



---

Volume 3 | Issue 1

Article 14

---

2017

## Orthopaedic Surgeon Density in West Virginia

Franklin D. Shuler, Grant S. Buchanan, Zachary Sanford, Milad Modarresi, James Timothy Reagan, Kelly Scott, Chad Fisher, and Ali Oliashirazi

Follow this and additional works at: <https://mds.marshall.edu/mjm>

 Part of the [Orthopedics Commons](#)



This work is licensed under a [Creative Commons Attribution 4.0 License](#).

---

## Recommended Citation

Shuler, Franklin D.; Buchanan, Grant S.; Sanford, Zachary; Modarresi, Milad; Reagan, James Timothy; Scott, Kelly; Fisher, Chad; and Oliashirazi, Ali (2017) "Orthopaedic Surgeon Density in West Virginia," *Marshall Journal of Medicine*: Vol. 3: Iss. 1, Article 14.

DOI: <http://dx.doi.org/10.18590/mjm.2017.vol3.iss1.14>

Available at: <https://mds.marshall.edu/mjm/vol3/iss1/14>

DOI: <http://dx.doi.org/10.18590/mjm.2017.vol3.iss1.14>

Open Access |

---

This original article is available in Marshall Journal of Medicine: <https://mds.marshall.edu/mjm/vol3/iss1/14>

## References with DOI

1. Oreluk H ES, Cherf J. Results of the 2014 OPUS/Census Survey. AAOS. 2015 August:32-3.
2. Fehring TK OS, Troyer JL, Lorio R, Kurtz SM, Lau EC. Shortage of orthopaedic surgeons predicted for total joint-replacement surgeries. Journal of Arthroplasty. 2010 December;25(8):1175-81.
3. J D. West Virginia's population expected to decline by more than 19,000 residents by 2030 West Virginia University 2014 March 3 [2016 September 01]. Available from: <http://wvutoday.wvu.edu/n/2014/03/31/west-virginia-s-population-expected-to-decline-by-more-than-19-000-residents-by-2030>.
4. Association WVRH. Orthopaedic Surgeon Needs in West Virginia 2015 2015 October [2016 August 31]. Available from: <http://wvrha.org/wp-content/uploads/2015/12/2015-Draft-WV-Workforce-9-28-15.pdf>.

This original article is available in Marshall Journal of Medicine: <https://mds.marshall.edu/mjm/vol3/iss1/14>

## Orthopaedic Surgeon Density in West Virginia

Franklin D. Shuler, MD, PhD<sup>1</sup>, Grant S. Buchanan, MD<sup>1</sup>, Zachary Sanford, MD<sup>1</sup>, Milad Modarresi, MD<sup>1</sup>, James Timothy Reagan, MD<sup>1</sup>, Kelly Scott, MD<sup>1</sup>, Chad Fisher, Esq<sup>1</sup>, Ali Oliashirazi, MD<sup>1</sup>

### Author Affiliations:

1. Marshall University, Huntington, West Virginia

Dr. Shuler serves on the editorial committee of the Marshall Journal of Medicine. Other authors have no conflicts of interest to disclose.

### Corresponding Author:

Milad Modarresi, MD  
Marshall University  
Huntington, West Virginia  
Email: modarresi@marshall.edu

## Abstract

West Virginia (WV) has many healthcare disparities and access barriers. For bone and joint disorders, WV has some of the highest rates of musculoskeletal problems, including the highest reported rate of adult arthritis in the nation (36.2%). We hypothesized that WV has one of the lowest orthopaedic surgeon densities in the country, which can negatively impact the delivery of musculoskeletal care. Using the WV Board of Medicine practitioner databank, the Veterans Administration practitioner data, and national Orthopaedic surgeon census data, we demonstrated a considerably low orthopaedic surgeon density in WV (7.71/100,000 population versus the national average of 8.51/100,000 population) with 54% of our counties (n=30) having no Orthopaedic surgeons. This data is currently being used to further determine the appropriate allocation of resources to help improve access to specialized orthopaedic care in our state.

## Keywords

Orthopaedic surgeon, density, census, musculoskeletal, West Virginia

## Introduction

West Virginia has one of the lowest numbers of orthopaedic surgeons in the country.<sup>1</sup> This is concerning since it is estimated that there will be a significant shortage of orthopaedic surgeons starting in 2016.<sup>1</sup> Demand for specialized musculoskeletal care is increasing dramatically, with WV having the highest reported rate of arthritis in the country with projected increases in total knee and total hip replacement surgeries by 72% and 46% respectively in 2016.<sup>1-3</sup> In addition, in 2015, the National Center for the Analysis of Healthcare Data (NCAHD) demonstrated that the density of orthopaedic surgeons in WV counties with the highest percentage of elderly patients was lower than that for the state overall.<sup>4</sup> As a result, WV is also challenged by the appropriate placement of access points for specialized musculoskeletal care.

In 2014, the American Academy of Orthopaedic Surgeons (AAOS) published the Orthopaedic Practice in the United States (OPUS) census survey.<sup>1</sup> In this report, WV, Mississippi, Arkansas, and Texas were ranked as having the lowest orthopaedic surgeon density in the nation. WV was stated to have 131 orthopaedic surgeons, producing an overall surgeon density of 7.06/100,000 population. When reviewing this data, we found no mention of practitioners in the Veterans Administration system (WV has three VA locations) and the survey results are negatively impacted by including census data submitted to the AAOS by its membership.

We determined the most accurate number of orthopaedic surgeons in our state, including their practice locations, so that we can most appropriately assess barriers to advanced musculoskeletal care.

## Methods

Records from the West Virginia Board of Medicine and Veterans Administration (VA) Health System were obtained in the spring of 2015. Results were further cross referenced with those of the AAOS OPUS and with West Virginia hospital directories to form a comprehensive and current list of Orthopaedic surgeons licensed to practice (and currently practicing) within the state. These data were then compared to national census population data (2010 census) to

determine the numbers and locations of orthopaedic surgeons. When a surgeon practiced in two different counties within West Virginia, the primary practice location (county) was used in the data collection and analysis.

Descriptive analysis was done on the collected data and the number of surgeons available per 100,000 citizens was calculated for each county in the state. This was charted and further compared to the national average ratio reported (Table 1 and Figure 1).

## **Results**

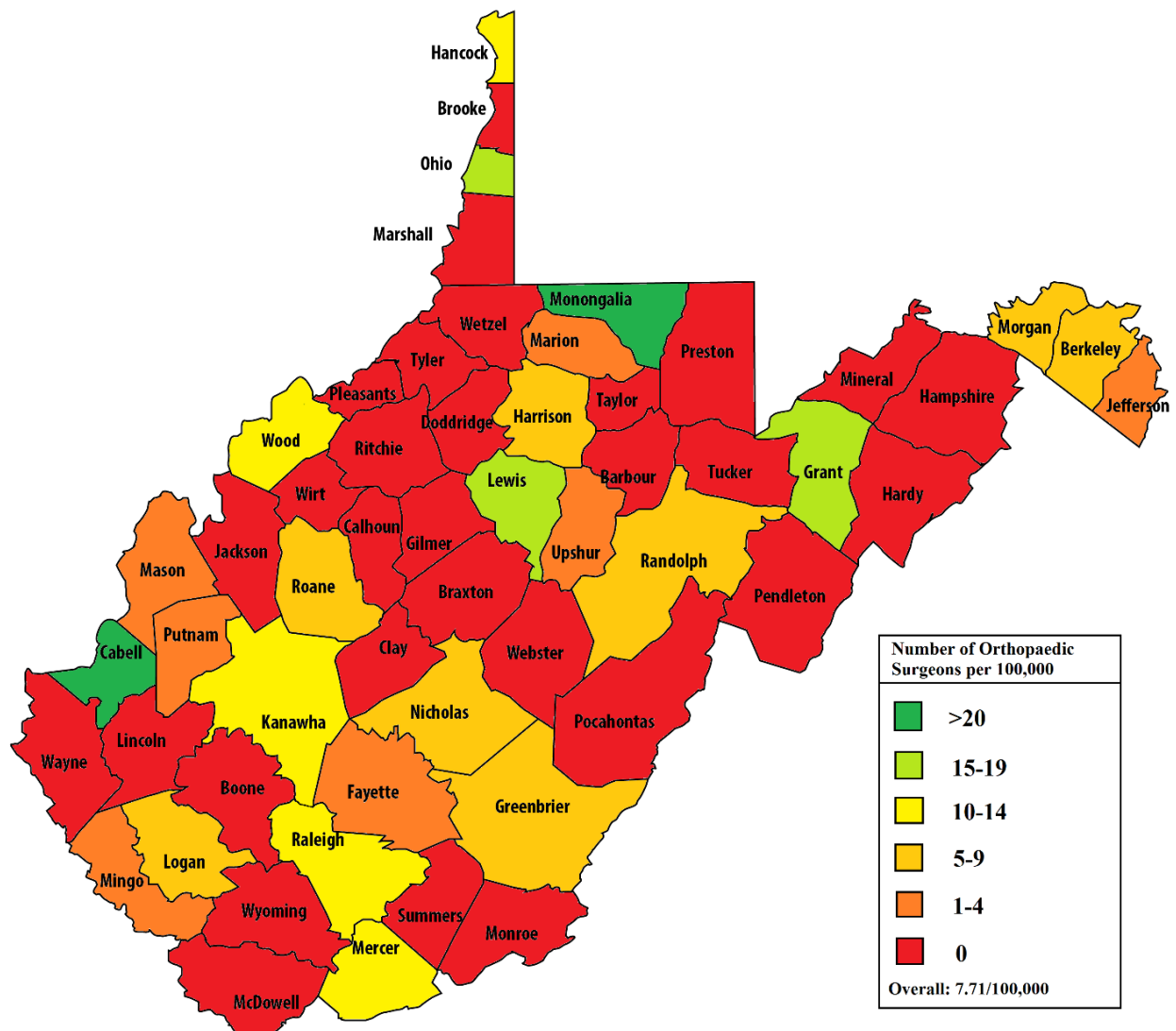
Our data indicate there are in fact 143 registered orthopaedic surgeons servicing West Virginia, which is slightly higher than that reported by AAOS (Table 1). This corresponds with a surgeon density of 7.71/100,000 which is well below the AAOS reported national average of 8.51/100,000.

Table 1: **Orthopaedic Surgeon Density per County**, Monongalia (24) and Cabell (20) counties had the highest numbers of orthopaedic surgeons. Counties without an orthopaedic surgeon (n=30) are omitted from the listing below. These counties include: Barbour, Boone, Braxton, Brooke, Calhoun, Clay, Doddridge, Gilmer, Hampshire, Hardy, Jackson, Lincoln, Marshall, McDowell, Mineral, Monroe, Pendleton, Pleasants, Pocahontas, Preston, Ritchie, Summers, Taylor, Tucker, Tyler, Wayne, Webster, Wetzel, Wirt and Wyoming.

County (n=55)	# Orthopaedic Surgeons	Population (2010 WV Census 1,852,994)	Surgeons Per 100,000 Citizens	Orthopaedic Surgeon Density
Monongalia	24	96189	25	High
Cabell	20	96319	21	High
Lewis	3	16372	18	High-Intermediate
Ohio	8	44443	18	High-Intermediate
Grant	2	11937	17	High-Intermediate
Hancock	4	30676	13	Intermediate
Kanawha	25	193063	13	Intermediate
Wood	9	86956	12	Intermediate
Raleigh	9	78859	11	Intermediate
Mercer	7	62264	11	Intermediate
Harrison	6	69099	9	Low-Intermediate
Berkeley	8	104169	8	Low-Intermediate
Nicholas	2	26233	8	Low-Intermediate
Randolph	2	29405	7	Low-Intermediate
Roane	1	14926	7	Low-Intermediate
Morgan	1	17541	6	Low-Intermediate
Greenbrier	2	35480	6	Low-Intermediate
Logan	2	36743	5	Low-Intermediate
Upshur	1	24254	4	Low
Mingo	1	26839	4	Low
Mason	1	27324	4	Low
Putnam	2	55486	4	Low
Fayette	1	46039	2	Low
Jefferson	1	53498	2	Low
Marion	1	56418	2	Low
30 counties	0	512462	0	No Orthopaedic Surgeons

Thirty counties within the state (54%) had no orthopaedic surgeons (Figure 1, red). Our data further indicate that of the remaining twenty counties, only the counties of Cabell and Monongalia have 20 or more surgeons per 100,000 population. The county of Kanawha had the highest number of total Orthopaedic surgeons (25), but its surgeon density was only 13/100,000.

**Figure 1: Geographic Representation of Orthopaedic Surgeon Density in West Virginia.** Orthopaedic surgeon densities are presented per 100,000 citizens. West Virginia averages 7.71 orthopaedic surgeons per 100,000 population with the greatest number of surgeons serving patient populations in Monongalia and Cabell counties (dark green). Thirty counties in the state do not have an orthopaedic surgeon (red). This data is critical for decisions on the appropriate allocation of musculoskeletal resources.



## Discussion

There are 143 orthopaedic surgeons in our state with a density of 7.71/100,000 population, which is well below the national average of 8.51/100,000. This number is more accurate than the 2014 AAOS report of 131 practitioners (density=7.06/100,000)<sup>1</sup> and more accurate than the report by NCAHD compiled from reports from the West Virginia Board of Medicine (2015) and West Virginia Board of Osteopathy (2015)<sup>4</sup>.

It was surprising to find that 54% of counties in the state had no orthopaedic surgeon (Figure 1). This is important information; however, re-analyzing this data can provide a more robust ability to access current musculoskeletal care in WV. Therefore, a second research study is being conducted to calculate surgeon densities within 25 and 50 mile radius of major WV population centers using the concept of Metropolitan Statistical Areas (MSA). For example, when considering Orthopaedic surgeon densities using MSA's, Huntington is considered underserved when compared to Morgantown and Charleston (Table 2).

Table 2: **Determination of Orthopaedic surgeon density in WV using Metropolitan Statistical Areas.** A Metropolitan Statistical Area (MSA) is centered on a single city that has substantial influence over a region, which the counties included in MSA determination shown in the table. Huntington MSA Orthopaedic surgeon density (9.06/100,000) is lower than that of Morgantown MSA density (22.04/100,000) and the Charleston MSA density (11.56/100,000).

City	Largest Metropolitan Statistical Areas (MSA) in WV				
	Counties Included	Population	# Orthopaedic Surgeons	Total	# Orthopaedic Surgeons/100,000 Population
Charleston	Boone (WV)	224,743	0	26	11.57
	Clay (WV)		0		
	Kanawha (WV)		26		
Huntington	Boyd (KY)	364,101	6	33	9.06
	Greenup (KY)		4		
	Lawrence (OH)		0		
	Cabell (WV)		21		
	Lincoln (WV)		0		
	Putnam (WV)		2		
	Wayne (WV)		0 (There are 3 Veterans Affairs doctors)		
Morgantown	Monongalia (WV)	136,133	29	30	22.04
	Preston (WV)		1		
Parkersburg	Wirt (WV)	92,470	0	5	5.41
	Wood (WV)		5		



This report provides the most accurate data on the orthopaedic surgery density in West Virginia with the following key items reported:

1. West Virginia Orthopaedic Surgeon Density = 7.71/100,000 population (one of lowest in nation; n=143);
2. 54% of West Virginia counties (n=30) have no Orthopaedic surgeons;
3. These data are necessary to assist with the appropriate allocation of musculoskeletal care resources for our state.

## References

1. Oreluk H ES, Cherf J. Results of the 2014 OPUS/Census Survey. AAOS. 2015 August:32-3.
2. Fehring TK OS, Troyer JL, Lorio R, Kurtz SM, Lau EC. Shortage of orthopaedic surgeons predicted for total joint-replacement surgeries. *Journal of Arthroplasty*. 2010 December;25(8):1175-81.
3. J D. West Virginia's population expected to decline by more than 19,000 residents by 2030 West Virginia University 2014 March 3 [2016 September 01]. Available from: <http://wvutoday.wvu.edu/n/2014/03/31/west-virginia-s-population-expected-to-decline-by-more-than-19-000-residents-by-2030>.
4. Association WVRH. Orthopaedic Surgeon Needs in West Virginia 2015 2015 October [2016 August 31]. Available from: <http://wvrha.org/wp-content/uploads/2015/12/2015-Draft-WV-Workforce-9-28-15.pdf>.