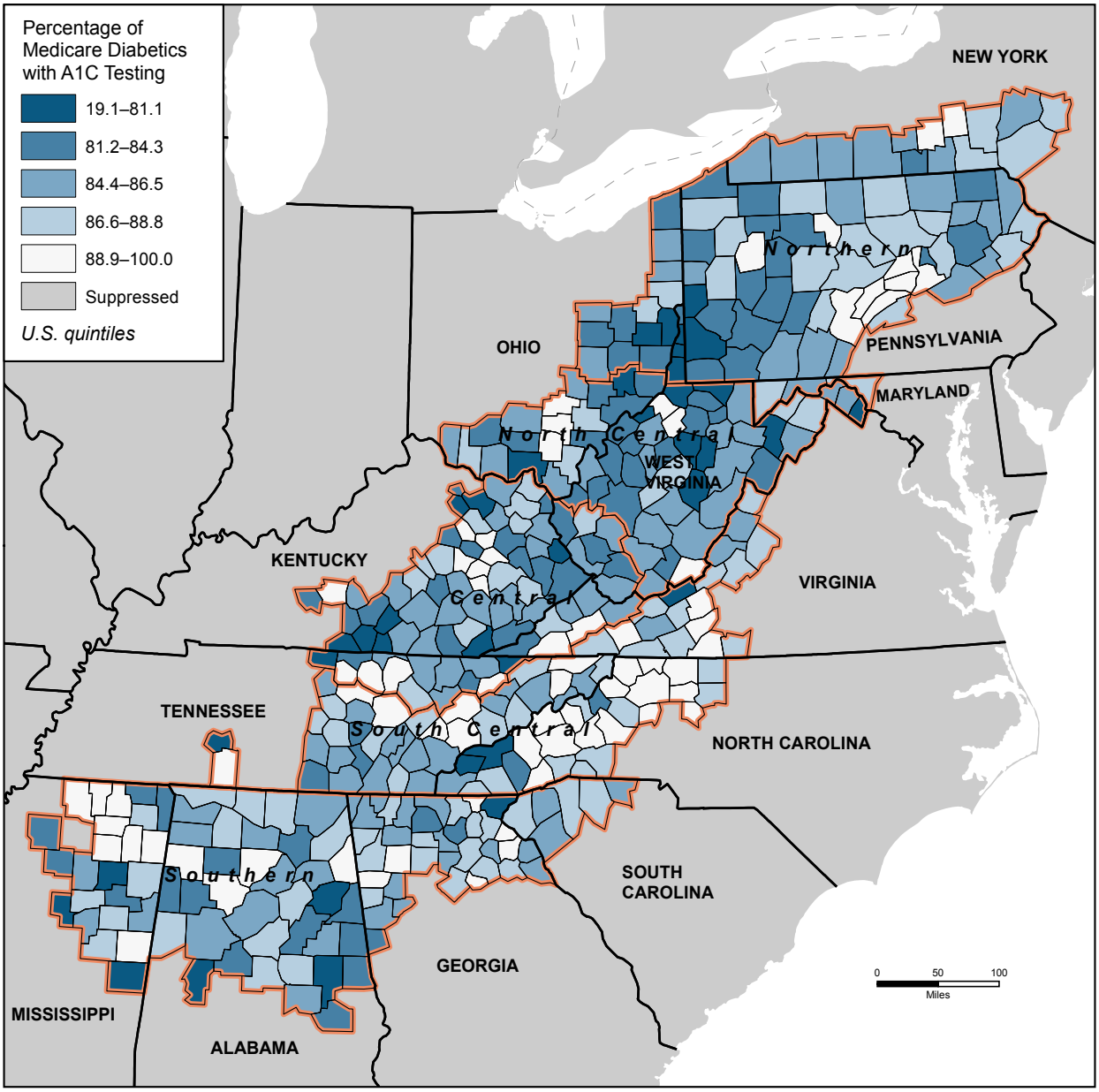
Unlike many other measures in this report, there is no urban-rural divide in diabetes monitoring, with all five classifications reporting percentages between 84.9 percent and 86.4 percent. There is a marginal difference in HbA1c testing percentages based on a county's economic status, with non-distressed Appalachian counties (85.9 percent) and distressed counties (84.6 percent) reporting similar percentages.

There is little variation in diabetes monitoring across the Appalachian portions of states within the Region. West Virginia reports the lowest percentage throughout the Region, with 83.5 percent of diabetic Medicare fee-for-service patients in the state having recently undergone HbA1c testing. In addition to West Virginia, only Appalachian Ohio (84.6 percent) and Appalachian Pennsylvania (84.5 percent) report percentages below the national mark, and the differences are small (the national level is 84.7 percent). The Appalachian portions in the following states report higher diabetes monitoring percentages than the non-Appalachian portions: Alabama, Georgia, Maryland, Mississippi, New York, South Carolina, Tennessee, and Virginia.

Figure 149 shows the variation in HbA1c testing among diabetic fee-for-service Medicare patients ages 65 to 75 across the Appalachian Region, grouped by national quintile. Darker colors indicate counties with lower testing prevalence; for this measure, higher values are associated with better health. There is a great deal of variation within the Region at both the subregional and state levels.

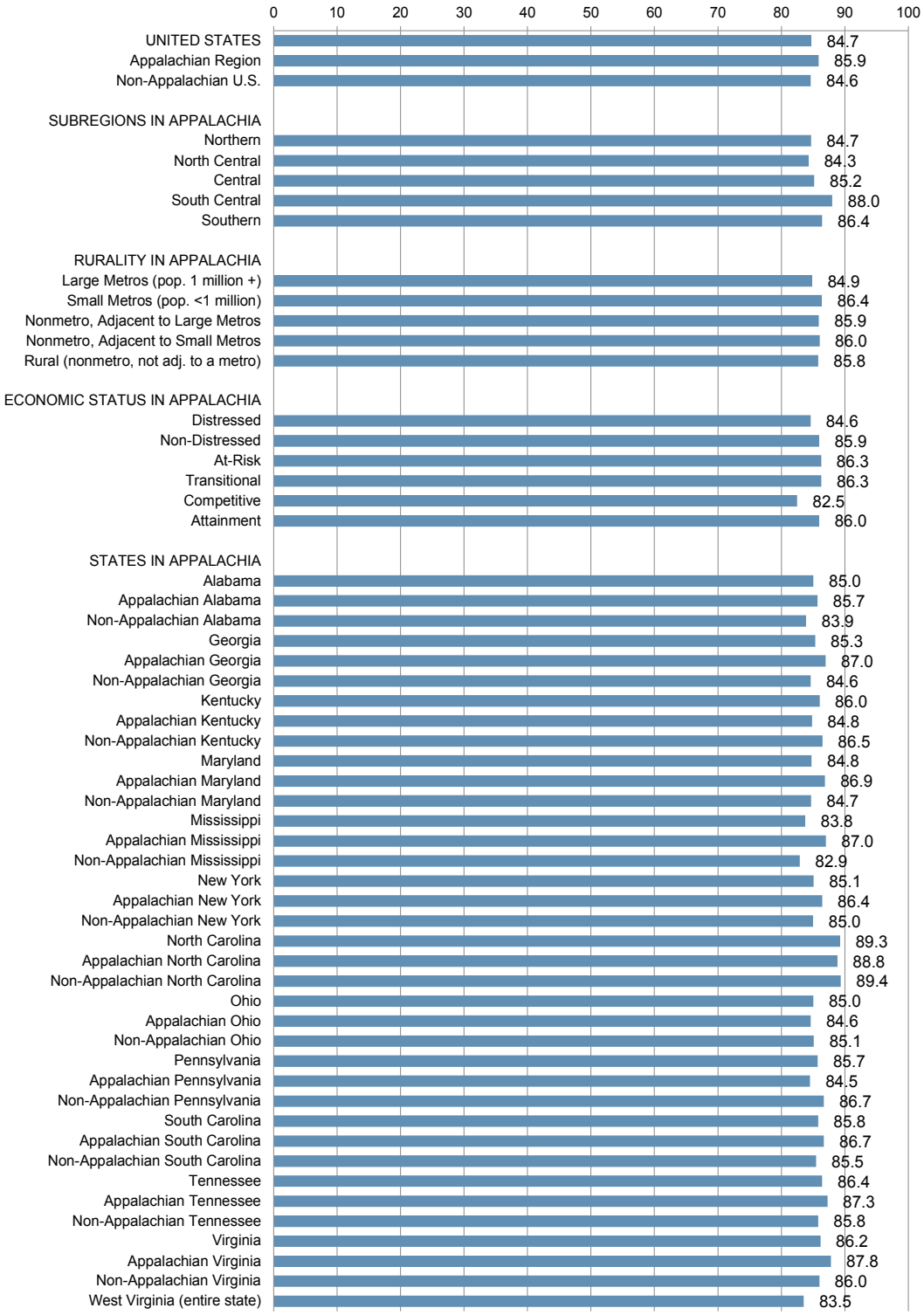
Figure 150 aggregates the data for a variety of geographies useful for comparison: the Region compared to both the U.S. as a whole and the non-Appalachian portion of the country, subregions throughout Appalachia, levels of rurality in Appalachia, and economic status in Appalachia. State-level aggregation is done at three levels: the entire state, and then both the Appalachian and non-Appalachian portions of each state.

Figure 149: Map of Percentage of Medicare Patients Ages 65 to 75 with an HbA1C Screening in the Past Year in the Appalachian Region, 2012



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

Figure 150: Chart of Percentage of Medicare Patients Ages 65 to 75 with an HbA1C Screening in the Past Year, 2012

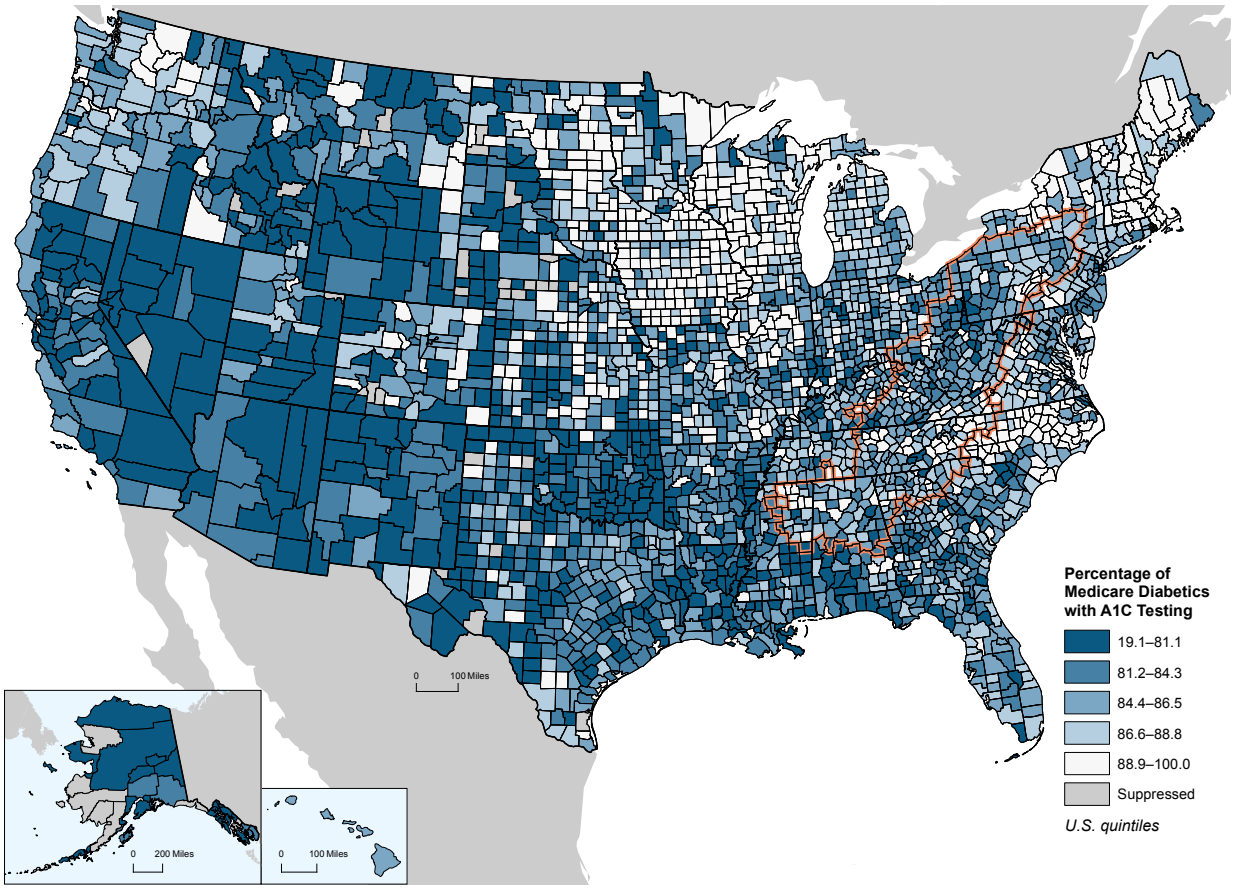


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation and the. http://www.countyhealthrankings.org/rankings/data.

Overview: Medicare Diabetes Monitoring in the United States

Figure 151 highlights variation in the percentages of diabetes monitoring across the United States. Much of the Upper Midwest and New England report high percentages. Many counties throughout North Carolina rank in the best-performing national quintile. Low testing levels begin in the Mississippi Delta, stretch across Texas and Oklahoma, and occur through much of the western half of the country. The Southwest, in particular, reports very low percentages of diabetes monitoring.

Figure 151: Map of Percentage of Medicare Patients Ages 65 to 75 with an HbA1C Screening in the Past Year in the United States, 2012

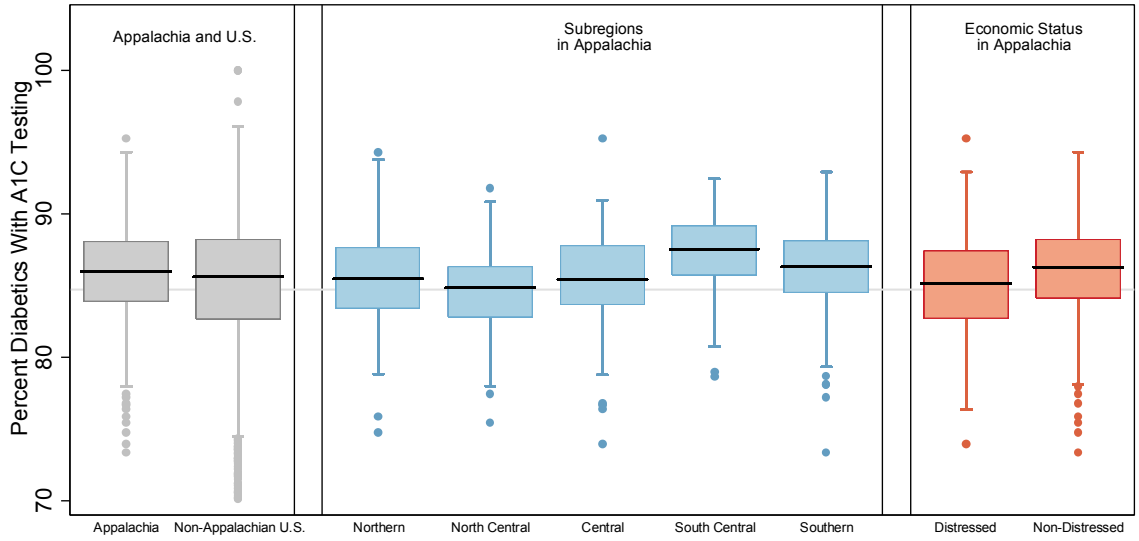


Data source: County Health Rankings & Roadmaps, 2016 edition. University of Wisconsin Population Health Institute supported by Robert Wood Johnson Foundation and the http://www.countyhealthrankings.org/rankings/data.

Distribution of Medicare Diabetes Monitoring

Figure 152 shows the distribution of HbA1c screening percentages by geography and economic status. The shaded boxes show the middle 50 percent of 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, 38 have a missing value for this indicator, and 25 counties with values less than 70 percent are not represented.

Figure 152: Box Plot of Percentage of Medicare Patients Ages 65 to 75 with an HbA1C Screening in the Past Year by Geography and Economic Status, 2012



Grey line denotes national average. 38 of 3113 counties have a missing value for this indicator.
For this indicator, higher values are associated with better health.
25 counties with values less than 70 not shown.

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

The distribution of HbA1c screening levels among national quintiles for Appalachian counties is shown in Table 49. Of the 420 counties in the Region, 38 (9 percent) rank in the worst-performing national quintile, while 74 (18 percent) rank in the best-performing national quintile.

Table 49: Distribution of Percentage of Medicare Patients Ages 65 to 75 with an HbA1C Screening in the Past Year among National Quintiles for Appalachian Counties

Indicator	Best Quintile		2nd Best Quintile		Middle Quintile		2nd Worst Quintile		Worst Quintile	
	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*	#	*Pct.*
Diabetes monitoring	74	*18%*	103	*25%*	120	*29%*	85	*20%*	38	*9%*

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

Electronic Prescriptions

Pallardy, Carrie. 25 things to know about e-prescribing. *Becker's Hospital Review*. April 7 2016. http://www.beckershospitalreview.com/healthcare-information-technology/25-things-to-know-about-e-prescribing.html

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American Diabetes Association Standards of Medical Care in Diabetes – 2016. (2016). Diabetes Care, 39(S1). Available: http://care.diabetesjournals.org/content/suppl/2015/12/21/39.Supplement_1.DC2/2016-Standards-of-Care.pdf