Cost of Education and Earning Potential for Non-Physician Anesthesia Providers

Philip MacIntyre, CRNA, MSN Bradley Stevens, CRNA, MSN Shawn Collins, CRNA, DNP, PhD Ian Hewer, CRNA, MA, MSN

Potential non-physician anesthesia students gauge many different aspects of a graduate program prior to applying, but cost of education and earning potential are typically high priorities for students. Our analysis evaluated the cost of tuition for all certified registered nurse anesthetist (CRNA) and anesthesiologist assistant (AA) programs in the United States, as well as earning potential for both professions. We collected educational cost data from school websites and salary data from the Medical Group Management Association's Physician Compensation and Production Survey: 2012 Report in order to compare the two groups. We found that the median cost of public CRNA programs is \$40,195 and the median cost of private programs

is \$60,941, with an overall median of \$51,720. Mean compensation for CRNAs in 2011 was \$156,642. The median cost of public AA programs is \$68,210 compared with \$77,155 for private AA education, and an overall median cost of \$76,037. Average compensation for AAs in 2011 was \$123,328. Considering these factors, nurse anesthesia school is a better choice for candidates who already possess a nursing license; however, for those prospective students who are not nurses, AA school may be a more economical choice, depending on the type and location of practice desired.

Keywords: Anesthesiologist assistant, cost of anesthesia education, debt, nurse anesthetist, salary.

n the United States, there are two distinct pathways to obtaining a non–physician-based advanced degree in anesthesia. Certified registered nurse anesthetists (CRNAs) are advanced practice nurses who have earned a bachelor's degree—commonly in nursing—practiced at least 1 year as an acute care nurse, and have successfully completed a graduate-level nurse anesthesia program. Anesthesiologist assistants (AAs) earn a bachelor's degree in any field and then complete a graduate-level anesthesia training program.

Each type of anesthesia professional goes through a different pathway to obtain their credentials. Both types of students earn a degree in a fee-for-service educational system; this can be extremely expensive and often requires students to obtain loans in order to cover the cost of tuition and fees. In addition to the costs of tuition and fees, both AA and CRNA students are so immersed in the training that there is no time for work outside of the educational setting. This leads to the need for loans to cover living expenses as well as tuition. The cumulative effect of school debt can deter people from pursuing advanced degrees in uncertain economic times, unless the earning potential is substantial enough to overcome the debt load. Consequently, there is utility to quantifying the debt load and earning potential one can expect following completion of either AA or CRNA training.

History

Currently, there are approximately 30,000 practicing CRNAs and 1,023 AAs in the United States.³ CRNAs have been administering anesthesia since its inception in the late 1800s. The first nurse anesthesia training program began in 1909, whereas the first AA school opened in 1969— ostensibly in response to a shortage of nurse anesthetists. In general terms, the two professions have similar length of training and preparation for practice, and have previously been compared to each other.⁴ However, there are four main areas of difference between CRNAs and AAs: curriculum prerequisites, scope of practice, governing entities, and practice jurisdictions.

Curriculum prerequisites

Although nurse anesthesia programs do not all stipulate a bachelor's in nursing, there is a requirement that the candidate be a registered nurse with at least 1 year of acute care experience. It is possible for an applicant to have a bachelor's degree in a related field, but in order for them to practice as a nurse, they must have at least an associate's degree in nursing. AA programs do not specify required undergraduate majors; however, certain prerequisite science, math, and English undergraduate classes are required for admission.

Scope of practice

In terms of guidelines from their respective licensing

bodies, the scope of practice of both professions is similar; however, significant differences exist between supervision requirements. AAs must always work under the supervision of an anesthesiologist, whereas CRNAs are not required to be under physician direction. However, although not required by professional scope of practice, in most states there is at least some form of legislative or billing requirement that stipulates supervision of a physician. The physician could be an anesthesiologist or a surgeon, and CRNAs are also permitted to work under the direction of certain other healthcare providers, such as dentists or podiatrists. Despite the use of the term supervision, it has been well established legally that when supervised by a non-anesthesia-trained physician, the CRNA is responsible for anesthetic-related negligence.⁵ In addition, 17 states have chosen to "opt out" of a federal rule that stipulates physician supervision and allows independent practice of CRNAs.⁶

Governing entities

As advanced practice nurses, CRNAs fall under the jurisdiction of the Nursing Boards of the state of practice, whereas AAs are regulated by the Board of Medicine. Consequently, practice boundaries are defined by the respective nurse or physician practice acts of each individual state.

Practice jurisdiction

CRNAs can practice in any state in the US, though with slightly varying supervision requirements as indicated above. AAs face a much different employment market, with only 18 states currently permitting them to practice, and all requiring a supervising anesthesiologist.⁴

Review of the Literature

Surprisingly little research surrounding the cost of nonphysician-based anesthesia education has been performed. Multiple healthcare, scientific, education, and other relevant resources were searched, including EBSCOhost, MEDLINE, CINAHL, PsycINFO, SPORTDiscus, ERIC, Academic and Business Search Complete, Google, and Google Scholar. Searches were conducted using keywords, phrases, and database-specific subject headings. Search words related to the topic of nurse anesthetists, anesthesiology assistants, and education costs were used, including variants of the terms: anesthetist, anaesthetist, or analgesia; nurse or assistant; education, training, school, or student; and cost, debt, or expense. Currently, the authors are unaware of any comparisons between cost of education and earning potential of CRNAs and AAs. Due to the limited research available, no search topics were excluded for this report.

Although there are no data comparing CRNAs and AAs, researchers have examined the total cost of educating CRNAs and physician anesthesiologists and concluded that the cost of anesthesia residency is substantially higher than nurse anesthetist training. However,

although CRNAs are less costly to train, earning potential for anesthesiologists was shown to be substantially higher than for nurse anesthetists. The total estimated cost (in 2008 dollars) for CRNA education was \$161,809 vs physician anesthesiologists at \$1,083,795. These costs include direct and opportunity costs as well as the offset of estimated student/resident productivity. Undergraduate degree cost was included in this study, but was identical for both types of anesthesia providers. Importantly, it was also shown that anesthesia care was equally safe and effective for both CRNAs and physician anesthesiologists. The study was funded by the American Association of Nurse Anesthetists, but carried out by an independent research group.

More recently, analysis of the anesthesia labor market has demonstrated a continually increasing demand for all types of anesthesia providers over the past 10 years.3 This report also showed a steady increase of CRNAs and AAs graduating into the workforce over the same time period. In the early 2000s, there was a severe national shortage of both AAs and CRNAs. According to the authors, this was due to a low number of AAs entering the market, and retirement exceeding graduation of new CRNAs. By 2010, there were few regional shortages of CRNAs and a moderate national shortage of AAs (both AA and CRNA schools had substantial increases in enrollment during this time). Continuing this trend, a possible surplus of CRNAs was projected by the year 2020, which is likely to result in a drop in CRNA supply due to decreased interest in pursuing advanced practice degrees as fewer positions become available. The authors also suggest that CRNA training programs should limit their output of graduates until more definitive economic trends and healthcare reform data are available.

In a different approach, current and future demand for CRNAs was assessed by comparing the ratio of CRNAs to surgeries, rather than the number of vacant CRNA positions.⁷ The research identified an increased number of CRNAs entering the workforce, probably as a result of increased capacity in nurse anesthesia schools in response to the prior shortage. However, the authors suggested that the increasing supply of CRNAs would not outpace the market demand.⁷ This is due to multiple factors, including higher volume of surgery (2% per year) and increasing numbers of CRNAs moving into the non-surgical work environment, such as pain management and radiology.⁷

Accurate salary numbers are difficult to determine for CRNAs and AAs. The only source the authors could locate that had consistent data on both CRNA and AA salaries was the Physician Compensation and Production Survey published by the Medical Group Management Association (MGMA).⁸ Other sources list each occupation's salary data separately, and/or with varying ranges instead of a single mean or median salary, making comparison difficult.⁹⁻¹⁴

School type	Cost			
	Median	Range		
Public (n=48)	\$37,243	\$15,000-\$84,402		
Private (n=60)	\$61,345	\$31,030-\$118,056		
Combined (n=108)	\$50,077	\$15,000-\$118,056		

Table 1. Cost of Anesthesia School, CRNA

School type	Length (months)				
	Median Range				
Public (n=48)	28	24-36			
Private (n=60)	28	24-36			
Combined (n=108)	28	24-36			

Table 2. Anesthesia School Length, CRNA

School type	Cost			
	Median	Range		
Public (n=1)	\$68,210	\$68,210		
Private (n=7)	\$71,410	\$42,000-\$96,380		
Combined (n=8)	\$71,410	\$42,000-\$96,380		

Table 3. Cost of Anesthesia School, AA

Methodology

The cost data collected were obtained from each school's respective website and consist of tuition and fees (see Tables 1-5). For the purposes of this study, tuition and fees refers to the cost of all credit hours needed to graduate, clinical site fees, equipment, and various other university-determined fees. We did not calculate cost of housing or travel, which is difficult to establish without surveying students in each program, and thus beyond the scope of this analysis. Books, licensing fees, and health insurance were also excluded from this report, as these fees are universal for all anesthesia programs and relatively small in the context of total educational costs, and therefore unlikely to influence the overall conclusions. The compared costs for public anesthesia programs are for in-state tuition only. The only exception to our webbased determination of costs was the Mayo Clinic College of Medicine Nurse Anesthesia Program, which was contacted by phone, as per instructions on their website.

The National Center for Education Statistics indicates an average undergraduate four-year degree costs \$88,368.¹⁵ However, the total costs for undergraduate education were not considered in this research, since both CRNA and AA students must have a bachelor's degree prior to starting their respective master's or doctoral program. The focus of this research was on the differences between the advanced degrees earned by each profession.

Since the cost of public and private institutions can

School type	Length (months)			
	Median	Range		
Public (n=1)	29	29		
Private (n=7)	24	24-28		
Combined (n=8)	25.5	24-29		

Table 4. Anesthesia School Length, AA

	Median	Mean	SD
CRNA (n=1,901)	\$158,092	\$156,642	+/- \$31,317
AA (n=33)	\$127,020	\$123,328	+/- \$27,250

Table 5. Provider Compensation

vary dramatically, fees were separated into two categories. The total costs and length of each individual program are listed in Table 6. Similarly, the median length of program (in months) was determined for public and private schools separately. The overall median total cost and length of program were also determined for all CRNA and AA institutions, respectively.

The salary data for CRNAs were collected from the MGMA Physician Compensation and Production Survey: 2012 Report Based on 2011 Data⁸, and the numbers reported for CRNAs and AAs are for total compensation. Specifically, these totals include salaries, bonuses/incentives, and profit sharing, but not costs incurred funding health insurance, retirement plans, or any business/educational expense reimbursement.

Results

The Council on Accreditation of Nurse Anesthesia Educational Programs (COA) lists 111 accredited nurse anesthesia educational programs. There is one nurse anesthesia program in Puerto Rico from which we were unable to obtain tuition information. Two other programs are military based and do not charge tuition in return for military service. These three programs have been excluded from this analysis.

Of the included nurse anesthesia programs, 60 are private schools and 48 are public institutions. The median cost of the public CRNA programs is \$37,243 compared with a private program cost of \$61,345. The median tuition and fees for all nurse anesthesia programs is \$50,077, and the median program length is 28 months. Data for nurse anesthesia programs are current as of October 2012.

Average provider compensation for CRNAs in 2011, as reported by the MGMA *Physician Compensation and Production Survey*⁸, was \$156,642. Median compensation was \$158,092. The highest CRNA compensation was reported in the Midwest region of the United States (median \$166,752). The lowest compensation was in the

			Length of	
CRNA School - Public	Cost ^a (\$)	State	program (mo)	Degree type ^b
University of Alabama at Birmingham	46,899	AL	27	
Arkansas State University	30,600	AR	28	
Kaiser Permanente School of Anesthesia California State University, Fullerton	26,259	CA	24	
Loma Linda University	84,402	CA	30	
New Britain School of Nurse Anesthesia	24,199	CT	29	
Hospital of St. Raphael School of Nurse Anesthesia	37,553	CT	29	
Florida Gulf Coast University	30,125	FL	28	
Florida International University	49,247	FL	28	
University of South Florida	57,600	FL	28	
University of North Florida	48,000	FL	28	
Georgia Health Sciences University	58,364	GA	28	
University of Iowa	59,000	IA	36	DNP
Southern Illinois University Edwardsville	47,841	IL	31	
University of Kansas	45,946	KS	36	DNP
Trover Health System/Murray State University	53,822	KY	28	2
Louisiana State University	27,684	LA	32	
University of Maryland	46,839	MD	28	
Michigan State University	45,100	MI	28	
Oakland University William Beaumont School of Medicine	48,675	MI	28	
University of Michigan, Flint Hurley Medical Center	30,849	MI	24	
	39,112	MI	24	
Wayne State University				
Mayo Clinic College of Medicine	21,000	MN	30	DND
University of Minnesota	71,109	MN	36	DNP
St. John's School of Nurse Anesthesia at Missouri State University	36,764	MO	30	
Truman Medical Center	32,600	MO	36	
University of North Carolina, Charlotte	29,216	NC	28	
East Carolina University	19,389	NC	28	
Raleigh School of Nurse Anesthesia, University of North Carolina at Greensboro	28,500	NC	24	
Western Carolina University	28,768	NC	28	
University of North Dakota	25,038	ND	28	
University of Medicine and Dentistry of New Jersey	45,608	NJ	28	
SUNY Health Science Center at Brooklyn	27,734	NY	27	
SUNY at Buffalo	38,759	NY	36	DNP
University of Akron College of Nursing	31,280	ОН	27	
University of Cincinnati	56,598	ОН	28	
St. Elizabeth Health Center	36,933	ОН	27	
Geisinger Health System, Bloomsburg University	35,394	PA	33	
University of Pittsburgh	56,344	PA	28	
Memorial Hospital of Rhode Island	23,500	RI	29	
Medical University of South Carolina	55,094	SC	28	
University of South Carolina PRMH Graduate Program	58,715	SC	27	
University of Tennessee	33,423	TN	31	
University of Tennessee, Chattanooga	29,225	TN	27	
University of Tennessee Health Science Center	56,718	TN	36	DNP
University of Texas at Houston Health Science Center	23,538	TX	32	
Old Dominion University	33,800	VA	28	
Virginia Commonwealth University	41,184	VA	28	
Franciscan Skemp Healthcare	15,000	WI	27	

CRNA School - PrivateCost (s)Department of Nurse Anesthesia Ida V. Moffett School of Nursing Samford University (6), 5r1 Midwestern University71,266 36,837 36,837National University, Fresno36,837Samuel Merritt University66,114 46,114University of Southern California69,285 59,285 59 Fairfield University and Bridgeport Hospital67,200 42,201 42,916 42,916 43,404 40,115		Length of	
Midwestern University, Fresno 36,837 Samuel Merritt University 66,114 University of Southern California 62,285 Fairfield University and Bridgeport Hospital 67,200 Georgetown University 42,916 Adventist University of Health Sciences 66,314 Barry University 46,155 Gooding Institute of Nurse Anesthesia 63,340 University of Miami 62,000 Wolford College 32,854 NorthShore University 57,894 Rosalind Franklin University 57,414 Rush University 57,206 The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program 60,400 Newman University and Decatur Memorial Hospital Nurse Anesthesia Program 60,400 Newman University and Decatur Memorial Hospital Nurse Anesthesia Program 60,400 Newman University Bouvé College of Health Sciences 69,553 Boston College 69,553 Boston College 69,440 University of New England 62,100 University of New England 62,100 University of New England 62,100<	State	program	Degree type ^b
National University, Fresno Samuel Merritt University University of Southern California Fairfield University and Bridgeport Hospital Georgetown University Adventist University of Health Sciences Georgetown University Adventist University of Health Sciences Barry University Adventist University of Health Sciences Barry University Gooding Institute of Nurse Anesthesia University of Miami 62,000 Wolford College 32,854 University Rosalind Franklin University Rosalind Franklin University Rosalind Franklin University Rush University To 2006 Rowman University The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Northand University Adventist Of the Lake College Boston College Hospital School of Lake College of Health Sciences Horiversity of New England University of New England University of Detroit Minneapolis School of Anesthesia Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Webster University Wake Forest University Wake Forest University BryanLGH College of Health Sciences Goldfarb School of Health Sciences Goldfarb School of Health Sciences Goldfarb School of Sursing at Barnes-Jewish College of Nursing and Allied Health Forest University University Wake Forest University BryanLGH College of Health Sciences Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Forest University Goldman University Goldman University To 3,030 College Goldfarb School of Nursing Allied Health Forest University Goldman University Go	AL	28	
Samuel Merritt University University of Southern California 59,285 Fairfield University and Bridgeport Hospital 67,200 Georgetown University Adventist University of Health Sciences 66,314 Barry University 41,155 Gooding Institute of Nurse Anesthesia 63,340 University of Miami 62,000 Wolford College 32,854 NorthShore University 57,895 Rosalind Franklin University 75,206 Rush University of Miami 80,000 Wolford College 32,854 NorthShore University 75,206 Rosalind Franklin University 76,206 Rosalind Franklin University 77,206 Rosalind Franklin University 78,206 Rosalind Franklin University and Decatur Memorial Hospital Nurse Anesthesia Program 80,400 Newman University 80,400 Newman University and Decatur Memorial Hospital Nurse Anesthesia Program 80,400 Newman University 80,400 Northeastern University Bouvé College of Health Sciences 80,553 Boston College 80,440 Northeastern University Bouvé College of Health Sciences 90,395 University of New England 82,100 University of Detroit 82,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University Duke University Duke University BryanLGH College of Health Sciences 66,776 Clarkson College 49,200 Our Lady of Lourdes Medical Center Albany Medical College Columbia University 75,088 Cleveland Clinic Foundation 101,191 Frances Payne Bolton, Case Western 101,192 Cleveland Clinic Foundation 101,191 Frances Payne Bolton, Case Western 101,192 Orterbein University 70,310 Orterbein University 70,310 Orterbein University 70,310 Cleveland Valley Hospital / La Roche College School of Nurse Anesthesia 33,360 Crozer Chester Medical Center / Villanova University Drexel University 86,415 Excela Health School Anesthesia 49,000 Crozer Chester Medical Center / Villanova University Drexel University 65,415 Excela Health School Anesthesia 49,000 Crozer Chester Medical Center / Villanova University 66,416 Excela Health School Anesthesia 49,000		27	
Samuel Merritt University University of Southern California 59,285 Fairfield University and Bridgeport Hospital 67,200 Georgetown University Adventist University of Health Sciences 66,314 Barry University 41,155 Gooding Institute of Nurse Anesthesia 63,340 University of Miami 62,000 Wolford College 32,854 NorthShore University 57,895 Rosalind Franklin University 75,206 Rush University of Miami 80,000 Wolford College 32,854 NorthShore University 75,206 Rosalind Franklin University 76,206 Rosalind Franklin University 77,206 Rosalind Franklin University 78,206 Rosalind Franklin University and Decatur Memorial Hospital Nurse Anesthesia Program 80,400 Newman University 80,400 Newman University and Decatur Memorial Hospital Nurse Anesthesia Program 80,400 Newman University 80,400 Northeastern University Bouvé College of Health Sciences 80,553 Boston College 80,440 Northeastern University Bouvé College of Health Sciences 90,395 University of New England 82,100 University of Detroit 82,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University Duke University Duke University BryanLGH College of Health Sciences 66,776 Clarkson College 49,200 Our Lady of Lourdes Medical Center Albany Medical College Columbia University 75,088 Cleveland Clinic Foundation 101,191 Frances Payne Bolton, Case Western 101,192 Cleveland Clinic Foundation 101,191 Frances Payne Bolton, Case Western 101,192 Orterbein University 70,310 Orterbein University 70,310 Orterbein University 70,310 Cleveland Valley Hospital / La Roche College School of Nurse Anesthesia 33,360 Crozer Chester Medical Center / Villanova University Drexel University 86,415 Excela Health School Anesthesia 49,000 Crozer Chester Medical Center / Villanova University Drexel University 65,415 Excela Health School Anesthesia 49,000 Crozer Chester Medical Center / Villanova University 66,416 Excela Health School Anesthesia 49,000		27	
University of Southern California 69,285 Fairfield University and Bridgeport Hospital 67,200 Georgetown University 42,916 Adventist University of Health Sciences 66,314 Barry University 46,155 Gooding Institute of Nurse Anesthesia 63,340 University of Miami 62,000 Wolford College 32,854 NorthShore University 57,898 Rosalind Franklin University 57,898 Rosalind Franklin University 75,206 The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program 50,400 Northsatern University 43,540 Our Lady of the Lake College 69,440 Northeastern University Bouvé College of Health Sciences 59,398 University of New England 62,100 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota 35,470 Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,646 Webster University Webster University 88,855 University 04 Lourdes Medical Center 49,200 Our Lady of Lourdes Medical Center 74,400 Clarkson College 49,200 Culr Lady of Lourdes Medical Center 74,400 Albany Medical College 49,754 Cleveland Clinic Foundation 75,086 Commonwealth Health / University of Scranton 70,310 Crozer Chester Medical Center / Villanova University 70,310 Commonwealth Health / University 71,310 Crozer Chester Medical Center / Villanova University 70,310 Crozer Chester Medical Center / Villanova Un		27	
Georgetown University 42,916 Adventist University of Health Sciences 66,314 Barry University 67 Geoding Institute of Nurse Anesthesia 63,340 University of Miami 62,000 Wolford College 32,854 NorthShore University 57,895 Rosalind Franklin University 57,414 Rush University 75,208 Rush University 75,208 Rosalind Franklin University 75,208 Rosalind Franklin University 80,400 Newman University 43,540 Our Lady of the Lake College 89,553 Boston College 89,553 Boston College 89,553 University of New England 62,100 University of New England 62,100 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota 35,470 Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University Wake Forest University 88,850 Unive Luniversity 91 Byan LGH College of Health Sciences 56,776 Clarkson College 49,200 Our Lady of Lourdes Medical Center 74,400 Cleveland Clinic Foundation 101,191 Lourdes University 97 Cleveland Clinic Foundation 101,191 Cleveland Clinic Foundation 101,191 Cleveland Clinic Foundation 101,191 Cleveland Clinic Foundation 101,191 Cleveland University 64,935 Oregon Health and Science University 69,110 Otterbein University 64,935 Crozer Chester Medical Center / Villanova University 69,110 Otterbein University 65,415 Excela Health School Anesthesia 49,000 Crozer Chester Medical Center / Villanova University 65,415 Excela Health School Anesthesia 49,000 Drexel University Frank J. Tornetta School of Anesthesia 49,000 Drexel University 75,830 Razareth Hospital / University 61,933 Razareth Hospital / University 61,933 Razareth Hospital (61,033		24	
Georgetown University 42,916 Adventist University of Health Sciences 66,314 Barry University 67 Geording Institute of Nurse Anesthesia 63,340 University of Miami 62,000 Wolford College 32,854 NorthShore University 57,895 Rosalind Franklin University 57,414 Rush University 75,208 Rush University 77,208 Rosalind Franklin University 75,208 Rosalind Franklin University 80,400 Newman University 43,540 Our Lady of the Lake College 89,553 Boston College 69,450 Northeastern University Bouvé College of Health Sciences 59,395 University of New England 62,100 University of New England 62,100 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota 35,470 Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University 91 Wake Forest University 92 Wake Forest University 93 RyanLGH College of Health Sciences 56,776 Clarkson College 949,200 Our Lady of Lourdes Medical Center 74,400 Albany Medical College 949,200 Columbia University 75,088 Columbia University 76,088 Columbia University 76,088 Columbia University 77,310 Cleveland Clinic Foundation 101,191 Lourdes University 70 Ofterbein University 70 Ofterbein University 70 Ofterbein University 70 Crozer Chester Medical Center / Villanova University 70 Drexel University 70,310 Crozer Chester Medical Center / Villanova University 70 Drexel University 70,310 Crozer Chester Medical Center / Villanova University 70 Drexel University 70,310 Crozer Chester Medical Center / Villanova University 70 Drexel University 70 Drexel University 71 Crozer Chester Medical Center / Villanova University 70 Drexel University 70 Drexel University 71 Drexel University 71 Drexel University 72 Drexel University 73 Drexel University 74 Drexel University 75 Drexel University 76 Drexel University 76 Drexel University 76 Drexel University 77 Drexel University 76 Drexel University 76 Drexel Univ		36	DNP
Adventist University of Health Sciences Barry University Gooding Institute of Nurse Anesthesia Liniversity of Miami Wolford College NorthShore University Rosalind Franklin University Freakush University The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Northand University The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Northand University Pour Lady of the Lake College Boston College Soston College Goldarb School of Anesthesia University of New England University of New England University of Detroit Minneapolis School of Anesthesia Saint Mary University of Minnesota Soldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Webster University Duke University Wake Forest University Duke University Wake Forest University Duke University Wake Forest University Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University Otterbein University Otterbein University Otterbein University Otterbein University Otterbein University Otterbein University Oregon Health and Science University Oregon Health Science University Oregon Health School Anesthesia La Salle University Crozer Chester Medical Center / Villanova University Oregon Health School Anesthesia La Salle University Excela Health School Anesthesia La Salle University Frank J. Tornetta School of Anesthesia La Salle University Frank J. Tornetta School of Anesthesia La Salle University Frank College of Pennsylvania / WellSpan Health Frances Payre Botton, Case Western Frances Payre Botton, Case Western John School Anesthesia La Salle University Frank J. Tornetta School of Anesthesia La Salle University Frank J. Tornetta School of Anesthesia La Salle University Frank J. Tornetta School of Anesthesia La Salle University Frank J. Tornett		27	
Barry University Gooding Institute of Nurse Anesthesia Sae, 32,854 NorthShore University Fr.,898 Rosalind Franklin University Fr.,414 Rush University Fr.,414 Rush University Fr.,415 Rush University Fr.,416 Newman University and Decatur Memorial Hospital Nurse Anesthesia Program Fo.,400 Newman University Fr.,416 Northeastern University Bouvé College of Health Sciences Fo.,395 Boston College Fo.,410 Northeastern University Bouvé College of Health Sciences Fo.,395 University of Detroit Fo.,255 Himmeapolis School of Anesthesia Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Fo.,646 Webster University Duke University Fo.,410 Webster University Forest Event Health / University Except Health Forest College of Pennsylvania / WellSpan Health		28	
Gooding Institute of Nurse Anesthesia University of Miami 62,000 Wolford College 32,885 Rosalind Franklin University 57,895 Rosalind Franklin University 57,414 Rush University The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Newman University 43,540 Our Lady of the Lake College 89,553 Boston College Northeastern University Bouvé College of Health Sciences 59,395 University of New England 62,100 University of New England 62,100 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Webster University Duke University Wake Forest University BryanLGH College of Health Sciences 56,776 Clarkson College 0ur Lady of Lourdes Medical Center Albany Medical College Columbia University Cleveland Clinic Foundation 101,191 Frances Payne Bolton, Case Western 101,191 Curdes University Oregon Health and Science University Oregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 28,245 Commonwealth Health / University of Scranton Crozer Chester Medical Center / Villanova University Drexel University Frank J. Tornetta School of Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 La Salle University Frank J. Tornetta School of Anesthesia 40,000 La Salle University, Frank J. Tornetta School of Anesthesia 40,000 La Salle University Frank J. Tornetta School of Anesthesia 40,000 La Salle University Frank J. Tornetta School of Anesthesia 40,000 La Salle University Frank J. Tornetta School of Anesthesia 41,000 La Salle University Frank J. Tornetta School of Anesthesia		28	
University of Miami 62,000 Wolford College 32,854 NorthShore University 57,895 Rosalind Franklin University 57,414 Rush University 75,206 The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Newman University 43,540 Our Lady of the Lake College 69,553 Roston College 69,440 University of New England 62,100 University of New England 62,100 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota 35,470 Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University Wake Forest University 88,850 University 61 BryanLGH College of Health Sciences 56,776 Clarkson College 49,200 Cur Lady of Lourdes Medical Center 4,400 Clurbal University 75,088 Columbia University 75,088 Columbia University 70,080 Columbia University 70,0310 Corec Payne Bolton, Case Western 101,190 Cleterbein University 70,0310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 88,248 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 70,310 Crozer Chester Medical Center / Villanova University 70,016 Crozer Chester Medical Center / Villanova Univers		28	
NorthShore University 57,895 Rosalind Franklin University 57,414 Rush University 75,208 Rush University 75,414 Rush University 75,208 Rush University 75,414 Rush University 75,208 Rewman University 90,400 Newman University 43,540 Rush University 90,400 Newman University 90,400 Rewman University 90,400 Rewman University 90,400 Rosalind Franklin University 80,400 Rosalind Franklin University 90,400 Rosalind Franklin University 91,400 Rosalind University 91,400 Rosalind Franklin University 91,400 Rosalin Health University 91,400 Rosalin Health Pulniversity 91,400 Rosalin Health Pulniv		28	
NorthShore University Rosalind Franklin University Rosalind Franklin University Rosalind Franklin University Fine Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Fine Millikin University 43,540 Fine Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Fine Millikin University A13,540 Fine Millikin University Bouvé College Fine Rosalin Mary University Bouvé College of Health Sciences Fine Fine Fine Fine Fine Fine Fine Fine		28	
Rosalind Franklin University Rush University T5,208 Rush University T6,208 Rush University T6,208 Rewman University and Decatur Memorial Hospital Nurse Anesthesia Program S0,400 Newman University T0,414 Soston College Roston R		36	DNP
Rush University The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Newman University A3,540 Dur Lady of the Lake College G9,553 Boston College Northeastern University Bouvé College of Health Sciences Jniversity of New England University of Detroit 52,255 University of Detroit Jniversity of Nursing at Barnes-Jewish College of Nursing and Allied Health Robster University Robster Univ		27	
The Millikin University and Decatur Memorial Hospital Nurse Anesthesia Program Newman University 23,540 Newman University 343,540 Our Lady of the Lake College 39,553 Boston College 89,440 Northeastern University Bouvé College of Health Sciences 59,395 University of New England 52,255 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota 36,410 Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Nebster University 72,410 Nake Forest University 88,850 Clarkson College of Health Sciences 56,776 Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University 75,088 Cleveland Clinic Foundation Frances Payne Bolton, Case Western 101,191 Lourdes University Oregon Health and Science University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University Drexel University 55,255 Torsel University 56,415 Excela Health School Anesthesia 49,005 As Salle University, Frank J. Tornetta School of Anesthesia 49,005 Alegheny Valley Hospital / WellSpan Health 65,330 Nazareth Hospital 61,083		27	
Newman University Our Lady of the Lake College Boston College Northeastern University Bouvé College of Health Sciences Jay 39,395 University of New England Jniversity of Detroit Minneapolis School of Anesthesia Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Webster University Vake Forest University Nake Forest University Albany Medical College Our Lady of Lourdes Medical Center Albany Medical College Columbia University Cleveland Clinic Foundation Frances Payne Bolton, Case Western Lourdes University Oregon Health and Science University Chephony Valley Hospital / La Roche College School of Nurse Anesthesia Coroxer Chester Medical Center / Villanova University Crozer Chester Medical Center / Vi		31	
Cour Lady of the Lake College Boston College Northeastern University Bouvé College of Health Sciences 59,395 University of New England 62,100 University of Detroit 52,255 Minneapolis School of Anesthesia 31,840 Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University 72,410 Duke University Nake Forest University 31,030 BryanLGH College of Health Sciences 56,776 Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University 75,086 Cloumbia University 76,987 Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western 101,191 Cuddes University 76,936 Oregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton Crozer Chester Medical Center / Villanova University Drexel University Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 Rozareth Hospital		24	
Roston College Northeastern University Bouvé College of Health Sciences Sp.398 University of New England Sciences Sp.398 University of Detroit Sp.255 University of Detroit Sp.398 University of Minnesota Sp.398 University Of Nursing and Allied Health Sp.398 University Of Health Sciences Sp.398 University Of Health Sciences Sp.398 University Of Lourdes Medical Center Of Nurse Anesthesia Sp.398 University Of Lourdes Medical Center Of Nurse Anesthesia Sp.398 University Of Scranton Sp.398 Universit		28	
Northeastern University Bouvé College of Health Sciences 59,395 University of New England 52,255 University of Detroit 52,255 University of Detroit 52,255 University of Detroit 52,255 University of Detroit 52,255 University of Minnesota 531,840 Saint Mary University of Minnesota 536 Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University 72,410 University 88,850 University Onlike University 88,850 University Onlike University 88,850 University Onlike University 89,776 University Onlike University 89,776 University Onlike Onlike Medical Center 80,776 University Onlike		27	
University of New England University of Detroit S2,255 Minneapolis School of Anesthesia Saint Mary University of Minnesota Saint Mary University of Minnesota Soldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Nebster University T2,410 Duke University Wake Forest University S1,030 S1,776 S1,776 S1,776 S1,777		32	
University of Detroit Minneapolis School of Anesthesia Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Nebster University Duke University Nake Forest University 31,030 BryanLGH College of Health Sciences Clarkson College Dur Lady of Lourdes Medical Center Albany Medical College Columbia University Tenaces Payne Bolton, Case Western Lourdes University Dregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia Commonwealth Health / University of Scranton Crozer Chester Medical Center / Villanova University Drexel University Excela Health School Anesthesia La Salle University, Frank J. Tornetta School of Anesthesia (A) 858 Kork College of Pennsylvania / WellSpan Health Nazareth Hospital		27	
Minneapolis School of Anesthesia Saint Mary University of Minnesota Saint Mary University of Minnesota Soldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Mebster University 72,410 Duke University 88,850 Make Forest University 31,030 BryanLGH College of Health Sciences 56,776 Clarkson College Dur Lady of Lourdes Medical Center Albany Medical College Columbia University 75,088 Cleveland Clinic Foundation 7101,190 Cleveland Clinic Foundation 7101,190 Cuterbein University 70,310 Cheyon Health and Science University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 70,70 Crozer Chester Medical Center / Villanova University 70 Crexel University 71 Crexel University 71 Crexel University 72 Crexel University 71 Crexel University 72 Crexel University 72 Crexel University 71 Crexel University 72 Crexel University 72 Crexel University 71 Crexel University 72 Crexel University 72 Crexel University 71 Crexel University 72 Crexel University 73 Crexel University 74 Crexel University 75 Crexel Univers		27	
Saint Mary University of Minnesota Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health 76,648 Webster University 72,410 Duke University 88,850 Wake Forest University 31,030 BryanLGH College of Health Sciences 56,776 Clarkson College 49,200 Dur Lady of Lourdes Medical Center Albany Medical College 49,754 Columbia University 75,088 Cleveland Clinic Foundation 101,196 Lourdes University 69,110 Otterbein University 70regon Health and Science University 70regon Health and Science University 70regon Health and Science University 70rezer Chester Medical Center / Villanova University 70rexel University		27	
Goldfarb School of Nursing at Barnes-Jewish College of Nursing and Allied Health Webster University Duke University Nake Forest University 31,030 BryanLGH College of Health Sciences Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University Tenaces Payne Bolton, Case Western Lourdes University Oregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia Crozer Chester Medical Center / Villanova University Drexel University Torexel University Drexel University Allegheny Science University Drexel University Crozer Chester Medical Center / Villanova University Drexel University As a Salle University, Frank J. Tornetta School of Anesthesia As Salle University, Frank J. Tornetta School of Anesthesia As Salle University, Frank J. Tornetta School of Anesthesia As Salle University, Frank J. Tornetta School of Anesthesia As Salle University, Frank J. Tornetta School of Anesthesia As Salle University Assarreth Hospital		28	
Webster University Duke University Wake Forest University BryanLGH College of Health Sciences Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University Tolumbia University Trances Payne Bolton, Case Western Lourdes University Otterbein University Toregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia Commonwealth Health / University of Scranton Torexe University Torexel University, Frank J. Tornetta School of Anesthesia Torexel University		28	
Duke University Wake Forest University 31,030 BryanLGH College of Health Sciences Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University Cleveland Clinic Foundation Frances Payne Bolton, Case Western Lourdes University Otterbein University Oregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia Commonwealth Health / University of Scranton Crozer Chester Medical Center / Villanova University Drexel University Excela Health School Anesthesia La Salle University, Frank J. Tornetta School of Anesthesia Nazareth Hospital 88,850 31,030 31,030 49,200 74,400 49,754 75,088 75,088 69,110 69,110 69,110 61,018 61,018 61,018		30	
Wake Forest University BryanLGH College of Health Sciences Clarkson College 49,200 Our Lady of Lourdes Medical Center Albany Medical College 49,754 Columbia University 75,088 Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western 101,197 Lourdes University 69,110 Otterbein University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital		28	
BryanLGH College of Health Sciences Clarkson College Our Lady of Lourdes Medical Center Albany Medical College Columbia University Cleveland Clinic Foundation Frances Payne Bolton, Case Western Lourdes University Otterbein University Oregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia Commonwealth Health / University of Scranton Crozer Chester Medical Center / Villanova University Excela Health School Anesthesia La Salle University, Frank J. Tornetta School of Anesthesia Nazareth Hospital Nazareth Hospital 61,083		24	
Clarkson College Our Lady of Lourdes Medical Center Albany Medical College 49,754 Columbia University 75,088 Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western Lourdes University 69,110 Otterbein University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 Fork College of Pennsylvania / WellSpan Health Nazareth Hospital 61,083		33	
Our Lady of Lourdes Medical Center 74,400 Albany Medical College 49,754 Columbia University 75,088 Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western 101,196 Lourdes University 69,110 Otterbein University 64,935 Oregon Health and Science University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Orexel University 65,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 Fork College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		30	
Albany Medical College Columbia University 75,088 Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western 101,197 Lourdes University 69,110 Otterbein University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Drexel University 55,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 Fork College of Pennsylvania / WellSpan Health Nazareth Hospital 61,083		27	
Columbia University 75,088 Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western 101,196 Lourdes University 69,110 Otterbein University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 Vork College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital		28	
Cleveland Clinic Foundation 101,196 Frances Payne Bolton, Case Western 101,196 Lourdes University 69,110 Otterbein University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		27	
Frances Payne Bolton, Case Western 101,190 Lourdes University 69,110 Otterbein University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		28	
Lourdes University 69,110 Otterbein University 64,935 Oregon Health and Science University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Orexel University 65,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		28	
Otterbein University Cregon Health and Science University 70,310 Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Crexel University 55,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 Fork College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital		28	
Oregon Health and Science University Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49,000 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital		28	
Allegheny Valley Hospital / La Roche College School of Nurse Anesthesia 38,245 Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Crexel University 65,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		27	
Commonwealth Health / University of Scranton 33,360 Crozer Chester Medical Center / Villanova University 40,015 Drexel University 65,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		24	
Crozer Chester Medical Center / Villanova University Drexel University 65,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 49rork College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital		25	
Drexel University 65,415 Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		28	
Excela Health School Anesthesia 49,000 La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		28	
La Salle University, Frank J. Tornetta School of Anesthesia 64,855 York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		27.5	
York College of Pennsylvania / WellSpan Health 65,330 Nazareth Hospital 61,083		27.5	
Nazareth Hospital 61,083		32	
HIOHIAS JEHEISON UNIVERSITY 43.387		27	
		30	
Jniversity of Pennsylvania 118,050		24	
UPMC Hamot School of Anesthesia 37,680		28	
Saint Joseph Hospital School of Anesthesia for Nurses 64,690 Mount Marty College 51,616		27 30	

Lincoln Memorial University Caylor School of Nursing	57,400	TN	28	
Middle Tennessee School of Anesthesia	61,607	TN	28	
Union University	54,435	TN	31	
Baylor College of Medicine	84,602	TX	36	DNP
Texas Christian University	83,915	TX	36	DNP
Texas Wesleyan University	59,765	TX	28	
Westminster College	60,800	UT	29	
Sacred Heart Medical Center Gonzaga University	45,455	WA	28	
Charleston Area Medical Center	85,500	WV	36	DNP

AA School	Cost (public) ^a	Cost (private)ª	State	program (mo)
Case Western Reserve University School of Medicine		96,380	DC	24
Nova Southeastern University - Ft. Lauderdale		71,410	FL	27
Nova Southeastern University - Tampa		71,410	FL	27
Emory University School of Medicine		42,000	GA	24
South University		66,125	GA	28
University of Missouri, Kansas City	68,210		MO	29
Case Western Reserve University		96,380	ОН	24
Case Western at Houston (UTHSC)		96,380	TX	24

Table 6. School Location, Cost, and Program Length

eastern region of the country (median \$152,678).

The American Academy of Anesthesiologist Assistants (AAAA) lists eight AA programs in the United States. ¹⁷ Seven of these eight schools are private institutions. The average cost of the seven private AA programs is \$77,155. The one public AA program's tuition and fees is \$68,210. This leads to an average cost of \$76,037 to educate an anesthesiologist assistant. The average program length for AA education is 25.9 months. Data for AA programs are current as of October 2012.

Average provider compensation for AAs in 2011, as reported by the MGMA *Physician Compensation and Production Survey*⁸, was \$123,328. Median compensation was \$127,020. Geographic compensation data were not reported for AAs in the MGMA survey.

Limitations

There were several limitations noted when assessing the data. The cost and length of nurse anesthesia programs only offering a doctoral degree skews the educational cost data for CRNAs slightly higher than AA programs that only offer master's degree programs. When separated out, the mean cost for public CRNA programs only offering DNP education is \$54,306 (n=5), whereas the private DNP program mean was \$75,822 (n=5). However, the American Association of Colleges of Nursing (AACN) will require all CRNA programs to graduate doctoral-prepared anesthetists starting in the year 2025. 18

The information obtained for the cost of educa-

tion was reported by each respective school's website. Unfortunately, the fees stated by the programs are not standardized throughout anesthesia schools. Some costs were listed simply as "total estimated cost" instead of broken down into tuition, fees, books, and housing. This makes comparison difficult even among schools in the same anesthesia specialty. Also, we calculated costs of public school tuition based on in-state costs, but in all likelihood at least some students had to pay the higher out-of-state rate. This could be expected to increase overall expense for both programs, but possibly CRNAs to a greater degree since there is a higher ratio of public:private schools.

1 --- -- 11 -- 6

Another limitation in the data relates to compensation of AAs. The MGMA Physician Compensation Survey only had four medical practices consisting of a total of 33 anesthesiologist assistant providers reporting data on AAs. This is compared to 80 medical practices reporting compensation data on 1,901 CRNAs. According to the AAAA, when AAs are employed in the same department as CRNAs with similar expectations, salaries are typically identical.7 Since the MGMA data are not delineated by hospital, it is difficult to determine the accuracy of this statement. In addition, it is not known how many departments exist with CRNAs and AAs working concurrently. However, personal communication with one of the authors has verified concurrent employment with identical salaries in at least one department in Georgia. Thus, the authors believe if more AA compensation data were

^aContact the authors for specific page sources related to educational program cost and/or length.

^bDegree types are master's degrees unless otherwise noted.

reported, the gap between the salaries could potentially be smaller, as AAAA claims.

Lastly, the authors acknowledge that there are several different options for obtaining a bachelor's degree in nursing other than the traditional 4-year route. These alternative programs were not considered for analysis in this study.

Discussion

There are many factors to consider when comparing educational routes to become a non-physician anesthesia provider. However, from an economic standpoint, our analysis indicates that whether a prospective student either has no undergraduate education or has already received a bachelor's degree in nursing, nurse anesthesia school is the better method. We found that the average cost of CRNA education is \$24,317 less than AA education. Furthermore, while the additional cost of the DNP degree mandated for CRNAs effective in 2025 would decrease this difference, it would remain less costly to complete CRNA education in comparison to AA (net difference of \$9,611). In addition, depending on the type of employment arrangement for a nurse anesthetist, there is a higher earning potential for CRNAs than AAs and no geographical practice restrictions in the United States.

However, if a prospective student has a bachelor's degree in any major other than nursing, anesthesiologist assistant school could be a more economical option. Our analysis shows the average cost of a second bachelor's degree plus nurse anesthesia school would be \$140,088 (assuming all 4 years are needed to obtain the necessary bachelor's degree). This does not account for students who may be able to matriculate through an accelerated BSN program, or those who took an associate's degree; however, either route would still result in increased cost due to additional undergraduate education. While AA school is more expensive than CRNA school, our analysis suggests it is less costly (by \$64,052) and faster than completing a second bachelor's degree in nursing and a nurse anesthesia program. Though alternate routes to a nursing licensure are less expensive, the net outcomemore costly education—is similar.

Summary

Overall, nurse anesthetists have better opportunities to attain a higher income due to fewer restrictions on practice, geographic mobility, and a wider distribution of available positions. Unless a prospective student is considering anesthesia with a bachelor's degree in a subject other than nursing, decreased cost of education, higher earning potential, wider scope of practice, and more job opportunities indicate becoming a CRNA is a more practical and economical choice.

REFERENCES

- Hogan PF, Seifert RF, Moore CS, Simonson BE. Cost effectiveness analysis of anesthesia providers. Nurs Econ. 2010;28(3):159-169.
- Facts about AAs. The American Academy of Anesthesiologist Assistants Website. http://www.anesthetist.org/factsaboutaas/. Accessed November 16, 2012.
- 3. 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. *Anesth Analg.* 2012;115(2):407-427.
- 4. Amburgey B, Fordham M, Payne B, Trebelhorn M. A Study of Anesthesiologist Assistants. Frankfort, Kentucky: Legislative Research Commission; 2007.
- Blumenreich G. Another article on the surgeon's liability for negligence. AANA J. 2007;75(2):89-93.
- Fields R. 17 states opting out of the physician supervision of anesthesia rule. Becker's ASC Review Website. http://www.beckersasc. com/anesthesia/17-states-opting-out-of-the-physician-supervisionof-anesthesia-rule.html. Published May 30, 2012. Accessed January 28, 2013.
- 7. Merwin E, Stern S, Jordan LM. Supply, demand, and equilibrium in the market for CRNAs. AANA J. 2006;74(4):287-293.
- 8. Medical Group Management Association. MGMA Physician Compensation and Production Survey: 2012 Report Based on 2011 Data. USA: Glacier Publishing Services, Inc.; 2012.
- 9. Abouleish AE, Stead SW, Cohen NA. Myth or fact? Nurse anesthetists cost less than anesthesiologists. *ASA Newsl.* 2010;74(12):30-34, 51.
- Nurse anesthetist. ExploreHealthCareers.org. http://explorehealthcareers. org/en/Career/80/Nurse_Anesthetist. Accessed December 13, 2012.
- 11. Anesthesiologist assistants. ExploreHealthCareers.org. http://explore healthcareers.org/en/Career/135/Anesthesiologist_Assistants# Tab=Overview. Accessed December 13, 2012.
- Decker F. Anesthesiologist assistant vs. anesthesiologist nurse. Chron. com. http://work.chron.com/anesthesiologist-assistant-vs-anesthesiologist-nurse-5973.html. Accessed December 13, 2012.
- 13. 2012 Compensation and Benefits Survey. American Association of Nurse Anesthetists. Park Ridge, IL: 2012.
- 14. Anesthesiologist assistant. *Health Care Careers Directory*. American Medical Association; 2009.
- Fast facts. National Center for Education Statistics Website. http://www.nces.ed.gov/fastfacts/display.asp?id=76. Accessed February 18, 2013.
- Accredited nurse anesthesia programs. Council of Accreditation Website. http://home.coa.us.com/accredited-programs/Pages/default.aspx. Accessed October 8, 2012.
- 17. Educational programs. The American Academy of Anesthesiologist Assistants Website http://anesthetist.org/education/. Accessed November 16, 2012.
- American Association of Colleges of Nursing. AACN Position Statement on the Practice Doctorate in Nursing. http://www.aacn.nche.edu/publications/position/DNPpositionstatement.pdf. Published October 2004. Accessed November 16, 2012.

AUTHORS

Philip MacIntyre, CRNA, MSN, is a graduate of Western Carolina University's nurse anesthesia program in Asheville, North Carolina. He works for Asheville Anesthesia Associates as a staff anesthetist. Email: pcmacintyre@yahoo.com.

Bradley Stevens, CRNA, MSN, is a graduate of Western Carolina University's nurse anesthesia program in Asheville, North Carolina.

Shawn Collins, CRNA, DNP, PhD, is interim associate dean of the College of Health and Human Sciences and program director of Western Carolina University's Nurse Anesthesia Program, Asheville, North Carolina. Email: shawncollins@wcu.edu.

Ian Hewer, CRNA, MA, MSN, is an assistant professor at Western Carolina University, in Asheville, North Carolina. He works for Asheville Anesthesia Associates as a staff anesthetist.