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Running Head: EVALUATION OF CRICOTHYROIDOTOMY TRAINING

Evaluation of Cricothyroidotomy Training During a “Can’t Intubate, Can’t Ventilate” Scenario

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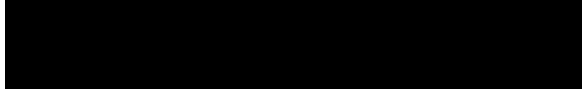
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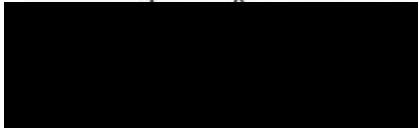
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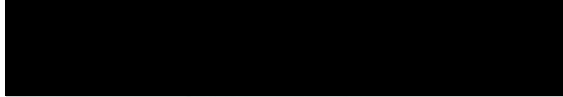
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Abstract

Phase II Site: Wright-Patterson AFB

DNP Project Title: Evaluation of Cricothyroidotomy Training During a “Can’t Intubate, Can’t Ventilate” Scenario

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Background or Problem/Issue: Cricothyroidotomy is a crucial skill for anesthesia providers as the final step during a Can't Intubate, Can't Ventilate (CICV) scenario in the difficult airway algorithm. However, cricothyroidotomy is so rarely performed that anesthesia providers often lack competency and proficiency in the skill.

Clinical Question or Purpose: The purpose of this project was to determine how the implementation of standardized, hands-on cricothyroidotomy training affects the competency and proficiency of student registered nurse anesthetists (SRNA) in performing this skill.

Project Design: This project was a time series design, utilizing a task specific checklist (TSC) to evaluate SRNA skills after training with low-fidelity task trainers. They were evaluated again three months post-training for retention.

Analysis of the Results: This training demonstrated significant performance improvement in both competency and proficiency in cricothyroidotomy. Three-month decay was evident and greater improvement during reevaluation suggests a positive training effect. Furthermore, this data was consistent with the literature supporting the need for repetitive hands-on training compared with didactic alone, as well as a need for regular reinforcement of training.

Organizational Impact/Implications for Practice: Cricothyroidotomy training will result in increased competency and provider readiness, a better experience of care, decreased per capita cost for the Military Health System, and improved health outcomes.

Evaluation of Cricothyroidotomy Training During a “Can’t Intubate, Can’t Ventilate” Scenario

Introduction

The American Society of Anesthesiologists (ASA) defines a difficult airway as “the clinical situation in which a conventionally trained anesthesiologist experiences difficulty with facemask ventilation of the upper airway, difficulty with tracheal intubation, or both” (Apfelbaum et al., 2013, p.253). The ASA published “Practice guidelines for management of the difficult airway” in 2003; an Update Report followed in 2013, including a Difficult Airway Algorithm (See Figure 1) to assist providers in managing unanticipated difficult airways (Apfelbaum et al., 2013). Per the guidelines, two unsuccessful intubation attempts and inadequate mask ventilation places the provider on the ‘emergency pathway’. In the ‘emergency pathway,’ the anesthesia provider should call for help and consider placing a supraglottic airway such as a laryngeal mask airway (Apfelbaum et al., 2013). If obtaining a supraglottic airway is unsuccessful after two attempts and ventilation is inadequate, the scenario is considered a “can’t intubate, can’t ventilate” (CICV) situation requiring emergent infraglottic airway access. This requires a surgical or percutaneous airway to be established via cricothyroidotomy or tracheostomy (Apfelbaum et al., 2013).

Thus, an anesthesia provider correctly following the Difficult Airway Algorithm should progress through increasingly invasive interventions until ventilation is restored. Despite knowledge of this algorithm and its acceptance as the standard of care, anesthesia providers frequently do not proceed to infraglottic airway access when faced with a CICV situation (Henderson, Popat, Latto, & Pearce, 2004). According to Boet, et al. (2011), infraglottic airway access is performed so infrequently during crisis situations that optimizing simulation training,

developing procedural competency, and combating skill decay remain challenges for anesthesia providers.

Significance of the Problem

Mismanagement of airway emergencies can result in poor outcomes with devastating consequences when initial interventions fail, and the algorithm is not followed in a timely fashion. During routine general anesthetics CICV events occur in less than 1 in 5,000 cases with only 1 in 50,000 requiring an emergent surgical airway, however, CICV events contribute to 25% of anesthesia-related deaths (Cook & MacDougall-Davis, 2012). According to Henderson et al. (2004), failure to promptly obtain an emergent surgical airway when appropriate is the leading cause of hypoxemic brain damage. From the ASA Closed Claims database, Peterson et al. (2005, p. 33) found that “adverse respiratory events represent the most common mechanism leading to anesthesia malpractice claims”. According to Heard, Green, and Eakins (2009), cricothyrotomy is a rare elective procedure occurring in 0.01-2 patients per 10,000 cases, making it difficult to maintain provider proficiency. While the occurrence is rare, the event is associated with a high risk of patient morbidity and mortality. Therefore, despite the infrequency of CICV situations, it is crucial for anesthesia providers to remain competent in the recognition of CICV situations and the use of emergency infraglottic airway techniques.

The National Board of Certification and Recertification for Nurse Anesthetists (2014) has identified airway management as a core competency for Continued Professional Certification in certified registered nurse anesthesia (CRNA) practice. The American Association of Nurse Anesthetist (AANA) Code of Ethics (2005) states that the CRNA is responsible and accountable for decisions made, and actions taken, during the care of the patient. Additionally, the AANA’s

mission states that the CRNA will advance patient safety and practice excellence (AANA, 2016). Emergency airway competence is an important component in fulfilling this mission.

Clinical Question

Are anesthesia providers who receive hands-on training in cricothyroidotomy more competent and proficient at managing simulated CICV situations than anesthesia providers who did not receive hands-on training?

Focus Areas

This project has four focus areas. First, conduct a systematic literature search evaluating the levels of evidence and identify proven best practice for conducting hands-on cricothyroidotomy skills training. Second, create a training program utilizing the knowledge obtained from the literature review. Third, implement a cricothyroidotomy skills training program including initial and retention testing. Fourth, present project data to nurse anesthesia program faculty with recommendations for curriculum timing as well as recommendations for future use in nurse anesthesia cricothyroidotomy skill development and retention.

Project Goals

The short-term goal of this project was to improve competency and proficiency of nurse anesthesia students in performing the psychomotor skill of infraglottic airway access. The long-term goals of the cricothyroidotomy education and training Evidence Based Practice (EBP) project are multifactorial. The first goal is for USU GSN to adopt the training as part of the educational curriculum. Second is to improve military readiness by ensuring CRNAs who deploy are prepared to deal with the airway emergencies they might encounter. The third goal is to improve patient safety, reduce cost, and decrease morbidity & mortality by reducing anesthesia related complications. The fourth goal is that the cricothyroidotomy education and

training program be adapted as part of the Comprehensive Medical Readiness Program (CMRP) for all Air Force CRNAs as part of their regular clinical competencies to prevent skill decay and maintain anesthesia provider competency.

Relevance to Military Nursing

The Military Health System (MHS) strives toward a “Quadruple Aim” to improve the experience of care, lower per capita cost, increase readiness, and improve health outcomes (Defense Health Agency, 2014). Management of a difficult or failed airway is a crucial readiness skill that directly impacts the CRNA’s ability to support the military quadruple aim. A CRNA who is competent and proficient in infraglottic access is better prepared to prevent poor outcomes related to a failed airway, and ensure safe, high quality care. Preventing poor outcomes related to CICV scenarios is often synonymous with preventing loss of life. Optimal force readiness is improved by ensuring the continued health of military members so that they are prepared to deploy when required (DHA, 2016).

Medical readiness is defined as the ability to “deliver healthcare anytime, anywhere, in [all] military operations,” and is the goal of the MHS (DHA, 2014, p. 30). Military anesthesia providers often operate in austere environments where there is an increased likelihood of CICV scenarios. In a study examining potentially survivable battlefield deaths from 2003-2006, treatable airway compromise was found to be the third leading cause of death, responsible for 18 out of 1000 (1.8%) of mortalities (Mabry, Edens, Pearse, Kelly, & Harke, 2010). A more comprehensive analysis of battlefield fatalities from 2001-2011 showed that 8% (n=78) of 4,596 potentially survivable injuries were due to upper airway obstruction, indicating that these deaths were potentially preventable (Eastridge et al., 2012). According to Schauer, Bellamy, Mabry, and Bebart (2015), military medicine has the potential to decrease mortality by ensuring

advanced airway skills remain current. These statistics show that it is crucial to medical readiness for military anesthesia providers to have the skill to proficiently perform an emergent surgical airway when the need arises.

Educating and training anesthesia providers to skillfully obtain emergent airway access under duress should improve patient outcomes for active duty military members, veterans, and their families. Improved patient outcomes will consist of fewer anoxic brain injuries, reduced end organ damage, and fewer deaths. In addition to improving the patient experience, preventing these negative outcomes will reduce the per-capita cost of care to the MHS by preventing additional costs associated with closed case settlements and long-term care costs. Improving anesthesia providers' competence should enhance their confidence and readiness to deploy. In summary, cricothyroidotomy training will result in increased competency and provider readiness, a better experience of care, decreased per capita cost for the Military Health System, and improved health outcomes.

Organizing Framework

The Iowa Model was used as the organizing framework for this EBP project (Figure 2). Initially, USU GSN faculty identified a cricothyroidotomy educational training deficit in the nurse anesthesia program. Utilizing the Iowa Model, this deficit was identified as a problem focused trigger. Next, a team was formed consisting of nurse anesthesia students at Wright-Patterson Air Force Base. The team conducted a literature review regarding cricothyroidotomy training and performance. The team identified current evidence supporting cricothyroidotomy skills training and retention. Next, the team developed a plan to increase the quality and frequency of cricothyroidotomy training to nurse anesthesia students. Ultimately, the EBP project data was evaluated to for improved performance and competence in cricothyroidotomy

skills. If the project demonstrates an improvement in performance, then ideally the training will be adopted as standard training in the USU GSN curriculum. This training could also be incorporated as part of the CMRP requirements for military anesthesia providers. If the results of the project are inconclusive or demonstrate no improvement in performance and competence with the cricothyroidotomy, then research and new knowledge should be evaluated to determine the best methods for improving the performance of the cricothyroidotomy.

Project Design

General Approach

This EBP project used a time series design evaluating the effectiveness of didactic instruction followed by hands-on training with concurrent data collection.

Setting

The implementation of this training occurred at USU. The subject matter experts consulted for project development were members of the nurse anesthesia faculty.

Procedural Steps

First, we assessed the current phase I curriculum content for RNA students at USUHS for all instruction related to the difficult airway algorithm and cricothyroidotomy placement. This was accomplished by retrospective review of the preceding year's syllabi and class schedules for RNA students. Second, we obtained buy in from key stakeholders, USU RNA faculty, to incorporate our training into the curriculum. Third, we completed a systematic literature search and evidence evaluation, uncovering recommendations for best practice. Fourth, Utilizing this we authored a PowerPoint presentation for didactic instruction, and a low-fidelity training model with the guidance of the simulation expert at Wright Patterson Medical Center for the hands-on training. Fifth, the USU GSN faculty delivered the didactic instruction during the RNA607

regional anesthesia course to all RNA students, followed by individual hands-on training delivered by the authors to each student. Sixth, an unexpected CICV scenario was presented to the same student cohort during an induction simulation as part of RNA801, followed by a cricothyroidotomy skill station. Data was collected on the task specific checklist (TSC) during all repetitions of the hands-on training and subsequent cricothyroidotomy skill station during simulation.

Evidence Evaluation. Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed were utilized to search for peer reviewed articles relating to the technical skill of performing a cricothyrotomy. The CINAHL search was conducted with the terms “Cricothyrotomy” or “CICV” or “Can’t Intubate, Can’t Ventilate” and yielded 140 articles. The PubMed search was conducted using the terms “cricothyrotomy” and “surgical” or “CICV” or “Can't intubate can't ventilate,” and yielded 197 articles. The search was retrospectively limited to 2005 and included all articles in the database as of 18 January 2017. The search was limited to articles published in English. After duplicates were removed via EndNote™ and manually, this strategy produced 300 peer reviewed articles as of 18 January 2017.

An initial review of titles and abstracts of these articles was conducted evaluating relevance to the PICOT question. Inclusion criteria were articles that described training and/or efficacy for emergency surgical airway access with an objective measurement of success, and included needle, surgical, and percutaneous cricothyrotomy. Exclusion criteria were single case reports, pediatric population, and dental clinics. After these criteria were applied to titles and abstracts 80 articles remained with potential relevance to the PICOT question. Full text review of the remaining 80 articles was conducted using the same inclusion and exclusion criteria, resulting in 11 articles selected for qualitative synthesis. The PRISMA flowchart is presented in

Figure 3. Articles were reviewed, categorized, and entered into a database comparing sample size, methods, and results. These results are presented in Table 1.

The studies collected during this evidence synthesis examined several aspects of hands-on training in cricothyrotomy, including type of training, techniques, devices, repetitions required for proficiency, and skill retention. Of the 11 articles that met criteria, seven articles provided level II evidence, three provided level III evidence, and one provided level IV evidence. Quality of evidence was determined utilizing the Strength of Recommendation Taxonomy (Ebell et al., 2004). Five articles were level II (limited quality) and six were level I (good quality).

Types of training evaluated included simulation vs. didactic (Jayaraman, Feeney, Brautigam, Burns, & Jacobs, 2014), high- vs. low-fidelity simulation (Friedman, You-Ten, Bould, & Naik, 2008; & You-Ten et al., 2015), simulation vs. baseline (no training) (Boet et al., 2011; Hubert, Duwat, Deransy, Mahjoub, & Dupont 2014; Kudavalli, Jervis, Tighe, & Robin 2008; & Nakstad, Bredmose, & Sandberg, 2013), and didactic followed by placement on manikins (Sulaiman, Tighe, & Nelson, 2006) or on cadavers (Latif, Chhabra, Ziegler, Turan, & Carter, 2010). A validated three-point task-specific checklist for cricothyroidotomy was used in four articles (Boet et al., 2011; Friedman et al., 2008; Hubert et al., 2014; & Jayaraman et al., 2014) and a global rating scale for cricothyroidotomy was used in three articles (Boet et al., 2011; Friedman et al., 2008; & Hubert et al., 2014). All types of training demonstrated positive improvement in skills compared to baseline or no training. Simulation training was significantly better than didactic alone; improving time, accuracy of airway placement, and skill retention. No difference in these measures was found in comparison of high versus low-fidelity simulation training.

Different techniques used for cricothyrotomy were compared in three articles (Buonopane et al., 2014; Nakstad et al., 2013; & Sulaiman, et al., 2006) and cricothyrotomy device effectiveness was compared in one article (Sulaiman et al., 2006). Buonopane et al. (2014) compared wire-guided to percutaneous technique, however, they reported only provider preference for wire-guided and no comparison of time between techniques despite collecting data on time for each attempt. Nakstad et al. (2013) compared a percutaneous technique with surgical Bougie-Assisted Cricothyrotomy Technique (BACT) and found that while percutaneous technique was performed faster it had greater rate of injury. Additionally, Nakstad et al. (2013) found that providers preferred the surgical BACT technique over the percutaneous kit. Sulaiman et al. (2006) compared surgical with wire-guided cricothyrotomy demonstrating the surgical technique was significantly faster achieving placement in half the time. The ability to effectively ventilate was compared between the un-cuffed Melker, the cuffed Melker, and the surgically placed cuffed tube. Even with obstruction of the upper airway, the un-cuffed Melker did not achieve adequate ventilation volumes compared to the cuffed devices (Sulaiman et al., 2006).

The number of repetitions required to develop proficiency was assessed by two articles (Buonopane et al., 2014; & Shetty, Nayyar, Stachowski, & Byth, 2013). These two studies were homogenous in design and results demonstrated that five repetitions is the optimal number to develop proficiency in cricothyrotomy placement. Five studies addressed skill retention (Boet et al., 2011; Hubert et al., 2014; Kudavalli et al., 2008; Nakstad et al., 2013; You-Ten et al., 2015) with retention intervals assessed varying from 2 weeks, 6 weeks, 3 months, 6 months, and 1 year. All demonstrated retention of procedural skills at the reassessment interval chosen based on time and accurate placement. Kuduvalli et al. (2008) noted post-training improvement in cannula insertion technique was maintained at 6 months, but correct use of the jet ventilator was not.

While study designs were heterogeneous, all studies reviewed demonstrated positive improvement in some aspect of cricothyrotomy skill after training. Procedural skills were improved and skill retention was increased by hands-on simulation training, but no difference was found between high- and low-fidelity simulation. Surgical technique was faster than wire-guided and had fewer complications than percutaneous techniques. The improvement in procedural skill plateaued at five repetitions. Skill retention was demonstrated when reassessed any point from six weeks to one year.

Training development. The training structure included a group didactic session of instruction followed by individual practice sessions using low-fidelity task trainers with each student performing five repetitions in cricothyroidotomy. Tasks for this focus area included development of an instructional PowerPoint, development of an instructional training video, and development of a TSC for evaluation. In addition, we consulted the simulation expert at Wright-Patterson Medical Center to determine the optimal task trainer for low-fidelity cricothyroidotomy skills sessions. This meeting led to the creation of low-fidelity trachea models. After faculty approval of our plan we submitted an itemized list of required supplies and costs to the GSN for budgetary approval. Building the models ourselves allowed us to create a durable and cost-effective trainer allowing for long term sustainment of this training.

Training implementation. The initial training and evaluation were delivered in April of 2018 during the RNA607 regional anesthesia course. The didactic content was delivered by the USU RNA faculty utilizing PowerPoint presentation created by the authors, as well as a video demonstration of correct technique. The authors then trained and evaluated each student individually. Students were oriented to the equipment and given opportunity to handle and organize it prior to performing the first attempt. Each student performed five repetitions of the

cricothyroidotomy procedure on the low-fidelity task trainer (A1-A5), with feedback provided between each attempt on correct identification of landmarks and successful placement in the trachea. Skill retention was evaluated using the same TSC in July of 2018. This assessment was not preceded by any instruction or training such as was provided in the initial training but was incorporated into a high-fidelity simulation training of a CICV scenario. The subjects were told they would perform a standard induction prior to the experience. The scenario evolved into a CICV situation and upon identification of the need for an infraglottic airway they were presented with a low-fidelity model and the same supplies utilized during the initial training. After one repetition (A6) they watched a trigger film on CICV scenarios and performed the sequence a second time (A7).

Data collection and analysis. Participant competency, proficiency, and speed at cricothyrotomy was evaluated after initial didactic training in May and again during high-fidelity simulation in July. Competency and proficiency of cricothyrotomy were evaluated using a standardized Task Specific Checklist (TSC) for Cricothyroidotomy (see Appendix G). Examiners assessed the subject's performance of the 12 tasks and assigned one of the following: 0 = did not perform, 1 = inadequately performed, 2 = adequately performed, with a maximum of 24 points awarded. The TSC was completed for each attempt, with order of attempts included in the data. Inter-rater reliability for the TSC was established and demonstrated 96% agreement among the reviewers.

Correct placement and time to ventilation were the primary outcome measures. The secondary outcome measure was cricothyrotomy skill, as determined by the total score from the task-specific checklist. Failure was defined as any attempt in which the trachea was not cannulated or ventilated or took greater than 300 seconds to perform. Subjects performed a

series of five consecutive procedures. Each procedure was evaluated against the checklist individually, and improvement was evaluated by comparison between subsequent attempts.

After collection all data was de-identified, aggregated into a Microsoft Excel spreadsheet. Data was analyzed using SPSS software to describe participant competency, proficiency, and speed across all time points.

HIPAA Concerns

The Health and Human Services (HHS) policy 45 CFR 46 details the protection of human research subjects and is governed by the Human Research Protections Program Office (HRPPO) at USUHS. The USUHS Institutional Review Board (IRB) reviews research submissions and “ensures all research involving human subjects conducted or supported by the Department of Defense (DoD) shall comply with all applicable Federal statutes [and] incorporates the ethical principles of respect for persons, beneficence, and justice” (2017, para. 1).

While our DNP project utilized human participants, it did not require IRB review according to the HRPPO at USU because we are not conduct research to generate new knowledge (USU, 2017). Only non-sensitive information was collected and stored on CAC enabled computers housed in a restricted area at Wright-Patterson Medical Center. The rights and welfare of human participants will be protected during their participation. Student were de-identified prior to analysis and dissemination.

Project Results

Thirty-one first-year SRNA students from USUHS participated in the initial training, two were lost at retest due to attrition from the program. All students had received training on the difficult airway algorithm, completed a standard Advanced Trauma Life Support course, observed a single cadaver cricothyroidotomy, and participated in a single non-standardized

simulation of difficult airway adjuncts prior to this training. A general linear mixed model was utilized for initial data analysis which demonstrated correlated covariance, followed by paired sample tests and Pearson correlations.

Primary Outcomes

Evaluation of the initial five attempts revealed the mean procedure time for cricothyrotomy was 89.29 seconds on the first attempt (A1), 65.15 seconds on the second attempt (A2), 56.30 seconds on the third attempt (A3), 49.38 seconds on the fourth attempt (A4) and 44.23 seconds on the fifth attempt (A5) (Table 2). At reevaluation the mean procedure time for cricothyrotomy on the sixth (A6) and seventh (A7) attempts were 132.97 seconds and 72.30 seconds, respectively (Table 2). One subject did not establish correct placement in the trachea on A1. During reevaluation of A6 and A7, the number of subjects failing to establish correct placement was four and zero, respectively (Table 2).

Table 2

Task-Specific Checklist Data

Iteration	TSC Score	Placement	Mean Time
A1	21.34	28/29	89.29
A2	23.14	29/29	65.15
A3	23.83	29/29	56.30
A4	23.93	29/29	49.38
A5	23.93	29/29	44.23
A6	19.24	25/29	132.97
A7	22.00	29/29	72.30

There were several statistically significant paired differences in the times to ventilation. The improvements in mean time averaged 10.6 ± 0.69 seconds per repetition across A1 to A5 ($p < 0.000$) (Table 3).

Table 3

Estimates of Fixed Effects

Parameter	Estimate	Std. Error	95% Confidence Interval		Sig.
			LL	UL	
Intercept	92.632793	3.071903	86.522023	98.743564	.000
A1-A5	-10.588103	.696693	-11.968118	-9.208089	.000

Note. LL = lower limit; UL = upper limit; Sig. = significance

Decay was evident between A5 and A6 with a mean increase of 88.7 ± 13.2 seconds ($p = 0.000$) (Table 4). Between A6 and A7 an improvement of 60.6 ± 14.0 seconds decrease was found ($p = 0.000$) (Table 4). Comparison between A1-2 and A6-7 demonstrated 36.5 ± 13.9 seconds greater improvement during the retest (A6-7) than initial training (A1-2) ($p = 0.014$) (Table 4).

Table 4

Paired Sample T-Test

Parameter	Mean	SD	Std. Error Mean	95% Confidence Interval		Sig. (2-tailed)
				LL	UL	
A5-A6	-88.734138	71.2703677	-61.624340	13.2345750	-115.84394	.000
A6-A7	60.6634483	75.5283210	89.3928851	14.0252571	31.9340115	.000
A5-A7	-28.070690	18.9438744	-20.864825	3.51778917	-35.276554	.000
diffA1A2-diffA6A7	36.53069	75.33458	13.98928	13.98928	7.87495	.014

Note. SD = standard deviation; LL = lower limit; UL = upper limit; Sig. = significance

Secondary Outcome

Regarding the performance in cricothyrotomy skills, the mean TSC score was 21.34 on A1, 23.14 on A2, 23.83 on A3, and 23.93 on both A4 and A5 (Table 2). Reevaluation of the mean TSC score on the sixth (A6) and seventh (A7) attempts were 19.24 and 22, respectively (Table 2).

Analysis of the Results

The results of this training demonstrated that mean time to ventilation improved by an average of 10.6 ± 0.69 seconds per iteration over the first five attempts (Table 3). This is consistent with the literature which demonstrated five repetitions is ideal for development of proficiency (Buonopane et al., 2014; Shetty, Nayyar, Stachowski, & Byth, 2013). The data from this training also demonstrated that, despite receiving initial didactic training, participants' competency, proficiency, and speed required several repetitions to reach values consistent with patient survival. This finding correlated with the literature supporting the need for hands-on training compared with didactic alone (Friedman et al., 2008; Hubert et al., 2014; & Jayaraman et al., 2014). Time to ventilation improved with each successive attempt, and TSC scores improved to near perfect after a single run during each training (A1-2 and A6-7) (Table 2).

Participants retested at the three-month interval demonstrated skill decay in time to ventilation between attempts A5 and A6 with a mean increase of 88.7 ± 13.2 seconds ($p=0.000$) (Table 4). This training did not include a baseline evaluation of performance prior to delivery of initial didactic training. In the studies evaluated in our literature review, participants demonstrated overall positive retention at retest compared to baseline, but also noted a similar decay between post-test and retest (Boet et al, 2011). The difference in time to ventilation between A6 and A7 was 60.7 ± 14.0 seconds ($p=0.000$) (Table 4). Additionally, the difference in

the rate of improvement between A1 to A2 and A6 to A7 demonstrated 36.5 ± 13.9 second greater improvement during reevaluation than initial training despite a lack of feedback or additional instruction during reevaluation ($p=0.014$) (Table 4). Both results suggest a positive training effect. Pearson correlation between A5 and A7 performance time showed a moderate effect ($r=0.446$, $p=0.015$), suggesting trainability was a subject effect; that is, participants who reached the fastest times after initial training also reached the fastest times after repeated training.

In summary, participants demonstrated significant performance improvement in competency, proficiency, and speed in cricothyroidotomy across repetitions, substantial three-month decay in speed, and greater improvement during retest compared to the initial training effect. The results were consistent with the literature supporting the need for hands-on training compared with didactic alone, as well as a need for regular reinforcement of training to maintain competency, proficiency, and speed at this seldom-used but critical airway management skill (Boet et al., 2011; Hubert et al., 2014; Kudavalli et al., 2008; Nakstad et al., 2013; You-Ten et al., 2015).

There are possible weaknesses to implementation of the retest evaluation that may have affected data. Subjects did not have the opportunity to organize equipment or preload the endotracheal tube on the bougie, as they had during the initial training. Furthermore, the retest was embedded into a high-fidelity CICV scenario while the initial training was limited to isolated performance on the low-fidelity task trainer. Also, the students watched a trigger film on CICV scenarios and had the opportunity to discuss the experience within groups of five classmates. No additional training on cricothyroidotomy skills nor feedback was given to the students between A6 and A7.

Organizational Impact / Implications to Practice & Policy

Incorporating the instructional PowerPoint and dedicated hands-on training in cricothyroidotomy skills to the curriculum required minimal scheduling adjustments and a nominal supply budget. This data demonstrated a significant training impact on procedural skill cricothyroidotomy proficiency, competency, and speed. Maintaining this training within the curriculum will require an additional faculty member to replace the authors' roles as trainers during the hands-on sessions. Additionally, it will require a replenishment of supplies such as the simulation skin.

Future Directions for Research and Practice

While the results of this project mirrored that of the evidence, there were limitations. This training should be implemented utilizing the same task trainer on first and second evaluations and including a baseline evaluation of performance prior to delivery of the training. We recommend that this training be incorporated permanently into the didactic curriculum of USU SRNA's. Given the decay that occurs between initial testing and retesting it is evident that training should be recurring. Hands-on cricothyroidotomy skills training should be accomplished as a baseline standard for military CRNA's and should be re-accomplished in six months to one-year time intervals to combat skills decay. We suggest that this skill be added to the CMRP checklist for Air Force CRNA's to ensure readiness.

Conclusions

While the CICV scenario is rare, it is imperative anesthesia providers are prepared to manage such an encounter. Cricothyroidotomy is definitive management for the emergent surgical airway and therefore an essential skill for all anesthesia providers. This training demonstrated significant performance improvement in both competency and proficiency in cricothyroidotomy. Three-month decay was evident and greater improvement during

reevaluation suggests a positive training effect. Furthermore, this data was consistent with the literature supporting the need for hands-on training compared with didactic alone, as well as a need for regular reinforcement of training.

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Figure 1. American Society of Anesthesiologists Difficult Airway Algorithm

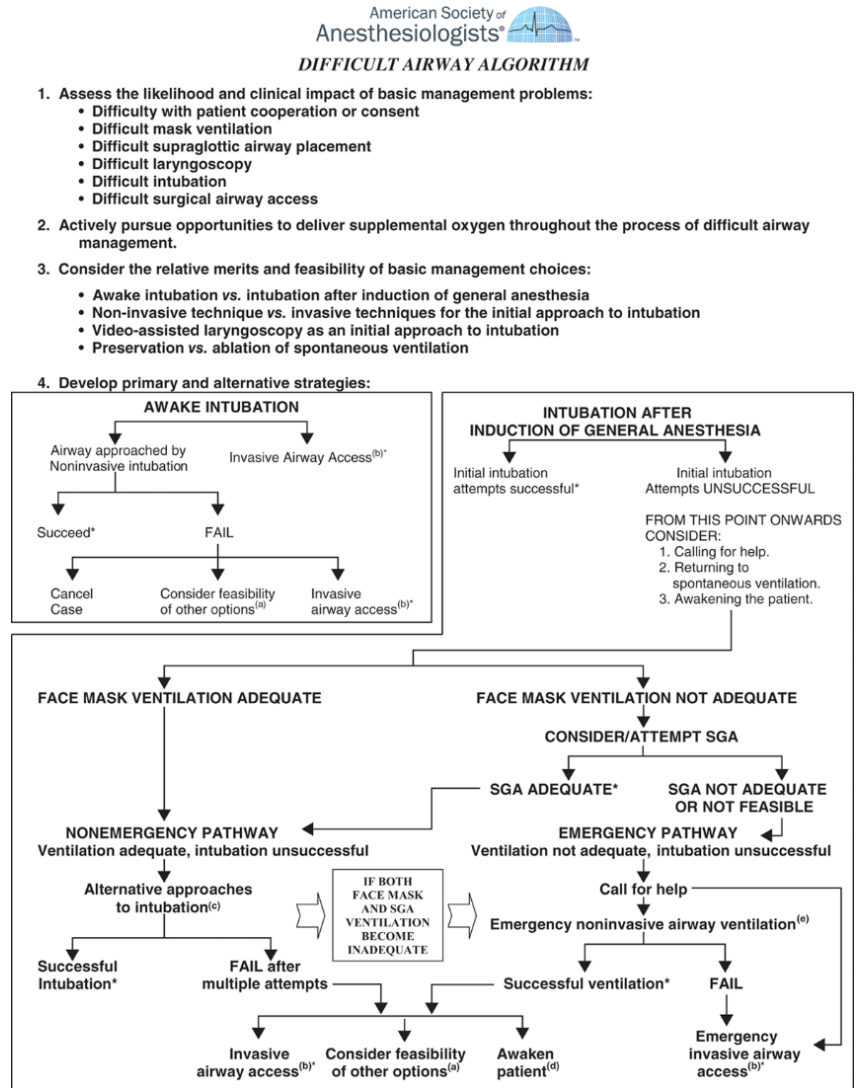


Figure 1. The ASA Difficult Airway Algorithm identifies the steps taken by an anesthesia provider when faced with a patient who they are unable to ventilate and/or intubate. Adapted from "Practice Guidelines for Management of the Difficult Airway" by Apfelbaum, J. L., Hagberg, C. A., Caplan, R. A., Blitt, C. D., Connis, R. T., & Nickinovich, D. G, 2013, *Anesthesiology*, 118(2), 251-270. Copyright 2013 by The American Society of Anesthesiologists.

Figure 2. Iowa Model Collaborative

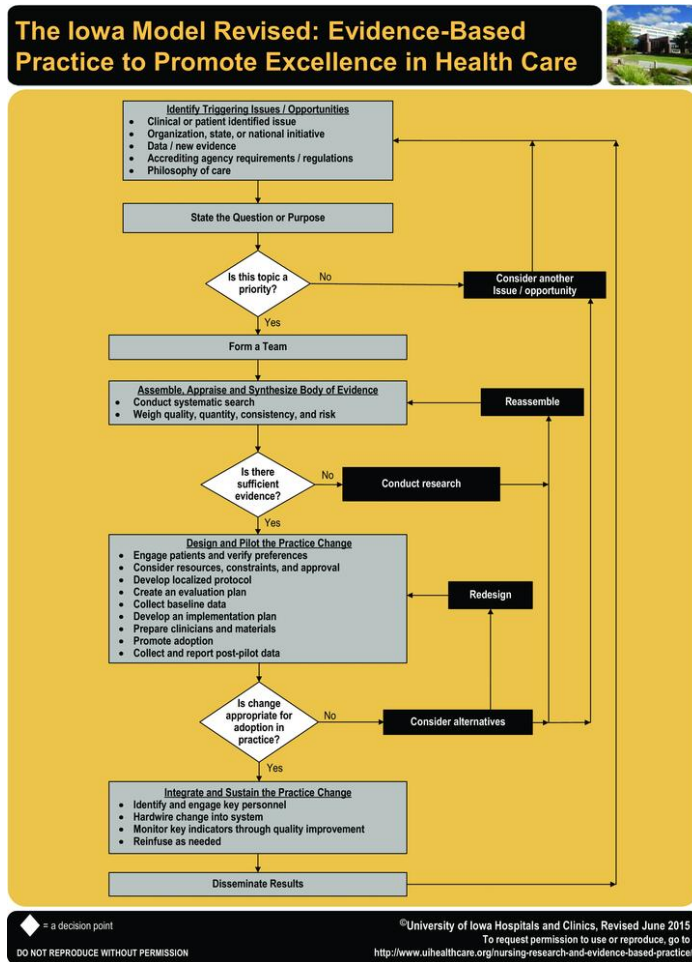


Figure 2. The Iowa Model depicts the organizing framework used in this evidenced-based practice project. Adapted from "Iowa Model Collaborative", 2017, Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing*, 14(3), 175-182. Used/reprinted with permission from the University of Iowa Hospitals and Clinics, copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.

Figure 3. Can't Intubate Can't Ventilate Systematic Review PRISMA Diagram

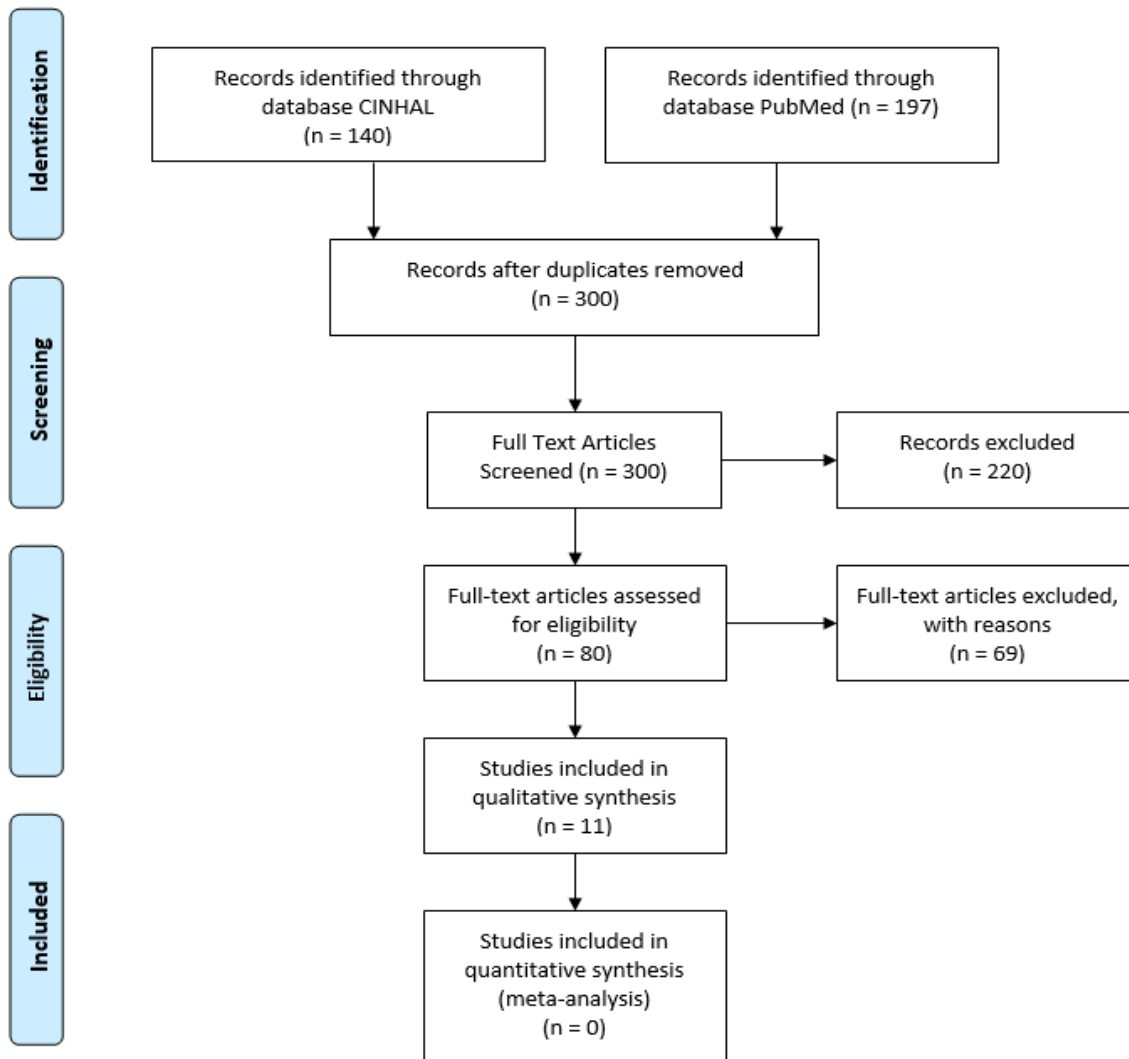


Figure 3. The PRISMA diagram depicts the flow of information through the different phases of a systematic review. It maps out the number of records identified, included and excluded, and the reasons for exclusions. Adapted from “Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement,” by Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., and the PRISMA Group, 2009, *Annals of Internal Medicine*, 151(4), 264-269. Copyright 2015 by The PRISMA Group.

Table 1

Literature Review Matrix

Author	Purpose	Conclusions
Boet	To investigate the 6-month and 1-year retention of the skill of cricothyroidotomy using high fidelity simulated CICV scenarios.	A single high-fidelity simulation training improves procedural skills of cricothyroidotomy, and the improvement was retained for one year.
Buonopane	To identify issues related to cricothyrotomy training through evaluation of three aspects: (i) the teaching efficacy designed to improve cricothyrotomy skills; (ii) preference rates; and (iii) the learning skills for each technique.	Cricothyroidotomy skills improve with repetition during hands on training, but plateau at 5 attempts.
Friedman	To compare cricothyrotomy skills acquired on a simple inexpensive model to those learned on a high-fidelity simulator using valid evaluation instruments and testing on cadavers.	Performance in the posttest improved significantly, regardless of whether participants received high fidelity training vs low fidelity training. Shows that a simple model achieved the same effect on objectively rated skill acquisition, as did an expensive simulator.
Hubert	To assess the impact of a short training course on the ability of anesthesiology residents to comply with current difficult airway management guidelines.	Results emphasize the value of simulation for training in general and for the acquisition of algorithms and complex procedural skills.
Jayaraman	To determine if the addition of instruction using a low-fidelity simulator could improve residents' confidence, knowledge, and performance of cricothyroidotomy as compared with a traditional method.	Low-fidelity simulation demonstrates improved performance, compared to those students who did not have any training simulation.

Kuduvalli	To measure the effect of training on compliance with national guidelines for the management of unanticipated failed intubation and/or ventilation. It also assessed the effect of formal training on performance over time.	Simulation-based airway training significantly improves early performance. Long-term retention of both technical and decision-making skills requires frequent reinforcement.
Latif	To determine if teaching cricothyrotomy with fresh cadavers improves confidence with neck anatomy, patient positioning, procedural steps, and familiarity with a cricothyrotomy kit.	Didactic workshop followed by performance of cricothyrotomy on fresh human cadavers may improve providers' confidence in performing cricothyrotomy.
Nakstad	To evaluate the performance of the two locally available techniques when performed by air ambulance anesthesiologists in both a baseline setting and after an intensive training package.	Testing the baseline PCK skills of prehospital anesthesiologists revealed low confidence, sub-optimal performance and a very high failure rate. The BACT technique demonstrated a significantly higher success rate, no tracheal damage, and higher confidence.
Shety	To determine the number of attempts required by trainees to gain adequate skills for a successful cricothyroidotomy.	Participants achieved proficiency within 5 attempts of surgical cricothyroidotomy after a training session.
Sulaiman	To compare surgical cricothyroidotomy with cuffed and uncuffed devices to understand both the practicalities of insertion and the effectiveness of ventilation.	Surgical cricothyroidotomy was significantly faster than wire guided. All participants were successful with all 3 devices by the third attempt.
You-Ten	To determine whether contextualization of a crisis scenario would impact the performance of cricothyrotomy procedural task.	Contextualized scenario did not improved performance of cricothyroidotomy.

Appendix A: CITI Certificates

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Katherine Knott (ID: 5742291)
- **Email:** katherine.knott@usuhs.edu
- **Institution Affiliation:** Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 603)
- **Phone:** 301-295-9556

- **Curriculum Group:** OUSD P&R Human Research
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 20622767
- **Completion Date:** 28-Aug-2016
- **Expiration Date:** 28-Aug-2019
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	27-Aug-2016	3/3 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	27-Aug-2016	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	27-Aug-2016	5/5 (100%)
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	27-Aug-2016	No Quiz
History and Ethics of Human Subjects Research (ID: 498)	28-Aug-2016	7/7 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	28-Aug-2016	5/5 (100%)
Informed Consent (ID: 3)	28-Aug-2016	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	28-Aug-2016	4/4 (100%)
Records-Based Research (ID: 5)	28-Aug-2016	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	28-Aug-2016	5/5 (100%)
Vulnerable Subjects - Research Involving Children (ID: 9)	28-Aug-2016	3/3 (100%)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	28-Aug-2016	3/3 (100%)
FDA-Regulated Research (ID: 12)	28-Aug-2016	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	28-Aug-2016	5/5 (100%)
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	28-Aug-2016	No Quiz
The Federal Regulations - SBE (ID: 502)	28-Aug-2016	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

**COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Alicia Scott (ID: 5742938)
- **Email:** alicia.scott@usuhs.edu
- **Institution Affiliation:** Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 603)
- **Phone:** 4067815219

- **Curriculum Group:** OUSD P&R Human Research
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 20624268
- **Completion Date:** 28-Aug-2016
- **Expiration Date:** 28-Aug-2019
- **Minimum Passing:** 80
- **Reported Score*:** 98

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	28-Aug-2016	3/3 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	28-Aug-2016	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	28-Aug-2016	4/5 (80%)
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	28-Aug-2016	No Quiz
History and Ethics of Human Subjects Research (ID: 498)	28-Aug-2016	7/7 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	28-Aug-2016	5/5 (100%)
Informed Consent (ID: 3)	28-Aug-2016	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	28-Aug-2016	4/4 (100%)
Records-Based Research (ID: 5)	28-Aug-2016	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	28-Aug-2016	5/5 (100%)
Vulnerable Subjects - Research Involving Children (ID: 9)	28-Aug-2016	3/3 (100%)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	28-Aug-2016	3/3 (100%)
FDA-Regulated Research (ID: 12)	28-Aug-2016	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	28-Aug-2016	5/5 (100%)
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	28-Aug-2016	No Quiz
Vulnerable Subjects - Research Involving Prisoners (ID: 8)	28-Aug-2016	4/4 (100%)

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 Phone: 888-529-5929
 Web: <https://www.citiprogram.org>

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Robert Wittwer (ID: 5748043)
- **Email:** robert.wittwer@usifs.edu
- **Institution Affiliation:** Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 603)
- **Phone:** 2408122782

- **Curriculum Group:** OUSD P&R Human Research
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 20640006
- **Completion Date:** 30-Aug-2016
- **Expiration Date:** 30-Aug-2019
- **Minimum Passing:** 80
- **Reported Score*:** 84

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	29-Aug-2016	3/3 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	30-Aug-2016	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	30-Aug-2016	4/5 (80%)
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	30-Aug-2016	No Quiz
History and Ethics of Human Subjects Research (ID: 498)	30-Aug-2016	7/7 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	30-Aug-2016	5/5 (100%)
Informed Consent (ID: 3)	30-Aug-2016	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	30-Aug-2016	2/4 (50%)
Records-Based Research (ID: 5)	30-Aug-2016	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	30-Aug-2016	4/5 (80%)
Vulnerable Subjects - Research Involving Children (ID: 9)	30-Aug-2016	2/3 (67%)
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	30-Aug-2016	3/3 (100%)
FDA-Regulated Research (ID: 12)	30-Aug-2016	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	30-Aug-2016	5/5 (100%)
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	30-Aug-2016	No Quiz
The Federal Regulations - SBE (ID: 502)	30-Aug-2016	0/5 (0%)

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Appendix B: USU Form 3202N

USUHS FORM 3202N
DANIEL K. INOUE GRADUATE SCHOOL OF NURSING
EVIDENCE-BASED PRACTICE/PERFORMANCE IMPROVEMENT PROPOSAL

VPR Date Stamp

Project Number: **GSN-61-10263** (VPR #8 only)

Project Title: **Evaluating Airway Placement with "Can't Intubate, Can't Ventilate" Simulation Training**

SECTION A: STUDENT POC INFORMATION	
1. Name (Last, First, MI): Wittwer, Robert, L.	Student E-mail: robert.wittwer@usuhs.edu
2. Home Address: [REDACTED]	
SECTION B: COMMITTEE CHAIR / SENIOR MENTOR INFORMATION	
3. Name (Last, First, MI): Hodgen, R. K.	
4. Telephone: (228) 348-1727 Fax: (937) 257-0596	E-mail: r.kyle.hodgen@usuhs.edu
5. USUHS Building/ Room No.: N/A, Wright Patterson AFB	
SECTION C: PROJECT INFORMATION	
6. Attach the Abstract for the proposal, including the following sections: Site Location of the Project, Title, Authors, Background or Problem/Issue, Clinical Question/Purpose, Project Design, Anticipated Organizational Impact/Implications for Practice and also include the Proposed Timeline. Single space the abstract and use Times New Roman font, size 12.	
7. Is this proposal related to an active research project of the Chair/Senior Mentor identified in Section B? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, complete below; if no, proceed to Part 8. Project Number: _____ Project Title: _____ Project Start Date: _____ Project End Date: _____	
8. Anticipated period of performance: Project Start Date: 1/1/2018 Project End Date: 5/10/2019	
9. Performance Site(s): USUHS/Walter Reed National Military Medical Center/Wright Patterson AFB	
10. Does this project involve any classified information? (Contact the USUHS Security Office for guidance) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
11. Do you have a funding source for this project? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA If yes, specify the funding agency and the amount provided: In kind-GSN	
SECTION D: SIGNATURES	
The following signatures attest to the validity of the above information:	
[REDACTED]	[REDACTED]
Student (Project Point of Contact for the Group) (Signature and Date)	Chair/Senior Mentor (Signature and Date)
[REDACTED]	[REDACTED]
Chair/Program Director (Signature and Date)	Chair/Program Director (Signature and Date)
[REDACTED]	[REDACTED]
DNP Project Director or PhD Director (Signature and Date)	Associate Dean for Academic Affairs, GSN (Signature and Date)
[REDACTED]	[REDACTED]
Associate Dean for Research, GSN (Signature and Date)	Dean, DKI Graduate School of Nursing (Signature and Date)
In light of the above signatures, the project is approved.	
[REDACTED]	30 Nov 2018
USUHS Vice President for Research	Date

Appendix C: USU Notice of Project Approval



OFFICE OF RESEARCH
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814
PHONE: (301) 295-3303; FAX: (301) 295-6771

NOTICE OF PROJECT APPROVAL

Change Number: Original

VPR Site Number: GSN-61-10263
Principal Investigator: Wittwer, Robert
Department: Graduate School of Nursing
Project Type: Student
Project Title: Evaluating Airway Placement with "Can't Intubate, Can't Ventilate" Simulation Training
Project Period: 1/1/2018 to 5/10/2019

Assurance and Progress Report Information:

Table with 6 columns: Name, Sup, Approval Type, Status, Approved On, Forms Received. Row 1: Progress Report, 0, Final, To be Submitted, N/A

Remarks:
This Notice of Project Approval has been reviewed and approved. Please remember that you must submit a final Progress Report (Form 3210) upon completion of this project.

Questions regarding this approval should be directed to the following person in the Office of Research:
Gale Morgan, (301) 295-0137.

[Redacted Signature] 6 Dec 2018
Yvonne T. Maddox, Ph.D.
Vice President for Research
Uniformed Services University of the Health Sciences

cc: Wittwer, Robert
File
Robert Wittwer
Linda Wanzer

Appendix D: DNP Project Timeline

Spring 2018

Submit eIRB Application

Upload 3202N (Appendix D), SM Approved Abstract (Appendix F), and Project Timeline

Present PowerPoint CICV Training

Cadaveric advanced airway technique demonstration, CICV trigger film video and cricothyroidotomy skills performance evaluation

Upload SM Approved Final Proposal (Appendix E), Update Milestone Checklist (Appendix A)

Summer 2018

Reevaluation of cricothyroidotomy skills performance x1 repetition

Submit request for course data retrieval

Update Milestone Checklist (Appendix A)

Fall 2018

Submit Analysis of Data to SM

Submit eIRB Determination Document

Update Milestone Checklist (Appendix A)

Spring 2019

Senior Mentor Discussion

Upload Phase II Site Leadership Stakeholders Oral Presentation

Upload DNP Project SM approved Abstract/Impact Statement Form (Appendix F)

Upload DNP Project Completion Verification Form (Appendix G)

Upload Final SM Approved DNP Project Report (Source Document)

Upload Final SM Approved Poster

Upload Phase II Public Affairs Office Clearance Letter

Register for USU Research Days

Print Final Approved Poster

Upload Final SM Approved Project Overview

Present 10-minute Oral PowerPoint to GSN/USU Community

Appendix E: IRB/PI Letter of Determination



UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND
20814-4799
www.usuhs.edu



August 02, 2018

MEMORANDUM FOR Lt. Col RONALD HODGEN, USAF, NC, DANIEL K. INOUYE
GRADUATE SCHOOL OF NURSING

SUBJECT: Uniformed Services University (USU) Human Research Protections Program
(HRPP) Amendment Approval for Exempt Protocol GSN-61-9846

Congratulations! The Amendment 1 (Reference # 906200) to your EXEMPT human subjects research protocol, GSN-61-9846 entitled "Implementing Virtual Reality Trigger Films in Nurse Anesthesia Airway Management Education," was reviewed and determined on July 27, 2018 by Mr. Micah R. Stretch, M.A., J.D., Exemption Determination Official, to not affect the original exemption determination for this protocol under the provision of 32 CFR 219.101(b)(1). This determination will be reported to the USU IRB scheduled to meet on August 23, 2018.

The purpose of this study is to integrate a point-of-view difficult airway trigger film (DATF) into initial nurse anesthesia education in managing difficult airway High-fidelity simulation (HFS) scenarios in the DKI-GSN RNA (Registered Nurse Anesthetist) curriculum; and evaluate the impact of using point-of-view DATF in the DKI-GSN RNA curriculum on student RNA (SRNA) performance executing the American Society of Anesthesiologists (ASA) DA algorithm during DA scenarios in HFS, defined as time to: 1) recognize that a DA situation is occurring and call for help; 2) take appropriate intermediate steps to restore ventilation; and 3) proceed to a definitive surgical airway if intermediate steps do not restore ventilation.

Amendment 1. This modification adds 3 new Associate Investigators to the study:

- Maj Katherine Knott, BSN, RN, CCRN, USAF, NC
- Maj Robert Wittwer, NC
- Capt Alicia Scott, BSN, RN, CCRN, USAF, NC

You are required to submit amendments to this protocol, changes to the informed consent document (if applicable), adverse event reports, and other information pertinent to human research for this project. No changes to this protocol may be implemented prior to approval. If you have questions regarding this action or questions of a more general nature concerning human participation in research, please contact Elizabeth Thammasuvimol at 301-295-0704 or elizabeth.tham.ctr@usuhs.edu.

86 3
Micah R. Stretch, M.A., J.D.
Senior IRB Coordinator
Exemption Determination Official

Appendix F: PAO Clearance Letter

FW: 88 ABW Case Completed: Case Number 88ABW-2019-2200

Funke, Frederick H (Fred) CIV USAF 88 MDG (USA)

Sent: Tuesday, May 07, 2019 12:29 PM

To: Wittwer, Robert L Maj USAF (US)

Cc: Hodgen, R Kyle Lt Col USAF 88 MDG (USA); Coons, Erin E CTR (USA)

Sir,

Your PA clearance came through this AM! This case number will be used for the manuscript, poster, and briefing slides.

v/r,

fred

FREDERICK H. FUNKE, Civ, DAF, CIP

WPMC IRB Administrator

88th Medical Group/SGNE

Wright-Patterson AFB OH 45433

(937) 257-4242 FAX: (937) 656-1622

Please note I have transitioned to Defense Enterprise Email:

frederick.h.funke.civ@mail.mil

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-----Original Message-----

From: usaf.pentagon.saf-pa.mbx.saf-pa-security-and-policy-review@mail.mil

[\[mailto:usaf.pentagon.saf-pa.mbx.saf-pa-security-and-policy-review@mail.mil\]](mailto:usaf.pentagon.saf-pa.mbx.saf-pa-security-and-policy-review@mail.mil)

Sent: Tuesday, May 7, 2019 9:25 AM

To: Funke, Frederick H (Fred) CIV USAF 88 MDG (USA) <frederick.h.funke.civ@mail.mil>; Holtz, Amy L

CTR (US) <amy.holtz.ctr@us.af.mil>; 711hpwstinfomailbox@us.af.mil

Subject: 88 ABW Case Completed: Case Number 88ABW-2019-2200

88 ABW has completed the review process for your case on 07 May 2019:

Subject: Evaluation of Cricothyroidotomy Training During a "Can't Intubate, Can't Ventilate" Scenario (Dissertation/Thesis)

Case Reviewer: John Van Winkle

Case Number: 88ABW-2019-2200

The material was assigned a clearance of CLEARED on 07 May 2019. This email serves as the official notice of the disposition of this case. If you have additional questions, contact the Review Manager for your case, John Van Winkle, johnny.van_winkle@us.af.mil.

Appendix G: Task-Specific Checklist for Cricothyroidotomy

Task-Specific Checklist for Cricothyroidotomy			
Task	0 Did Not Perform	1 Inadequately Performed	2 Adequately Performed
1. Stabilize thyroid cartilage [START STOPWATCH]			
2. Identify cricothyroid membrane			
3. Prepare the surgical site with antiseptic			
4. Create a vertical skin incision over cricothyroid membrane with #10 blade			
5. Use finger dissection to expose cricothyroid membrane			
6. Make a horizontal (transverse) incision through the cricothyroid membrane			
7. Spread cricothyroid membrane with back of blade to widen cricothyroidotomy			
8. Insert an Eschmann stylet through cricothyroidotomy			
9. Pass a 6.0mm cuffed endotracheal tube over Eschmann stylet into trachea			
10. Inflate cuff adequately			
11. Verify ventilation with EtCO2 [STOP STOPWATCH]			

Adapted from "Airway Management in the Austere Setting" by R. K. Hodgen and K. A. Wofford, 2017, *Austere Anesthesia Survival Handbook*, 12, p. 9. Copyright 2017 by the Borden Institute.

Appendix H: DNP Project Completion Verification Form



Appendix G: Daniel K. Inouye Graduate School of Nursing
DNP Project Completion Verification Form

**DOCTOR OF NURSING PRACTICE PROJECT
Completion Verification Form**

The DNP Project titled: Evaluating infraglottic airway placement with "Can't Intubate, Can't Ventilate" simulation training
was completed at Val G Simulation Center by the following student(s):

<i>(type student name)</i>	<i>(signature)</i>	<i>(date)</i>
<u>Robert L. Wittwer</u>		<u>9 Sept 18</u>
<u>Katherine L. Knott</u>		<u>9 Sept 18</u>
<u>Alicia M. Scott</u>		<u>9 Sept 18</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

The DNP Practice Project Team verifies that the following components of the DNP project, accomplished by the above students, is of sufficient rigor and demonstrates doctoral level scholarship to meet the requirements for USUHS GSN graduation:

- Presentation of DNP project to the leadership/stakeholders at the Phase II Site,
- Abstract/Impact Statement (*Appendix F*), and
- DNP Project written report.

Verified by:

<i>(type name)</i>	<i>(signature)</i>	<i>(date)</i>	
<u>Kyle Hodgen</u>		<u>1 Mar 19</u>	Senior Mentor
_____	_____	_____	Team Mentor
_____	_____	_____	Team Mentor
_____	_____	_____	Team Mentor & Phase II Site Director

For RNA Students only - add the following additional signature for final verification of project completion:

<u>Kennett Radford</u>		<u>02Apr2019</u>
RNA Project Director <i>(type name)</i>	<i>(Signature)</i>	<i>(Date)</i>