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# Paramedic Students' Perceived Self-Efficacy at Airway Management

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PARAMEDIC STUDENTS' PERCEIVED SELF-EFFICACY AT  
AIRWAY MANAGEMENT

Presented in Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Nursing Practice

By

Holly Herron, MS  
The Graduate School  
Otterbein University  
2014

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PARAMEDIC STUDENTS' PERCEIVED SELF-EFFICACY

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By

Holly Herron, MS

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**Abstract**

The out of hospital (OOH) environment is chaotic, unpredictable and unforgiving. Paramedics are the primary providers of life-saving, OOH airway management, which includes respiratory assessment, bag-valve-mask ventilation (BVM), and endotracheal intubation (ETI). OOH ETI is the most difficult skill for which to obtain and retain clinical competence. Preventable patient care errors and deaths related to OOH ETI are a healthcare concern. Clinical experience remains limited for paramedic students in the acquisition of adequate ETI experience. The purpose of this study was to assess the perceived self-efficacy (PSE) of paramedic students in ETI. Bandura's self-efficacy theory was the theoretical framework for this project. PSE relates to an individual's level of self-confidence in his or her perceived ability to achieve successful task completion. PSE enhances psychomotor skill performance. High fidelity simulation (HFS) improves PSE in psychomotor skill performance. Ten students attending a paramedic program in the mid-western United States served as the study sample. Students were surveyed during an OOH ETI HFS curricular required laboratory (CRL) designed to mimic four commonly encountered OOH ETI situations. Participants completed identical anonymous pre and post OOH ETI HFS CRL PSE surveys. Data revealed a small, nonsignificant increase in total PSE scores after exposure to the HFS session. PSE scores for Respiratory Assessment and ETI increased in 50% of the scenarios and decreased in one scenario for ETI. PSE scores for BVM were not increased. Further exploration of the impact of OOH ETI HFS to increase PSE for paramedic students is required.

## Introduction

Out-of-hospital endotracheal intubation (OOH ETI) is a potentially life-saving advanced airway management skill that is fraught with the potential for patient death and disability if improperly performed (Wang & Yearly, 2006; Wang, Balasubramani, Cook, Lave, & Yearly, 2010). Paramedics are the primary providers of OOH ETI; however, they receive limited training and continuing education in this vital skill (Bledsoe & Gandy, 2010). Wang, Mann, Mears, Jacobson and Yealy (2011) utilized the National Emergency Medical Services Information System (NEMSIS) Database, which represents 16 states, to examine the largest and most heterogeneous EMS data available at that time. They noted that of the 4,383,768 EMS activations, ETI occurred 10,356 times with a success rate between 72.8% - 82.6% dependent on various patient subgroups related to diagnosis and age. OOH ETI remains one of the most difficult skills in the care of the prehospital and emergency department patient. Many obstacles limit the prehospital professional in obtaining and retaining competence in this skill. Strategies to correct the problems surrounding the OOH ETI patient must begin with education of the caregiver to ensure competency in this procedure.

Paramedic education must center on the knowledge and application of this skill and concentrate on the when, where, how and why of ETI, management of complications of ETI and life-like simulation education with hands-on skill training. Access to clinical patient ETI experience in the ED setting, prehospital setting and operating room environment is ideal. However, actual experience with airway management on live patients is limited due to few opportunities to perform ETI for students and practicing paramedics and issues related to student liability (Breckwoldt et al., 2012; Breckwoldt et

al., 2011; Wang et al., 2010). High-quality airway management education must concentrate on initial skill acquisition and continued competency of the prehospital ETI healthcare provider. One method of improving paramedic performance is through aggressive, state-of-the-art educational sessions such as high-fidelity simulation (HFS) laboratories with hands-on experience and real-life scenarios.

Perceived self-efficacy (PSE) relates to an individual's level of self-confidence in the perceived ability to achieve successful completion of a task. PSE and self-efficacy appear in the literature as interchangeable terms and will be considered as such within the context of this document. Self-efficacy theory promotes the concept that an individual's view of their ability to be successful assists them in actualizing success. Self-efficacy beliefs aid in efficient analytic thinking during complex decision-making situations (Youngquist et al., 2008). The concept of self-efficacy has been identified as a factor in the success rate of competent skill acquisition in HFS teaching (Sinclair & Ferguson, 2009).

A correlation between self-efficacy and improved clinical performance of students exposed to HFS exists (Gee, 2006). HFS is an effective solution for the acquisition of ETI skill in a safe, predictable and reliable environment. Adequate exposure to ETI for competency validation prior to graduation is critical (Gee, 2006; Zigmont, Kappus, & Sudikoff, 2011). The evidence surrounding the problems associated with paramedic OOH airway management skills related to ETI may be due to a lack of confidence in the ETI skill set. Given few opportunities to practice ETI skills, do paramedics and paramedic students feel confident in these skills? Or, do they lack confidence in airway management skills particularly in ETI? If a lack of confidence

exists, then anxiety may increase when paramedics and paramedic students encounter a difficult ETI given the relationship between confidence and anxiety (Bandura, 1993). HFS can benefit knowledge acquisition, knowledge retention, competence and self-efficacy in clinical skills such as ETI (Youngquist et al., 2008).

High fidelity simulation (HFS) can be used to improve paramedics' perceptions of self-efficacy at ETI (Kaakinen & Arwood, 2009; Rutherford-Hemming, 2012). The purpose of this Doctorate of Nursing Practice project was to assess paramedic students' perceived self-efficacy at airway management before and after an HFS laboratory during the required curriculum of a nationally accredited paramedic program in the mid-western United States.

### **Background**

The prehospital world is an unpredictable and unforgiving environment that gives rise to secondary complications resulting from the delivery of ETI. Opportunities for paramedics to acquire ETI skills are limited. Therefore, they may be lacking in confidence and experience increased anxiety when performing ETI. The risks versus benefits of OOH ETI remain controversial due to limited outcome data (Wang et al., 2010). Clear guidelines related to decisions which define the what, when, where, how, and why of OOH ETI are lacking in the literature. OOH ETI errors have gained increased attention in recent years. Continued questions mount regarding the efficacy of ETI in the prehospital setting (Egley et al., 2010; Sayre, White, Brown, & McHenry, 2005).

OOH ETI has been practiced for over 25 years by paramedics, flight nurses and physicians during field resuscitations and has long been considered the "gold standard" in definitive airway management among advanced life support providers (Wang & Yealy,



2006). The emphasis on OOH ETI originated from emergency department use of ETI as an expectation for Advanced Life Support (ALS). Additionally, a desire to mitigate the shortcomings of existing alternative airway management devices led to the view that ETI was a superior solution (Thomas & Bengner, 2011; Wang et al., 2011; Wang & Yealy, 2006). However, controversy exists as to the benefits of OOH ETI compared to other airway management strategies.

The literature related to OOH ETI errors cites a variety of complications including misplacement, iatrogenic oxygen desaturation, and bradycardia (Wang et al., 2010). In a prospective study, Wang, Cook, Chang, Yealy, and Lave (2009, p. 50), “reported that 1 in 4.5 patients receiving an ETI procedure were exposed to at least one of three key errors: (1) endotracheal tube misplacement (2) multiple ETI attempts (at least 4 or more laryngoscopies), or (3) failed ETI.” Such adverse events may have significant correlations with secondary complications such as airway or pulmonary injury; however, few prior studies linked OOH errors to poor outcomes or secondary complications (Wang and Yealy, 2006; Wang et al., 2009). Wang et al. (2009) reviewed OOH ETI and hypothesized that ETI errors increased the odds of death and/or secondary complications. However, the results of their study did not support this hypothesis and they noted that OOH ETI did not increase mortality. Failed ETI did, however, increase secondary complications of pneumonitis (Wang et al., 2009).

In the United States, low success rates are reported for OOH airway management, calling for national efforts for improvement (Wang et al., 2010). The missed intubation rate has been estimated at 20 - 25% (Egly et al., 2010; Thomas & Bengner, 2011; Wang et al., 2010). Success rates for the first three intubation attempts have been reported as

69.9%, 84.9% and 89.9% (Egly et al., 2010). Paramedics may also overestimate the correct placement of an ETI and fail to recognize improper placement, suggested to occur 25% of the time (Thomas & Bengner, 2011). These studies further demonstrate the degree of OOH ETI failure.

The environmental factors in which paramedics must perform ETI have a significant impact on the overall success rate of this procedure. Egly et al. (2010) noted an 85% success rate of ETI by paramedics with a 20% incidence of "significant scene distractions" and a 40% incidence of suboptimal space available for intubation. The study noted that more than half of the time paramedics were required to kneel at the patient's head to perform the intubation procedure. Conditions such as these are common in the prehospital setting as opposed to an emergency department and are certainly not ideal conditions to perform an ETI (Egly et al., 2010).

A landmark classic study conducted by Gausche et al. (2000) remains one of the most notable investigations of OOH ETI to date. This airway management study of pediatric patients served as a controversial and compelling report in the initial and continued shift away from OOH ETI and towards bag-valve-mask (BVM). The findings noted that an airway strategy incorporating OOH ETI offered no survival or neurologic benefit compared to BVM ventilation alone. Although limited by its sample of pediatric patients in a large urban location, this study represented the largest prospective, controlled evaluation of OOH airway management interventions at that time (Gausche et al., 2000; Wang & Yealy, 2006). The results of this extensive pediatric airway management study have implications for the adult population as well.

The American Heart Association (AHA) recently changed the priority in its resuscitation mnemonic from Airway, Breathing, and Circulation (ABC) to Circulation, Airway, and Breathing (CAB). These revised guidelines further demonstrate the progressive reduction in priority of the immediate acquisition of a definitive airway such as ETI. Wang et al. (2010) reviewed over four million EMS activations in which ETI and alternative airway placement were successful 77% and 87.4% of the time respectively. This study demonstrates an increased success rate in the placement of alternative airways compared to successful ETI placement in the OOH setting. However, ETI remains the "gold standard" in definitive airway management within the current international resuscitation literature (Egly et al., 2010).

In the OOH setting, time plays heavily when evaluating field procedures that delay immediate transport to a hospital. ETI is no exception, as the literature increasingly supports a "load and go" stance for the OOH patient. The use of basic airway management skills such as BVM and alternative airways can be viewed as time-saving strategies that support the concept of "load and go". Definitive airway management with ETI may add OOH time and supports the concept of "stay and play" in lieu of "load and go" (Egly et al., 2010; Shin, Ahn, Song, Park, & Lee, 2012).

Educational standards for paramedic training in OOH ETI may lack adequate minimal competency requirements. Most programs require a minimum of five intubations under the ideal conditions of the operating room (OR) with anesthesia personnel oversight. Under these ideal OR conditions, a paramedic student requires between 15-25 patient encounters to achieve a success rate greater than 90% (Wang, Reitz, Hostler, & Yealy, 2005). Others suggest that at least of at least 50 ETI experiences

are necessary to obtain minimum competency (Wass, Jacob, Kopp & Torsher, 2011). Therefore, minimum competency at ETI under ideal conditions is not achieved during paramedic training programs, setting up the paramedic students and graduate paramedics for continued failure in the adverse conditions of the OOH environment.

The emergency department (ED) and OR environment are very dissimilar to the chaotic and out of control prehospital world. It is impossible to create live patient education settings at night, in a cornfield, upside down in a car with a patient who has just eaten, is severely injured or in full cardiac arrest and in the care of two overwhelmed rescuers who must attempt to accomplish the nearly impossible task of a successful OOH ETI. Uncontrolled conditions in the OOH environment reduce the chances for successful ETI.

The attempt to successfully simulate the OOH environment to educate and evaluate paramedic student competence in airway management skills remains a challenge for prehospital educators. The most promising solution may be HFS laboratory education. The use of HFS for airway training can provide an optimal education environment for ETI skill acquisition. Unlike real-life clinical situations, HFS can be used to emphasize specific skills, curricular content, and patient scenarios in a short period of time. HFS also offers full control and manipulation of the type of patient, treatments, outcomes and required skills in a controlled, safe environment. Additionally, HFS provides a safe haven for students to learn and practice patient care on manikins prior to exposure to real patients in a clinical setting, a desirable patient safety and quality standard in current healthcare delivery. Hall et al. (2005) demonstrated that the exposure to live patient ETI and HFS were equally sufficient in helping to master the ETI skill for

paramedics. However, data supporting the efficacy of HFS for prehospital ETI education is limited, and HFS training of the paramedic student remains the exception rather than the rule (Garcia, 2011; Lucisano & Talbot, 2012; Lyon, Clarke, Milligan, & Glegg, 2012).

Skill maintenance remains a barrier for EMS providers in the retention of OOH ETI skill. Prehospital providers have great difficulty obtaining and retaining competency in this skill set. In one state, paramedics performed less than four adult intubations per year and rarely intubated children (Wang & Yealy, 2006). Infrequent ETI opportunities give paramedics few chances to maintain competent in ETI skills (Wang & Yealy, 2006). Finding opportunities for paramedics to use the skill of ETI to maintain competence is limited. Evidence attempting to assess the number of ETI performed to gain and maintain confidence remains ill defined.

The problems associated with OOH ETI competence are further compounded when considering the environmental component of actualizing this skill set for the ALS provider. An attempt to simulate the working environment of a prehospital paramedic to practice this infrequent skill remains impossible. HFS environments, operating rooms, emergency departments and manikin training in an education setting remains very dissimilar to the chaos of the environmental realities in which ALS providers are required to perform ETI (Walker, Jensen, Leroux, McVey, & Carter, 2012; Warner et al., 2010).

Patient populations requiring OOH ETI are challenging and present unique barriers to care. Patients encountered by paramedics represent the highest acuity in the prehospital and hospital setting. Cardiac arrest patients represent the most common OOH ETI. Trauma patients requiring ETI present considerable obstacles in the prehospital

setting related to sub-optimal positioning due to limited access, spinal injury precautions, excessive bleeding, or trauma to the head, face, or neck that creates potential airway obstruction (Garcia, 2011). Airway complications such as trismus (teeth clinching) compromise airway access in the head trauma patient. Management of the trauma patient's airway is more difficult with the misplacement of ETI more common in these patients compared to non-trauma patients (Garcia, 2011). The bariatric patient represents another patient population with significant and unique challenges for the prehospital provider. The morbidly obese patient represents a difficult airway for ETI with anatomical and physical barriers related to the patients' size, poor positioning and limited access to perform successful ETI (Holmberg et al., 2011).

Uncertainty remains regarding the long-term efficacy of paramedic's use of this advanced airway skill. Many obstacles remain present in the continued value of ETI in the prehospital setting. These obstacles include less opportunity to utilize ETI in the field, more paramedics responding on each dispatch request and a difficult continuing education problem to maintain skill competency. Attempts to mimic the environment in which field ETI is performed within the classroom setting to promote and assure competency of this high-risk, low frequency skill remains an ongoing concern for students, educators, and administrators (Wang et al., 2010).

National curriculum standards for paramedic education require didactic instruction and hands-on manikin training on ETI. OR exposure to ETI occurs within some paramedic programs around the country. The inability to assure adequate clinical experience on actual patients during a paramedic program is common (Johnston, Seitz, & Wang, 2006). However, state and national paramedic program requirements mandate

validation of student competency at airway management and ETI upon program completion. Completion of these mandatory skill requirements is satisfied through practical skills labs, manikin training, hospital clinical experience in the OR and ED or in the field internship clinical experience. Actual clinical experience at ETI on real patients is not required.

### **Significance of the Problem**

In its 2001 report *“To Err is Human,”* the Institute of Medicine (IOM) described staggering statistics of preventable deaths and patient errors in health care and demanded changes in practice at all levels of patient care (IOM, 2001). In the decade since this publication, significant morbidity and mortality continues as a result of medical errors (Berger, 2006; Berger & McKenna, 2007; IOM, 2006; Lu, Guenther, Wesley, & Gallagher, 2013).

Recent studies suggest that medical errors occur frequently in the hospital setting and clinics with an estimated 400,000 adverse drug errors and approximately 100,000 preventable patient deaths per year from medical errors (Lu et al., 2013); however, no studies have investigated the incidence of OOH medical errors (Lu et al., 2013).

Realizing that approximately 16 million medical transports occur in the United States annually, the prevalence of OOH medical errors is likely to be significant (Lu et al., 2013). Currently, evidence-based techniques are being used to evaluate paramedic skills such as spinal immobilization and intubation to reveal what factors make a difference in patient outcomes (Garcia, 2011).

Safety issues surrounding the OOH patient requiring ETI must focus on competency issues of the paramedic who assesses and manages airway needs. The risks

and complications of ETI or withholding the life-saving skill of ETI when appropriate are significant (Wang et al., 2009). The decision to perform ETI must be dictated by the needs of the patient and not influenced by the competence or confidence of the paramedic caregiver. Wang et al. (2010) assert an association between increased rescuer procedural experience and improved patient survival after OOH ETI in cardiac arrest and medical non-arrest patients.

In the absence of adequate clinical exposure to OOH ETI, HFS during paramedic training remains a viable solution for both students and educators. The potential increased PSE of paramedic students in airway management skills through HFS may lead to improved clinical skill performance in ETI.

### **Theoretical Framework**

Bandura's self-efficacy theory was the theoretical framework for this project. PSE relates to an individual's level of self-confidence in their perceived ability to achieve successful completion of a task. An individual's feelings regarding their capabilities affect the level of stress and depression experienced in difficult situations, as well as their degree of motivation (Bandura, 1993).

Persons who perceive that they are unable to manage threats experience high anxiety (Bandura, 1993). When self-efficacy is increased through successful management of similar experiences, an individual copes with the same difficult situation without the burden of stress reactions; therefore, a link between PSE and anxiety exists (Bandura, 1993). Positive PSE enhances psychomotor skill performance. Paramedics lack adequate experience, skill and competence in the airway management skill of ETI. Henderson et al. (1998) noted that confidence (self-efficacy) in skill performance affects



paramedics' abilities to perform life-saving skills such as pediatric airway management (PAM). Maibach, Schieber, and Carroll, (1996, p. 94) examined the "relevance of self-efficacy—a cognitive process indicating people's confidence in their ability to affect a given behavior—to training and performance of pediatric resuscitation" and noted a correlation. As such, self-efficacy influences real-time access to cognitive, affective, psychomotor and social aspects of proficiency in resuscitation (Maibach et al., 1996). Maibach et al. (1996, p. 94) stated, "even clinicians who are knowledgeable and skilled in resuscitation techniques may fail to apply them successfully unless they have an adequately strong belief in their capability." HFS improves self-efficacy in the performance of psychomotor skills such as airway management (Kaakinen & Arwood, 2009; Wright et al., 2006).

The most influential source of one's efficacy is information related to previous performance accomplishment and one's belief in his or her ability to be successful at a task (Billings & Halstead, 2009). Paramedics have a high failure rate in the psychomotor skill of ETI which may stem from a lack of confidence related to this skill. The concept of self-efficacy includes an evaluation of one's likelihood to accomplish expected outcomes (Bastable, 2003). Additionally, PSE contributes to higher levels of productivity and improved performance (Bandura, 1993; Maibach et al., 1996). Self-efficacy can be influenced and changed through interventions (Rutherford-Hemming, 2012). Application of Bandura's theoretical framework postulates that self-efficacy related to managing emergency situations is predictive of a person's performance during the management of emergency situations (Nishisaki, Keren, & Nadkarni, 2007).

Simulation provides a unique, risk-free environment to learn skills that can improve emergency responders' self-efficacy. Increased emergency responder self-efficacy and skills are expected to improve outcomes of emergency response calls. Nishisaki, et al. (2007) found that emergency response self-efficacy (confidence) is one's perceived belief of the ability to respond effectively to an emergency with expected outcomes. An individual's perceived abilities to be successful empower the person to perform more successfully. Thus, increased self-efficacy (self-confidence) elevates successful performance (Kaakinen & Arwood, 2009).

ETI remains the most difficult prehospital skill set for paramedics to obtain, retain and maintain. Exposure of paramedics and paramedic students to ETI is limited. PSE has been correlated with enhanced success at psychomotor skill performance. HFS improves PSE in the performance of psychomotor skills. HFS offers a close to real-life environment which is safe, low risk and readily available to help paramedic students practice the low frequency high-risk skill of ETI, thus improving their PSE.

### **Problem Statement**

Because paramedic students have limited opportunities to practice and acquire airway management skills, their PSE at these skills may be lacking.

### **Purpose**

The purpose of this quantitative study with a quasi-experimental design was to assess PSE of the paramedic student in airway management. The aim of this study was focused on the impact of HFS on paramedic students' PSE related to OOH ETI skills.

### **Project Implementation**

Following approval by the University's and healthcare system's Institutional Review Boards (IRB), a pre- and post-OOH ETI HFS CRL survey to evaluate the effect

of HFS on paramedic students' PSE at ETI was conducted. PSE was assessed before and after an HFS session. The HFS session was required in the paramedic curriculum and included ETI, alternative airway devices, and difficult airway situations. The OOH ETI HFS CRL was a three-hour program in which subjects participated in four airway scenario situations similar to the written scenarios described in the pre- and post-OOH ETI HFS CRL survey. The OOH ETI HFS CRL was required for students enrolled in a mid-western paramedic program and was conducted by paramedic educators with simulation staff assistance in November 2013.

Participants completed a self-efficacy survey before and after the OOH ETI HFS CRL. The survey consisting of 24 items rated with a Likert-type scale and seven demographic questions. Demographic questions included gender, level of education, past work experience in EMS, previous number of successful OOH ETI and previous number of alternative airway attempts and successful placements.

### **Design**

This was a quantitative study with a one group pre-test post test quasi-experimental design. The paramedic curriculum included an OOH ETI HFS CRL in which participants completed a pre-and post OOH ETI HFS CRL survey.

### **Objective**

The objective of this project was to assess paramedic students' PSE related to airway management skills (respiratory assessment, BVM, and ETI) before and after a HFS OOH ETI HFS CRL.

### **Methodology**

The survey used in this study was originally created to assess the perceived self-efficacy of paramedics practicing in southern California in the management of the

pediatric airway (Youngquist et al., 2008). The 24-item questionnaire is a self-reported measure of a participant's personal level of confidence and anxiety based on the Pediatric Skill Survey (PPS) developed by Craven and Froman (1992) for nursing skills related to the care of patients less than 18 years of age. The PPS had a Cronbach's alpha internal consistency estimate of 0.98 and indicated a high degree of homogeneity to the items on the instrument (Craven and Froman, 1992). Youngquist et al. (2008) modified the PPS document to include four separate clinical scenarios that reflected specific pediatric age groups and included the newborn, infant, toddler and child with a focus on airway management skills. The scenarios depicted pediatric airway management problems commonly encountered by paramedics in the OOH environment.

With author approval (Appendix A), the survey tool was modified to reflect paramedic students' perceived self-efficacy in the management of the adult airway. The clinical scenarios in the survey version used in this study (Appendix B) were modified to reflect adult airway management situations commonly encountered by paramedics in the OOH environment. The corresponding OOH ETI HFS CRL required students to perform respiratory assessment, BVM ventilation and ETI. Scenarios included difficult patient access and poor positioning of the HFS patient similar to real-life OOH ETI situations experienced by practicing paramedics. These scenarios were reviewed for content validity by paramedic program faculty. Face validity of the content of the modified survey tool was approved by the DNP project committee members.

Subjects were asked three identical pairs of questions in each of the four scenarios: one item of each pair assessed the subject's perceived level of confidence and a corresponding item assessed the perceived level of anxiety in the performance of a

specific aspect of airway management. The specific aspects of airway management include respiratory assessment, BVM and ETI. Each response included a Likert-type scale with values ranging from one to four with higher scores on each question representing increasing confidence or anxiety with each clinical scenario. Ratings of confidence were: 4 = very confident, 3 = somewhat confident, 2 = not confident and 1 = not at all confident. The corresponding anxiety ratings were: 4 = very difficult, 3 = somewhat difficult, 2 = not difficult and 1 = not at all difficult. Self-efficacy scores were calculated using the following method (Younquist et al., 2008, p. 1297):

Self-efficacy scores for each item are determined by subtracting anxiety scores from corresponding confidence scores. Negative self-efficacy scores were avoided by adding three points to each score. Each pair of questions will give a composite self-efficacy score that ranged from 0 - 6. Self-efficacy scores for assessment, BVM, and ETI were summed to arrive at a composite self-efficacy score for each evaluation. Therefore, the potential scores for each testing may range from 0 - 72 (four airway scenarios x three pairs of confidence-anxiety questions worth a score of 0 - 6 per pair).

### **Sample**

A convenience sample of ten students in the final quarter of a 14-month paramedic training program in the mid-western United States was recruited following university and healthcare system IRB approval. Participants were solicited in person by the healthcare system senior nurse researcher from a student group attending an OOH ETI HFS CRL. Participants were volunteers and no incentives were offered. All ten students (100%) present at the OOH ETI HFS CRL agreed to participate in the study.

### **Budget**

This course is an “in-kind” offering within this large healthcare organization in which reciprocal agreements exist to provide a no-cost fee structure for this project. The senior nurse researcher was a salaried full-time employee who assumed the role as part of

her daily duties. Approximately one hour of time for administration of the survey was required. Payroll costs were not increased due to the minimal time required to administer the study surveys.

### **Protection of Human Subjects**

IRB approval was obtained from the university and healthcare system (Appendix C). Although participation in the OOH ETI HFS CRL was mandatory, participation in the survey was voluntary. The investigator was not present during the OOH ETI HFS CRL or the pre-and post-OOH ETI HFS CRL survey. The investigator did not have knowledge of which student's participated in the study or their identities through the self-generated anonymous identification number.

Students were invited to participate in the study prior to the OOH ETI HFS CRL by a senior nurse researcher employed by the healthcare system. Students were informed of their rights as human subjects in a research project (Appendix D), including that they did not have to participate, that they could withdraw from the study at any time, and that their grades would be unaffected regardless of their participation status. A cover letter was presented to each student that contained information about the goals, risks and rights of subjects participating in the study. Submission of a completed survey served as evidence of informed consent. The cover letter also contained instructions for developing an anonymous code that would facilitate matching of pre- and post-test surveys (Appendix D). Participants developed a personal code by subtracting the number of their siblings from their birth date and adding the first initial of a best friend. For example, Participant A was born on the third day of February has two siblings, and the first initial of the participant's closest friend is "R." Therefore, the participant identification code

would be 1R.

The study was conducted during the last quarter of a 14-month long paramedic training program. The OOH HFS ETI CRL is conducted during the trauma module of the program's curriculum. Didactic and practical management labs and OR clinical rotations occur during the first quarter of the program. Clinical exposure to airway management in the hospital setting and field internship clinical rotations begin in the first quarter of the program and continue throughout the program.

### **Outcomes and Analysis**

Students participated in an OOH ETI HFS CRL designed to mimic conditions found in OOH ETI settings. PSE was assessed through pre- and post-OOH ETI HFS CRL surveys. A quasi-experimental design was used to assess the impact of OOH ETI HFS CRL education on the PSE of paramedic students. Student identity was protected through a self-generated, anonymous identification code number to match pre and post surveys for analysis.

### **Instrument**

Permission to utilize and modify the PSE survey used in the Youngquist et al. (2008) study was obtained from the author's prior to IRB approval. The PSE survey was modified to reflect four adult airway scenarios in which each airway management situation required ETI. The airway management skills included respiratory assessment, BVM ventilation and ETI which are all included in the clinical decision process leading to ETI during airway management scenarios. Each scenario is composed of six questions which assess confidence and anxiety related to respiratory assessment, BVM ventilation and ETI. The Likert-type score allowed the student to rate confidence and anxiety related

to each of the three skills. Increasing scores represent higher levels of confidence and anxiety so as confidence scores increase, anxiety scores decrease. Based on the previously described method, a total PSE score and one for each of the three corresponding skills can be calculated.

### **Data Analysis**

Demographic information was analyzed with descriptive statistics. A comparison of scores on identical pre- and post-survey questions was conducted with a paired t-test analysis. The level of significance was set at 0.05.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software, (Version 17). Parametric statistical procedures were selected in analyzing the ordinal data as parametric procedures are robust to violations in assumptions of normality.

The sample consisted of 10 male paramedic students. The survey return rate was 100%. Characteristics of the participants are presented in Table 1. One of the ten participants failed to complete the entire pre-survey demographics section. All ten of the pre- and post-OOH ETI HFS CRL surveys were complete with all 24 questions answered. Education beyond a high school equivalent diploma included three participants with a college degree, six with a high school diploma and one unknown. Seventy percent of the participants had past work experience in EMS.



Table 1

*Demographics of Survey Participants*

Criterion	Category	<i>n</i> (%)
Gender	Male	10 (100)
Educational level*	EMT Basic	6 (60)
	Associate/Bachelors	3 (30)
Previous EMS Experience	Yes	8 (80)
	No	2 (20)

*Note.* \* Percentages are < 100% due to missing data.

Students' previous ETI experience (Table 2) ranged from 0 – 12 ( $M = 3.7$ ,  $SD = 4.2$ ). The number of previous OOH ETI experience ranged from 0 – 10 ( $M = 1.44$ ). Prior OOH alternative airway attempts ranged from 0 – 6 ( $M = 1.11$ ). Successful placement of OOH alternative airways ranged from 0 – 6 ( $M = 1.11$ ). These results likely represent experiences gained during the paramedic training program because EMT Basic responders may only provide BVM ventilation. The data was skewed by two students who reported higher numbers of ETI. If data from these two students were eliminated, the average would be less. It is apparent that these paramedic students had limited ETI experience.

Table 2

*Paramedic Students' Previous Airway Management Experience*

Criterion	<i>M</i> (Range)
ETI attempts	3.7 (1-12)
Successful OOH ETI	1.4 (0-10)
Alternative Airway placement attempts	1.1 (0-6)
Successful OOH alternative airway placement	1.1 (0-6)

*Note.*  $n = 10$

Table 3 demonstrates the mean changes in total self-efficacy scores observed during the study period for all participants. The data revealed a small, but non-significant increase in perceived self-efficacy scores after exposure to the simulation session. Total pre-test PSE scores ranged from 43.0 to 72.0 ( $M = 54.7$ ,  $SD = 9.03$ ). Total post-test PSE scores ranged from 42.0 to 69.0 ( $M = 58.3$ ,  $SD = 10.26$ ). PSE scores for each of the individual skills (assessment, BVM, and ETI) were then examined to assess which factors might contribute to the lack of change in PSE.

Table 3

*Total Pre-and Post-HFS Perceived Self-Efficacy (PSE) Scores*

	<i>M</i> ( <i>SD</i> )	t-score	<i>p</i>
Pre Test	54.70 (9.03)		
Post Test	58.30 (10.26)	1.99	0.08

*Note.*  $n = 10$

Pre- and post-test PSE scores were analyzed for each of the four scenarios and three skill sets. PSE increased in respiratory assessment in scenarios three and four but remained relatively unchanged in scenarios one and two (Table 4). Review of the scenario type demonstrated increasing difficulty associated with scenarios three and four compared to scenarios one and two. Scenarios one and two occurred inside of a home where the environment was better controlled, access to the patient was easier, positioning of the patient was better, positioning of the paramedic performing ETI was easier and assistance from others during ETI performance was available. Scenarios one and two patients were both unresponsive medical patients in a more controlled environment. Scenarios three and four were complicated by the patient care setting, limited patient access and the possibility of a more complex patient condition.

Table 4

*PSE Scores for Respiratory Assessment Scenarios*

Scenario	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>	<i>t-score</i>	<i>p</i>
1	4.200 (1.03)	5.000 (0.94)	2.23	0.053
2	5.100 (0.73)	5.300 (0.94)	0.56	0.591
3	4.400 (0.84)	5.400 (0.69)	3.00	0.015*
4	4.400 (0.96)	5.400 (0.69)	2.74	0.023*

*Note.* n = 10, df = 9, \*p < 0.05.

PSE score for BVM did not change after any of the four scenarios (Table 5). This was the only skill in which the PSE was completely unchanged. This could be explained as BVM is a basic skill with which the participants feel a high level of confidence and

low anxiety. BVM has been practiced by these students regularly and was introduced to them during EMT Basic training prior to entrance into the advanced life support role as a paramedic student. The skill of BVM is a basic life support skill learned prior to enrollment in paramedic school. Proficiency in BVM is confirmed upon completion of an EMT Basic program prior to the re-exposure of this BLS skill within the paramedic curriculum. Lack of change in the BVM PSE score before and after the OOH ETI HFS CRL supports the concept of confidence in the delivery of BVM without associated anxiety for participants.

Table 5

*PSE Scores for BVM*

Scenario	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>	t-value	<i>p</i>
1	5.400 (0.69)	5.100 (1.10)	1.15	0.279
2	5.500 (0.70)	5.300 (0.94)	0.69	0.509
3	5.000 (1.05)	5.200 (1.13)	0.69	0.509
4	4.700 (1.16)	5.200 (1.03)	2.24	0.052

*Note.*  $n = 10$ ,  $df = 9$ , Results are non-significant ( $p < 0.05$ ).

PSE scores in ETI increased in the second and third scenario, but decreased in the fourth scenario (Table 6). Scenario one and two were similar with the patient accessible, inside of a home and presumed to be a medical patient. The patient in scenario one is described as unresponsive and the patient in scenario two is described as unarousable. This description of the patient's neurologic status could have contributed to a different PSE outcome between these similar scenarios. Additionally, scenario one involved a

patient with a past history of prescribed ACE inhibitor medication which included the potential side effect of angioedema of the tongue which greatly affects the difficulty of ETI performance. The HFS manikins are designed to completely prevent successful ETI of the patient due to an enlarged tongue and upper airway thus forcing airway management options other than ETI during this type of patient presentation. This may explain why there was no increase in PSE in scenario one as a successful ETI cannot be accomplished in this scenario.

The decrease in PSE scores in scenario four maybe related to the complex nature of the scenario. The fourth scenario presented the most difficult patient environment and the most critical patient condition. The patient was entrapped upside down, not breathing, critically injured and required immediate airway management including ETI. The paramedic student was required to intubate the patient while positioned on their back, in a confined space, with the patient above them, not breathing, and trapped in the simulated overturned vehicle. The students may have underestimated the difficulty of this scenario during the pre-test evaluation and more accurately evaluated scenario four during the post-test following the HFS experience. A greater appreciation of the difficult nature of scenario four experienced during the OOH ETI HFS CRL would account for the decreased PSE score in this scenario.

Table 6

*PSE Scores for ETI*

Scenario	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>	<i>t-value</i>	<i>p</i>
1	4.200 (1.22)	4.700 (1.25)	1.86	0.096
2	4.300 (1.25)	5.200 (1.13)	3.86	0.004*
3	3.700 (1.82)	4.800 (1.39)	2.54	0.032*
4	3.800 (1.75)	1.700 (1.33)	-6.03	0.000*

*Note.*  $n = 10$ ,  $df = 9$ , \* $p < 0.05$ .

The last two scenarios are complex as they occur outside at a motor vehicle accident scene where the victim is entrapped in the vehicle with limited access, poor positioning to assess and perform ETI. Performance of ETI is further complicated by the poor position of the patient and the difficult position required of the individual tasked with ETI. Threats such as scene safety, poor lighting, minimal accessible equipment, limited assistance by additional personnel, ambient temperature, poor weather conditions and extrication procedures related to breaking glass, hazardous materials, noise from extrication equipment, personal safety factors and patient hemodynamic considerations related to possible associated traumatic injuries further complicate scenarios three and four.

### **Barriers**

Barriers to the performance of this study included a lack of time and of available participants. Time constraints included the finite period of time for completing the DNP project and significant delays associated with obtaining the necessary IRB approvals from two institutions. As a result, only one paramedic student group could be studied instead of two as originally intended. Upon IRB approval from both institutions, only

one paramedic student group was scheduled to attend the OOH HFS ETI CRL within the study's limited time frame.

This study has several limitations including the design, sample, and instrument. The one-group pre-test post-test design was chosen because it was not ethical or feasible to have a control group that did not receive the CRL. Also, administration of the pre-test may have influenced the results of the post-test. Compared to an experimental design that suggests causal relationships between interventions and outcomes, only limited conclusions can be drawn from this study.

The small sample presented a number of limitations. The sample was a convenience sample, which prevents generalization of the study results. The small sample also prevented performing much in the way of statistical analysis. The targeted convenience sample had an unusually small enrollment from the onset of the program as well as a significant amount of student attrition prior to the final quarter where the OOH ETI HFS occurred within the curriculum. Approximately 18 - 20 students were expected to be enrolled in the final quarter of the program. The absence of female participants was also a limitation. The lack of diversity among institutions and geographic regions also limits generalizability.

The use of a tool with unknown reliability was not optimal. However, no other tools were available for the purposes of this study; therefore, interpretation of the results involves assumptions which include that the survey was a reliable measurement instrument, that participants answered the survey honestly and that data collection and analysis were relatively error free.

### **Conclusions/Recommendations**

An increase in PSE related to OOH ETI and Respiratory Assessment skills during an OOH ETI HFS CRL experience was noted in this study's paramedic student participants. This study contributes additional knowledge to the limited understanding surrounding PSE related to HFS, psychomotor skill performance and paramedic student education. The low frequency, high-risk skill of ETI requires the paramedic student to engage in a variety of educational settings in an effort to gain adequate exposure to the skill of ETI for increased PSE.

This study offers positive insight into the use of OOH ETI HFS for paramedic students and PSE. Additional testing of the PSE instrument to establish reliability as an assessment tool for PSE in ETI would be beneficial. Further exploration of the impact of OOH ETI HFS education to increase PSE for paramedic students is required.



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## Appendix A

### Herron, Holly

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**From:** Gausche, Marianne  
**Sent:** Sunday, July 07, 2013 6:15 PM  
**To:** Holly Herron  
**Subject:** Re: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Yes of course. Let me know if you need anything further.  
 Marianne Gausche-Hill, MD, FACEP, FAAP  
 Professor of Clinical Medicine , David Geffen School of Medicine at UCLA  
 Vice Chair and Chief of the Division of Pediatric Emergency Medicine  
 Director Pediatric Emergency Medicine and EMS Fellowships  
 Harbor-UCLA Medical Center, Department of Emergency Medicine

1000 W Carson Street, Box 21  
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 Voice 310 2226740  
 Office 310 222 3503  
 Cell 310 963 8014

From: Holly Herron <hherron@otterbein.edu<<mailto:hherron@otterbein.edu>>>  
 Date: Sunday, July 7, 2013 2:48 PM  
 To: Marianne Gausche-Hill <mgausche@emedharbor.edu<<mailto:mgausche@emedharbor.edu>>>  
 Cc: Scott Youngquist-Utah <scott.youngquist@utah.edu<<mailto:scott.youngquist@utah.edu>>>  
 Subject: RE: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Dear Dr. Gausche and Dr. Youngquist,

Thank you for your help. Would I be able to have your permission to alter your tool to focus on adult airway management related to endotracheal intubation among paramedic students. My study in "The Effects of High Fidelity Simulation on Paramedic Students' Perceived Self-Efficacy at Endotracheal Intubation". Your tool fits my study the closest so I would like to alter it as necessary and use your tool with your permission. Let me know your thoughts. Again, thank you.

Respectfully,

Holly

From: Gausche, Marianne [<mailto:MGausche@emedharbor.edu><<mailto:MGausche@emedharbor.edu>>]  
 Sent: Saturday, July 06, 2013 2:39 PM  
 To: Holly Herron  
 Subject: Re: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Good luck to you!  
 Marianne Gausche-Hill, MD, FACEP, FAAP  
 Professor of Clinical Medicine , David Geffen School of Medicine at UCLA  
 Vice Chair and Chief of the Division of Pediatric Emergency Medicine  
 Director Pediatric Emergency Medicine and EMS Fellowships  
 Harbor-UCLA Medical Center, Department of Emergency Medicine

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From: Holly Herron <hherron@otterbein.edu<<mailto:hherron@otterbein.edu>><<mailto:hherron@otterbein.edu>>>  
 Date: Saturday, July 6, 2013 10:50 AM  
 To: Marianne Gausche-Hill

<mgausche@emedharbor.edu<<mailto:mgausche@emedharbor.edu>><<mailto:mgausche@emedharbor.edu>>>, Scott Youngquist-Utah  
<[scott.youngquist@utah.edu](mailto:scott.youngquist@utah.edu)<<mailto:scott.youngquist@utah.edu>><<mailto:scott.youngquist@utah.edu>>>>  
Subject: RE: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Dr. Gausche-Hill and Dr. Youngquist,

Thank you for your quick response and permission. I have looked at the tools you developed and may be in touch with further questions related to my study very soon as I investigate available self-efficacy tools. Again, thank you.

Respectfully,

Holly

From: Gausche, Marianne [<mailto:MGausche@emedharbor.edu><<mailto:MGausche@emedharbor.edu>>]  
Sent: Friday, July 05, 2013 1:12 PM  
To: Scott Youngquist-Utah; Holly Herron  
Cc: Gausche, Marianne  
Subject: Re: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Dear Scott and Holly:

Yes this is the correct survey – our goal was to assess self-efficacy of paramedic providers in caring for children of different ages – specifically their self efficacy in airway management.

Please feel free to use the survey – can email myself or Scott with other questions.

Marianne  
Marianne Gausche-Hill, MD, FACEP, FAAP  
Professor of Clinical Medicine , David Geffen School of Medicine at UCLA  
Vice Chair and Chief of the Division of Pediatric Emergency Medicine  
Director Pediatric Emergency Medicine and EMS Fellowships  
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From: Scott Youngquist-Utah  
<[scott.youngquist@utah.edu](mailto:scott.youngquist@utah.edu)<<mailto:scott.youngquist@utah.edu>><<mailto:scott.youngquist@utah.edu>><<mailto:scott.youngquist@utah.edu>>>>  
Date: Thursday, July 4, 2013 4:17 PM  
To: Holly Herron  
<[hherron@otterbein.edu](mailto:hherron@otterbein.edu)<<mailto:hherron@otterbein.edu>><<mailto:hherron@otterbein.edu>><<mailto:hherron@otterbein.edu>>>>  
Cc: Marianne Gausche-Hill  
<[mgausche@emedharbor.edu](mailto:mgausche@emedharbor.edu)<<mailto:mgausche@emedharbor.edu>><<mailto:mgausche@emedharbor.edu>><<mailto:mgausche@emedharbor.edu>>>>  
Subject: RE: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Hi Holly,

I believe this is the instrument that was used. I have cc'd Dr. Gausche-Hill who may have some word of advice on its use as she was intimately involved in its development and deployment while I analyzed the data after its collection.

Marianne, is this the correct self-efficacy survey?

Best of luck!!

Scott Youngquist

Scott T. Youngquist, MD, MSc, FACEP  
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 Division of Emergency Medicine  
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---

From: Holly Herron  
[hherron@otterbein.edu](mailto:hherron@otterbein.edu)<<mailto:hherron@otterbein.edu>><<mailto:hherron@otterbein.edu>><<mailto:hherron@otterbein.edu>>]  
 Sent: Wednesday, July 03, 2013 3:15 PM  
 To: SCOTT TRAVIS YOUNGQUIST  
 Subject: Self-Efficacy Survey from your research on Paramedics and Peds Airway 2008

Dr. Youngquist,

I am a Doctor of Nursing Practice student at Otterbein University in Columbus Ohio. I work in the nursing department at Otterbein part time and am the program director of Grant Medical Center's Paramedic Program. I am interested in exploring self-efficacy tools to rate paramedic student learning before and after attending an endotracheal intubation high fidelity simulation lab. I have been having trouble finding a validated tool that would fit. I know that your study states that the tool that you used was not validated and was self generated because there were no available validated self-efficacy tools available. I was hoping that I may be able to gain permission from you to use your self-efficacy tool if it fits my study? If that is OK with you can you send it to me and can you give me any insight that may help me with my study that is similar? I have been a flight nurse for 30 years and have spent a great deal of time in the pre-hospital setting and teaching paramedics. My cell phone is 614 679 9595 as needed. Thank you in advance for your time.

Respectfully,

Holly Herron, MS, RN, CNS, EMT-P  
 DNP student Otterbein University  
 Clinical Coordinator, College of Nursing  
 Otterbein University  
 1 South Grove Street  
 Westerville, Ohio 43081

\_\_\_\_\_ Information from ESET Smart Security, version of virus signature database 8522 (20130703) \_\_\_\_\_

The message was checked by ESET Smart Security.

<http://www.eset.com>

\_\_\_\_\_ Information from ESET Smart Security, version of virus signature database 8530 (20130705) \_\_\_\_\_

The message was checked by ESET Smart Security.

<http://www.eset.com>

\_\_\_\_\_ Information from ESET Smart Security, version of virus signature database 8534 (20130706) \_\_\_\_\_

The message was checked by ESET Smart Security.

## Appendix B

### The Effect of High Fidelity Simulation on Paramedic Students' Perceived Self-Efficacy at Endotracheal Intubation

#### Pre-Test

Primary Investigator: Holly Herron, MS, RN, CNS, CCRN, CEN, EMT-P

Introduction: We invite you to participate in the following survey. This anonymous survey is part of a research study; your participation is voluntary. The only information we collect about you will be your responses to the following questions; we will not be able to identify you based on your individual answers. If you do not feel comfortable answering a specific question, you may skip it and move on to the other questions. Please respond to the questions in this survey about your perceptions of, and experience with, learning about out of hospital endotracheal intubation through high fidelity simulation.

Using the following guidelines, calculate your identification number for this study. Please do not show your work as the final answer will be unique to you and the other information (day of the month of your birth) might identify you.

Identification Number:

Day of the month of your birth (example 1-31)

- Number of siblings
- + First initial of best friend
- = Identification Number

1. What is your Identification number? \_\_\_\_\_
2. What is your gender?    Male        Female
3. What is your level of education beyond a high school equivalent diploma?  
\_\_\_\_\_
4. Do you have past work experience in EMS?        Yes        No
5. How many attempts at endotracheal intubation have you experienced in the past? \_\_\_\_\_
6. How many patients' have you intubated in the out of hospital setting? \_\_\_\_\_
7. How many alternative airway placement attempts have you experienced in the out of hospital setting in the past? \_\_\_\_\_
8. How many successful alternative airways placements in the out of hospital have you had in the past? \_\_\_\_\_

Please complete the survey that begins on the following page.



For the following statements, please circle the statement, which corresponds most closely to your feelings:

1. Scenario: You are called to a patient's home where you find an unresponsive adult who has a past history of ACE Inhibitor medication use:

		4	3	2	1
1.1	How confident are you in your ability to assess the respiratory status of this adult?	very confident	somewhat confident	not confident	not at all confident
1.2	How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
1.3	How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident
1.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
1.5	How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
1.6	How difficult would it be for you to overcome your anxiety about intubating this adult?	very difficult	somewhat difficult	not difficult	not at all difficult

2. Scenario: You have been called to a home where family found their family member unarousable early in the morning.

2.1	How confident are you in your ability to assess the respiratory status of this adult?	very confident	somewhat confident	not confident	not at all confident
2.2	How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
2.3	How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident
2.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult

- |     |  |                |                    |               |                      |
|-----|--|----------------|--------------------|---------------|----------------------|
| 2.5 | How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?  | very difficult | somewhat difficult | not difficult | not at all difficult |
| 2.6 | How difficult would it be for you to overcome your anxiety about intubating this adult?  | very difficult | somewhat difficult | not difficult | not at all difficult |
| 3.  | <u>Scenario: You respond to a single vehicle Motor Vehicle Accident (MVA) where you find a car with a significant front-in impact with large tree. The driver of the car is sitting up in the driver's seat and is pinned against the steering wheel. The patient is entrapped, unresponsive, not breathing and with weak pulses. A rapid extrication is NOT possible at this time. A lengthy extrication will be required. The scene is safe.</u>   |                |                    |               |                      |
| 3.1 | How confident are you in your ability to assess the respiratory status of this adult?  | very confident | somewhat confident | not confident | not at all confident |
| 3.2 | How confident are you in your ability to ventilate this adult with a bag-valve-mask device?  | very confident | somewhat confident | not confident | not at all confident |
| 3.3 | How confident are you in your ability to intubate this adult?  | very confident | somewhat confident | not confident | not at all confident |
| 3.4 | How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?   | very difficult | somewhat difficult | not difficult | not at all difficult |
| 3.5 | How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?  | very difficult | somewhat difficult | not difficult | not at all difficult |
| 3.6 | How difficult would it be for you to overcome your anxiety about intubating this adult?  | very difficult | somewhat difficult | not difficult | not at all difficult |
| 4.  | <u>Scenario: You respond to a single vehicle motor vehicle accident (MVA) where you find a multiple roll-over accident. The car is significantly damaged and is on its top in a cornfield against a tree. The driver of the car is sitting up in the driver's seat, with a seatbelt intact, a steering wheel airbag deployed and is pinned upside down. The patient is entrapped, unresponsive, not breathing and with weak pulses. A rapid extrication is NOT possible at this time. A lengthy extrication will be required. The scene is safe.</u> |                |                    |               |                      |
| 4.1 | How confident are you in your ability to assess the respiratory status of this adult?  | very confident | somewhat confident | not confident | not at all confident |

4.2	How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
4.3	How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident
4.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
4.5	How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
4.6	How difficult would it be for you to overcome your anxiety about intubating this adult?	very difficult	somewhat difficult	not difficult	not at all difficult

Additional

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

The information you have given us in this questionnaire will be used as group data only. If you are interested in the results of this study, please contact Holly Herron at [hherron@Otterbein.edu](mailto:hherron@Otterbein.edu). Thank you very much for your help.

The Effect of High Fidelity Simulation on Paramedic Students' Perceived Self-Efficacy at  
Endotracheal Intubation

Post-Test

Primary Investigator: Holly Herron, MS, RN, CNS, CCRN, CEN, EMT-P

Introduction: We invite you to participate in the following survey. This anonymous survey is part of a research study; your participation is voluntary. The only information we collect about you will be your responses to the following questions; we will not be able to identify you based on your individual answers. If you do not feel comfortable answering a specific question, you may skip it and move on to the other questions. Please respond to the questions in this survey about your perceptions of, and experience with, learning about out of hospital endotracheal intubation through high fidelity simulation.

Using the following guidelines, calculate your identification number for this study. Please do not show your work as the final answer will be unique to you and the other information (day of the month of your birth) might identify you.

Identification Number:

Day of the month of your birth (example 1-31)

- Number of siblings
- + First initial of best friend
- = Identification Number

What is your Identification number? \_\_\_\_\_

Please complete the survey that begins on the following page

For the following statements, please circle the statement, which corresponds most closely to your feelings:

1. Scenario: You are called to a patient's home where you find an unresponsive adult who has a past history of ACE Inhibitor medication use:

	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1.1 How confident are you in your ability to assess the respiratory status of this adult?	very confident	somewhat confident	not confident	not at all confident
1.2 How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
1.3 How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident

1.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
1.4	How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
1.5	How difficult would it be for you to overcome your anxiety about intubating this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
2.	<u>Scenario: You have been called to a home where family found their family member unarousable early in the morning.</u>				
2.1	How confident are you in your ability to assess the respiratory status of this adult?	very confident	somewhat confident	not confident	not at all confident
2.2	How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
2.3	How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident
2.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
2.5	How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
2.6	How difficult would it be for you to overcome your anxiety about intubating this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
3.	<u>Scenario: You respond to a single vehicle Motor Vehicle Accident (MVA) where you find a car with a significant front-in impact with large tree. The driver of the car is sitting up in the driver's seat and is pinned against the steering wheel. The patient is entrapped, unresponsive, not breathing and with weak pulses. A rapid extrication is NOT possible at this time. A lengthy extrication will be required. The scene is safe.</u>				

3.1	How confident are you in your ability to assess the respiratory status of this adult?	very confident	somewhat confident	not confident	not at all confident
3.2	How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
3.3	How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident
3.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
3.5	How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
3.6	How difficult would it be for you to overcome your anxiety about intubating this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
4.	<u>Scenario: You respond to a single vehicle motor vehicle accident (MVA) where you find a multiple roll-over accident. The car is significantly damaged and is on its top in a cornfield against a tree. The driver of the car is sitting up in the driver's seat, with a seatbelt intact, a steering wheel airbag deployed and is pinned upside down. The patient is entrapped, unresponsive, not breathing and with weak pulses. A rapid extrication is NOT possible at this time. A lengthy extrication will be required. The scene is safe.</u>				
4.1	How confident are you in your ability to assess the respiratory status of this adult?	very confident	somewhat confident	not confident	not at all confident
4.2	How confident are you in your ability to ventilate this adult with a bag-valve-mask device?	very confident	somewhat confident	not confident	not at all confident
4.3	How confident are you in your ability to intubate this adult?	very confident	somewhat confident	not confident	not at all confident
4.4	How difficult would it be for you to overcome your anxiety about assessing the respiratory status of this adult?	very difficult	somewhat difficult	not difficult	not at all difficult

4.5	How difficult would it be for you to overcome your anxiety about providing bag-valve-mask ventilation for this adult?	very difficult	somewhat difficult	not difficult	not at all difficult
4.6	How difficult would it be for you to overcome your anxiety about intubating this adult?	very difficult	somewhat difficult	not difficult	not at all difficult

Additional

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix C



## IRB - Exempt Approval

September 17, 2013

INSTITUTIONAL REVIEW BOARD  
 Grant Medical Center  
 Doctors Hospital  
 111 South Grant Avenue  
 Columbus, Ohio 43215-1898  
 614 | 566-9345  
 ohiohealth.com

Ms. Holly Herron, MS, RN, CNS, BMT-P  
 LifeLink and EMS Education Program Manager  
 Grant Medical Center  
 393 East Town St., #214  
 Columbus, OH 43221

RE: IRB #13-0044  
 Title: *The Effect of High Fidelity Simulation on Paramedic Students' Perceived Self-Efficacy at Endotracheal Intubation*  
 Principal Investigator: Holly Herron, MS, RN, CNS, EMT-P  
 Sub-Investigator: Paula Renker, PhD, RN  
 Project Advisor: Paula Renker, PhD, RN

Dear Ms. Herron:

The above-referenced protocol has been deemed exempt from Institutional Review Board (IRB) review under the provisions of 45 CFR 46.101(b)(2). No risks will accrue to research subjects. No names or other identifiers will be recorded in the research records. The study concerns the following:

- Understanding how high fidelity simulation impacts paramedics' perceived self-efficacy when performing endotracheal intubation

Please keep in mind that reports in journals or at meetings should involve only aggregate and anonymous information. As Principal Investigator of this protocol, it is your responsibility to keep all necessary documentation pertaining to the study. If you decide that you need to make changes to your study, you must contact the IRB office at (614) 566-9345 or submit a revised protocol to the IRB in order to re-evaluate the study's review status.

Thank you for submitting your proposal to the OhioHealth IRB for consideration

Sincerely,

Randall W. Franz, MD  
 Chairman, OhioHealth IRB #2

RWF:lep

RIVERSIDE METHODIST HOSPITAL + GRANT MEDICAL CENTER + DOCTORS HOSPITAL + GRADY MEMORIAL HOSPITAL  
 DUBLIN METHODIST HOSPITAL + DOCTORS HOSPITAL - NELSONVILLE + HARDIN MEMORIAL HOSPITAL + MARION GENERAL HOSPITAL  
 HOMEREACH + OHIOHEALTH NEIGHBORHOOD CARE + WESTERVILLE MEDICAL CAMPUS + 21 000 PHYSICIANS, ASSOCIATES & VOLUNTEERS





**Appendix D***“The Effect of High Fidelity Simulation on Paramedic Students' Perceived Self-Efficacy at Endotracheal Intubation”*

Holly Herron, MS, RN, CNS, EMT-P

September 1, 2013

Hello,

You are invited to participate in a research study that explores how EMS students' personal self-confidence (also known as perceived self-efficacy) related to the skill of endotracheal intubation performance changes after attending a high fidelity simulation endotracheal intubation education session during paramedic programs. The information from the surveys will assist in developing learning opportunities for future paramedic students. In the survey used in this study you will be asked some general questions about the above topic. The surveys will take no longer than 10 minutes to complete. You will be guided to create an anonymous random identification number to place on the top of the survey so that your pre and post educational session surveys can be matched for analysis and your identify will remain unknown to the research team and your faculty members.

You have specific rights that you should know when you participate in a research study including that:

- 1) Participation in the study is voluntary; your student status as a Grant Medical Center EMS Education paramedic student will not be affected if you do, or do not, participate.
- 2) If you don't like the study questions in the survey you do not have to answer them and you can end the survey at any time.
- 3) Anonymity of responses is important for you and for the study. Only members of the research team working on the study will have access to the survey results.
- 4) You should not experience any additional risks or harms by participating in this study.
- 5) All Grant Medical Center EMS Education paramedic students will be informed of the study findings via reports and posters.
- 6) If you have any questions or concerns regarding this study you can contact Holly Herron, Program Manager, LifeLink and EMS Education, Grant Medical Center at 566-8838, [hherron2@ohiohealth.com](mailto:hherron2@ohiohealth.com).
- 7) If you have questions or concerns regarding your rights as a research subject, please contact Dr. Randall Franz, Chairman of the OhioHealth Institutional Review Board #2 at (614) 566-9345. The Institutional Review Board is a group of people who review research projects to protect your rights as a research subject.

Respectfully,

Holly Herron, MS, RN, CNS, EMT-P  
LifeLink and EMS Education Program  
Manager  
Grant Medical Center