

National and Regional Projections of Supply and Demand for Surgical Specialty Practitioners: 2013-2025

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National and Regional Projections of Supply and Demand for Surgical Specialty Practitioners: 2013-2025

Overview

This report presents national and regional projections of U.S. supply and demand for surgical specialty practitioners in 2025, with 2013 data serving as baseline. Projections were made using the Health Resources and Services Administration's (HRSA) Health Workforce Simulation Model (HWSM), an integrated microsimulation model that estimates supply and demand for health care workers in multiple professions and care settings.¹ Baseline demand for all surgical specialty practitioners was assumed to be equal to 2013 supply, consistent with standard workforce research methodology for analyses like these where there are no consistent national/regional data sources available to estimate base year shortages or surpluses. All estimates are reported as full time equivalents (FTEs) rounded to the nearest tenth.

Practitioners considered in this report include physicians and physician assistants (PAs), and cover ten surgical specialties: general surgery, colon/rectal surgery, neurological surgery, ophthalmology, orthopedic surgery, cardiothoracic surgery, otolaryngology, plastic surgery, urology, and vascular surgery. Obstetric and gynecologic surgery has been omitted from this report because this specialty is included in the National Center's Women's Health Fact Sheet. Nurse Practitioners are not included in this report because they typically do not practice in these specialties.

Important limitations for these workforce projections include underlying model assumptions that health care delivery in the future (projected until 2025) will not change substantially from the way care was delivered in the base year (2013) and current rates of workforce participation and retirement will continue similarly into the future. Changes in any of these factors may

¹ A detailed description of the HWSM can be found in the technical documentation available at [HRSA: Health Workforce Analysis](#).

significantly impact both the supply and demand projections for the surgical specialty practitioners included in this report. The projections are also limited by the lack of data to adjust the baseline assumption that demand equals supply for any actual shortages or surpluses.

Key Findings

Surgical Specialty Physicians

- In 2025, the national supply of surgeons is projected to fall short of demand by 20,340 FTEs, with nine of the ten surgical specialties analyzed predicted to have national-level physician shortages. The only surgical specialty with a projected national surplus in 2025 is colon/rectal surgery (130 FTEs).
- Regionally, the South is projected to have the largest shortage of surgical specialty physicians in 2025, with a total deficit of 10,210 FTEs. The Midwest is projected to have a surgical specialty deficit of 7,040 FTE physicians in 2025, while the West is forecast to have a deficit of 5,330 FTEs. In the Northeast, the 2025 deficit equals 1,750 FTE physicians. In all four regions, the surgical specialty with the greatest shortage is ophthalmology.
- While all regions have overall deficits, there are some regions with an adequate supply of physicians in certain specialties. For example, in the Northeast, general surgeons, colon/rectal surgeons, and vascular surgeons are all expected to have surpluses in 2025, in spite of an overall regional deficit of 1,750 FTE surgical specialty physicians.

Surgical Specialty Physician Assistants

- In 2025, the national supply of surgical specialty PAs is projected to exceed demand by 13,990 FTEs with all modeled specialties projected to have national-level surpluses.
- Regional projections are congruent with national forecasts, with all four regions demonstrating overall PA surpluses in 2025 (Northeast: 3,940 FTEs; Midwest: 1,460 FTEs; South: 4,230 FTEs; and West: 4,310 FTEs). These figures suggest substantial growth in surgical specialty PA supply from baseline shortages in the Midwest (340 FTEs), South (1,070 FTEs), and West (350 FTEs).

Background

Demand for health providers,² including surgical specialists^{3, 4, 5} is expected to increase, primarily due to population aging and growth and, to a lesser extent, increased utilization of health care following the national expansion of health insurance coverage. Surgical specialists include physicians and PAs who provide pre-operative, operative, and post-operative care to patients who may require invasive or minimally invasive procedures to treat injuries, diseases, congenital anomalies, and other conditions.⁶

To predict the extent to which future surgical specialty supply will meet demand, HRSA utilized the HWSM to examine ten surgical specialties, both nationally and regionally.⁷ While the nuances of modeling supply and demand differ for individual health professions, the basic framework remains the same. The HWSM assumes that demand equals supply in the base year (2013). For supply modeling, the major prediction components (beyond common labor-market factors like unemployment) include characteristics of the existing workforce in a given occupation; new entrants to the workforce (e.g., newly trained workers); and workforce decisions (e.g., retirement and hours worked patterns). For demand modeling, the major components include population demographics, health care use patterns (including the influence of expanded insurance coverage), and staffing for health care services (translated into FTEs). Over the

² Dall TM, Gallo PD, Chakrabarti R, West T, Semilla AP, Storm, MV. 2013. An Aging Population and Growing Disease Burden Will Require A Large and Specialized Health Care Workforce By 2025. *Health Affairs*, 32: 2013-2020. [An Aging Population And Growing Disease Burden Will Require A Large And Specialized Health Care Workforce By 2025.](#)

³ Decker MR, Bronson NW, Greenberg CC, Dolan JP, Kent KC, Hunter JG. The general surgery job market: analysis of current demand for general surgeons and their specialized skills. *Journal of the American College of Surgeons*. 2013; 217(6):1133-1139. [An Aging Population And Growing Disease Burden Will Require A Large And Specialized Health Care Workforce By 2025.](#)

⁴ Etzioni DA, Beart RW, Madoff RD, Ault GT. Impact of the aging population on the demand for colorectal procedures. 2009. *Diseases of the Colon & Rectum*. 2009; 52(4): 583-590. [Impact of the aging population on the demand for colorectal procedures.](#)

⁵ Growing demand for eye care services may highlight shortages of ophthalmologists. *Healio*, Ophthalmology. Ocular Surgery News, U.S. Edition. March 10, 2010. [Growing demand for eye care services may highlight shortage of ophthalmologists.](#)

⁶ American College of Surgeons. 2016. A Guide to Surgical Specialists. Accessed 5/19/2016. Available from: [A Guide to Surgical Specialists.](#)

⁷ This model uses a microsimulation approach where supply is projected based on the simulation of career choices of individual health workers. Demand for health care services is simulated for a representative sample of the current and future U.S. population based on each person's demographic and socioeconomic characteristics, health-related behavior, and health risk factors that affect their health care utilization patterns. For more information on data and methods, please see the technical documentation available at [HRSA: Health Workforce Analysis.](#)

projection period, the HWSM assumes that base year patterns of staffing and health care delivery remain unchanged within each demographic group.

Results

Surgical Specialty Physicians

Exhibit 1 presents national estimates for 10 physician surgical specialties. At baseline, there were an estimated 113,560 FTE surgical specialty physicians, with the greatest numbers practicing in general surgery (28,190 FTEs), orthopedic surgery (25,420 FTEs), and ophthalmology (18,470 FTEs).

In 2025, projected supply and demand for the 10 modeled surgical specialties show an overall deficit of 24,340 FTE surgeons, with 9 surgical specialties displaying shortages. The greatest deficits are predicted for ophthalmology (6,180 FTEs), orthopedic surgery (5,050), urology (3,630 FTEs) and general surgery (2,970 FTEs). Colon/rectal surgery is the only surgical specialty with an expected 2025 surplus at the national level (130 FTEs).

Exhibit 1: National Estimates of Supply and Demand of Surgical Specialty Physicians, 2013 -2025

Specialty ^a	Baseline Estimates (FTEs, 2013)	Projections (FTEs, 2025)		
	Supply = Demand ^b	Supply	Demand	Difference ^c
General Surgery	28,190	30,760	33,730	-2,970
Colon/Rectal Surgery	1,710	2,120	1,990	130
Neurological Surgery	5,160	4,930	6,130	-1,200
Ophthalmology	18,470	16,510	22,690	-6,180
Orthopedic Surgery	25,420	24,350	29,400	-5,050
Cardiothoracic Surgery	4,490	3,600	5,410	-1,810
Otolaryngology	9,440	9,190	10,810	-1,620
Plastic Surgery	7,720	7,280	8,770	-1,490
Urology	9,910	8,830	12,460	-3,630
Vascular Surgery	3,050	3,410	3,930	-520
Total	113,560	110,980	135,320	-24,340

Notes: Numbers may not sum to totals due to rounding. All estimates are rounded to the nearest 10.

^aSpecialties reflect physicians' primary reported discipline.

^bSupply and demand for 2013 surgical specialty physicians were assumed to be in approximate equilibrium at the national level.

^cDifference = (supply – demand); a negative difference reflects a shortage (i.e., supply is less than demand), while a positive difference indicates a surplus (i.e., supply is greater than demand).

Supply and demand for the 10 surgical specialties were also examined for the 4 U.S. Census Bureau regions (Appendix A, Exhibit A-1). Baseline supply and demand for regional projections are estimated independently and are not assumed to be in equilibrium. Regional

supply was determined according to the state where physicians practiced. Regional demands were estimated by prorating the national demand for health care services based on regional population characteristics (e.g., age, sex, household income, insurance status, health status, etc.) and applying the national staffing ratios. Thus regional demand projections account for variations in demographic, economic, and health risk factors between the regions, but because these do not account for regional differences in staffing and service delivery, they indicate the number of providers required by the regions to achieve a national level of care. As seen in Exhibit 2, the greatest projected surgical specialty deficits in 2025 occur in the South (10,210 FTEs) and Midwest (7,040 FTEs), with the West (5,330 FTEs), and Northeast (1,750 FTEs) also showing overall shortages. These total deficits are broken down further to assess deficits and surpluses among the 10 specialties with each region. For example, in the Northeast, general surgery (360 FTEs), colon/rectal surgery (240 FTEs), and vascular surgery (50 FTEs) all show surpluses in 2025, despite an overall deficit of surgical specialists (1,750 FTEs).

Exhibit 2: Regional Estimates of Supply and Demand of Surgical Specialty Physicians, 2013 -2025

Region ^a and Specialty ^b	Baseline Estimates (FTEs, 2013)			Projections (FTEs, 2025)		
	Supply	Demand	Difference ^c	Supply	Demand	Difference ^c
Northeast						
General Surgery	6,040	5,160	880	6,010	5,650	360
Colon/Rectal Surgery	440	300	140	560	320	240
Neurological Surgery	980	890	90	890	970	-80
Ophthalmology	4,180	3,560	620	3,400	4,010	-610
Orthopedic Surgery	5,010	4,890	120	4,420	5,210	-790
Cardiothoracic Surgery	980	860	120	760	960	-200
Otolaryngology	1,830	1,820	10	1,690	1,930	-240
Plastic Surgery	1,580	1,450	130	1,400	1,520	-120
Urology	2,150	1,820	330	1,740	2,100	-360
Vascular Surgery	760	590	170	740	690	50
Total	23,950	21,340	2,610	21,610	23,360	-1,750
Midwest						
General Surgery	5,970	6,330	-360	5,900	6,970	-1,070
Colon/Rectal Surgery	410	380	30	510	410	100
Neurological Surgery	1,090	1,160	-70	950	1,270	-320
Ophthalmology	3,700	4,200	-500	3,050	4,760	-1,710
Orthopedic Surgery	5,480	5,900	-420	4,870	6,320	-1,450
Cardiothoracic Surgery	980	960	20	750	1,060	-310
Otolaryngology	1,900	2,170	-270	1,700	2,300	-600
Plastic surgery	1,280	1,710	-430	1,110	1,810	-700
Urology	1,990	2,160	-170	1,690	2,510	-820
Vascular Surgery	630	680	-50	640	800	-160
Total	23,430	25,650	-2,200	21,170	28,210	-7,040

Region ^a and Specialty ^b	Baseline Estimates (FTEs, 2013)			Projections (FTEs, 2025)		
	Supply	Demand	Difference ^c	Supply	Demand	Difference ^c
South						
General Surgery	10,090	10,750	-660	11,390	13,140	-1,750
Colon/Rectal Surgery	570	670	-100	700	790	-90
Neurological Surgery	1,960	2,030	-70	1,900	2,460	-560
Ophthalmology	6,370	6,700	-330	5,840	8,380	-2,540
Orthopedic Surgery	8,960	9,260	-300	8,860	10,940	-2,080
Cardiothoracic Surgery	1,650	1,650	0	1,340	2,010	-670
Otolaryngology	3,520	3,330	190	3,460	3,880	-420
Plastic Surgery	2,880	2,850	30	2,770	3,270	-500
Urology	3,690	3,700	-10	3,360	4,730	-1,370
Vascular Surgery	1,070	1,170	-100	1,310	1,540	-230
Total	40,760	42,110	-1,350	40,930	51,140	-10,210
West						
General Surgery	6,090	5,950	140	7,470	7,970	-500
Colon/Rectal Surgery	290	360	-70	350	470	-120
Neurological Surgery	1,130	1,080	50	1,190	1,440	-250
Ophthalmology	4,210	4,010	200	4,220	5,530	-1,310
Orthopedic Surgery	5,970	5,360	610	6,200	6,930	730
Cardiothoracic Surgery	890	1,020	-130	750	1,380	-630
Otolaryngology	2,190	2,120	70	2,350	2,710	-360
Plastic Surgery	1,980	1,730	250	2,010	2,170	-160
Urology	2,080	2,230	-150	2,040	3,130	-1,090
Vascular Surgery	590	620	-30	720	900	-180
Total	25,420	24,480	940	27,300	32,630	-5,330

Notes: Numbers may not sum to totals due to rounding. All estimates are rounded to the nearest 10.

^a Baseline supply and demand are not in equilibrium in the regions because regional demands were estimated by prorating the national demand for surgical services based on regional population characteristics (e.g., age, sex, household income, insurance status, health status, etc.).

^b Specialties reflect the physicians' primary reported discipline.

^c Difference = (supply – demand); a negative difference reflects a shortage (i.e., supply is less than demand), while a positive difference indicates a surplus (i.e., supply is greater than demand).

Surgical Specialty Physician Assistants

National provider supply and demand for the eight modeled PA surgical specialties are detailed in Exhibit 3. At baseline, over half of the estimated 20,230 FTE surgical PAs were orthopedic surgery specialists (10,440 FTEs). Again, modeling assumptions assume approximate equilibrium between provider supply and demand at baseline.

Nationally, 2025 surgical specialty PA supply is projected to be greater than demand by 13,990 FTEs. All 8 surgical specialties show a surplus of surgical specialty PAs, ranging from 30 FTEs for ophthalmology to 7,590 FTEs for orthopedic surgery.

Exhibit 3: National Estimates of Supply and Demand of Surgical Specialty Physician Assistants (PAs), 2013-2025

Specialty ^a	Baseline Estimates (FTEs, 2013)	Projections (FTEs, 2025)		
	Supply = Demand ^b	Supply	Demand	Difference ^c
General Surgery	2,960	5,660	3,540	2,120
Neurological Surgery	2,290	4,290	2,720	1,570
Ophthalmology	80	130	100	30
Orthopedic Surgery	10,440	19,660	12,070	7,590
Otolaryngology	1,020	1,890	1,170	720
Plastic Surgery	730	1,380	820	560
Urology	1,610	2,910	2,030	880
Vascular Surgery	1,100	1,930	1,410	520
Total	20,230	37,850	23,860	13,990

Notes: Numbers may not sum to totals due to rounding. All estimates are rounded to the nearest 10.

^aSpecialties reflect PAs' primary reported discipline. PAs were not modeled for cardiothoracic and colon/rectal surgical specialties due to the limited data available for these disciplines.

^bSupply and demand for 2013 surgical specialty PAs were assumed to be in approximate equilibrium at the national level.

^cDifference = (supply – demand); a negative difference reflects a shortage (i.e., supply is less than demand), while a positive difference indicates a surplus (i.e., supply is greater than demand).

Regional figures provide a different picture (Exhibit 4). Baseline estimates show shortages of PA surgical specialists in three regions: the Midwest (340 FTEs), the South (1,070 FTEs), and the West (350 FTEs). The Northeast is estimated to have equilibrium or a surplus at baseline in all modeled PA specialties, while the Midwest has no baseline surpluses of surgical PAs, and the South and West have equilibrium or surpluses at baseline in two surgical specialties (ophthalmology and vascular surgery in the South; ophthalmology and orthopedic surgery in the West).

Trending forward, in 2025 equilibrium or surpluses of surgical PAs are estimated for nearly all specialties across all regions with the exception of a small deficit in the Midwest for ophthalmology (10 FTEs). The largest projected surpluses are expected to occur in orthopedic surgery for all regions, followed by general surgery in the Northeast (990 FTEs), neurological surgery in the South (530 FTEs) and Northeast (500 FTEs), and general surgery in the West (500 FTEs).

Exhibit 4: Regional Estimates of Supply and Demand of Surgical Specialty Physician Assistants (PAs), 2013 -2025

Region ^a and Specialty ^b	Baseline Estimates (FTEs, 2013)			Projections (FTEs, 2025)		
	Supply	Demand	Difference ^c	Supply	Demand	Difference ^c
Northeast						
General Surgery	1,130	540	590	1,580	590	990
Neurological Surgery	640	400	240	930	430	500
Ophthalmology	20	20	0	20	20	0
Orthopedic Surgery	2,500	2,010	490	3,760	2,140	1,620
Otolaryngology	270	200	70	410	210	200
Plastic Surgery	210	130	80	310	140	170
Urology	490	300	190	650	340	310
Vascular Surgery	310	210	100	400	250	150
Total	5,570	3,810	1,760	8,060	4,120	3,940
Midwest						
General Surgery	620	660	-40	980	730	250
Neurological Surgery	410	510	-100	680	560	120
Ophthalmology	10	20	-10	10	20	-10
Orthopedic Surgery	2,370	2,430	-60	3,510	2,600	910
Otolaryngology	200	230	-30	300	250	50
Plastic Surgery	120	160	-40	210	170	40
Urology	340	350	-10	490	410	80
Vascular Surgery	190	240	-50	310	290	20
Total	4,260	4,600	-340	6,490	5,030	1,460
South						
General Surgery	760	1,140	-380	1,760	1,390	370
Neurological Surgery	820	900	-80	1,620	1,090	530
Ophthalmology	30	20	10	60	20	40
Orthopedic Surgery	3,340	3,810	-470	6,920	4,500	2,420
Otolaryngology	340	360	-20	660	420	240
Plastic Surgery	240	270	-30	460	300	160
Urology	500	600	-100	1,030	770	260
Vascular Surgery	430	430	0	780	570	210
Total	6,460	7,530	-1,070	13,290	9,060	4,230
West						
General Surgery	450	620	-170	1,340	840	500
Neurological Surgery	420	480	-60	1,070	640	430
Ophthalmology	20	20	0	30	20	10
Orthopedic Surgery	2,240	2,200	40	5,460	2,850	2,610
Otolaryngology	210	230	-20	520	290	230
Plastic Surgery	150	160	-10	390	200	190
Urology	280	360	-80	740	510	230
Vascular Surgery	170	220	-50	440	330	110
Total	3,940	4,290	-350	9,990	5,680	4,310

Notes: Numbers may not sum to totals due to rounding. All estimates are rounded to the nearest 10.

^a Baseline supply and demand are not in equilibrium in the regions because regional demands were estimated by prorating the national demand for surgical services based on regional population characteristics (e.g., age, sex, household income, insurance status, health status, etc.).

^b Specialties reflect PAs' primary reported discipline. PAs were not modeled for cardiothoracic and colon/rectal surgical specialties due to the limited data available for these disciplines.

^c Difference = (supply – demand); a negative difference reflects a shortage (i.e., supply is less than demand), while a positive difference indicates a surplus (i.e., supply is greater than demand).

Strengths and Limitations

The HWSM used to develop the supply and demand projections presented in this report relies on a microsimulation approach that replaces the cohort-based workforce models used historically by HRSA and others.⁸ A microsimulation approach was chosen for the HWSM because of the flexibility and granularity that this approach provides to simulate potential changes in health care delivery patterns.

HWSM is built to reflect the current patterns of health care utilization, service delivery, and labor market activities in the United States and its regions. In addition, it must be recognized that future supply and demand may be shaped by changes in a number of factors that include:

- Propensity to use health care services by demographic groups or insurance status
- Specialty care affordability
- Scope of practice regulations
- Technological advances and innovations in specialty care

As these factors change, the relationship between provider supply and demand will also change. As such, results presented in this report are to be interpreted based on the assumptions underlying HWSM.⁹

Summary

This report is one in a series of HRSA reports on the nation's health workforce. These reports are intended to help provide an understanding of the current and future workforce supply in the context of a growing and aging population, together with increased insurance coverage.

⁸ Historically, supply has been modeled using a cohort approach with each cohort typically defined by age, sex, and occupation/specialty. Demand has historically been modeled by deriving provider-to-population ratios based on historical care use and delivery patterns, and then applying these ratios to subsets of the population defined by age group, sex, insurance status, and sometimes race and ethnicity.

⁹ This model uses a micro-simulation approach where supply is projected based on the simulation of career choices of individual health workers. Demand for health care services is simulated for a representative sample of the current and future U.S. population based on each person's demographic and socioeconomic characteristics, health-related behavior, and health risk factors that affect their health care utilization patterns. For more information on data and methods, please see [Technical Documentation for Health Resources Service Administration's Health Workforce Simulation Model](#)

National increases in demand for the 10 surgical specialties modeled in this report are due, in part, to an aging population, as well as increased health care utilization following expanded insurance coverage. Physician supply at the national level is expected to fall short of projected demand in 2025 for all surgical specialties except colon/rectal surgery. The greatest projected national deficit is in ophthalmology (6,180 FTEs). In total, the capability to meet demands across the surgical specialties will fall short by 24,340 physician FTEs, although the national surplus of PAs practicing in surgical specialties (13,990 FTEs) may help to increase physician productivity.

Regional deficits are similar to those at the national level: across all four regions, physician supply for the majority of surgical specialties is inadequate to meet future demand. Again, although not a complete solution to the surgical specialist shortage, PAs may help address gaps in supply and demand across the United States.

It should be reiterated that these projections reflect the HWSM's underlying assumptions about baseline supply and demand, and the findings must be interpreted in the context of those assumptions. For example, the HWSM assumes national-level equilibrium at baseline between supply and demand for all PA specialties in this report. However, if baseline supply for these specialties is less than baseline demand, then the reported surplus of PA specialists may be an overestimate, and the projected 2025 supply may be closer to equilibrium with the projected demand.

In the absence of more specific data, it is not possible at this time to derive estimates of either shortages or surpluses of surgical specialty providers. However, as surgical specialty workforce data become more available, it will be possible to improve the microsimulation model to more fully characterize surgical specialty provider supply and demand.

Appendix A: U.S. Census Bureau Regions

Exhibit A-1 lists the states associated with each of the U.S. Census Bureau regions. This categorization was used in the regional projections of primary care practitioner supply and demand presented in this report.

Exhibit A-1: U.S. Census Bureau Regions and Associated States

NORTHEAST	MIDWEST	SOUTH	WEST
Connecticut	Illinois	Alabama	Alaska
Maine	Indiana	Arkansas	Arizona
Massachusetts	Iowa	Delaware	California
New Hampshire	Kansas	District of Columbia	Colorado
New Jersey	Michigan	Florida	Hawaii
New York	Minnesota	Georgia	Idaho
Pennsylvania	Missouri	Kentucky	Montana
Rhode Island	Nebraska	Louisiana	Nevada
Vermont	North Dakota	Maryland	New Mexico
	Ohio	Mississippi	Oregon
	South Dakota	Oklahoma	Utah
	Wisconsin	North Carolina	Washington
		South Carolina	Wyoming
		Tennessee	
		Texas	
		Virginia	
		West Virginia	

Source: U.S. Census Bureau. 2015. Geographic Terms and Concepts: Census Divisions and Census Regions. Accessed 10/1/2015: [Geographic Terms and Concepts - Census Divisions and Census Regions](#).

About the Model

The results included in this report come from HRSA's Health Workforce Simulation Model (HWSM), an integrated health professions projection model that estimates current and future supply and demand for health care providers.

The supply component of the HWSM simulates workforce decisions for each provider type based on each individual's demographics and profession, along with the characteristics of the local or national economy and the labor market. The starting supply plus new additions to the workforce minus attrition provide an end-of-year supply projection, which then becomes the starting supply estimate for the subsequent year. This cycle is repeated through 2025. Supply data come from multiple sources: the 2013 American Medical Association Physician Masterfile, the 2013 National Commission on Certification of Physician Assistants Masterfile, 2013 National Provider Identification data, and Florida's 2011-2013 physician survey.

Demand projections for health care services in different care settings are produced by applying regression equations for individuals' health care use on the projected population. The current staffing patterns by care setting are then applied to forecast the future demand for surgical specialty physicians and physician assistants. The population database used to estimate demand consists of records of individual characteristics of a representative sample of the entire U.S. population derived from the 2013 American Community Survey, the 2011 and 2013 Behavioral Risk Factor Surveillance System, the Bureau of Labor Statistics' Occupational Employment Statistics, and other sources. Using the Census Bureau's projected population and the Urban Institute's state-level estimates of the impact of the Affordable Care Act on insurance coverage,^{10, 11} the HWSM simulates expected demographic, socioeconomic, health status, health risk and insurance status for future populations.

The HWSM makes projections at the state level which are then aggregated to regional and national levels. A detailed description of the HWSM can be found in the accompanying technical documentation available at [HRSA: Health Workforce Analysis](#).

¹⁰ Holahan, J. & Blumberg, L. 2010. How would states be affected by health reform? Timely analysis of immediate health policy issues. Accessed 10/1/2015: [How Would States Be Affected by Health Reform?](#)

¹¹ Holahan, J. 2014. The launch of the Affordable Care Act in selected states: Coverage expansion and uninsurance. Washington, DC: The Urban Institute. Accessed 10/1/2015: [The Launch of the Affordable Care Act in Selected States: Coverage Expansion and Uninsurance](#).