

Projecting the Supply of Non-Primary Care Specialty and Subspecialty Clinicians: 2010-2025

Anticipated changes in the national supply of physicians, advanced practice nurses¹ (APNs), and physician assistants (PAs) in 35 predefined non-primary care specialty and subspecialty fields are presented in this brief (see Table 1). Using the Clinician Specialty Supply Model (CSSDM) future labor supply changes attributable to the changing demographic composition of the future workforce are projected. All supply projections represent provider Full Time Equivalents (FTEs) active in patient care.

Key Findings

Increased physician supply across non-primary care fields of practice is projected for 2025, although there is substantial variation across fields.

- The supply of physician FTEs in all non-primary care fields is expected to grow overall by 21 percent between 2010 and 2025.
- Large growth is projected in some fields (physical medicine and rehabilitation, emergency medicine) while losses are projected in a few others (critical care medicine, occupational medicine, thoracic surgery).
- The *per capita* supply of physicians is projected to vary. Per capita declines are projected in the fields of cardiology, psychiatry and general surgery; whereas per capita growth is projected within the pediatric subspecialties and in obstetrics-gynecology.

The supply of non-primary care APNs is expected to grow more rapidly than physicians.

- Between 2010 and 2025, the supply of non-primary care APN FTEs is expected to grow by 141 percent overall, with growth anticipated in every field where these providers are represented. Changes in the non-primary care APN supply somewhat mirror those of physicians, with the greatest growth expected in the fields of physical medicine and rehabilitation, and emergency medicine.
- The *per capita* supply of APNs is projected to increase across all non-primary care specialties with the greatest increases expected in obstetrics-gynecology and pediatric subspecialties.

¹APNs included in this study are nurse practitioners (NPs), certified registered nurse anesthetists (CRNAs), and certified nurse midwives (CNMs).

- Because of the data sources used, the number of APNs working in 5 of 11 surgical specialties (colorectal surgery, ophthalmology, otolaryngology, plastic surgery, vascular surgery), and in 3 other fields of practice (pathology, preventive medicine, and radiation oncology) are unobtainable.

The supply of non-primary care PAs is also projected to grow more rapidly than physicians, but less than APNs.

- The supply of non-primary care PAs is projected to more than double by 2025, with high rates of growth anticipated in almost all fields of (non-primary care) practice. The anticipated changes in the supply of PAs by field parallels the changes seen with physicians, with particularly high levels of growth projected in the fields of physical medicine and rehabilitation, emergency medicine, and pediatric subspecialties.
- The *per capita* supply of PAs is projected to increase across all fields examined, with obstetrics-gynecology and the pediatric subspecialties expected to have the greatest increases.
- Because of the data sources used the number of PAs specializing in preventive medicine are unobtainable.

Background

Physicians, following graduation from medical school and before entering their clinical practice, generally complete *specialty* residency training in either primary care or non-primary care fields. For the latter, much of the training and subsequent focus of clinical practice is within a condition-specific subpopulation of patients. Physicians may then opt, after residency training, to complete additional *subspecialty* fellowship training within a concentrated (non-primary care) clinical area before entering practice. The focus of this report is on the physician workforce who are trained and practice in non-primary care specialties and subspecialties, and advanced practice nurses and physician assistants in these same fields.

Table 1. Non-primary care specialty and subspecialty fields of practice examined

Non-primary care medical specialties	Medical subspecialties	Surgical specialties	Surgical subspecialties
Anesthesiology	Allergy-Immunology	General Surgery	Colorectal Surgery
Dermatology	Cardiology	Neurological Surgery	Thoracic Surgery
Emergency Medicine	Critical Care Medicine	Ophthalmology	Vascular Surgery
Neurology	Endocrinology	Orthopedic Surgery	Other surgical subspecialties ²
Obstetrics-Gynecology	Gastroenterology	Otolaryngology	
Occupational Medicine	Hematology-Oncology	Plastic Surgery	
Pathology	Infectious Disease	Urology	
Physical Medicine and Rehabilitation	Nephrology Pediatric Subspecialties		
Preventive Medicine	Pulmonology		
Psychiatry	Rheumatology		
Radiation Oncology			
Radiology			
Other patient care ³			

Source: The American Board of Medical Specialties at http://www.abms.org/Who_We_Help/Physicians/specialties.aspx

Results

Trends in Provider Supply: Of the total of 771,900 U.S. physicians active in patient care in 2010, approximately 498,800 (65 percent of the total) are estimated to be practicing in non-primary care fields.

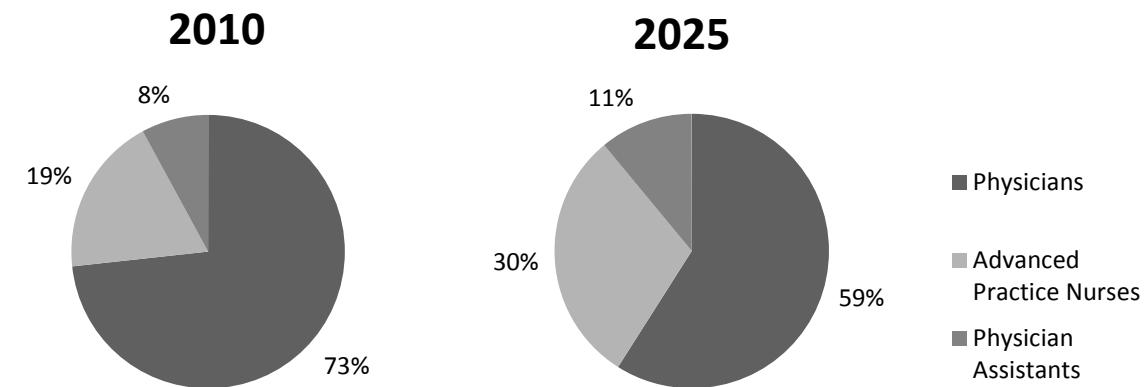
After accounting for differences in labor supply due to the changing demographic composition of the future providers (including the proportion in part-time roles), it is estimated that the supply of FTE non-primary care physicians in 2025 will increase by 21 percent (from 498,800 to 602,700 FTEs); that of APNs will increase by 141 percent (from 126,900 to 306,000 FTEs); and that of PAs will increase by 108 percent (from 52,500 to 109,300 FTEs).

As a result of the rapid growth in the supply of APNs and PAs, the composition of the non-primary care clinical workforce is expected to change in 2025 (Exhibit 1).

² This includes Abdominal Surgery, Critical care Surgery, Dermatologic Surgery, Head and Neck Surgery, Hand Surgery, Pediatric Surgery, Surgical Oncology, Traumatic Surgery, and Transplant Surgery.

³ The term “Other patient care” includes: Addiction Medicine, Epidemiology, Hospice and Palliative Medicine, Legal Medicine, Genetics, Medical Management, Nutrition, Clinical Pharmacology, Phlebology, and Pharmaceutical Medicine.

Exhibit 1: Composition of Non-Primary Care Specialty and Subspecialty Clinician Workforce in 2010 and 2025



Supply of Non-primary Care Specialty and Subspecialty Physicians: By 2025, physician FTE supply within focused (non-primary care) fields of practice is projected to increase by 24 percent in non-primary care medical specialties, 21 percent in medical subspecialties, and 14 percent in surgical fields. Despite these overall trends, the projected growth of physicians within certain specific fields is variable (Table 2). There are large growth increases in neurological surgery and otolaryngology, and declines predicted in thoracic surgery. Among the non-surgical fields, some remain largely stable in their supply (allergy-immunology, cardiology, and psychiatry) while others show high projected growth (the pediatric subspecialties, emergency medicine, and physical medicine and rehabilitation) or large declines (critical care medicine and occupational medicine).

Table 2: Projected Changes in the FTE Supply* of Non-Primary Care Specialty and Subspecialty Physicians, 2010-2025

	FTE Supply (2010)	Projected FTE Supply (2025)	Percent Change, 2010 to 2025	FTE Supply per 100,000 (2010)	Projected FTE Supply per 100,000 (2025)	Change, 2010 to 2025 [#]
Non-primary care medical specialties	271,700	336,800	24	87.8	91.1	3.3
Anesthesiology	46,000	54,800	19	14.9	14.8	0.0
Dermatology	11,500	15,500	35	3.7	4.2	0.5
Emergency Medicine	36,000	55,400	54	11.6	15.0	3.3
Neurology	14,500	20,400	40	4.7	5.5	0.8
Obstetrics-Gynecology	42,400	49,300	16	68.0	72.0	4.0
Occupational Medicine	1,700	1,100	-37	0.6	0.3	-0.3
Pathology	17,800	19,700	11	5.7	5.3	-0.4
Physical Medicine and Rehabilitation	10,400	17,100	64	3.4	4.6	1.3
Preventive Medicine	2,700	3,100	13	0.9	0.8	0.0
Psychiatry	44,200	46,500	5	14.3	12.6	-1.7
Radiation Oncology	4,700	6,200	32	1.5	1.7	0.2
Radiology	37,100	46,200	25	12.0	12.5	0.5
Other patient care	2,800	1,500	-46	0.9	0.4	-0.5

	FTE Supply (2010)	Projected FTE Supply (2025)	Percent Change, 2010 to 2025	FTE Supply per 100,000 (2010)	Projected FTE Supply per 100,000 (2025)	Change, 2010 to 2025 [#]
Medical subspecialties	109,900	132,700	21	35.5	35.9	0.4
Allergy-Immunology	4,000	4,046	2	1.3	1.1	-0.2
Cardiology	25,300	26,623	5	8.2	7.2	-1.0
Critical Care Medicine	1,600	1,410	-11	0.5	0.4	-0.1
Endocrinology	5,400	6,604	23	1.7	1.8	0.1
Gastroenterology	13,000	14,481	11	4.2	3.9	-0.3
Hematology-Oncology	12,500	15,403	23	4.0	4.2	0.1
Infectious Disease	6,400	7,872	23	2.1	2.1	0.1
Nephrology	8,400	10,059	20	2.7	2.7	0.0
Pediatric Subspecialties	17,700	27,500	55	23.9	35.2	11.3
Pulmonology	11,000	13,195	20	3.6	3.6	0.0
Rheumatology	4,600	5,505	19	1.5	1.5	0.0
Surgical specialties	104,000	118,600	14	33.6	32.1	-1.5
General Surgery	28,700	30,400	6	9.3	8.2	-1.0
Neurological Surgery	5,500	7,400	34	1.8	2.0	0.2
Ophthalmology	18,000	19,600	9	5.8	5.3	-0.5
Orthopedic Surgery	24,400	28,700	17	7.9	7.8	-0.1
Otolaryngology	9,800	12,000	23	3.2	3.2	0.1
Plastic Surgery	7,600	9,000	19	2.5	2.4	0.0
Urology	10,100	11,500	14	3.3	3.1	-0.1
Surgical subspecialties	13,10	14,600	11	4.2	3.9	-0.3
Colorectal Surgery	1,500	1,800	19	0.5	0.5	0.0
Thoracic Surgery	4,400	3,300	-24	1.4	0.9	-0.5
Vascular Surgery	2,900	3,600	26	0.9	1.0	0.0
Other surgical subspecialties	4,400	5,800	34	1.4	1.6	0.2

* FTE supply rounded to the nearest hundred; 1 FTE represents 1 provider who works average number of hours in the base year.

[#] Numbers may not add-up due to rounding.

Although the *per capita* supply of physicians, on average across all non-primary care fields, remains generally stable in proportion to projected population growth (from 161 per 100,000 in 2010 to 163 per 100,000 in 2025), some specific fields experience large increases (the pediatric subspecialties and obstetrics-gynecology) and some fields may see decreases of 1 to 2 FTEs per 100,000 (general surgery, psychiatry, and cardiology). In all surgical fields combined, it is projected that there will be 1.9 fewer physician FTEs per 100,000 in 2025 than in 2010.

Supply of Non-Primary Care Specialty and Subspecialty APNs: Between 2010 and 2025, the APN supply in focused (non-primary care) fields is projected to grow in all areas of practice⁴ – by 213 percent in medical subspecialties, 118 percent in non-primary care medical specialties, and 181 percent across all surgical fields (Table 3). Currently, only a small proportion of all APNs specialize in surgical fields (7 percent), and this is anticipated to increase by 1 percent to 8 percent in 2025. The high proportion of APNs in non-primary care medical specialties in 2010 will see a slight decrease by 2025 (from 73 to 66 percent), with a small increase in representation

⁴ Data sources used in these projections do not show any APNs working in many of the surgical specialties (colorectal surgery, ophthalmology, otolaryngology, plastic surgery, and vascular surgery) and some non-primary care medical specialties (pathology, preventive medicine, and radiation oncology).

in medical subspecialty fields (from 20 to 26 percent). The high representation of APNs in the non-primary care medical specialties is almost exclusively due to the certified registered nurse anesthetist (CRNA) and certified nurse midwife (CNM) supply, which together constitute over 50 percent of the non-primary care APN workforce. The large gains in FTEs in the projected supply of APNs translate into significant increases in *per capita* numbers of APNs by 2025.

Table 3: Projected Changes in the FTE Supply* of Non-Primary Care Specialty and Subspecialty APNs, 2010-2025

	FTE Supply (2010)	Projected FTE Supply (2025)	Percent Change, 2010 to 2025	FTE Supply per 100,000 (2010)	Projected Supply per 100,000 (2025)	Change, 2010 to 2025 [#]
Non-primary care medical specialties	92,700	201,800	118	30.0	54.6	24.6
Anesthesiology	43,900	82,000	87	14.2	22.2	8.0
Dermatology	1,300	4,400	241	0.4	1.2	0.8
Emergency Medicine	5,600	21,700	287	1.8	5.9	4.0
Neurology	1,300	4,800	259	0.4	1.3	0.9
Obstetrics-Gynecology	23,200	53,600	131	37.2	78.2	41.0
Occupational Medicine	2,100	3,300	55	0.7	0.9	0.2
Pathology	-	-	-	-	-	-
Physical Medicine and Rehabilitation	700	2,900	317	0.2	0.8	0.6
Preventive Medicine	-	-	-	-	-	-
Psychiatry	7,000	17,900	156	2.3	4.8	2.6
Radiation Oncology	-	-	-	-	-	-
Radiology	600	1,900	213	0.2	0.5	0.3
Other patient care	7,000	9,500	35	2.3	2.6	0.3
Medical subspecialties	25,400	79,500	213	8.2	21.5	13.3
Allergy-Immunology	300	900	154	0.1	0.2	0.1
Cardiology	5,400	14,200	165	1.7	3.8	2.1
Critical Care Medicine	1,200	2,600	119	0.4	0.7	0.3
Endocrinology	1,600	5,000	215	0.5	1.3	0.8
Gastroenterology	1,800	4,900	178	0.6	1.3	0.8
Hematology-Oncology	4,300	13,500	215	1.4	3.7	2.3
Infectious Disease	900	2,800	214	0.3	0.8	0.5
Nephrology	1,000	3,200	210	0.3	0.9	0.5
Pediatric Subspecialties	7,500	27,900	274	10.0	35.6	25.6
Pulmonology	1,200	3,600	205	0.4	1.0	0.6
Rheumatology	400	1,100	202	0.1	0.3	0.2
Surgical specialties	5,100	15,000	194	1.6	4.1	2.4
General Surgery	1,500	4,200	172	0.5	1.1	0.6
Neurological Surgery	1,100	3,700	236	0.4	1.0	0.6
Ophthalmology	-	-	-	-	-	-
Orthopedic Surgery	1,700	5,000	192	0.6	1.4	0.8
Otolaryngology	-	-	-	-	-	-
Plastic Surgery	-	-	-	-	-	-
Urology	700	2,100	184	0.2	0.6	0.3
Surgical subspecialties	3,700	9,700	3,700	1.2	2.6	1.4
Colorectal Surgery	-	-	-	-	-	-
Thoracic Surgery	1,800	3,400	1,800	0.6	0.9	0.3
Vascular Surgery	-	-	-	-	-	-

	FTE Supply (2010)	Projected FTE Supply (2025)	Percent Change, 2010 to 2025	FTE Supply per 100,000 (2010)	Projected FTE Supply per 100,000 (2025)	Change, 2010 to 2025 [#]
Other surgical subspecialties	1,900	6,300	234	0.6	1.7	1.1

* FTE supply rounded to the nearest hundred; 1 FTE represents 1 provider who works average number of hours in the base year.

[#] Numbers may not add-up due to rounding.

Supply of Non-Primary Care Specialty and Subspecialty PAs: The PA supply was estimated to be 9,100 in medical subspecialties, 20,400 in surgical specialties, and 23,000 in non-primary care medical specialty areas. By 2025, the PA supply is projected to grow by 110 percent (to 19,000 FTEs) in medical subspecialties, by 99 percent (to 40,500 FTEs) in surgical specialties, and by 117 percent (to 49,900 FTEs) in non-primary care medical specialty areas (Table 4).

Despite some differential growth rates, the distribution of PAs among these broad non-primary care specialty groupings is not expected to change significantly during the projection period. In 2025, PAs in non-primary care specialty areas will constitute 46 percent of the PA non-primary care workforce (previously 44 percent), medical subspecialties will constitute 17 percent (unchanged), and the remaining 37 percent will be in surgical fields (previously 39 percent).

Fields with the highest projected growth for PAs are physical medicine and rehabilitation (193 percent), emergency medicine (172 percent), and the pediatric subspecialties (185 percent). The non-primary care specialty area with the lowest anticipated growth is occupational medicine – with 9 percent growth in FTE supply predicted from 2010 to 2025. Data sources used in these projections identified no PAs working in the field of preventive medicine.

Similar to APNs, the rapid growth of a young PA workforce results in projections where the expected supply of providers exceeds population growth. Therefore, the *per capita* availability of PAs increases in almost all non-primary care fields by 2025.

Table 4: Projected Changes in the FTE Supply* of Non-Primary Care Specialty and Subspecialty PAs, 2010-2025

	FTE Supply (2010)	Projected FTE Supply (2025)	Percent Change, 2010 to 2025	FTE Supply per 100,000 (2010)	Projected FTE Supply per 100,000 (2025)	Change, 2010 to 2025 [#]
Non-primary care medical specialties	23,000	49,900	117	7.4	13.5	6.1
Anesthesiology	1,100	2,400	110	0.4	0.6	0.3
Dermatology	2,600	6,200	139	0.8	1.7	0.8
Emergency Medicine	9,200	25,000	172	3.0	6.8	3.8
Neurology	500	1,200	153	0.2	0.3	0.2
Obstetrics-Gynecology	2,100	4,300	108	3.3	6.2	2.9
Occupational Medicine	1,800	2,000	9	0.6	0.5	-0.1
Pathology	0	0	104	<0.1	<0.1	<0.1
Physical Medicine and Rehabilitation	600	1,800	193	0.2	0.5	0.3
Preventive Medicine	-	-	-	-	-	-
Psychiatry	1,200	2,300	88	0.4	0.6	0.2
Radiation Oncology	200	400	131	0.1	0.1	0.1

	FTE Supply (2010)	Projected FTE Supply (2025)	Percent Change, 2010 to 2025	FTE Supply per 100,000 (2010)	Projected FTE Supply per 100,000 (2025)	Change, 2010 to 2025 [#]
Radiology	600	1,400	120	0.2	0.4	0.2
Other patient care	3,100	2,900	-5	1.0	0.8	-0.2
Medical subspecialties	9,100	19,000	110	2.9	5.2	2.2
Allergy-Immunology	400	800	79	0.1	0.2	0.1
Cardiology	2,800	5,100	86	0.9	1.4	0.5
Critical Care Medicine	400	500	54	0.1	0.1	0.0
Endocrinology	400	800	122	0.1	0.2	0.1
Gastroenterology	1,200	2,300	96	0.4	0.6	0.2
Hematology-Oncology	1,400	3,000	121	0.4	0.8	0.4
Infectious Disease	400	1,000	121	0.1	0.3	0.1
Nephrology	400	900	117	0.1	0.2	0.1
Pediatric Subspecialties	1,200	3,300	185	1.6	4.2	2.7
Pulmonology	400	800	115	0.1	0.2	0.1
Rheumatology	200	500	112	0.1	0.1	0.1
Surgical specialties	15,200	31,400	107	4.9	8.5	3.6
General Surgery	2,400	4,600	91	0.8	1.2	0.5
Neurological Surgery	1,800	4,200	137	0.6	1.1	0.6
Ophthalmology	100	200	91	<0.1	0.1	<0.1
Orthopedic Surgery	8,600	17,700	105	2.8	4.8	2.0
Otolaryngology	600	1,400	116	0.2	0.4	0.2
Plastic Surgery	600	1,300	106	0.2	0.4	0.2
Urology	1,000	2,100	99	0.3	0.6	0.2
Surgical subspecialties	5,200	9,000	75	1.7	2.4	0.8
Colorectal Surgery	100	200	109	<0.1	<0.1	<0.1
Thoracic Surgery	2,900	3,800	31	0.9	1.0	0.1
Vascular Surgery	500	1,100	118	0.2	0.3	0.1
Other surgical subspecialties	1,700	4,000	135	0.6	1.1	0.5

* FTE supply rounded to the nearest hundred; 1 FTE represents 1 provider who works average number of hours in the base year.

[#] Numbers may not add-up due to rounding.

Limitations

This report projects future labor supply changes attributable to the changing demographic composition of the future health workforce. Numerous factors can influence the future supply of health care providers, many of which cannot be easily predicted or modeled. For example, the supply projection methodology cannot predict or incorporate hypothetical new trends in specialty choice by health professions graduates, which can develop in response to changing labor market conditions or other factors. New policies and programs for the training of clinicians, such as emerging models for graduate medical education (GME) financial support that target specialty fields by need or shortage, may influence the specialty distribution of future clinicians. The projections in this brief do not account for health system changes that may improve the efficiency and adequacy of the national provider supply, meaning that potentially fewer providers may be needed to deliver care. These include future system-level changes that cannot be accurately anticipated – such as improvements in technology, practice patterns (such as team-based care models), or service delivery (such as medical homes and accountable care organizations). Finally, these national level projections do not take into account known

variations in the distribution of providers at subnational levels, such as in rural and remote areas, or in other regions that are noted to be medically underserved.

Conclusions

This study estimated the *relative supply* of non-primary care clinical workforce in 2025 compared to 2010 under prevalent conditions, accounting only for labor supply changes attributable to the changing demographic composition of the future workforce. The vast majority of non-primary care fields are expected to see some growth, but these projections suggest considerable variations both by profession and by specialty area.

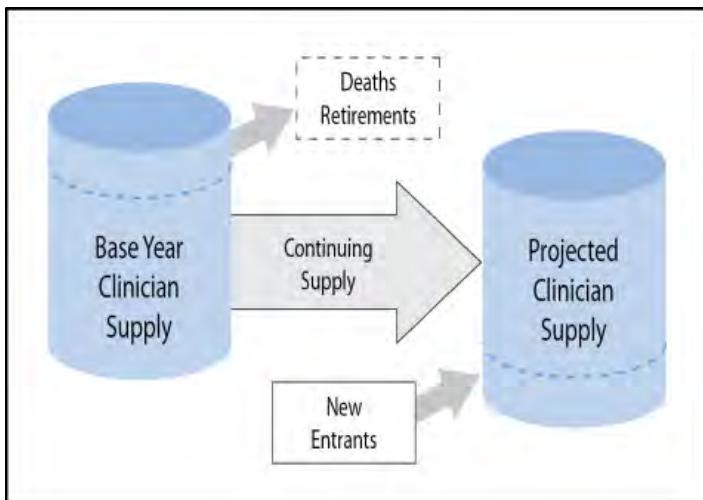
Although the overall supply of non-primary care physicians is expected to increase by 2025, the projected change in physician FTEs is highly variable across areas of specialization. The *per capita* numbers of physicians in non-surgical fields is projected to increase in 2025, but is projected to decline for surgical fields. The supply of physicians in some critical core non-primary care specialty service areas, such as in psychiatry and general surgery, may not keep up with population growth. On the other hand, the rapid growth in the APN and PA workforce is projected to be sufficient to maintain or raise the *per capita* supply of non-primary care specialty providers across all fields in which they are represented.

Appendix

About the Model

The Clinical Specialty Supply Model (CSSDM) is a projection model that uses the stock and flow approach to estimate the future supply of clinicians by specialty (Exhibit 2). The model considers a variety of factors that may impact the supply of clinicians such as the effect of the changing demographic composition of the future workforce.

Exhibit 2: Overview of the Clinical Specialty Supply Model



Clinician supply: Physicians, physician assistants (PAs), nurse practitioners (NPs), certified registered nurse anesthetists (CRNAs), and certified nurse midwives (CNMs) are included in the projection. Data on the number of active clinical providers by age, sex, and specialty are projected forward using age-sex specific attrition rates.⁵ Future entrants to the clinical workforce estimated from the expected number of trainees in different profession are based on assumptions regarding the future size and demographic composition of graduating cohorts and include a continuation of the past trends in specialty choices among clinicians. Specifically,

$$C_t = C_0 + E_{n_t} - (C_0 * A_0),$$

Where C_t represents the projected clinician supply, C_0 represents the current supply of clinicians, E_{n_t} represents the number of new trainee entrants, and A_0 represents the attrition rate.

Baseline counts of physicians by age, sex, and specialty are from the 2010 American Medical Association (AMA) physician master file. Physicians who provide direct patient care in the U.S., regardless of the care setting, are included along with residents. Using the equation above,

⁵ Net attrition rates by age and sex is a combination of age-sex specific mortality rates derived from the U.S. Social Security Administration's published Life tables, Table 6 – Period life tables for Social Security Area by Calendar Year and Sex available at http://www.socialsecurity.gov/OACT/NOTES/as120/LifeTables_TBL6_2020.html accessed May 2012, and retirement rates calculated from 2005-2010 American Community Survey.

the baseline physician counts are projected forward using age-sex specific attrition rates.⁶ Future entrants to the medical profession are estimated from the expected number of graduates from U.S. medical schools and the expected number of total GME training positions. Past trends in specialization from AMA data are used to project the specialty distribution of future cohorts of physicians.

The number of graduate medical education (GME) training slots has been a driver of the total number of new entrants to the physician workforce. In keeping with the recent statistics⁷, the projections assume that GME positions will grow by about 1 percent per year up until 2020.

Data from HRSA's 2012 National Survey of Nurse Practitioners (NSSNP) were used to estimate the baseline supply of NPs in patient care by age, sex, and specialty. The 2010 supply of CRNAs active in patient care by age and sex is derived from data provided by the National Board of Certified Registered Nurse Anesthetists. The 2010 American Midwifery Certification Board (AMCB) data were used to estimate the number of available CNMs by age and sex at baseline. Data from these two sources suggest that recent nursing graduate cohorts have been growing by 6⁸ and 10 percent.⁹ The projections assume a continuation of these rates up until 2017 and no further change in training positions after that. In addition, it is assumed that the American College of Nurse Midwives' strategic goal of 1,000 new graduates by 2015 will be met.

The age-sex distribution of PAs was derived from the 2010 National Commission on Certification of Physician Assistants (NCCPA) and the specialty distribution from the American Association of Physician (AAPA) Master file. Numbers of new entrants into this profession are projected assuming a continuation of the 5 percent growth in PA graduates observed in the recent past.¹⁰ As with physicians and APNs, the future supply of PAs is projected forward using attrition rates and the expected number of new entrants to the workforce.

The model produces two measures of future clinician supply: counts and relative FTE. Because clinician productivity, in terms of hours worked, depends on the age and sex of a clinician, the changing age-sex distribution of future clinicians have implications for service availability. Data on the average numbers of hours worked by clinicians of different age-sex groups calculated from the 2005-2010 American Community Survey were used to adjust the total number FTEs that would be available in 2025 relative to the current supply.

⁶ Net attrition rates by age and sex is a combination of age-sex specific mortality rates derived from the U.S. Social Security Administration's published Life tables, Table 6 – Period life tables for Social Security Area by Calendar Year and Sex available at http://www.socialsecurity.gov/OACT/NOTES/as120/LifeTables_TBL6_2020.html accessed May 2012, and retirement rates calculated from 2005-2010 American Community Survey.

⁷ Data from Association of American Medical Colleges and American association of Colleges of Osteopathic Medicine 2012.

⁸ American Association of Nurse Anesthetists and American Midwifery Certification Board

⁹ American Association of Colleges of Nursing Surveys

¹⁰ Data from NCCPA report *Certified Physician Assistant Population Trends* show that the numbers of newly licensed PAs have been increasing by 5 percent on average in recent years.

Per capita FTE supply in 2010 and the projected *per capita* FTE supply in 2025 were calculated from 2010 census data¹¹ and projected population for 2025 from the U.S. Census Bureau.¹² The *per capita* calculations for obstetrics-gynecology utilized population data from 2010 and 2025 projections of women between 15 and 44 years of age. Those for pediatric subspecialties utilized population data from 2010 and 2025 projections of all persons less than 18 years of age.

¹¹Howden, LM and Meyer, JM “Age and Sex Composition: 2010” 2010 Census Bureau Brief# C2010BR-03, US Census Bureau available at <http://www.census.gov/prod/cen2010/briefs/c2010br-03.pdf>.

¹² Projections of the Population by Selected Age Groups and Sex for the United States: 2015 to 2060 (NP2012-T2) Source: U.S. Census Bureau, Population Division Release Date: December 2012 downloaded from <http://www.census.gov/population/projections/data/national/2012/summarytables.html> on May 8, 2014.