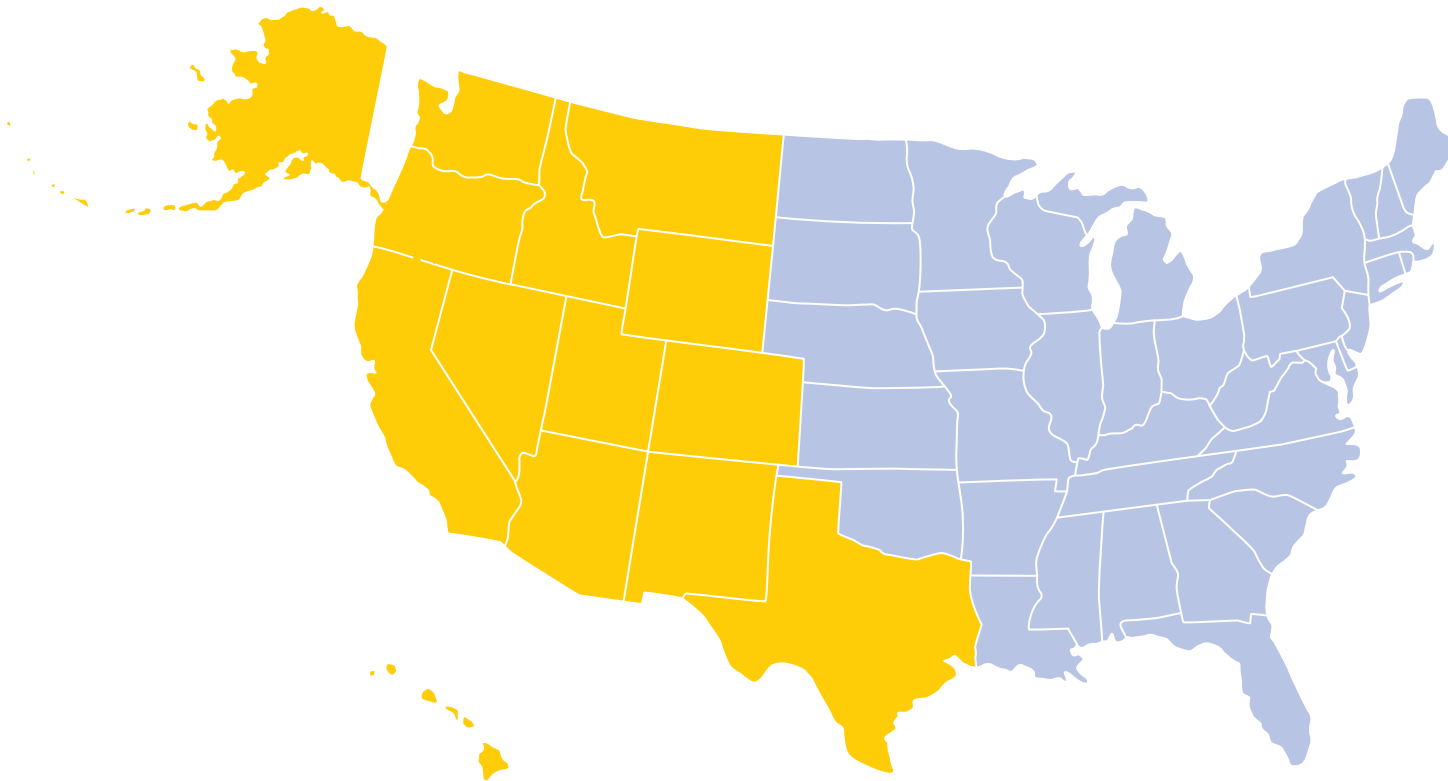


ANESTHESIA WORKFORCE SUMMARY

WESTERN CAUCUS



HEALTH POLICY RESEARCH DEPARTMENT
FEBRUARY 2015

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INTRODUCTION

The purpose of this report is to summarize the anesthesia workforce supply¹ in the Midwest Caucus states to help inform ASA member discussions on workforce trends and related issues. The information presented in this inaugural report is based on publicly available data from:

- the National Provider Identifier (NPI) dataset,
- the Medicare Physician Compare National Downloadable File (Physician Compare),
- the American Medical Association (AMA),
- an anesthesia workforce analysis by the RAND Corporation (RAND), and
- the U.S. Census Bureau.



THREE MAJOR
WORKFORCE
DATA SOURCES

The three workforce data sources used in this report (NPI, Physician Compare, and the AMA) are the likely sources used in most published reports on the anesthesia and perioperative workforce. The development and purpose of the data are different for each source and understanding these differences is essential for any review of information using these data. The NPI data are updated weekly; the Physician Compare dataset is as of December 2014; and AMA data represent 2013 information. Both the NPI and Physician Compare data include nurse anesthetists. The AMA data used in this report are derived from the AMA Physician Masterfile. **APPENDIX A** contains additional information about the three data sources used in this report.

This anesthesia workforce summary includes several state-level and inter-caucus comparisons. The composition of anesthesia practices within a local market may be quite different; and it is important to recognize these differences. The workforce summary can help caucuses better understand differences among their state members and identify regional and national trends. The data should prove useful for evaluating membership goals and understanding differences in policy priorities among states. This information can be supplemented with state society data and other local data sources to form a more accurate profile of the anesthesia workforce in the caucus states.

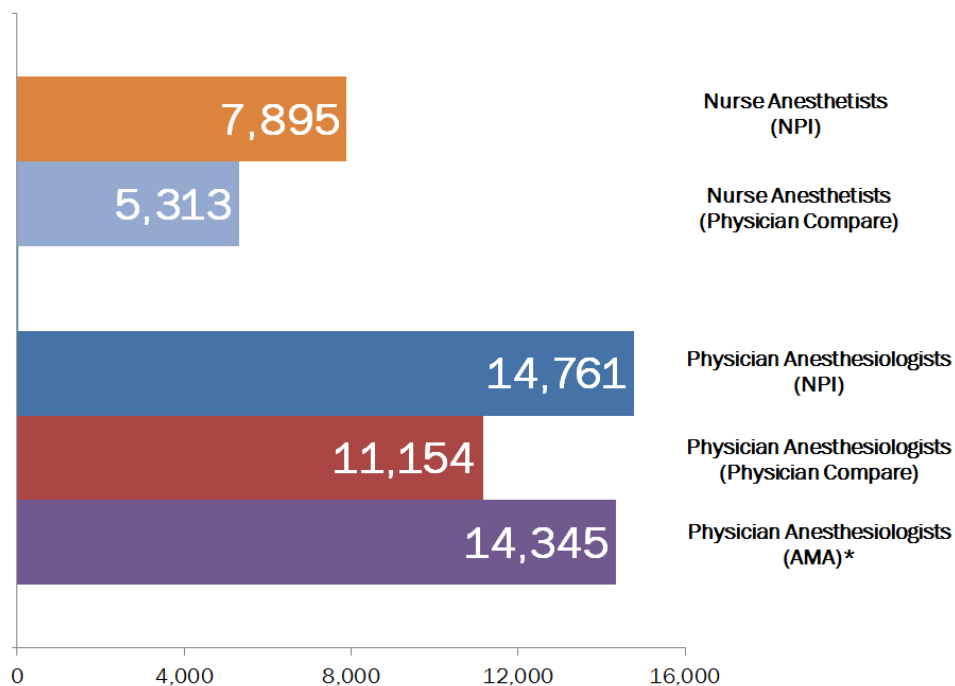
¹The data reflect total counts for physician and nurse anesthesia professionals and not full-time equivalents (FTEs). That is, the workforce data are not adjusted to account for differences in work hours or productivity.

SUMMARY OF WESTERN ANESTHESIA WORKFORCE

Physician anesthesiologists and nurse anesthetists in the Western Caucus states account for 32.3 percent and 17.0 percent of their respective total workforces in the United States (U.S.) (based on NPI data).

FIGURE 1

WESTERN CAUCUS NURSE ANESTHETISTS AND PHYSICIAN ANESTHESIOLOGISTS BY DATA SOURCE

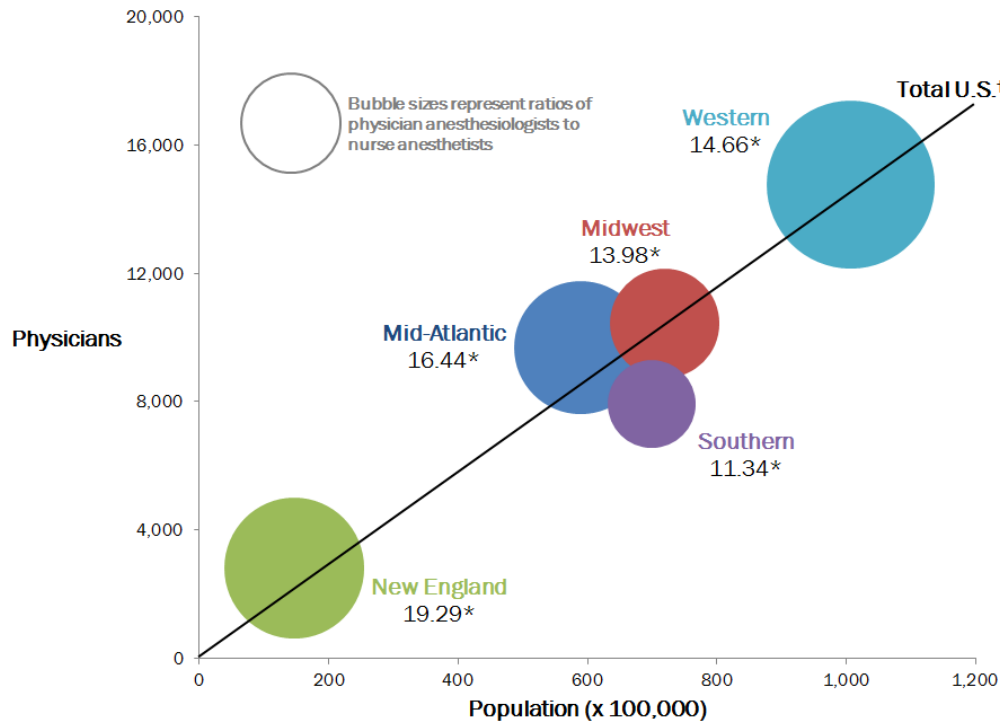


*Includes only physicians who self-reported as being involved in patient care activity.

FIGURE 1 compares anesthesia workforce counts between the three datasets used in this analysis. The ratio of physicians to nurses based on NPI and Physician Compare data are 1.87 and 2.10, respectively. The numbers of physician anesthesiologists in AMA and NPI data are close (<3% difference). The physician and nurse counts based on Physician Compare data are 76 and 67 percent of the NPI counts, respectively.

FIGURE 2

NUMBER OF PHYSICIANS, POPULATION AND WORKFORCE RATIOS BY CAUCUS, JANUARY 2015



Western Caucus Anesthesia Workforce Ratio	Compared to Rest of U.S., Is:
Physicians to Population	ABOUT THE SAME§
Nurses to Population	56% LOWER
Physicians to Nurses	134% HIGHER
Total‡ to Population	31% LOWER

§Less than 5 percent difference.

‡Total includes physician anesthesiologists, nurse anesthetists and anesthesiologist assistants.

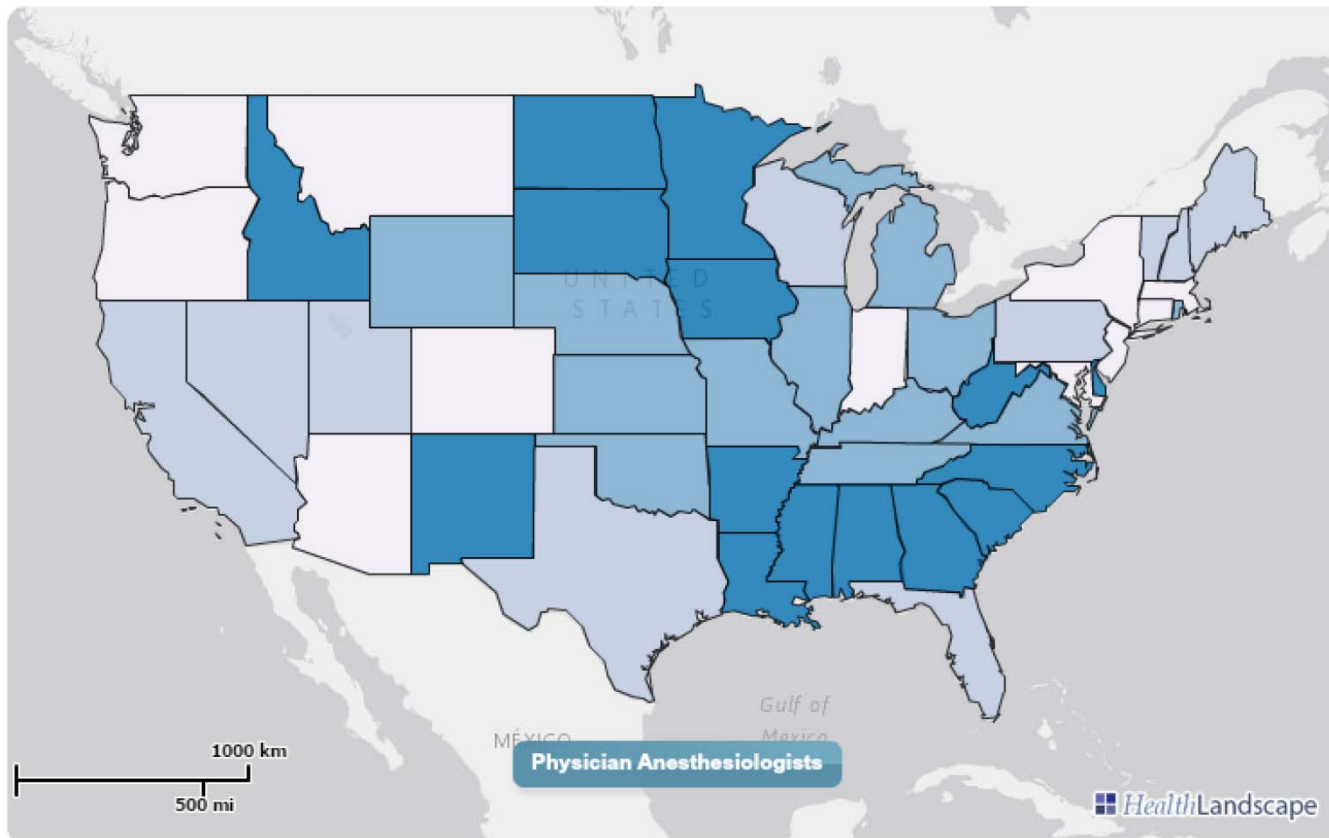
*Represents ratio of physicians per 100,000 population.

†Slope of line represents overall U.S. ratio of physicians per 100,000 population (14.44).

Sources: Workforce data from Medicare National Plan & Provider Enumeration System (NPPES). Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

FIGURE 2 compares physician anesthesiologist workforces across all five ASA caucuses, including ratios of physician anesthesiologists to population and to nurse anesthetists. The accompanying table compares anesthesia workforce ratios for the Western Caucus with the combined other four caucuses.

FIGURE 3
RATIO OF POPULATION TO PHYSICIAN ANESTHESIOLOGIST WORKFORCE BY STATE, 2013
Created with AMA Health Workforce Mapper

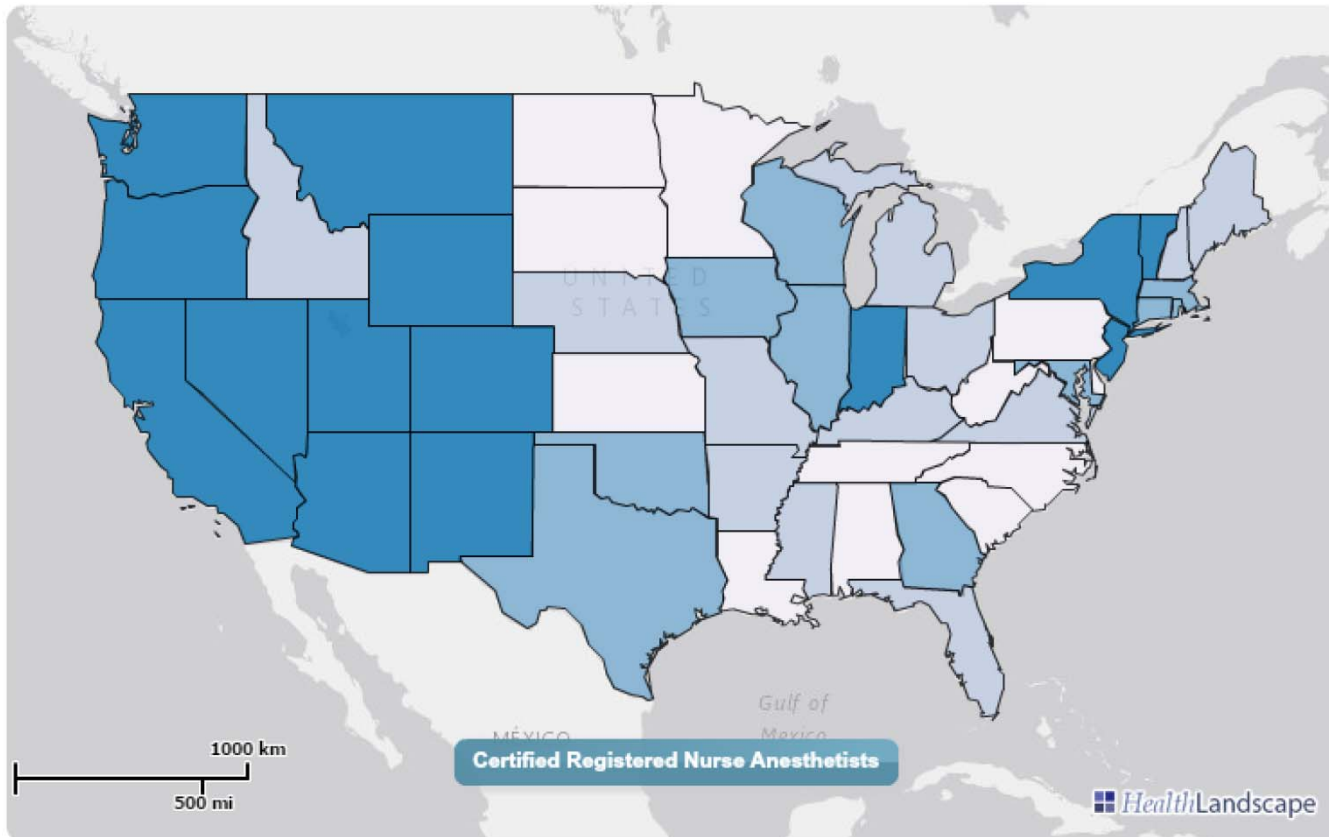


Population per Provider
2,686 to 7,056
7,142 to 7,925
8,246 to 9,976
10,077 to 14,251

Source: American Medical Association Health Workforce Mapper. Accessed February 18, 2015 from <http://www.ama-assn.org/ama/priv/advocacy/state-advocacy-arc/health-workforce-mapper-a.page>.

FIGURE 4

RATIO OF POPULATION TO NURSE ANESTHETIST WORKFORCE BY STATE, 2013
 Created with AMA Health Workforce Mapper



Source: American Medical Association Health Workforce Mapper. Accessed February 18, 2015 from <http://www.ama-assn.org/ama/priv/advocacy/state-advocacy-arc/health-workforce-mapper-a.page>.

WESTERN CAUCUS ANESTHESIA WORKFORCE PROFILE

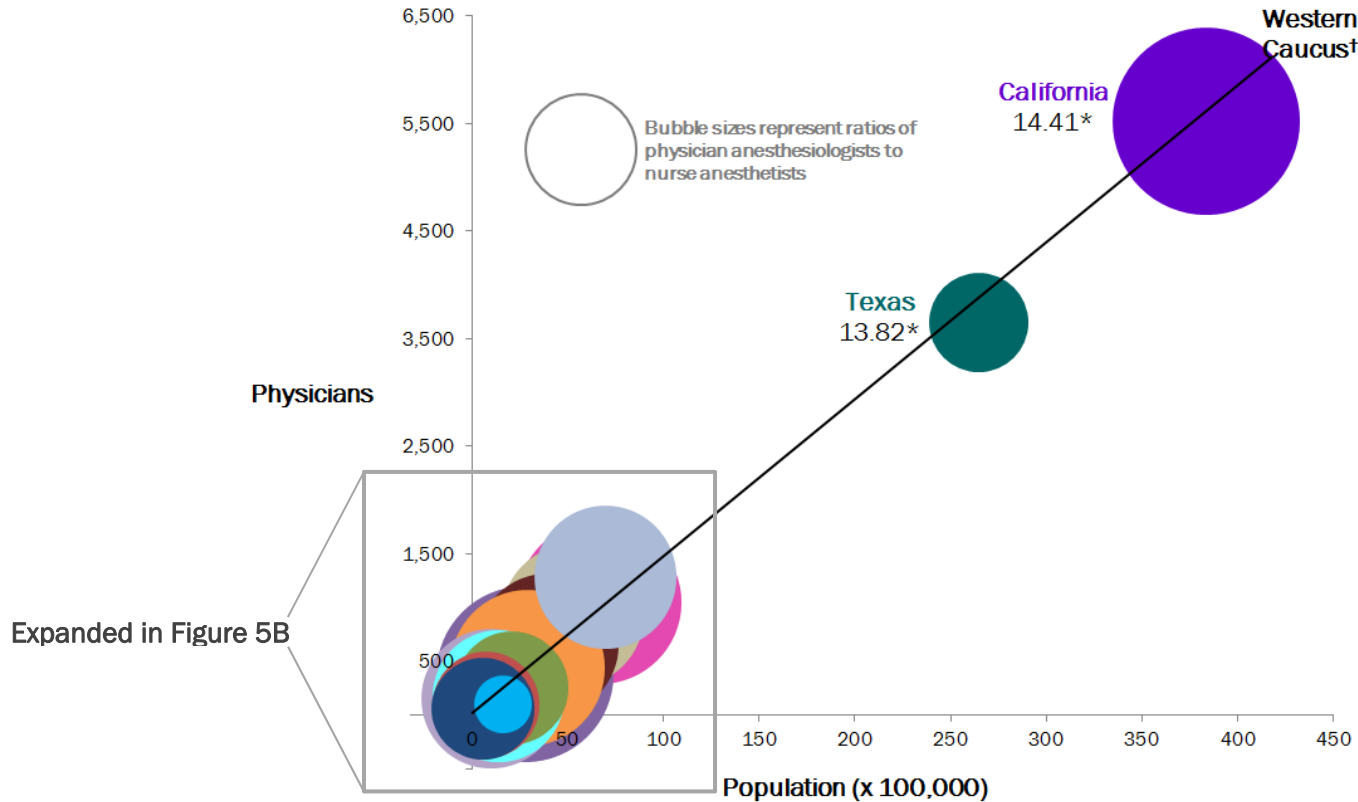
FIGURES 5A AND 5B, and TABLES 1-3 (pages 7-11) profile the anesthesia workforce based on the three datasets used in this report: NPI, Physician Compare, and AMA. Key observations are provided below.

- There is relatively little variation in the concentration of the anesthesia workforce between states².
 - Based on NPI and Physician Compare data, **California** has the lowest ratio of total anesthesia workforce to population and **Texas** has the highest.
 - **Idaho** is the exception, which has a substantially lower ratio of physicians to population and a substantially higher ratio of nurses to population than the rest of the Western Caucus.
- There is relatively little variation in the ratio of physicians to nurses between states.
 - Based on Physician Compare data, **California** is the exception. It has a substantially higher ratio of physicians to nurses than the rest of the Western Caucus.
- **Idaho** was the only state with a percentage decrease in physicians between December 2012 and January 2015.
 - Based on AMA data, 3 states had a percentage decrease in physicians between 2008 and 2013 (**Idaho, Montana and Nevada**).
- **Hawaii** was the only state with a percentage decrease in nurses between December 2012 and January 2015.
- **California** has the highest ratio of physicians to nurses in the U.S. (based on both NPI and Physician Compare).

²Assessment by ASA Health Policy Research Department based on comparison of standard errors between caucuses.

FIGURE 5A

NUMBER OF PHYSICIANS, POPULATION AND WORKFORCE RATIOS IN WESTERN CAUCUS BY STATE, JANUARY 2015



*Represents ratio of physicians per 100,000 population.

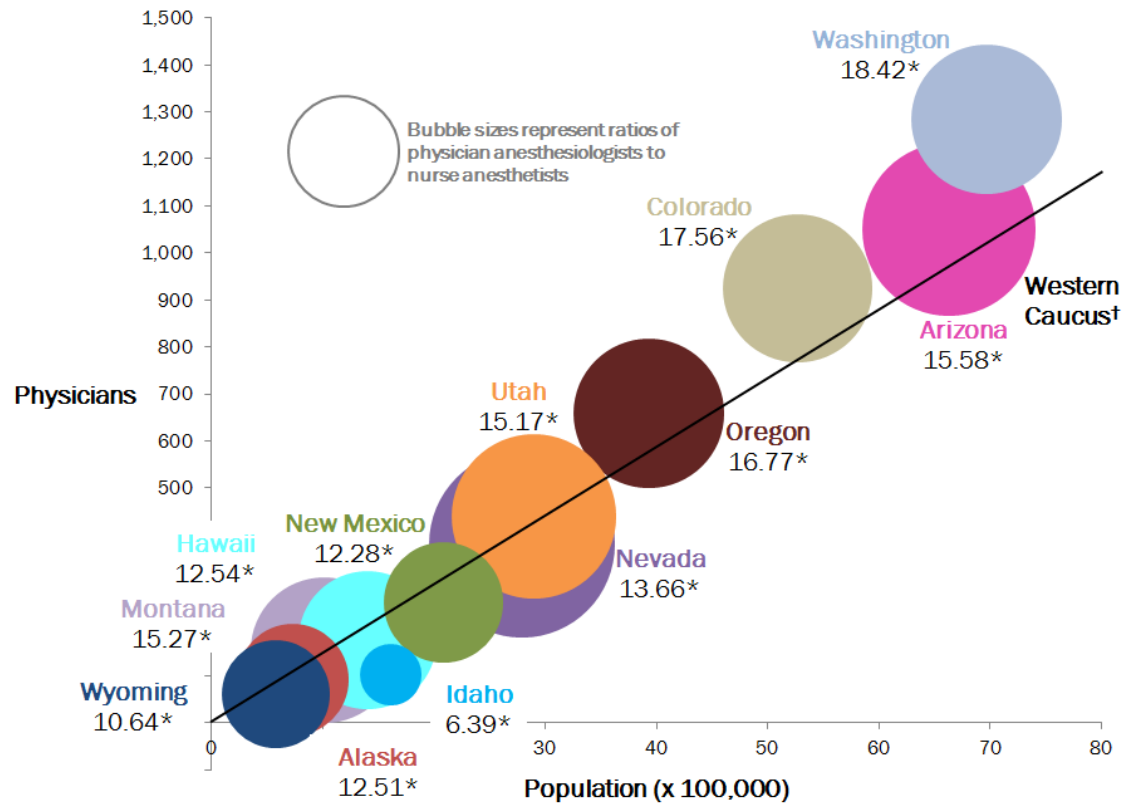
†Slope of line represents overall Western Caucus ratio of physicians per 100,000 population (14.66).

Sources: Workforce data from Medicare National Plan & Provider Enumeration System (NPPES). Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

FIGURE 5A compares physician anesthesiologist workforces across all 14 states in the Western Caucus, including ratios of physician anesthesiologists to population and to nurse anesthetists.

FIGURE 5B

NUMBER OF PHYSICIANS, POPULATION AND WORKFORCE RATIOS IN 12 WESTERN CAUCUS STATES, JANUARY 2015



*Represents ratio of physicians per 100,000 population.

†Slope of line represents overall Western Caucus ratio of physicians per 100,000 population (14.66).

Sources: Workforce data from Medicare National Plan & Provider Enumeration System (NPPES). Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

FIGURE 5B compares physician anesthesiologist workforces across all 12 of the 14 states in the Western Caucus, including ratios of physician anesthesiologists to population and to nurse anesthetists.

TABLE 1
ANESTHESIA WORKFORCE BASED ON NATIONAL PROVIDER IDENTIFIER (NPI) DATASET, JANUARY 2015

State	Number of Professionals		25-month Change (%)†		Ratio of Physicians to Nurses	Number per 100,000 Population		
	Physicians	Nurses	Physicians	Nurses		Physicians	Nurses	Total*
Alaska	92	78	13.6	20.0	1.18	12.51	10.61	23.13
Arizona	1,050	373	4.9	23.5	2.82	15.85	5.63	21.49
California	5,524	1,517	7.0	15.7	3.64	14.41	3.96	18.38
Colorado	925	446	9.1	13.8	2.07	17.56	8.47	26.48
Hawaii	176	98	8.0	-3.0	1.80	12.54	6.98	19.51
Idaho	103	288	-3.7	8.7	0.36	6.39	17.86	24.32
Montana	155	77	6.2	11.6	2.01	15.27	7.58	22.85
Nevada	381	117	4.7	25.8	3.26	13.66	4.19	17.85
New Mexico	256	190	3.2	11.8	1.35	12.28	9.11	22.97
Oregon	659	314	8.2	18.0	2.10	16.77	7.99	24.76
Texas	3,654	3,560	6.5	17.7	1.03	13.82	13.46	27.73
Utah	440	174	5.5	1.8	2.53	15.17	6.00	21.23
Washington	1,284	606	8.4	19.3	2.12	18.42	8.69	27.20
Wyoming	62	57	6.9	26.7	1.09	10.64	9.78	20.42
Western Caucus	14,761	7,895	6.8	16.4	1.87	14.66	7.84	22.69
Other Caucuses	30,874	38,657	5.3	11.3	0.80	14.33	17.94	33.00
Total U.S.	45,635	46,552	5.8	12.1	0.98	14.44	14.73	29.72

*Total includes physician anesthesiologists, nurse anesthetists and anesthesiologist assistants.

†Based on data for December 2012 and January 2015.

Sources: Workforce data from Medicare National Plan & Provider Enumeration System (NPPES). Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

TABLE 2
ANESTHESIA WORKFORCE BASED ON PHYSICIAN COMPARE, 2013

State	Number of Professionals		Ratio of Physicians to Nurses	Number per 100,000 Population		
	Physicians	Nurses		Physicians	Nurses	Total*
Alaska	72	54	1.34	9.77	7.28	17.04
Arizona	934	315	2.96	14.10	4.76	18.86
California	3,825	552	6.93	9.98	1.44	11.42
Colorado	766	341	2.25	14.55	6.46	21.33
Hawaii	158	45	3.53	11.25	3.19	14.44
Idaho	84	257	0.33	5.20	15.95	21.15
Montana	143	59	2.42	14.04	5.79	19.83
Nevada	324	44	7.35	11.61	1.58	13.19
New Mexico	175	169	1.03	8.38	8.12	17.56
Oregon	450	240	1.88	11.45	6.10	17.55
Texas	2,900	2,680	1.08	10.96	10.13	21.47
Utah	343	112	3.07	11.81	3.84	15.65
Washington	912	403	2.26	13.08	5.78	18.86
Wyoming	69	42	1.64	11.89	7.26	19.15
Western Caucus	11,154	5,313	2.10	11.08	5.28	16.49
Other Caucuses	24,296	30,540	0.80	11.28	14.18	26.03
Total U.S.	35,450	35,853	0.99	11.21	11.34	22.99

*Total includes physician anesthesiologists, nurse anesthetists and anesthesiologist assistants.

Sources: Workforce data from Medicare Physician Compare. Physician Compare numbers are for professionals with at least 1 Medicare claim during 2013. Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

TABLE 3
ANESTHESIA WORKFORCE BASED ON AMERICAN MEDICAL ASSOCIATION (AMA) DATA, 2013

State	Number of Physicians		Five-Year Change in Physicians (%)†		Physicians per 100,000 Population	
	Total	Patient Care	Total	Patient Care	Total	Patient Care
Alaska	97	95	14.1	14.5	13.19	12.92
Arizona	1,026	1,004	11.3	11.2	15.48	15.15
California	5,772	5,612	8.8	9.1	15.06	14.64
Colorado	861	843	14.5	14.5	16.34	16.00
Hawaii	180	177	13.9	13.5	12.82	12.61
Idaho	103	103	-6.4	-6.4	6.39	6.39
Montana	134	132	-0.7	-0.8	13.20	13.00
Nevada	366	363	-0.8	-5.7	13.12	13.01
New Mexico	234	230	11.4	10.6	11.22	11.03
Oregon	654	627	9.9	7.9	16.64	15.95
Texas	3,712	3,638	15.2	15.6	14.03	13.76
Utah	440	424	15.8	16.8	15.17	14.62
Washington	1,078	1,042	6.4	7.2	15.46	14.95
Wyoming	56	55	5.7	3.8	9.61	9.44
Western Caucus	14,713	14,345	10.6	10.6	14.61	14.24
Other Caucuses	31,221	30,390	8.8	8.6	14.49	14.11
Total U.S.	45,934	44,735	9.4	9.2	14.53	14.15

†Based on AMA data for 2008 and 2013.

Sources: Workforce data from American Medical Association's *Physician Characteristics and Distribution in the US (2015 edition)*. "Patient Care" numbers include physicians who self-reported as being involved in patient care activity. Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

ANESTHESIOLOGY AND SURGICAL³ WORKFORCES IN THE WESTERN CAUCUS

TABLE 4 profiles the anesthesia and surgical workforces based on AMA and NPI data. Key observations are provided below.

- The Western Caucus has higher ratios of physician anesthesiologists to GI physicians (gastroenterologists) and to OB/GYN physicians than the rest of the U.S.
 - They have similar ratios of physician anesthesiologists to Other Surgeons and Total Surgeons compared to the rest of the U.S.
- The ratios of physician anesthesiologists to OB/GYN physicians vary substantially between states.
 - Ratios range from 0.66 (ID) to 1.51 (NV).
- There is relatively little variation in the ratios of physician anesthesiologists to GI physicians, Other Surgeons, and Total Surgeons between states.
 - **Idaho** is the exception, which has significantly lower ratios of anesthesiology workforce to surgical workforce (across total and all subspecialties; based on NPI data).
- **Nevada** has the highest ratio of physician anesthesiologists to Total Surgeons in both datasets.
- **Idaho** has the lowest ratio of physician anesthesiologists to Total Surgeons in both datasets.

³For purposes of this report, “surgical” also includes OB/GYN physicians and gastroenterologists.

TABLE 4
ANESTHESIOLOGY AND SURGICAL WORKFORCE RATIOS BASED ON NPI AND AMA DATASETS

State	Ratios of Anesthesiologists to Surgeons Based on NPI Data, 2015				Ratios of Anesthesiologists to Surgeons Based on AMA Data*, 2013			
	GI [§]	OB/GYN	Other Surgeons [†]	TOTAL	GI [§]	OB/GYN	Other Surgeons [†]	TOTAL
Alaska	4.18	0.93	0.33	0.23	6.33	1.12	0.37	0.27
Arizona	3.85	1.36	0.44	0.31	3.86	1.35	0.47	0.32
California	3.51	1.19	0.42	0.28	3.73	1.11	0.39	0.27
Colorado	3.95	1.27	0.46	0.31	4.35	1.15	0.43	0.29
Hawaii	3.45	0.83	0.33	0.22	3.61	0.79	0.31	0.21
Idaho	2.02	0.66	0.20	0.14	2.71	0.69	0.21	0.15
Montana	5.34	1.44	0.38	0.29	5.08	1.35	0.35	0.26
Nevada	4.65	1.51	0.52	0.36	4.65	1.28	0.51	0.34
New Mexico	3.94	0.96	0.37	0.25	3.38	0.95	0.35	0.24
Oregon	3.49	1.24	0.40	0.28	3.82	1.11	0.36	0.26
Texas	3.61	1.19	0.44	0.29	4.08	1.12	0.42	0.29
Utah	4.49	1.42	0.46	0.32	5.05	1.28	0.42	0.30
Washington	3.36	1.48	0.45	0.31	3.80	1.29	0.41	0.29
Wyoming	4.43	0.86	0.29	0.21	4.58	0.90	0.29	0.21
Western Caucus	3.62	1.22	0.42	0.29	3.92	1.14	0.40	0.28
Other Caucuses	2.74	1.04	0.34	0.24	3.06	1.02	0.34	0.24
Total U.S.	2.97	1.09	0.37	0.25	3.29	1.06	0.36	0.25

*Includes physicians who self-reported as being involved in patient care activity.

§Gastroenterology

†Other Surgeons include the following surgical specialties: Colon and Rectal Surgery, General Surgery, Neurological Surgery, Ophthalmology, Orthopedic Surgery, Otolaryngology, Plastic Surgery, Thoracic Surgery, Urology, and Transplant Surgery.

Sources: Medicare National Plan & Provider Enumeration System (NPPES) and American Medical Association's *Physician Characteristics and Distribution in the US (2015 edition)*. Calculations by ASA Health Policy Research Department.

WESTERN CAUCUS PAIN MEDICINE* WORKFORCE PROFILE

TABLE 5 profiles the pain medicine workforce based on NPI data. Key observations are provided below.

- Anesthesia pain physicians and pain medicine physicians in the Western Caucus states account for 28.4 and 27.7 percent of their respective total workforces in the U.S.
- The Western Caucus has a lower ratio of anesthesia pain physicians, pain medicine physicians, and total pain physicians to population than the rest of the U.S.
 - They have a similar ratio of anesthesia pain physicians to pain medicine physicians as the rest of the U.S.
- There is relatively high variation between states in the ratio of anesthesia pain physicians to pain medicine physicians.
 - Ratios range from 0.57 (MT) to 6.00 (HI).
- There is relatively little variation between states in ratios of pain physicians per population (total and across both subspecialties).
 - **Hawaii** is the exception, which has substantially lower ratios of pain medicine physicians and total pain physicians to population than the rest of the Western Caucus.
- **Wyoming** was the only state with a percentage decrease in anesthesia pain physicians between December 2012 and January 2015.
- **Hawaii** was the only state with a percentage decrease in pain medicine physicians between December 2012 and January 2015.
- **Arizona** had an exceptionally high percentage increase in pain medicine physicians between December 2012 and January 2015.

*NOTE: For purposes of this report, the Pain Medicine workforce is based on the following primary NPI taxonomies: **Pain Medicine** (likely not an anesthesiologist: 208VP0014X, Interventional Pain Medicine; and 208VP0000X, Pain Medicine) and **Anesthesia Pain** (207LP2900X, Anesthesiology-Pain).

TABLE 5
PAIN MEDICINE WORKFORCE BASED ON NPI DATASET, 2013

State	Number of Professionals		25-month Change (%) [†]		Ratio of Anesthesia Pain to Pain Medicine	Number per 100,000 Population		
	Anesthesia Pain	Pain Medicine	Anesthesia Pain	Pain Medicine		Anesthesia Pain	Pain Medicine	Total*
Alaska	7	6	0.00	0.00	1.17	0.95	0.82	1.77
Arizona	60	55	11.11	61.77	1.09	0.91	0.83	1.74
California	315	200	9.38	9.29	1.58	0.82	0.52	1.34
Colorado	33	23	10.00	15.00	1.43	0.63	0.44	1.06
Hawaii	6	1	50.00	-50.00	6.00	0.43	0.07	0.50
Idaho	10	11	42.86	37.50	0.91	0.62	0.68	1.30
Montana	4	7	0.00	0.00	0.57	0.39	0.69	1.08
Nevada	36	16	16.13	23.08	2.25	1.29	0.57	1.86
New Mexico	18	8	0.00	0.00	2.25	0.86	0.38	1.25
Oregon	30	23	7.14	4.55	1.30	0.76	0.59	1.35
Texas	242	197	9.50	32.22	1.23	0.92	0.74	1.66
Utah	16	19	0.00	11.77	0.84	0.55	0.65	1.21
Washington	68	36	36.00	28.57	1.89	0.98	0.52	1.49
Wyoming	2	2	-33.33	0.00	1.00	0.34	0.34	0.69
Western Caucus	847	604	0.11	0.21	1.40	0.84	0.60	1.44
Other Caucuses	2,132	1,574	0.12	0.19	1.35	0.99	0.73	1.72
Total U.S.	2,979	2,178	0.12	0.19	1.37	0.94	0.69	1.63

*For purposes of this report, the Pain Medicine workforce is based on the following primary NPI taxonomies: **Pain Medicine** (likely not an anesthesiologist: 208VP0014X, Interventional Pain Medicine; and 208VP0000X, Pain Medicine) and **Anesthesia Pain** (207LP2900X, Anesthesiology-Pain).

[†]Based on data for December 2012 and January 2015.

[‡]Total may not foot due to rounding.

Sources: Workforce data from Medicare National Plan & Provider Enumeration System (NPPES). Population data from U.S. Census Bureau (estimates for July 2013). Calculations by ASA Health Policy Research Department.

RAND STUDY ON THE ANESTHESIOLOGIST WORKFORCE IN 2013

In January 2013, ASA commissioned RAND to conduct a survey of the anesthesia workforce as a follow-up to the 2007 RAND report. The 2013 final report was released on May 30, 2014.

- There were approximately 6,800 responses, and a response rate of 25.5 percent.
 - In 2007, the response rate was below 22%.
- The survey included 49 items on a range of topics, including:
 - Employer and facility arrangements
 - Compensation
 - Time use
 - Future plans
 - Indicators of shortage

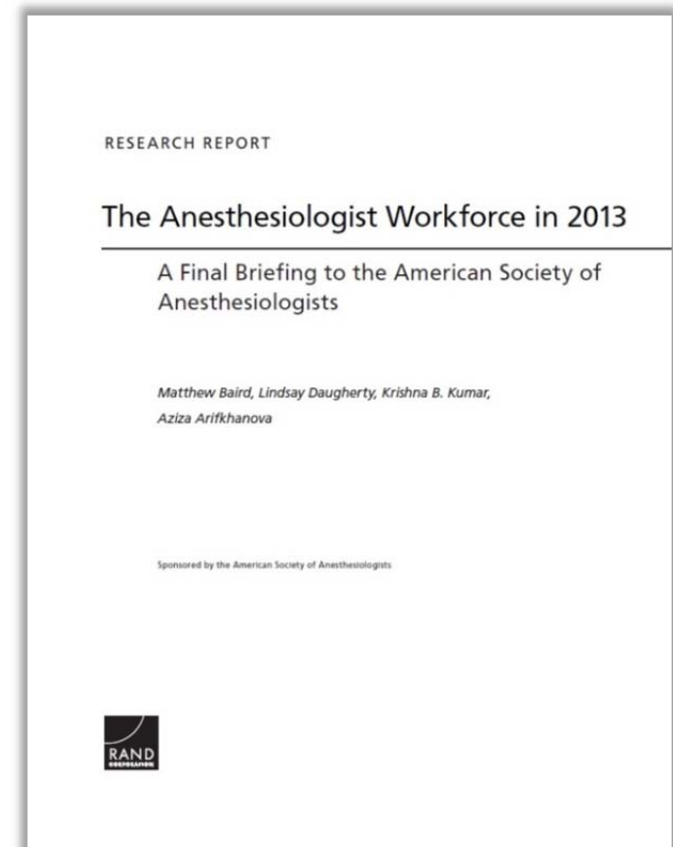
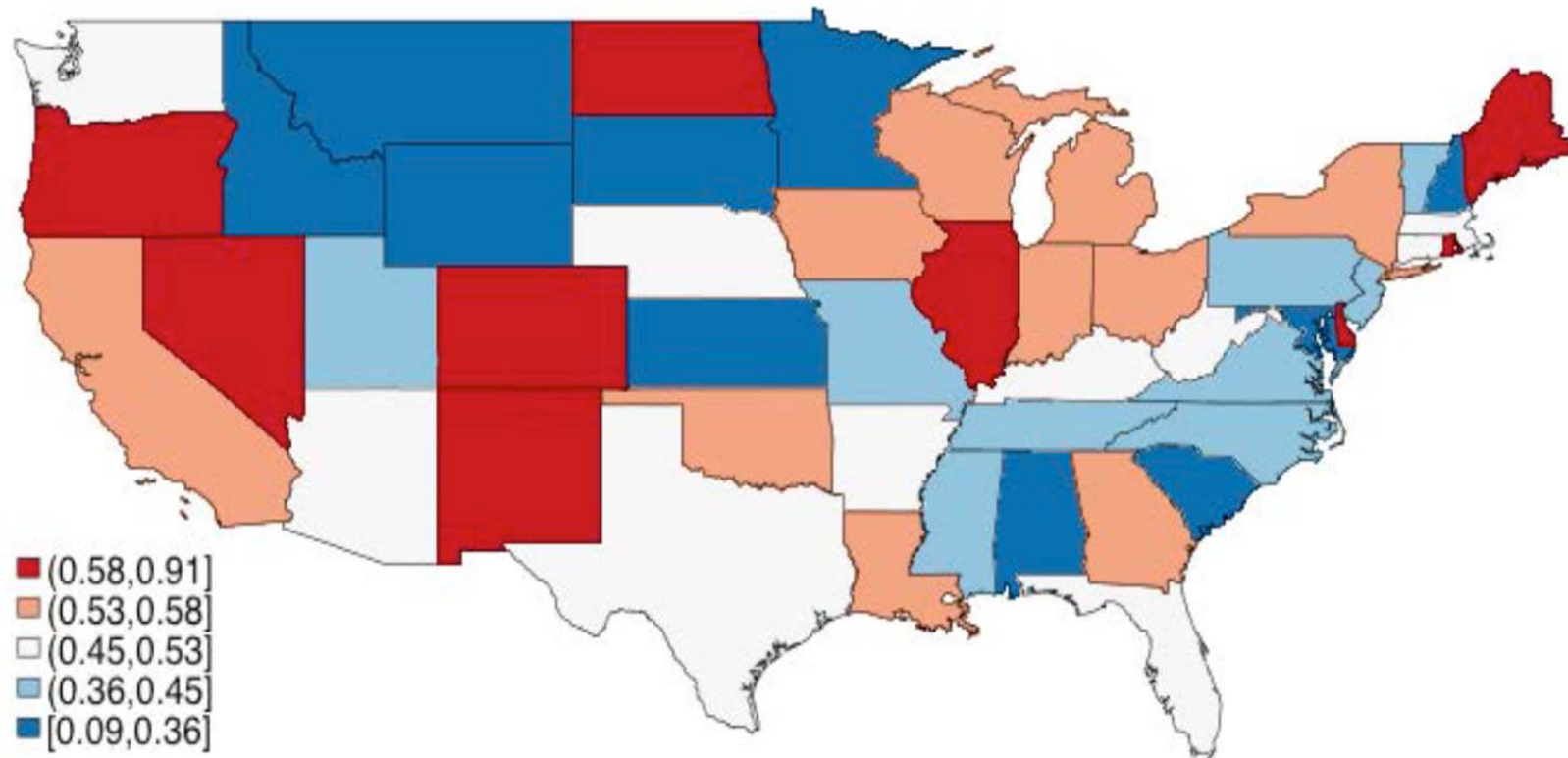


FIGURE 6

PROPORTION OF ANESTHESIOLOGISTS REPORTING A NEED FOR MORE ANESTHESIOLOGISTS* BY STATE
From 2014 RAND Research Report: *The Anesthesiologist Workforce in 2013*



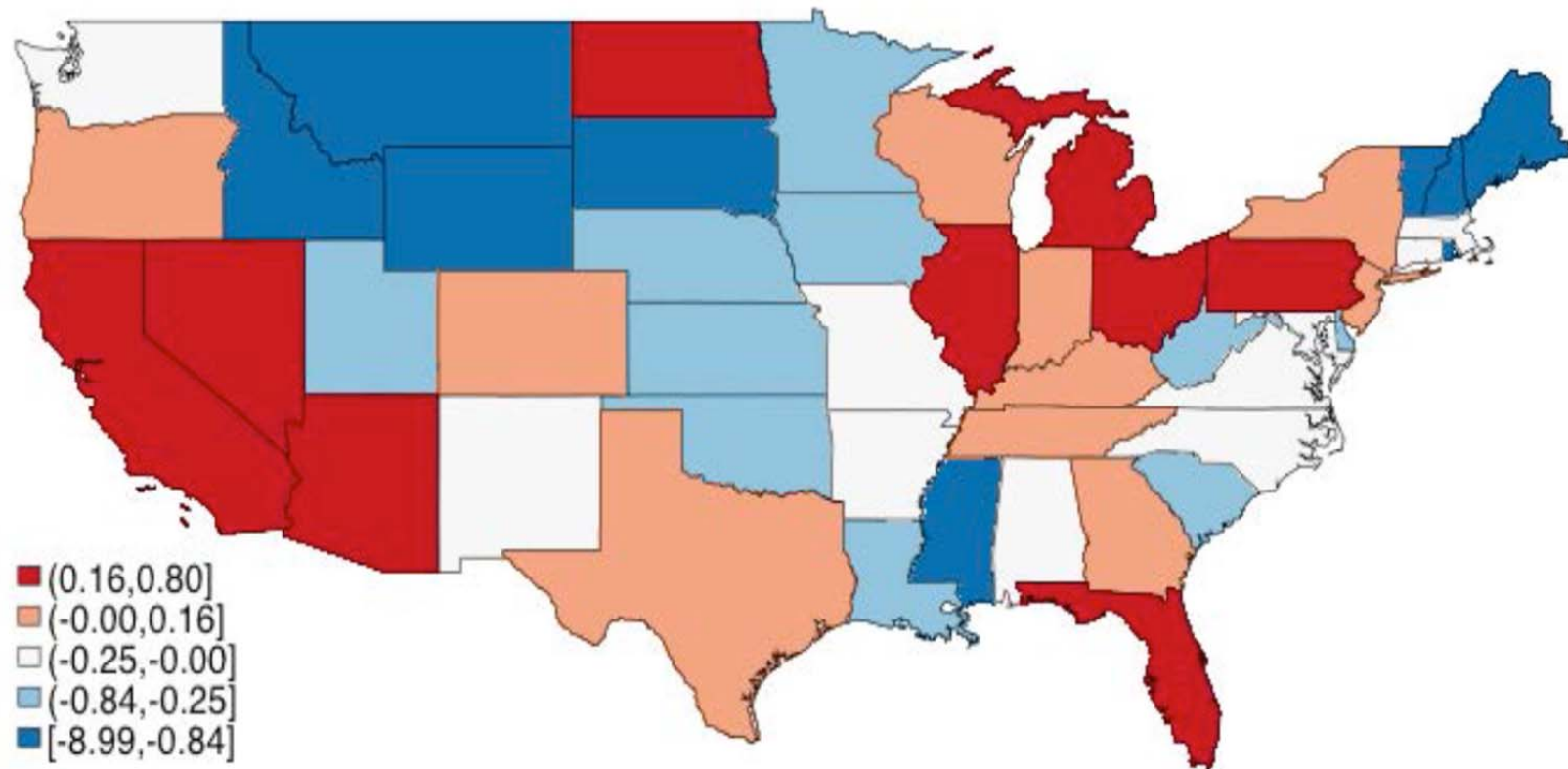
In the legend above, square brackets indicate that the endpoint number is included in the range; parentheses indicate that the endpoint is not included in the range.

*Defined as respondents who reported “My facility would prefer more anesthesiologists to cover current demand.”

Source: The RAND Corporation: *The Anesthesiologist Workforce in 2013*. RAND Research Report 2014.
[http://www.rand.org/pubs/research_reports/RR650.html]

FIGURE 7

SHORTAGE OF ANESTHESIOLOGISTS BY STATE
 From 2014 RAND Research Report: *The Anesthesiologist Workforce in 2013*



NOTES: Based on results from a survey conducted by RAND in April and May of 2013. The numbers in the bracket represent the shortage of anesthesiologists divided by the total number of anesthesiologists in the state (full time equivalents). RAND aggregated a series of shortage indicators from their survey (e.g. facility prefers more anesthesiologists, number of open anesthesiologist positions, elasticity of labor supply, change in wages) into a single shortage variable which they used to estimate the probability that a state is in shortage. Dark red states have a shortage, while darker blue states have a greater surplus. In the legend, square brackets indicate that the endpoint number is included in the range; parentheses indicate that the endpoint is not included in the range.

Source: The RAND Corporation: *The Anesthesiologist Workforce in 2013*. RAND Research Report 2014.
[\[http://www.rand.org/pubs/research_reports/RR650.html\]](http://www.rand.org/pubs/research_reports/RR650.html)

Health Policy Research Department and Supplemental Information

The ASA Health Policy Research Department (HPRD) will provide regular updates to the caucus workforce summaries. If you have any questions or feedback regarding this inaugural report or the data upon which it is based, please email an HPRD staff member listed below or send your comments, suggestions and questions to ask.HPR@asahq.org. Additional anesthesia workforce data may be available through state medical boards and societies. HPRD encourages ASA members to reach out to these organizations to identify available resources.

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**Additional references for selected
supplemental workforce
information are provided
on the following page.**

For information about other ongoing HPR projects, visit:

<http://www.asahq.org/resources/quality-improvement/health-policy-research/hpr-projects>

To view HPR Policy Briefs, NEWSLETTER Articles, Reports and other documents, visit:

<http://www.asahq.org/resources/quality-improvement/health-policy-research/hpr-resources>

Selected Additional Workforce References

Brief Description	Reference
ACGME Resource Book	Accreditation Council for Graduate Medical Education: ACGME Data Resource Book, Academic Year 2013-2014. 2014: Chicago, IL.
AAMC: Two reports	Association of American Medical Colleges (www.aamc.org/data/workforce) (1) 2013 State Physician Workforce Data Book. 2013: Washington, DC. (2) Recent Studies and Reports on Physician Shortages in the US. 2012: Washington, DC.
Example of state analysis: CA	California HealthCare Foundation (www.chcf.org/publications/2014/03/california-physicians) California Physicians: Surplus or Scarcity? 2014: Oakland, CA.
JAMA article	Cooper RA: Unraveling the physician supply dilemma. JAMA 2013;310(18):1931-2.
Anesthesia job postings	GasWork.com (www.gaswork.com/section/Anesthesiologist)
Example of state analysis: MA	Massachusetts Medical Society. (www.massmed.org/workforce2013) 2013 MMS Physician Workforce Study.
Article by ASA member	Schubert A, Eckhout GV, Ngo AL, Tremper KK, Peterson MD: Status of the anesthesia workforce in 2011: Evolution during the last decade and future outlook. Anesthesia and Analgesia 2012; 115(2):407-27.
Resource and example of state analysis: NY	State University of New York at Albany Center for Health Workforce Studies (http://chws.albany.edu) New York Physician Supply and Demand through 2030. 2009: Albany, NY.
Resource: BLS	United States Bureau of Labor Statistics (www.bls.gov).
HRSA report on methodology in workforce studies	United States Department of Health and Human Services, Health Resources and Services Administration, Council on Graduate Medical Education Resource Paper: Evaluation of Specialty Physician Workforce Methodologies. 2000: Washington, DC.
HRSA report noting shortages	United States Department of Health and Human Services, Health Resources and Services Administration: Physician Supply and Demand: Projections to 2020. 2006: Washington, DC.
Resource	University of North Carolina Cecil G. Sheps Center for Health Services Research (www.healthworkforce.unc.edu).
Example of state analysis: UT	Utah Medical Education Council (www.utahmec.org) Utah's Physician Workforce, 2012: A Study on the Supply and Distribution of Physicians in Utah. 2012.
State medical boards data	Young A, Chaudhry HJ, Rhyne J, Dugan M: A census of actively licensed physicians in the United States, 2010. Journal of Medical Regulation 2011; 96(4):10-20.

APPENDIX A
DESCRIPTIONS OF DATA SOURCES

DESCRIPTIONS OF DATA SOURCES

NPPES Downloadable File

(<https://nppes.cms.hhs.gov>)

NOTE: ASA HPRD has monthly data beginning December 2012

Established as a standard in 2004, the National Provider Identifier (NPI) is a 10-digit unique identification number assigned to health care providers created to improve electronic transmission of health information. NPI identifiers are assigned, maintained and updated using the National Plan & Provider Enumeration System (NPPES) which disseminates the NPPES Downloadable File. Downloadable files are available as full replacement monthly files or weekly incremental files.

NPI Taxonomies used for this report: (The professional's primary taxonomy was used to assign the specialty.)

Anesthesiologist Assistant (367H00000X), **Anesthesiology Pain** (207LP2900X), **Nurse Anesthetist** (367500000X), **Pain Medicine** (208VP0014X, 208VP0000X), **Physician Anesthesiologist** (207L00000X, 207LA0401X, 207LC0200X, 207LH0002X, 207LP30000X), **Surgeon** (208C00000X, 207T00000X, 207W00000X, 204E00000X, 207X00000X, 207XS0114X, 207XX0004X, 207XS0106X, 207XS0117X, 207XX0801X, 207XP3100X, 207Y00000X, 207YS0123X, 207YX0602X, 207YX0905X, 207YX0901X, 207YP0228X, 207YX0007X, 207YS0012X, 208200000X, 2082S0099X, 2082S0105X, 208600000X, 2086S0120X, 2086S0122X, 2086S0105X, 2086S0102X, 2086X0206X, 2086S0127X, 2086S0129X, 208G00000X, 204F00000X, 208800000X, 2088F0040X, 2088P0231X), **Gastroenterology** (207RG0100X, 2080P0206X), and **OB/GYN** (207V00000X, 207VB0002X, 207VF0040X, 207VX0201X, 207VG0400X, 207VM0101X, 207VX0000X).

Physician Compare National Downloadable File

(www.medicare.gov/physiciancompare)

NOTE: Only 2013 dataset is available as of Feb 2015.

The Physician Compare National Downloadable file contains data about physicians and other health care professionals currently enrolled in Medicare. This file is an extension of the Physician Compare website established by the Centers for Medicare & Medicaid Services (CMS) as required by the Section 10331 of the Patient Protection and Affordable Care Act (ACA) of 2010. This information is being made available to help consumers make informed decisions and to improve physician performance. The Physician Compare data was first made available to the public in March 2014 and is updated quarterly.

Specialties used for this report:

Anesthesiology, Certified Registered Nurse Anesthetist, and Anesthesiologist Assistant

American Medical Association Physician Masterfile

(www.ama-assn.org/go/masterfile)

Established in 1906, the AMA Physician Masterfile includes current and historical data for over 1.4 million physicians, residents and medical students in the U.S.. Physicians are presented with their Masterfile information and asked to submit updates through electronic or written methods. It is maintained by the AMA Division of Survey and Data Resources. The AMA aggregates data from the Physician Masterfile into *Physician Characteristics and Distribution in the U.S.*, an annual publication that includes a variety of data elements about national, international and state physician workforces.

Specialties used for this report:

Anesthesiology, Colon and Rectal Surgery, Gastroenterology, General Surgery, Neurological Surgery, Obstetrics & Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Plastic Surgery, Thoracic Surgery, and Transplant Surgery.

APPENDIX B
SUPPLEMENTAL DATA: POPULATION AND SURGICAL WORKFORCE

TABLE B1
2013 POPULATION BY STATE AND CHANGE FROM 2008

State	2013 Population			Five-Year Change in Population (%)†	
	Total	65+	%65+	Total	65+
Alaska	735,132	66,089	9.0	7.1	31.4
Arizona	6,626,624	1,018,862	15.4	1.9	18.1
California	38,332,521	4,791,731	12.5	4.3	16.5
Colorado	5,268,367	647,391	12.3	6.7	26.7
Hawaii	1,404,054	219,557	15.6	9.0	15.5
Idaho	1,612,136	223,142	13.8	5.8	22.5
Montana	1,015,165	164,768	16.2	4.9	20.0
Nevada	2,790,136	380,900	13.7	7.3	28.4
New Mexico	2,085,287	306,661	14.7	5.1	17.9
Oregon	3,930,065	607,395	15.5	3.7	20.5
Texas	26,448,193	2,966,167	11.2	8.7	20.0
Utah	2,900,872	283,635	9.8	6.0	15.2
Washington	6,971,406	951,084	13.6	6.4	21.3
Wyoming	582,658	78,689	13.5	9.4	19.9
Western Caucus	100,702,616	12,706,071	12.6	5.8	19.0
Other Caucuses	215,426,223	31,998,003	14.9	3.1	13.5
Total U.S.	316,128,839	44,704,074	14.1	4.0	15.0

†Based on U.S. Census population estimates for July 2008 and July 2013.

Source: U.S. Census Bureau (estimates for July 2013 and July 2008). Calculations by ASA Health Policy Research Department.

TABLE B2
SURGICAL WORKFORCE BASED ON NPI AND AMA DATA

State	Number of Surgeons Based on NPI Data, 2015				Number of Surgeons Based on AMA Data*, 2013			
	GI§	OB/GYN	Other Surgeons†	TOTAL	GI§	OB/GYN	Other Surgeons†	TOTAL
Alaska	22	99	277	398	15	85	256	356
Arizona	273	773	2,384	3,430	260	745	2,149	3,154
California	1,574	4,637	13,235	19,446	1,505	5,037	14,379	20,921
Colorado	234	729	1,991	2,954	194	736	1,981	2,911
Hawaii	51	211	527	789	49	223	577	849
Idaho	51	155	518	724	38	149	482	669
Montana	29	108	405	542	26	98	376	500
Nevada	82	253	727	1,062	78	283	716	1,077
New Mexico	65	268	687	1,020	68	241	650	959
Oregon	189	530	1,662	2,381	164	565	1,726	2,455
Texas	1,012	3,082	8,389	12,483	892	3,236	8,621	12,749
Utah	98	310	948	1,356	84	332	1,010	1,426
Washington	382	868	2,838	4,088	274	808	2,556	3,638
Wyoming	14	72	211	297	12	61	187	260
Western Caucus	4,076	12,095	34,799	50,970	3,659	12,599	35,666	51,924
Other Caucuses	11,268	29,664	89,753	130,685	9,937	29,776	88,192	127,905
Total U.S.	15,344	41,759	124,552	181,655	13,596	42,375	123,858	179,829

*Includes physicians who self-reported as being involved in patient care activity.

§Gastroenterology

†Other Surgeons include the following surgical specialties: Colon and Rectal Surgery, General Surgery, Neurological Surgery, Ophthalmology, Orthopedic Surgery, Otolaryngology, Plastic Surgery, Thoracic Surgery, Urology, and Transplant Surgery.

Sources: Medicare National Plan & Provider Enumeration System (NPPES) and American Medical Association's *Physician Characteristics and Distribution in the US (2015 edition)*. Calculations by ASA Health Policy Research Department.