

THE WASHINGTON STATE NURSE ANESTHETIST WORKFORCE: A CASE STUDY

Louise Kaplan, PhD, ARNP

Vancouver, Washington

Marie-Annette Brown, PhD, ARNP, FAAN

Holly Andrilla, MS

L. Gary Hart, PhD

Seattle, Washington

The purposes of this study were to describe the Washington State Certified Registered Nurse Anesthetist (CRNA) workforce and analyze selected dimensions of their clinical practice. We developed the 31-item CRNA Practice Questionnaire. After receiving institutional review board approval, the questionnaire was mailed in 2003 to CRNAs licensed in Washington with an address in Washington, Oregon, and Idaho. Statistical analysis included descriptive statistics for all variables and was performed by University of Washington Center for Health Workforce Studies staff.

Results indicate that the typical Washington State CRNA is 50.7 years old, white, and equally likely to be a man or woman. More than half of the Washington State CRNAs are master's educated and have an average of 19 years of CRNA

experience. Most work at least 40 hours a week, take call, and earn more than \$100,000 per year. Almost all have hospital privileges, but only 30% believe they are equal colleagues with physicians.

A χ^2 analysis comparing urban and rural respondents yielded few differences except that rural CRNAs reported seeking significantly less consultation and were more likely to take call. Workforce data may assist CRNAs when negotiating with employers and institutions and in resolving interprofessional conflicts and can have implications for scope of practice, policy, and legislative issues.

Key words: Certified Registered Nurse Anesthetists (CRNAs), practice characteristics, rural-urban nurse anesthetists, workforce.

Certified Registered Nurse Anesthetists (CRNAs) are essential to ensuring that the surgical and obstetrical analgesia needs of patients are met.^{1,2} Because of this critical role in the provision of healthcare, it is alarming that the American Association of Nurse Anesthetists (AANA) identified that the nationwide hospital vacancy rate for CRNAs in 2002 was approximately 13% and the ambulatory surgical center vacancy rate was 12%.³ In Washington State, the focus of this study, the demand for CRNAs exceeds the supply (Lorraine Jordan, AANA, written communication, July 28, 2004). The projected hospital vacancy rate for Washington CRNAs forecasted in the fall of 2002 was 33 positions. Efforts to recruit and retain CRNAs require a better understanding of the CRNA workforce itself and the challenges CRNAs face.

Laws governing CRNA practice vary widely across the nation. In 39 of the 50 United States, the laws regulating CRNA practice do not require CRNAs to be supervised by physicians. Some states, however, require a CRNA receive clinical "direction," and some states have hospital licensing laws or regulations that impose physician supervision or direction on the CRNA. A total of 24 states have no statutory or regulatory requirement to CRNA supervision or direction.⁴

In states where CRNAs are licensed as independent professionals, facility-based policies may require direct or indirect supervision. The AANA states that CRNAs provide 65% of anesthesia care nationwide and 70% in rural areas. In contrast, the American Society of Anesthesiologists states that anesthesiologists provide or participate in 90% of the anesthesia procedures conducted each year and that CRNA data do not acknowledge anesthesiologist supervision of the CRNA cases.⁵ Inter-professional tensions may be related to the fact that anything that reduces the level of role differentiation increases competition. The stakes are highest for the groups of providers with the greatest overlap in training and for their prospective patients.⁶

According to the AANA, CRNAs face additional barriers to practice, such as not all are recognized through state licensure. Instead, some state practice acts confer certification, authorization, approval, registration, or recognition. Nine states have no method of recognition for CRNAs.⁴ There is a federal requirement for physician supervision of CRNAs by the Centers for Medicare & Medicaid Services. However, this policy allows states to opt out of this requirement if state laws do not require a CRNA to be supervised. As of December 2006, only 14 of 23 eligible states have chosen to exercise this option.

In 2003, Washington State opted out of the Medicare requirement for supervision. CRNAs are licensed in Washington State as advanced registered nurse practitioners (ARNPs) and legally authorized to practice independently. They are eligible for third-party reimbursement and may obtain prescriptive authority for legend and schedule II-V drugs. The 2005 law allowing Washington State CRNAs to prescribe Schedule II through IV controlled substances independently within the scope of their practice and may open new opportunities.

As of December 2006, 194 of 635 CRNAs licensed in Washington State had this type of prescriptive authority (Taylor Stair, Washington State Nursing Care Quality Assurance Commission, written communication, December 28, 2006). Most Washington State CRNAs provide anesthesia under a law that allows them, subject to facility-specific protocols, to “select, order, or administer Schedule II through IV controlled substances being limited to those drugs that are to be directly administered to patients who require anesthesia for diagnostic, operative, obstetrical, or therapeutic procedures in a hospital, clinic, ambulatory surgical facility, or the office of a practitioner.”⁷

Although considerable attention is directed to CRNA supply and demand issues, little is known about the factors that describe the CRNA practice environment. No published data about practice characteristics specific to Washington State were located. This information is necessary to guide the evolution of CRNA practice and changes in the practice environment. The purposes of this study were to describe the Washington State CRNA workforce and analyze selected dimensions of their clinical practice.

Methods

We developed the 31-item CRNA Practice Questionnaire based on a review of workforce studies and the results of a prior study of advanced practice nurses in Washington State. We established content validity of the questionnaire for the present study using expert consultation and review by the University of Washington Center for Health Workforce Studies and leaders of the Washington Association of Nurse Anesthetists.

After receiving institutional review board approval, the questionnaire was mailed in 2003 to 387 CRNAs licensed in Washington with an address in Washington, Oregon, and Idaho. Respondents were included in the study if they were licensed and practicing in Washington State ($n = 283$). As a result of 4 mailings, a response rate of 73% was achieved. Data entry, verification, cleaning, and analyses were performed by University of Washington Center for Health Work-

force Studies staff. Statistical analysis included descriptive statistics for all variables. A χ^2 analysis was used to compare urban and rural respondents using the .05 level of statistical significance. Urban and rural were defined using zip code verified Rural-Urban Commuting Area Codes categories. Because of the small number of respondents in small and isolated rural areas, detailed analyses were limited to overall urban and rural comparisons.

Results

- *Demographics of the CRNA workforce in Washington State.* There were 283 CRNAs who responded to the survey and met inclusion criteria, of which 50.9% (144) were women and 48.8% (138) were men. Of the respondents, 57.6% (163) had a master's degree; 22% (62) of the respondents held a master's in nursing. None of the respondents was doctorally prepared. CRNA educational preparation was obtained in a master's level program by 46.1% (130), and 42.9% (121) attended a certificate program. Approximately half of the sample (137 [48.4%]) was educated before 1984. Of note is that 84% (231) completed initial CRNA preparation before 1995 when the graduate degree became a requirement for advanced nursing practice in Washington.

The average age of the respondents was 50.7 years with a range of 28 to 73 years. More than three quarters (232 [82.0%]) were 45 years or older, more than half (159 [56.2%]) were 50 years or older, and more than a quarter (79 [27.9%]) were 55 years or older. Of the 277 participants who responded to the question about racial background, only 6.5% (18) were from communities of color.

- *Practice setting characteristics.* The majority of respondents practiced in urban settings (178 [62.9%]), whereas nearly one fifth (53 [18.7%]) practiced in rural areas. Another one fifth (52 [18.4%]), however, did not answer the question about their practice location. Study findings confirm that CRNAs practice throughout Washington State. Although we had no respondents reporting a practice location in 10 of 39 counties, it is possible that some CRNAs who did not report their practice locations work in some of those 10 counties.

Although most of the 272 respondents who reported the type of setting in which they worked as a hospital operating room (235 [86.4%]), the data indicate that many CRNAs work in multiple settings, including ambulatory surgical centers, surgical offices, dental offices, and pain clinics (Table 1). About half of 271 respondents (132 [48.7%]) were in group practices with anesthesiologists, whereas 15.9%

Table 1. Types of facilities reported by 271 respondents

Facility	Percentage	No. of respondents
Hospital operating room	86.4	235
Obstetrics	45.6	124
Surgical center	48.3	131
Surgical office	14.7	40
Dental office	4.8	13
Pain center	4.8	13
Rural facility	13.6	37
Critical access hospital	8.8	24
Other	2.9	8

Table 2. Hospital privileges reported by 268 respondents

	Percentage responding yes	No. of respondents
Hospital privileges	92.5	248
Ancillary*	44.4	108
Admission/discharge	4.9	12
Other	17.3	42
Orders implemented		
Before physician co-signs	76.5	186
After physician co-signs	5.3	13

* Authorized to make rounds, examine patients, teach, and chart.

(43) were in a group practice with only CRNA colleagues. Solo practices were reported by 18.5% (50) of the respondents, whereas 10.3% (28) had “other” arrangements such as doing locum tenens work, and 6.7% (19) noted multiple arrangements.

- *Individual clinical practice characteristics.* This was a highly experienced sample: slightly more than half (145) had practiced 20 or more years, and only 10% (28) had practiced 5 or fewer years. Most of the 273 CRNAs (202 [74%]) who reported hours of work were practicing 40 or more hours per week. Nearly all (244 [89.4%]) of the CRNAs worked full time, using the definition of 30 or more hours per week. Approximately half of 261 respondents (139 [53.2%]) stated that they do 20 or more cases per week. More than half (167 [62.5%]) of 267 respondents indicated that they participate in taking weekend or evening call.

Table 3. CRNA-related income before taxes for 2002, full and part time combined, for 271 respondents

Income	Percentage	No. of respondents
Zero	0.4	1
< \$25,000	1.1	3
\$25,000-\$49,999	1.1	3
\$50,000-\$74,999	6.3	17
\$75,000-\$99,999	17.3	47
\$100,000-\$124,999	29.2	79
≥ \$125,000	44.6	121

CRNA indicates Certified Registered Nurse Anesthetist.

The CRNAs were asked: “During a typical practice week, how many hours do you spend in the following activities?” Direct patient care was the most common practice activity. Nearly all of 272 respondents (263 [96.7%]) engaged in direct patient care. Of the 263 providing direct patient care, 93.5% (246) spent 20 or more hours a week in direct patient care, 81.6% (222) spent 30 or more hours in direct patient care, and 58.2% (153) spent 40 or more hours providing direct patient care. Practice administration from 1 to 55 hours per week was reported by 30.1% (82). Teaching responsibilities were reported by 15.8% (43). Few CRNAs (6 [2.2%]) reported that they conducted research. Participation in other professional activities such as state or national CRNA associations and continuing education was reported by 17.2% (47).

Specific types of CRNA hospital privileges are summarized in Table 2. Although most of the 268 respondents (248 [92.5%]) had hospital privileges, few (12 [4.9%]) had admission and discharge privileges. Another 17.3% (42) of respondents reported “other” types of privileges. Almost three quarters (186 [76.5%]) reported having hospital privileges to write orders that could be implemented before a physician co-signature was obtained.

CRNAs were asked to indicate their yearly CRNA-related income before taxes for 2002 with 271 responding. With full and part time combined, 73.8% (200) of CRNAs earned \$100,000 or more per year and 44.6% (121) had salaries of \$125,000 or greater (Table 3). One fourth of 279 respondents (66 [23.3%]) stated that they received a bonus in addition to their salary.

Consultation patterns of CRNAs varied enormously. Never consulting with an anesthesiologist

Table 4. Structure of CRNA–physician relationship as reported by 274 respondents*

	Percentage responding yes	No. of respondents
No physician in practice	17.4	47
No physician on site	5.2	14
Equal colleagues	29.6	80
Physician is medical director who oversees everyone's practice	39.3	106
Hierarchical/supervisory and CRNA required to accept his/her decisions about patients	22.6	61
Other	13.3	36

CRNA indicates Certified Registered Nurse Anesthetist.

* Respondents could select all that apply.

about a patient was reported by 36.3% (97) of 268 respondents, whereas 20.2% (54) consulted on every patient. In addition, 35% (92) of 263 respondents never consulted with a CRNA colleague about a patient, whereas more than three quarters (210 [79.8%]) consulted with a CRNA colleague for 15% or fewer of their patients.

Two questions were asked about the availability of a physician on site and by phone for consultation about patient issues. The questions, however, did not specify whether the physician was an anesthesiologist. Responses to open-ended questions suggested that some CRNAs defined the term *physician* as other than an anesthesiologist. Physicians were generally present on site to discuss patient problems as they occurred. Of the 271 CRNAs responding, 11.4% (31) never had a physician on site. In contrast, 51.3% (139) nearly always had a physician on site. A physician was never available for telephone consultation for 16.6% (45) of 237 respondents, whereas more than half (149 [62.9%]) reported that a physician was nearly always available for telephone consultation.

Study participants were asked to describe the nature of their relationship with physicians in their practice (Table 4). Of particular note, 29.6% (80) of 270 participants responded that they were equal with their colleagues with no hierarchy, whereas 22.6% (61) had a hierarchical relationship in which the physicians made the final decisions about patient care. Many of the 13.3% (36) who reported "other" types of relationships offered comments such as the physician

was viewed as a consultant and resource for questions, and the relationship depended on practice location or the complexity of case (ASA physical status III-IV).

- *Rural-urban comparisons.* Several statistically significant differences emerged when comparing urban and rural respondents. Only 231 respondents reported their practice location with 53 practicing in a rural area and 178 in an urban area. Almost half (24 [45.3%]) of rural CRNAs were in a solo practice compared with only 16.9% (30) of urban CRNAs. Because so many rural CRNAs are in solo practice, they infrequently consult with anesthesiologists about their patients. When compared with their urban counterparts, rural CRNAs reported significantly less consultation with anesthesiologists (6.4% vs 49.6%) and with their CRNA colleagues (5.8% vs 11.5%). Another interesting comparison was that 84.9% (45) of rural CRNAs take evening and weekend call, whereas significantly fewer (94 [54%]) urban CRNAs take evening and weekend call. Otherwise, there were few urban and rural differences.

Discussion

This study provides us with rich data that enhance our understanding of the Washington State CRNA workforce and practice environment. Our data allow us to profile CRNA practice in Washington State and compare it with national practice characteristics of CRNAs. The typical Washington State CRNA is:

- Older than 50 years
- White
- Equally likely to be a man or woman
- Master's prepared
- Very experienced
- Working in an urban setting
- Working in multiple settings
- Working 40 or more hours per week
- Taking call
- Earning an income greater than \$100,000

The CRNA workforce is unique in nursing because it reflects a fairly equal number of men and women. The percentage of men in the Washington State CRNA workforce is the same as the national average for CRNAs (49% vs 49%).⁸ Moreover, Washington CRNAs have significantly more gender balance than the Washington and national RN and nurse practitioner (NP) workforces, both of which are 8% men.^{9,10} In regard to ethnic diversity, however, 93.5% of Washington CRNAs are white compared with 92% of the Washington RN workforce.⁹ To meet the healthcare needs of an increasingly diverse population, the future CRNA workforce would be well served to reflect this diversity.

Of CRNAs in Washington, 57.6% hold a master's

degree. In Washington State a far lower percentage of the CRNA workforce is master's prepared compared with NPs, 86% of whom hold a master's degree.¹¹ This is in part a reflection of the fact that 84% of the CRNAs in our sample received their education before a graduate degree was required for advanced practice licensure in Washington State. In addition, it was not until 1998 that entering nurse anesthetist students nationwide were required to obtain a master's degree.

Many CRNA educational programs are housed outside of schools of nursing, so it is not surprising that only 22% of the respondents hold a master's degree in nursing compared with 82% of Washington State NPs.¹¹ Review of the 105 nurse anesthetists programs currently accredited by the Council on Accreditation reveals that just more than half, 56, now grant a master's degree in nursing, 29 grant a master's degree in nurse anesthesia, and 20 grant a master's degree in another field such as biology or health sciences.¹² The only Washington State CRNA program is located in Spokane and is jointly administered by Sacred Heart Medical Center and Gonzaga University's Graduate School of Education. The program began before the development of a nursing program at Gonzaga and remains unaffiliated with nursing. In a survey of Washington CRNAs by Simonson in 2002, 21% (64) of the respondents reported attending the Gonzaga-Sacred Heart program (Daniel Simonson, unpublished data, 2002).

Data about the ages of CRNAs are noteworthy, with 82.0% of CRNAs 45 years or older and 27.9% 55 years or older. As the older CRNAs begin to retire, there may be a significant impact on the adequacy of the state's supply of CRNAs, especially in light of current vacancies that are already problematic. As noted, the CRNA vacancy rate in Washington hospitals in 2002 was forecasted to be 33 positions. Moreover, the retirement of CRNAs will create a loss of their expertise because many have practiced for decades. This has implications for healthcare systems and for novice CRNAs in need of mentors. Strategies such as phased retirements may offer opportunities to continue to use the collective wisdom of these seasoned practitioners. Innovative ideas will be necessary to provide incentives for expert CRNAs to continue their clinical involvement.

Questions about consultation patterns yielded some interesting answers. The respondents had an average of 19 years in CRNA practice. Only 10% of the respondents had fewer than 5 years of experience. Why then would approximately 20% of this highly experienced Washington State CRNA workforce consult with an anesthesiologist on every patient? The

data do not allow for a deeper understanding of whether consultation patterns were determined by institutional requirements or reflected a true need for patient management information.

Our data suggest that there may be practice constraints for Washington State CRNAs even though they are independently licensed. State law does not require a physician co-signature before CRNA orders can be implemented. The fact that only 76.5% of respondents reported that orders could be implemented before obtaining a co-signature from a physician suggests there are facility-specific protocols that are more restrictive than the state law. As previously noted, a 2005 law allows CRNAs to prescribe Schedule II through IV controlled substances independently within the scope of their practice, which may allow them to broaden their practice activities in areas such as pain management. With the change in Washington's prescribing law, will CRNAs continue to select, order, and administer anesthesia subject to facility protocols? Or will CRNAs obtain and be able to use Schedule II through IV prescriptive authority to eliminate the barrier that requires a physician to sign orders before implementation? Only time will answer this significant practice question about changing practice patterns. Two of this study's investigators, Kaplan and Brown, are currently conducting a statewide survey of Washington CRNAs that will, among other things, evaluate the effect of prescriptive authority for controlled substances on CRNA practice.

Physician-CRNA relationships may be evolving. It is noteworthy that combining CRNAs in CRNA-only group practice and those in solo practice, about one third (34.1%) of the respondents were in practices without physicians. It appears that hierarchical relationships with anesthesiologists remain the norm because only 29.6% of the respondents in practice with physicians described their relationships with these physicians that of equal colleagues. There were surprisingly few rural-urban differences. Rural CRNAs were more likely to be in solo practices, consulted less with anesthesiologists or CRNAs, and were more likely to take evening or weekend call. Although we did not assess the availability of common anesthesia services, the literature suggests that the size of the facility drives the types, complexity, and volume of surgical services offered in a rural facility.¹ Although rural CRNAs were more likely to report being in solo practice, the study did not clarify whether the respondent was the sole CRNA employed by a facility or in a private solo practice. Rural CRNAs may struggle financially in private practice in comparison with those who are hospital

Table 5. Comparison of Washington CRNAs and NPs*¹¹

	CRNAs	NPs
Average age	50.7	48.6
Male	48.8	8
Female	50.9	92
Master's degree	57.6	86
Master's in nursing	21.9	82
Average years of experience	19	11
Full time†	86.2	75
Salary ≥ \$100,000	73.8	5
Equal colleague with physician	28.6	45

CRNA indicates Certified Registered Nurse Anesthetist; NP, nurse practitioner.

* Data are given as percentages unless otherwise indicated.

† Full time = ≥ 30 hours per week.

employees given current reimbursement rates and the volume of surgical caseloads.¹

Our study of Washington State ARNPs, conducted concurrently with the CRNA survey, revealed some interesting comparisons.¹¹ CRNAs are licensed as ARNPs in Washington State, along with NPs, certified nurse midwives, and psychiatric clinical nurse specialists who are collectively referred to as NPs. On average, CRNAs were slightly older than NPs, were more often male, had more years of experience, were more likely to work full time, and earned significantly higher salaries. The NPs, however, were more likely than CRNAs to report relationships with physicians as equal colleagues (Table 5).

As a group, Washington State CRNAs are well educated for a specialized role, typically work full time in direct care, and have demonstrated a long-term commitment to nurse anesthesia. This research can serve as a model for systematic inquiry about CRNA practice characteristics. Results provide greater knowledge about the Washington State CRNA workforce and document the realities of practice that will be useful to address a variety of professional issues. The results also act as a baseline with which subsequent surveys can be compared so that change over time can be evaluated. Data may assist CRNAs when negotiating with employers and institutions and in resolving inter-professional conflicts. For example, CRNAs could use workforce research to support the opt out from the Centers for Medicare & Medicaid Services supervi-

sion requirement by focusing on the quality of care provided by CRNAs and a cost-benefit comparison between CRNA and anesthesiologist care. These study findings should also serve to prompt further research that can have implications for scope of practice, policy, and legislative issues. Research provides the foundation to articulate key dimensions of CRNA practice and changes in practice.

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AUTHORS

Louise Kaplan, PhD, ARNP, is assistant professor, Washington State University Vancouver College of Nursing, Vancouver, Wash. Email: kaplan@vancouver.wsu.edu

Marie-Annette Brown, PhD, ARNP, FAAN, is professor, University of Washington, School of Nursing, Seattle, Wash.

Holly Andrilla, MS, is a biostatistician, University of Washington, Center for Health Workforce Studies, Seattle, Wash.

L. Gary Hart, PhD, is director, University of Washington, Center for Health Workforce Studies, Seattle, Wash.

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