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# CRNA Practice Environment in Current Healthcare Systems

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- Bobbie Berkowitz, PhD, RN, NEA-BC, FAAN Committee Chair

- Pat Stone, PhD, RN, FAAN

- Jonathan Shaffer, PhD, MS

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# Learning objectives

Participants will

Describe current working conditions of CRNAs

Learn the important aspects that comprise CRNA practice environment

Understand the similarities and differences of CRNA practice environment between two states

Understand policy, practice, and research implications of CRNA practice environment



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# Certified registered nurse anesthetists

- CRNAs are advanced practice registered nurses
- Experienced critical care nurses educated to the Master's degree and beyond
- Successfully passed national certification exam
- Trained to administer any type of anesthesia to patients across the care continuum



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# Background

- 40,000 CRNAs in the U.S.

- In 2015 CRNAs delivered 65% of anesthesia care in the U.S.

- Workforce expected to grow 19% over the next decade

- Surgical volume increasing:

- Free-standing ASCs surgical volume up 300% through 1996-2006

- Hospital-owned ASC surgical volume up 300K from 2000-2014

- Hospital operating room surgical volume up 300K from 2001-2011

- Twenty million newly insured



# Research demonstrates

- CRNA care is safe and yields positive outcomes for patients regardless if CRNAs practice independently or in collaboration with other providers
- CRNA care is most cost-effective when CRNAs practice to their full potential
- CRNAs provide care to vulnerable populations in rural and underserved America



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# Policy organization recommendations

- In 2001 Centers for Medicare and Medicaid Services' (CMS) final rule stated no evidence supported the requirement for CRNA supervision
- In 2010 National Academy of Medicine (former IOM) Report “Leading Change, Advancing Health” recommended full practice authority for APRNs, including CRNAs
- Department of Veterans Affairs proposed a rule that would allow APRNs, including CRNAs, to practice without a supervision requirement regardless of their state of practice



# Practice environment within employment settings

Shared perceptions of and experience with organizational structures that affect behaviors and outcomes

- Leadership characteristics, group behaviors, communications, quality attributes of work life, and rewards

Practice environment and healthcare workforce

- Registered nurse practice environment
- Nurse practitioner practice environment
- CRNA practice environment



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# Practice environment impact on providers and patients

## Registered nurses

- Encompasses characteristics of organizations that enable nurses to function to their full potential
- When optimal: Job satisfaction increases, turnover decreases, quality of care increases, patients experience less falls, more rescue from critical emergencies, and die less often

## Nurse practitioners

- Professional visibility, NP-administration relations, NP-physician relations, and Independent practice and support
- When optimal: Job satisfaction increases, quality of care increases, healthcare costs decrease, and access to primary care increases



# CRNA practice environment

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# Objective 1: Describe current working conditions of CRNAs

## Systematic review

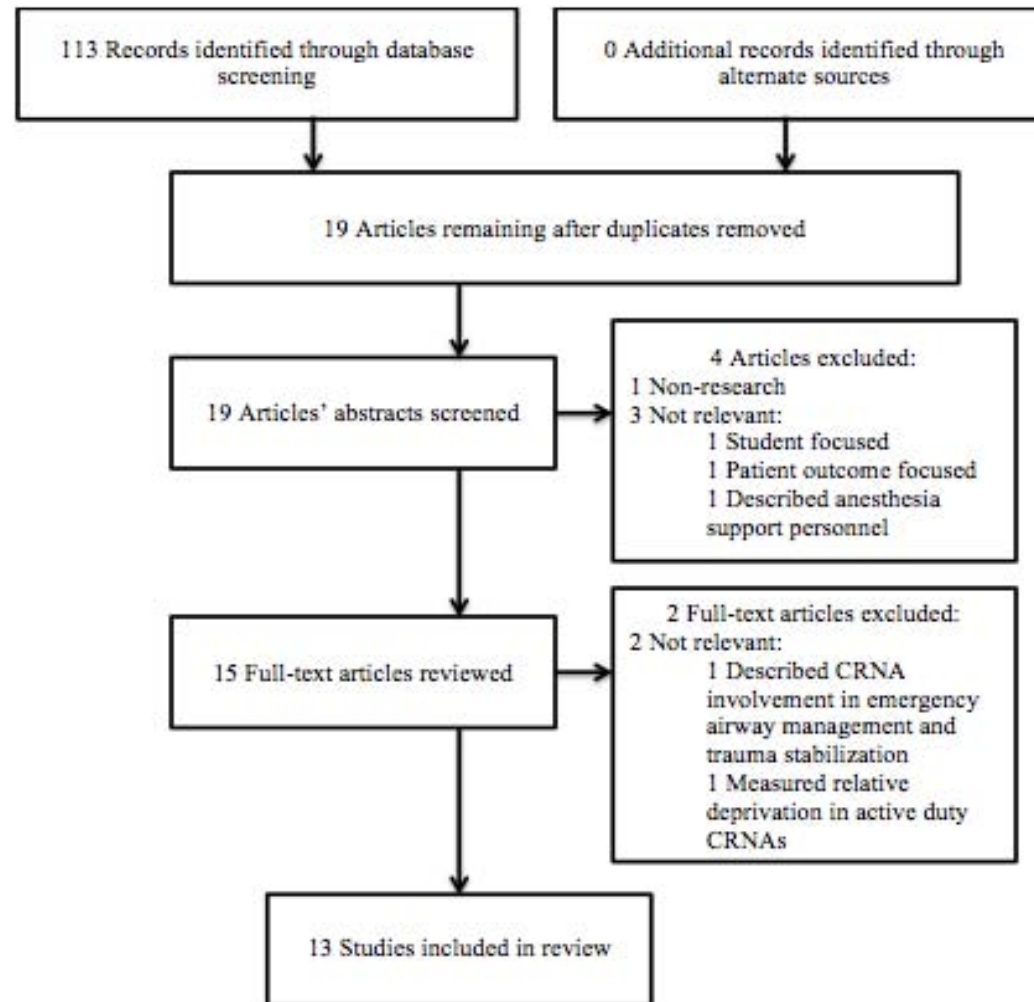
- Databases: Ovid/MEDLINE, PubMed, SCOPUS, and EBSCO Cumulative Index to Nursing and Allied Health Literature
- Keywords: Nurse anesthetists, physician-nurse relations, interpersonal relations, organizational culture, professional autonomy, practice environment, professional practice, care environment, work environment
- Eligibility: U.S. studies, original research, published in peer-reviewed journals from 2001-2015
- Preferred Reporting Items for Systematic and Meta-Analyses guidelines (PRISMA)



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# PRISMA



# Findings

- CRNAs practice in challenging work environments
- Four themes emerged
  - Collaboration and communication
  - Professional identity and autonomy
  - Work relations of CRNAs
  - CRNA outcomes



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# Collaboration and communication

- CRNAs: Collaborators who promote patient safety
- Collaboration, teamwork, and mutual respect between CRNAs and anesthesiologists were important to providing safe care
- Attitudes on collaboration decreased as the percentage of anesthesiologists in the workplace increased
- Percentage of anesthesia care team practice exceeded 50%, CRNA attitudes on collaboration decreased, role conflict increased, and was associated with CRNA stress and job dissatisfaction
- Variability in CRNA collaboration: Never 36%, Always 20%



# Professional identity and autonomy

- Intractable conflict, role overlap, threats to intra-professional identities
- Effective communication could de-escalate conflict
- Various way of resolving conflict: Collaboration, compromise, avoidance
- Autonomy was important for job satisfaction
- Requiring CRNAs to accept clinical decisions of anesthesiologists led to moral distress and intent to leave



# Work relations of CRNAs

- Anesthesia care team dynamics

- 88% of CRNAs practice in anesthesia care teams

- Scope of practice restrictions existed

- Private physician groups had restrictive SOP for CRNAs

- Less restrictive SOP, more occupational stress

- 50% of daily CRNA stress was occupational stress

- High workload and pressures from administrators to meet patient quotas

- Interpersonal work relations contribute most to CRNA stress

- Strategies for managing stress

- Professional help, support from others, prescription medications





# CRNA outcomes

- Incivility: Deviant, disrespectful behavior intended to harm its target
- Burnout: State of emotional and physical exhaustion experienced as a result of chronic, demanding work situations
- Workplace aggression: Physical or verbal abuse, bullying, conflict, or threatening behaviors

CRNAs practice in poor working conditions

Poor outcomes may lead to job dissatisfaction, job turnover, and a negative effect on patient safety



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# Learning objective 1

Describe current working conditions of CRNAs

✓ Achieved

Reference: Boyd, D. R., & Poghosyan, L. (in press). Certified registered nurse anesthetist working conditions and outcomes: A review of the literature. *AANA Journal*



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# Objective 2: Learn important aspects that comprise CRNA practice environment

Many instruments exist that measure practice environment (or similar concepts) of nursing, or advanced practice nursing, but none is CRNA specific

- Nursing Work Index and subsequent revisions
- Perceived Nurse Work Environment of critical care nurses
- EverCare Nurse Practitioner Role and Activity Scale
- Nurse Practitioner Primary Care Organizational Climate Questionnaire (NP-PCOCQ)



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# Content validity

- One meeting of six purposively selected expert CRNAs from NYSANA
- Participants evaluated the 34 items, participated in a group discussion, and made additional item recommendations
- Participants individually evaluated items for their relevance to CRNA organizational climate:
  - 1 = Not relevant
  - 2 = Unable to assess without significant revision
  - 3 = Item is relevant and succinct
  - 4 = Item is very relevant and succinct



# Content validity results

- All items were judged to be content valid
- Five newly created items were added to capture:
  - Teamwork dynamics, anesthesiologist support for CRNA decisions, and CRNA suggestions regarding patient care
- 39 item instrument
- Experts agreed:
  - Instrument accurately represented CRNA practice environment
  - Content of all final items were valid
  - Instrument measured CRNA practice environment and nothing else



# Pilot testing

- Aim: Item analysis and reliability testing

- Sample: Purposive sample of 30 NYSANA CRNAs

- Eligibility: Clinically practicing CRNA in New York State and being a NYSANA member

- Exclusion: CRNA retirees or student registered nurse anesthetists

- Data collection

- Email invitation to participate with anonymous Qualtrics survey link

- Participants indicated the degree to which each of the 39 items was present in their primary practice site:

- 1 = Strongly Disagree

- 2 = Disagree

- 3 = Agree

- 4 = Strongly Agree



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# Pilot testing analysis

- Data were exported into SPSS for analysis
- Data were evaluated for missing responses and outliers
- Instrument named the Certified Registered Nurse Anesthetist Organizational Climate Questionnaire (CRNA-OCQ)
- Items were grouped into subscales
- Items with low inter-item correlations or those not contributing to internal consistency reliability were considered for removal



# Pilot testing results

CRNA-OCQ subscales (with Cronbach's alphas) with respective items	Mean	SD	Cronbach's alpha if deleted
CRNA-Administration Relations (Cronbach's alpha .895)			
Administration shares information equally with CRNAs and physicians	1.8	0.80	.881
Administration treats CRNAs and physicians equally	1.7	0.71	.893
CRNA-Physician Relations (Cronbach's alpha .833)			
In my organization, CRNAs and physicians collaborate to provide patient care	3.0	0.46	.827
Physicians ask CRNAs for their advice when providing patient care	2.5	0.68	.789
Independent Practice (Cronbach's alpha .830)			
My organization does not restrict my abilities to practice to the full extent of my state's regulatory scope of practice	2.3	0.91	.766
My organization fosters an environment where I can practice autonomously	2.2	1.10	.765





CRNA-OCQ subscales (with Cronbach's alphas) with respective items	Mean	SD	Cronbach's alpha if deleted
<b>Professional Visibility (Cronbach's alpha .772)</b>			
In my organization there is a system in place to reward my performance	2.0	0.85	.791
CRNAs are represented on important committees in my organization	2.0	0.91	.728
<b>CRNA-Anesthesiologist Relations (Cronbach's alpha .753)</b>			
In my organization, anesthesiologists and CRNAs practice as a team	3.1	0.53	.722
My organization is open to CRNA suggestions regarding new ideas about patient care	2.4	0.74	.748
<b>Support for CRNA Practice (Cronbach's alpha .683)</b>			
In my organization, enough time is allotted to perform patient care	3.0	0.56	.611
CRNAs are an integral part of the organization	2.9	1.00	.711



## Learning objective 2

Learn important aspects that comprise CRNA practice environment

- **Partially Achieved**

Boyd, D. R., & Poghosyan, L. (in press). Measuring certified registered nurse anesthetist organizational climate: Instrument adaptation. *Journal of Nursing Measurement*.

Boyd, D. R., & Poghosyan, L. (2017, April). *A new tool to measure certified registered nurse anesthetist organizational climate: Instrument adaptation*. Accepted for poster session presentation at the 29th Annual Scientific Sessions of the Eastern Nursing Research Society, Philadelphia, PA



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# Objective 2: Learn important aspects that comprise CRNA practice environment

- Sample: Cross-sectional survey of 279 TxANA CRNAs

- Eligibility: Clinically practicing CRNA in TX and being a TxANA member

- Exclusion: CRNA retirees or student registered nurse anesthetists

- Data collection:

- Email invitation to participate with anonymous Qualtrics survey link

- Participants indicated the degree to which each of the 35 items was present in their primary practice site:

- 1 = Strongly Disagree

- 2 = Disagree

- 3 = Agree

- 4 = Strongly Agree



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# Analysis

- Exploratory factor analysis (EFA) was conducted on the 35-item CRNA-OCQ
  - To determine factorial structure
  - To finalize the subscales
- EFA approaches
  - Maximum likelihood extraction
  - Promax rotation
  - Allowed number of factors emerged from data
  - Pre-selected the number of factors to be extracted
- Cronbach's alphas on each subscale were computed



Demographics	n (%)
Sex	
Female	145 (52.0)
Male	134 (48.0)
Age	
< 30	8 (2.9)
30 - 39	46 (16.5)
40 - 49	81 (29.0)
50 - 59	81 (29.0)
60 and older	63 (22.6)
Race	
White	231 (83.1)
Asian or Pacific Islander	12 (4.3)
Black or African American	12 (4.3)
Other	23 (8.3)
Years of CRNA experience	
< 10	91 (32.7)
10 - 19	75 (26.9)
20 - 29	52 (18.6)
30 - 39	52 (18.6)
40 or more	9 (3.2)

Demographics	n (%)
Current employment structure	
Employee of a hospital	54 (19.4)
Employee of a group	121 (43.4)
Independent contractor	72 (25.8)
Other employment arrangement	9 (11.4)
Current practice setting	
Hospital	217 (77.8)
Ambulatory surgical center	54 (19.4)
Other	8 (2.9)
Physician supervision of CRNA practice	
Yes	198 (71.0)
No	81 (29.0)
Type of physician supervising CRNA practice	
Anesthesiologist	187 (94.4)
Surgeon	8 (4.0)
Other	3 (1.5)
Highest education level	
Diploma/Certificate in anesthesia	25 (9.0)
BS in nursing or other field	17 (6.1)
MS in nursing or other field	182 (65.2)
DNP, PhD, JD or other doctorate	55 (19.7)



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# Results

- EFA revealed 29 items loading on four factors
- Kaiser-Meyer-Olkin measure of sampling adequacy was .939
- The goodness-of-fit test was non-significant: Chi-Square 941.46, DF 461, Sig .000
- Percent total cumulative variance explained by the 4-factor solution was 60.04
- Cronbach's alphas for the four factors ranged from .925 - .760



	CRNA-OCQ factors (with Cronbach's alphas) and respective items	Factor loading	Corrected item-total correlation	Cronbach's alpha if item deleted
Factor 1: CRNA-Administration Relations (.925)				
1	Administration takes CRNA concerns seriously	.972	.816	.914
2	Administration is open to CRNA ideas to improve patient care	.882	.749	.917
3	I feel valued by my organization	.795	.729	.917
4	Administration makes efforts to improve working conditions for CRNAs	.746	.705	.918
5	My organization is open to CRNA suggestions regarding new ideas about patient care	.700	.710	.918
6	Administration is well informed of the skills and competencies of CRNAs	.673	.698	.919
7	In my organization, there is ongoing communication between CRNAs and administration	.668	.724	.918
8	In my organization the CRNA role is well understood	.603	.674	.919
9	Administration shares information equally with CRNAs and physicians	.565	.704	.918
10	Administration treats CRNAs and physicians equally	.549	.668	.920
11	Staff members have an understanding about CRNA roles in the organization	.483	.638	.921
12	There are enough ancillary staff to help with patient care	.333	.388	.929
13	In my organization, enough time is allotted to perform patient care	.321	.482	.926



	CRNA-OCQ factors (with Cronbach's alphas) and respective items	Factor loading	Corrected item-total correlation	Cronbach's alpha if item deleted
Factor 2: CRNA-Physician Relations (.882)				
1	Physicians ask CRNAs for their advice when providing patient care	.873	.745	.854
2	Physicians ask CRNAs for patient care suggestions	.853	.746	.854
3	Physicians seek CRNAs' input when providing patient care	.829	.776	.850
4	Physicians in my practice setting value my patient care decisions	.569	.662	.866
5	In my organization, physician colleagues and CRNAs practice as a team	.510	.540	.880
6	I am valued by my physician colleagues	.508	.681	.863
7	In my organization, CRNAs and physicians collaborate to provide patient care	.472	.531	.881





CRNA-OCQ factors (with Cronbach's alphas) and respective items		Factor loading	Corrected item-total correlation	Cronbach's alpha if item deleted
Factor 3: Independent Practice and Support (.875)				
1	My organization does not restrict my abilities to practice to the full extent of my state's regulatory scope of practice	.997	.802	.823
2	In my organization, I can provide patient care to the full extent of my state's regulatory scope of practice	.947	.808	.821
3	My organization fosters an environment where I can practice autonomously	.713	.801	.823
4	In my organization, I apply all my knowledge and skills to provide patient care	.536	.571	.878
5	I independently make patient care decisions within my area of competency without input from a physician	.363	.550	.881



CRNA-OCQ factors (with Cronbach's alphas) and respective items		Factor loading	Corrected item-total correlation	Cronbach's alpha if item deleted
Factor 4: Professional Visibility (.760)				
1	In my organization, there is a system in place to evaluate the care that I provide	.662	.545	.710
2	I regularly get feedback about my performance from my organization	.625	.645	.655
3	In my organization there is a system in place to reward my performance	.572	.571	.696
4	CRNAs are represented on important committees in my organization	.346	.477	.748



# Learning objective 2

Learn important aspects that comprise CRNA practice

- **Fully Achieved**

Boyd, D. R., Shaffer, J., & Poghosyan, L. (2017). Psychometric assessment and validation of the Certified Registered Nurse Anesthetist Organizational Climate Questionnaire. Manuscript in preparation

Boyd, D. R., Shaffer, J., & Poghosyan, L. (2017, June). *Refinement of the certified registered nurse anesthetist organizational climate questionnaire through exploratory factor analysis*. Accepted for poster session presentation at the 2017 Annual Research Meeting of Academy Health, New Orleans, LA



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# Ongoing research

- Comparison study (Learning objective 3)

- TxANA

- NYSANA

- Confirmatory factor analysis

- 361 NYSANA CRNAs

- NYSANA data collected

- Confirm factorial structure as further evidence of construct validity



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# Objective 3: Understand similarities and differences of CRNA practice environment between two states

- Sample: Cross-sectional survey of TxANA CRNAs, and NYSANA CRNAs

- Eligibility: Clinically practicing CRNA in TX and being a TxANA member or clinically practicing CRNA in NYS and being a NYSANA member

- Exclusion: CRNA retirees or student registered nurse anesthetists

- Data collection:

- Email invitation to participate with anonymous Qualtrics survey link

- Participants indicated the degree to which each of the 29 items on the CRNA-OCQ was present in their primary practice site:

- 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree



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# State-to-state comparisons

CRNA-OCQ subscales and respective items	TX		NY	
	n	% (Agree)	n	% (Agree)
<b>CRNA-administration relations</b>				
Administration makes efforts to improve working conditions for CRNAs	278	46.4 (129)	361	41.6 (150)
In my organization, there is ongoing communication between CRNAs and administration	279	41.2 (115)	361	38.5 (139)
Administration shares information equally with CRNAs and physicians	279	29.7 (83)	360	30.8 (111)
Administration treats CRNAs and physicians equally	279	17.6 (49)	361	14.7 (53)
<b>CRNA-physician relations</b>				
Physicians ask CRNAs for patient care suggestions	279	62.4 (174)	361	59.8 (216)
Physicians seek CRNAs' input when providing patient care	278	62.2 (173)	361	59.6 (215)
Physicians ask CRNAs for their advice when providing patient care	279	58.4 (163)	361	56.5 (204)



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CRNA-OCQ subscales and respective items	TX		NY	
	n	% (Agree)	n	% (Agree)
<b>Independent practice and support</b>				
My organization fosters an environment where I can practice autonomously	279	62.7 (175)	361	46.0 (166)
In my organization, I can provide patient care to the full extent of my state's regulatory scope of practice	279	55.6 (155)	359	52.9 (190)
My organization does not restrict my abilities to practice to the full extent of my state's regulatory scope of practice	277	54.5 (151)	361	47.9 (173)
<b>Professional visibility</b>				
In my organization, there is a system in place to evaluate the care that I provide	279	54.1 (151)	360	60.3 (217)
I regularly get feedback about my performance from my organization	279	37.6 (105)	361	42.9 (155)
CRNAs are represented on important committees in my organization	278	30.9 (86)	359	26.5 (95)
In my organization there is a system in place to reward my performance	279	28.7 (80)	361	25.2 (91)



# Learning objective 3

Understand similarities and differences of CRNA practice environment between two states

- **Achieved**



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# Objective 4: Understand policy, practice, and research implications of CRNA practice environment

## Future directions

- Use of CRNA-OCQ may produce evidence regarding underutilization of CRNAs
- Use of CRNA-OCQ may produce evidence regarding problematic intra-professional collaboration and teamwork
- Use of CRNA-OCQ may produce evidence regarding poor CRNA-administration relations

To positively impact providers, healthcare systems, and patients



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# Learning objective 4

Understand policy, practice, and research implications of CRNA practice environment

- **Achieved**



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# Strengths

- Contributes new knowledge regarding CRNA practice environment to nursing science
- Methodological approaches were guided by empirical evidence and were implemented to ensure scientific rigor
- Valid tool with strong psychometric properties was adapted to measure CRNA practice environment
- Data from a large sample were collected to finalize and refine the CRNA-OCQ and determine subscale reliability
- This work is timely, as policy organizations call for full practice authority of CRNAs



# Limitations

- Systematic review

- 2001 – 2015

- Non-U.S. studies excluded

- Search strategy

- Only CRNA members from state-based advocacy organizations participated

- Response bias possible

- Psychometric testing limitations



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# Conclusions

- CRNA Practice Environment in Current Healthcare Systems
- Four studies address the 4 learning objectives
- All learning objectives were met
- This work lays the foundation for future work regarding CRNA practice environment



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# Questions?



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# Content validity testing appendix

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## Items added during content validity testing

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Anesthesiologists support my patient care decisions

In my organization, anesthesiologists and CRNAs practice as a team

In my organization, healthcare providers and CRNAs practice as a team

My organization is open to CRNA suggestions regarding new ideas

In my organization there is a system in place to reward my performance

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# Pilot testing appendix

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## Items removed during pilot testing

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I have to discuss every patient care detail with an anesthesiologist

Administration informs CRNAs about changes taking place in the organization

In my organization, staff members practice as a team

Anesthesiologists and CRNAs have similar support for daily functions (e.g. help with patient follow-up, referrals, labs, clerical support, or office space, etc.)

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# Psychometric testing appendix

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## Items removed during psychometric testing

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In my organization, anesthesiologists and CRNAs practice as a team

CRNAs are an integral part of the organization

In my practice setting, I have enough resources to provide patient care

Anesthesiologists support my patient care decisions

Physician colleagues support my patient care decisions

In my practice setting, I have colleagues who I can ask for help

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