West Virginia State Profile of Primary Care Workforce and Social Determinants of Health

Report prepared for:
West Virginia University and
West Virginia Health Innovation Collaborative

ROBERT GRAHAM CENTER

AAFP Center for Policy Studies

HealthLandscape[SM]

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Executive Summary

The Patient Protection and Affordable Care Act (PPACA) has led to an unprecedented number of people having access to health insurance. As such, West Virginia has experienced a substantial increase in the number of people who have access to health insurance, with a large percentage coming through the expansion of Medicaid. Questions remain about the capacity of the primary care workforce to meet the increasing demand, both now and in the future. This report explores four major questions related to the current and future state of the primary care workforce capacity in the state of West Virginia:

- What is the geographic variation of the primary care workforce in West Virginia?
- Where are priority counties that lack access to primary care, have high levels of social deprivation, and have other issues related to poor social determinants of health?
- What will West Virginia's primary care workforce look like in the future and how does it compare to neighboring states?
- Are medical schools and family medicine residency programs producing physicians that are practicing in high need areas (HPSAs, MUA/Ps, rural)?

The first part of this report explores the geographic distribution of primary care physicians. County-level maps were created to visualize the distribution of primary care physicians (PCPs) and several primary care specialties, including family medicine, pediatrics, and internal medicine. The maps show consistent patterns of low rates of population per primary care physicians in rural parts of the state, particularly in the central part of the state in the Mid-Ohio Valley and Mountain Lakes regions, and in the northeast corner of the state.

The second part of this report helps to identify areas with the highest expected need, referred to as "cold spots", which are counties that have low rates of primary care physicians, high rates of uninsured populations, high levels of social deprivation, or poor health behaviors (such as smoking and obesity) and outcomes (such as mortality rates). While the patterns vary to some extent based on the indicator, counties with the highest levels of social deprivation and worst health outcomes and behaviors are generally located in rural areas in the southern and central parts of the state.

The third part of this report describes primary care workforce projections from 2015 to 2030 based on population growth, aging of the population, and the rise of insured related to PPACA. While the overall population is expected to decline, West Virginia has an aging population and increasing number of people with health insurance, which will require an increase in the number of primary care physicians. Also included in this section are primary care workforce comparisons between West Virginia and neighboring states. The results reveal that, with the exception of Pennsylvania, West Virginia has higher rates of primary care physicians than neighboring states and the highest rate of family physicians.

The final section of this report explores where medical schools and family medicine residency programs in West Virginia are sending their graduates. Overall, the residency graduates are remaining close to where they completed their residency, resulting in a lack of physicians practicing in rural areas in the central and northeast parts of the state.

Overall Lessons

- Areas of need in terms of primary care physicians and social determinants are located in the rural central and southern parts of the states.

- Similar to the primary care physician maps, footprint maps show graduates of West Virginia medical schools and residency programs not practicing in central and southern parts of the state; these areas are farther away from residency program and medical school locations.

- Despite a decline in overall population, the healthcare workforce projections reveal an increasing demand for primary care physicians in West Virginia due to an aging population and increasing number of newly insured.

- Compared to neighboring states, West Virginia has higher rates of primary care physicians per population, particularly family physicians, and lower rates of subspecialists.

- Counties in the central and eastern part of West Virginia may face larger increases in demand for primary care physicians than the rest of the state due to having higher percentages of populations 65 and older and potentially higher rates of newly insured.

Visualizing the Primary Care Workforce

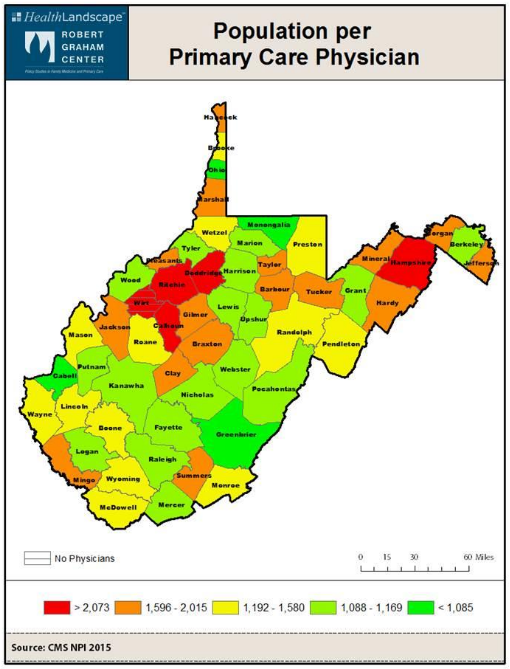
Several population (2010) per physician ratio maps were created for primary care physicians and selected primary care physician specialties, including family physicians, pediatricians, and internal medicine physicians. The maps on the following page display counties with the highest population per physician ratios in red and orange (i.e., counties with fewer physicians per population), and the lowest population per physician ratios in green (light and dark). Overall, the population per physician ratio maps reveal a lack of primary care physicians in rural areas throughout the state, particularly in west central West Virginia, in the Mid-Ohio Valley and Mountain Lakes regions, and in the northeast corner of the state. See Appendix D for population per physician maps of all primary care physician specialties, nurse practitioners, and physician assistants.

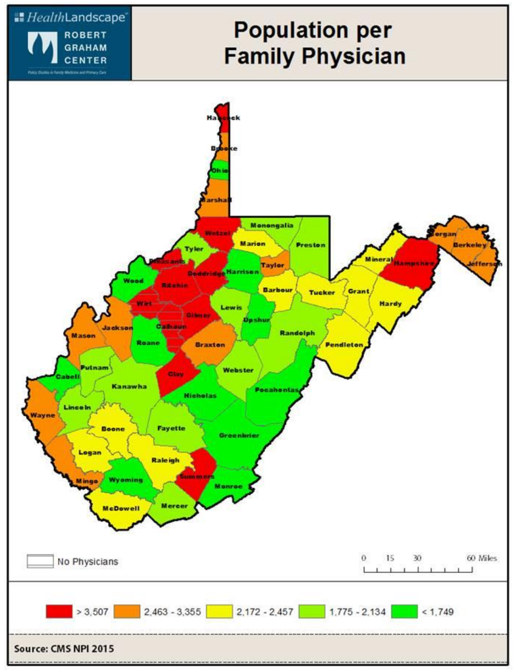
The geographic patterns for all primary care physicians are similar for the specialties of family medicine and pediatrics, which show a lack of family medicine physicians in the rural central and north central regions of the state, as well as in the northeast corner. Furthermore, the pediatrician map reveals that more than one-third of counties in West Virginia do not have a pediatrician, with these counties concentrated in the central part of the state.

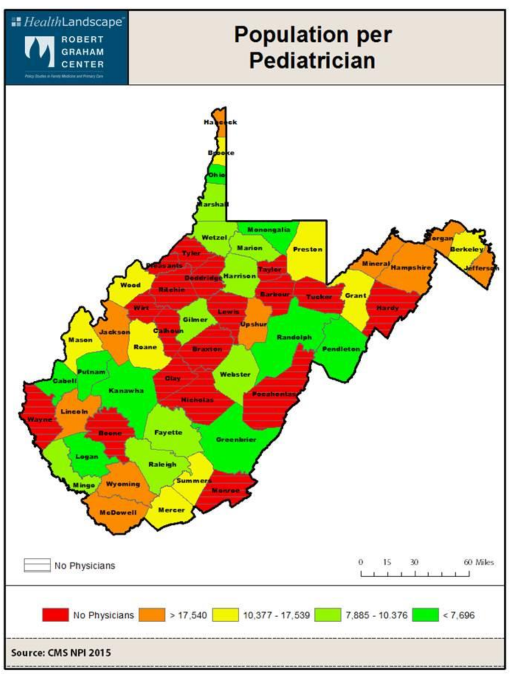
The distribution of the ratio of population to internal medicine physicians is markedly different than other primary care physicians. With the exception of small clusters of counties in the northeast and south, counties lacking internal medicine physicians are scattered throughout the state. Counties with the lowest population to physician ratios for internal medicine are located primarily in counties with more dense populations near urban regions.

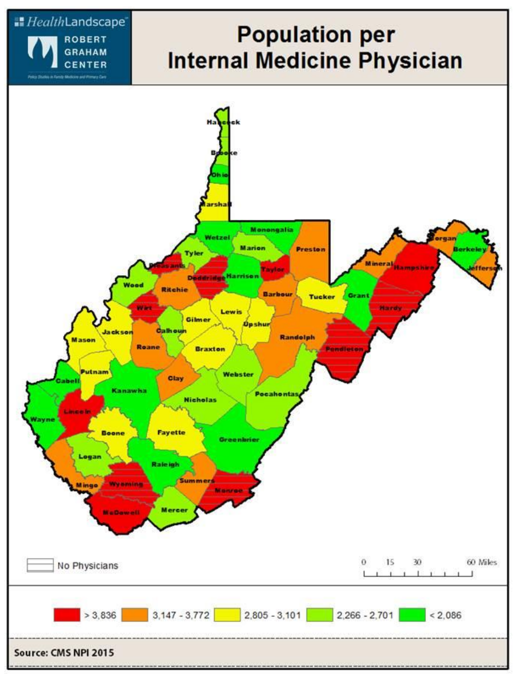
Overall Lessons:

- Rural areas of the state are most in need of primary care physicians. These counties are primarily located in central and northern parts of the state in the Mid-Ohio Valley and Mountain Lakes regions, as well as the northeastern corner.


HealthLandscape
ROBERT GRAHAM CENTER
Population per
Primary Care Physician
No Physicians
0 15 30 60 Miles
> 2,073
1,596 - 2,015
1,192 - 1,580
1,088 - 1,169
< 1,085
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per
Family Physician
No Physicians
0 15 30 60 Miles
> 3,507
2,463 - 3,355
2,172 - 2,457
1,775 - 2,134
< 1,749
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per
Pediatrician
No Physicians
0 15 30 60 Miles
No Physicians
> 17,540
10,377 - 17,539
7,885 - 10,376
< 7,696
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per
Internal Medicine Physician
No Physicians
0 15 30 60 Miles
> 3,836
3,147 - 3,772
2,805 - 3,101
2,266 - 2,701
< 2,086
Source: CMS NPI 2015

Pinpointing Areas of High Need (Cold-Spots)

Maps were created for a variety of indicators related to the social determinants of health, access to healthcare, health behaviors, and health outcomes. Overall, maps revealed relatively consistent patterns for poverty, social deprivation, and health behaviors and outcomes, where counties of higher need and poorer health are located in the rural central and southern parts of the state. See Appendix E for maps of all indicators.

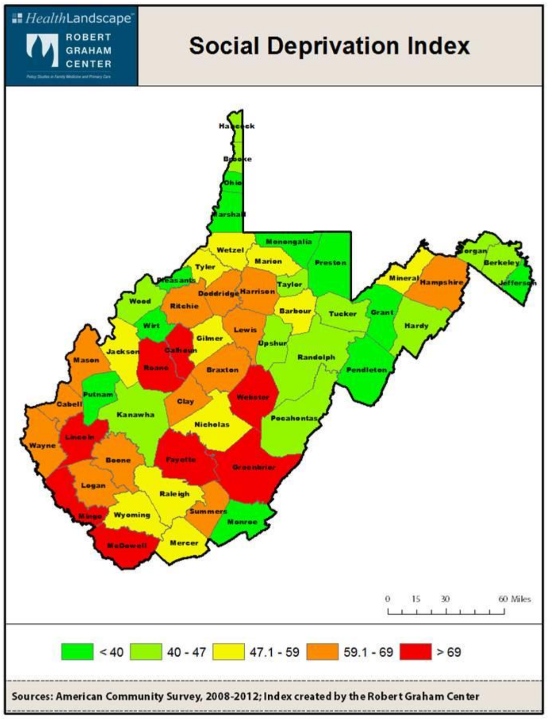
The first map on the following page displays the geographic distribution of social deprivation for West Virginia counties by quintiles, where counties in red have the highest levels of social deprivation and counties in green have the lowest. The Social Deprivation Index (SDI) is calculated from several variables, including the following: percent poverty, percent black, percent less than high school education, percent single parent households, percent rented housing units, percent overcrowded housing units, percent of households without a car, percent unemployed, and percent unemployed adults under 65 years of age (see Butler et al., 2013 for more details on SDI). The Social Deprivation Index map displays higher levels of deprivation in the southwest and central parts of the state.

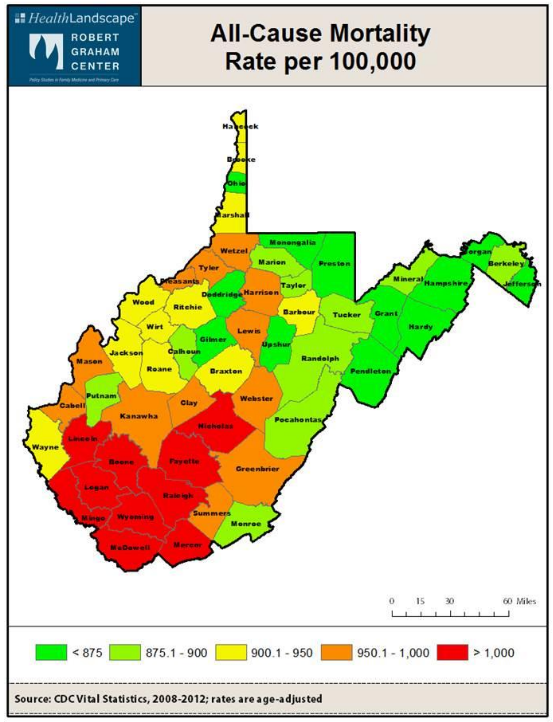
The geographic distribution of health outcomes follow similar patterns to the SDI, but are even more concentrated, as evidenced by the All-Cause Mortality Rate map. Counties with the highest mortality rates are clustered in the southernmost portion of the state, particularly in the southwest. Similar patterns can be found in the distribution of health behaviors; for both smoking and obesity the highest rates are in the southwest and central parts of West Virginia.

One area with markedly different geographic patterns is health insurance. The Percent Uninsured Population map shows counties with the highest rates of uninsured populations prior to the implementation of PPACA located in the eastern half of the state, particularly along the Virginia borders. The central part of the state also has a cluster of counties with high rates of uninsured.

Overall Lessons:

- Rural areas in central and southern parts of state have the highest levels of social deprivation, higher rates of mortality, and worse outcomes for indicators such as obesity and smoking.
- Enrollment efforts for health insurance should focus on eastern half of state along the Virginia border and in central part of state.


HealthLandscape
ROBERT GRAHAM CENTER
Social Deprivation Index
0 15 30 60 Miles
< 40
40 - 47
47.1 - 59
59.1 - 69
> 69
Sources: American Community Survey, 2008-2012; Index created by the Robert Graham Center


HealthLandscape
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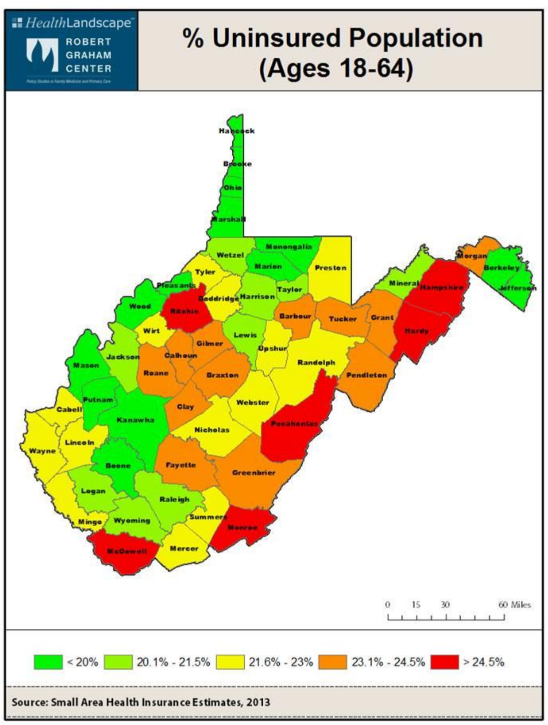
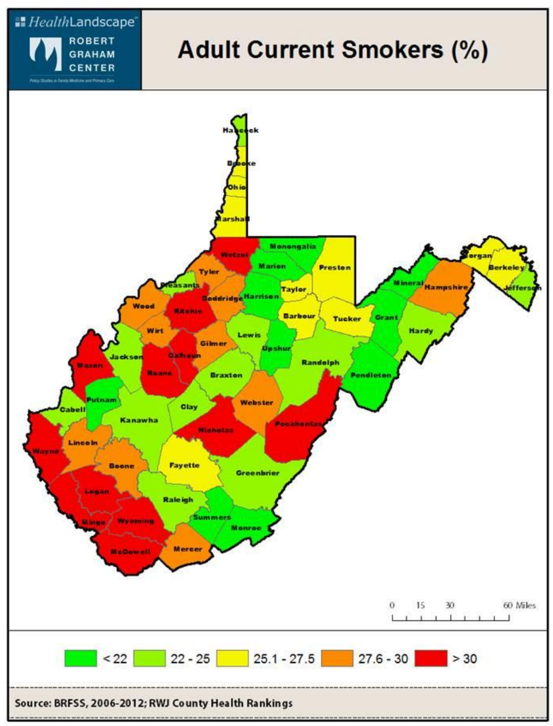
All-Cause Mortality Rate per 100,000
0 15 30 60 Miles
< 875
875.1 - 900
900.1 - 950
950.1 - 1,000
> 1,000
Source: CDC Vital Statistics, 2008-2012; rates are age-adjusted


HealthLandscape
ROBERT GRAHAM CENTER
% Uninsured Population (Ages 18-64)
0 15 30 60 Miles
< 20%
20.1% - 21.5%
21.6% - 23%
23.1% - 24.5%
> 24.5%
Source: Small Area Health Insurance Estimates, 2013


HealthLandscape
ROBERT GRAHAM CENTER
Adult Current Smokers (%)
0 15 30 60 Miles
< 22
22 - 25
25.1 - 27.5
27.6 - 30
> 30
Source: BRFSS, 2006-2012; RWJ County Health Rankings

Primary Care Physician Workforce Model

Current health care utilization data were used to project West Virginia's primary care physician workforce needs from 2015 to 2030 due to (a) population growth, (b) aging of the population, and (c) the rise in the number of insured attributable to the Affordable Care Act.

Recent population projections for West Virginia forecast a 1% decline in overall population but a substantial aging of the population (Figure 1). Since the elderly living in southern states have substantially more primary care visits than other age groups (Figure 2), more primary care physicians will be needed to care for them.

Figure 1

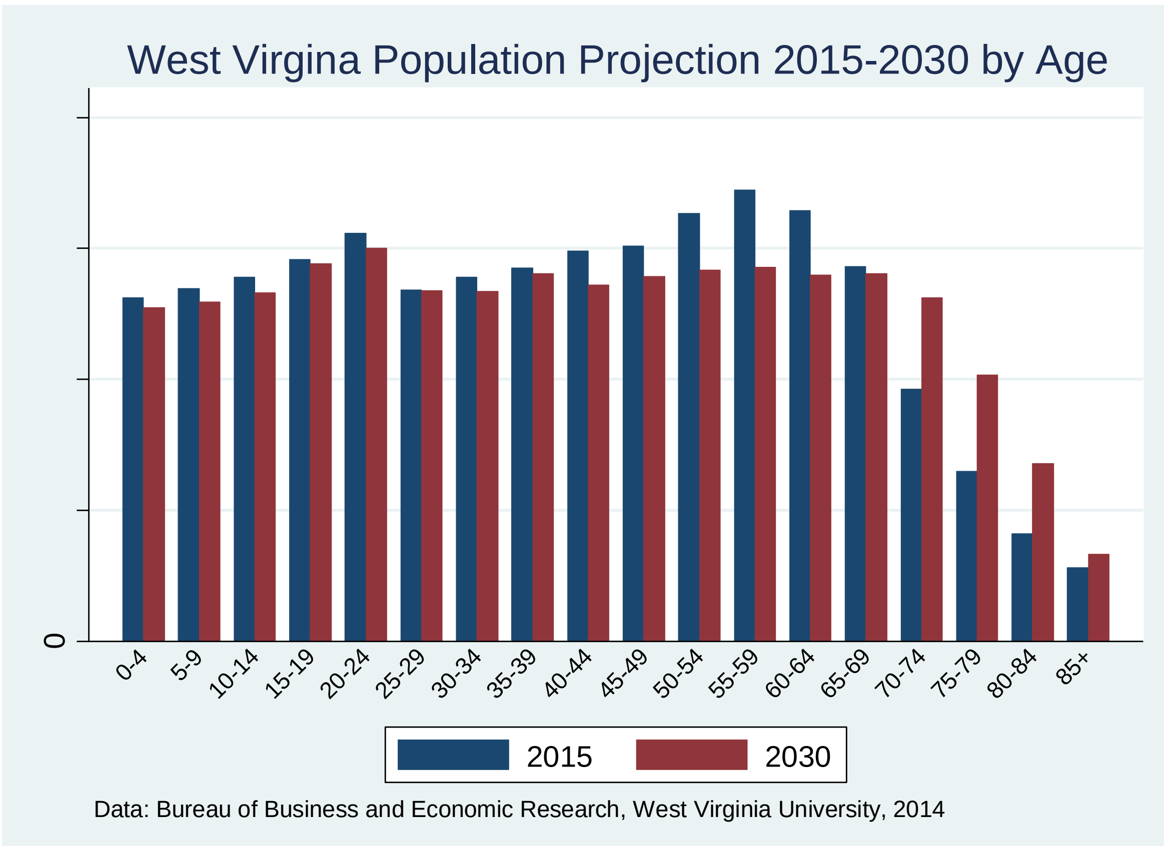
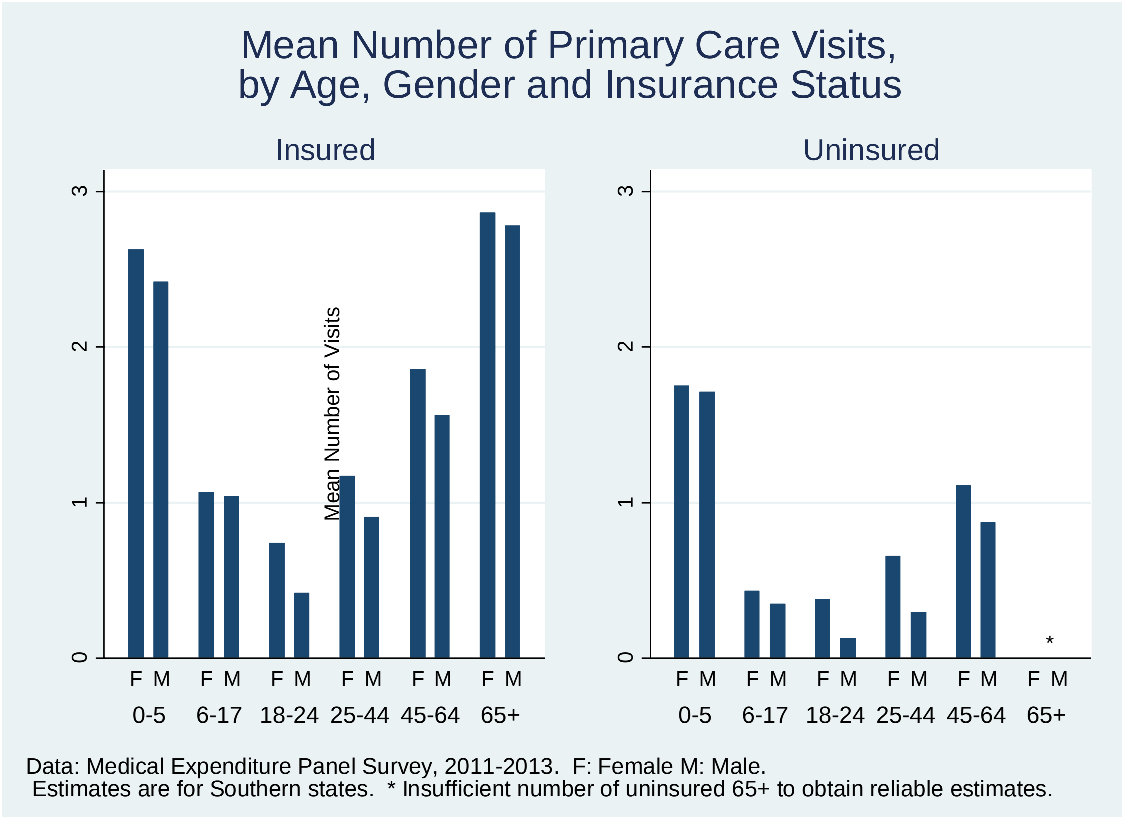
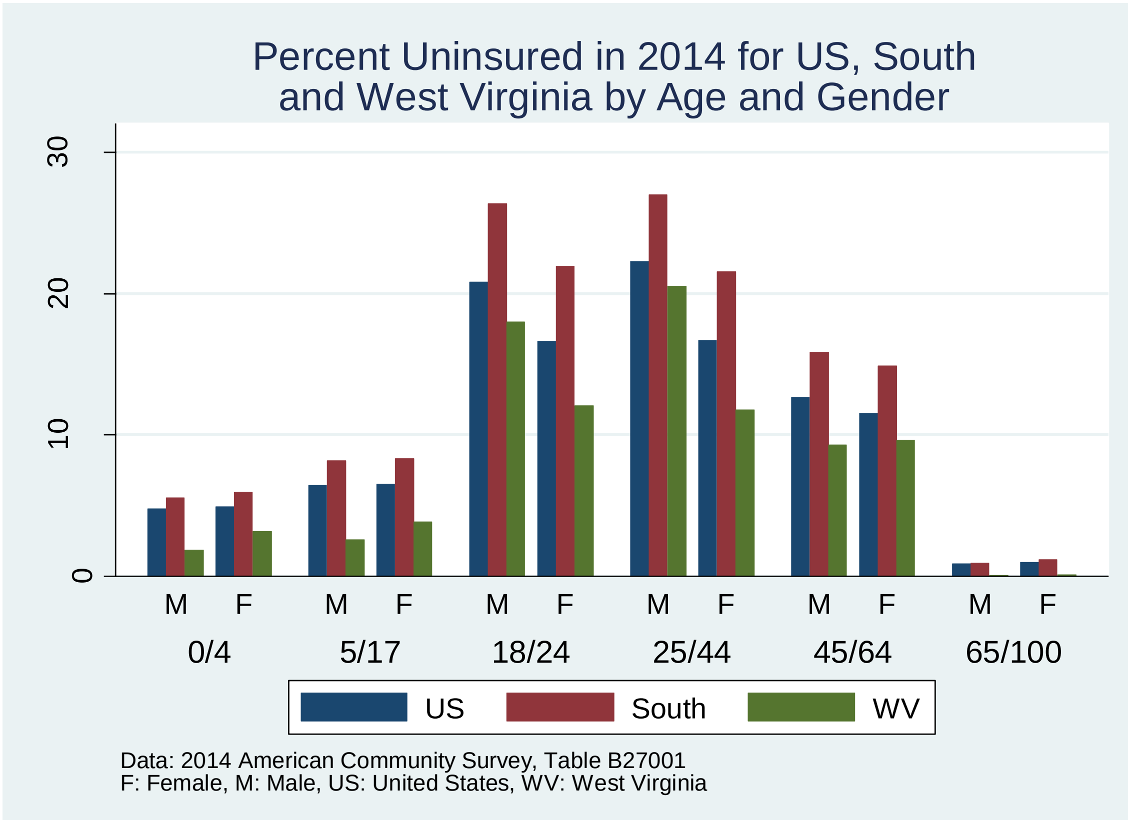


Figure 2



Health insurance is another area that impacts demand for primary care physicians. A study from Kaiser Family Foundation estimates that when fully implemented, 67.4% of the uninsured in West Virginia will be covered assuming Medicaid expansion. As shown in Figure 3, based on an analysis of data from the Medical Expenditure Panel Survey, the uninsured are substantially less likely to have primary care visits across all age groups. This means that as more people gain access to health insurance, more primary care physicians will be needed to meet the increasing demand. Compared to the US as a whole and to states in the South, West Virginia has lower levels of uninsurance, especially for children (0-17 years old).

Figure 3



Projections

In 2015, West Virginia had an estimated 1,319 primary care physicians responsible for a total population of 1,859,514 and a MEPS-based estimate of 2,888,469 primary care visits (Table 1). Based on these numbers, the 2015 population per provider ratio is equal to 1,410:1, with PCPs averaging 2,190 visits per year.

The "Population Growth Only" estimates of needed PCPs across years were obtained by dividing the projected state population by the 2015 population per provider ratio. Given the expected population decline, the required number of PCPs in this scenario would decline from 1,319 in 2015 to 1,300 in 2030. However, as the population changes across time, the average number of visits per person is forecasted to increase from 1.60 to 1.66, due to the aging of the population and the greater use of services by the newly insured. Taking into account the aging of the population (but not the rise in the number insured), the number of PCPs needed would increase to 1,354 by 2030. Comparing these estimates to the baseline 2015 workforce (1,319) show that population decline accounts for a decrease of 19, while the aging of the population requires 54 additional primary care physicians.

The number of primary care physicians needed to also meet the need associated with universal coverage is equal to 1,361 in 2015. After, adjusting these figures for state-level estimates of coverage of the uninsured, the total number of primary physicians equals 1,347 assuming Medicaid expansion. Altogether, West Virginia will require an additional 62 primary care physicians by 2030.

Table 1

West Virginia: Projection of Primary Care Visits and Demand for Primary Care Physicians

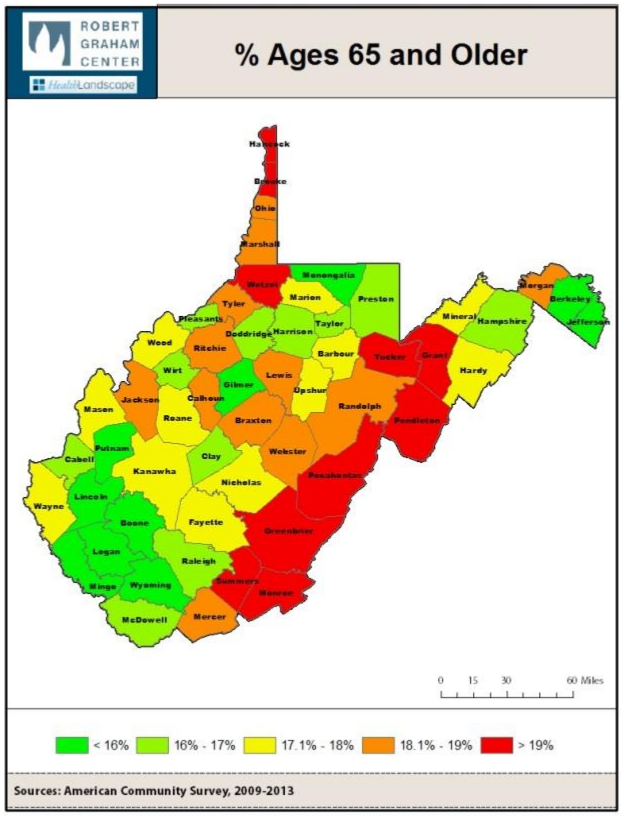
	2015	2020	2025	2030
Visits				
Current Insurance Coverage (Age+Population)	2,888,469	2,942,907	2,974,012	2,966,686
Total number of PC visits insured	2,981,383	3,033,188	3,061,565	3,052,254
Average number of PC visits	1.60	1.63	1.65	1.66
Estimated State Population	1,859,514	1,857,796	1,850,140	1,833,538
Estimated Population/Provider Ratio	1,410	1,383	1,363	1,354
Visit per Physician (Constant Productivity)	2,190	2,190	2,190	2,190
Required PC Physicians				
Baseline	1,319	1,319	1,319	1,319
Population Growth Only	1,319	1,318	1,312	1,300
Current Insurance Coverage (Age+Population)	1,319	1,344	1,358	1,354
Universal Coverage	1,361	1,385	1,398	1,394
ACA, Medicaid Expansion	1,347	1,371	1,385	1,381
Change (Relative to Baseline)				
Increase due to Aging	-	26	46	54
Increase due to Population Growth	-	(1)	(7)	(18)
ACA, Medicaid Expansion	29	28	27	26
Total	29	53	66	62

Note: For West Virgina the estimated reduction in uninsured is 67.4% assuming Medicaid expansion (Holohan et al, 2012, Table ES-3.).

While the aging of the population and increased number of people with health insurance will lead to an increased demand for primary care physicians, this demand will likely vary significantly based on geographic location. The Percent Uninsured Population and Percent Ages 65 and older maps reveal that the eastern half of West Virginia has the highest rates of uninsured populations and highest percentages of elderly population, likely causing an even large increase in demand for primary care physicians in these areas.

Overall Lessons:

- Overall population is declining, but substantial aging of the population will lead to increased demand for primary care physicians.
- Increasing number of people gaining access to health insurance will require more primary care physicians.
- Increased demand for primary care physicians may be concentrated in counties in eastern half of the state along the Virginia border, due to high rates of elderly population and potential increase in access to health insurance.


ROBERT
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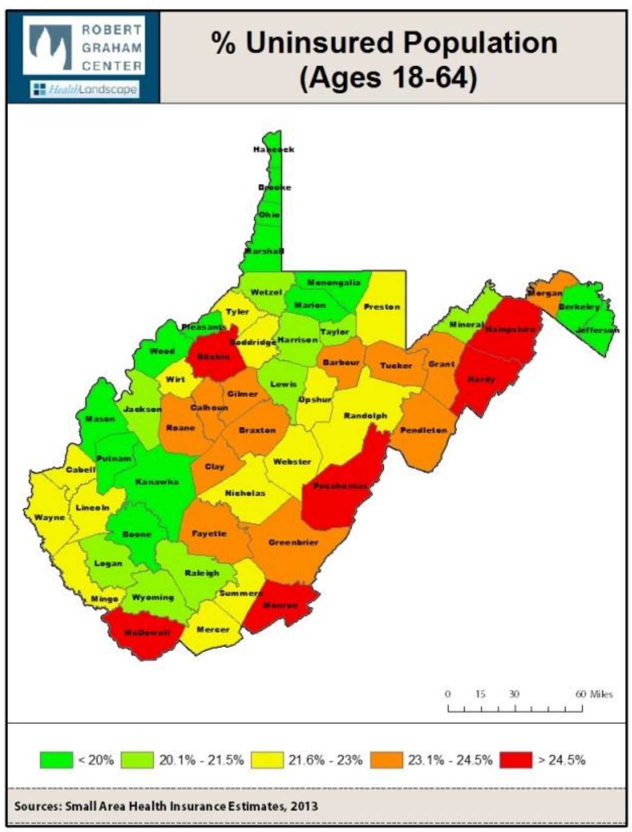
HealthLandscape
% Ages 65 and Older
Ohio
Marshall
Wetzel
Monongalia
Tyler
Marion
Preston
Pleasants
Doddridge
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Morgan
Berkeley
Jefferson
Hardy
Wirt
Gilmer
Lewis
Upshur
Jackson
Calhoun
Randolph
Pendleton
Mason
Roane
Braxton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 16%
16% - 17%
17.1% - 18%
18.1% - 19%
> 19%
Sources: American Community Survey, 2009-2013


ROBERT
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CENTER
HealthLandscape
% Uninsured Population
(Ages 18-64)
Ohio
Wetzel
Monongalia
Tyler
Marion
Preston
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Jefferson
Hardy
Wirt
Gilmer
Lewis
Upshur
Jackson
Calhoun
Randolph
Pendleton
Mason
Roane
Braxton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 20%
20.1% - 21.5%
21.6% - 23%
23.1% - 24.5%
> 24.5%
Sources: Small Area Health Insurance Estimates, 2013

PCP Workforce Comparisons

West Virginia is performing fairly well in terms of its primary care workforce compared to other states (Figure 4). West Virginia has higher rates of primary care physicians than the national average and all of its neighbors, except for Pennsylvania (Table 2). West Virginia relies heavily on family physicians rather than general internists or general pediatricians. While West Virginia fares well in terms of primary care supply, it has relatively fewer subspecialists per capita compared to the US as a whole and for comparison states (Table 2).

Figure 4

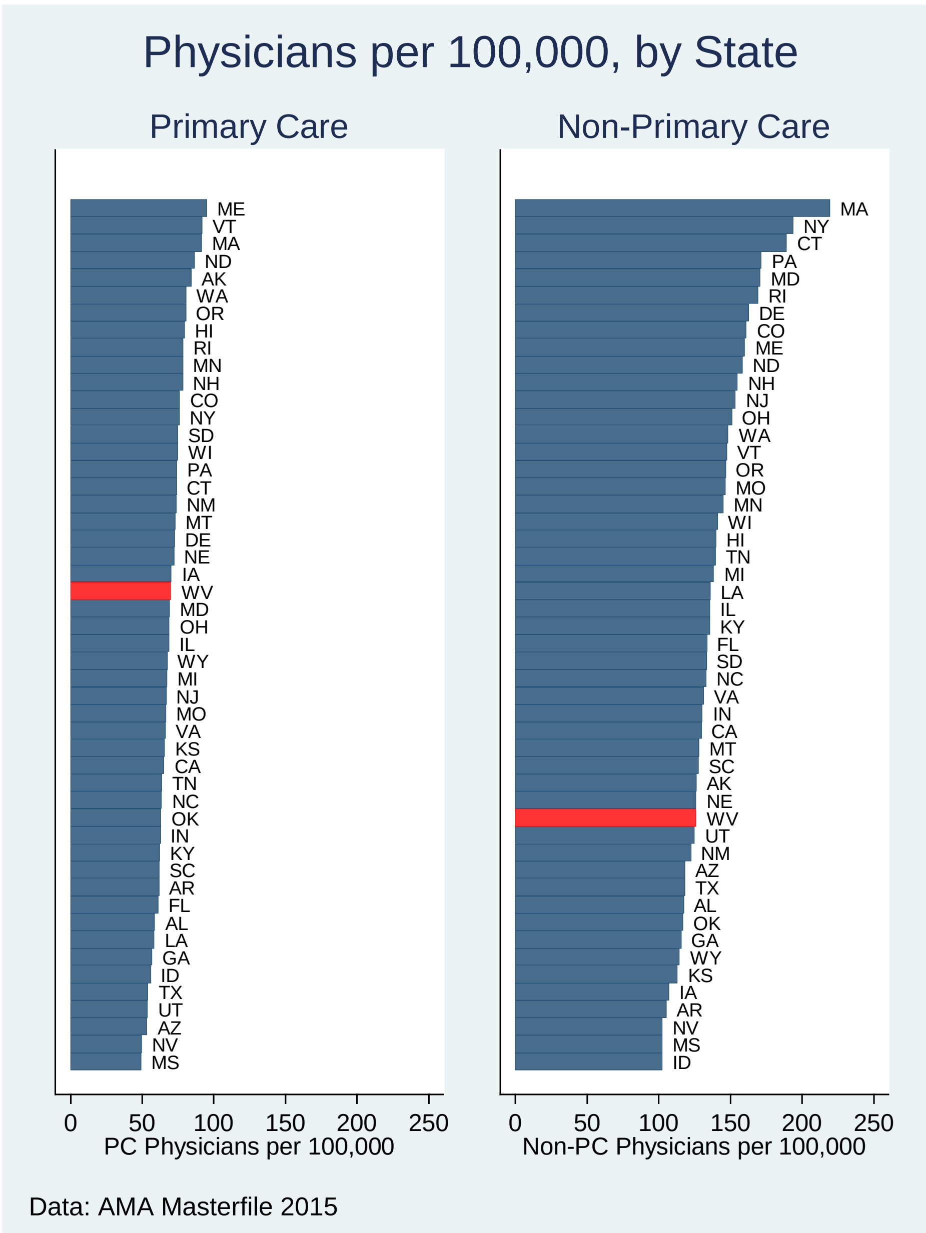


Table 2

	PC	Subspecialists		FP	GIM	GPD
WV	65.8	119.2		34.0	17.7	9.8
US	65.4	137.4		25.7	22.6	14.0
Region						
Midwest	65.8	131.2		30.3	20.6	12.1
North East	72.4	172.2		20.2	31.3	17.9
South	58.2	123.9		23.6	19.2	12.8
West	63.8	125.5		26.6	21.5	13.0
Comparison States						
GA	53.5	108.4		19.7	19.0	13.0
OH	65.3	142.7		25.9	22.4	14.0
PA	70.5	163.4		28.4	24.8	13.8
TN	59.1	128.5		23.4	21.4	12.5
VA	62.8	124.2		26.0	20.5	14.0

Data: 2015 AMA Masterfile

PCP: Primary Care Physicians (family physicians (FP), general internists (GIM), general pediatricians (GPD), and geriatricians

More than 20% of the primary care physicians in West Virginia are osteopathic physicians, twice the national average (Table 3). Compared to the nation as a whole and comparison states, a smaller fraction of West Virginia's primary care physicians are female. The percent of West Virginia primary care physicians over the age of 54 is comparable to the national average (42.5% v. 42.3%).

Table 3

	Osteopaths	Female	Age>54
WV	22.6%	26.1%	42.5%
US	10.1%	31.7%	42.3%
Region			
Midwest	12.2%	31.1%	40.3%
North East	10.7%	35.9%	44.1%
South	8.9%	30.3%	41.7%
West	10.2%	31.0%	41.1%
Comparison States			
GA	5.5%	32.1%	39.2%
OH	14.3%	32.0%	40.8%
PA	20.2%	32.4%	43.2%
TN	6.3%	27.2%	41.8%
VA	5.9%	34.7%	40.5%

Data: 2015 AMA Masterfile

Overall Lessons:

- West Virginia is performing well compared to its neighbors and other comparison states, as it has higher rates of primary care physicians, particularly family physicians, but lower rates of general pediatricians, internal medicine physicians, and subspecialists.

Residency Footprints

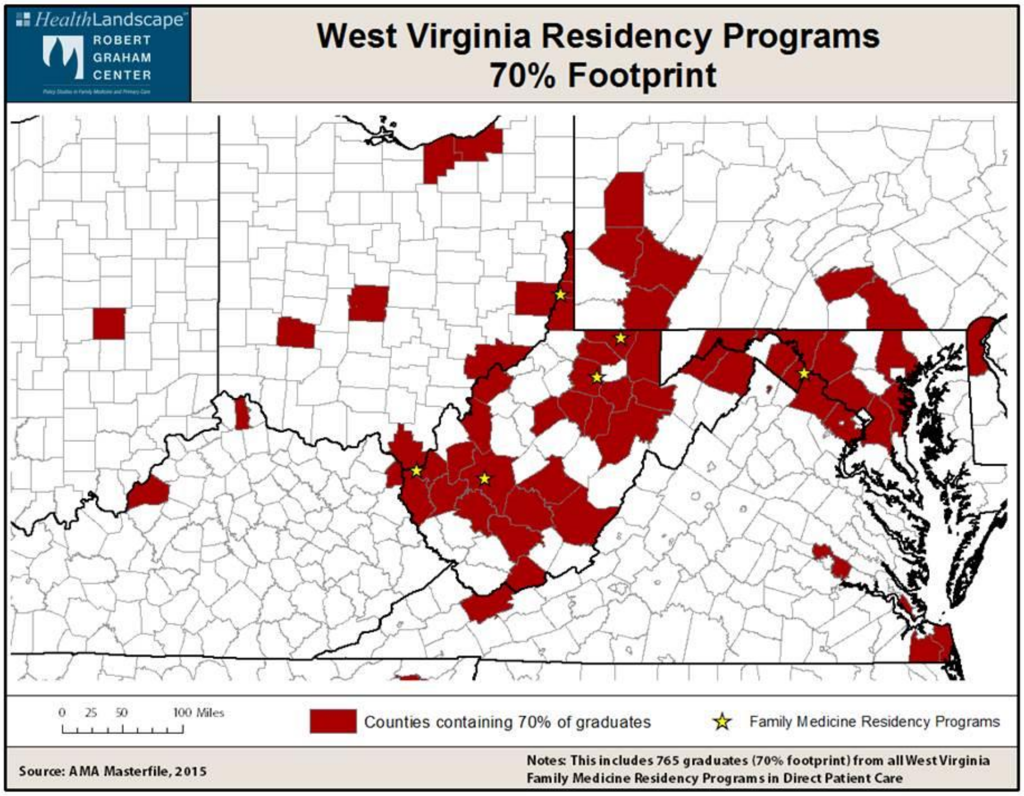
It is important to explore residency footprints as most workforce studies and policies tend to be national or regional in scope and cross-sectional in time, while many decisions impacting the development of physician workforce training sites remain local and with consequences felt long after the decision to open or close a program. Local decisions are often prone to political and financial influences and lack objective data that might help guide these decisions. West Virginia is no exception, and would benefit from local analyses of its existing primary care training sites before assessing the need to develop additional capacity.

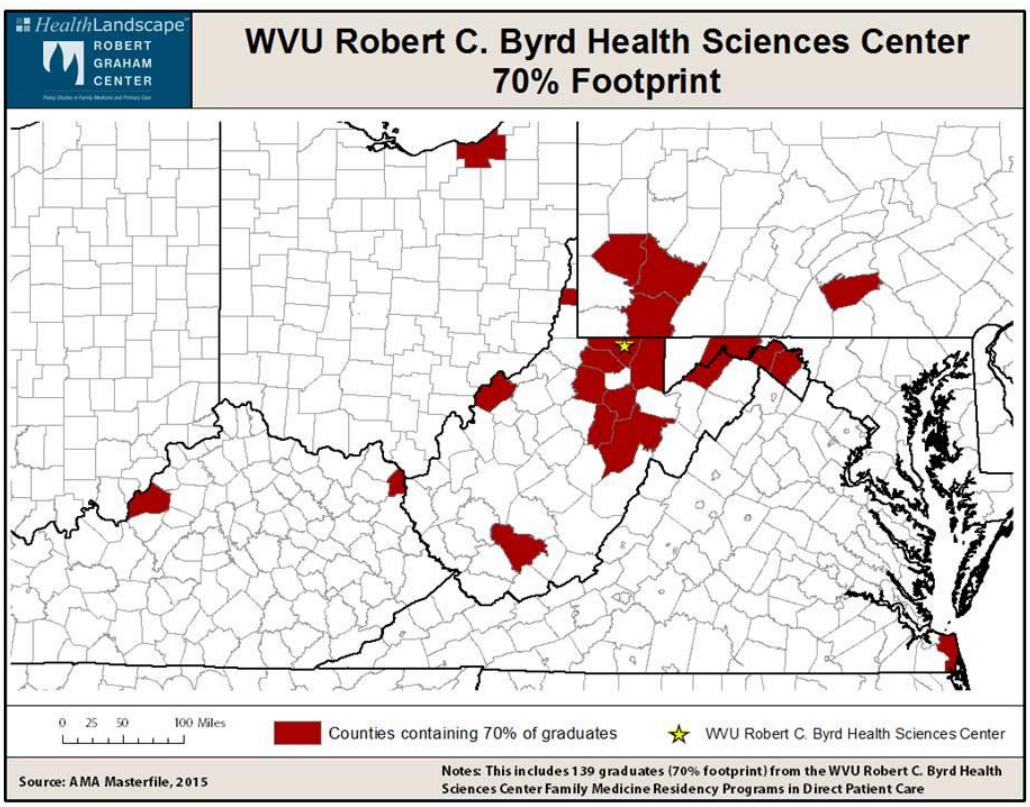
Footprinting is a form of service area analysis which displays the spatial distribution of West Virginia's residency programs' graduates as it relates to other spatially defined variables, in this case counties. We have assessed the "footprint" of family medicine programs on their communities and regions using both traditional analytic tools as well as geographic information systems (GIS). These maps depict the historical relationship between a program and its community, state, and region. The areas incorporated in the 70% threshold footprint have most consistently attracted program graduates and may not have had as many family physicians if the program had not existed. In this regard, the footprint may indicate an area's measure of dependence on the program for its family physicians. Areas with graduates that are outside the footprint are not unimportant, as many may be underserved areas. Residency programs can use these maps for internal reflection about whether they are fulfilling their missions, and to demonstrate their value to hospital and community leaders.

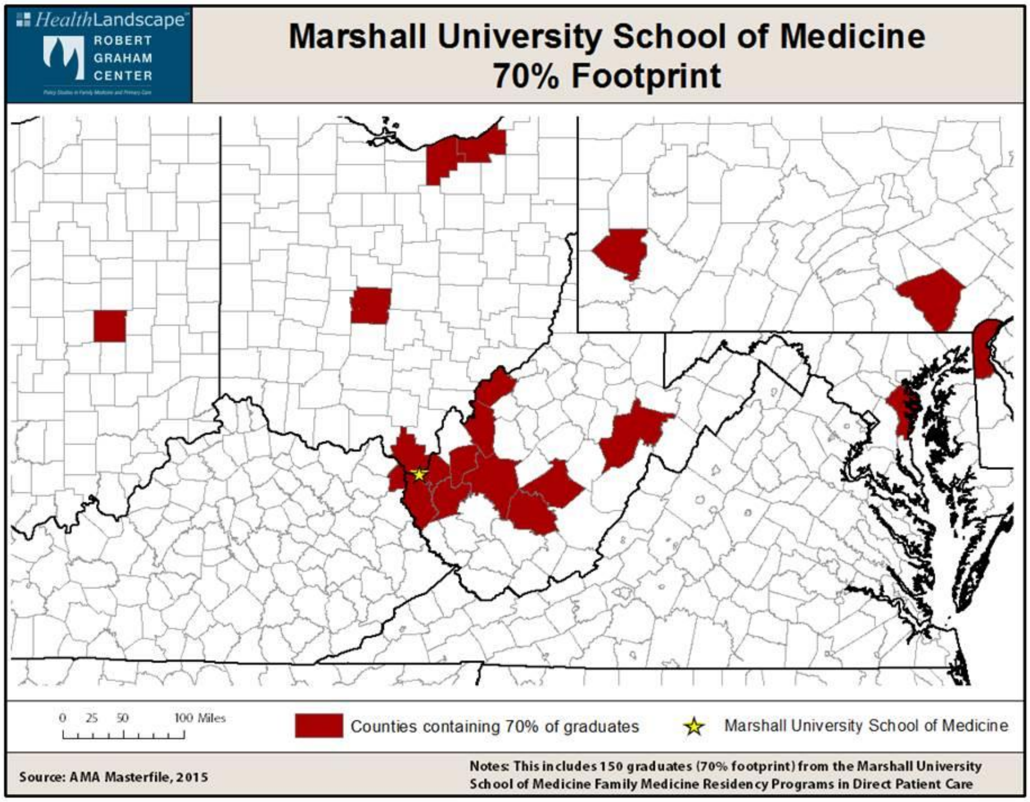
The results reveal that service areas for West Virginia's Family Medicine Residency programs largely follow patterns previously documented by Fagan et al. (2013); physicians are more likely to practice in locations near their residency training programs. In general, residency program service areas are concentrated in their surrounding counties. Overall patterns for the service area of all West Virginia Family Medicine Residency programs mirror the primary care physician maps described previously in this report – there is a lack of physicians in rural areas in the central and northeast parts of the state. In addition, the overall footprint for programs in West Virginia reveals a lack of physicians in the southern part of the state.

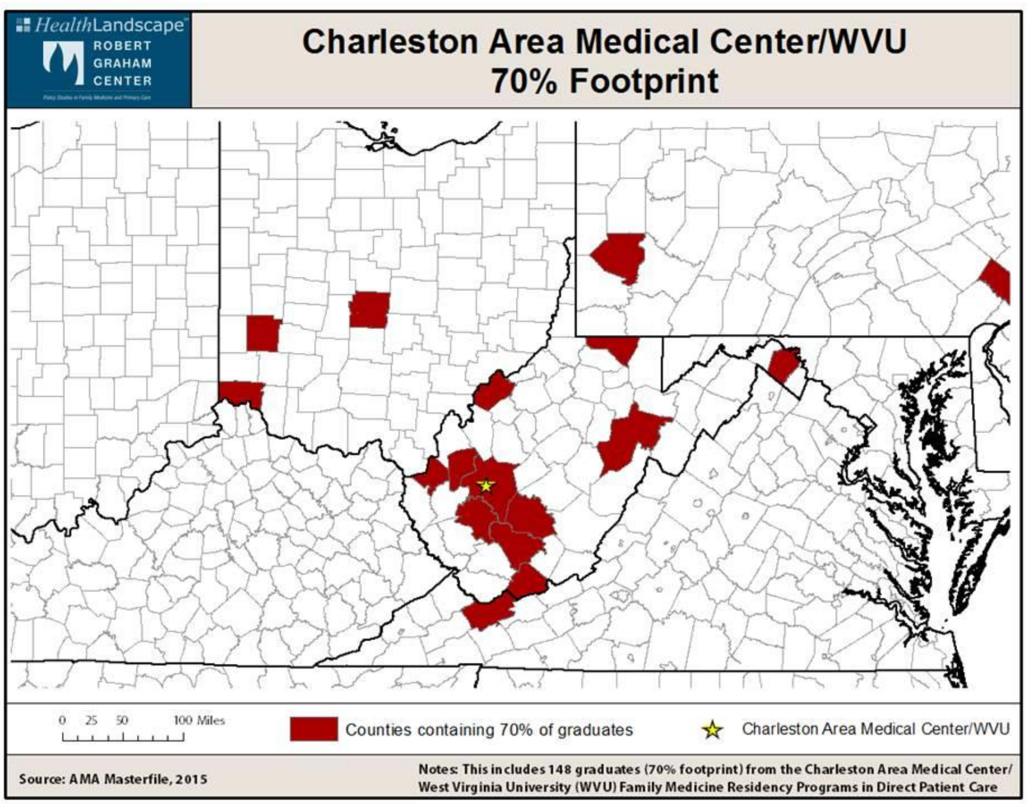
Overall Lessons:

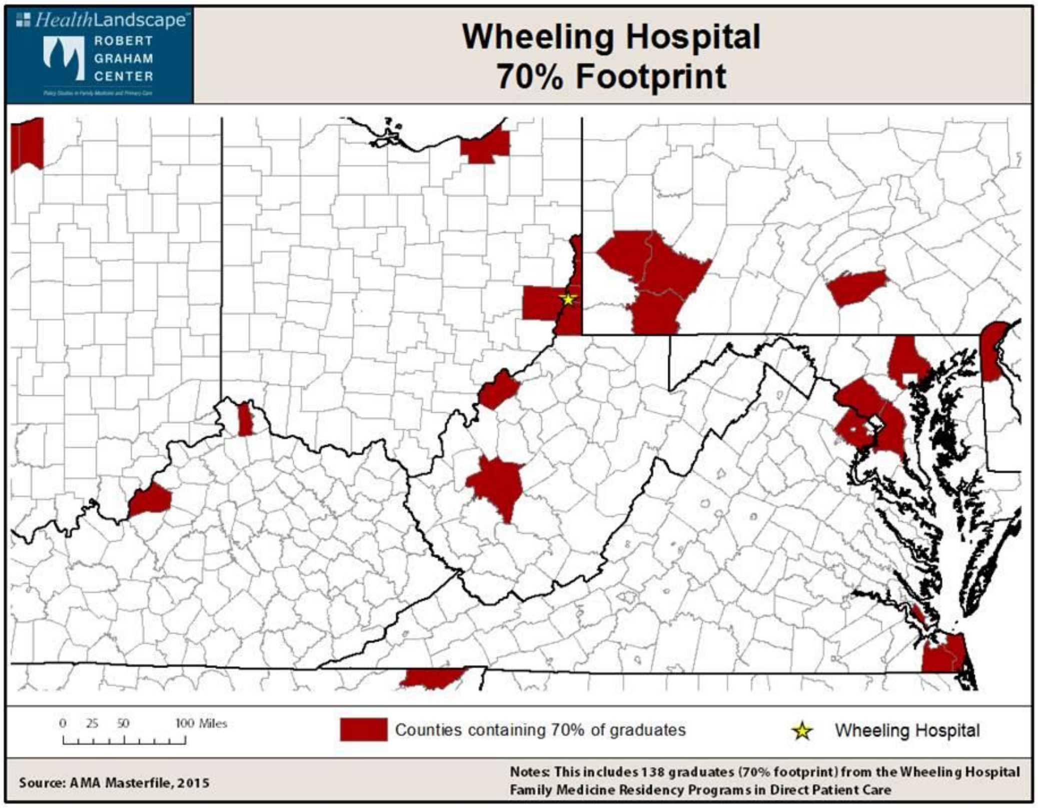
- Counties located in the central and northeastern part of West Virginia are not part of core service area of state residency programs
- Physicians are remaining close to locations of residency programs, leaving shortages in the more rural parts of the state.

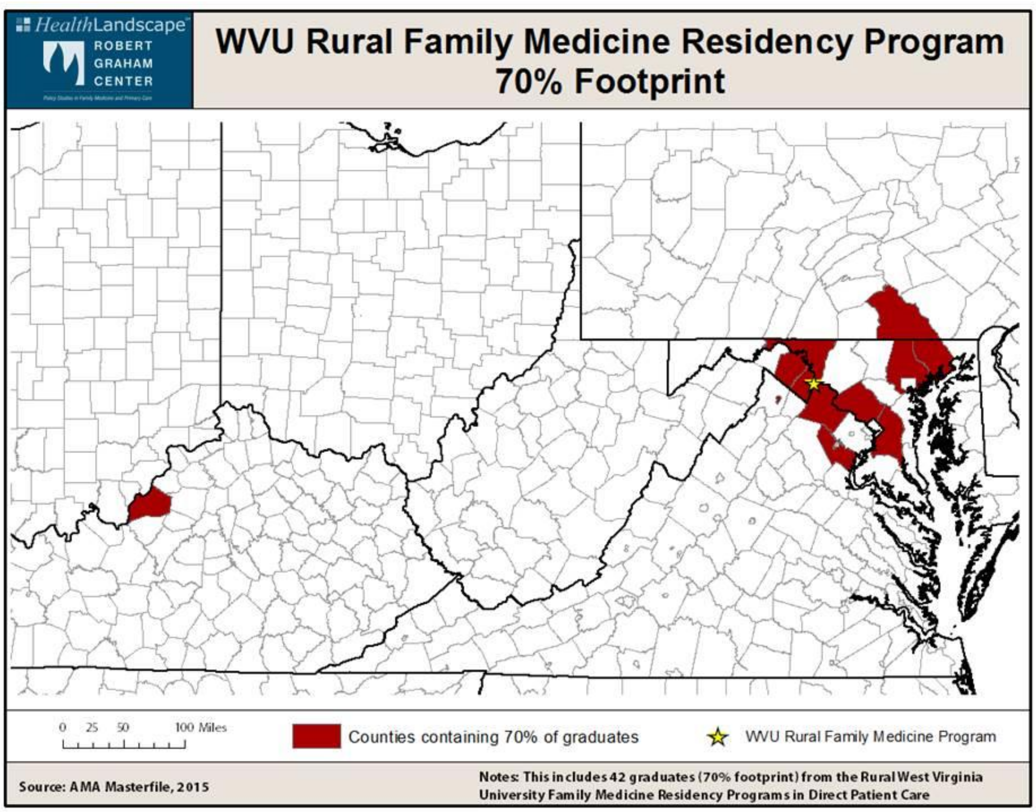

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia Residency Programs
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Family Medicine Residency Programs
Source: AMA Masterfile, 2015
Notes: This includes 765 graduates (70% footprint) from all West Virginia Family Medicine Residency Programs in Direct Patient Care

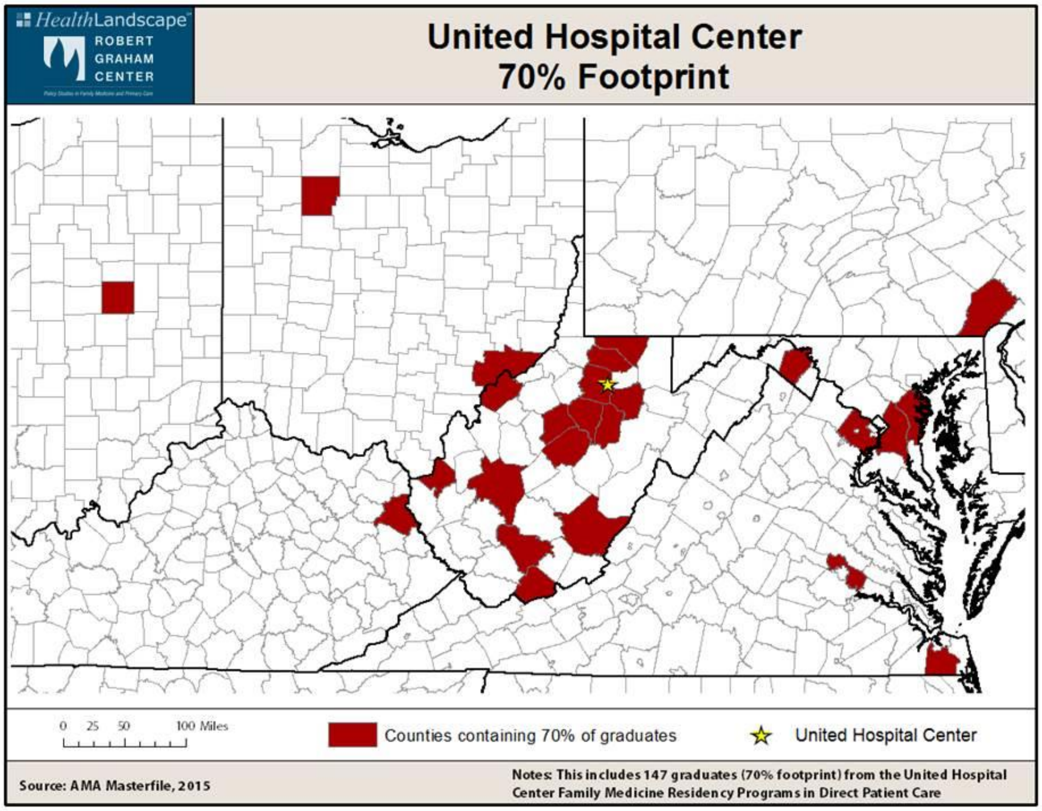

HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WVU Robert C. Byrd Health Sciences Center
Source: AMA Masterfile, 2015
Notes: This includes 139 graduates (70% footprint) from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Marshall University School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 150 graduates (70% footprint) from the Marshall University School of Medicine Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Charleston Area Medical Center/WVU
Source: AMA Masterfile, 2015
Notes: This includes 148 graduates (70% footprint) from the Charleston Area Medical Center/ West Virginia University (WVU) Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Wheeling Hospital
Source: AMA Masterfile, 2015
Notes: This includes 138 graduates (70% footprint) from the Wheeling Hospital Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WVU Rural Family Medicine Program
Source: AMA Masterfile, 2015
Notes: This includes 42 graduates (70% footprint) from the Rural West Virginia University Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
United Hospital Center
Source: AMA Masterfile, 2015
Notes: This includes 147 graduates (70% footprint) from the United Hospital Center Family Medicine Residency Programs in Direct Patient Care

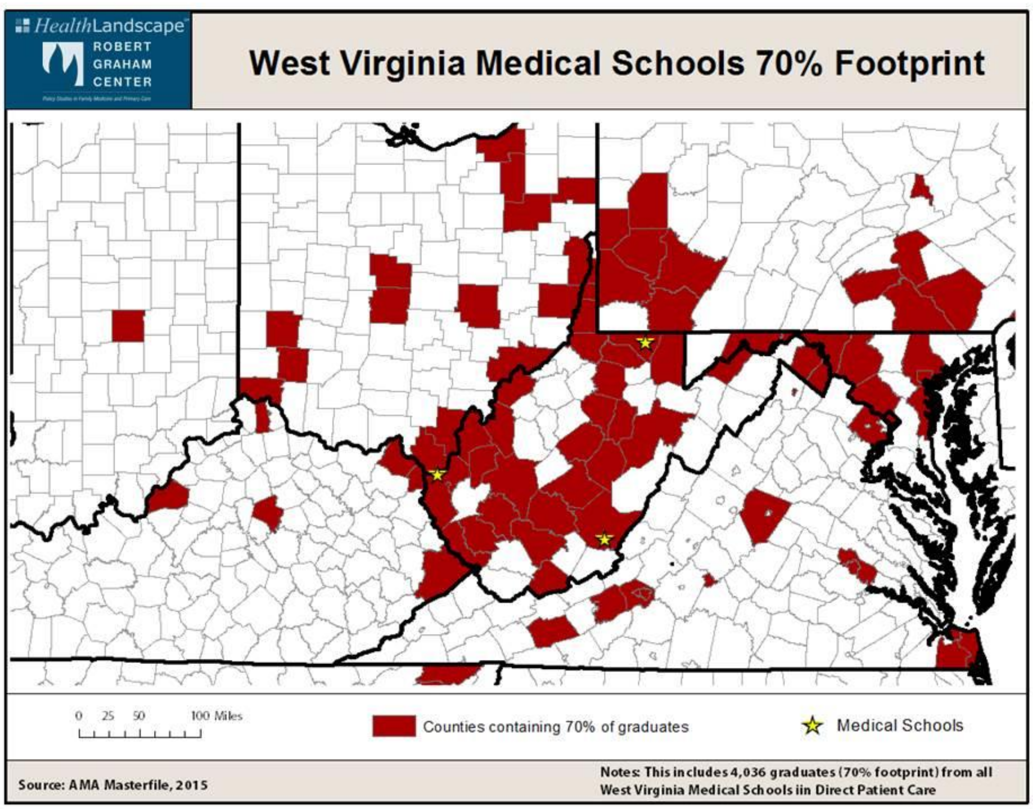
Medical School Footprints

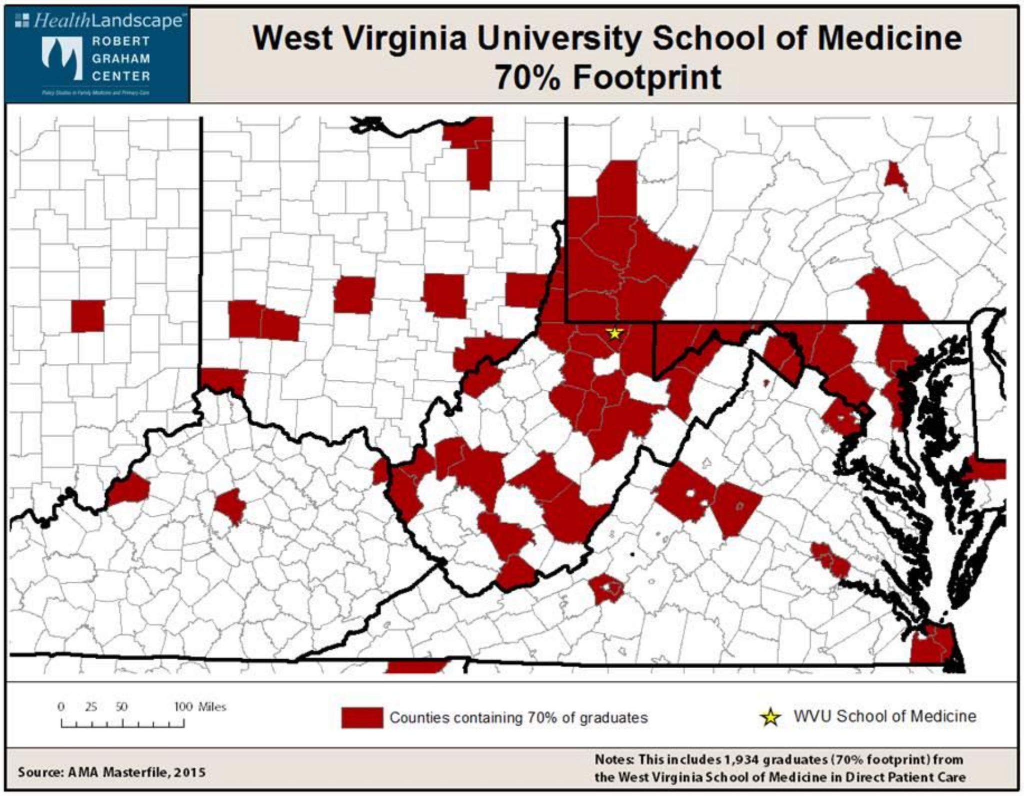
Like the residency analysis described above, studying institution-specific graduate location patterns in West Virginia helps one to understand how the large investments of public dollars in each school is meeting the needs of West Virginia's population, and to understand their social impact on a national scale. These efforts also help schools and state policymakers to assess their accountability to their own regional social and health care access needs, as they have few tools for understanding the local and regional impact of such institutions. Neither national rankings, nor workforce models can capture the regional impact of individual training sites.

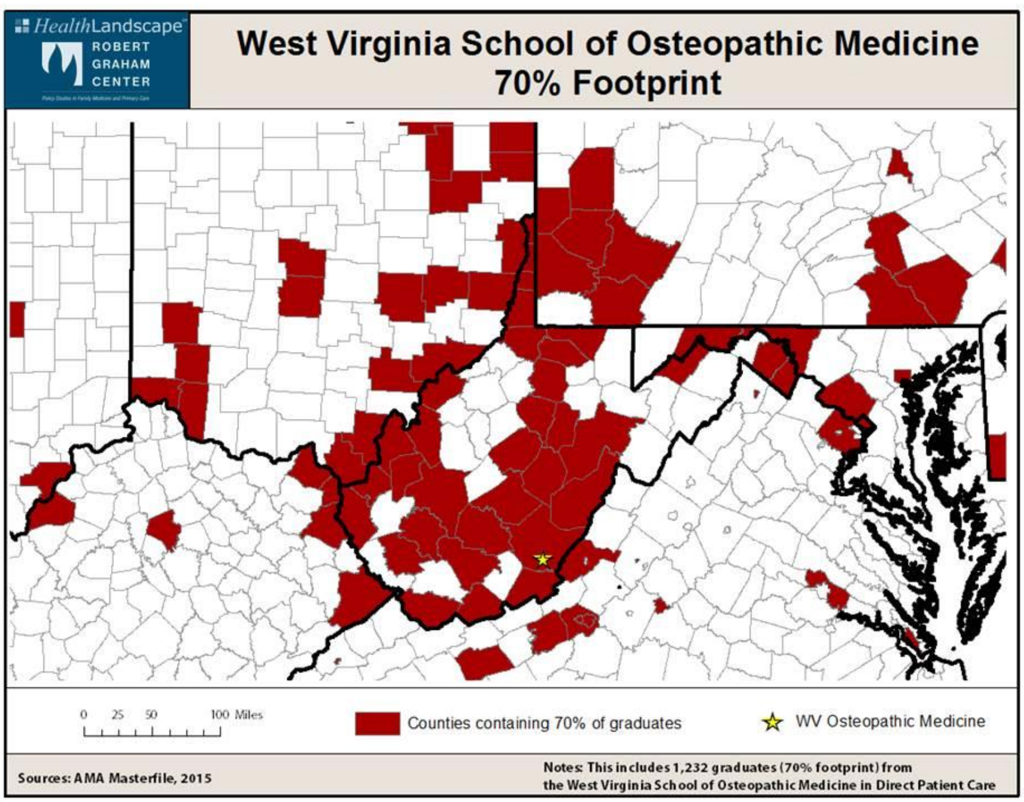
Similar to the footprints of West Virginia residency programs, the core service area of medical schools does not include counties in the central and northeastern part of the state. In addition, graduates of the three medical schools tend to remain close to their site of graduation, though the West Virginia School of Osteopathic Medicine shows the largest geographic variation among the schools.

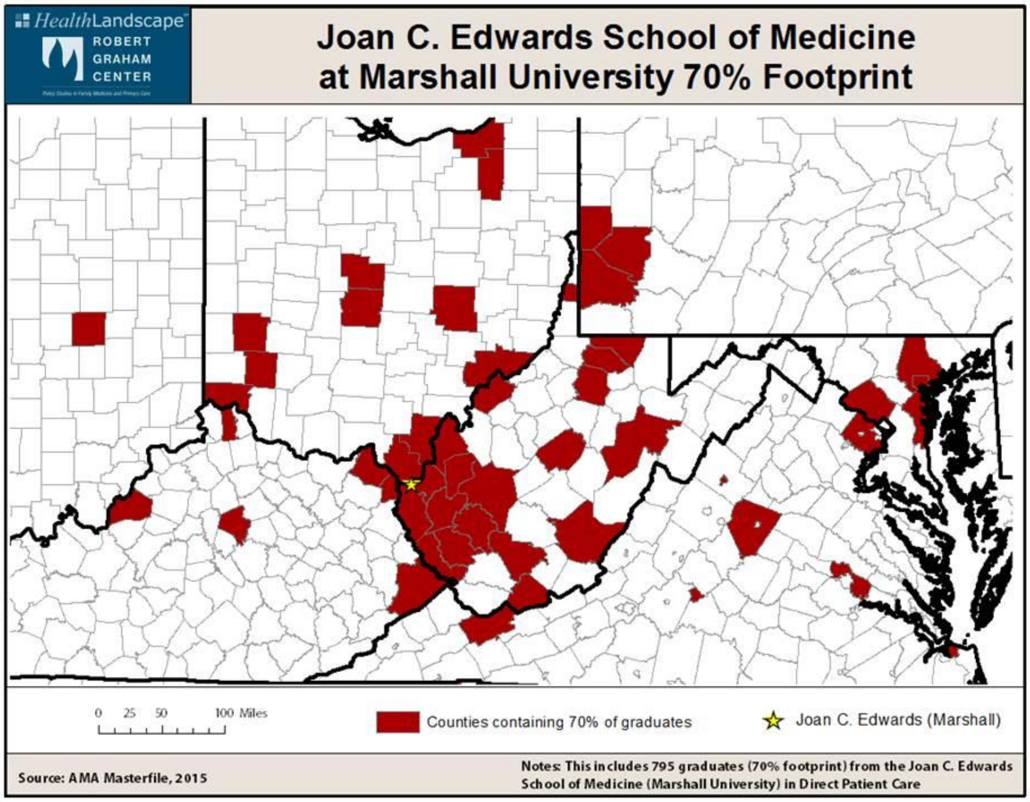
Overall Lessons:

- Counties located in the central and northeastern part of West Virginia are not part of core service area of the three medical schools




HealthLandscape
ROBERT GRAHAM CENTER
West Virginia University School of Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WVU School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,934 graduates (70% footprint) from the West Virginia School of Medicine in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
West Virginia School of Osteopathic Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WV Osteopathic Medicine
Sources: AMA Masterfile, 2015
Notes: This includes 1,232 graduates (70% footprint) from the West Virginia School of Osteopathic Medicine in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine
at Marshall University 70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 795 graduates (70% footprint) from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care

References

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Medical Expenditure Panel Survey (MEPS), 2011-2013. Agency for Healthcare Research and Quality, Rockville, MD.
http://www.ahrq.gov/research/data/meps/index.html

Appendix A: Data Sources for Maps

Visualizing the Primary Care Workforce

National Plan and Provider Enumeration System (NPPES), National Provider Identifier (NPI), 2015
http://download.cms.gov/nppes/NPI_Files.html

Pinpointing Areas of High Need (Cold-Spotting)

Centers for Disease Control and Prevention (CDC), Vital Statistics, 2008-2012
Downloaded from the Health Indicators Warehouse (HIW)
http://www.healthindicators.gov/

Centers for Disease Control and Prevention (CDC), Diabetes Surveillance System, 2012
http://www.cdc.gov/diabetes/data/county.html

U.S. Census Bureau, American Community Survey (ACS), 5-Year Estimates, 2008-2012, 2009-2013
http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

U.S. Census Bureau, Small Area Health Insurance Estimates (SAHIE), 2013
http://www.census.gov/did/www/sahie/

Centers for Medicare and Medicaid (CMS), Geographic Variation Public Use File, 2013
https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Geographic-Variation/GV_PUF.html

Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System (BRFSS), 2006-2012
Downloaded from the Robert Wood Johnson County Health Rankings
http://www.countyhealthrankings.org/

Social Deprivation Index

Methodology

The Social Deprivation Index measures developed by Butler et al. (2013) were updated using the 2008-2012 5-year American Community Survey population indicators.

Measures of Social Deprivation: ACS Measures

A subset of the socio-demographic characteristics collected in the 2008-2012 5-year American Community Survey (ACS) were used to construct a "Social Deprivation Index." The Social Deprivation Index (SDI) is calculated from several variables, including the following: percent poverty, percent black, percent less than high school education, percent single parent households, percent rented housing units, percent overcrowded housing units, percent of households without a car, percent unemployed, and percent unemployed adults under 65 years of age (see Butler et al., 2013 for more details on SDI). A measure was created for high health care needs by computing the percentage of population with high needs by dividing the sum of number of the population younger than five and females aged 15-44 years by the total population at the geography level. All these variables are available for block groups that have a population between 600 and 3,000 people and for census tracts with a population of at least 4,000 peoplein the 5-year ACS.

Developing the Social Deprivation Index

First the ACS demographic variables were converted into centiles in order to create a common scale for easy interpretation of results. Factor analysis methods, a statistical technique used in investigation of the relationship between a group of observed variables and an unobserved or latent variable underlying a concept, were used to create the Social Deprivation Index from the ACS variables. Factor analysis methods allow exploration of the concept through reducing large number of related variables into the underlying latent (unobserved) factors. The output from the factor analysis model is a factor loading for each variable representing the strength of correlation between the variables that comprise the factor and the factor itself. The factor loadings can be interpreted as though they were regression coefficients; the higher the correlation the greater the variation over the variables comprising the factor that is explained by that individual variable.

Residency and Medical School Footprints

American Medical Association (AMA) Masterfile, 2015.

Appendix B: Web-Based Mapping Tools

In addition to the static maps displayed in this report, our team trained members of the West Virginia SIM Healthcare Workforce team on using several web-based mapping tools, including the following:

Primary Care Physician Mapper – This mapping tool allows users to visualize the primary care physician workforce at the state, county, and physician levels. The tool utilizes NPPES NPI 2015 data and allows for mapping of population to provider ratios for the following primary care specialties: family medicine (general), family medicine: addiction medicine, family medicine: adolescent medicine, family medicine: adult medicine, family medicine: bariatric medicine, family medicine: hospice and palliative medicine, family medicine: sleep medicine, family medicine: sports medicine, general practice (general), internal medicine (general), internal medicine: adolescent medicine, internal medicine: geriatric medicine, pediatrics (general), and pediatrics: adolescent medicine.

To access the Primary Care Physician Mapper, visit
http://www.graham-center.org/rgc/maps-data-tools/interactive/primary-care-physician.html.

Population Health Mapper - The Centers for Disease Control and Prevention (CDC) created a resource guide of the most frequently recommended health outcomes and determinants, the Community Health Assessment for Population Health Improvement. Using this guide as a framework, HealthLandscape created the Population Health Mapper, which includes the majority of the Health Outcome and Health Determinant Metrics identified in the report at the county level. The Mapper allows users to select metrics from seven categories (Mortality, Morbidity, Health Care, Health Behaviors, Demographics, Social Environment, and Physical Activity) and use a slider bar to set thresholds. By default, thresholds are set at values that represent national benchmarks. The tool will highlight those counties that are outside of the national benchmark, or will incrementally shade or remove counties depending on how the user modifies the thresholds for selected indicators. Darker gradations of color will indicate which counties are outside of the established thresholds for multiple indicators. Users can also view a histogram that shows the number of counties outside of thresholds by the number of indicators, allowing users to quickly filter by the number of indicators that are outside of the established thresholds.

To access the Population Health Mapper, visit
http://www.healthlandscape.org/PopulationHealth/map.cfm

Appalachia Data Portal - this data visualization tool allows users to explore demographic, education, income, and health disparities for the 420 counties in the Appalachian region. The data included in the Appalachia Data Portal come from a variety of sources, including the American Community Survey, the Appalachian Regional Commission, the Robert Wood Johnson County Health Rankings, and the Centers for Medicare and Medicaid Services. The tool allows users to visualize economic, demographic, and other types of data for the Appalachian region using maps, graphs, and trend charts. Users also have the ability to examine the relationship between two indicators (for example, diabetes and poverty) with side-by-side maps and a comparison tool that uses percentiles to visualize the relationship between variables. The Appalachia Data Portal provides an array of tools for exploring population health throughout the Appalachian region, and can be useful for identifying health disparities and bright spots within the region.

To access the Appalachia Data Portal, visit
http://www.healthlandscape.org/AppalachiaDataPortal/map.cfm

Residency Footprint Mapper – this tool depicts the historical relationship between a family medicine residency program and its community, state, and region. The areas incorporated in the 70% threshold footprint have most consistently attracted program graduates and may not have had as many family physicians if the program had not existed. In this regard, the footprint may indicate an area's measure of dependence on the program for its family physicians. Areas with graduates that are outside the footprint are not unimportant, as many may be underserved areas. Residency programs can use these maps for internal reflection about whether they are fulfilling their missions, and to demonstrate their value to hospital and community leaders.

To access the Residency Footprint Mapper, visit
http://www.graham-center.org/rgc/maps-data-tools/interactive/residency-footprinting.html

The Med School Mapper – this tool allows users to explore the geographic reach of medical school programs and graduates across the United States, from both the perspective of medical schools and states.

To access the Med School Mapper, visit
http://www.medschoolmapper.org/

Appendix C: Detailed Description of Workforce Projection Methods

Primary Care Workforce Projections

We identified West Virginia primary care physicians in the 2015 American Medical Association (AMA) Masterfile by selecting physicians in direct patient care with a primary specialty of family medicine, general practice, general internal medicine, general pediatrics, or geriatrics. Because of concern about the quality of addresses in the AMA Masterfile, we substituted where possible AMA practice addresses with those available in the 2015 National Plan and Provider Enumeration System (NPPES). To address the undercount of retirees in AMA Masterfile, we adjusted counts downwards based on a comparison of the age distribution of physicians in the AMA Masterfile with the subset of these physicians who could be matched in the NPPES. We also decreased general internist counts by 20% to account for hospitalists and those in non–primary care settings[2] and decreased counts for family physicians, pediatricians, and geriatricians by 5% to account for those working primarily in urgent or emergency care.[1]

Calculating Residency and Medical School Footprints

To create a graduate 'Footprint', we calculate the number of graduates from a selected state or program in each county, rank these counties from highest to lowest, and select counties to be shaded that have the highest number of graduates in them until 70% of all graduates are accounted for. For example, if a program has 100 active graduates practicing in the U.S., and 50 are practicing in County A, 15 in County B, 5 in County C, and 3 each in Counties D- M, only Counties A, B, & C (which constitute 70% of graduates) will be shaded in the Medical School Graduate Footprint map. This methodology, which borrows from business industry literature on market service area, is thought to be a reasonable standard for gauging the core service area of a medical school program(s). In the event of a tie (two or more counties have the same number of graduates) that crosses the footprint threshold, the county with a smaller population is included in the footprint first; in other words, out of counties with the same number of graduates, those that might be presumed to be less dependent on those graduates are ranked lower. However, in the mapping tool you have the option of adjusting the percentage to reflect the footprint threshold most appropriate to your situation, needs, or interests. Additional maps are included in appendices F and G that show the 100% service areas and core service areas that do not include ties (two or more counties with the same number of physicians).

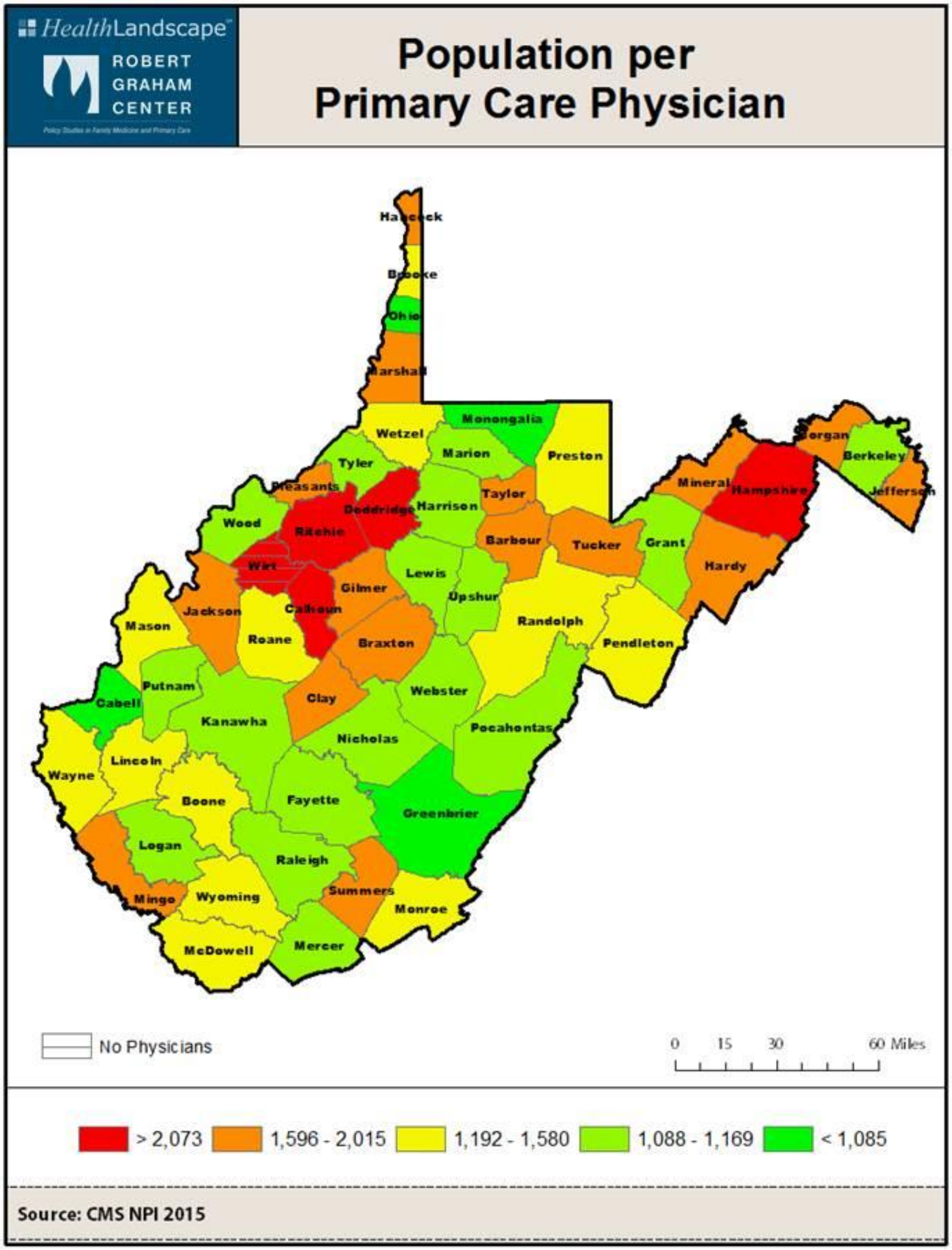
What data are used to create the footprint?

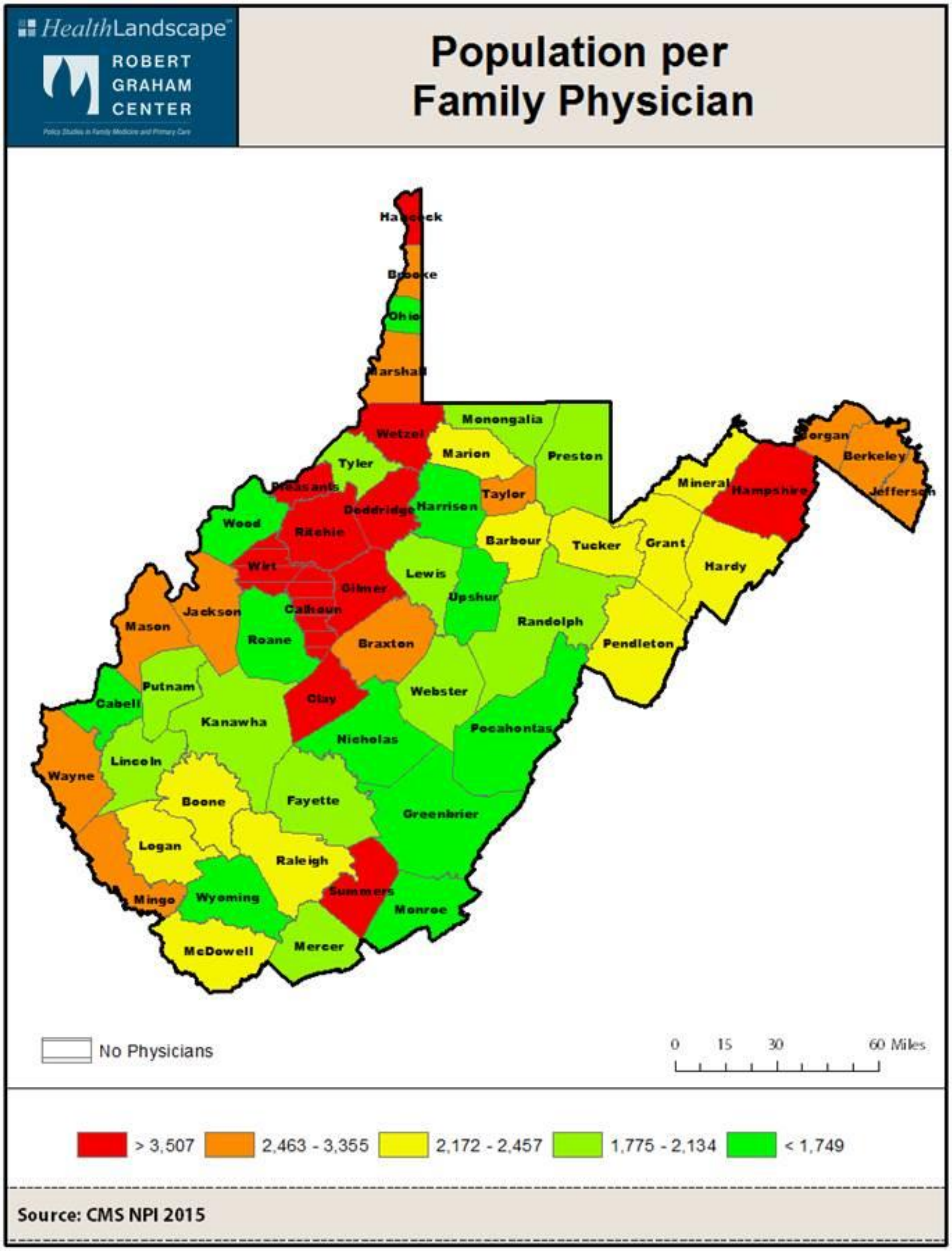
We use physician practice location information from the 2015 American Medical Association Physician Masterfile. From a geocoded Masterfile, we extract practice location (including county) for each active physician practicing in the United States. We then use AMA Masterfile data to attach each physician to a current medical school and residency program (graduates from closed medical schools are not included in the footprints) and a county of practice.

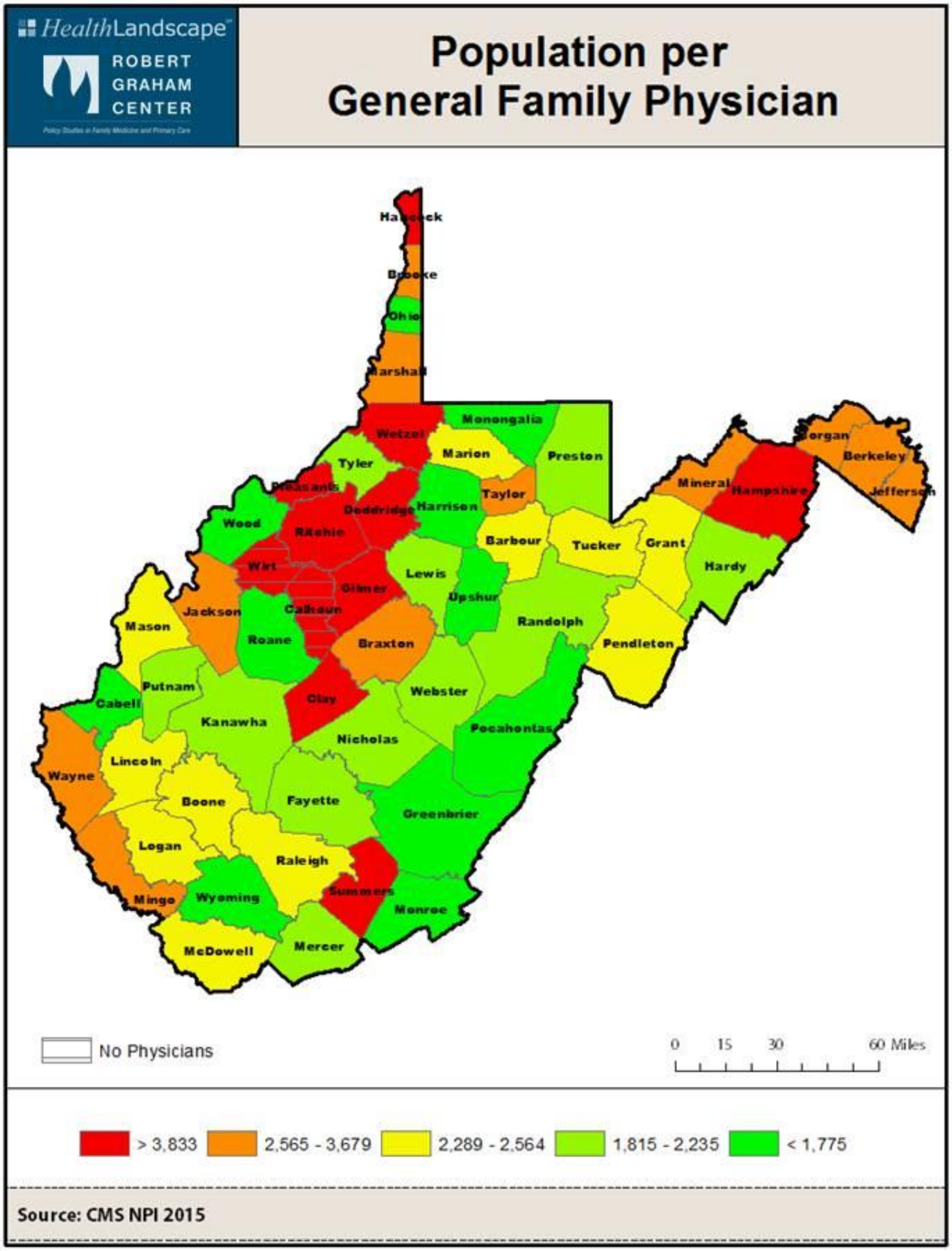
[1] This figure is based on an analysis of American Board of Family Medicine data showing that roughly 5% to 6% of family physicians report spending more than 50% of their time in urgent or emergency care.

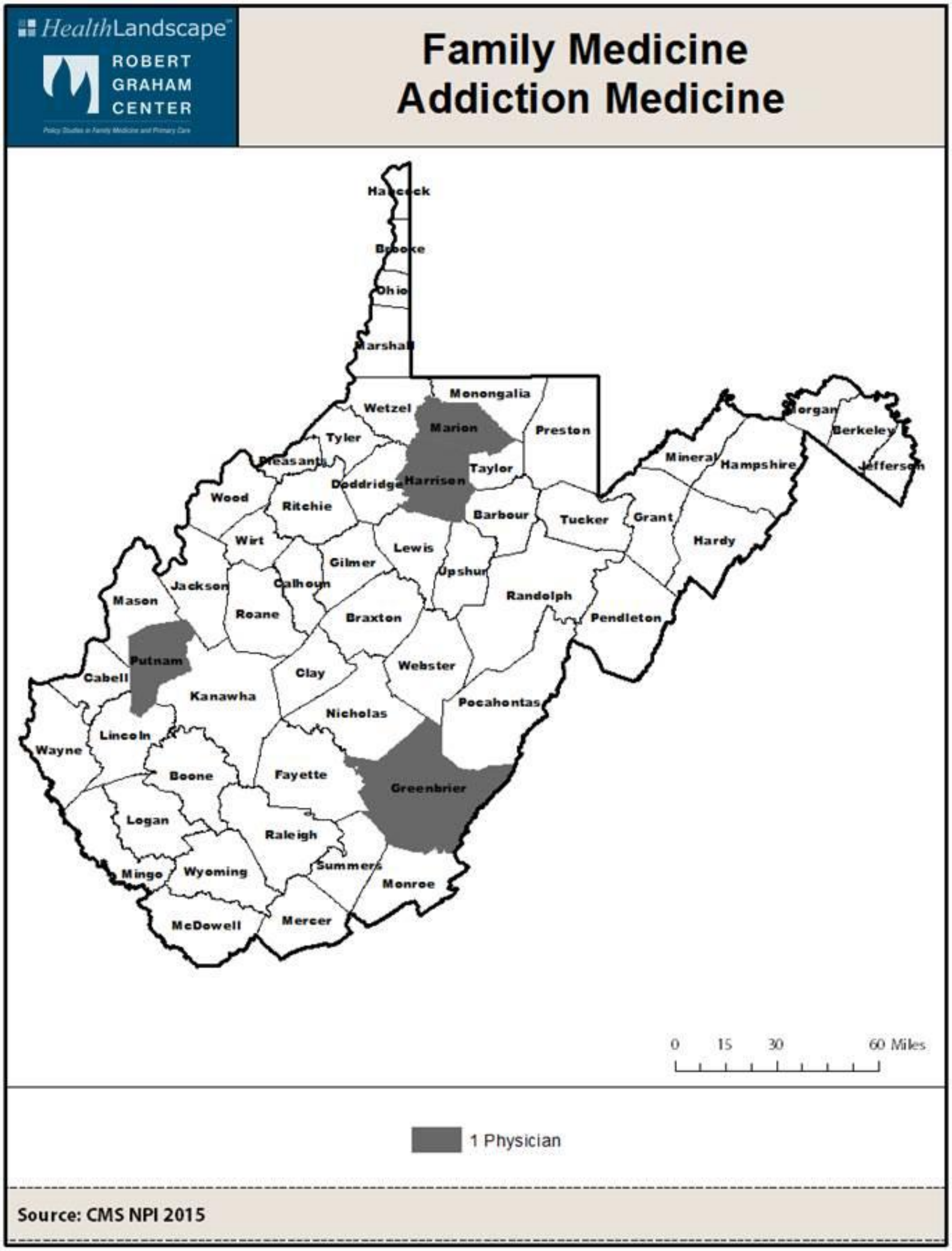
The AMA Physician Masterfile is perhaps the most widely used dataset in studies of the national physician workforce, but it is not without limitations. Despite the following statement, "The AMA seeks to achieve a high degree of accuracy in the organization and publication of physician data. Physicians' records are subject to change and are continuously updated through the extensive data collection and verification efforts performed within SDR," not every physician is captured, nor can we guarantee that every physician whose data is captured has accurate business address and school of training information.

Appendix D: Individual Maps: Primary Care Workforce




HealthLandscape
ROBERT GRAHAM CENTER
Population per Family Physician
Monongalia
Wetzel
Marion
Preston
Tyler
Taylor
Mineral
Hampshire
Berkeley
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Wirt
Lewis
Hardy
Gilmer
Upshur
Jackson
Calhoun
Randolph
Mason
Roane
Braxton
Pendleton
Putnam
Clay
Webster
Cabell
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
No Physicians
0 15 30 60 Miles
> 3,507
2,463 - 3,355
2,172 - 2,457
1,775 - 2,134
< 1,749
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per General Family Physician
Ohio
Wetzel
Monongalia
Tyler
Marion
Preston
Mineral
Hampshire
Berkeley
Taylor
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Randolph
Mason
Roane
Braxton
Pendleton
Putnam
Clay
Webster
Cabell
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
No Physicians
0 15 30 60 Miles
> 3,833
2,565 - 3,679
2,289 - 2,564
1,815 - 2,235
< 1,775
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Family Medicine
Addiction Medicine
Ohio
Monongalia
Wetzel
Marion
Preston
Tyler
Mineral
Hampshire
Berkeley
Taylor
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Hardy
Wirt
Lewis
Gilmer
Jackson
Upshur
Randolph
Mason
Roane
Braxton
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
0 15 30 60 Miles
1 Physician
Source: CMS NPI 2015

HealthLandscape

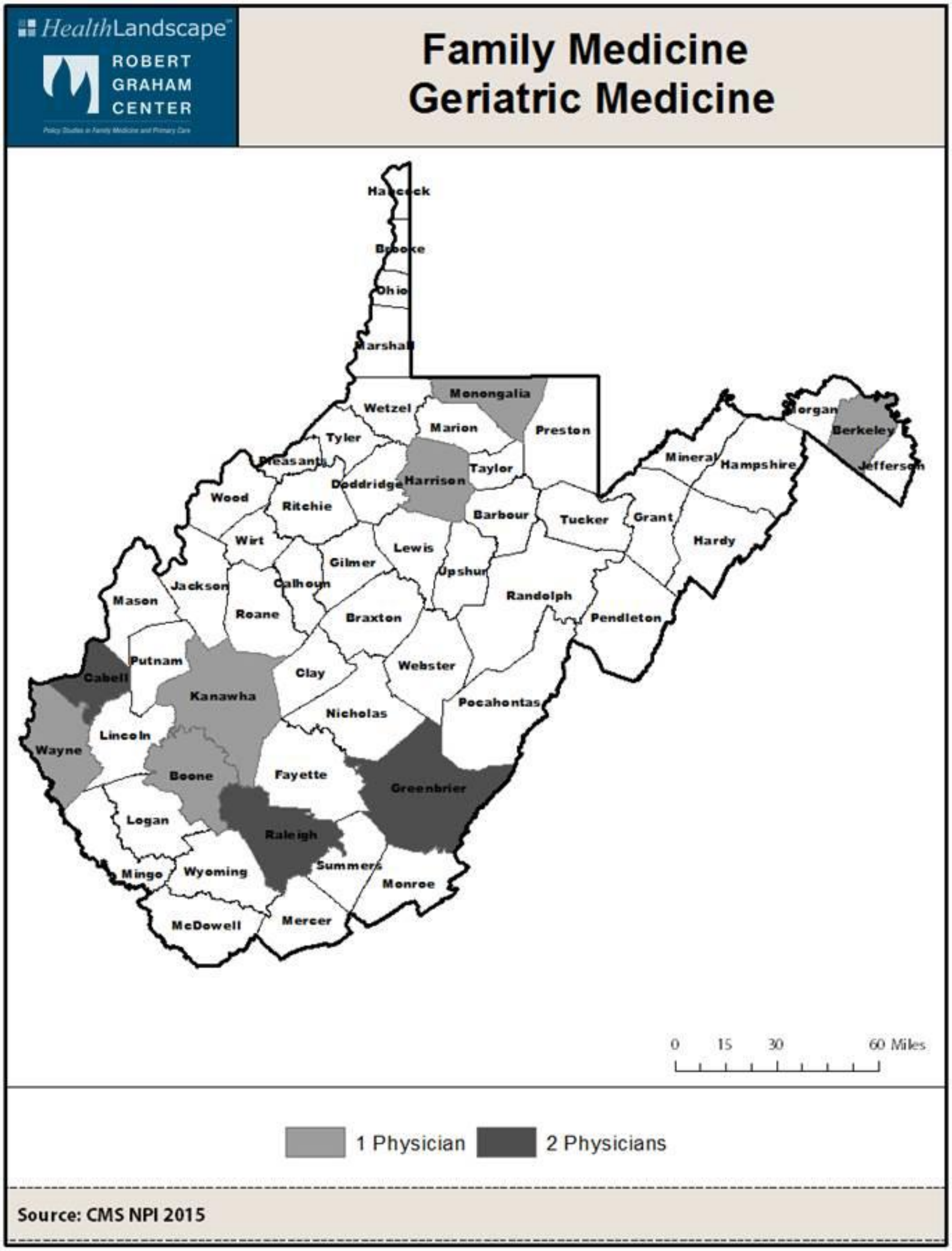
ROBERT GRAHAM CENTER

Policy Studies in Family Medicine and Primary Care

Family Medicine Adult Medicine

1 Physician

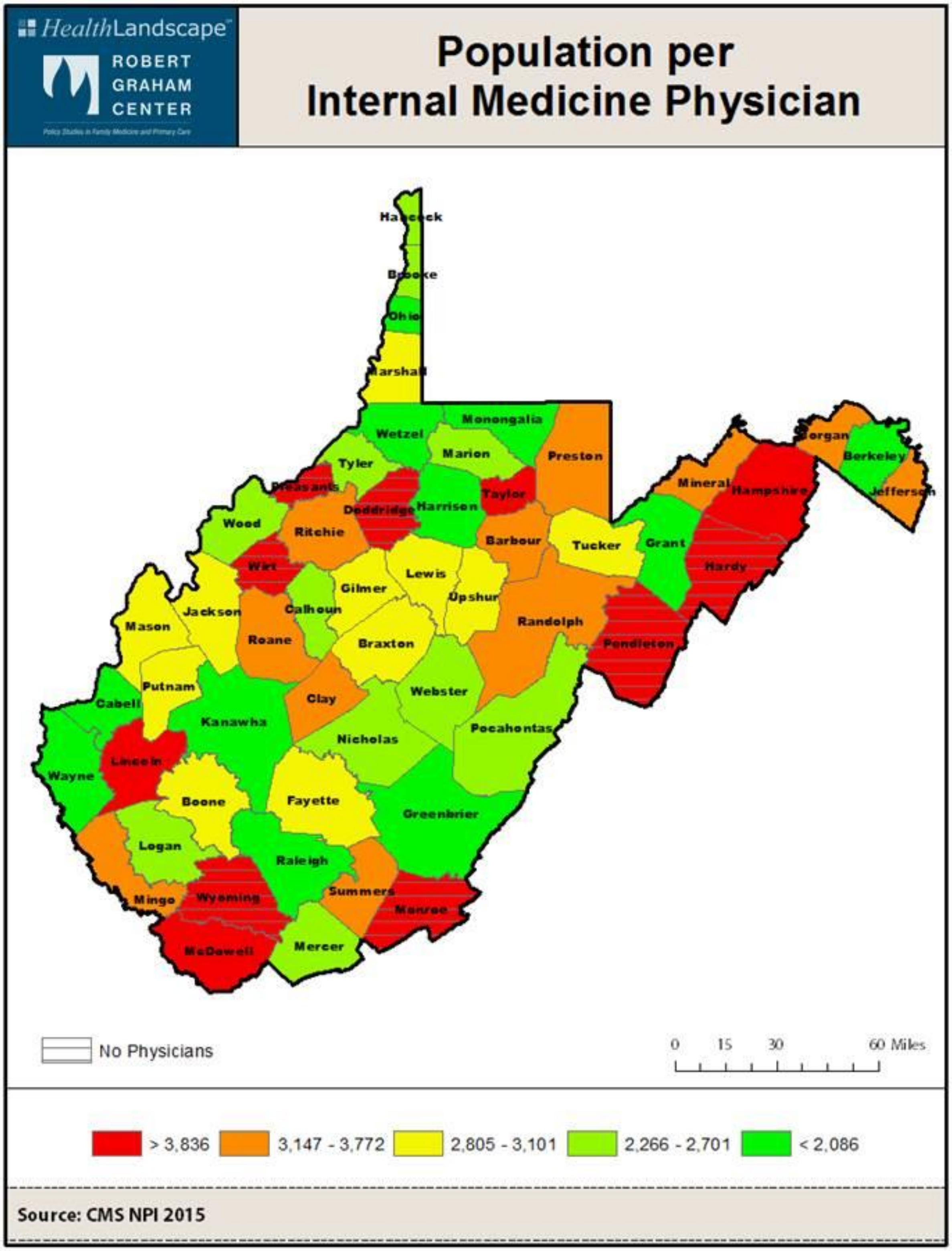
Source: CMS NPI 2015



HealthLandscape
ROBERT GRAHAM CENTER
Family Medicine
Geriatric Medicine
Hancock
Brooke
Ohio
Marshall
Wetzel
Monongalia
Marion
Preston
Tyler
Pleasants
Doddridge
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Morgan
Berkeley
Jefferson
Hardy
Wirt
Gilmer
Lewis
Upshur
Randolph
Pendleton
Jackson
Calhoun
Mason
Roane
Braxton
Putnam
Cabell
Kanawha
Clay
Webster
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Monroe
Mingo
Wyoming
McDowell
Mercer
0 15 30 60 Miles
1 Physician
2 Physicians
Source: CMS NPI 2015

HealthLandscape
ROBERT GRAHAM CENTER
Family Medicine
Hospice & Palliative Medicine
Ohio
Wetzel
Monongalia
Marion
Preston
Tyler
Pleasants
Mineral
Hampshire
Berkeley
Doddridge
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Randolph
Mason
Roane
Braxton
Pendleton
Putnam
Webster
Cabell
Clay
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
0 15 30 60 Miles
1 Physician
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Family Medicine
Sports Medicine
Monongalia
Wetzel
Marion
Preston
Tyler
Taylor
Harrison
Pleasants
Wood
Ritchie
Doddridge
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Mason
Roane
Randolph
Braxton
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
1 Physician
2 Physicians
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per Internal Medicine Physician
Ohio
Wetzel
Monongalia
Tyler
Marion
Preston
Pleasants
Taylor
Mineral
Hampshire
Berkeley
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Wirt
Hardy
Lewis
Gilmer
Upshur
Calhoun
Jackson
Mason
Randolph
Roane
Braxton
Pendleton
Putnam
Webster
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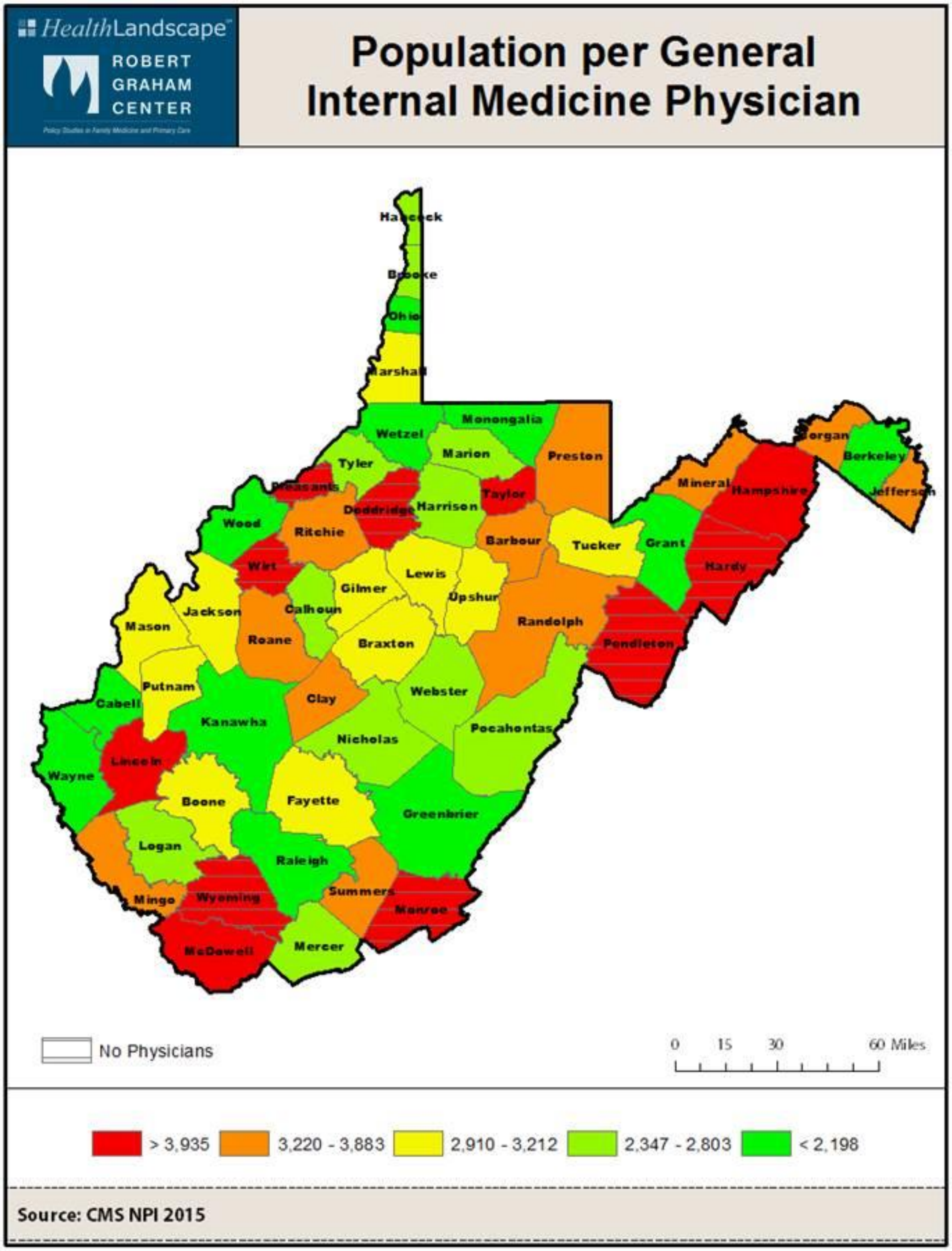
Clay
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
No Physicians
0 15 30 60 Miles
> 3,836
3,147 - 3,772
2,805 - 3,101
2,266 - 2,701
< 2,086
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per General Internal Medicine Physician
Wetzel
Monongalia
Tyler
Marion
Preston
Mineral
Hampshire
Berkeley
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Hardy
Wirt
Lewis
Gilmer
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Calhoun
Mason
Roane
Braxton
Randolph
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Putnam
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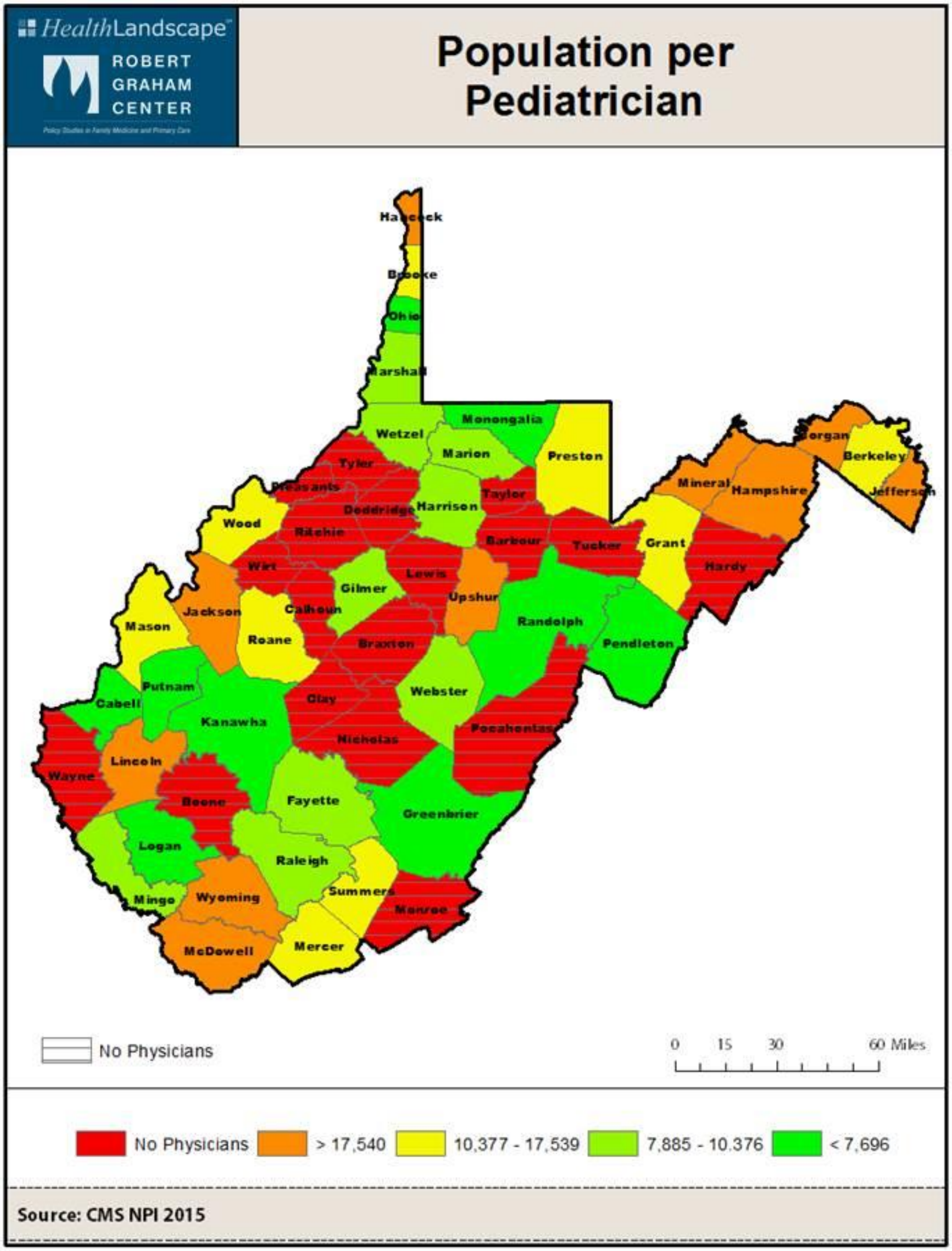
Clay
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
No Physicians
0 15 30 60 Miles
> 3,935
3,220 - 3,883
2,910 - 3,212
2,347 - 2,803
< 2,198
Source: CMS NPI 2015

HealthLandscape
ROBERT GRAHAM CENTER
Internal Medicine
Geriatric
Wetzel
Monongalia
Marion
Preston
Tyler
Taylor
Harrison
Ritchie
Wood
Barbour
Tucker
Grant
Mineral
Hampshire
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Mason
Roane
Braxton
Randolph
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Nicholas
Pocahontas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
1 Physician
2 Physicians
3 Physicians
4 Physicians
Source: CMS NPI 2015


HealthLandscape
ROBERT
GRAHAM
CENTER
Population per Pediatrician
Hancock
Brooke
Ohio
Marshall
Wetzel
Monongalia
Marion
Preston
Tyler
Pleasants
Doddridge
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Morgan
Berkeley
Jefferson
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Randolph
Mason
Roane
Braxton
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Cabell
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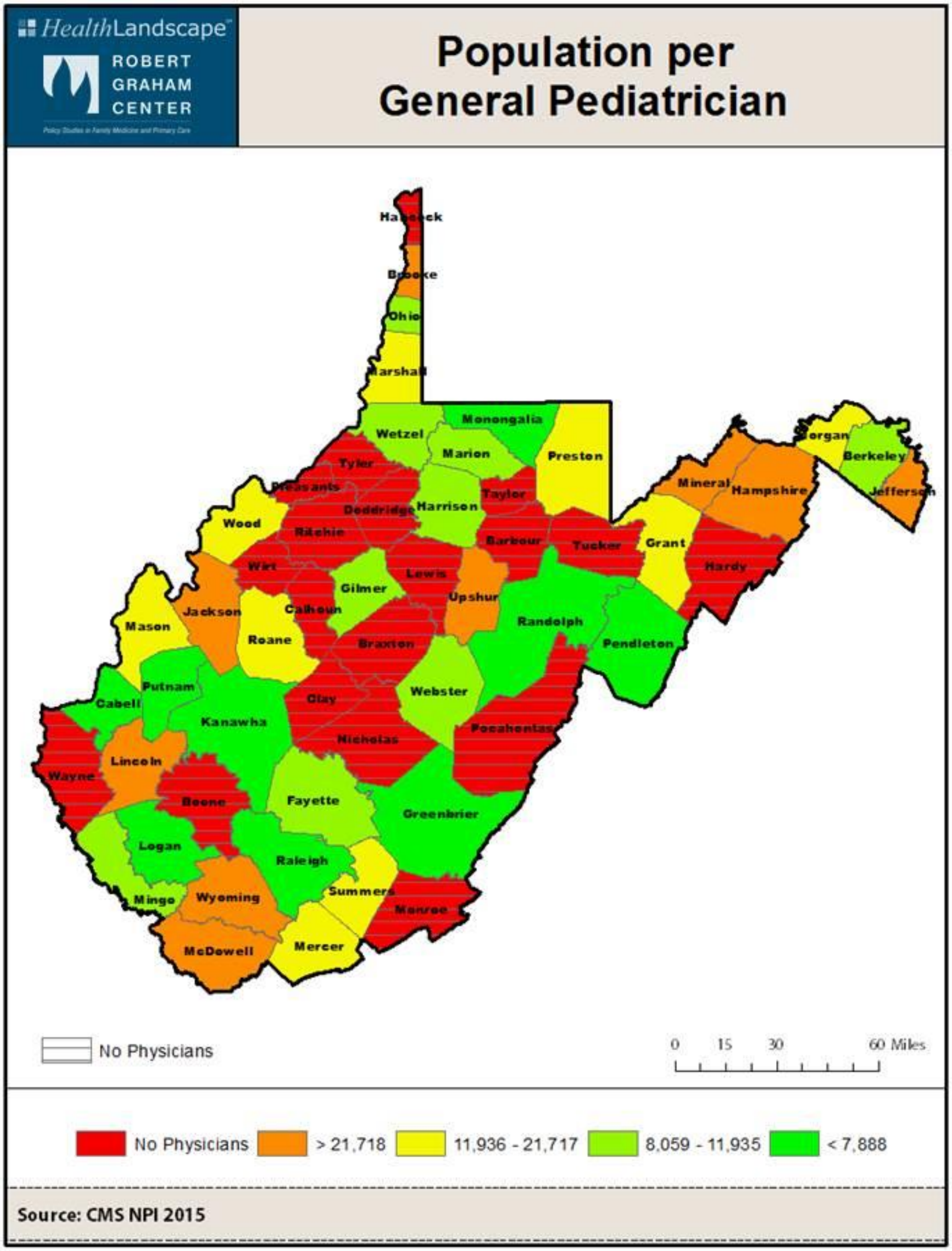
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
No Physicians
0 15 30 60 Miles
No Physicians
> 17,540
10,377 - 17,539
7,885 - 10,376
< 7,696
Source: CMS NPI 2015


HealthLandscape
ROBERT GRAHAM CENTER
Population per General Pediatrician
Ohio
Wetzel
Monongalia
Marion
Preston
Tyler
Taylor
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Doddridge
Ritchie
Wood
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
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Calhoun
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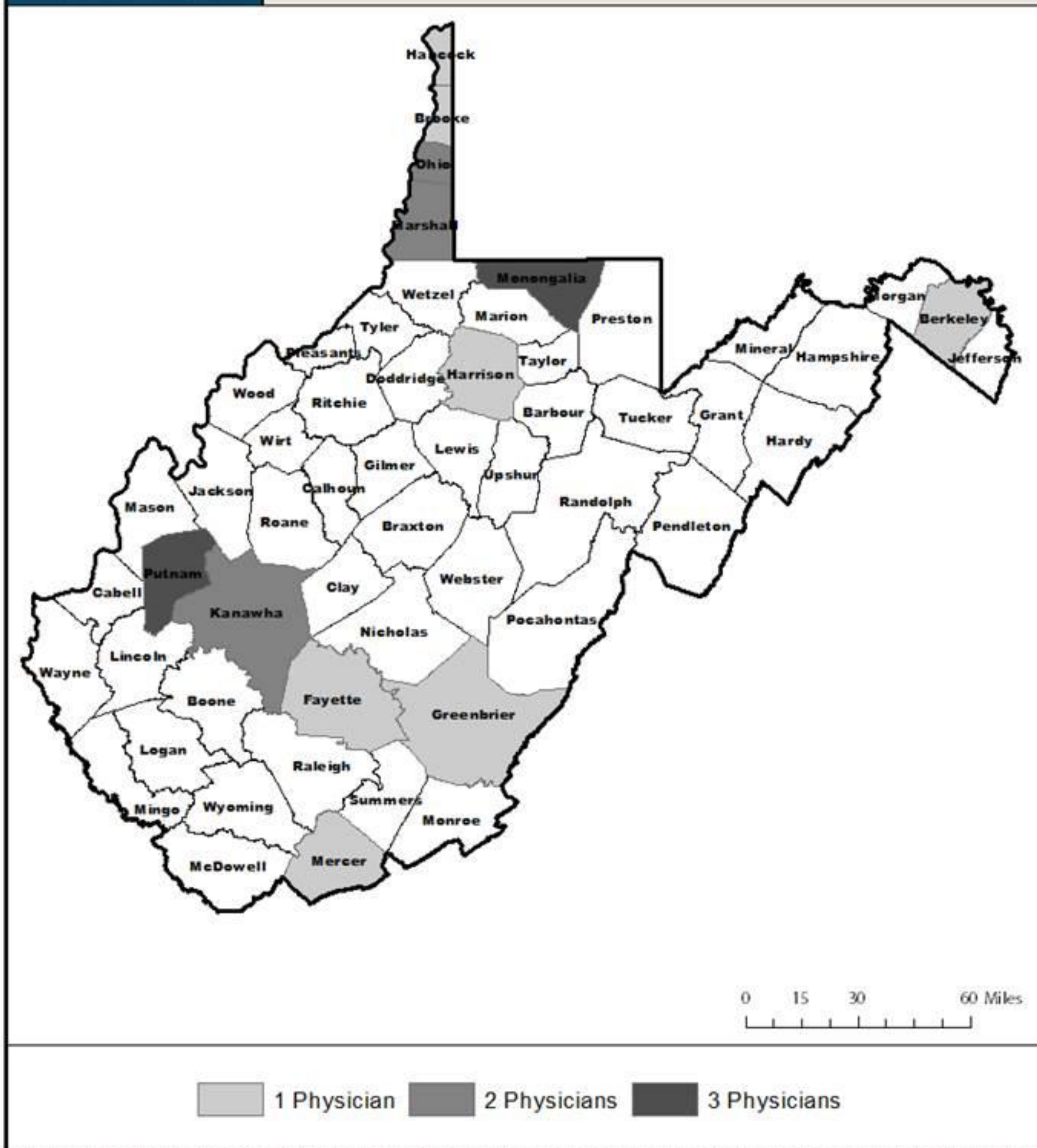
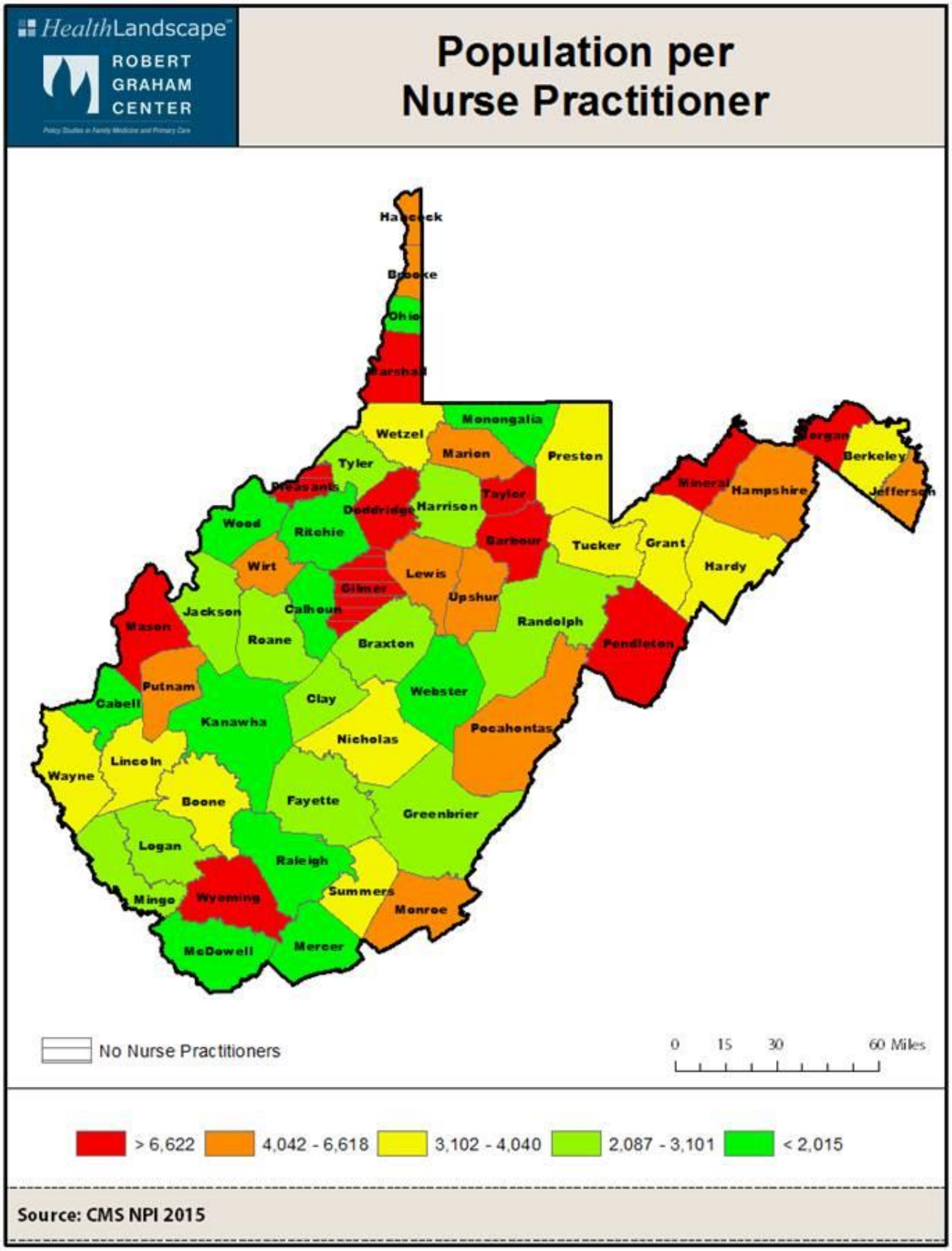
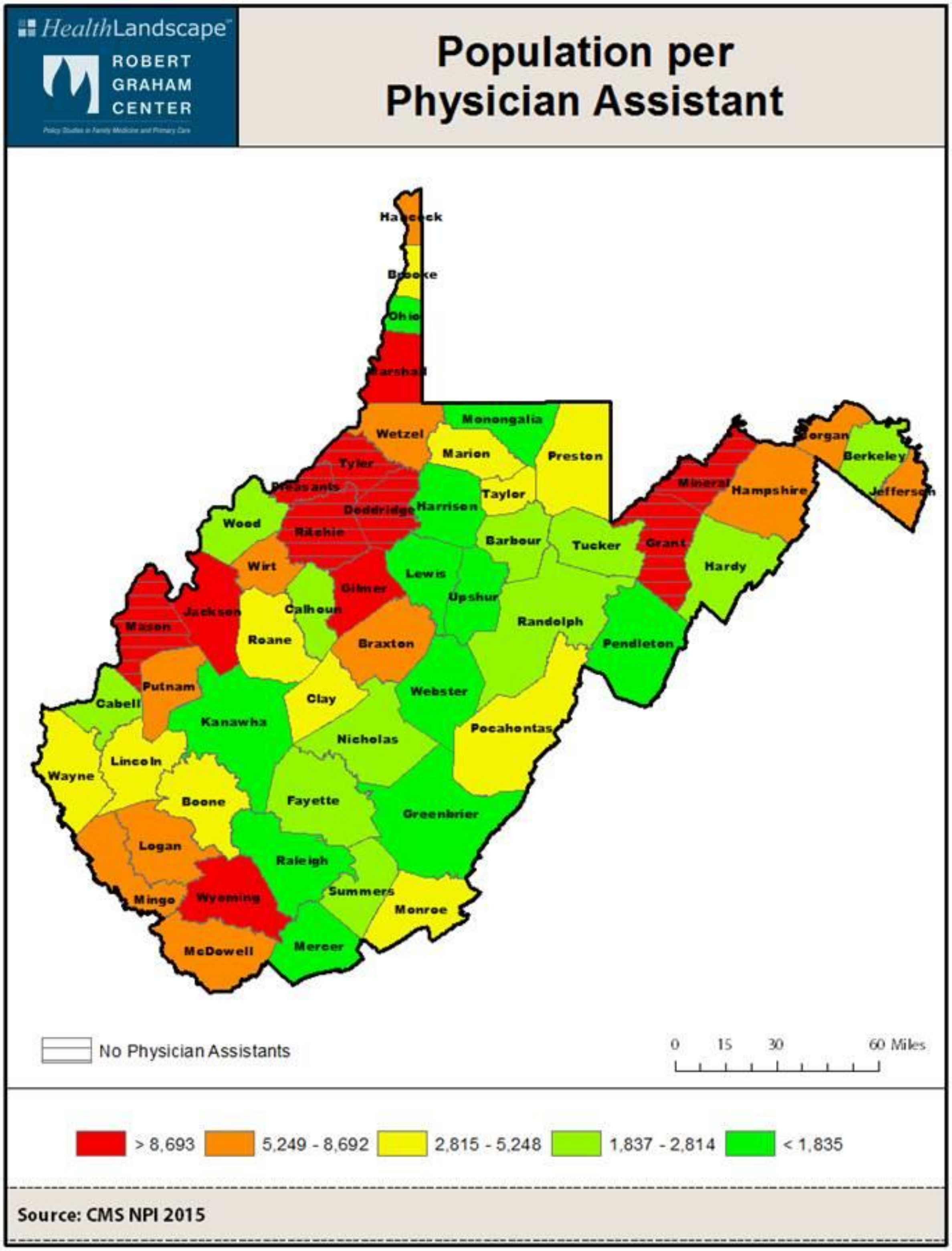
Wyoming
Summers
Monroe
McDowell
Mercer
No Physicians
0 15 30 60 Miles
No Physicians
> 21,718
11,936 - 21,717
8,059 - 11,935
< 7,888
Source: CMS NPI 2015

Population per Pediatrician (Adolescent)

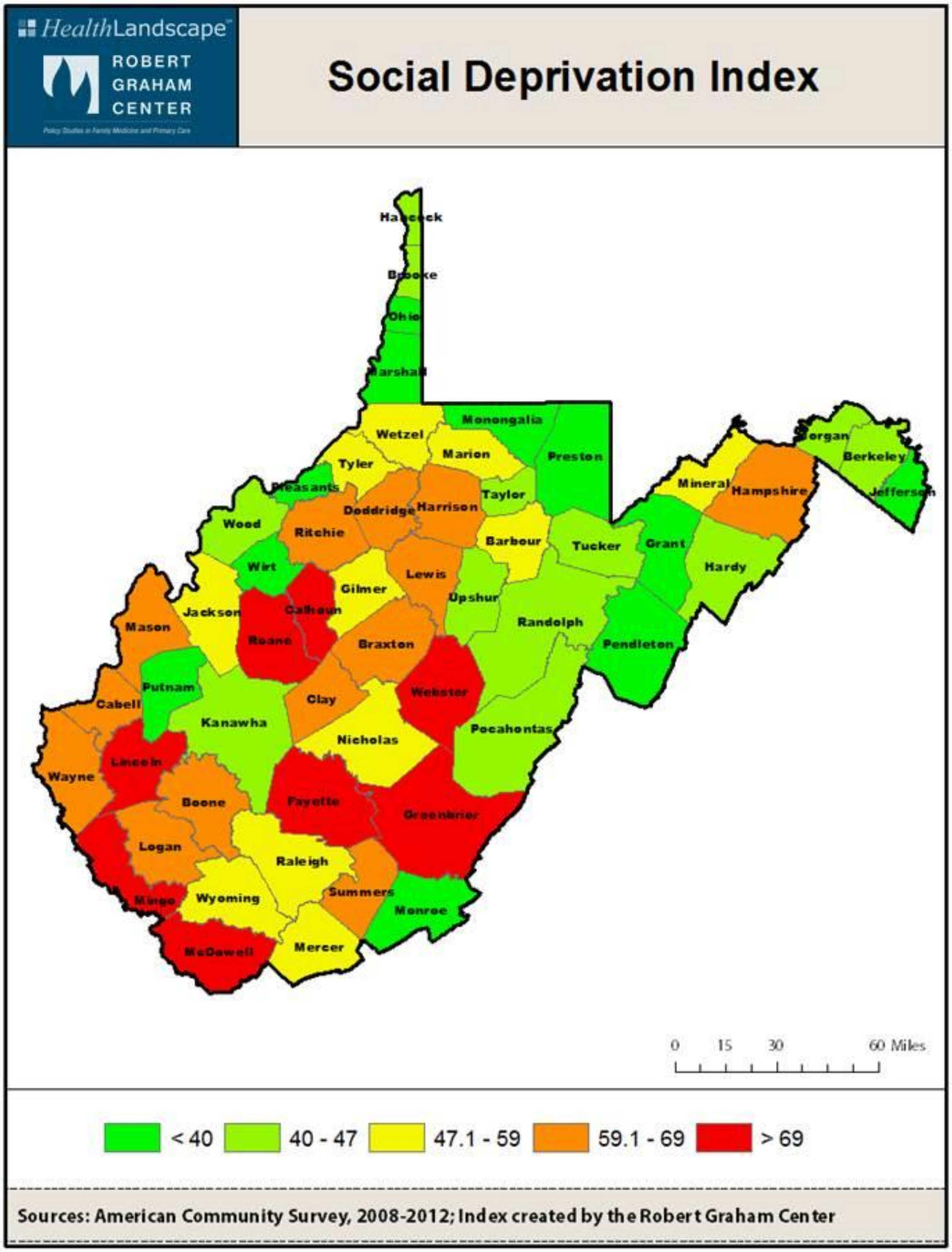


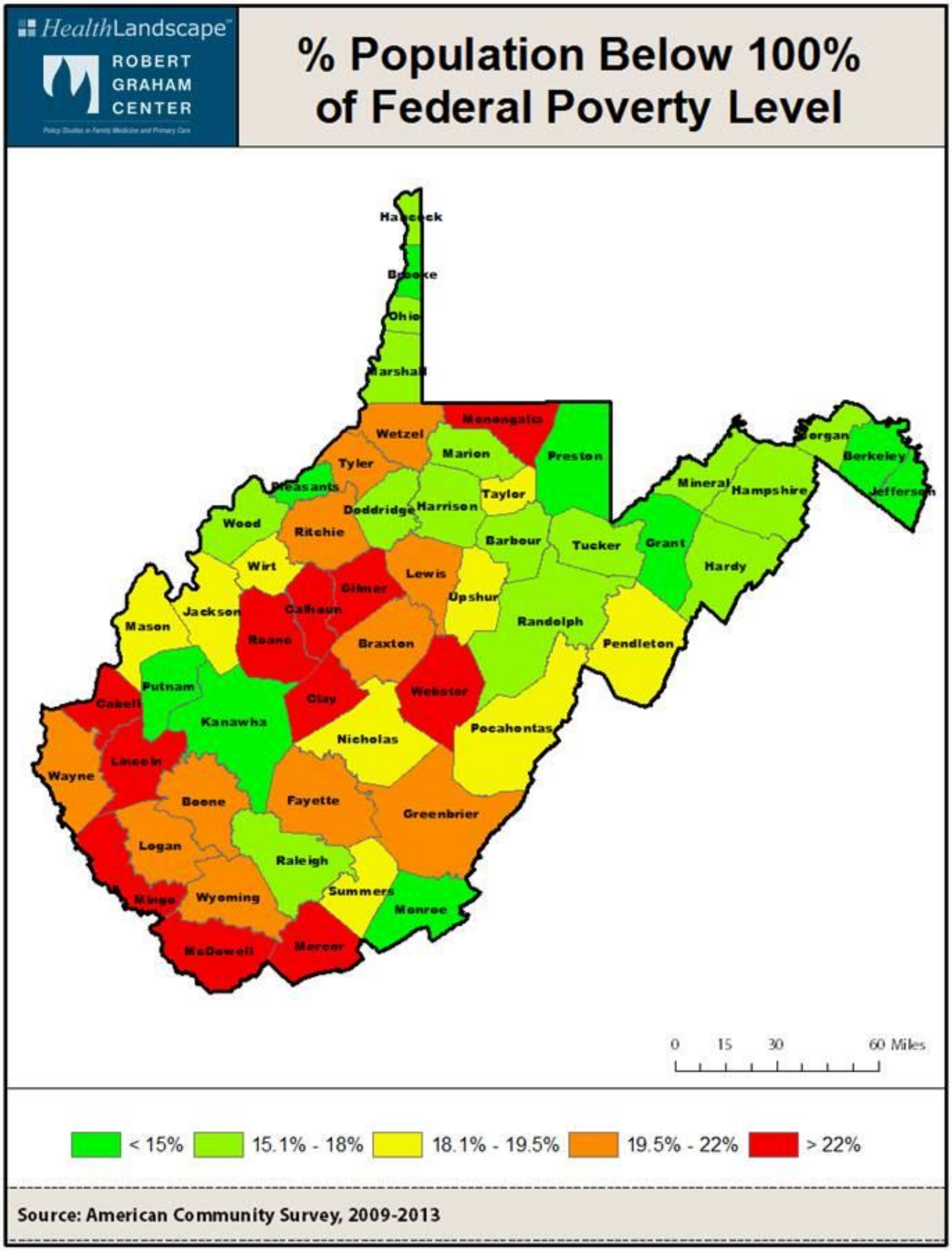
Source: CMS NPI 2015

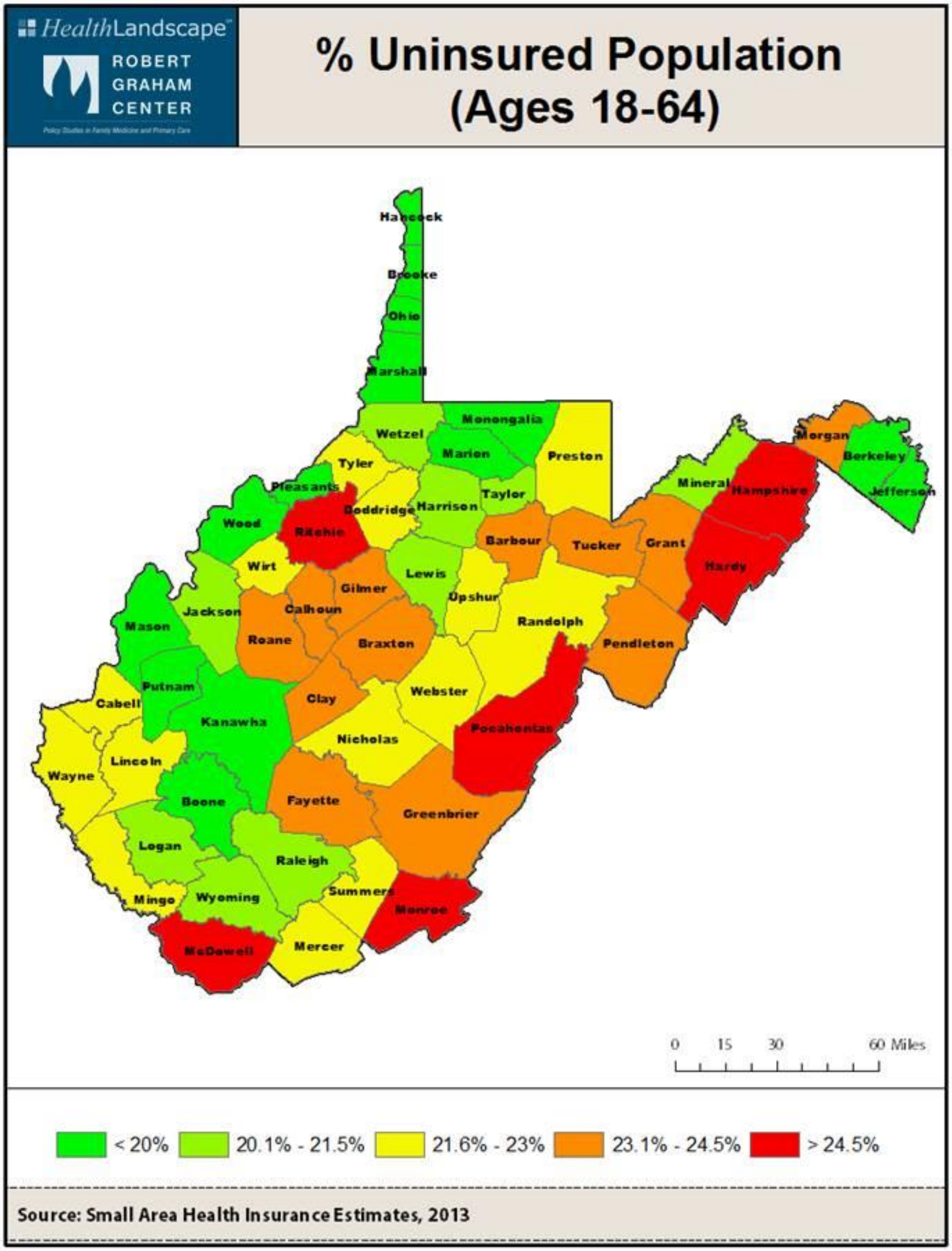

HealthLandscape
ROBERT GRAHAM CENTER
Population per Nurse Practitioner
Ohio
Wetzel
Monongalia
Marion
Preston
Tyler
Taylor
Mineral
Hampshire
Berkeley
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Wirt
Lewis
Hardy
Gilmer
Upshur
Jackson
Calhoun
Mason
Randolph
Roane
Braxton
Pendleton
Putnam
Webster
Cabell
Clay
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
No Nurse Practitioners
0 15 30 60 Miles
> 6,622
4,042 - 6,618
3,102 - 4,040
2,087 - 3,101
< 2,015
Source: CMS NPI 2015

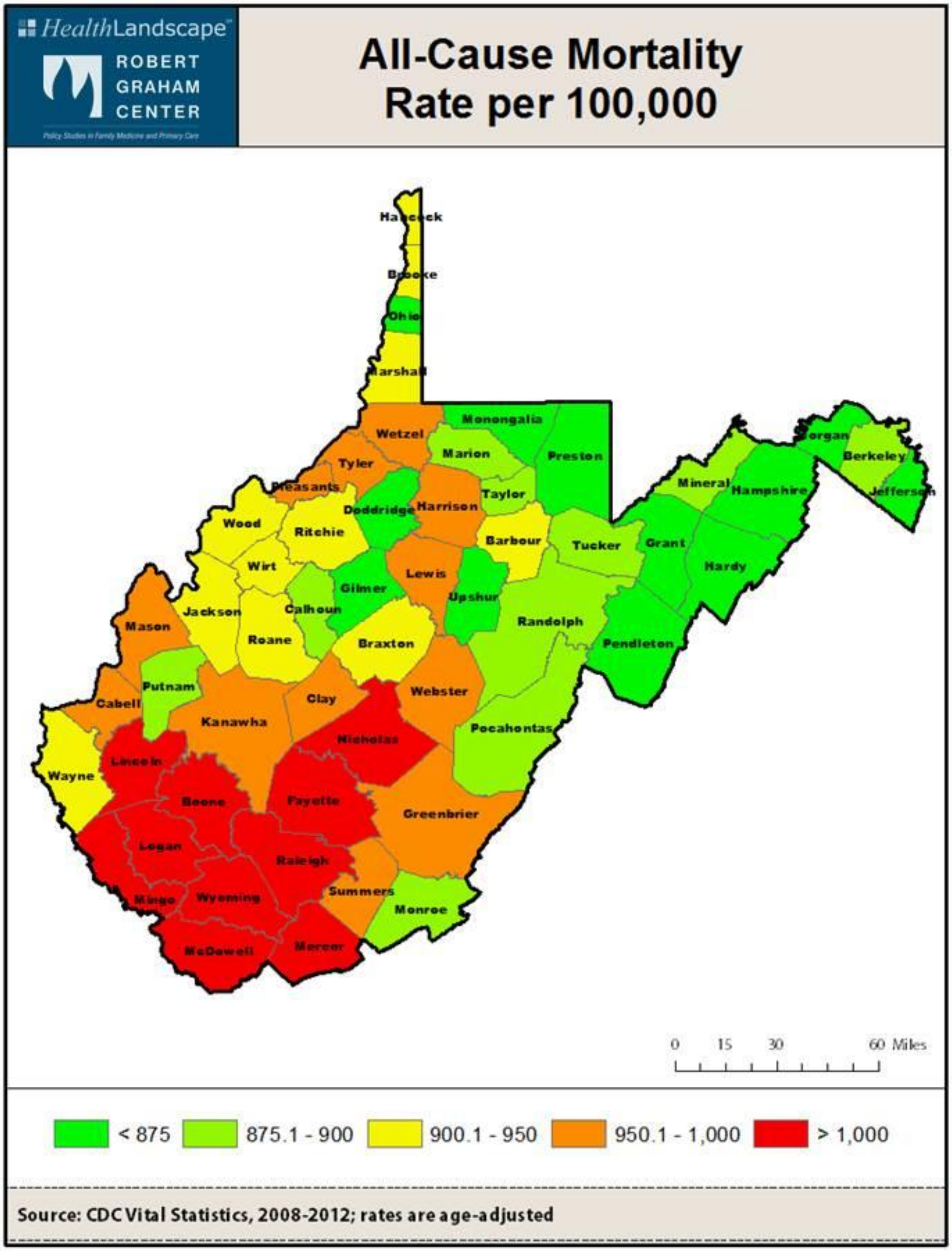

HealthLandscape
ROBERT
GRAHAM
CENTER
Population per
Physician Assistant
Wetzel
Monongalia
Tyler
Marion
Preston
Taylor
Harrison
Wood
Doddridge
Ritchie
Barbour
Tucker
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Mason
Roane
Braxton
Randolph
Pendleton
Putnam
Clay
Webster
Cabell
Kanawha
Nicholas
Pocahontas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
Mercer
McDowell
Berkeley
Hampshire
Mineral
Grant
Hardy
No Physician Assistants
0 15 30 60 Miles
> 8,693
5,249 - 8,692
2,815 - 5,248
1,837 - 2,814
< 1,835
Source: CMS NPI 2015

Appendix E: Individual Maps: "Cold Spots"

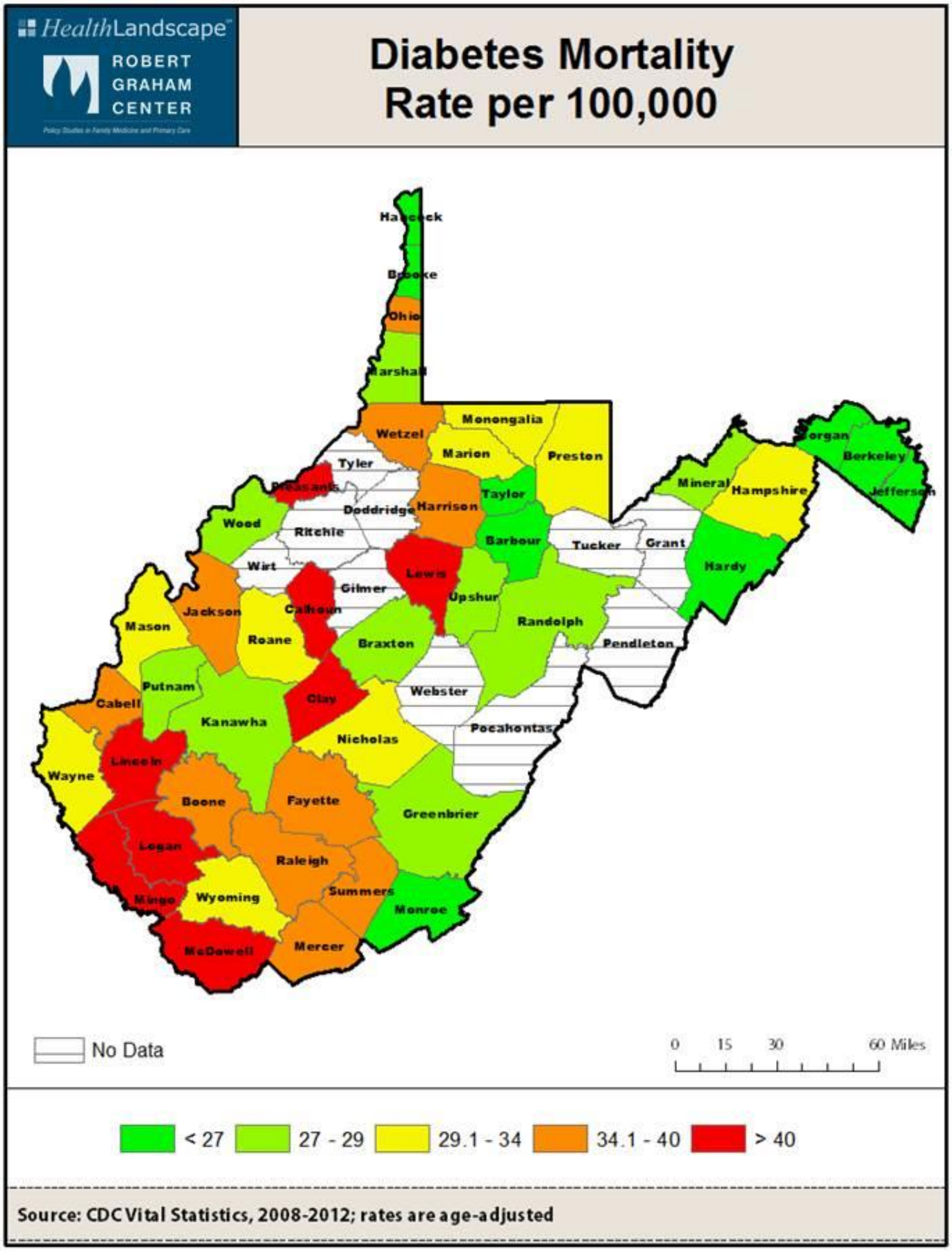



HealthLandscape
ROBERT GRAHAM CENTER
% Population Below 100% of Federal Poverty Level
Ohio
Monongalia
Wetzel
Marion
Preston
Tyler
Taylor
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Mason
Roane
Braxton
Randolph
Pendleton
Putnam
Cabell
Webster
Clay
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 15%
15.1% - 18%
18.1% - 19.5%
19.5% - 22%
> 22%
Source: American Community Survey, 2009-2013

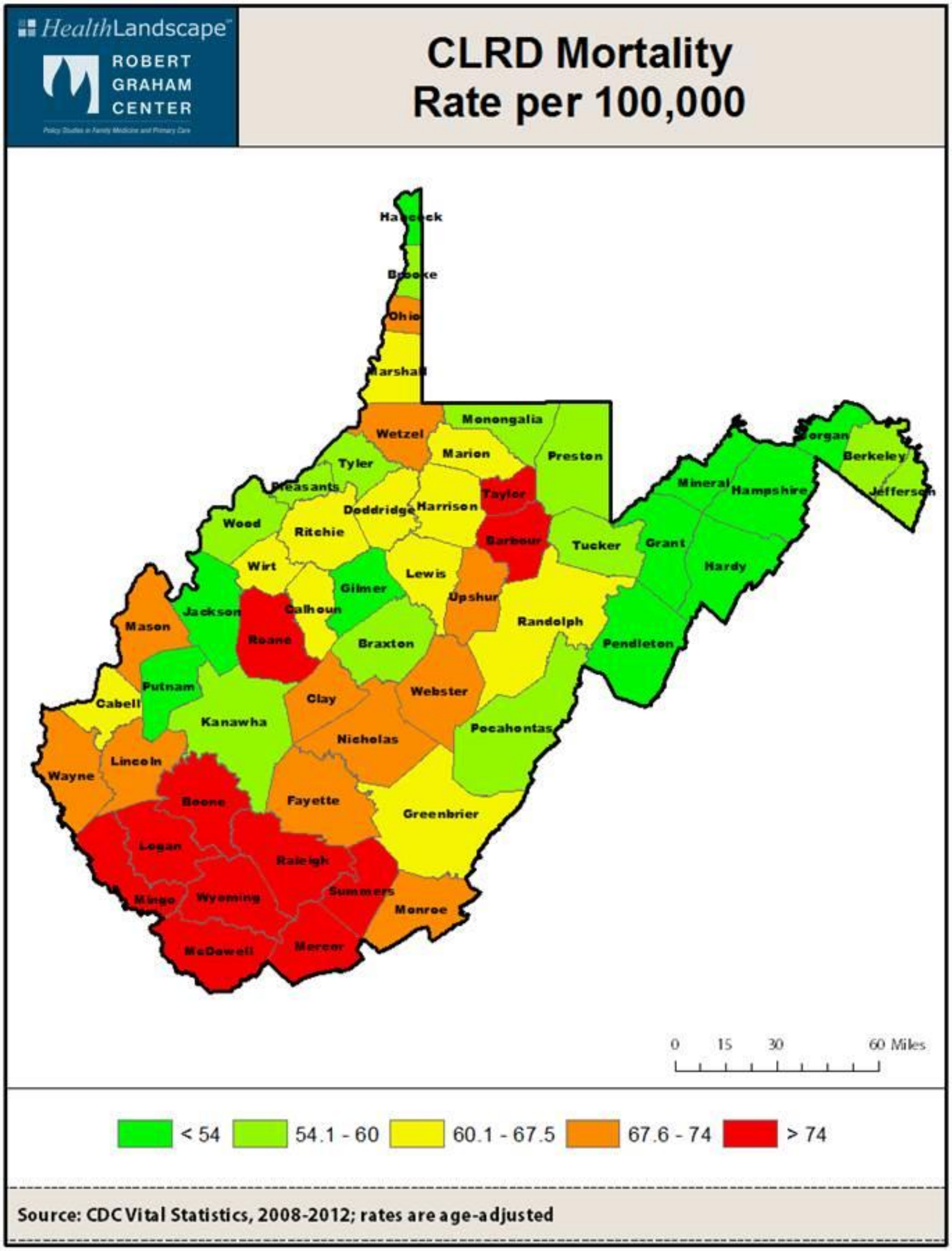

HealthLandscape
ROBERT GRAHAM CENTER
% Uninsured Population
(Ages 18-64)
Hancock
Brooke
Ohio
Marshall
Wetzel
Monongalia
Marion
Preston
Tyler
Pleasants
Doddridge
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Morgan
Berkeley
Jefferson
Hardy
Wirt
Gilmer
Lewis
Upshur
Randolph
Pendleton
Jackson
Calhoun
Mason
Roane
Braxton
Putnam
Cabell
Kanawha
Clay
Webster
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 20%
20.1% - 21.5%
21.6% - 23%
23.1% - 24.5%
> 24.5%
Source: Small Area Health Insurance Estimates, 2013

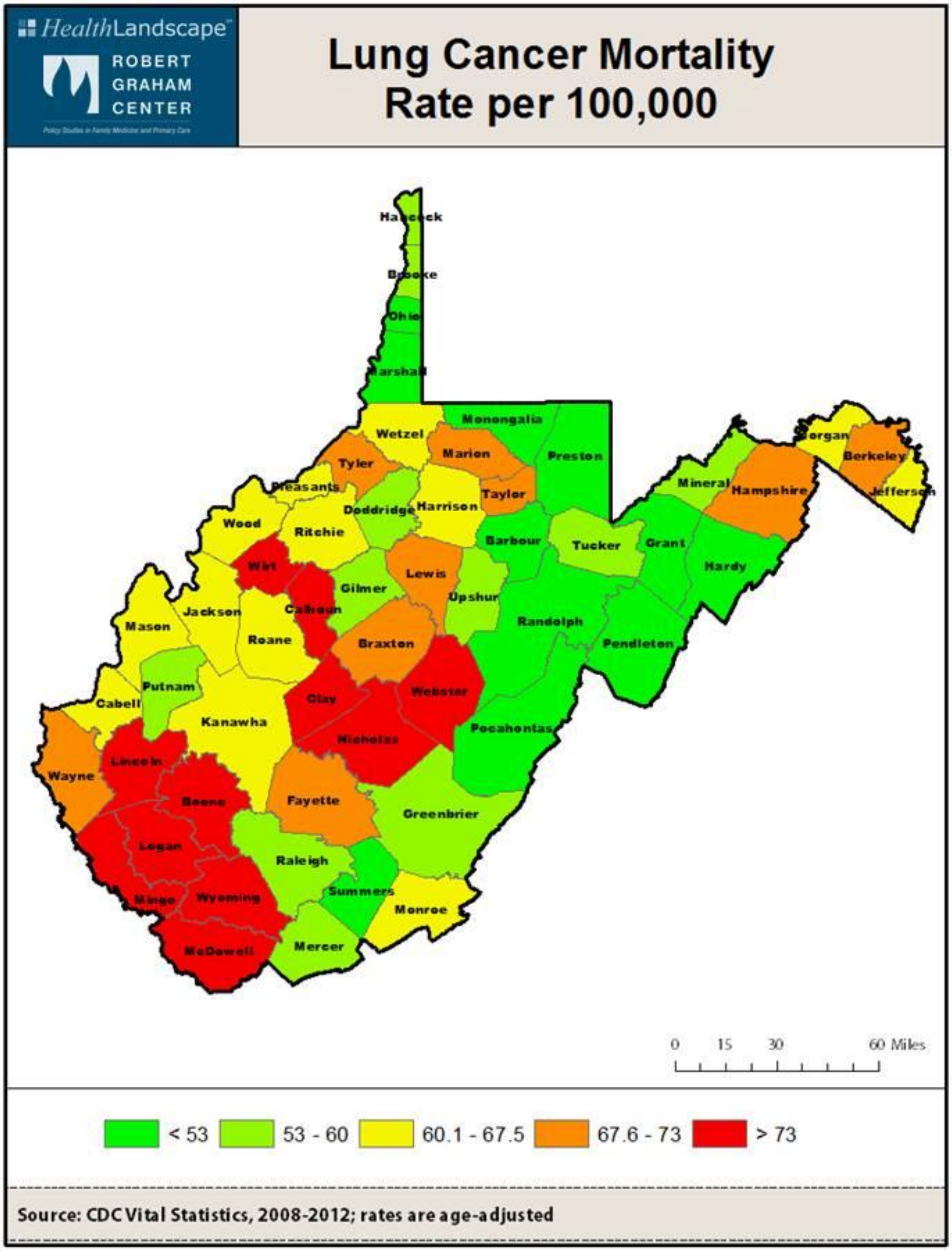


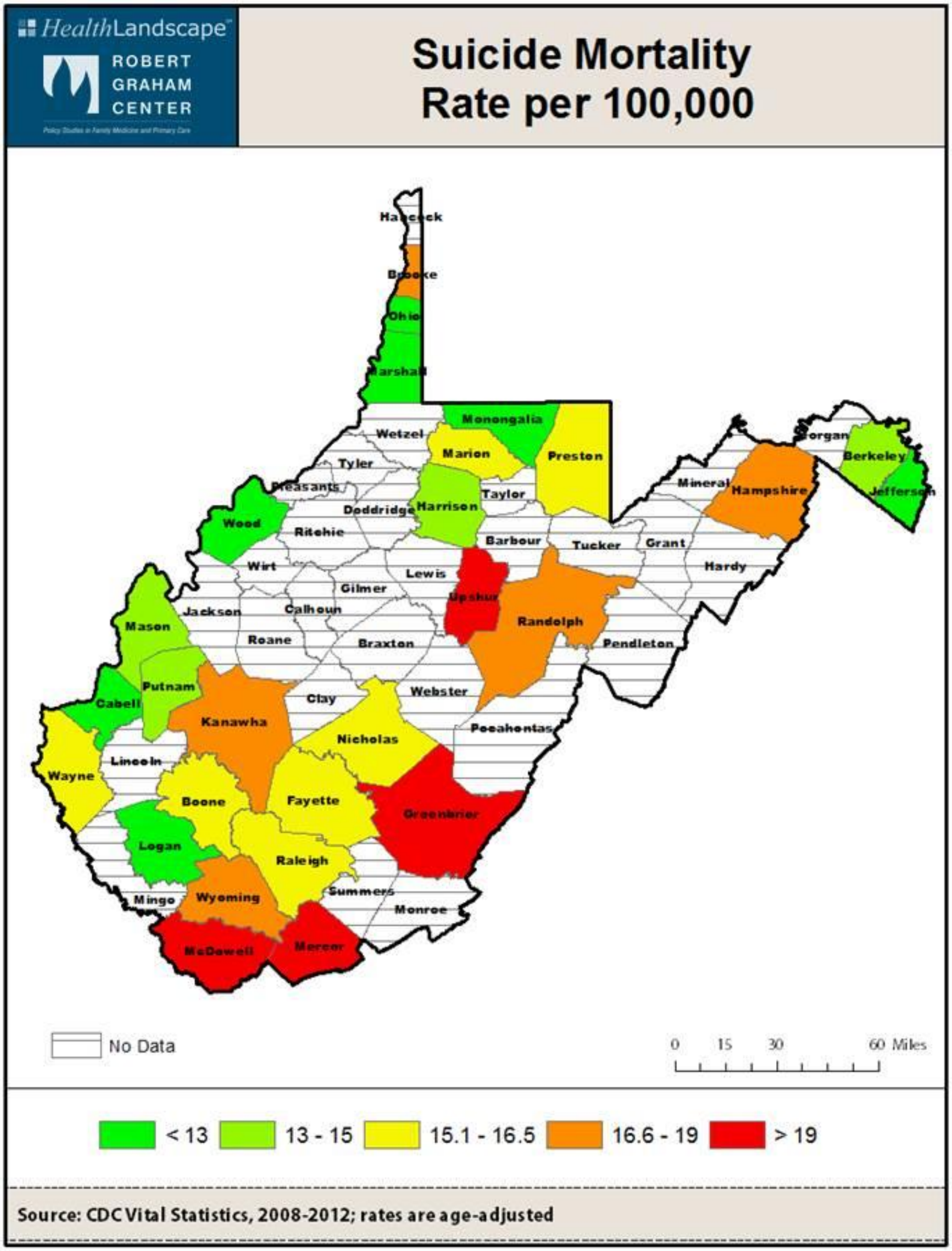
HealthLandscape
ROBERT GRAHAM CENTER
Policy Studies in Family Medicine and Primary Care
All-Cause Mortality Rate per 100,000
Ohio
Monongalia
Wetzel
Marion
Preston
Tyler
Taylor
Pleasants
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Mason
Roane
Braxton
Randolph
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
Mineral
Hampshire
Berkeley
Grant
Hardy
Pendleton
0 15 30 60 Miles
< 875
875.1 - 900
900.1 - 950
950.1 - 1,000
> 1,000
Source: CDC Vital Statistics, 2008-2012; rates are age-adjusted



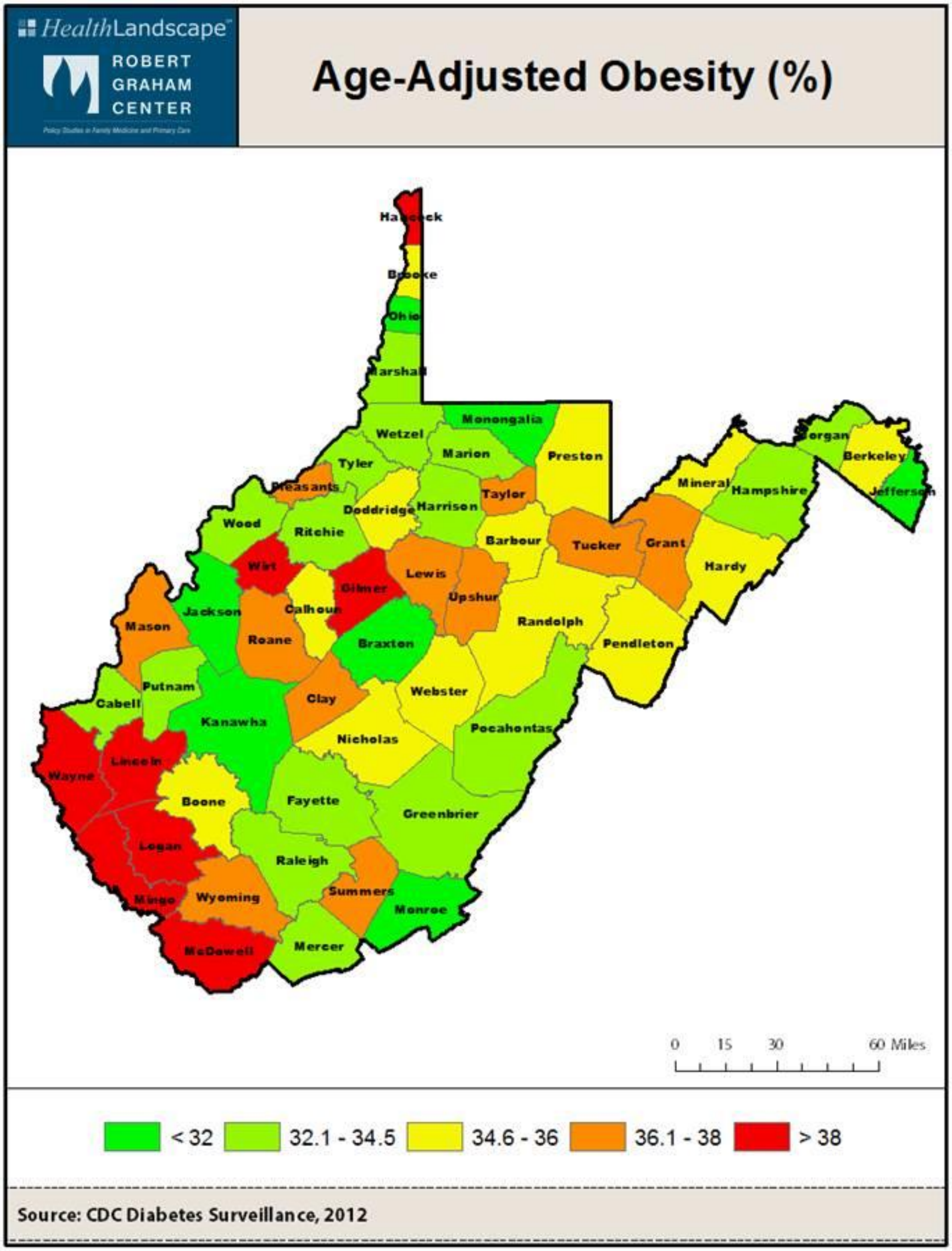
HealthLandscape
ROBERT GRAHAM CENTER
Diabetes Mortality Rate per 100,000
Ohio
Monongalia
Wetzel
Marion
Preston
Tyler
Taylor
Harrison
Doddridge
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
Lewis
Gilmer
Upshur
Calhoun
Jackson
Mason
Roane
Braxton
Randolph
Pendleton
Putnam
Webster
Cabell
Clay
Kanawha
Pocahontas
Nicholas
Wayne
Lincoln
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
Mercer
McDowell
No Data
0 15 30 60 Miles
< 27
27 - 29
29.1 - 34
34.1 - 40
> 40
Source: CDC Vital Statistics, 2008-2012; rates are age-adjusted


HealthLandscape
ROBERT
GRAHAM
CENTER
CLRD Mortality
Rate per 100,000
Ohio
Wetzel
Monongalia
Tyler
Marion
Preston
Taylor
Harrison
Doddridge
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Mason
Roane
Braxton
Randolph
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 54
54.1 - 60
60.1 - 67.5
67.6 - 74
> 74
Source: CDC Vital Statistics, 2008-2012; rates are age-adjusted

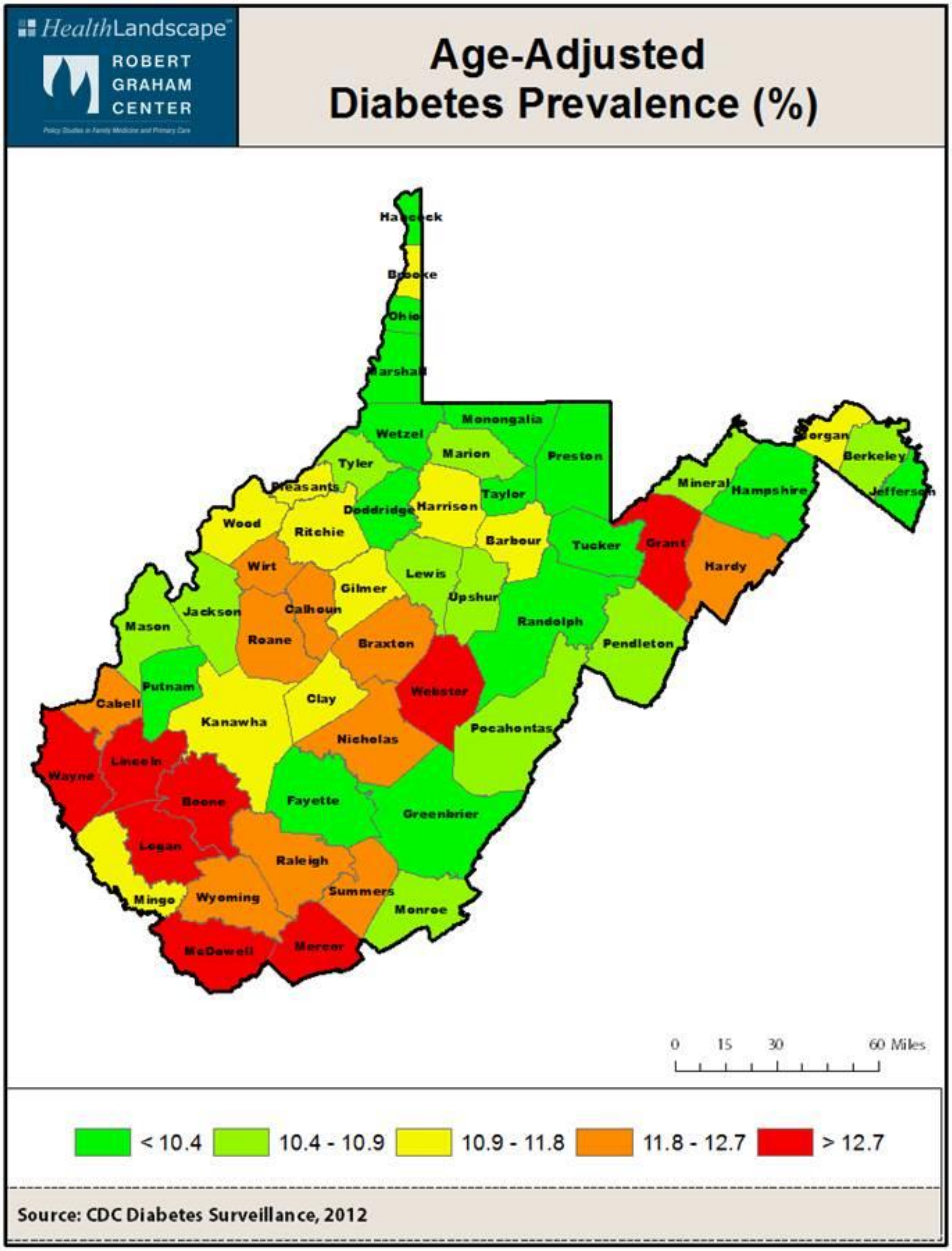

HealthLandscape
ROBERT GRAHAM CENTER
Lung Cancer Mortality Rate per 100,000
Ohio
Monongalia
Wetzel
Tyler
Marion
Preston
Mineral
Berkeley
Hampshire
Pleasants
Taylor
Doddridge
Harrison
Wood
Ritchie
Barbour
Tucker
Grant
Hardy
Wirt
Lewis
Gilmer
Upshur
Jackson
Calhoun
Randolph
Mason
Roane
Braxton
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 53
53 - 60
60.1 - 67.5
67.6 - 73
> 73
Source: CDC Vital Statistics, 2008-2012; rates are age-adjusted

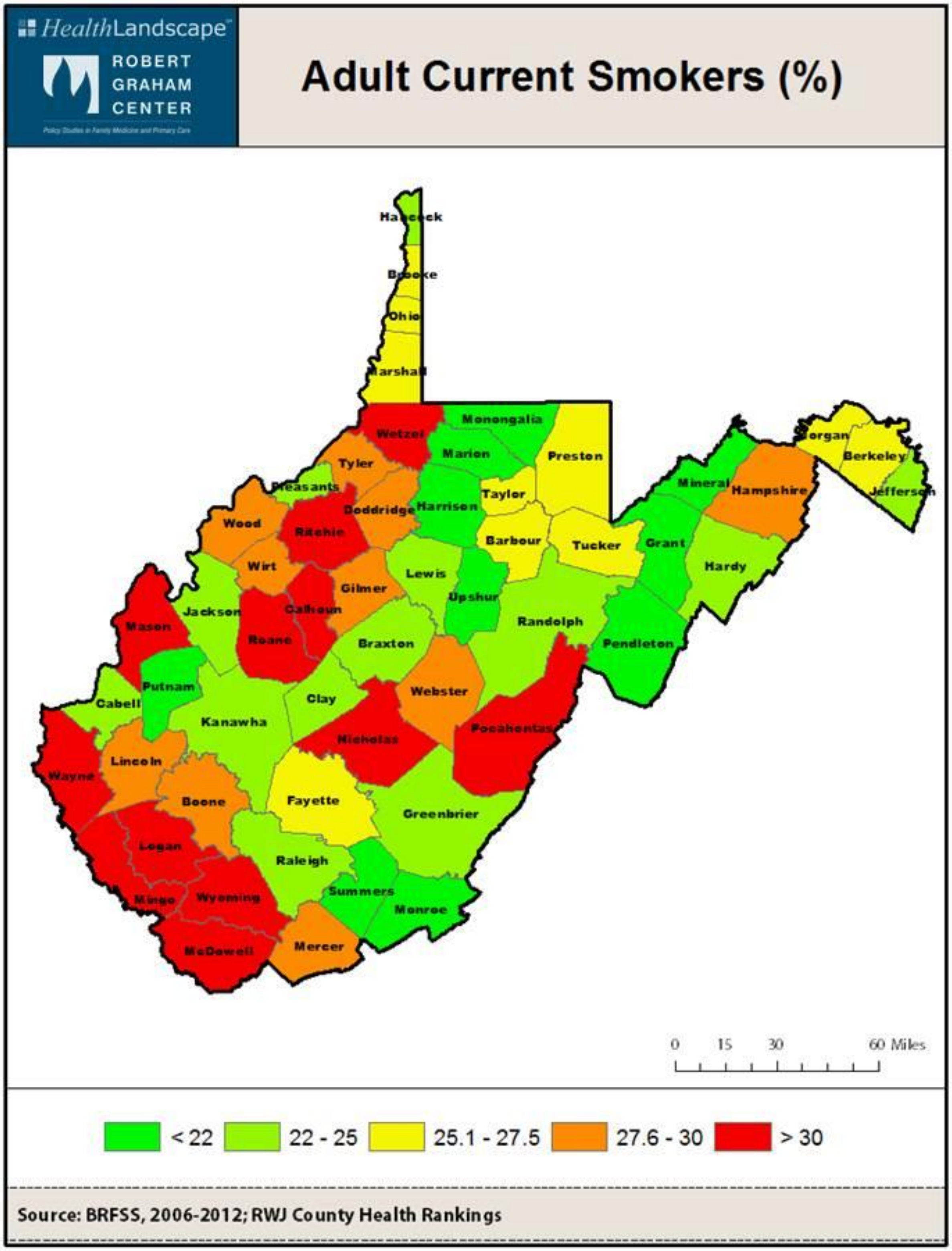


HealthLandscape
ROBERT GRAHAM CENTER
Suicide Mortality Rate per 100,000
Ohio
Wetzel
Monongalia
Tyler
Marion
Preston
Wood
Doddridge
Harrison
Taylor
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
Lewis
Gilmer
Jackson
Calhoun
Randolph
Mason
Roane
Braxton
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
No Data
0 15 30 60 Miles
< 13
13 - 15
15.1 - 16.5
16.6 - 19
> 19
Source: CDC Vital Statistics, 2008-2012; rates are age-adjusted

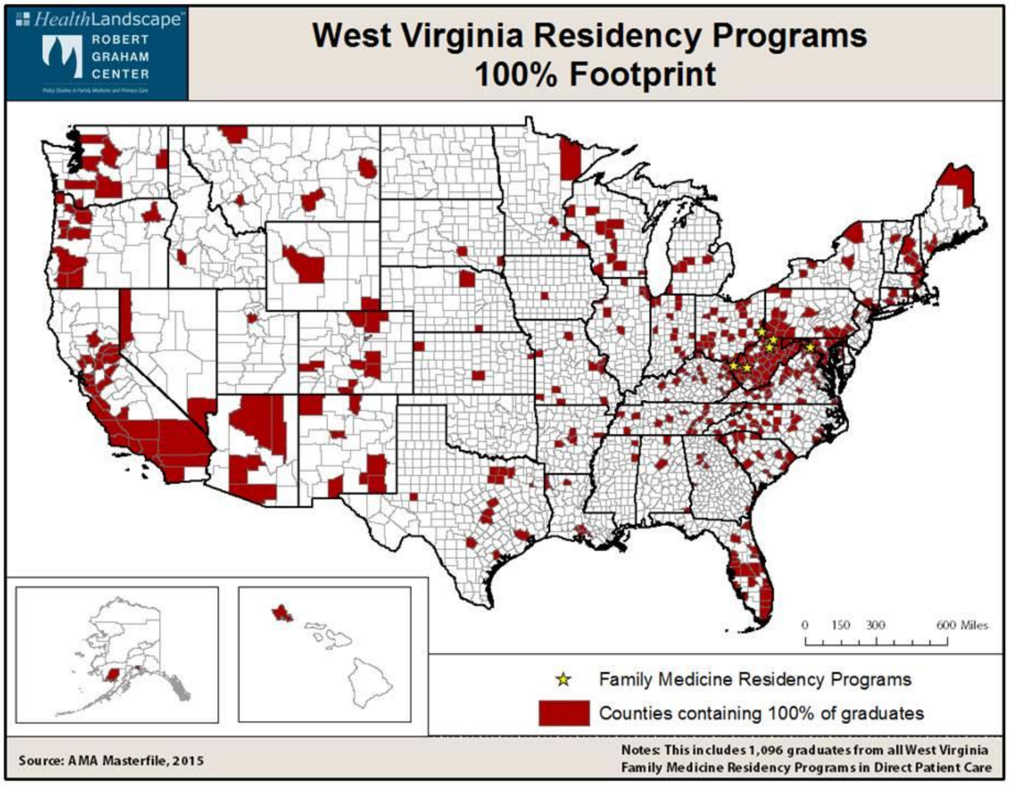


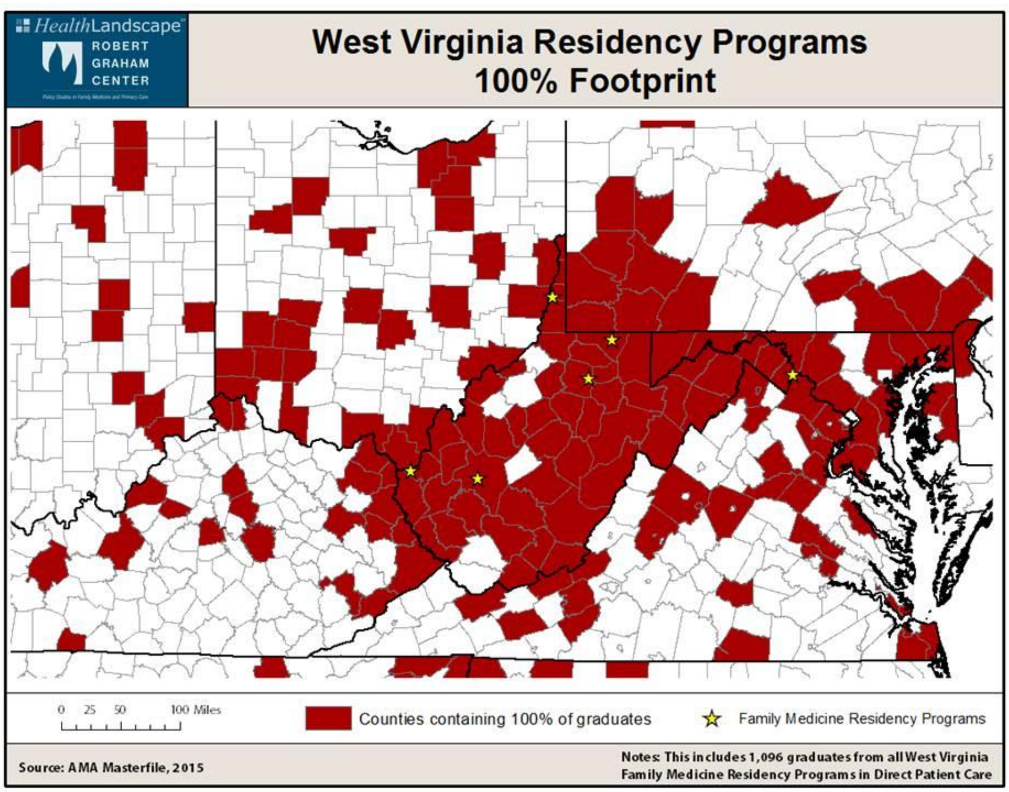
HealthLandscape
ROBERT GRAHAM CENTER
Age-Adjusted Obesity (%)
Ohio
Wetzel
Monongalia
Marion
Tyler
Preston
Taylor
Doddridge
Harrison
Wood
Ritchie
Mineral
Hampshire
Berkeley
Barbour
Tucker
Grant
Hardy
Wirt
Gilmer
Lewis
Upshur
Mason
Jackson
Calhoun
Randolph
Roane
Braxton
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Mingo
Wyoming
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 32
32.1 - 34.5
34.6 - 36
36.1 - 38
> 38
Source: CDC Diabetes Surveillance, 2012

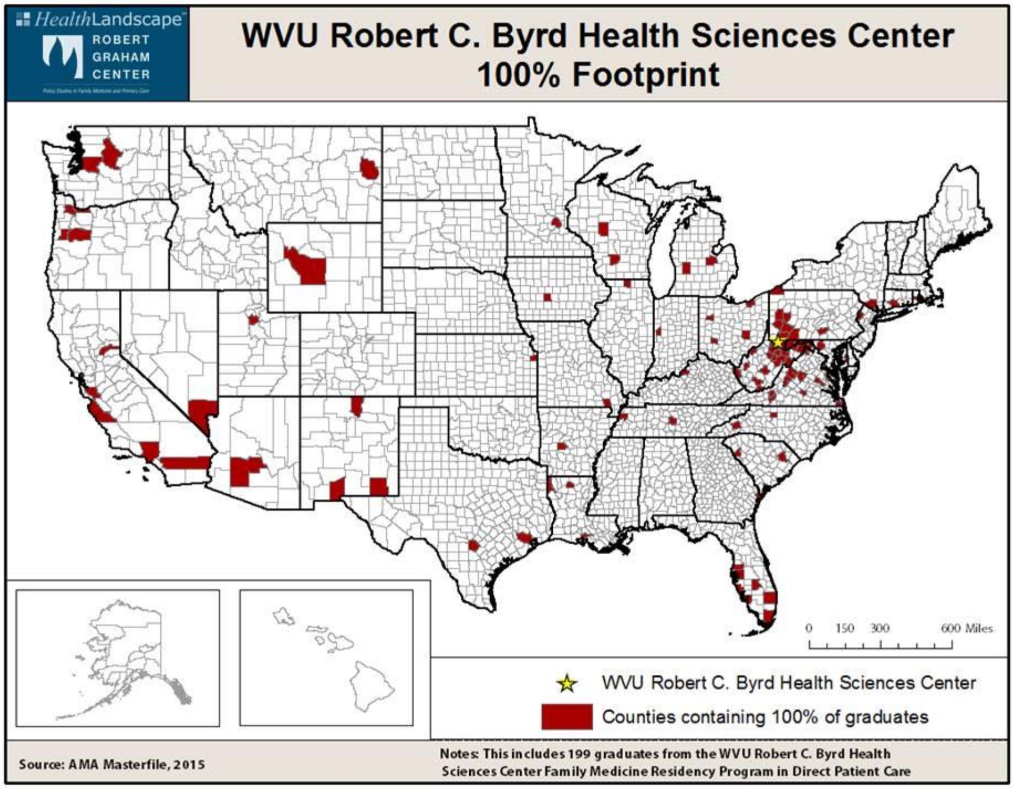

HealthLandscape
ROBERT GRAHAM CENTER
Age-Adjusted Diabetes Prevalence (%)
Ohio
Wetzel
Monongalia
Marion
Preston
Tyler
Taylor
Harrison
Doddridge
Wood
Ritchie
Barbour
Tucker
Grant
Mineral
Hampshire
Berkeley
Hardy
Wirt
Gilmer
Lewis
Upshur
Calhoun
Jackson
Mason
Roane
Braxton
Randolph
Pendleton
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Wayne
Lincoln
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
0 15 30 60 Miles
< 10.4
10.4 - 10.9
10.9 - 11.8
11.8 - 12.7
> 12.7
Source: CDC Diabetes Surveillance, 2012

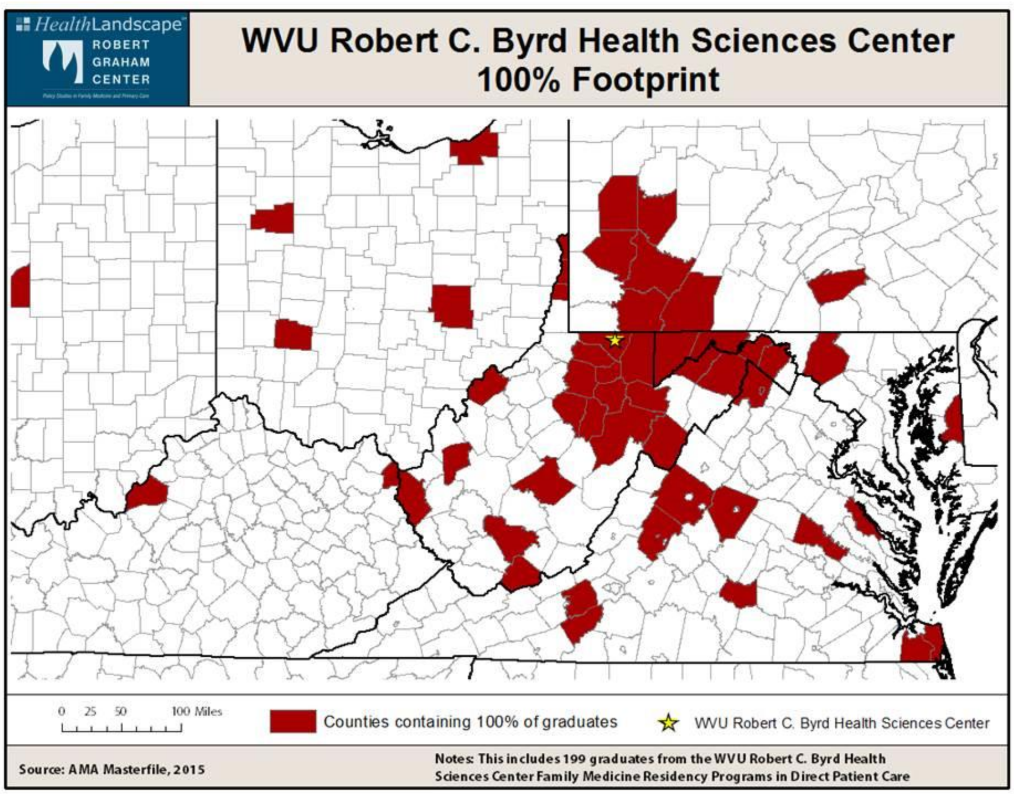

HealthLandscape
ROBERT GRAHAM CENTER
Adult Current Smokers (%)
Hancock
Brooke
Ohio
Marshall
Wetzel
Monongalia
Marion
Preston
Tyler
Pleasants
Doddridge
Harrison
Taylor
Wood
Ritchie
Barbour
Tucker
Wirt
Lewis
Gilmer
Upshur
Calhoun
Jackson
Mason
Roane
Braxton
Randolph
Putnam
Cabell
Clay
Webster
Kanawha
Pocahontas
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer
Mineral
Hampshire
Grant
Hardy
Pendleton
Morgan
Berkeley
Jefferson
0 15 30 60 Miles
< 22
22 - 25
25.1 - 27.5
27.6 - 30
> 30
Source: BRFSS, 2006-2012; RWJ County Health Rankings

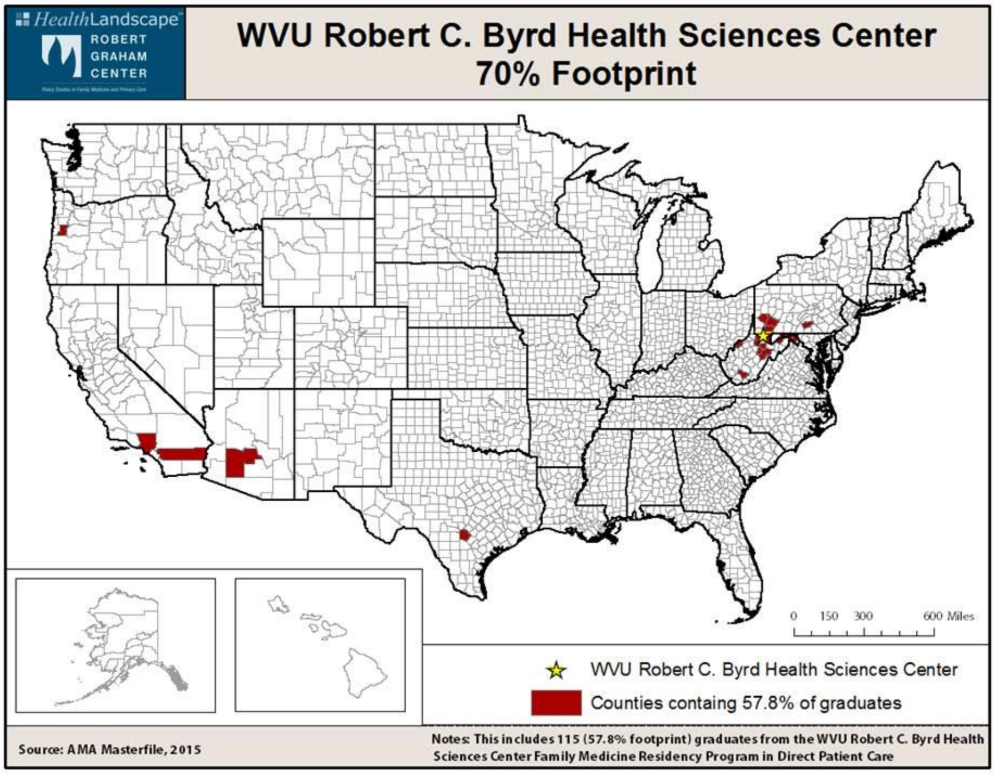
Appendix F: Individual Maps: Residency Footprints



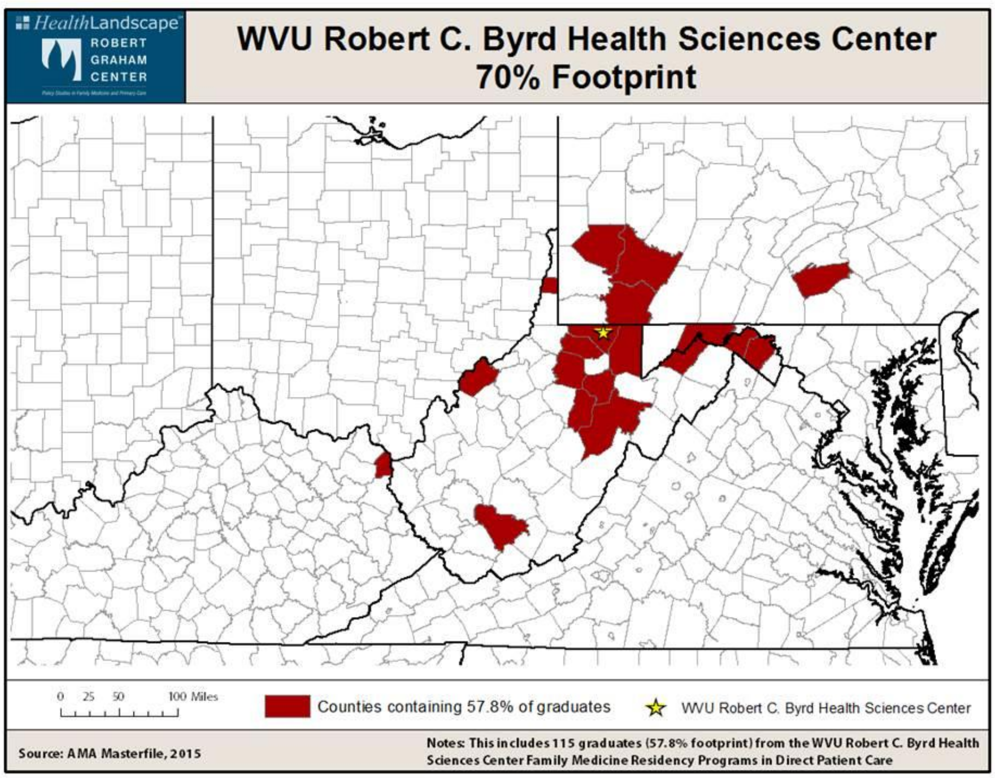



HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
100% Footprint
0 150 300 600 Miles
WVU Robert C. Byrd Health Sciences Center
Counties containing 100% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 199 graduates from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Program in Direct Patient Care

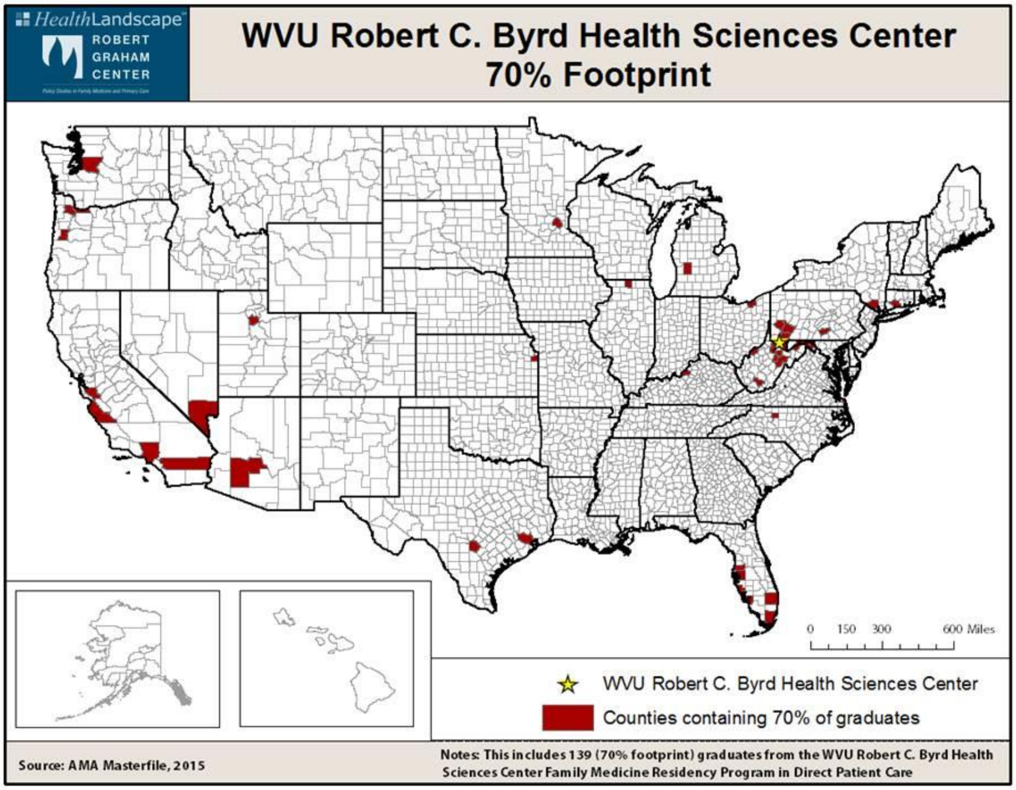

HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
WVU Robert C. Byrd Health Sciences Center
Source: AMA Masterfile, 2015
Notes: This includes 199 graduates from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Programs in Direct Patient Care

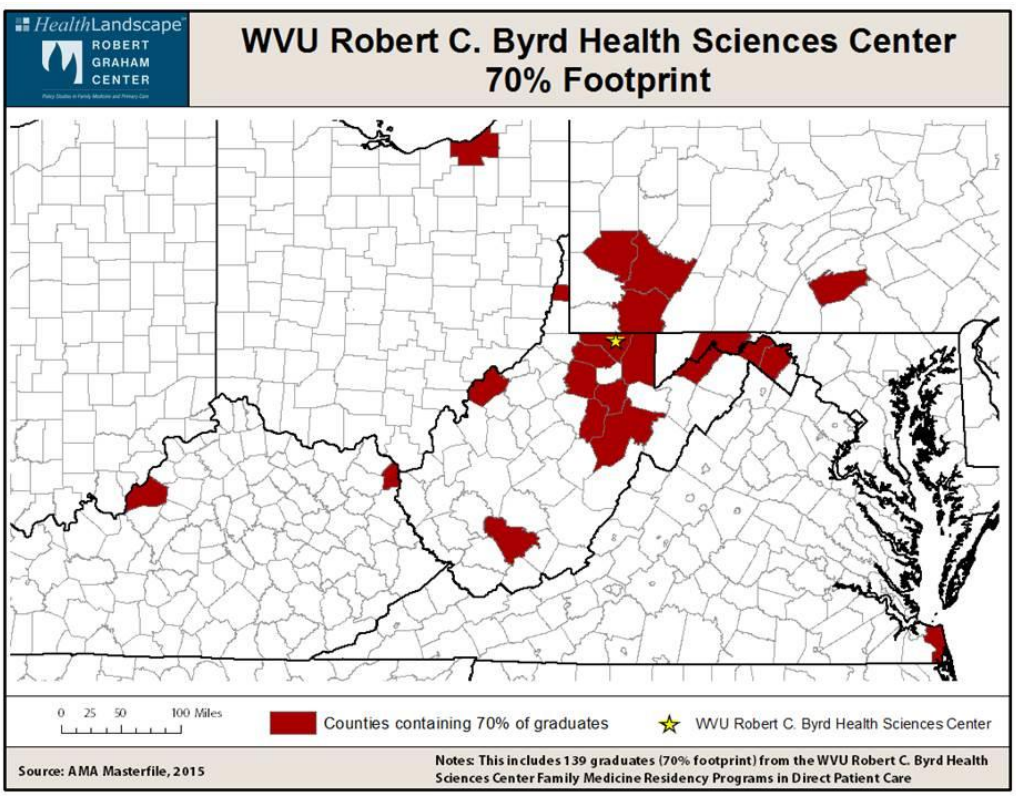


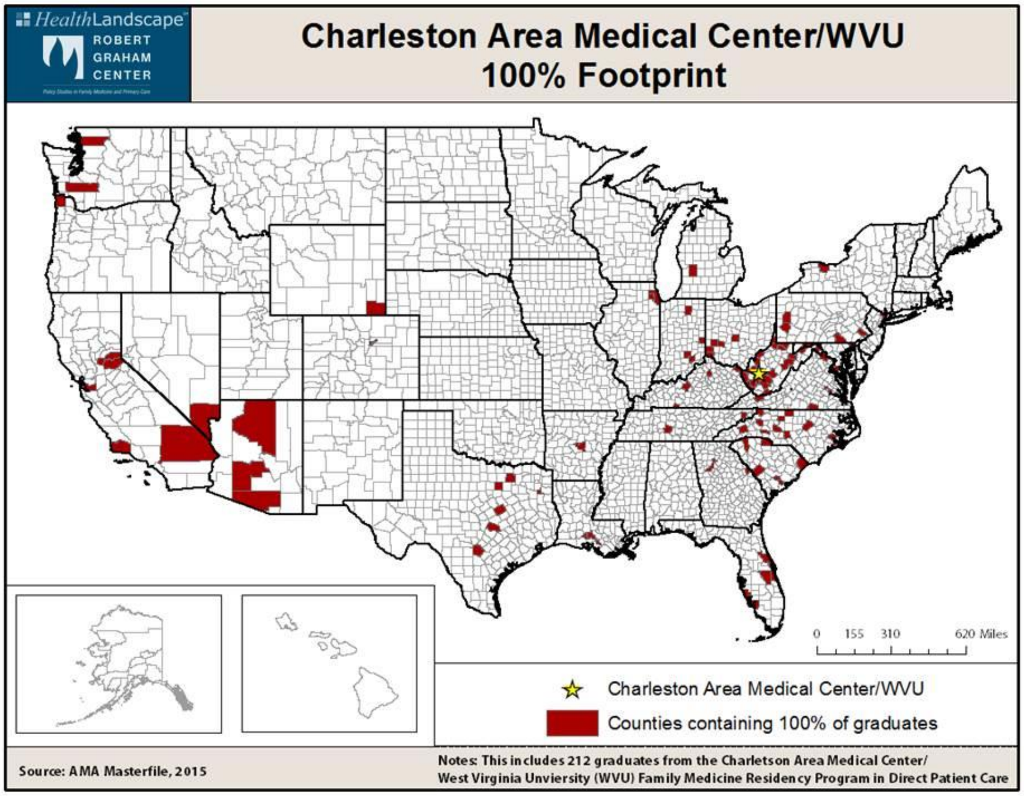
HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
70% Footprint
0 150 300 600 Miles
WVU Robert C. Byrd Health Sciences Center
Counties containg 57.8% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 115 (57.8% footprint) graduates from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Program in Direct Patient Care

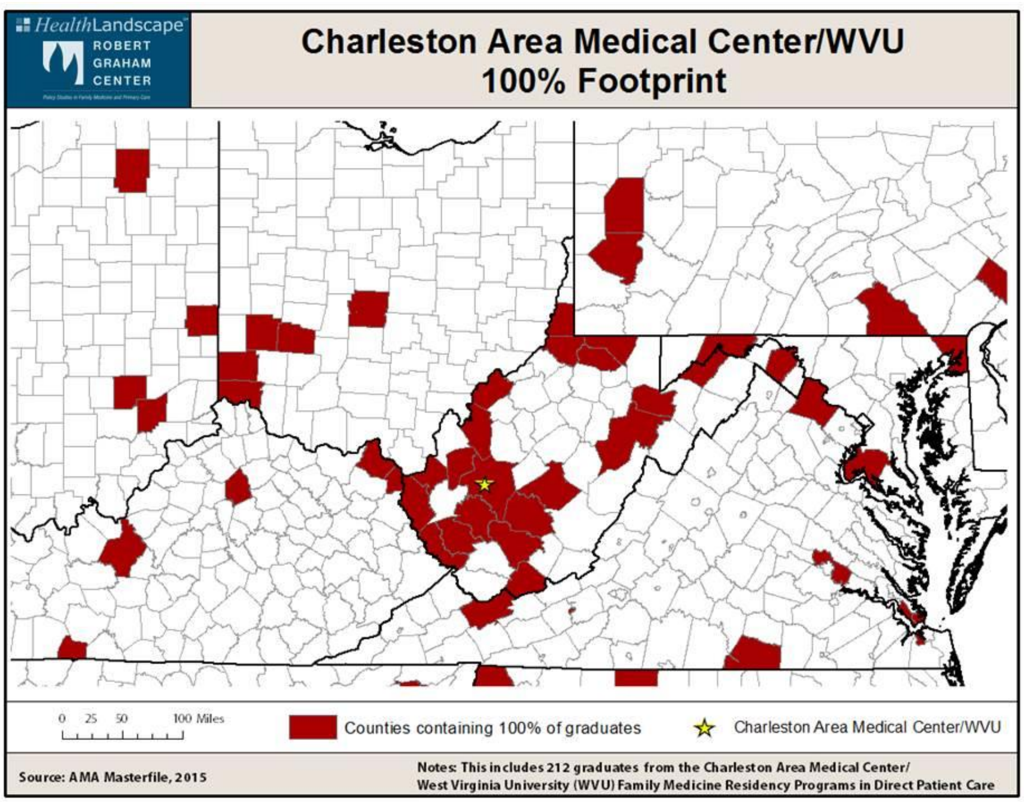


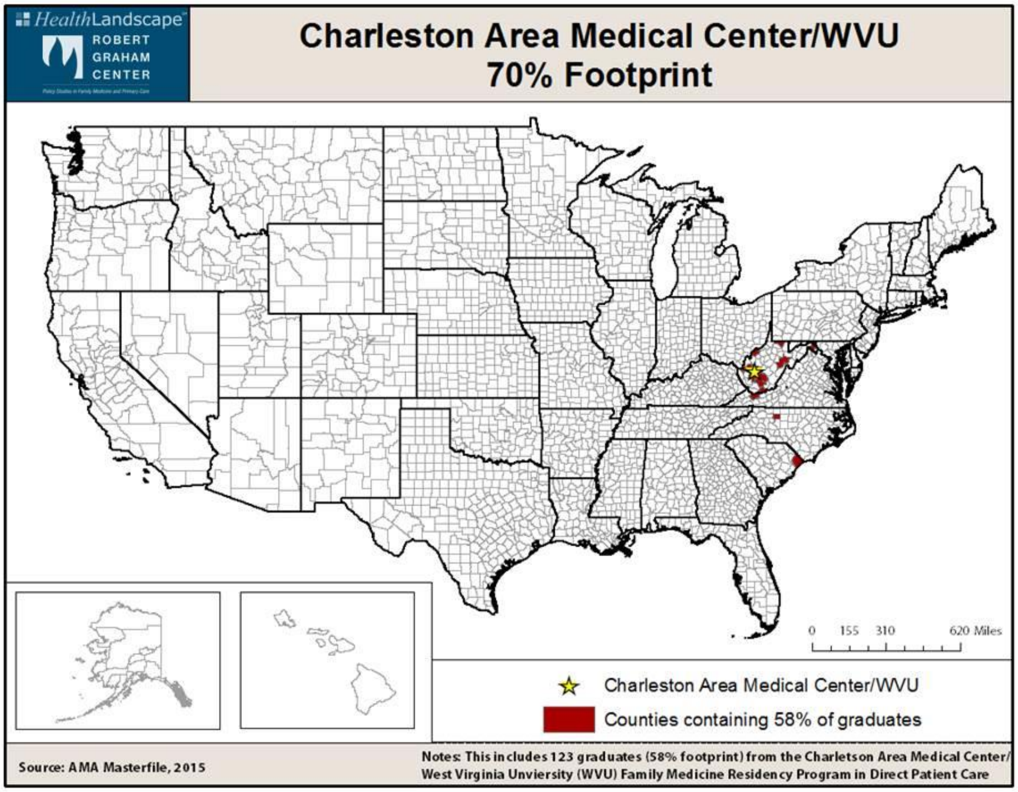
HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
70% Footprint
0 25 50 100 Miles
Counties containing 57.8% of graduates
WVU Robert C. Byrd Health Sciences Center
Source: AMA Masterfile, 2015
Notes: This includes 115 graduates (57.8% footprint) from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Programs in Direct Patient Care

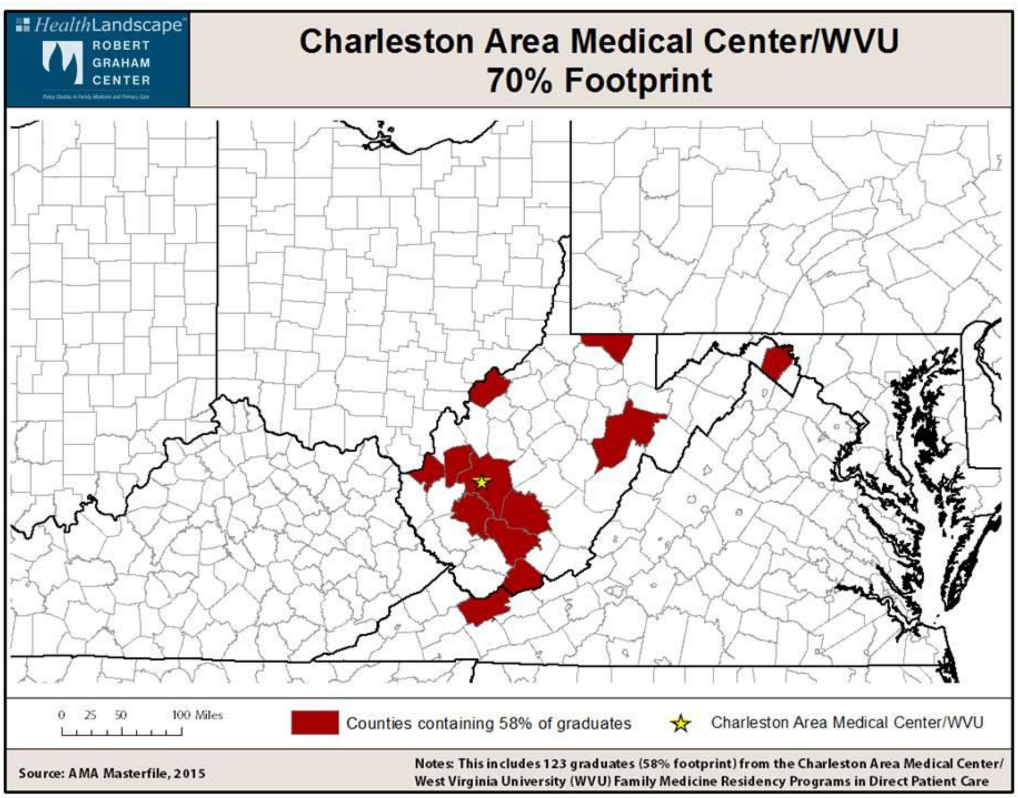

HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
70% Footprint
0 150 300 600 Miles
WVU Robert C. Byrd Health Sciences Center
Counties containing 70% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 139 (70% footprint) graduates from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Program in Direct Patient Care

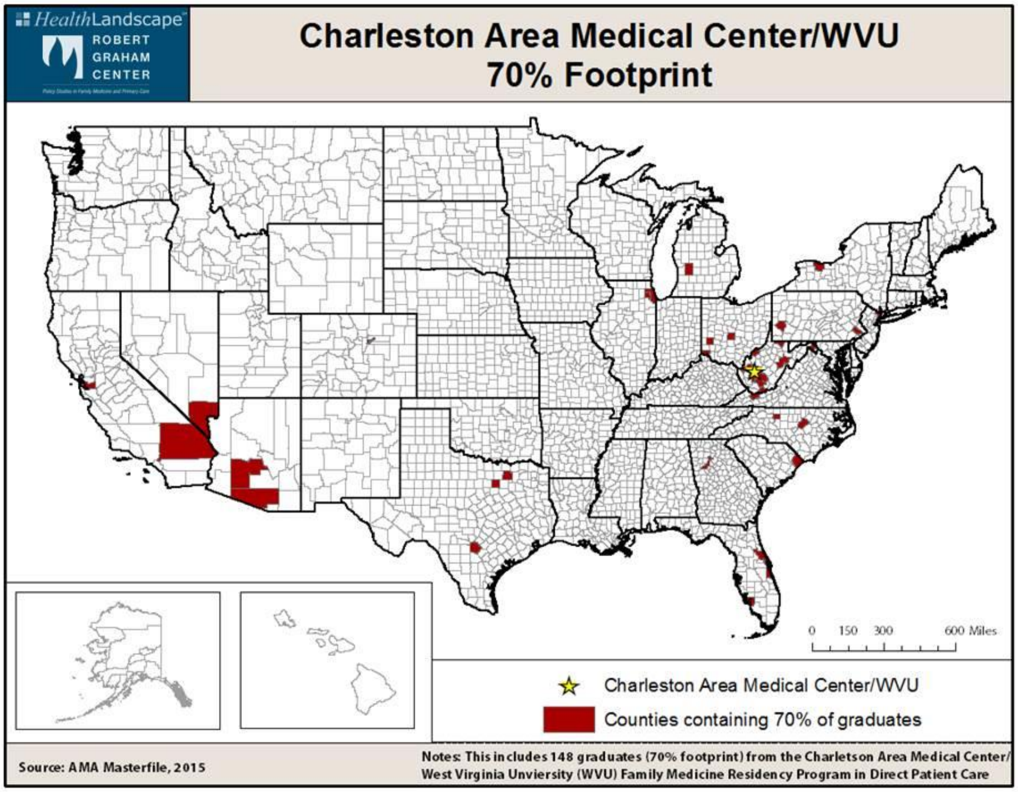

HealthLandscape
ROBERT GRAHAM CENTER
WVU Robert C. Byrd Health Sciences Center
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WVU Robert C. Byrd Health Sciences Center
Source: AMA Masterfile, 2015
Notes: This includes 139 graduates (70% footprint) from the WVU Robert C. Byrd Health Sciences Center Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
100% Footprint
0 155 310 620 Miles
Charleston Area Medical Center/WVU
Counties containing 100% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 212 graduates from the Charletson Area Medical Center/
West Virginia Unviersity (WVU) Family Medicine Residency Program in Direct Patient Care

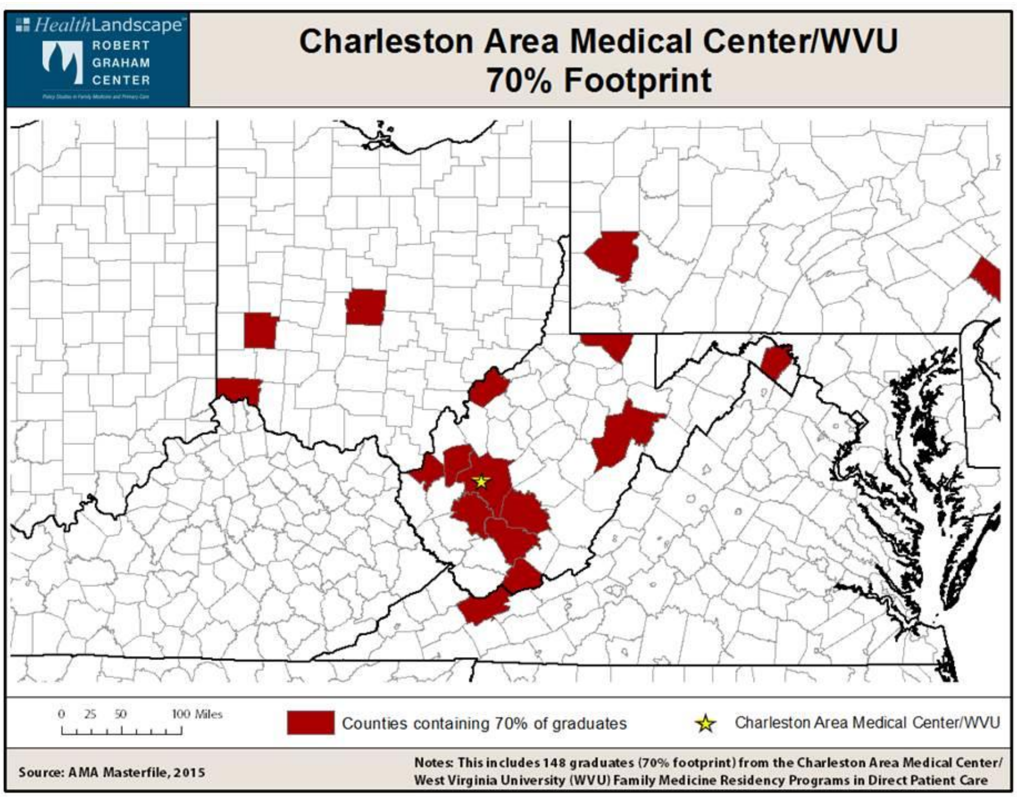

HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
Charleston Area Medical Center/WVU
Source: AMA Masterfile, 2015
Notes: This includes 212 graduates from the Charleston Area Medical Center/
West Virginia University (WVU) Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
70% Footprint
0 155 310 620 Miles
Charleston Area Medical Center/WVU
Counties containing 58% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 123 graduates (58% footprint) from the Charletson Area Medical Center/ West Virginia Unviersity (WVU) Family Medicine Residency Program in Direct Patient Care

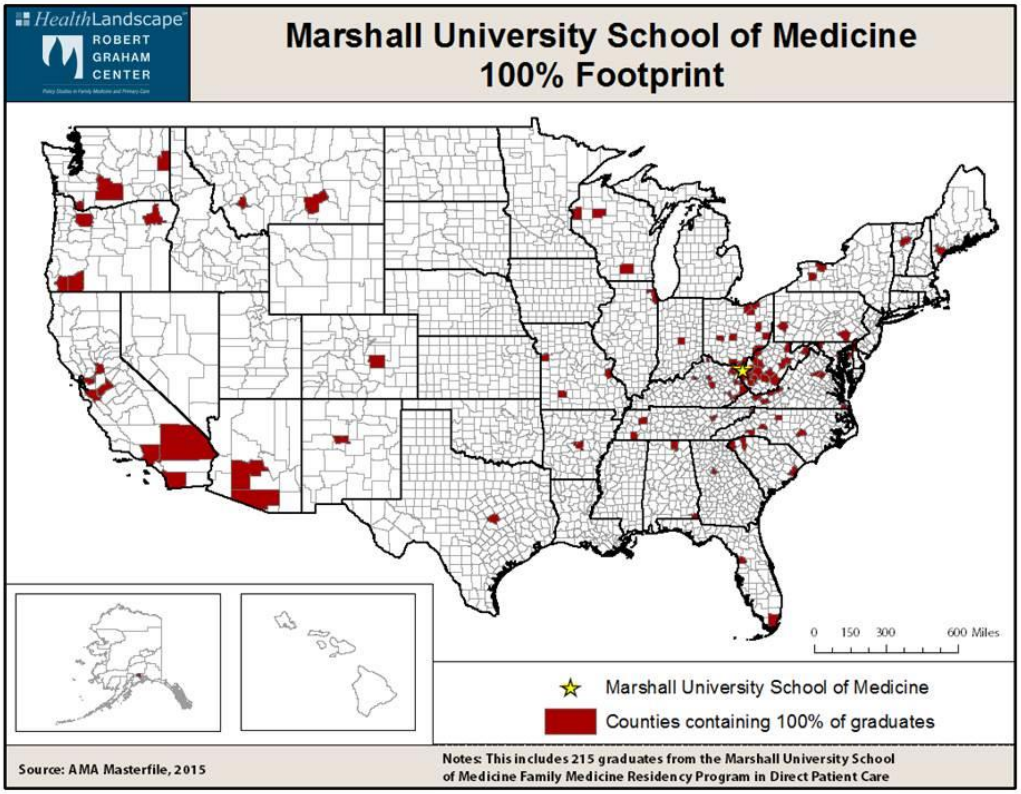

HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
70% Footprint
0 25 50 100 Miles
Counties containing 58% of graduates
Charleston Area Medical Center/WVU
Source: AMA Masterfile, 2015
Notes: This includes 123 graduates (58% footprint) from the Charleston Area Medical Center/ West Virginia University (WVU) Family Medicine Residency Programs in Direct Patient Care

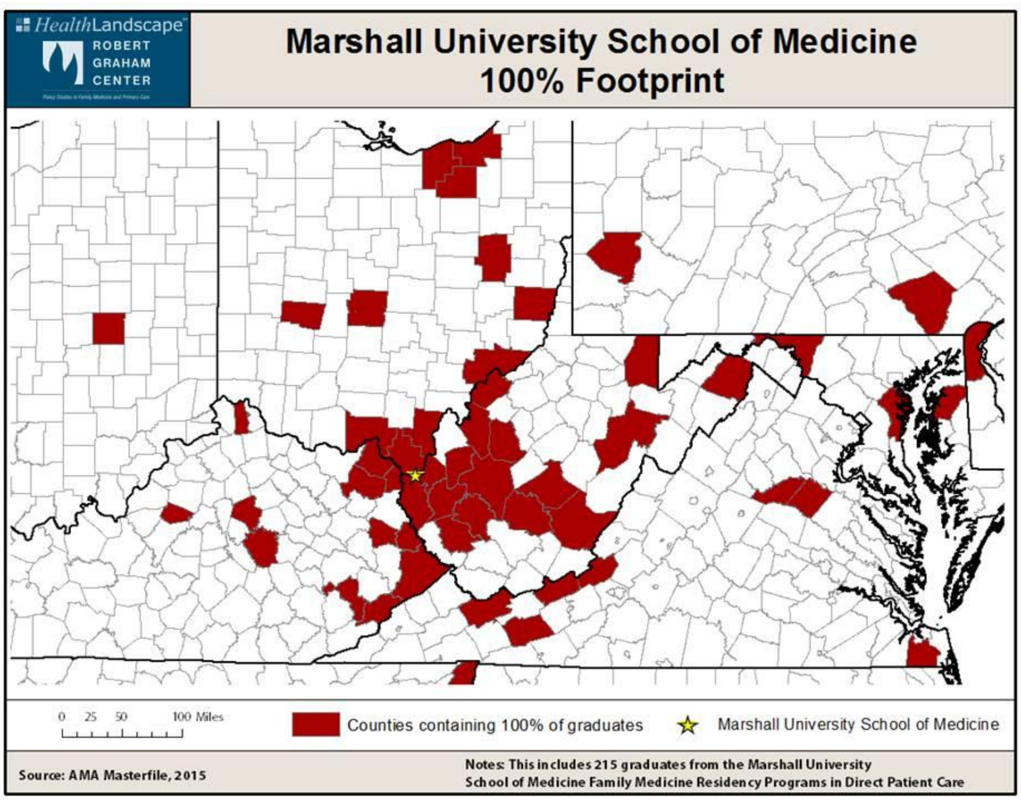


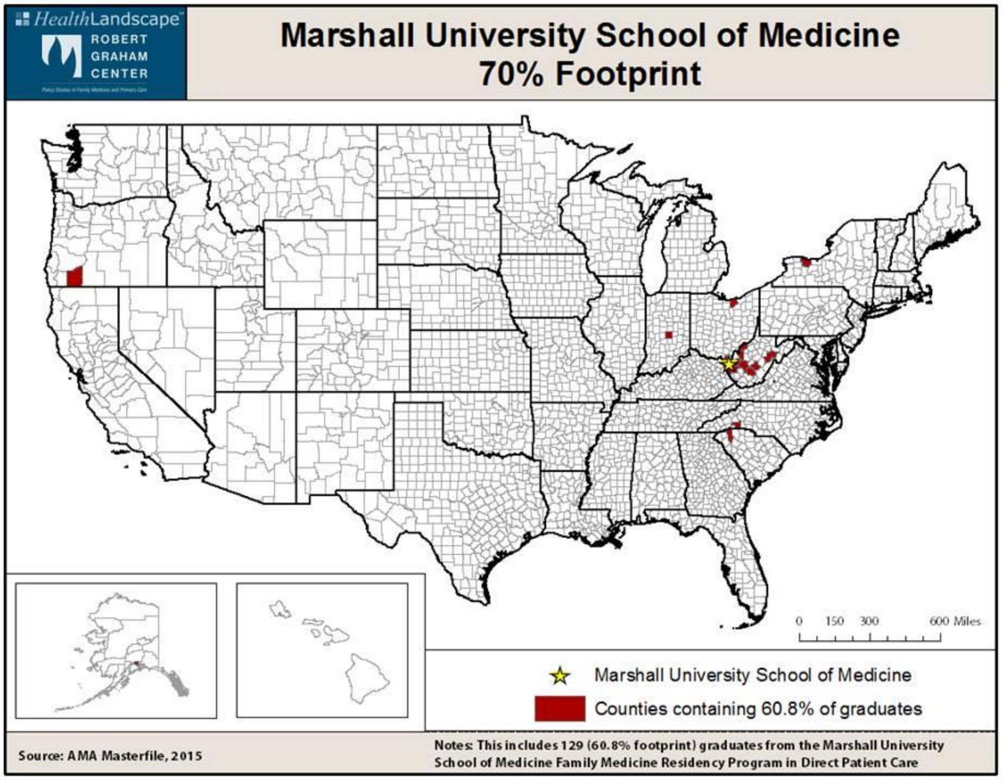
HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
70% Footprint
0 150 300 600 Miles
Charleston Area Medical Center/WVU
Counties containing 70% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 148 graduates (70% footprint) from the Charletson Area Medical Center/ West Virginia Unviersity (WVU) Family Medicine Residency Program in Direct Patient Care

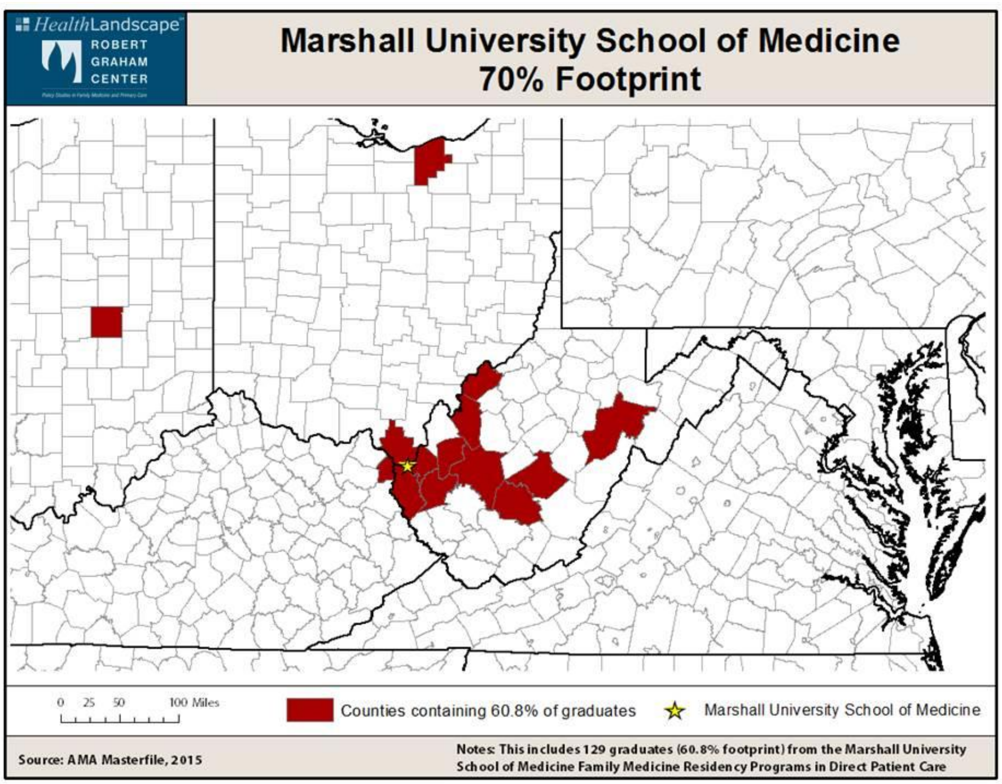


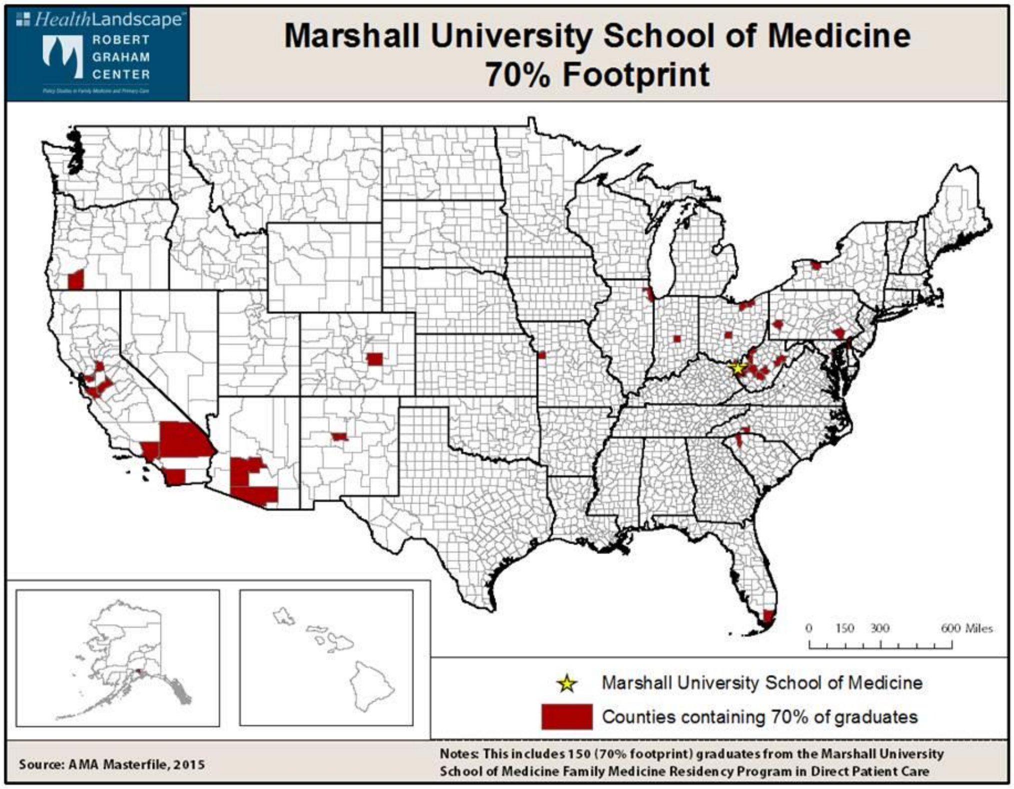
HealthLandscape
ROBERT GRAHAM CENTER
Charleston Area Medical Center/WVU
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Charleston Area Medical Center/WVU
Source: AMA Masterfile, 2015
Notes: This includes 148 graduates (70% footprint) from the Charleston Area Medical Center/ West Virginia University (WVU) Family Medicine Residency Programs in Direct Patient Care

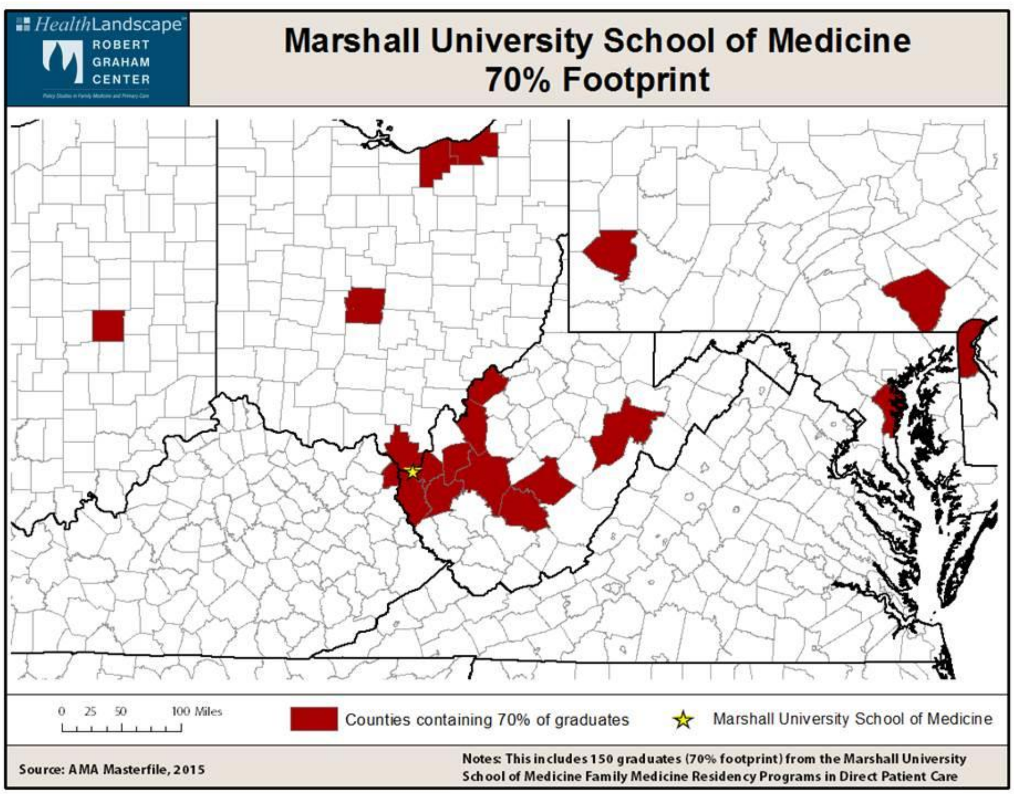

HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
100% Footprint
0 150 300 600 Miles
Marshall University School of Medicine
Counties containing 100% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 215 graduates from the Marshall University School of Medicine Family Medicine Residency Program in Direct Patient Care

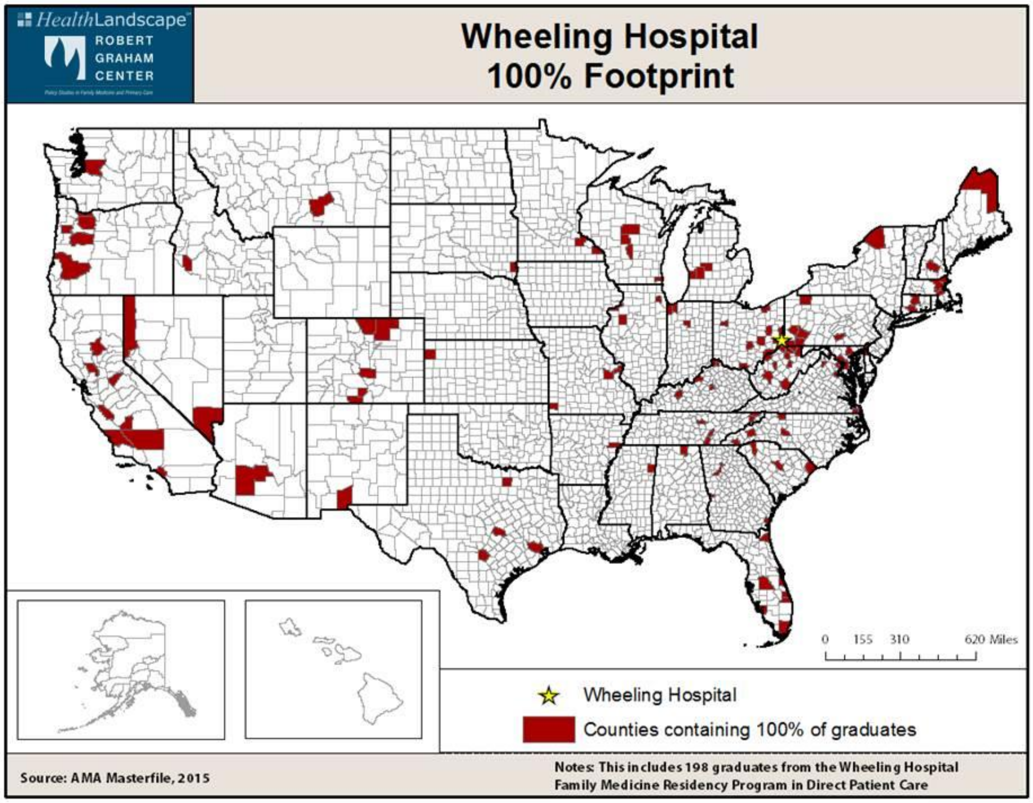

HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
Marshall University School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 215 graduates from the Marshall University School of Medicine Family Medicine Residency Programs in Direct Patient Care

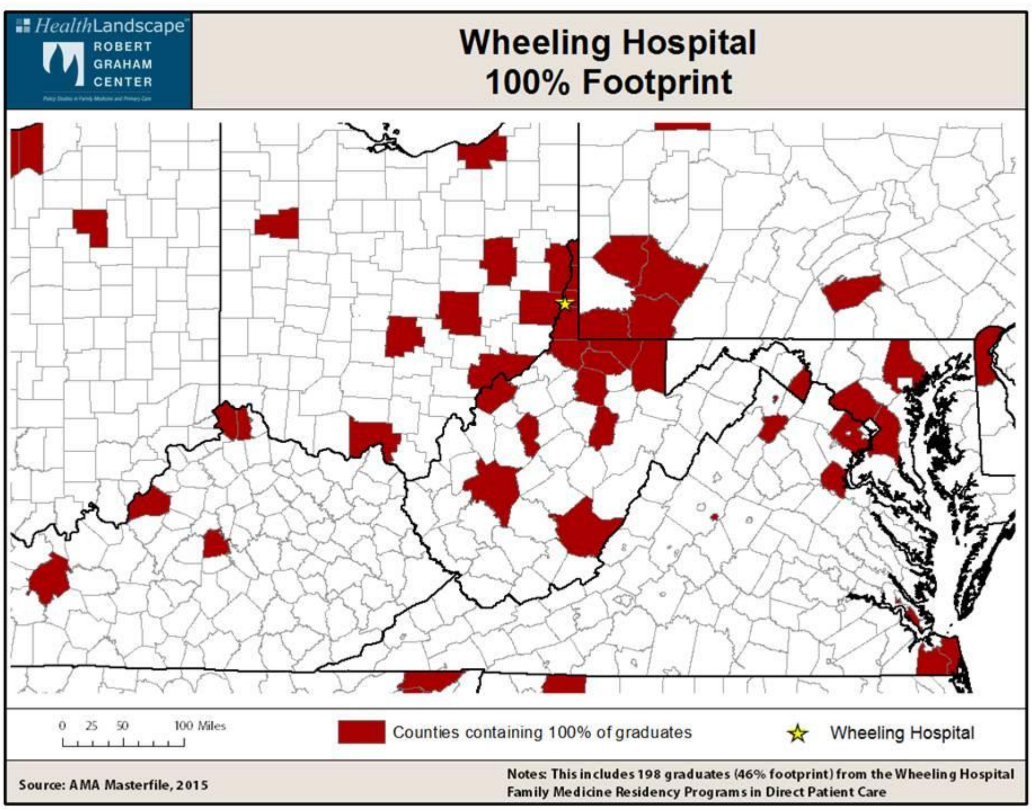

HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
70% Footprint
0 150 300 600 Miles
Marshall University School of Medicine
Counties containing 60.8% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 129 (60.8% footprint) graduates from the Marshall University School of Medicine Family Medicine Residency Program in Direct Patient Care

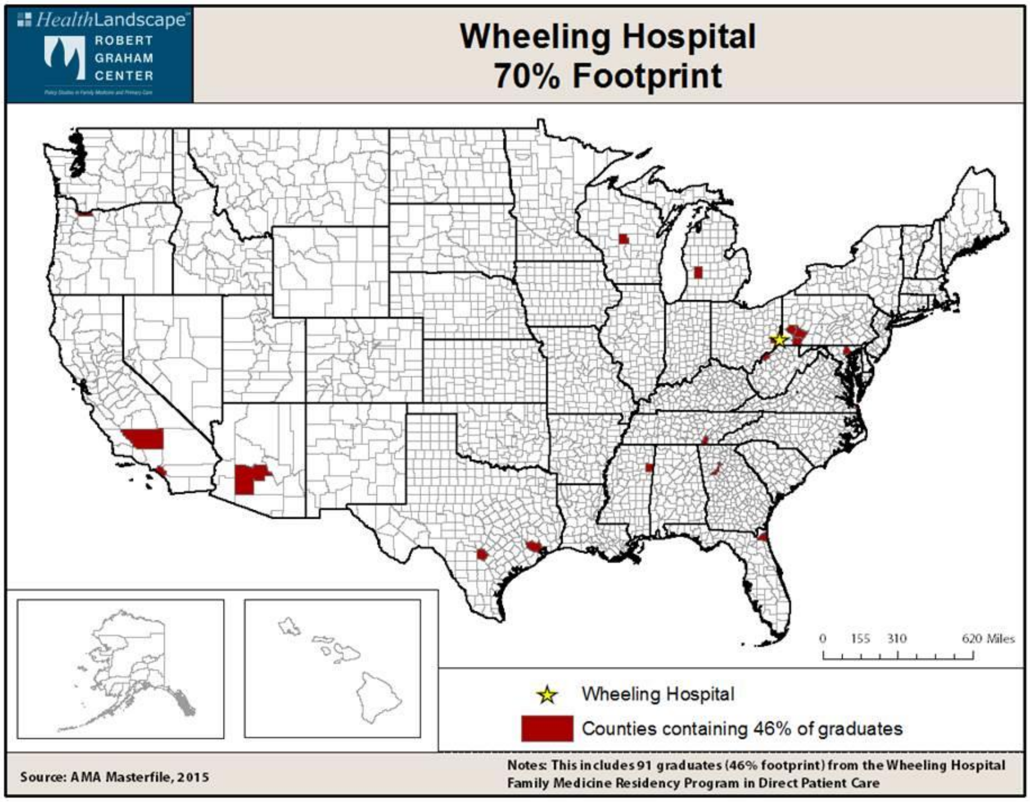

HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 60.8% of graduates
Marshall University School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 129 graduates (60.8% footprint) from the Marshall University School of Medicine Family Medicine Residency Programs in Direct Patient Care

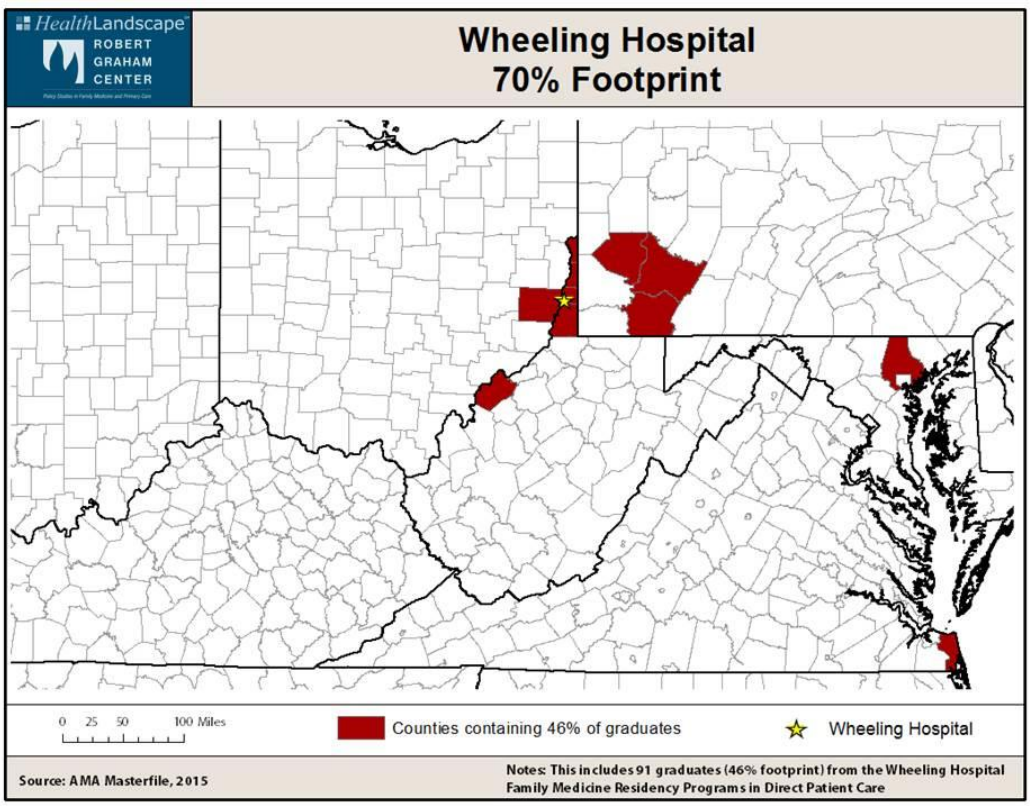

HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
70% Footprint
0 150 300 600 Miles
Marshall University School of Medicine
Counties containing 70% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 150 (70% footprint) graduates from the Marshall University School of Medicine Family Medicine Residency Program in Direct Patient Care

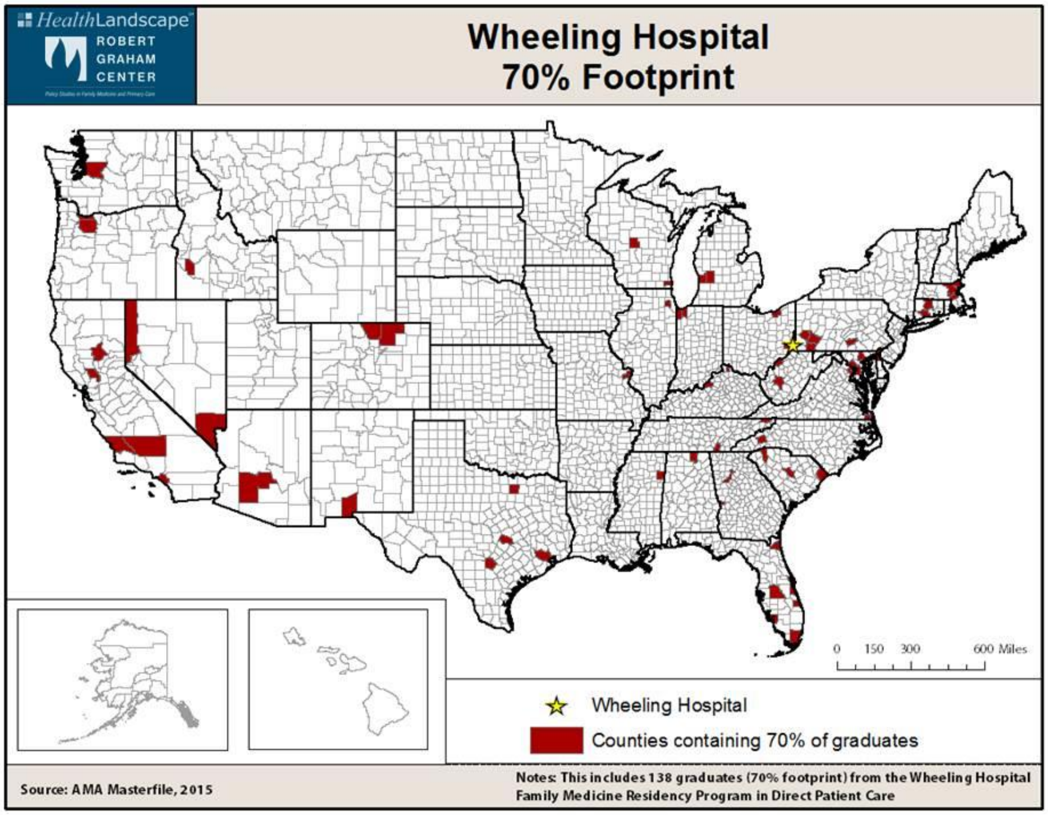

HealthLandscape
ROBERT GRAHAM CENTER
Marshall University School of Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Marshall University School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 150 graduates (70% footprint) from the Marshall University School of Medicine Family Medicine Residency Programs in Direct Patient Care

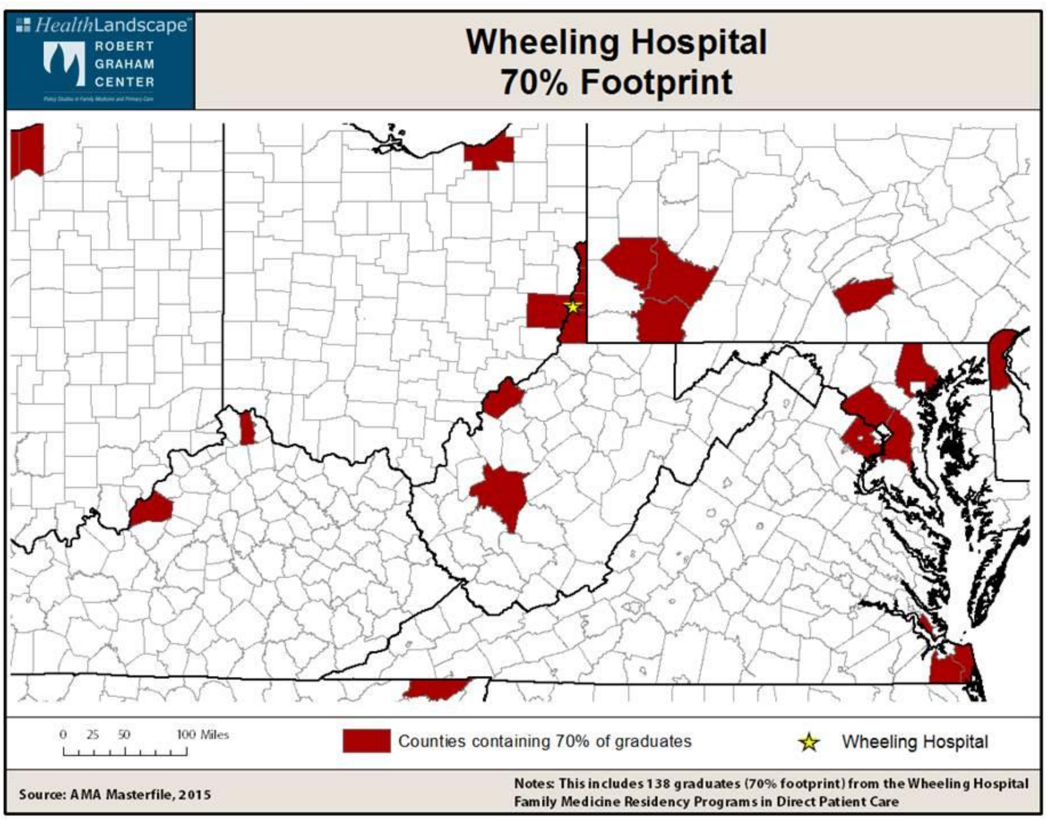

HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
100% Footprint
0 155 310 620 Miles
Wheeling Hospital
Counties containing 100% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 198 graduates from the Wheeling Hospital Family Medicine Residency Program in Direct Patient Care

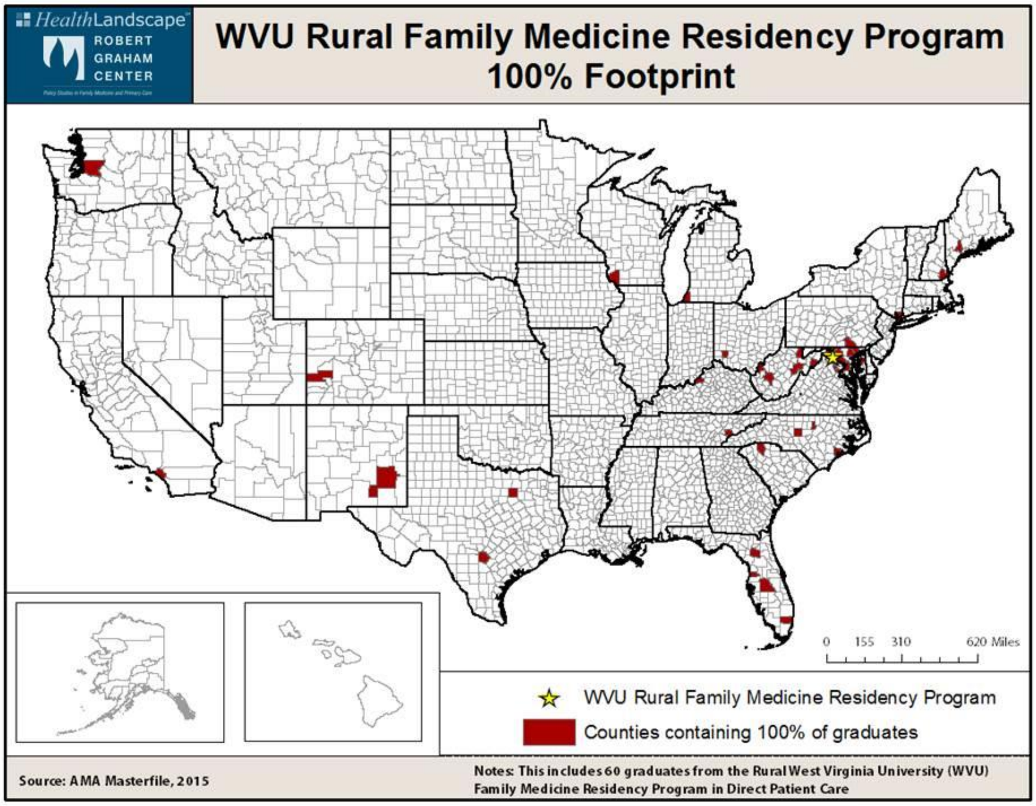

HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
Wheeling Hospital
Source: AMA Masterfile, 2015
Notes: This includes 198 graduates (46% footprint) from the Wheeling Hospital Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
70% Footprint
0 155 310 620 Miles
Wheeling Hospital
Counties containing 46% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 91 graduates (46% footprint) from the Wheeling Hospital Family Medicine Residency Program in Direct Patient Care

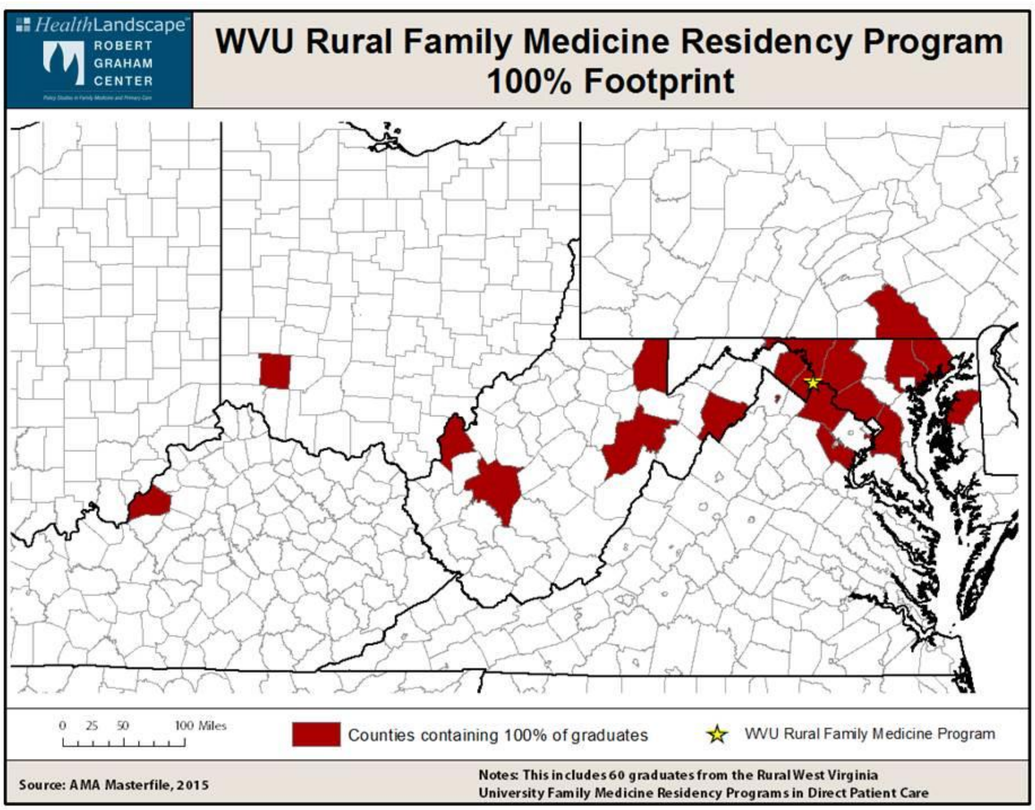

HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
70% Footprint
0 25 50 100 Miles
Counties containing 46% of graduates
Wheeling Hospital
Source: AMA Masterfile, 2015
Notes: This includes 91 graduates (46% footprint) from the Wheeling Hospital Family Medicine Residency Programs in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
70% Footprint
0 150 300 600 Miles
Wheeling Hospital
Counties containing 70% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 138 graduates (70% footprint) from the Wheeling Hospital Family Medicine Residency Program in Direct Patient Care

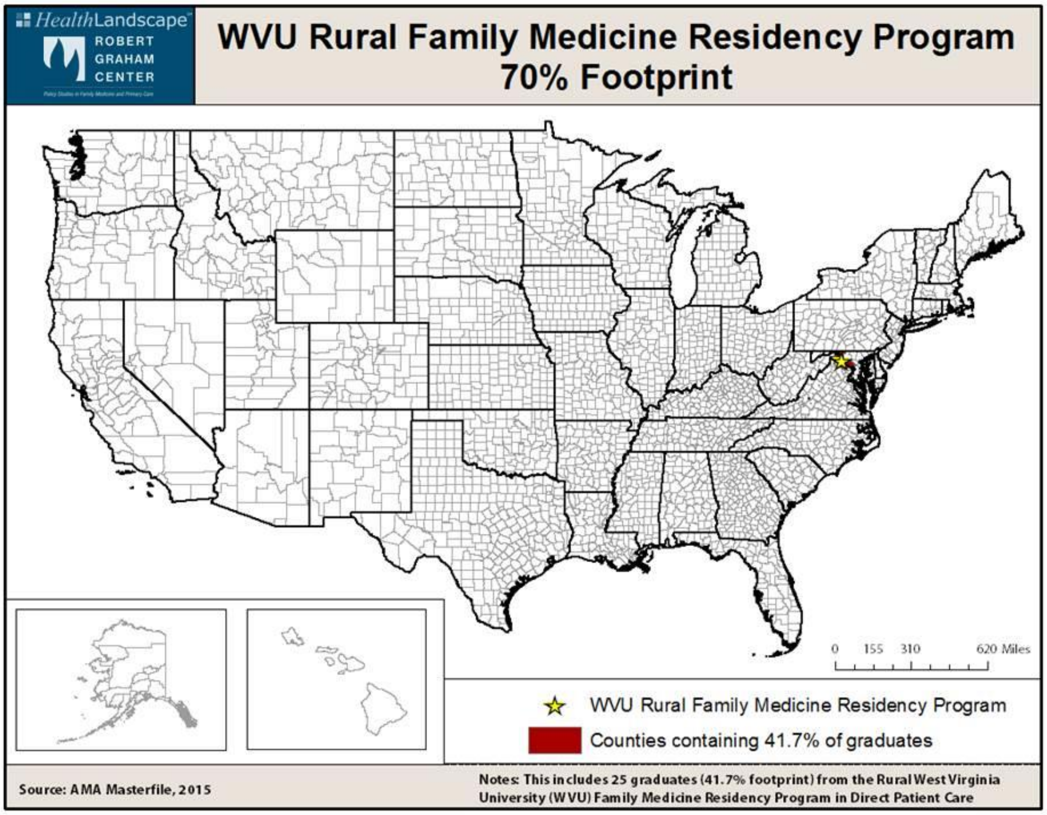

HealthLandscape
ROBERT GRAHAM CENTER
Wheeling Hospital
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Wheeling Hospital
Source: AMA Masterfile, 2015
Notes: This includes 138 graduates (70% footprint) from the Wheeling Hospital Family Medicine Residency Programs in Direct Patient Care

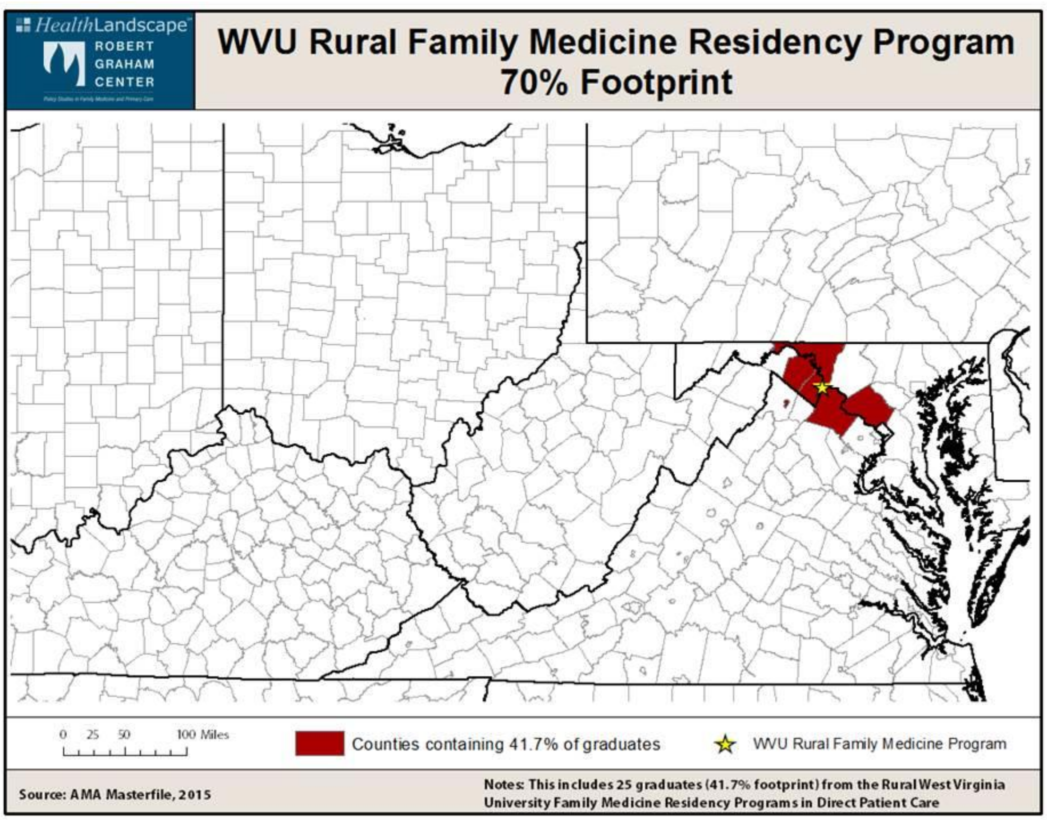


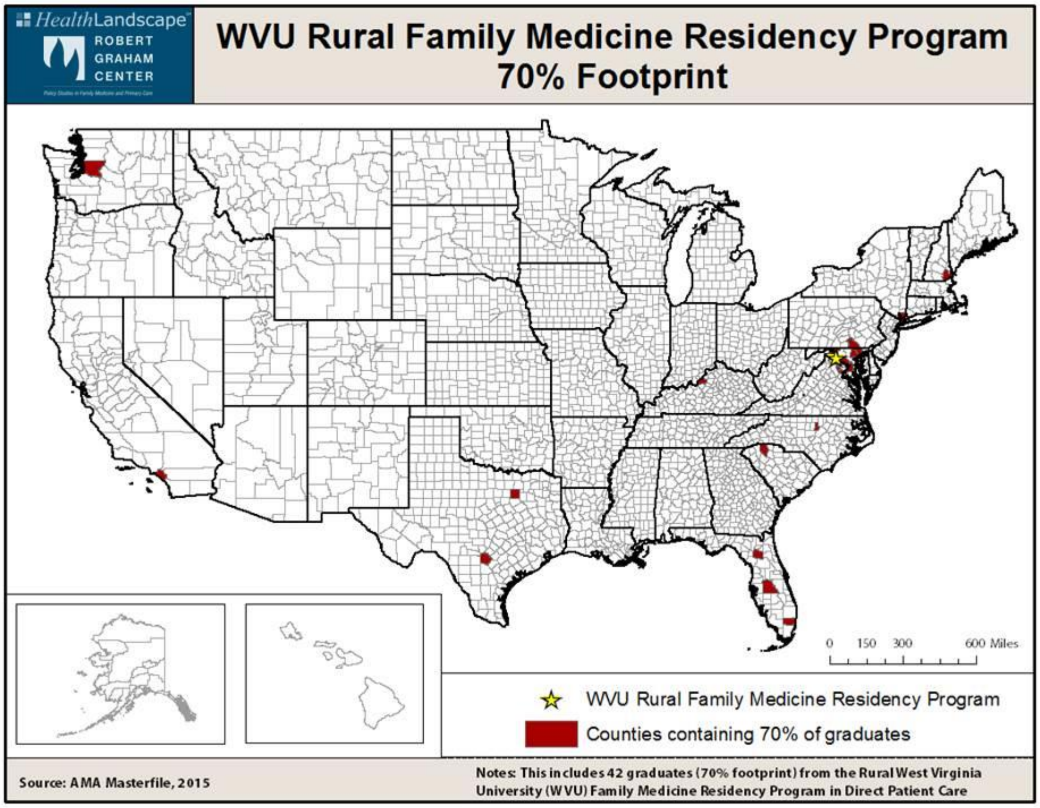
HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
100% Footprint
0 155 310 620 Miles
WVU Rural Family Medicine Residency Program
Counties containing 100% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 60 graduates from the Rural West Virginia University (WVU) Family Medicine Residency Program in Direct Patient Care

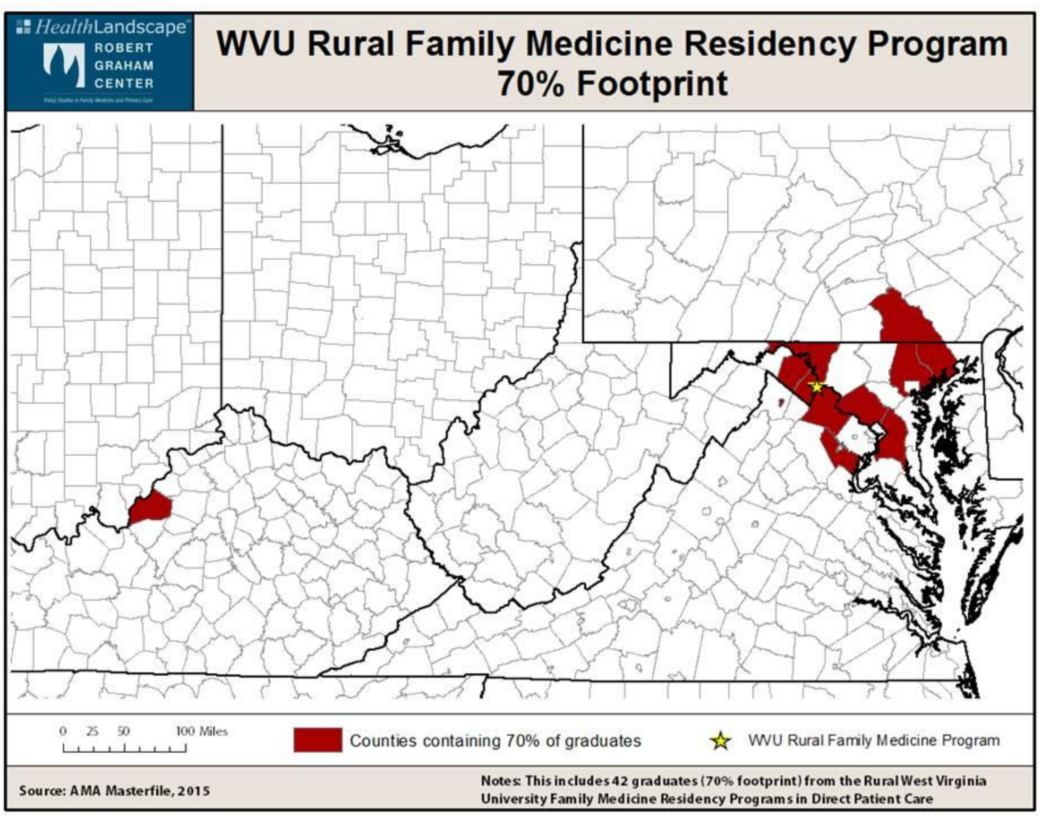


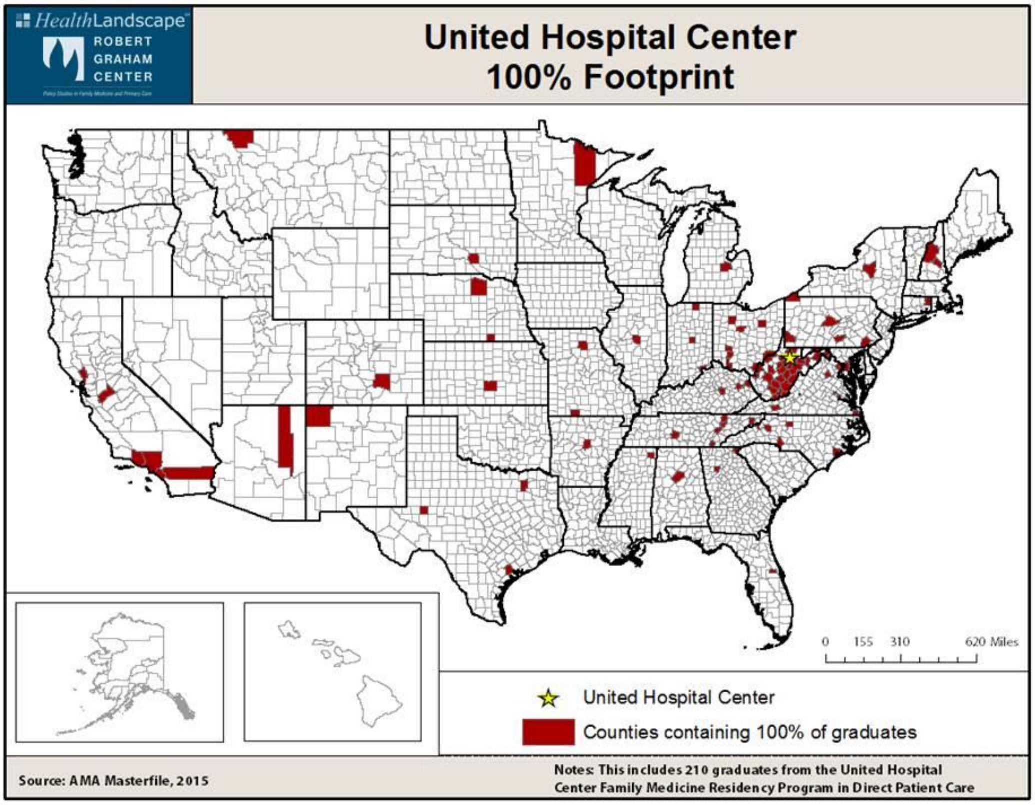
HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
WVU Rural Family Medicine Program
Source: AMA Masterfile, 2015
Notes: This includes 60 graduates from the Rural West Virginia University Family Medicine Residency Programs in Direct Patient Care

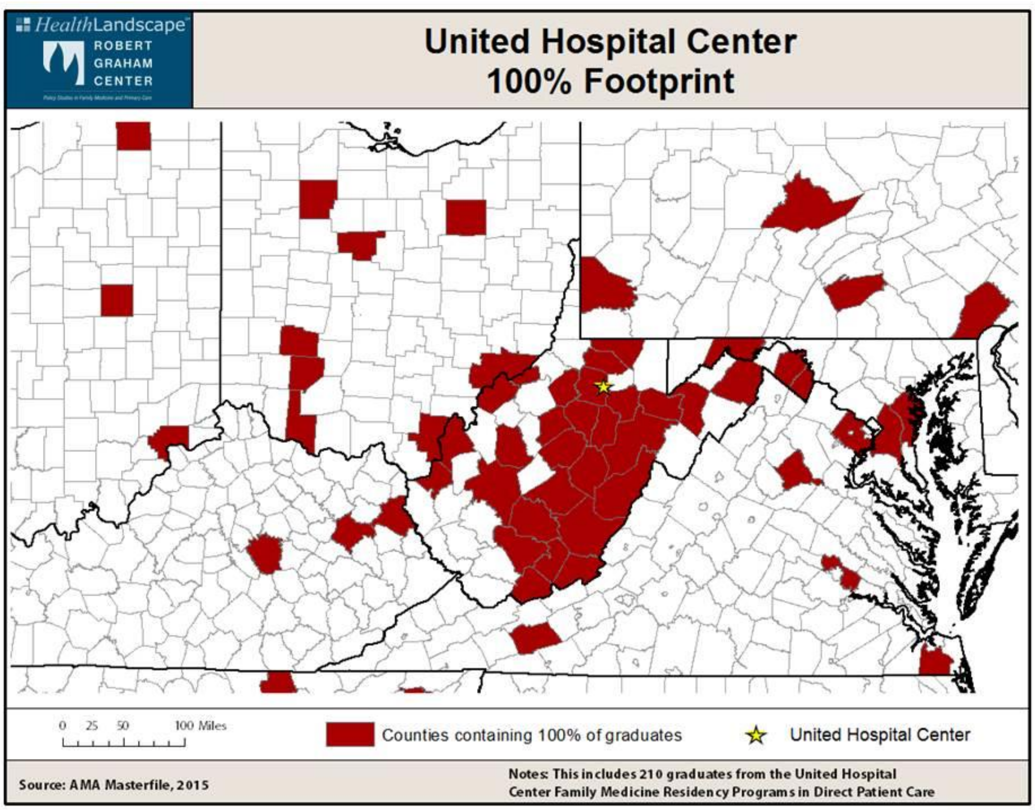

HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
70% Footprint
0 155 310 620 Miles
WVU Rural Family Medicine Residency Program
Counties containing 41.7% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 25 graduates (41.7% footprint) from the Rural West Virginia University (WVU) Family Medicine Residency Program in Direct Patient Care

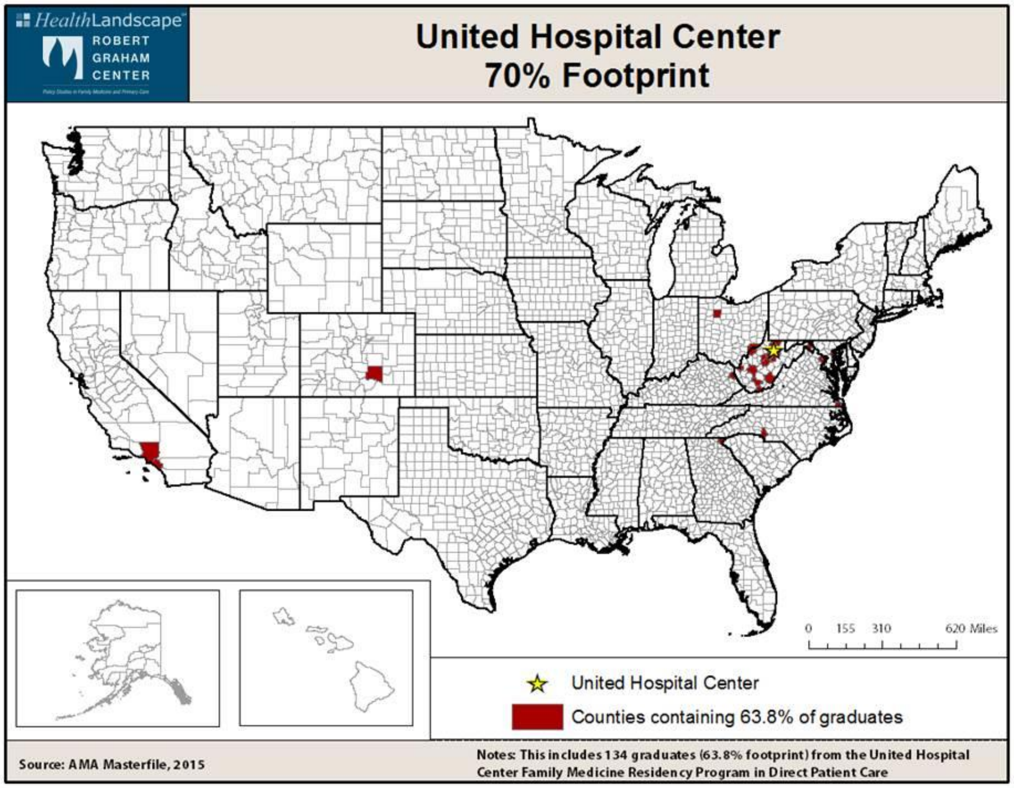

HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
70% Footprint
0 25 50 100 Miles
Counties containing 41.7% of graduates
WVU Rural Family Medicine Program
Source: AMA Masterfile, 2015
Notes: This includes 25 graduates (41.7% footprint) from the Rural West Virginia University Family Medicine Residency Programs in Direct Patient Care

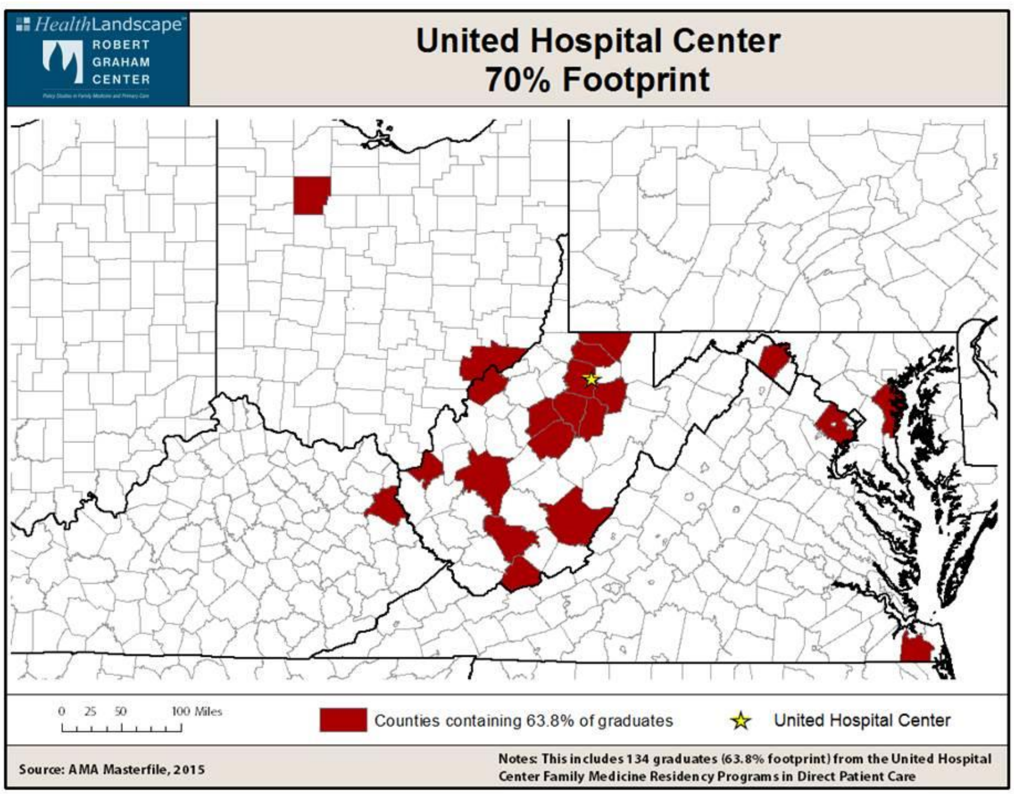

HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
70% Footprint
0 150 300 600 Miles
WVU Rural Family Medicine Residency Program
Counties containing 70% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 42 graduates (70% footprint) from the Rural West Virginia University (WVU) Family Medicine Residency Program in Direct Patient Care

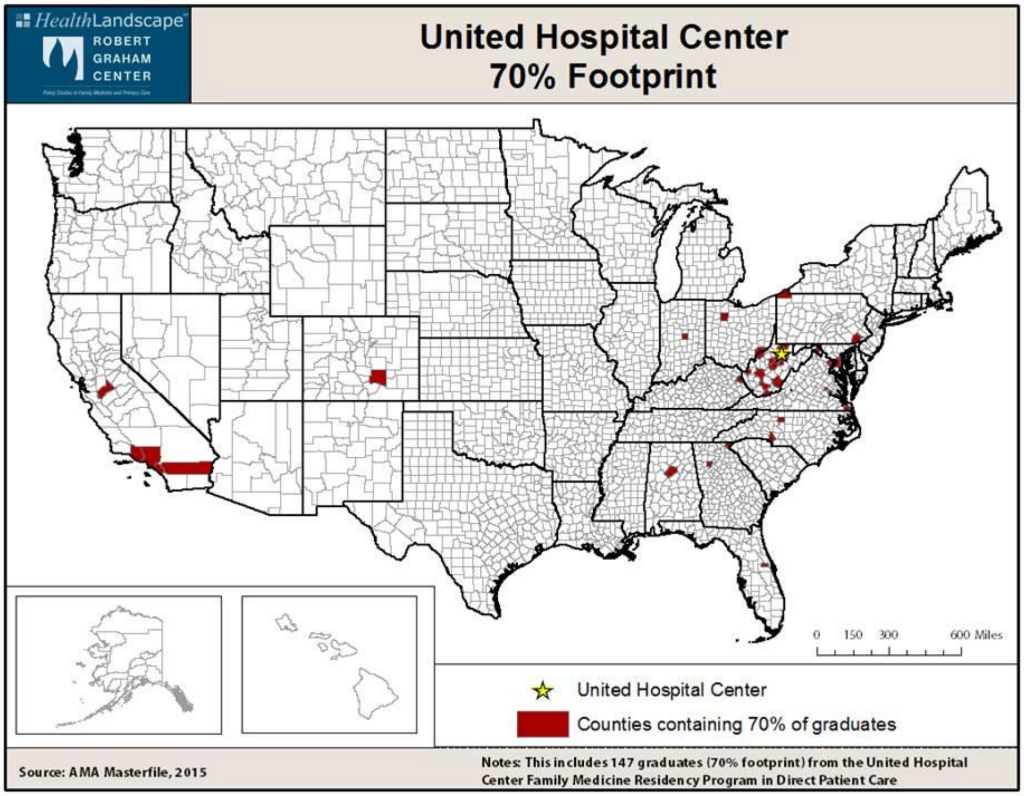

HealthLandscape
ROBERT GRAHAM CENTER
WVU Rural Family Medicine Residency Program
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WVU Rural Family Medicine Program
Source: AMA Masterfile, 2015
Notes: This includes 42 graduates (70% footprint) from the Rural West Virginia University Family Medicine Residency Programs in Direct Patient Care

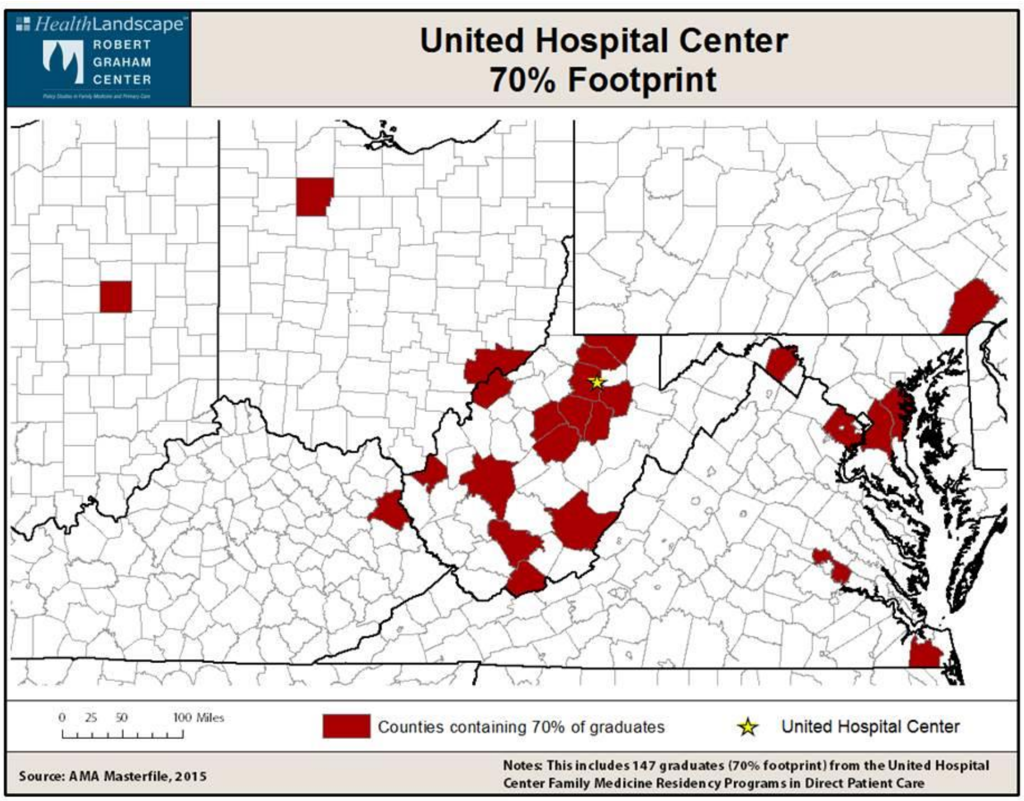

HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
100% Footprint
0 155 310 620 Miles
United Hospital Center
Counties containing 100% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 210 graduates from the United Hospital Center Family Medicine Residency Program in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
United Hospital Center
Source: AMA Masterfile, 2015
Notes: This includes 210 graduates from the United Hospital Center Family Medicine Residency Programs in Direct Patient Care

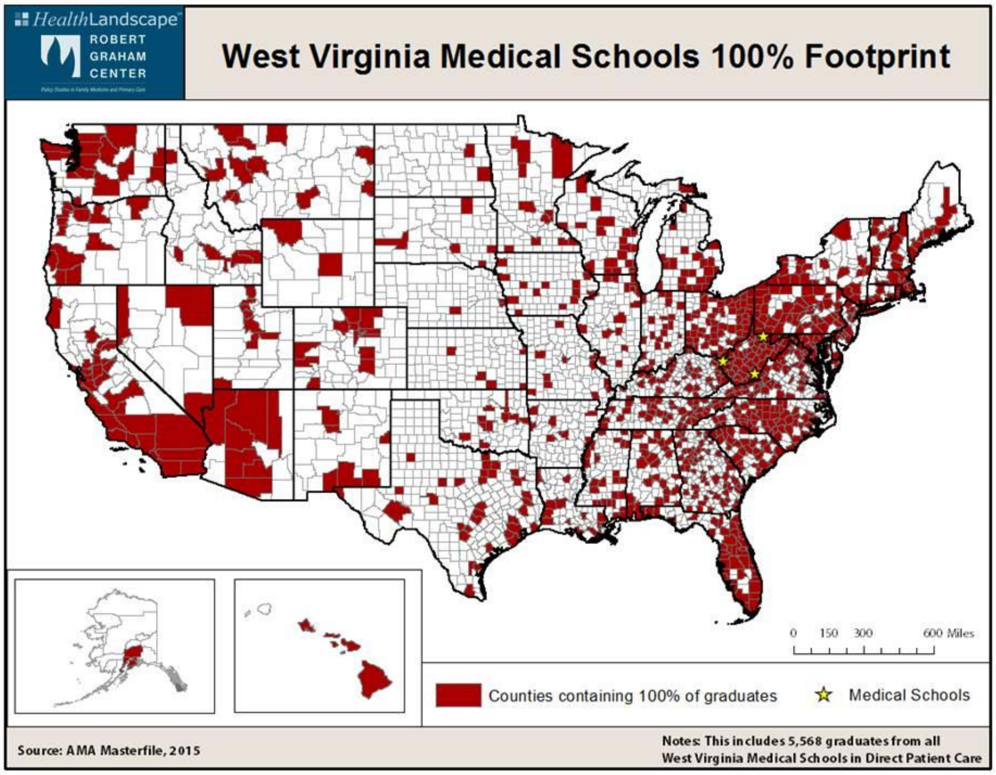

HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
70% Footprint
0 155 310 620 Miles
United Hospital Center
Counties containing 63.8% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 134 graduates (63.8% footprint) from the United Hospital Center Family Medicine Residency Program in Direct Patient Care

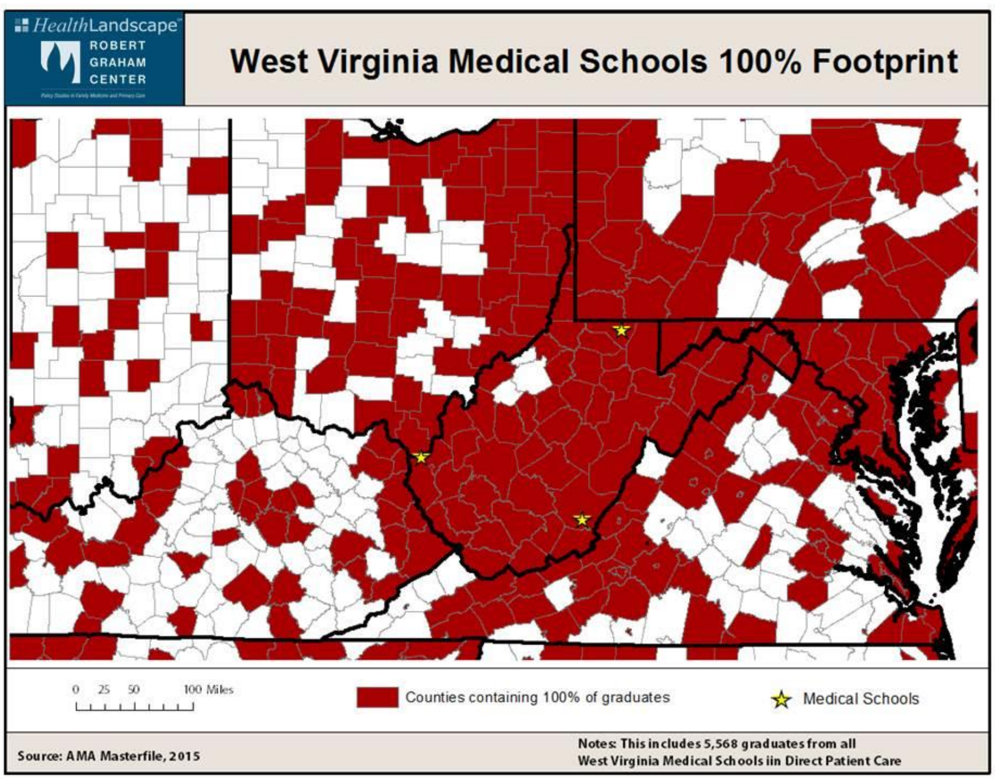

HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
70% Footprint
0 25 50 100 Miles
Counties containing 63.8% of graduates
United Hospital Center
Source: AMA Masterfile, 2015
Notes: This includes 134 graduates (63.8% footprint) from the United Hospital Center Family Medicine Residency Programs in Direct Patient Care

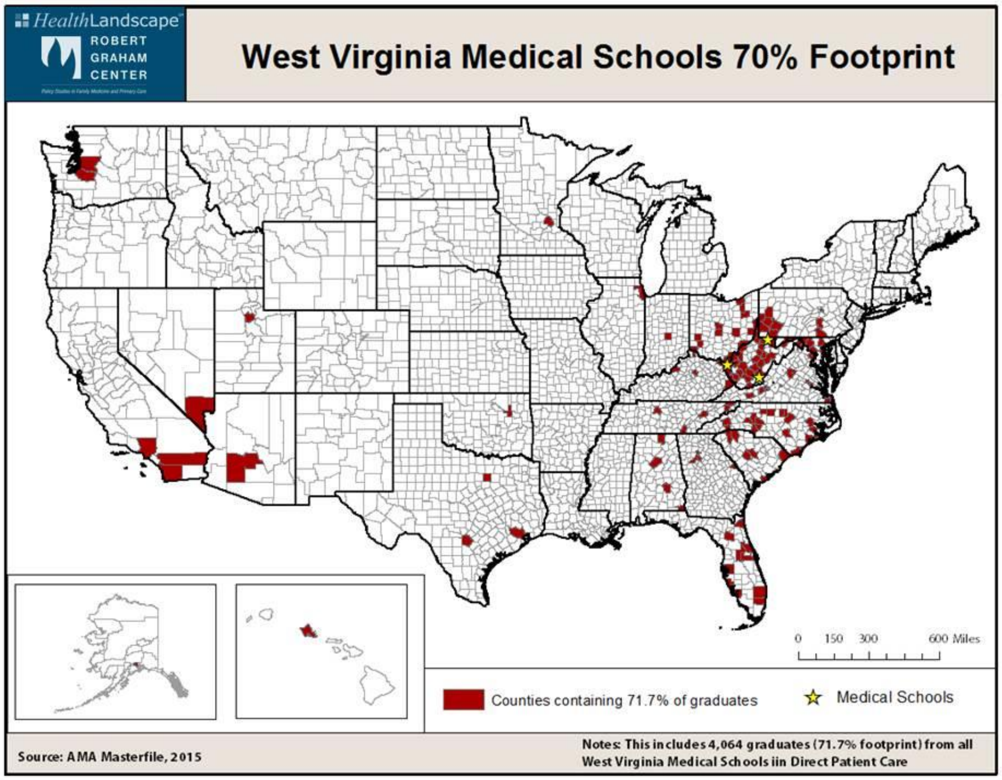

HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
70% Footprint
0 150 300 600 Miles
United Hospital Center
Counties containing 70% of graduates
Source: AMA Masterfile, 2015
Notes: This includes 147 graduates (70% footprint) from the United Hospital Center Family Medicine Residency Program in Direct Patient Care

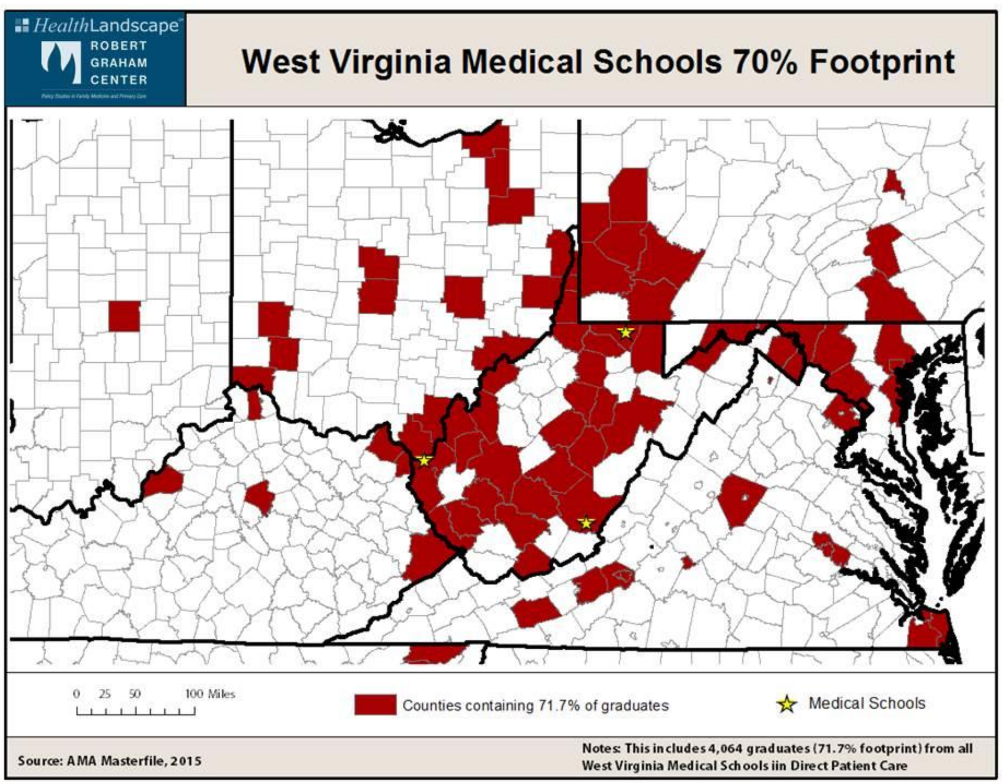

HealthLandscape
ROBERT GRAHAM CENTER
United Hospital Center
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
United Hospital Center
Source: AMA Masterfile, 2015
Notes: This includes 147 graduates (70% footprint) from the United Hospital Center Family Medicine Residency Programs in Direct Patient Care

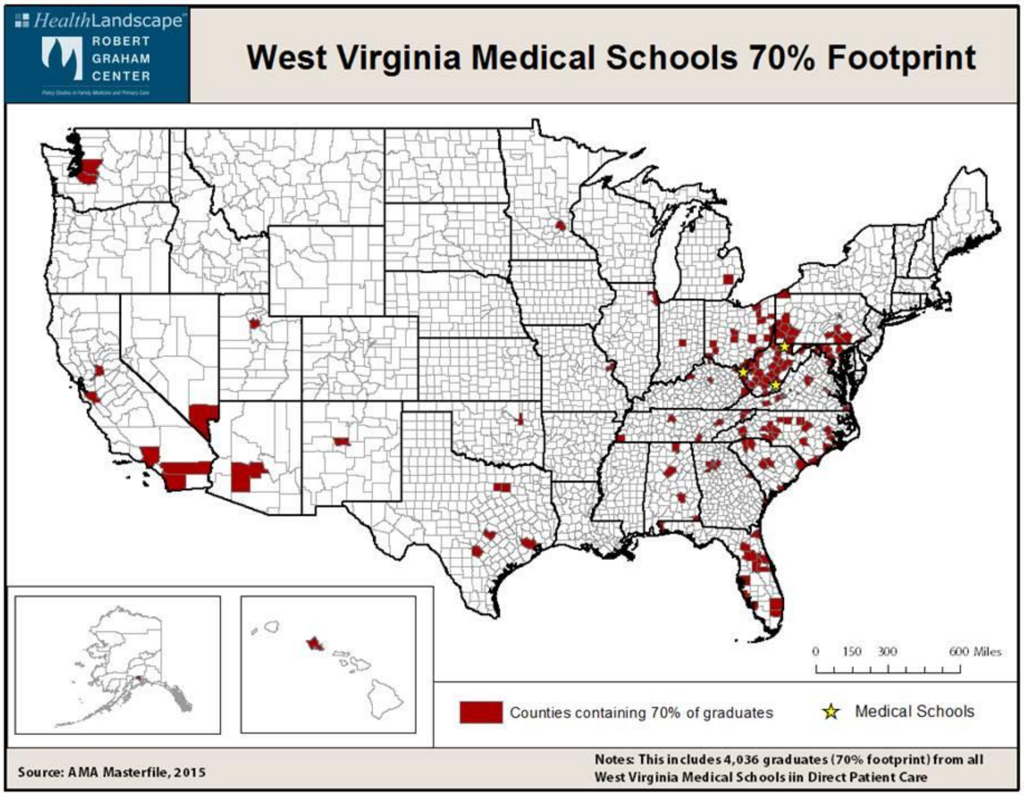
Appendix G: Individual Maps: Medical School Footprints

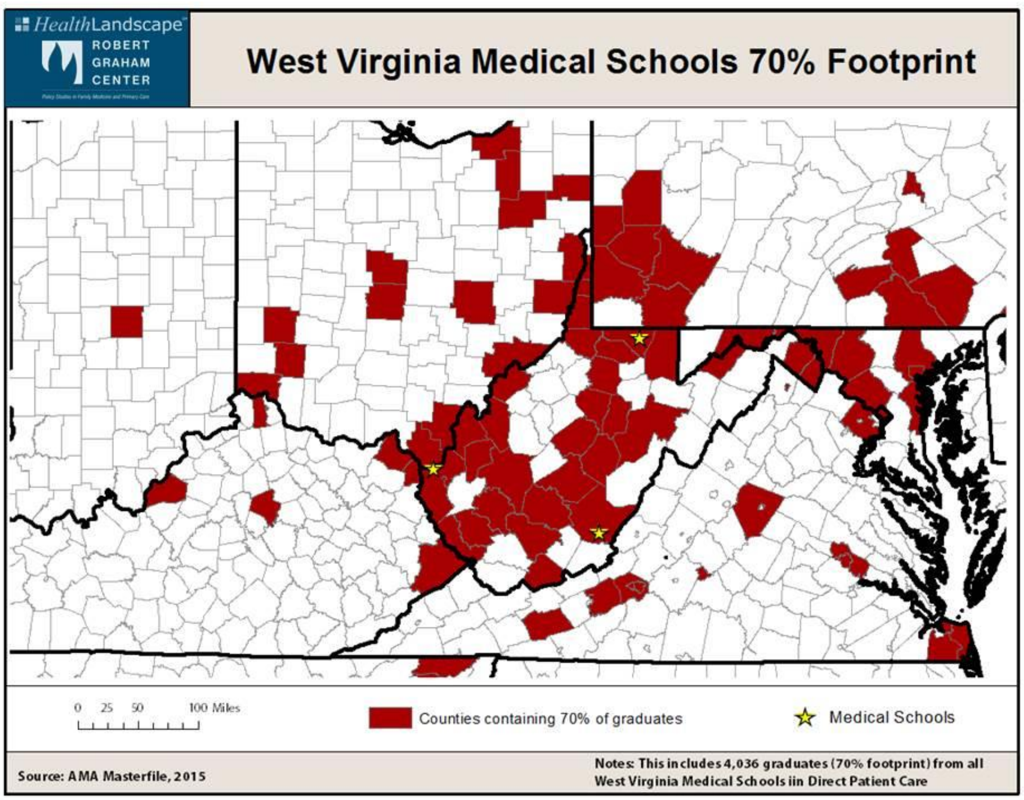


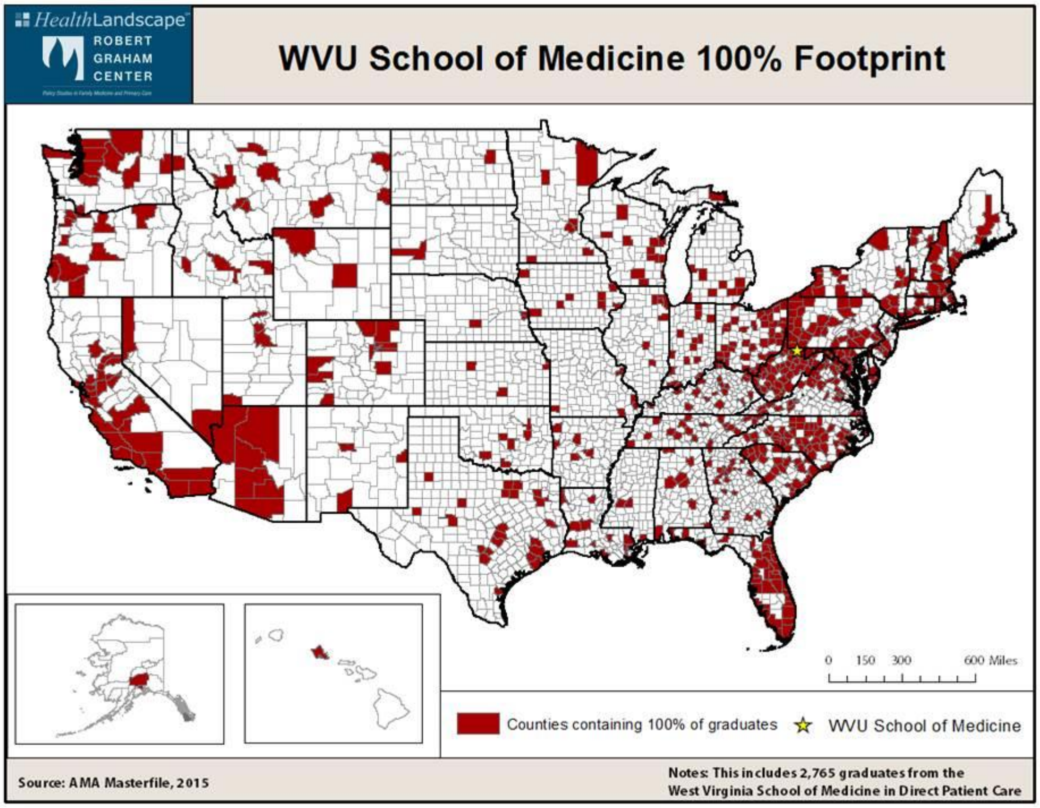


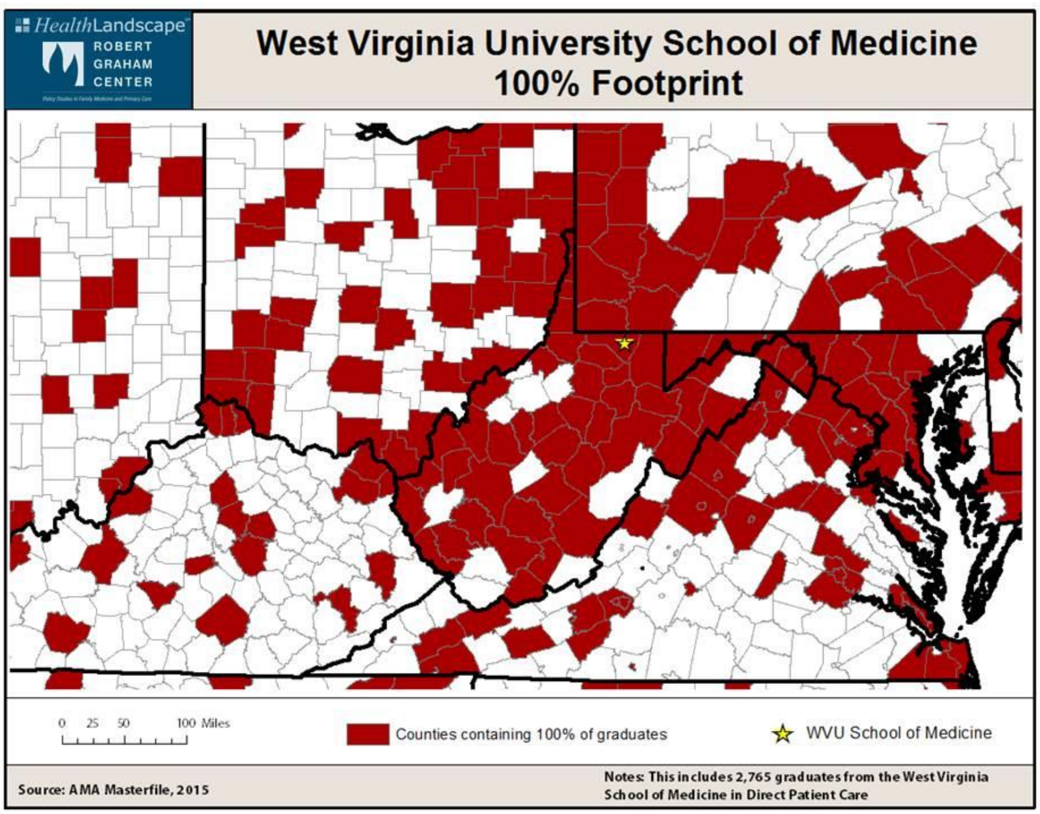

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia Medical Schools 70% Footprint
0 150 300 600 Miles
Counties containing 71.7% of graduates
Medical Schools
Source: AMA Masterfile, 2015
Notes: This includes 4,064 graduates (71.7% footprint) from all West Virginia Medical Schools iin Direct Patient Care

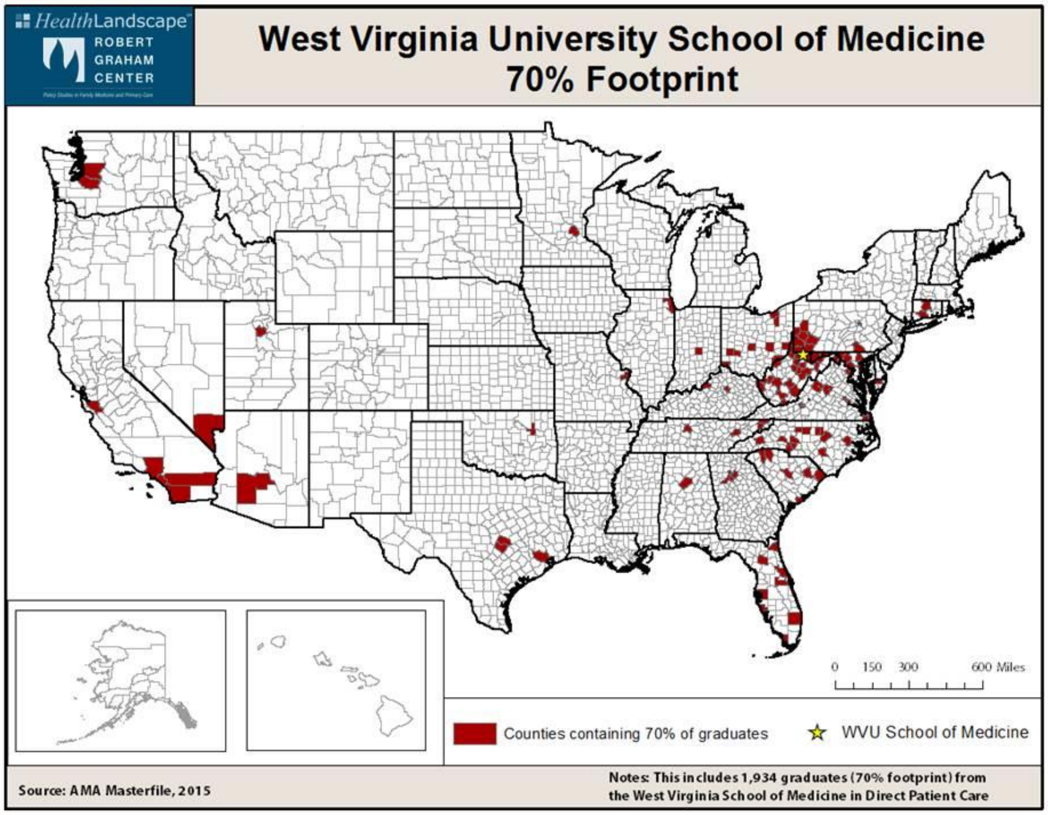

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia Medical Schools 70% Footprint
0 25 50 100 Miles
Counties containing 71.7% of graduates
Medical Schools
Source: AMA Masterfile, 2015
Notes: This includes 4,064 graduates (71.7% footprint) from all West Virginia Medical Schools iin Direct Patient Care

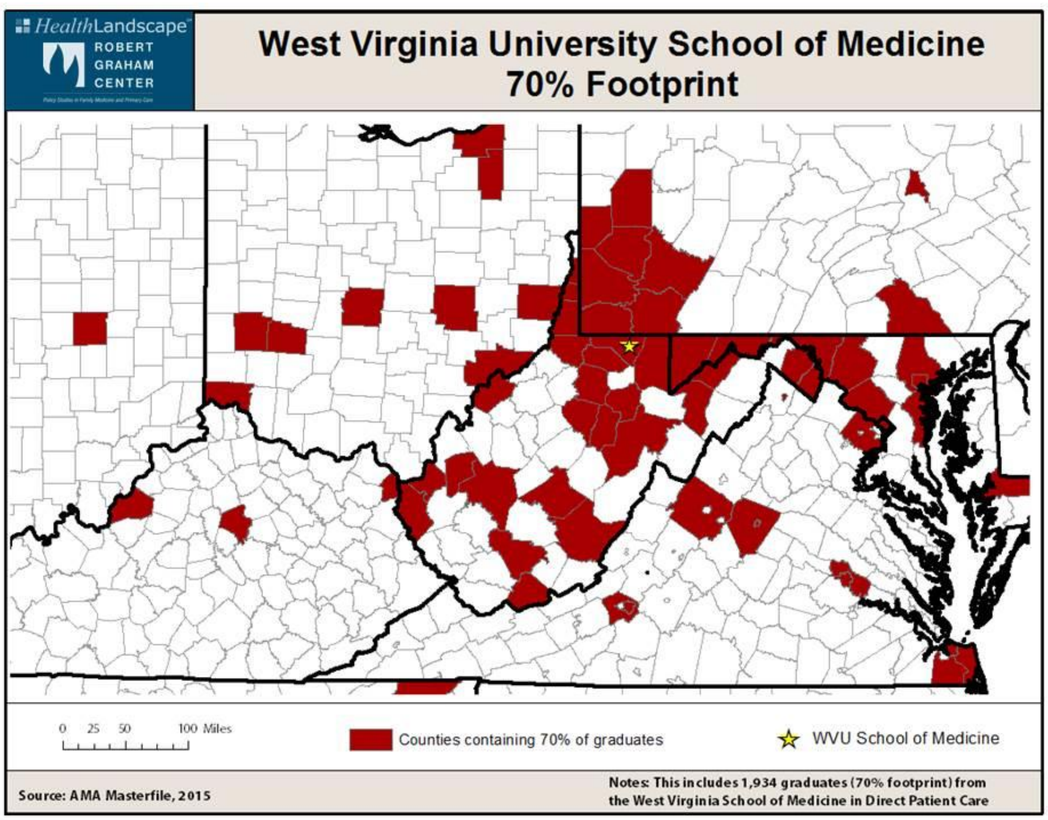

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia Medical Schools 70% Footprint
0 150 300 600 Miles
Counties containing 70% of graduates
Medical Schools
Source: AMA Masterfile, 2015
Notes: This includes 4,036 graduates (70% footprint) from all West Virginia Medical Schools iin Direct Patient Care

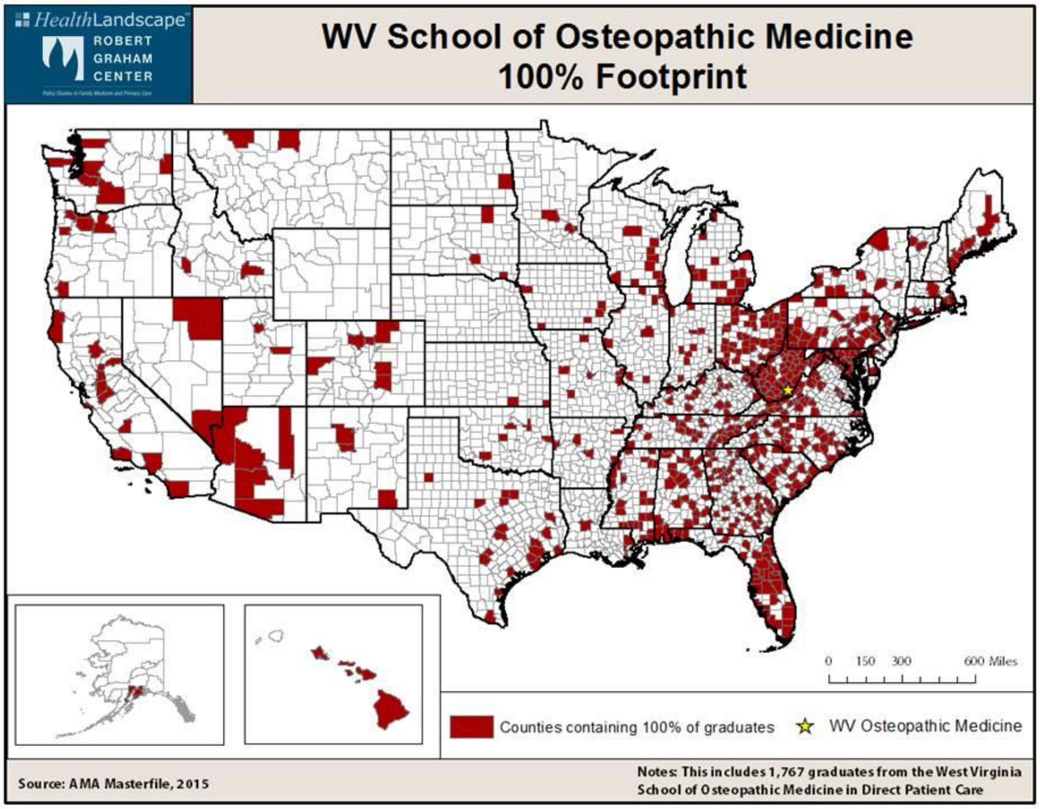

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia Medical Schools 70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Medical Schools
Source: AMA Masterfile, 2015
Notes: This includes 4,036 graduates (70% footprint) from all West Virginia Medical Schools iin Direct Patient Care

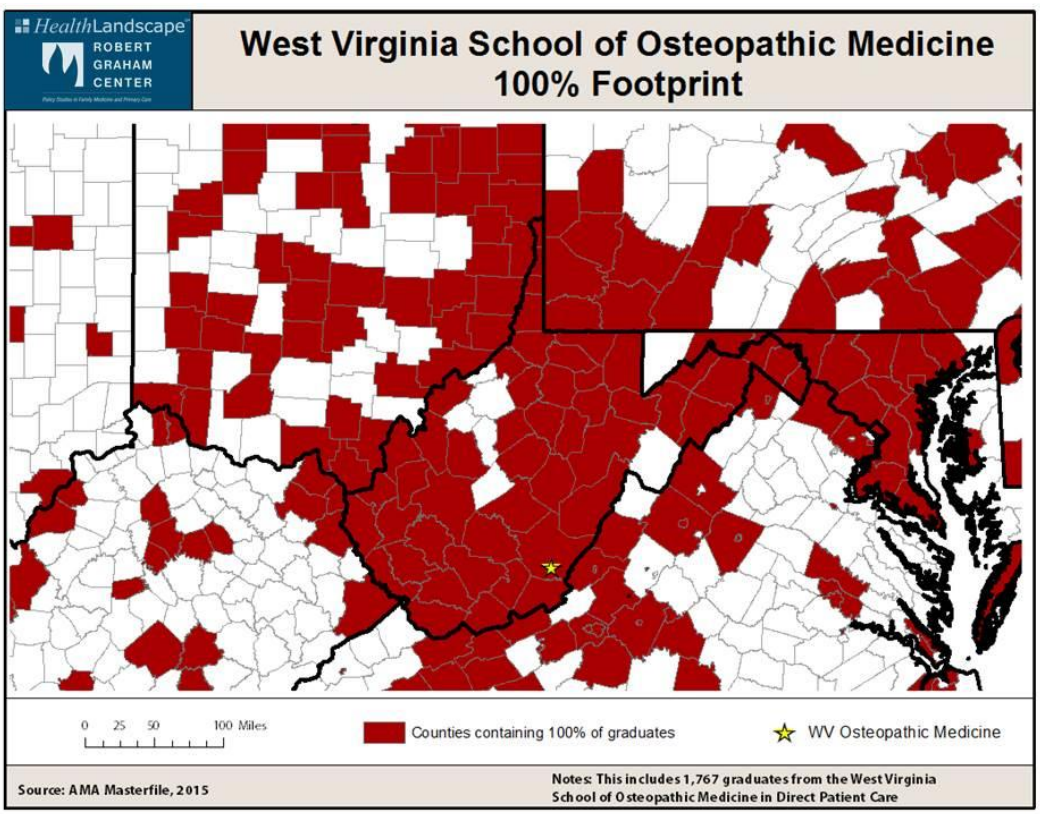

HealthLandscape
ROBERT GRAHAM CENTER
WVU School of Medicine 100% Footprint
0 150 300 600 Miles
Counties containing 100% of graduates
WVU School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 2,765 graduates from the West Virginia School of Medicine in Direct Patient Care

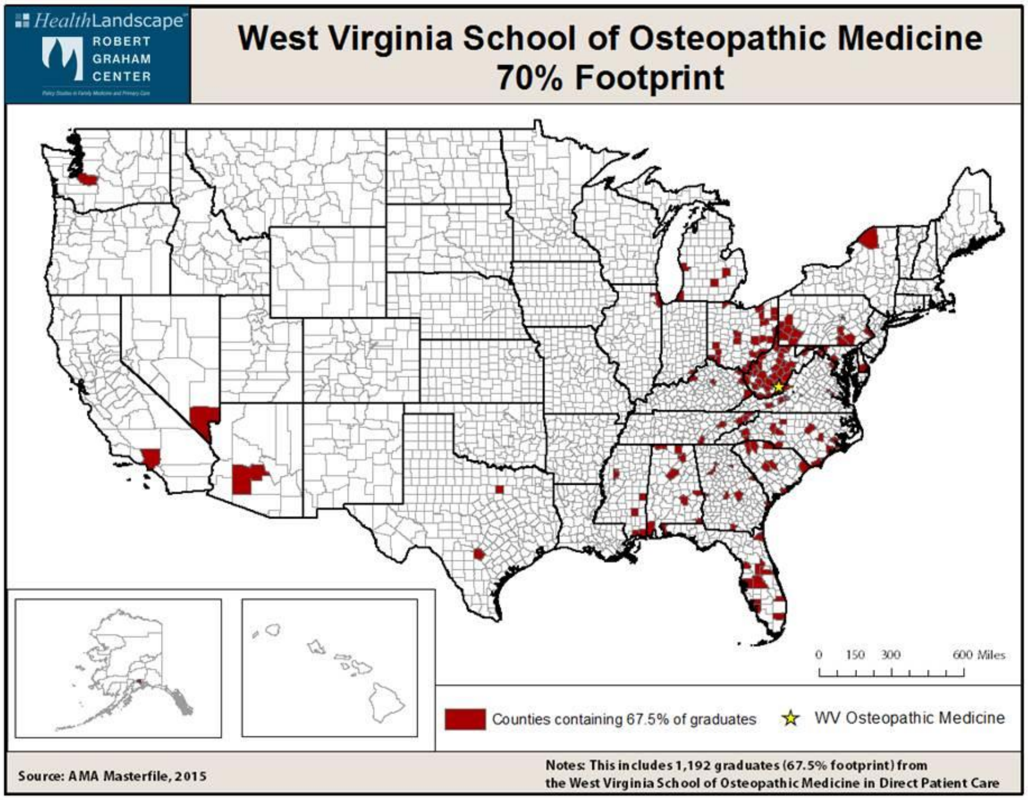

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia University School of Medicine 100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
WVU School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 2,765 graduates from the West Virginia School of Medicine in Direct Patient Care

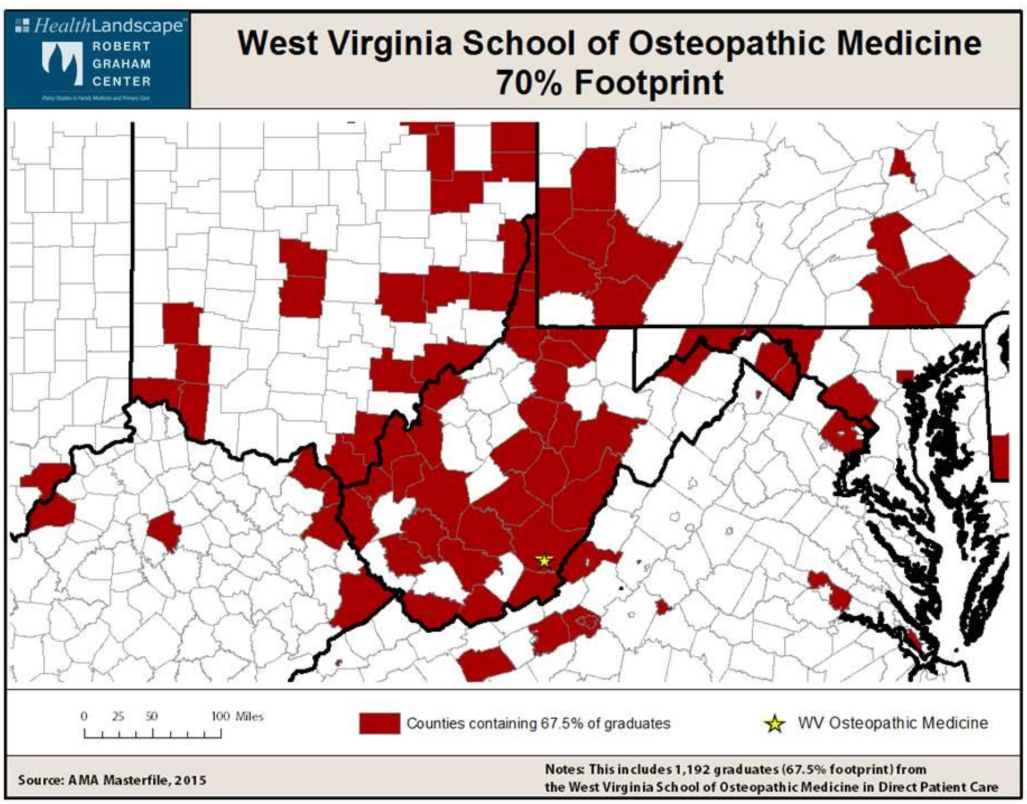

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia University School of Medicine
70% Footprint
0 150 300 600 Miles
Counties containing 70% of graduates
WVU School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,934 graduates (70% footprint) from the West Virginia School of Medicine in Direct Patient Care

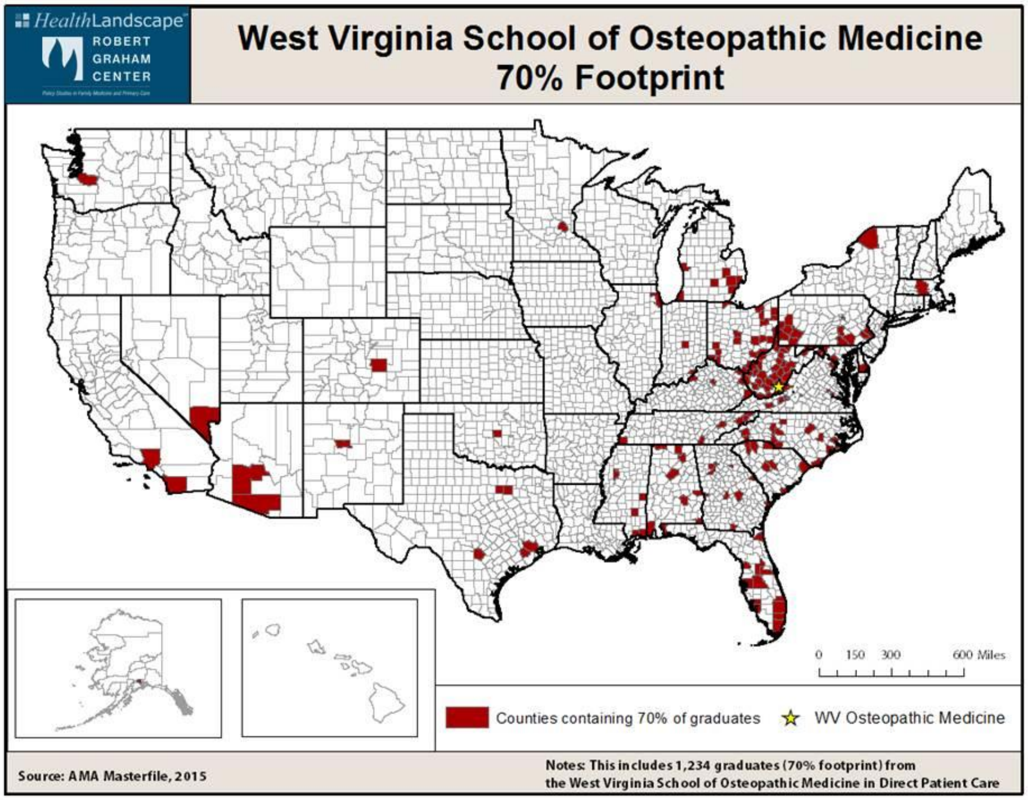

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia University School of Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WVU School of Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,934 graduates (70% footprint) from the West Virginia School of Medicine in Direct Patient Care

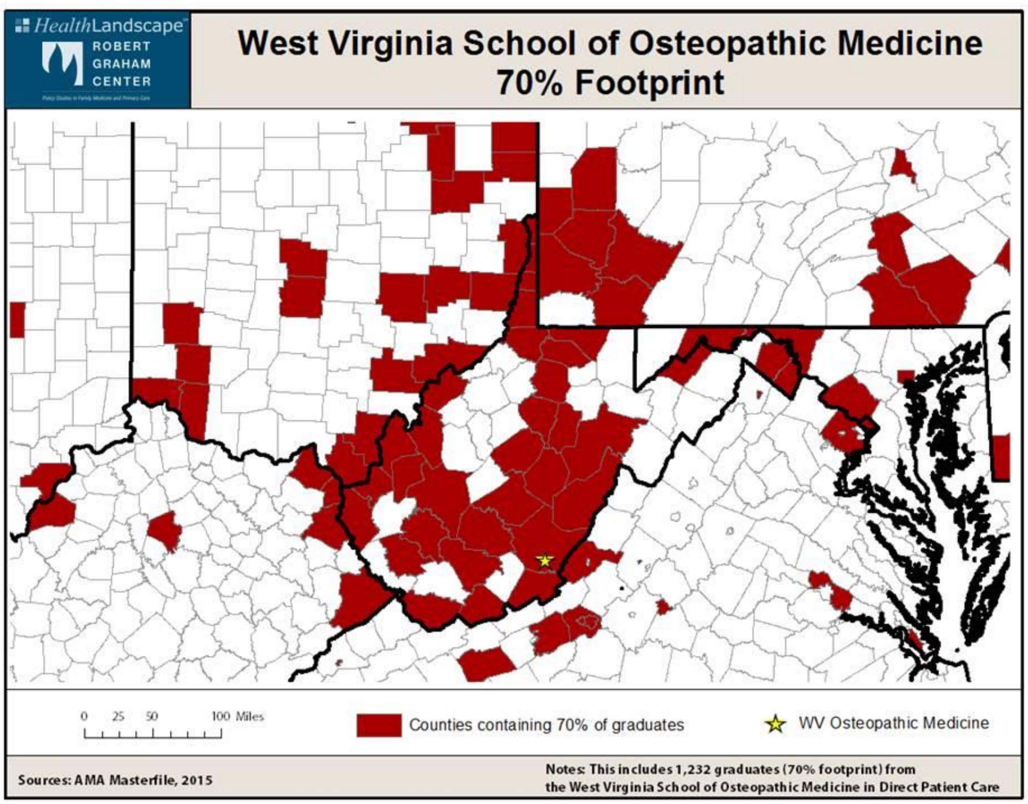

HealthLandscape
ROBERT GRAHAM CENTER
WV School of Osteopathic Medicine
100% Footprint
0 150 300 600 Miles
Counties containing 100% of graduates
WV Osteopathic Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,767 graduates from the West Virginia School of Osteopathic Medicine in Direct Patient Care

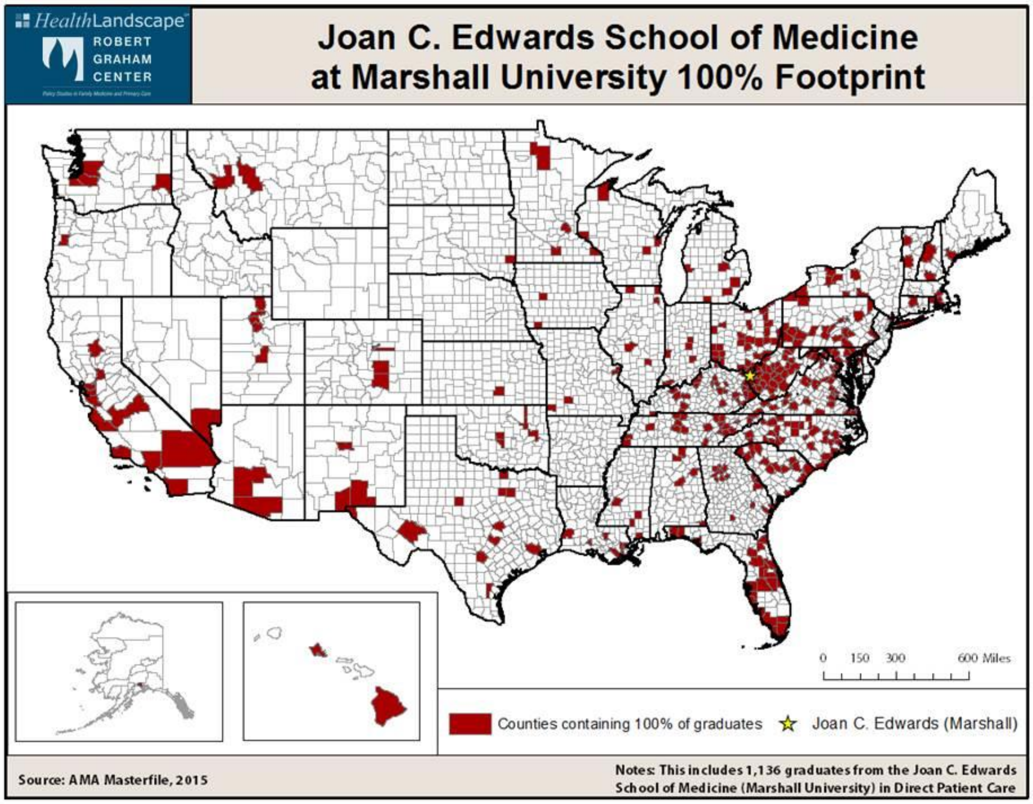

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia School of Osteopathic Medicine
100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
WV Osteopathic Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,767 graduates from the West Virginia School of Osteopathic Medicine in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
West Virginia School of Osteopathic Medicine
70% Footprint
0 150 300 600 Miles
Counties containing 67.5% of graduates
WV Osteopathic Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,192 graduates (67.5% footprint) from the West Virginia School of Osteopathic Medicine in Direct Patient Care

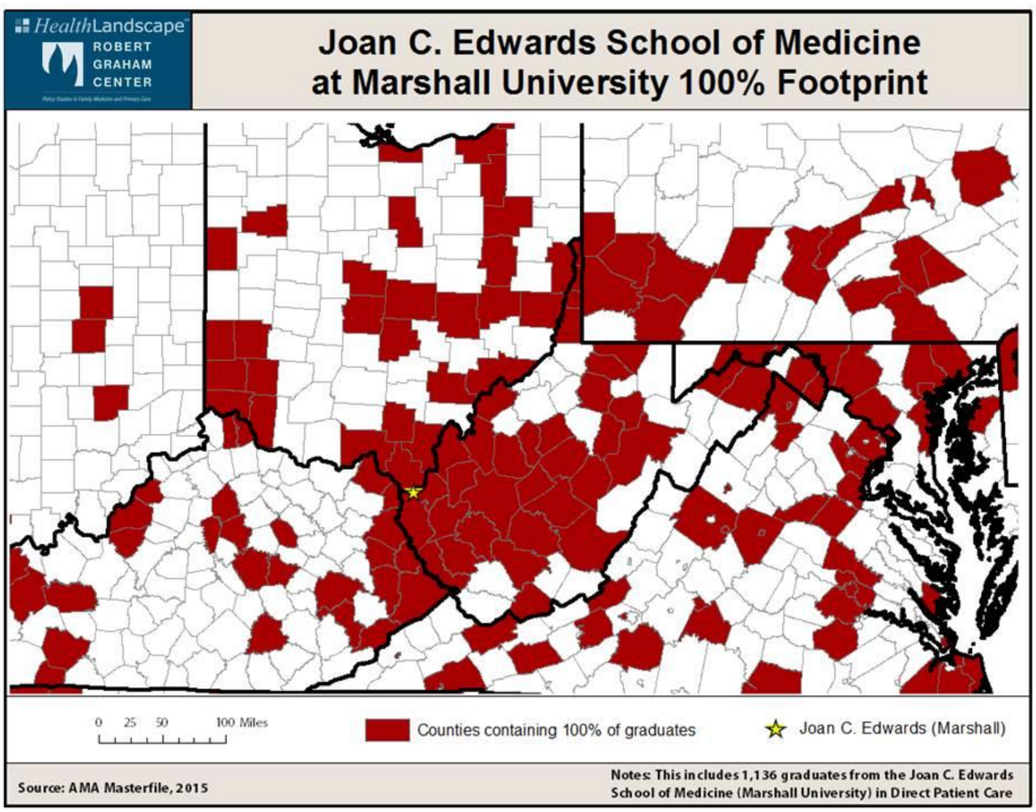

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia School of Osteopathic Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 67.5% of graduates
WV Osteopathic Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,192 graduates (67.5% footprint) from the West Virginia School of Osteopathic Medicine in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
West Virginia School of Osteopathic Medicine
70% Footprint
0 150 300 600 Miles
Counties containing 70% of graduates
WV Osteopathic Medicine
Source: AMA Masterfile, 2015
Notes: This includes 1,234 graduates (70% footprint) from the West Virginia School of Osteopathic Medicine in Direct Patient Care

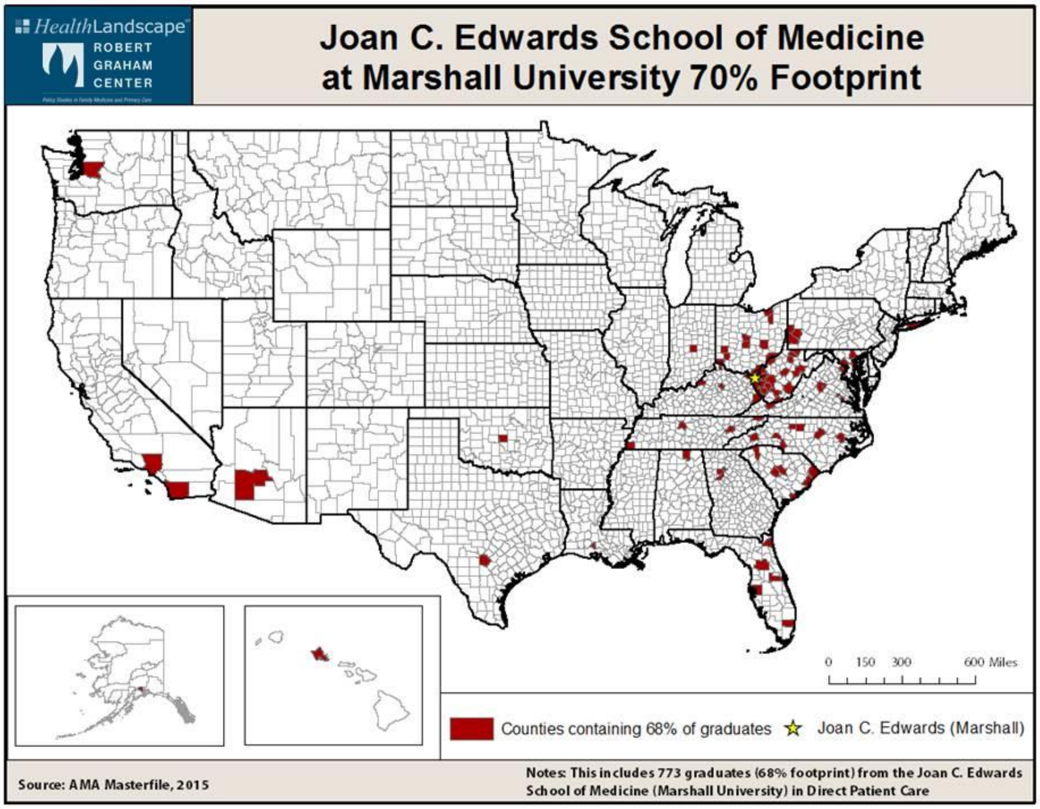

HealthLandscape
ROBERT GRAHAM CENTER
West Virginia School of Osteopathic Medicine
70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
WV Osteopathic Medicine
Sources: AMA Masterfile, 2015
Notes: This includes 1,232 graduates (70% footprint) from the West Virginia School of Osteopathic Medicine in Direct Patient Care

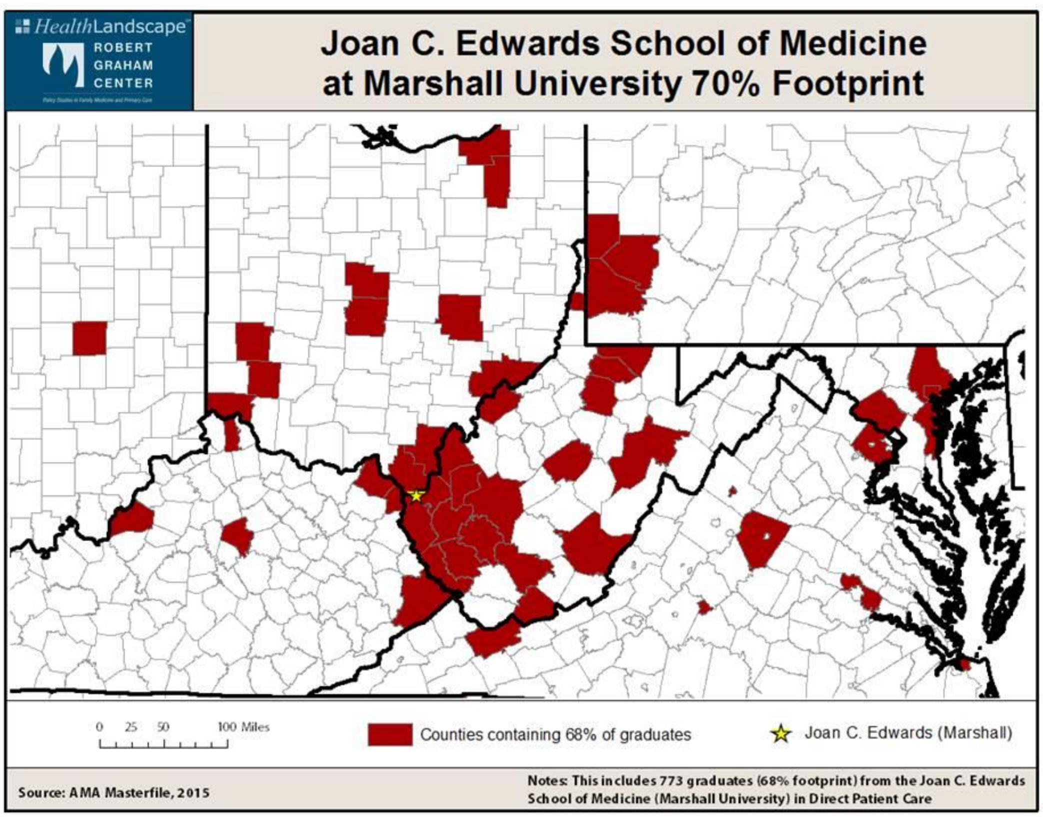


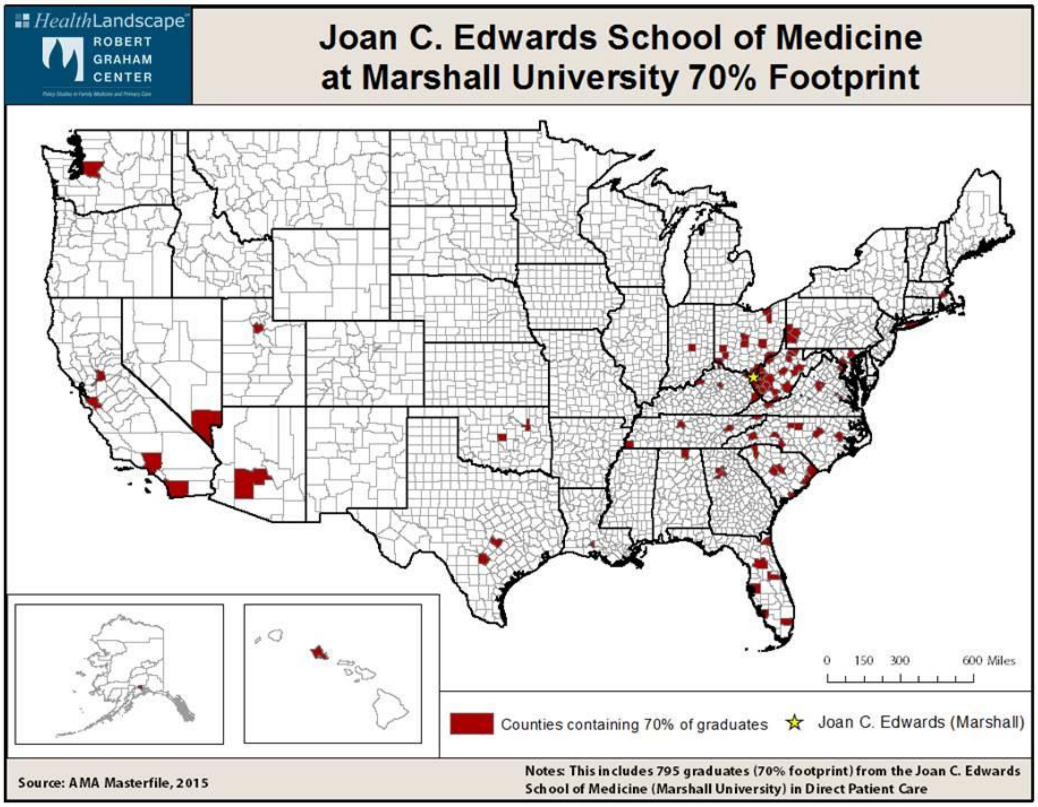
HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine
at Marshall University 100% Footprint
0 150 300 600 Miles
Counties containing 100% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 1,136 graduates from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care

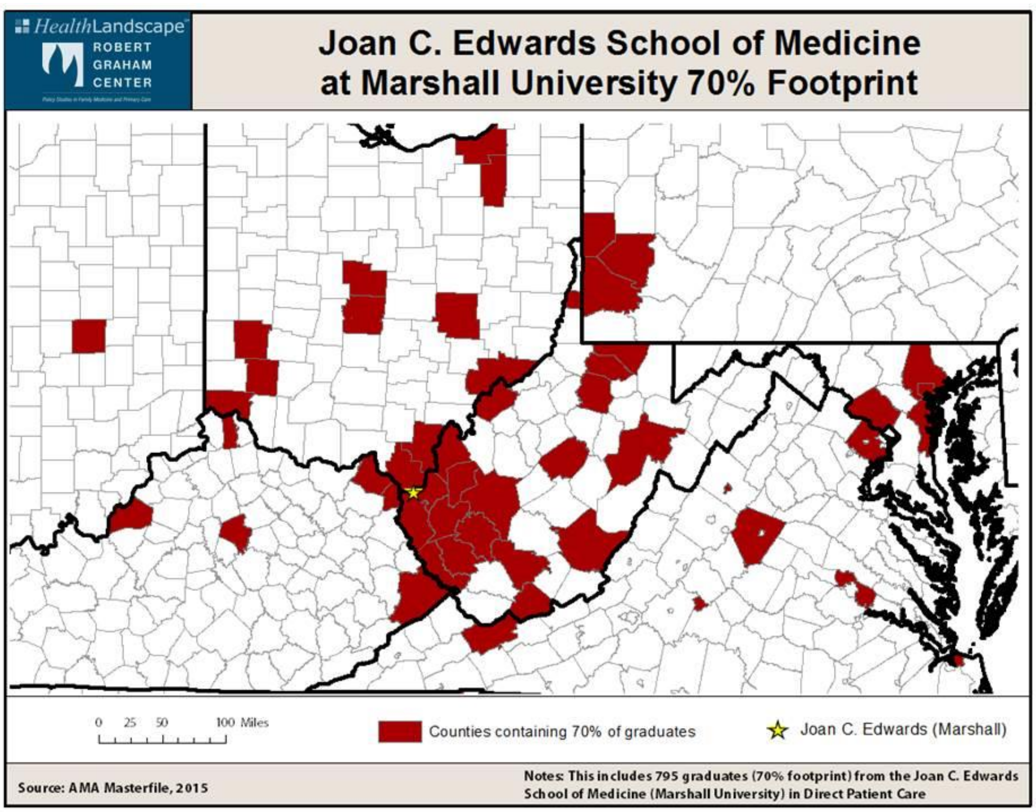


HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine
at Marshall University 100% Footprint
0 25 50 100 Miles
Counties containing 100% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 1,136 graduates from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine
at Marshall University 70% Footprint
0 150 300 600 Miles
Counties containing 68% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 773 graduates (68% footprint) from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine
at Marshall University 70% Footprint
0 25 50 100 Miles
Counties containing 68% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 773 graduates (68% footprint) from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine at Marshall University 70% Footprint
0 150 300 600 Miles
Counties containing 70% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 795 graduates (70% footprint) from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care


HealthLandscape
ROBERT GRAHAM CENTER
Joan C. Edwards School of Medicine at Marshall University 70% Footprint
0 25 50 100 Miles
Counties containing 70% of graduates
Joan C. Edwards (Marshall)
Source: AMA Masterfile, 2015
Notes: This includes 795 graduates (70% footprint) from the Joan C. Edwards School of Medicine (Marshall University) in Direct Patient Care