



EDUCATION NEWS

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Clinical Evaluation Tool for Student Registered Nurse Anesthetists Based on Quality and Safety Education for Nurses (QSEN) Competencies

Student registered nurse anesthetists (SRNAs) must demonstrate competent clinical performance of the unique set of knowledge and skills inherent to the profession of nurse anesthesia to meet academic objectives. The National Academies' Health and Medicine Division (formerly the Institute of Medicine) describes a set of competencies required for healthcare providers to ensure provision of safe contemporary healthcare. The Quality and Safety Education for Nurses (QSEN) project aligned its objectives with these recommendations, adding patient safety as an additional component. Recommendations exist for the need for unsafe practices to be identified among SRNAs early in their education, and corrective action taken

immediately by their credentialing body or teaching institution. This article describes the development of a QSEN competencies-based clinical evaluation tool. The evaluation tool targets early identification of SRNAs at risk of clinical failure and SRNAs' attitudes that may contribute to unsafe practice. SRNAs with clinical performance problems place disproportionate demands on time, emotional effort, and resources of nurse anesthesia programs and may lead to probation and training termination of students.

Keywords: Clinical evaluation, Quality and Safety Education for Nurses, QSEN competencies, remediation, students at risk of failure.

Evaluation of student registered nurse anesthetists (SRNAs) in clinical settings is a complex domain. To meet academic program objectives, SRNAs must demonstrate competent clinical performance of a unique set of skills inherent to the profession of nurse anesthesia. The Institute of Medicine, now called the Health and Medicine Division (HMD) of the National Academies of Sciences, Engineering, and Medicine, called for restructuring of education in all health professions to focus on patient safety issues and the advancement of healthcare delivery.¹⁻³ The HMD recommends that advanced practice nurses possess a new set of clinical competencies to meet the 21st century healthcare demands. In addition, the American Association of Colleges of Nursing (AACN) identifies as essential com-

ponents of the Doctorate of Nursing Practice (DNP) degree the ability to deliver evidence-based, patient-centered care and to use information systems and technology to support and improve healthcare outcomes.⁴

Following a 2003 report from what was then the Institute of Medicine, the Quality and Safety Education for Nurses (QSEN) initiative was established.^{5,6} In 2005 to 2007, QSEN outlined the guidelines for graduate-level nursing quality and safety competencies. The 6 domains introduced by QSEN are patient-centered care, teamwork and collaboration, evidence-based practice (EBP), quality improvement (QI), safety, and informatics (Figure 1). Specific knowledge, skills, and attitudes that SRNAs must possess to deliver safe and effective care must be targeted during the

evaluation of a student's clinical performance. Prediction of clinical performance, development of more rigorous admission criteria for nurse anesthesia programs (NAPs), and strategies for remediation of unsuccessful students are of consideration by faculty in educating safe healthcare providers.⁷

In 2005, the attrition rate for individual NAPs was reported at 7.7% ± 9.1%, representing the percentage of enrolled students who did not complete the programs. The most common reason for attrition was withdrawal, followed by academic dismissal and clinical dismissal.⁸ SRNAs with poor clinical performance place considerable demands on faculty's time, emotional effort, and resources and may lead to demoralization among faculty and other students.⁹ Therefore, develop-



Figure 1. Quality and Safety Competency Domains of Quality and Safety Education for Nurses (QSEN)

ing a comprehensive strategy for early identification of students at risk of clinical failure is essential for learning, educational interventions, and successful remediation in NAPs. Furthermore, in light of the HMD's recommendations and in alignment with QSEN and the DNP essentials, the above-listed specific set of competencies should be incorporated in the clinical evaluation tools for SRNAs.

According to the experience of nurse anesthesia faculty in a large academic institution and as described in the current literature, some students develop problems in academic and personal spheres. Such student problems can lead to probation, resignation, or termination of training. Although a clinical probation policy is in place for failing students at this author's academic institution, the NAP faculty is aware that the current clinical evaluation tool needs to be redefined and restructured as the program curriculum has transitioned to a BSN-to-DNP plan of study. This proposed clinical evaluation tool has been modeled after Baker's¹⁰ clinical performance metric tool for evaluation of anesthesia

residents' performance. The 6 QSEN competencies for graduate nursing education⁶ have been incorporated throughout the new evaluation tool to assess competency related to nurse anesthesia clinical practice.

Literature Review

In its 1991 publication *To Err is Human*, the Institute of Medicine, as it was then known, recommended early identification of unsafe healthcare providers to begin during the university admission process or in the early stages of clinical training.¹ The publication also recommended taking corrective action by the credentialing body or the teaching institution immediately on identification of unsafe provider behavior.¹ However, the report did not delineate specific strategy for such identification. The growing focus on ensuring and measuring quality and efficiency of healthcare outcomes necessitates marked transformation in graduate-level nursing education.⁶

Clinical evaluation is described as one of the most complex aspects of nursing education. Faculty members are obligated to facilitate student

learning in a patient-care environment while ensuring standards of nursing practice are met.¹¹ An extensive database search did not find a previous QSEN-based clinical evaluation tool pertaining to nurse anesthesia education.

Baker¹⁰ identified the need for valid and reliable measures of anesthesia residents' performance to enhance and direct learning, and to identify residents in need of remediation based on the core competencies set by the Accreditation Council for Graduate Medical Education. Residents with marginal performance were identified and referred to the clinical competency committee. Subsequently, their performance had improved because of an educational intervention. In another study,⁹ incidents of residents' performance deficiencies were most commonly noted in the faculty meeting minutes, followed by resident rotation evaluations. The literature supports that decisions about clinical performance should be made by a faculty group rather than a single faculty member or a few clinical preceptors' opinions.^{12,13}

Methods

The focus of this article is to describe the development and implementation of an innovative clinical evaluation tool for BSN-to-DNP SRNAs that integrates QSEN competencies for graduate nurses and meets the essentials of DNP education.

- **Development of QSEN-Based Clinical Evaluation Tool.** The aim of the proposed evaluation tool is early identification of SRNAs with suboptimal clinical performance. It is designed to capture and measure SRNAs' performance in 3 interrelated competency areas: absolute, relative, and essential. The relationship of cognitive, personality, and academic measures to anesthesiology residents' clinical performance has been studied, with a high statistical correlation found among the 5 clinical competence domains

in medical education: essential character attributes, acquired character skills, knowledge, judgment, and clinical skills.¹⁴ In comparison, the 6 QSEN competencies (patient-centered care, teamwork and collaboration, EBP, QI, safety, and informatics) are outlined in 3 domains: knowledge, skills, and attitudes. Students' overall clinical progression should be evaluated in a summative form, based on their daily clinical performance within the QSEN competencies as pertaining to the anesthesia process. Specific passing scores were calculated for each clinical course. The percentage of clinical objectives required to be completed increases progressively as the course complexity increases near the end of the program. The passing scores were calculated with input from all faculty members and reviewed with a statistician.

• **Absolute Competencies Section.** There are 6 absolute competencies as outlined by QSEN, which are the core patient care competencies. Each competency incorporates knowledge, clinical skills, and attitudes, which are applicable to nurse anesthesia clinical practice. This section comprises 80% of the evaluation. The absolute competencies are evaluated on a percentage performance rating scale of 1 to 5, with 1 meaning that the student is unable to perform the skill or does not possess the knowledge, and 5 meaning that the student is performing without input or correction from the preceptors.

• **Relative Competencies Section.** Relative competencies (or global rating), which designate the student's performance at peer level, may be somewhat subjective and may vary among evaluators. Studies suggest that evaluators tend to rate the students they like at higher levels compared with their peers, and their ranking remained consistent over time.¹⁴ The global rating uses a 3-point Likert scale, with a score of 1 indicating SRNA performance

below peer level and a score of 3 indicating performance above peer level compared with other students from the same academic institution.

• **Essential Competencies Section.** Essential competencies are personal attributes, which may contribute to unsafe practice. Personality characteristics that contribute to unsafe nurse anesthesia practice are described by Wong and Li⁷ and are the base for the essential competencies. There are 5 statement questions requiring a "yes" or "no" answer. Any "yes" response marked by preceptors indicates potential jeopardy to the patient's safety, which would require immediate attention by the faculty and the program's director.

• **Implementation of QSEN-Based Clinical Evaluation Tool.** The first step in implementing the proposed clinical evaluation tool was obtaining approvals from the graduate faculty committee and faculty school council for beta testing. The new form was tested for 1 month with junior-level SRNAs. During this period 2 forms were used: the new proposed form and the program's approved form for student evaluation. The CRNA clinical preceptors at 1 of the 3 primary clinical sites received a formal presentation from the faculty on formative clinical evaluation principles and expectations, and were introduced to the new evaluation tool. One credit hour of approved continuing education was awarded to the CRNA preceptors attending the presentation. Twenty-two junior-level SRNAs who were enrolled in the fourth semester of the program participated during the pilot phase of the form. Students were attending clinical practicum at 4 facilities for an average of 4 days per week. The SRNAs were provided with an explanation of the purpose and the focus of the new clinical evaluation tool.

• **Evaluation of the Tool.** The tool was analyzed based on cumulative scoring of daily clinical evalua-

tions at the end of the 1-month trial period. Scores on 29 absolute competencies in specific relation to NAP course objectives grouped in the 6 QSEN domains were individually calculated for each student. Chi-square calculations were used for additional data analysis.

Statistical analysis was performed to measure the reliability and validity of the modified tool in the context of SRNAs' clinical performance. The validity of this evaluation tool was assessed by comparing the students' cumulative grade point average (GPA), including the current semester, and the midterm examination grade for the clinical course with the global rating scale and the total clinical performance score.

Feedback from the clinical preceptors was obtained by a short questionnaire. Three questions about the clinical evaluation tool were included at the end of each form (Figure 2). A Likert scale with scores of 1 to 5, with 1 meaning completely disagree and 5 completely agree, was used for rating preceptors' responses.

Results

On statistical analysis, the Cronbach α for the tool ranged from .83 to .94 across all the days the performance was assessed, indicating strong internal consistency reliability. The total clinical performance score was significantly correlated with the global rating, $r_s = .57, P < .001$, but not with the examination grade, $r_s = .10, P = .122$. Global rating was correlated with cumulative GPA, $r_s = .19, P = .003$, but not with examination grade, $r_s = -.01, P = .855$.

A total of 396 clinical evaluation forms were received at the end of the 1-month trial period. Completing clinical evaluation forms and providing written feedback to SRNAs about their performance was challenging at 3 of the facilities (Figure 3). The clinical site where the workshop was provided

had the highest rate of completed forms by CRNA preceptors at 82%, compared with 48% and 56% completion rates at the other 2 facilities. The fourth facility, which had a 94% completion rate, is considered a transition site for SRNAs. At this site, the students train under direct medical supervision of anesthesiologists. Compared with CRNAs, the anesthesiologists were more likely to rate the students as “above peers” (possible high tendency error). These physicians were also less likely to provide negative feedback in a written evaluation form.

The preceptors’ global rating differed from actual scores when performance was rated against SRNAs’ peers—other students at the same level of training in the same program. There was a statistical difference in the preceptors’ opinions from the calculated scores in the 3 facilities, $\chi^2 (df = 2) = 23.888, P < .001$ (Table). At the facility where the workshop was provided, the numeric rating was consistent with the actual performance opinion. Two students received 8 evaluations with consistent scores that were marked “below peer level.” The facility where the students were evaluated by anesthesiologists was excluded from the calculations because no other students from this cohort had rotated there, and ratings of the students against their peers would be inaccurate.

Performance scores analysis determined that 2 students were “performing below peer level” and needed remediation and faculty support. Poor clinical performance was identified as consistently being rated at the lowest 25th percentile. In addition, these 2 students were marked for some of the personal attributes that may contribute to unsafe practice. Both students were enrolled in month-long remediation programs consisting of individual tutoring and high-fidelity simulation sessions. Both students successfully continued their studies.

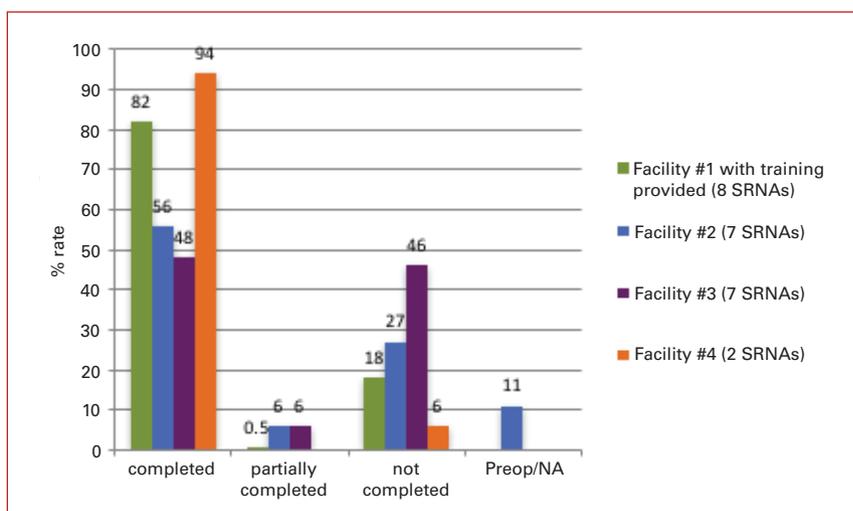


Figure 2. Pilot Evaluation Form Completion Rate by Facility (Total of 396 Forms)

Abbreviations: NA, not applicable; preop, preoperative; SRNA, student registered nurse anesthetist.

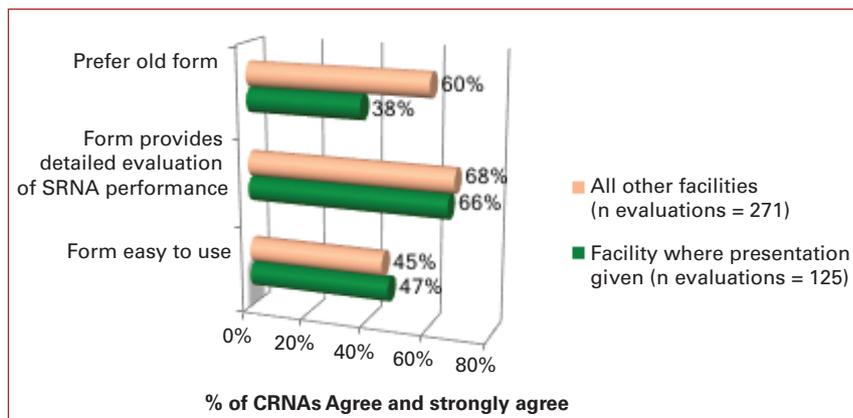


Figure 3. Clinical Preceptors’ Evaluation of New QSEN-Based Form

Abbreviations: CRNA, Certified Registered Nurse Anesthetist; n, number of; QSEN, Quality and Safety Education for Nurses; SRNA, student registered nurse anesthetist.

Some QSEN domains were marked as “not applicable” in the daily evaluation forms. Informatics as part of “application and use of technology to communicate, manage knowledge, and support decision making” was marked “not applicable” in some forms, although technology use is imbedded in daily anesthesia practice. Evidence-based practice was marked as “not applicable” in 25 of the forms. Quality improvement initiatives, such as the student being able to describe common quality measures and compliance in anesthesia practice, were also marked “not applicable” by

some of the preceptors.

• **Clinical Preceptors’ Feedback.**

On feedback from the clinical preceptors regarding the new clinical evaluation form (see Figure 3), more than 65% of all preceptors agreed or strongly agreed that the form was “providing detailed evaluation of students’ performance,” and approximately 50% found the form easy to use. Only 38% of the preceptors from the facility where the presentation was given would prefer to use the old form, compared with 60% from the other facilities.

The new section about the students’ professional attributes had the

Facility Number	Difference in evaluations: opinions and calculated scores		Total number of evaluations completed
	Difference of opinions from scores, No. (%)	Calculated correct scores, No. (%)	
1: workshop provided to CRNAs' preceptors	4 (4)	99 (96)	103
2: no training to CRNAs' preceptors	20 (31)	44 (68)	64
3: no training to CRNAs' preceptors	15 (23)	48 (76)	63
Total	39 (17)	191 (83)	230

Table. Difference in Preceptors' Opinions From Calculated Scores in Students' Evaluations for Peer Rating^a

Abbreviation: CRNA, Certified Registered Nurse Anesthetist.

^a $\chi^2 = 23.888$, $df = 2$, $\chi^2/df = 11.94$, $P(\chi^2 > 23.888) = 0.0000$. Percentages may not total to 100 because of rounding.

most positive comments from the preceptors in all 3 facilities. Specific responses included “this is the best part of the new form” and “these questions are really good.” Some frequently written comments about the QSEN-based evaluation form were “too long” and “time-consuming,” perhaps because 2 forms (new and old) were being used at the same time.

Discussion

To this author's knowledge, no clinical evaluation tool measuring SRNAs' clinical performance that integrates QSEN competencies and meets essentials for DNP curriculum is previously described in the literature. Therefore, the proposed tool and the ratings cannot be measured and validated against a similar tool. However, the global rating correlated with cumulative GPA but not midterm examination grade. This finding is consistent with previous studies indicating that GPA is the most reliable predictor for performance in NAPs. In addition, students' performance at high-stake examinations, such as the compared midterm examination, has shown poor correlation with clinical performance.^{10,15}

This project has some limitations and constraints. The clinical competence ratings are inherently limited because they are based on a 1-day evaluation of student performance. In addition, the type of anesthetic cases the students are involved in can affect their daily performance scores. Skills such as intubation and

bag-mask ventilation are not rated in monitored anesthesia cases; therefore, the students' total scores may be lower by as much as 15 points. This limitation needs to be considered during the summative evaluation by faculty. The summative clinical evaluation at midpoint and at the end of each semester should be based on statistical calculation of the daily clinical evaluations.

In addition, interrater variability testing was not performed. However, different preceptors submitted the 8 evaluations for the students with poor performance, and the opinions “below peer level” were consistent with the calculated scores. Although the preceptors spent an average of 8 to 10 hours a day with an individual student, written evaluations were not being filled out on regular basis or were not consistent with the scored performance. This problem was evident in the facilities where the workshop on preceptorship was not offered. Introduction of any new evaluation tool should be done by NAP faculty in some form of a preceptor workshop before the implementation of the tool. Such workshops offer the additional benefit of stressing the importance of providing constructive and consistent feedback to students, which is evidenced by the 82% completion rate of the forms in this project. The workshop has improved not only the form completion rate but also the accuracy of the clinical evaluations. The actual scores were 96% accurate compared with the rela-

tive performance designation. Early recognition of students performing at levels below their peers is important so that faculty can intervene before patient harm is done or the student fails clinically. In this NAP, early intervention and enrolling the students into a comprehensive remediation program showed promising results.

In the piloted evaluation tool, the QSEN domains were listed, and different phases of the anesthesia process were listed under each domain, which may have led to confusion among some of the CRNAs, as seen in the results. For example, EBP was marked as “not applicable” even though evidence-based anesthetic care is the essence of contemporary anesthesia practice. After the data were collected and analyzed, the tool was presented at a faculty meeting for discussion. In addition, feedback was obtained from key clinical partners and preceptors during formal meetings. Following these processes, the form was redesigned with the following QSEN domains and DNP essentials incorporated into the nurse anesthesia process: anesthetic preparation, patient's preanesthetic evaluation, induction, maintenance, emergence from anesthesia, and transfer of care. The questions reflect the clinical practice objectives for the corresponding level of the clinical course (Figure 4). The number of the questions was decreased from 29 to the 25 shown in Figure 4.

The form was adapted into an

Daily Clinical Evaluation Form
Second-Year BSN-DNP Nurse Anesthesia Students, Semester 4
 NUR 620 Advanced Concepts of Anesthesia Nursing I

Student _____ Preceptor _____ Clinical site _____

Anesthetic case/s _____

Evaluation Code:

- 5.0 = Performs **fully independent**, without input or correction
- 4.0 = Needs **very infrequent** assistance, input, or correction (25% or less of the time)
- 3.0 = Needs **moderate** assistance, input, or correction (50% or more of the time)
- 2.0 = Needs **significant** preceptor assistance, input, or correction (75% or more of the time)
- 1.0 = **Unable to perform** N/A = Not Applicable/**Not able to evaluate** student on this competency

Clinical Objectives

1 2 3 4 5 N/A

Preparation

1. Checks anesthesia machine and emergency equipment to assure proper functioning.
2. Identifies, locates, and prepares anesthetic equipment, drugs, monitors, and supplies for basic anesthetic case setup.

Preanesthetic assessment and plan of care

3. Performs patient interview and assessment, reviews patient's chart, labs, diagnostic tests, (including use of electronic patient records); documents and communicates abnormal findings to the patient care team members.
4. Develops evidence-based anesthesia care plan tailored to the specific patient's procedure and comorbidities and cultural values.
5. Place peripheral IV catheters, appropriate catheter size and site selection. Appropriate IV fluids and fluids replacement calculation.

Anesthetic induction

6. Properly positions patient and obtains baseline vital signs in preparation for induction of anesthesia.
7. Demonstrates knowledge of the used anesthetic medications for induction of anesthesia.
8. Uses correct technique in application of face mask, bag-mask ventilation and placement of oral/nasal airways.
9. Uses correct technique to secure airway (uncomplicated LMA and oral ETT insertions) and verifies correct placement.
10. Begins to utilize advanced airway management techniques (GlideScope, fiberoptic scope, intubating LMA, etc).
11. Uses correct sterile technique to insert a-lines and able to interpret obtained data.
12. Uses correct technique to perform regional anesthetic (spinal, epidural, nerve blocks), and demonstrates knowledge of anatomy and local anesthetics utilized in the procedure.

Anesthetic maintenance

13. Vigilant in monitoring and discusses appropriate interventions to assure adequate oxygenation and ventilation.
14. Vigilant in monitoring and discusses appropriate interventions to assure CV stability.
15. Able to answer patient-focused physiology and pathophysiology questions appropriately.
16. Maintains normothermia.
17. Monitors for complications associated with surgical positioning.
18. Vigilant in monitoring and discusses appropriate interventions to assure adequate depth of anesthesia.
19. Monitors and recognizes complications associated with regional anesthesia.
20. Maintains safe environment (organized, clutter-free, proper labeling, etc).

Anesthetic emergence and transfer of care

21. Prepares patient for emergence from anesthesia, turns VAA/IV sedation off, sites extubation criteria, extubates with proper technique.
22. Exhibits knowledge of reversal agents and appropriate dosages.
23. Determines adequate airway status and CV stability for safe transport to PACU/ICU.

Clinical Objectives	1	2	3	4	5	N/A
24. Follows safe communication practices during care handoffs (SBARD report, complete documentation, care coordination, and protection of patient privacy).						
25. Conducts postanesthetic patient visits to review outcomes of care and identify potential areas for improvement of care.						
Personal and professional attributes, which may contribute to unsafe practice. Answering YES to any of the questions requires further comments and/or contact the faculty.	YES	NO				
When working with this SRNA, I have concerns regarding patient safety.						
I have concerns regarding this SRNA's honesty, ethics, or moral character.						
I am concerned that this SRNA lags behind peers or may need extra help.						
I have concerns about this SRNA as a team player, acceptance of assignments, and help colleagues.						
I have concerns about this SRNA's openness to teaching and improvement.						
Relative Performance Designation	3	2	1	N/A		
SRNA's performance compared to other students from the same program, who are at the same level of training						
1 = below peer level; 2 = at peer level; 3 = above peer level						
N/A = not able to evaluate student on this competency						
Comments (may use the back of the page):						
Student's signature _____	Preceptor's signature _____		Date _____			

Figure 4. Example of Daily Clinical Evaluation Form

Abbreviations: a-line, arterial line; CV, cardiovascular; ETT, endotracheal tube; IV, intravenous; LMA, laryngeal mask airway; PACU/ICU, postanesthesia care unit/intensive care unit; SBARD, Situation, Background, Assessment, Recommendation; SRNA, student registered nurse anesthetist.

electronic format and was beta tested again for 1 month in the 3 facilities to evaluate the electronic settings, privacy settings, or any other unforeseen issues that might arise, and concerns were addressed as needed. Analysis of the performance scores is software-calculated and available to faculty at any time to review. In addition, standardizing and computerizing the process of evaluation is expected to contribute to early identification of students in need of remediation. Future research should examine the tool's performance in multiple settings and refine the items and procedures for other NAPs.

Conclusion

The proposed innovative clinical evaluation tool aims for early identification of BSN-to-DNP SRNAs who have suboptimal clinical performance, therefore ensuring early educational interventions and graduation of safe and competent

clinical providers. Meeting contemporary healthcare demands for advanced healthcare practitioners while maintaining high standards for patients' care and safety aligns with the goals and recommendations of the National Academies' HMD¹⁻³ and the QSEN initiative. Development and implementation of remediation strategy for failing SRNAs should be in place at all academic institutions. The remediation interventions must be examined in future studies to ensure that students graduate with long-lasting knowledge and skills.

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DISCLOSURES

The author declares no financial relationships with any commercial entity related to the content of this article. The author did not discuss off-label use within the article.

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