

# CRNA-Physician Collaboration in Anesthesia

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*The benefits of collaboration in healthcare have been linked positively with higher patient satisfaction, improved patient outcomes, enhanced nursing staff satisfaction, and decreased hospital costs. A sample of nurse anesthetists and anesthesiologists affiliated with postgraduate training programs in the state of Texas responded to a survey designed to gather attitudes toward physician-nurse collaboration using an adaptation of the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration.*

*Two-hundred seventy surveys were completed by 62 anesthesiologists and 208 nurse anesthetists. The mean for the total scores on attitudes toward collaboration for anesthesiologists was 44.4 ( $\pm$  SD 8.7) and*

*51.8 ( $\pm$  SD 2.7) for nurse anesthetists. Mean scores were consistently higher in the 4 subscales (showed stronger agreement) for nurse anesthetists than for anesthesiologists.*

*No significant differences in attitudes were found between men and women for the total sample. However, the health discipline showed a statistically significant difference. These findings suggest that Certified Registered Nurse Anesthetists who deal with role conflict or unclear expectations as well as limited scope of practice may have increased job stress and dissatisfaction.*

**Keywords:** Anesthesia care team, attitudes, physician-nurse collaboration.

Physician-nurse collaboration has been linked with improvement in nursing job satisfaction and retention.<sup>1</sup> However, few researchers have compared the attitudes toward collaboration of nurse anesthetists and anesthesiologists. These professionals often work together in teams but may be viewed as competitors in anesthesia practice.

The benefits of collaboration in healthcare have been linked positively with higher patient satisfaction, improved patient outcomes, enhanced nursing staff satisfaction and retention, decreased job stress for nurses, and decreased hospital costs.<sup>2-11</sup> Knaus et al<sup>12</sup> established that in intensive care units (ICUs) in which there was poor collaborative communication between nurses and physicians, ineffective leadership, and poor nurse staffing, the patient risk-adjusted mortality and length of stay increased as much as 58%. Wheelan et al<sup>4</sup> found that staff members from ICUs where mortality rates were lower than predicted perceived their units as functioning with trust, collaboration, and teamwork.

The Institute of Medicine has stated that the culture of medicine and nursing will have to change in order to improve patient safety.<sup>13</sup> Respect for, and recognition of, each group member's knowledge and judgment is a prerequisite to collaboration.<sup>14</sup> This respect requires members to have a basic level of understanding and acceptance of the other's expertise and roles.

Since the early 1900s, the anesthesia care team (ACT) has consisted of nurse anesthetists and physician anesthesiologists. Prior to the 1930s, different practitioners administered anesthesia (primarily nurses and a few dentists and physicians) as professional qualifications were not

necessary. By 1933, the issue of specialization in anesthesia was apparent to both nurse anesthetists and physicians.<sup>15</sup> Currently, ACT may refer to any combination of nurse anesthetists and anesthesiologists, either working solo or as a team, or to anesthesiologists with anesthesiologist assistants (AAs).<sup>16-19</sup> The term ACT has been used in recent articles to refer to Certified Registered Nurse Anesthetists (CRNAs) practicing in a medically directed environment with anesthesiologists.<sup>17</sup> In 1975, nearly 70% (69%) of all CRNAs practiced as hospital employees, and only 20% worked for an anesthesiologists' group. Currently, 27% of CRNAs practice in nonmedically directed or unsupervised settings, and 73% practice in medically directed environments.<sup>17,20</sup> The fastest growing practice types over the years 1975 to 1997 were CRNA-only groups (these increased 125%), followed by combined CRNA and anesthesiologist groups (increased 88%) and CRNAs in office and surgical center categories (increased 85%). Currently, there are 4 alternative arrangements for inpatient anesthesia in the United States: an all-anesthesiologist staff; an all-nurse anesthetist staff; a mixed staff of CRNAs and anesthesiologists; and anesthesiologists and anesthesiologist assistants.<sup>15,21</sup>

No single anesthesia model is best for all hospitals; several team models are possible.<sup>21</sup> "Team" anesthesia is generally thought of in the context of the CRNA performing hands-on skills throughout the surgery and the anesthesiologist supervising and assisting at key times.<sup>20,21</sup> Other team arrangements are more associative; for example, in some models CRNAs are responsible for their own cases with no physician involvement unless requested. Even in departments where 1 physician super-

vises 2 CRNAs, there is no guarantee of a particular level of supervision since the physician typically has other clinical responsibilities, including pain management and preoperative and postoperative care.<sup>21</sup> Fassett and Calmes<sup>18</sup> surveyed CRNAs and anesthesiologists in the same ACT who agreed that medical direction was not needed in more than 70% of the caseload.

Currently, there are 42,330 anesthesiologists (including residents) and 36,000 CRNAs in the United States.<sup>22,23</sup> The number of surgical procedures is estimated at 40 million per year, most requiring an anesthetic, and this number is increasing annually based on population growth.<sup>24</sup> Increasingly, studies have linked occupational stress, scope of practice, and collaboration with anesthesia practice types.<sup>17,25</sup> In an analysis of several reported surveys, CRNAs rated job-related interpersonal conflicts as primary stressors.<sup>17</sup>

Alves<sup>17</sup> found that even with the prevalence of ACT practices, there are no consistent standards or models that make the best use of CRNAs and anesthesiologists. The characteristics of CRNA-anesthesiologist relationships in settings that limit the scope of practice for CRNAs can affect conflict-resolution behaviors. Difficulties in attempting to satisfy conflicting job demands and unclear expectations are 2 causes of occupational stress.<sup>17,25</sup> The Texas Association of Nurse Anesthetists (TANA) reported that approximately 58% of all hospitals provide anesthesia using the ACT model.<sup>26</sup> With most CRNAs now working in ACT models, it is important to address issues of collaboration characterized by tension, conflicting expectations, and poor communication skills.<sup>9,27</sup>

The purpose of this study was to compare attitudes toward collaboration of CRNAs with those of anesthesiologists.

## Methods

This descriptive study included nurse anesthetists and anesthesiologists affiliated with postgraduate training programs in the state of Texas. Surveys were designed to gather attitudes toward physician-nurse collaboration using an adaptation of the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration. This instrument measures physician and nurse attitudes toward authority, autonomy, and responsibility for patient monitoring, collaborative decision making, role expectations, and collaborative education.<sup>28</sup> The questionnaire consists of 15 items with answers recorded on a 4-point Likert scale (strongly agree, agree, disagree, strongly disagree). The total score is the sum of all item scores; scores range from 15 to 60, with higher scores indicating a more positive attitude toward physician-nurse collaboration.

For the current study the word *anesthesiologist* replaced *physician* and CRNA replaced *nurse* in the Jefferson Scale. The item “physicians and nurses should

contribute to decisions regarding the hospital discharge of patients” was replaced with “anesthesiologists and CRNAs should contribute to decisions regarding the discharge of patients from PACU” (postanesthesia care unit). Permission to use the scale adapted as described was obtained from the tool’s author, M. Hojat, of the Jefferson Medical College, Philadelphia, Pennsylvania. Previous studies found the reliability assessed through Cronbach alpha to be .84 to .85.<sup>28</sup>

Before implementing the study, the authors obtained approval from the institutional review board. Program directors of 8 anesthesiology residency programs and 5 nurse anesthesia programs in the state of Texas were sent links to the Internet survey via email. Postcards were also sent to anesthesiologist faculty (n = 403) and nurse anesthetists (n = 72) at primary clinical sites; the researcher was unable to access the email or mailing addresses of all potential respondents.

## Results

- *Sample Characteristics.* Two-hundred seventy surveys were completed; 62 were from anesthesiologists and 208 from nurse anesthetists. There was no way to identify the program directors who sent the survey link to their residents. Most anesthesiologists and nurse anesthetists in the sample were similar in age (largest percentage were 45 to 54 years) and years of experience (more than 15). This sample of anesthesiologists was primarily male (73%), whereas the nurse anesthetist sample was primarily female (54%). Nearly all nurse anesthetists (92%) and anesthesiologists (89%) were white. Some respondents in both groups were African American, Hispanic, Asian, or other ethnicity or race; 2 did not respond to the question of ethnicity. Most nurse anesthetists reported a master’s degree as their highest educational degree (75%).

Anesthesiologists and nurse anesthetists were asked to report the percentage of their practice that took place in ACT environments. Responses ranged from zero to 100% for both groups. Among nurse anesthetists and anesthesiologists, the most common response was 100% ACT (43% of nurse anesthetists and 32% of anesthesiologists chose that response). Anesthesiologists’ practices were primarily in large, urban hospitals (70%), with smaller numbers practicing in small, community hospitals (10%), multiple sites (10%), or outpatient (6%); only 2% were in nonclinical practice. Nurse anesthetists reported practices in large, urban hospitals (60%), small, community hospitals (29%), multiple sites (6%), outpatient (3%) practices, and office or nonclinical practice (1%) (Table 1).

Findings of the reliability testing with this sample on the Jefferson Scale were similar to those found in an earlier study of nurse anesthetists and anesthesiologists.<sup>29</sup> Cronbach coefficient alpha ( $\alpha$ ) for the total sample (N =

	<b>Anesthesiologists % of sample (n = 62)</b>	<b>Nurse anesthetists % of sample (n = 208)</b>
<b>Gender</b>		
Male	72.5	46.2
Female	27.4	53.8
<b>Age, y</b>		
Under 35	27.4	19.7
35-44	19.3	26.9
45-54	30.6	30.7
55-65	19.3	20.2
Over 65	3.2	1.9
<b>Ethnicity/race</b>		
White	88.7	91.8
African American	1.6	1.4
Hispanic	3.2	2.4
Asian	4.8	1.9
Other	1.6	1.4
<b>Highest degree</b>		
MD/DO or postdoctorate	100.0	1.4
Master's degree	NA	75.3
Bachelor's degree	NA	22.7
No degree	NA	2.4
<b>Years' experience</b>		
<5	27.4	25.1
5-10	11.2	22.7
10-15	6.4	13.0
>15	54.8	39.1
<b>% of ACT practice</b>		
None	3.2	15.9
<50%	12.9	11.1
50%-75%	27.4	4.3
>75%	56.3	68.5
<b>Practice setting</b>		
Large urban	69.3	59.9
Small community	9.6	29.4
Outpatient	6.4	2.8
Office	—	0.5
Nonclinical	3.2	0.5
Multiple	9.6	5.7
Retired/leave of absence	—	0.9
<b>Practice location</b>		
Texas	95.1	40.5
Other	4.8	58.4
<b>Professional organization membership</b>		
National	80.6	99.5
State	14.5	99.5
<b>Board certification</b>		
Anesthesia/anesthesiology	82.3	87.0
Pain management	3.2	NA
Critical care	3.2	NA

**Table 1. Sample Characteristics of the Participants (N = 270)\***

MD indicates medical doctor; DO, doctor of osteopathy; NA, not applicable; ACT, anesthesia care team. Dash indicates zero responses.  
\*Some percentages do not total to 100 due to rounding.

270) was .91, compared with .89 in Taylor's study.<sup>29</sup>

The mean for the total scores on attitudes toward collaboration for anesthesiologists was 44.4 ( $\pm$  SD 8.7) and 51.8 ( $\pm$  SD 2.7) for nurse anesthetists. Mean scores were consistently higher in the 4 subscales (showed stronger agreement) for nurse anesthetists than for anesthesiologists. These results are presented in Table 2.

With 96 males and 112 females in the nurse anesthetist group and 45 males and 17 females in the physician group, analysis of differences based on gender (sex) was explored. No significant differences in attitudes were found between males and females for the total sample ( $F = 2.22$ ;  $P = .14$ ). However, discipline (anesthesiologist vs nurse anesthetist) showed a significant difference ( $F = 215.31$ ;  $P = .001$ ).

A 2-way analysis of variance was used to determine the interaction effect of gender and discipline. There was a significant difference in attitudes by the interaction of gender and discipline; the computed  $F$  for the interaction effect was 6.27 ( $P = .013$ ). Results are shown in Table 3.

When examining differences in attitudes toward collaboration based on participation in ACT practice, we found an inverse relationship, indicating that those who engage in team practice more than 50% of the time have a less favorable attitude toward collaboration. When differences were explored using the Mann-Whitney test, findings showed that the group who engage in ACT practice less than 50% of the time had significantly higher attitudes regarding collaborative practice ( $U = 5,376$ ;  $P = .016$ ) than those who were in ACT practice more than 50% of the time. Written comments were made by 12

anesthesiologists and 33 nurse anesthetists at the end of the survey. The emerging themes of the comments were grouped under 3 themes associated with the Jefferson Scale: shared education and teamwork, nurses' autonomy, and physician's authority. Anesthesiologists' comments on education indicated a strong bias toward medical education over nursing education as well as a misunderstanding of the new doctoral program for nurse anesthetists. Comments on teamwork referred to limited interpersonal skills as a cause for strained relationships between nurse anesthetists and anesthesiologists and the need for teamwork and mutual respect. Positive comments included the remark that healthy collaboration between anesthesiologists and CRNAs as part of a true team approach is in the patient's best interest for safety. Comments on nurses' autonomy referred to lack of autonomy for individual nurse anesthetists related to job satisfaction and scope of practice. Comments regarding physician authority were primarily about the physician being the leader of the team, along with the need to value the input of those being given orders.

## Discussion

Many nurse anesthetists and anesthesiologists work in a collaborative team effort, with satisfaction experienced by both members. Such satisfaction is the result of mutual respect for each member's knowledge. The results of this study are comparable to those of Taylor,<sup>29</sup> indicating that there is a difference in attitudes toward collaboration between nurse anesthetists and anesthesiologists. The implications for practice are that CRNAs may deal

Jefferson score	Anesthesiologists (n = 62)		Nurse anesthetists (n = 208)	
	Range*	Mean $\pm$ SD	Range*	Mean $\pm$ SD
Total	18.4	44.4 $\pm$ 8.7	6.4	51.8 $\pm$ 2.7
Factor score				
Shared education and teamwork	10.6	20.8 $\pm$ 4.8	4.6	26.3 $\pm$ 1.8
Caring opposed to curing	4.6	8.7 $\pm$ 1.8	2.7	11.1 $\pm$ .85
Nurses autonomy	3.6	10.4 $\pm$ 1.3	2.4	11.7 $\pm$ .71
Physician authority	4.6	4.4 $\pm$ 1.8	3.0	7.0 $\pm$ 1.0

**Table 2.** Results and Comparisons of Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration, Total Scores, and Factor Scores (N = 270)

\*Range indicates variation in responses to the items.

Variable	df	F	Significance
Discipline	1	215.314	.001*
Gender	1	2.224	.07
Discipline-gender interaction	1	6.274	.0137*

**Table 3.** Results of 2-Way Analysis of Variance, Effect of Gender, and Discipline on Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration Score

\* Difference significant at the .05 level.

with role conflict or unclear expectations as well as limited scope of practice that can lead to increased job stress and dissatisfaction.

Anesthesiologists in this sample were more concentrated (27%) in the under-35 age category than is the national population, more concentrated in nonmetropolitan communities (10%), and largely white (89%), whereas the 45% of the national population of anesthesiologists is white.<sup>30</sup> Sample nurse anesthetists were similar in age and gender distribution with the national population.<sup>31</sup> The percentage of nurse anesthetists practicing in metropolitan locations was greater than the national population. However, this sample differed from the national sample with regard to ACT practices. Nationally, 21% of anesthesiologists and nurse anesthetists report they do not work in ACT practices; in this sample, only 3% of anesthesiologists and 16% of nurse anesthetists reported they did not work in ACT practices.<sup>32,33</sup>

Findings of the reliability (ie, internal consistency) testing with this sample were similar to those found in Taylor's study.<sup>29</sup> Cronbach coefficient alpha for the total sample (N = 270) was .91, compared with .89 in the previous study. The alpha of the total scale for nurse anesthetists (n = 208) was .60 and for anesthesiologists (n = 62) was .92. The interitem correlation mean for the nurse anesthetists was .09, while that of the anesthesiologists was .43. The lower alpha for the nurse anesthetists reflects the finding that there was a limited amount of covariance among the items, resulting in a low item-to-item correlation (< .30) for most of the items. Internal consistency measures of the adapted measurement instrument were lowest for the factor of nurse's autonomy (anesthesiologists,  $\alpha = .42$ ; nurse anesthetists,  $\alpha = .38$ ; total sample,  $\alpha = .52$ ). The lower effect sizes could be the result of a poor fit of the instrument to measure these factors or an indication that there is greater agreement between anesthesiologists and nurse anesthetists when both groups have lower scores. The consistency scores indicate that in order to make meaningful conclusions, a more reliable instrument is needed to measure attitudes in nurse anesthetists.

Future research into rating interpersonal skills of anesthesia providers may add knowledge to the factors that affect attitudes toward collaboration and cohesiveness in the ACT. Another interesting research topic would be the comparison of nurse anesthesia job satisfaction related to their scope of practice. A qualitative study using the written comments from this survey would potentially add some insight to the differences in attitudes between anesthesia professionals.

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