2022

Equipping Advanced Practice Providers: Interprofessional Pediatric Airway Management Course

Kenton M. Schrock
West Virginia University, Schrockk@mix.wvu.edu

Equipping Advanced Practice Providers: Interprofessional Pediatric Airway Management Course

Kenton Schrock, BSN, SRNA

Doctor of Nursing Practice Project submitted
to the School of Nursing
at West Virginia University

in partial fulfillment of the requirements for the degree of

Doctor of Nursing Practice in
Nurse Anesthetist Program

Mike Frame, DMPNA, MS, APRN, CRNA, Chair
Adam Hoffman, NR-P, MCCP, CHSE
Sara Harms, MSN, CRNA
Eric "Jake" Lindstrom, MHS, CRNA
Kesheng Wang, Ph.D., MA, BS

Department of Nursing

Morgantown, West Virginia
2022

Keywords: interprofessional, simulation, pediatric, airway

ABSTRACT

Equipping Advanced Practice Providers: Interprofessional Pediatric Airway Management Course

Kenton M. Schrock, BSN, SRNA

Background: Developmental differences between pediatrics and adults requires intervention adjustments for airway management. Segregated intraprofessional training and limited provider exposure could result in poor collaboration and low-quality management. Patient outcomes depend on the proficient collaborative application of skill and knowledge. **Purpose:** The interprofessional pediatric airway management course paired unique airway considerations with interprofessional training strategies to equip providers to deliver safe airway management. **Intervention:** The course was delivered as a 3-hour training session. Participants completed team simulations and skill/concept stations. Pre- and post-intervention competency and confidence scores were measured and analyzed. **Methods:** Baseline confidence and competency scores in managing a pediatric airway were established through an initial team simulation. Participants attended discussions and practiced aspects of airway management. Participants then completed a modified version of the initial simulation. **Results:** Two competency items showed statistically significant improvements. A clinically significant item could not be analyzed because there was no difference in means. There was an average improvement for all confidence measures with nine questions being statistically significant. **Conclusion:** This project improved participants' confidence in several aspects of pediatric airway management. Competency was improved in fifteen of the twenty-three measured actions. However, not all of these were statistically significant, and the small sample size limited the statistical power.

Table of Contents

Equipping Advanced Practice Providers: Interprofessional Pediatric Airway Management Course

Healthcare provider development, interprofessional collaboration, and evidence-based practice are required to provide comprehensive patient care in an ever-changing healthcare system. Advanced practice providers (APPs) must reassess and develop their knowledge and skills to ensure the continual delivery of high-quality patient care. Patient outcomes depend on the proficient collaborative application of skill and knowledge, especially in emergent situations. Interprofessional contributions to team learning, collaborative efforts, and communication are paramount (Bell & Fredland, 2020).

Educational simulations provide opportunities to refine proficiencies and avoid patient harm while increasing learner participation and exposure to rare scenarios that may be limited in a real-world encounter. Interprofessional simulations could serve as a bridge allowing providers to practice collaborative care in a controlled environment (Bell & Fredland, 2020). This method of training could incorporate different professional knowledge, skillsets, and perspectives to deliver cohesive interprofessional patient care.

The National Academy of Medicine (2000), formerly the Institute of Medicine, describes several components of a strategic approach to reducing medical errors including simulation and team training. The American Association of Nurse Anesthesiology (2019) standards describe "interprofessional engagement, open communication, a culture of safety, and supportive leadership" as components of a collaborative and cooperative patient care environment. The ultimate goal of interprofessional simulations should be the enhancement of patient safety (Bell & Fredland, 2020). This project involved the development of an interprofessional pediatric

airway management course to equip providers tasked with the management and treatment of pediatric patients.

Problem Description

More than five thousand emergency departments in the United States deliver services to thirty-four million pediatric patients annually (Abu-Sultaneh et al., 2019). Four million of those encounters are categorized as high acuity; requiring emergent and lifesaving intervention including airway management. High-functioning interprofessional teams' situational awareness, problem identification, and decision-making are key aspects of optimal care for pediatric trauma patients (Falcone et al., 2008). Advanced airway management in pediatric intensive care units is frequently non-elective, necessitating emergent intervention by skilled interprofessional teams for successful management (Nishisaki et al., 2012).

The anatomical and physiological differences between neonates, children, adolescents, and adults can present management challenges. Adjustments must be made to accommodate the developmental differences between these populations including age-appropriate equipment selection and techniques for bag-mask ventilation and endotracheal airway insertion (Weatherall et al., 2019). A retrospective study reviewed 114 (93%) available records of 123 pediatric emergency room visits that required rapid sequence intubation (RSI). The first attempt success rate was 52%, oxygen desaturation occurred during 33% of attempts, a three-minute median duration from induction to final endotracheal tube placement was noted, and two cases resulted in cardiopulmonary resuscitation (Kerrey et al., 2012). This study suggested that intubation first-attempt failures and adverse effects occur more often than previously reported for pediatric emergency room encounters (Kerrey et al., 2012). Limited practice with low-frequency, high-

risk scenarios can leave providers unprepared to appropriately manage life-threatening situations (Cain et al., 2014).

Problem Statement

Segregated intraprofessional training and limited provider exposure to pediatric airway emergencies could result in low-quality pediatric airway management with poor collaboration in high-risk, low-frequency scenarios. Specific pediatric airway management considerations paired with interprofessional training strategies could provide an opportunity for improved practice leading to safer patient care.

Literature Review and Synthesis

This project was built upon a literature review guided by the following PICO question: In advanced healthcare providers, how does interdisciplinary pediatric airway training, compared to intradisciplinary training, affect pediatric airway management competency. The objectives were (1) to evaluate the evidence on interprofessional and intraprofessional simulation differences, (2) to determine if support for specialized interprofessional pediatric airway simulations existed, and (3) to apply the evidence to create practice and education change related to interprofessional pediatric airway management training.

Search Strategy

A literature search was performed using online databases including MEDLINE, CINAHL, Health Source: Nursing/Academic Edition, and the Cochrane Library with keywords: airway, pediatric, multidisciplinary, interdisciplinary, and simulation. Preliminary searches were conducted with the “English language” as the only search limiter to maximize the identification of potentially informative studies. Secondary searches were completed with the addition of a publication date between 2010-2020 as a limiter.

An initial search of the CINAHL database using keywords *airway*, *simulation*, and *multidisciplinary* produced eight relevant studies. An additional search of the Cochrane Library database using the keywords *pediatric*, *multidisciplinary*, and *simulation* generated two results, both studies were germane to the topic. A second search of the Cochrane Library with keywords *pediatric*, *airway*, and *simulation* delivered 37 studies. This search contained two possibly applicable studies. A MEDLINE database search with keywords *pediatric*, *airway*, and *simulation* resulted in 280 articles; yielding 15 pertinent studies for review. A concurrent search of MEDLINE and CINAHL with keywords *pediatric*, i*nterdisciplinary*, and *airway simulation* produced 14 results with three potentially relevant studies. Additional searches were conducted using CINAHL, Health Source: Nursing/Academic Edition, and MEDLINE simultaneously. The keyword search for *simulation* and *interdisciplinary* produced 4,488 hits with 16 identified relevant studies. The search with keywords *simulation*, *interdisciplinary*, and *pediatric* generated 175 hits with four relevant articles being identified. The last search with keywords *simulation*, *interdisciplinary*, and *airway* produced 37 hits and two studies were deemed relevant.

A review of potential studies generated 10 relevant studies for critical appraisal. These studies were chosen based on their applicability to the PICO question and the goal of the DNP project. Refer to Appendix A for a complete list of the literature search log.

Critical Appraisal of Literature

System-Level Impact

Abu-Sultaneh et al. (2019) hypothesized that a simulation training program with collaboration among community emergency departments (CEDs) and a state academic medical center (AMC) could increase the CEDs' pediatric airway management quality and improve their pediatric emergency readiness scores. This project selected 10 CEDs in the state of Indiana to

deliver in situ pediatric airway simulations. The assessment, simulation, and follow-up for each site were conducted by members of the AMC pediatric critical care transport service. The objective was to improve the CEDs' simulated pediatric airway management, as evidenced by a critical action checklist. Additionally, pre-and post-intervention pediatric emergency readiness scores were analyzed to strengthen the evaluation. During the study period, 35 interprofessional teams were involved in the pre-intervention sessions and an additional five teams were involved in the post-intervention sessions. This study found a 19% (53% to 71%) improvement in the CEDs' adherence to the critical action checklist during the post-intervention simulation assessment. This result was statistically significant with a p-value of 0.003. Clinically significant improvements included a better selection of age-appropriate laryngoscope blade size (58% to 100%), age-appropriate endotracheal tube (ETT) size (67% to 100%), use of a cuffed ETT (8% to 71%), and availability of suction catheter (10% to 41%). The CEDs' pediatric emergency readiness scores improved from 58.8 ± 15.6 pre-intervention to 75.8 ± 9.3 post-intervention.

Leeper et al. (2018) evaluated the outcomes from the educational arm of a (three-arm) hospital-wide difficult airway response program. The educational component of this program is recognized as the multidisciplinary difficult airway course (MDAC). The MDAC is a comprehensive full-day course for providers who participate in airway management. The course was delivered in an academic hospital simulation center. The course included lectures, hands-on skill stations, and high-fidelity simulations. Participants included healthcare students, residents, fellows, certified registered nurse anesthetists, practicing physicians, physician assistants, nurse practitioners, registered nurses, and respiratory therapists. Prospective quantitative and qualitative data were collected for evaluation. Qualitative data was collected via survey and course evaluation form. Quantitative data was collected through pre-and post-course multiple

choice question (MCQ) assessments. A total of 499 participants were involved in the study's 23 MDAC offerings. The MCQ scores significantly increased from a median (interquartile range) score of 69% to 81% in the post-assessment (p-value <0.001). Positive course evaluation ratings were reported with a mean score of 86.9, from a possible 95. Participant responses highlighted the value of high-fidelity simulations, hands-on skill stations, and teamwork practice.

Airway Management in Trauma Care

Falcone et al. (2008) evaluated the influence of interprofessional education and simulation training as part of a comprehensive effort to improve trauma care. Expanded trauma education was the hallmark of this study with an emphasis on high-fidelity training simulators. For 12 months, interprofessional teams completed 46 simulated trauma scenarios. The simulations were video recorded to enhance debriefing efforts and strengthen the performance analysis. Two groups were identified for comparison; participants from the initial 4-months (early group) and those from the final 4-months (late group). An evaluation tool designed to determine the percentage of appropriate tasks completed throughout the simulation was used for evaluation. The tool had specific domains of interest including airway management, initial assessment, cervical spine precautions, and pelvic fracture management. The early group had a mean score of 65% for appropriately completed tasks. The late group showed improvement with a mean score of 75% (p-value 0.05). While this study was unable to control all possible variables, it is reasonable to conclude that the training had a positive effect on the desired outcome measures.

Collaborative Impact

Figueroa et al. (2013) explored simulation-based team training (SBTT) (cited as an effective means to increase teamwork skills) that could be used to evaluate new guidelines and

increase end-user performance in high-risk patient scenarios such as post-pediatric cardiac surgery cardiac arrest (PPCS-CA). A treatment algorithm based on the patient population of interest was developed using SBTT to heighten the identification and management of PPCS-CA in a pediatric cardiovascular intensive care unit. Specific simulation scenarios were devised to include unique considerations of the patient population and determine if participation in SBTT would improve teamwork, confidence, and communication of healthcare team members during stressful events. This course also incorporated a didactic component including three 30-min lectures that focus on Team Strategies and Tools to Enhance Performance and Patient Safety (Team STEPPS) principles and details of the PPCS-CA algorithm. Each participant completed a survey before the training, directly after the session, and 3-months post-intervention. The survey evaluated the perception of skill, knowledge, and confidence of training recipients. A significant increase (p-value <0.05) in confidence and skill in the roles of team leader, advanced airway management, and cardioversion/defibrillation was found based on 3-month post-intervention surveys. A statistically significant (p-value <0.05) increase in the use of Team STEPPS concepts was found immediately post-intervention and 3-month post-intervention. SBTT is shown to be an effective tool to improve participant communication and confidence and could be useful for disseminating and implementing clinical practice change.

Evaluation Tool Development

Nishisaki et al. (2012) developed a scoring system to assess the interprofessional management of pediatric respiratory failure in a pediatric intensive care unit (PICU). Simulation-based evaluations provided an assessment of the value of the scoring system. An interprofessional collaborative effort between experienced PICU airway management providers and patient safety specialists contributed to the development of the 34-item, task-based, scoring

system. Assessment of a primary airway provider's performance was the main focus. The scoring system was titled the Just-in-Time Pediatric Airway Provider Performance Scale (JIT-PAPPS) version 3. The reliability and validity of this instrument were evaluated through interprofessional airway management training with a simulation-based session. Participants included pediatric and emergency medicine residents, registered nurses, and respiratory therapists working in the PICU. Expert raters used the JIT-PAPPS to assess the performances of the 85 teams that participated in the study. A global assessment tool was used concurrently with the JIT-PAPPS to validate the new instrument. Two additional independent expert raters evaluated video recordings of each session. The interclass correlation coefficient for the raters was 0.64 and the JIT-PAPPS scores correlated well with the global rating scale with a correlation coefficient of $r = 0.71$ (p-value < 0.001). Notability, the correlation was moderate for advanced airway management ($r = 0.64$, p-value < 0.001). The mean total scores were positively associated with the resident leaders' previous training participation. These results were supportive of the reliability and validity of the scoring system.

Learner and Educator Experiences

Weatherall et al. (2019) completed a qualitative study exploring educational methods for pediatric airway training. The study acknowledged the challenges of pediatric airway management and the adjustments that must be made to bag-mask ventilation, supraglottic, and endotracheal airway techniques to accommodate developmental differences in this population. The particular difficulty, and patient risk, are encountered when providers lack experience with low-frequency complications and are unable to practice or gain proficiency. Interprofessional focus groups containing four to six individuals from nursing, anesthesia, simulation, and critical care participated in guided interviews to gather data for qualitative analysis. The themes

identified during the analysis of interview responses included high value in hands-on learning, the difficulty of variability in exposure, the importance of the development of basic airway skills, the potential for simulations on rare situations, and problems in current airway models. These themes show the learners' desires to become proficient in basic airway skills, use simulations as a method of education, and change current models. The expressed usefulness of simulations to rehearse high-risk, low-incidence scenarios and practice mastery of basic airway skills to provide a foundation for advanced skills are highly relevant to the interprofessional pediatric airway management course.

Interprofessional Pediatric Education

High-fidelity simulations (HFS) are effective for practicing team management in complex healthcare settings. Luctkar-Flude et al. (2013) conducted a prospective study evaluating an interprofessional (IP) pediatric educational module using HFS. Study participants included nursing (n=79) and medical students (n=17). As a control, 53 nursing students participated in the intradisciplinary simulation. The experimental group contained 26 nursing students and 17 medical students who participated in the interprofessional simulations. Two scenarios were presented focusing on asthma exacerbation and sepsis. A checklist focused on basic pediatric skills and team skills was used to evaluate critical actions throughout the simulation. A survey assessed participants' confidence in performing pediatric skills and comfort with interprofessional communication and collaboration. Team skills improved significantly for the IP groups ($p < .001$), while the non-IP groups did not show improvement. The pediatric skill scores were lower than team skill scores in all simulations. Participant confidence was higher in the control group, but only one item was statistically significant. The all-nursing control groups' familiarity with working together was cited as a possible factor. It was concluded that HFS is a

useful tool to teach interprofessional teamwork in pediatrics and repeated practice could increase participant confidence.

Reducing Stereotypes

Liaw et al. (2014) examined the effects of an interprofessional simulation-based communication education with nursing and medical students. The goal was to evaluate the students' perception of the other health profession and attitudes toward nurse-physician collaboration. Liaw et al. used a prospective quasi-experimental pre-posttest design to complete this study. Participants included third-year nursing students (n-79), and third- and fourth-year medical students (n-23). Pre-test questionnaires were completed using the Student Stereotypes Rating Scale (SSRQ) and the Jefferson Scale of Attitudes Toward Physician–Nurse Collaboration (JSATPNC). Two 15-minute simulations were facilitated by nursing and medicine faculty. The TeamSTEPPS strategy was explained to participants before simulation and debriefing was conducted after each session. The SSRQ tool evaluated nine characteristics: interpersonal skills, professional competence, leadership, academic ability, team player, independent worker, confidence, decision making, and practical skills. The JSATPNC tool was comprised of 14 items with subscales including shared educational and collaborative relationships, caring as opposed to curing, nurses' autonomy, and physician's authority. The authors reported no significant statistical relationship between perception of each other’s health profession and attitudes on nurse-physician collaboration before intervention; however, a statistically significant relationship was found after the intervention. The study findings suggest that perceptions of different healthcare professions can be influenced by stereotypes. This study provides support for interprofessional simulation education as an effective means to improve collaboration and positive perceptions between healthcare students.

Nurse Anesthetist Perceptions

The hospital admissions resulting in patient harm are 4.1% to 6.7% in Australia. Interprofessional simulation education (IPSE) can focus on reducing errors in the operating room by improving team performance. Armour et al. (2019) authored a qualitative study in Australia aimed at exploring anesthetic nurses' (n-9) perceptions of learning in IPSE. Data analysis of individual and group interviews produced three central themes including learning and skill development, interprofessional team communication, and focusing on the team. While IPSE provides a safe environment to learn and practice in high-performing teams, this study found some frustrations among participants related to an imbalance in nurse and medical participant ratios. The authors concluded that IPSE is beneficial and should be provided to all operating room health professionals; while ensuring ratios are consistent with the actual team configurations.

Low-Frequency – High-Risk

Cain et al. (2014) investigated interprofessional simulations for optimization of patient outcomes related to malignant hyperthermia (MH) crisis management. Simulation-based learning for perioperative personnel was aimed at educating early recognition, treatment, and management of MH. Due to low frequency in the perioperative setting, many providers are ill-equipped to manage the life-threatening process of MH crisis with precision. Cain et al. recognize that simulation mimicking real-life clinical scenarios provides a valuable and safe environment for cumulative and integrative learning. The multifaceted MH training course incorporated didactic educational sessions and role-playing scenarios within a high-fidelity operating room simulation. This course provided skill development, teamwork, interprofessional communication, and problem-solving opportunities. Role clarity, team cohesion, and anticipatory

response were noted as significant factors in crisis management. The project resulted in an MH response cart and policy updates. Simulated drills were recommended two or more times yearly to improve personnel efficiency in managing the MH crisis.

Literature Review Synthesis

The selected studies contained insights into pediatric airway training or interprofessional simulation education for healthcare providers. Abu-Sultaneh et al. (2019) and Leeper et al. (2018) provided evidence on the impact of interprofessional simulations on the unit and hospital-wide educational programs. Falcone et al. (2008) focused on interprofessional simulation use in trauma management education, including pediatric airway management. Figueroa et al. (2013) published the effects of simulation-based team training within a PICU. Nishisaki et al. (2012) examined the creation of a novel scoring system for the assessment of multidisciplinary teams' management of respiratory failure in a PICU through interprofessional simulation. Weatherall et al. (2019) completed a qualitative study exploring different educational methods for pediatric airway training. Luctkar-Flude et al. (2013) conducted a prospective study with a sample of medical and nursing students to evaluate an interprofessional pediatric educational module using high-fidelity simulations. Liaw et al. (2014) examined the effects of an interprofessional simulation-based education program focused on communication between nursing and medical students. Armour et al. (2019) authored a qualitative study aimed at exploring anesthetic nurses' perceptions of learning in interprofessional simulated environments. Cain et al. (2014) investigate the use of interprofessional simulations to optimize patient outcomes related to MH crisis management.

Current Evidence Synthesis

Interprofessional simulation training can improve providers' selection of age-appropriate emergency equipment, endotracheal tubes, and laryngoscope blades for the pediatric population (Abu-Sultaneh et al., 2019). This model of training can incorporate various foci such as difficult airways to increase participants' knowledge of airway management and improve perceptions of teamwork and skillset (Leeper et al., 2018). Appropriate actions of pediatric trauma teams and individual provider confidence and skill in leadership and advanced airway management can be improved through interprofessional simulation (Falcone et al., 2008; Figueroa et al., 2013). Targeted pediatric airway simulations can improve interprofessional teamwork skills and change healthcare students' perceptions of each other and attitudes concerning nurse-physician collaboration (Liaw et al., 2014; Luctkar-Flude et al., 2013). Interprofessional simulation participants have expressed value in the safe environment for skill development and learning opportunities for interprofessional communication, role clarity, and problem-solving (Armour et al., 2019; Cain et al., 2014). An interprofessional simulation was used to optimize patient outcomes related to the low-frequency, high-risk scenario encountered in a malignant hyperthermia crisis (Cain et al., 2014). The benefits of targeted simulation and interprofessional training are apparent in the literature and guided the development of the interprofessional pediatric airway management course. For the literature evaluation table, refer to Appendix B.

Theoretical Framework

The Interprofessional Education Collaborative (IPEC) vision states that "interprofessional collaborative practice drives safe, high-quality, accessible, person-centered care and improved population health outcomes" (IPEC, n.d.). The IPEC Interprofessional Collaborative Practice Competencies framework includes four domains: values and ethics for interprofessional practice;

roles and responsibilities; interprofessional communication; and teams and teamwork. These domains focus on individuals working with other professionals to maintain mutual respect and shared values; use of individual roles in concert with other professions to assess and provide for patients' needs; implementation of responsive and responsible communication strategies between patients, families, communities, and other health professionals to support a team approach; and application of relationship-building values and the principles of team dynamics to deliver safe, timely, efficient, effective, and equitable care (IPEC, n.d.). This framework aligns with the interprofessional pediatric airway management course and aims to provide safe, high-quality care specialized to the unique needs of a population. Mutual respect and shared values are pivotal for effective teamwork during the heightened emotional strain produced by pediatric airway emergencies. The incorporation of the team members' unique perspectives and skills could enhance each provider's ability to deliver patient care. Maintaining open and responsive communication between professionals and patients supports a team approach and improves knowledge sharing. Team members' level of involvement in interprofessional care will be influenced by their perceptions of collaboration and teamwork.

The Quality-Caring Model©, developed by Duffy (2018) explores the benefit of evidence-based nursing practice in the current healthcare environment. Processes and relationships are key components of this model. This model also aims to translate everyday nursing actions into objective and measurable terms. This translation allows for better evaluation of nursing practice and improves the quality of healthcare. The interprofessional pediatric airway management course will incorporate aspects of this model to guide relationship building and obtain measurable data to enhance project analysis.

Specific Aim

Purpose Statement

The purpose of this project was to implement an interprofessional pediatric airway management course that paired unique airway considerations with interprofessional training strategies to equip providers with the pertinent knowledge, skill, and confidence required to deliver safe, high-quality, pediatric airway management.

Methods

Context

The project was implemented at a large University Hospital in West Virginia. The course was delivered at the Simulation Training and Education for Patient Safety (STEPS) Center. The population that was invited to receive the intervention included providers who are trained in standard intubation and airway management techniques or who would be part of a response team including, but not limited to, certified registered nurse anesthetists, physician anesthesiologists, nurse practitioners, medical residents, registered respiratory therapists, registered nurses, and student registered nurse anesthetists. This project was not intended to serve as an initial airway training course; rather, the purpose is to integrate evidence and expert knowledge into a shared-learning experience leading to provider enrichment and refinement.

Intervention

Description of Intervention

The interprofessional pediatric airway management course was delivered as a 3-hour education course (the proposed course schedule is presented in Appendix E). The number of participants for each course offered ensured adequate instructor-to-participant ratios (1:4 or less). Participants completed a baseline Likert-scale survey assessing their perceived confidence in

managing a pediatric airway (survey presented in Appendix D). Baseline competency was established through an initial team simulation. The team encountered a simulated child with respiratory distress and impending respiratory failure. The Just-in-Time Pediatric Airway Provider Performance Scale (JIT-PAPPS) was utilized to evaluate and quantify the performance scores. A debriefing session followed the initial simulation to address any issues or insights identified by instructors or participants.

The initial plan included participants cycling through six skill and concept stations that focused on different aspects of pediatric airway management. (1-preparation, 2-assessment, 3-positioning, 4/5-airway management and/or securement, 6-algorithms). Upon completion of each of the stations, the participants were going to participate in three additional simulations focused on the management of a neonate, a congenital abnormality, and a previously failed airway or current difficult intubation case. The JIT-PAPPS was utilized to evaluate performances during the additional simulations. All participants completed the confidence survey again after finishing the course.

Benchmarks

Various forms of interprofessional pediatric airway training programs have demonstrated a positive effect on learner knowledge, skill, and confidence development. This project aimed to achieve the benchmark of a statistically significant difference between pre-and post-course competency and confidence scores.

Gaps

No suitable confidence survey was found to meet the needs of this project. The Pediatric Airway Management Confidence Survey was developed to measure participants' confidence in providing pediatric airway management.

Feasibility Analysis

To reduce unnecessary resource use including personnel, the need for an interprofessional pediatric airway management course was evaluated using professional affiliation aims, implementation site patient population, and future developments in the community.

Needs Assessment. The NAM (2000) strategic approach to reducing medical errors includes simulation and team training. As a standard of care, the AANA (2019) promotes collaborative patient care to cultivate a culture of safety. The work by Cain et al. (2014) highlights the potential harm to patients if providers are unprepared to properly manage life-threatening situations due to limited practice with low-frequency situations. Simulations target these needs by increasing provider exposure and practice with collaboration in high-risk, complex patient situations.

The implementation site houses the state's largest group of primary care and specialty care physicians and surgeons and is the only hospital in the state with a pediatric cardiac surgery program. The University's flagship hospital, including the children's hospital, is the only Magnet® designated site for nursing excellence in the state. A high honor considering that only five percent of hospitals in the United States obtain this designation (WVU Medicine Children's Hospital, 2020). The Children's Hospital has a 28-bed pediatric and adolescent ward, a 19-bed PICU, a 39-bed Neonatal Intensive Care Unit (NICU), and a 29-room Maternal Infant Care Center (MICC). The Hospital has expansion plans for the Fall of 2022, with a planned completion of a new 155-bed, free-standing Children's Hospital. This organization has served more than 140 thousand patients and provided for over 61 thousand emergency room visits (WVU Medicine Children's Hospital, 2020). The Children's Hospital's growth will require increased numbers of skilled providers to deliver safe, high-quality, pediatric patient care. Future

integration of this course into the available training opportunities for advanced providers at the University Hospital is aimed at creating a collaborative pediatric practice approach.

SWOT Analysis. Potential strengths, weaknesses, opportunities, and threats (or SWOT analysis) were considered during the refinement of this project. Potential strengths included access to the STEPS Center through the University and support from several implementation site stakeholders. Possible weaknesses included the need for broad simulations due to the availability of a wide variety of professions possessing their unique knowledge base, skill sets, and perspectives, and limited objective measures for evaluation, and participant follow-up. Opportunities included the growing Children's Hospital, improved provider exposure to high-risk situations, and improved collaboration among healthcare professionals. Potential threats included the cost of STEPS Center access, participant resistance to interprofessional training, and pandemic-related restrictions. These considerations were cyclically monitored during the planning, implementation, and evaluation of the project.

A contingency plan was developed if COVID-19 restrictions halted the use of the STEPS Center. This included planned adjustments to participant numbers, course location, and methods used for training. Smaller group sizes with appropriate safety precautions in a low-fidelity setting could have been utilized to deliver the course content. Additionally, components of the course could have been provided to participants online.

Technical Equipment. The STEPS Center's efforts to improve patient care through a simulated crisis of high-risk conditions in a safe environment and the focus on interprofessional education among nurses, physicians, and other integrative healthcare members echo the evidence found in current literature (WV STEPS, 2020). The Center accommodates student learners and hospital professionals. The Center has a wide variety of simulators including a realistic

reproduction of a six-year-old child; an infant-sized, high-fidelity simulator that is powered with advanced physiology for practicing infant airway management; a simulator with realistic newborn traits and lifelike clinical feedback; a realistically proportioned 25-week preterm manikin; and an orally or nasally intubation compatible "Infant Airway Management Trainer" with realistic anatomy of a three-month-old infant featuring landmarks including the uvula, vocal cords, glottis, epiglottis, larynx, arytenoid cartilage, trachea, esophagus, and inflatable lungs and stomach (WV STEPS, 2020). These technologies can enable numerous training scenarios and enhance participant learning.

Budget. The largest financial burden for this project was the STEPS Center fee. The estimated cost for one eight-hour course offering, as initially planned for the intervention, was $1,700. There was minimal marketing cost since organizational emails and word-of-mouth notifications recruited adequate participants. Several airway experts initially volunteer instructor services for the project implementation phase; however, scheduling conflicts occurred. Funding was sought with grant requests. For budget details, refer to Appendix G. Participants were advised to submit workshop requests to their perspective departments for paid workshop time. Due to the variation in professional departments, this was up to the participants to complete.

Congruence of Strategic Plan. The mission of the University Hospital is to "improve the health of West Virginians and all we serve through excellence in patient care, research, and education" (Mission and Vision, 2020). The Children's Hospital builds on that mission with a focus "on the most vulnerable children and expectant mothers" (WVU Medicine Children's Hospital, 2020). These missions are congruent with the project's aim to improve patient safety and outcomes through the betterment of providers who deliver care to the vulnerable pediatric population of West Virginia.

Evidence of Key Site Support. The implementation site chief CRNA (letter of support is found in appendix H), STEPS director, and IPE program specialist extended their support for this project. Sara Harms, CRNA provided expert content consultation throughout the project development and implementation. Additional team members were consulted for simulation development, project implementation, and evaluation. Team members included CRNAs, physician anesthesiologists, pediatric intensivists, neonatal nurse practitioners, simulation education specialists, and other healthcare personnel.

Project Timeline

Proposal finalization and submission to Nursing Research Council and the Institutional Review Board (IRB) was completed in the Fall of 2020. The detailed simulation development phase started in the Fall of 2020 and continued in the Spring of 2021. The implementation phase occurred in the Summer of 2021 with two separate course offerings. Following the implementation phase, an evaluation of the project was completed in the Fall of 2021. The project phases contained unique tasks developed using the SMART (Specific, Measurable, Achievable, Realistic, and Time-Bound) work plan format as a guide. For details of the initial SMART work plan, refer to Appendix F.

Study of the Intervention

Qualitative and quantitative baseline data were collected at the start of each course and compared with post-intervention data after all course offerings. This enabled comparison between each course group and related information available in the literature from similar projects. Additionally, statistical analysis of pre-and post-course data was used to objectively evaluate the training effect. All data collection was transparent and aimed at future course improvements.

Evaluation Plan

This project used the Donabedian Conceptual Model for evaluation. This model is often used in healthcare to evaluate the quality of care and consists of three main components including structure, process, and outcome (S-P-O) (Curley, 2020). The structure consists of the available resources; the process is the method of service delivery; the outcome is the change caused by the intervention. This methodical and objective method of evaluation can be prioritized to the needs of a project making it applicable to various settings (Hickey & Brosnan, 2017). This model also includes the concepts of criteria and standards to help guide evaluation. Criteria are attributes of a core element (S-P-O), and standards are specific measures of that attribute (Hickey & Brosnan, 2017). The application of this model answered the following questions: was the overarching goal achieved, were the objectives met, and how can the project be strengthened?

Ongoing Assessment

Ongoing assessment of success, failure, efficiency, and cost of the program was measured with a satisfaction survey, competency and confidence scores, and adaptability of the program. Performance and confidence measures were evaluated to assess the effects of the course. Opportunities for adaptability were sought to promote the future implementation of this program in various locations. Studies exploring the value of low-fidelity simulation have been published and could be integrated into future iterations of the project for locations without access to high-fidelity simulators. The intent is to expand the potential impact of the interprofessional pediatric airway management course.

Measures

Measurable Project Objectives

The purpose of this project was to equip providers with skills, knowledge, and confidence to improve pediatric airway management quality and safety. The measurable objectives for this project included improvement of participants' pediatric airway management (1) competency and (2) confidence as well as (3) satisfaction with the training upon completion of each training day.

Competency Outcome Measure. The JIT-PAPPS version 3.0 is an assessment tool for interprofessional management of respiratory failure (Nishisaki et al., 2012). Experienced pediatric airway providers collaborated with patient safety specialists to develop this 34-item scoring system. Simulation-based evaluations were utilized to assess the value of the scoring system. The reliability and validity of this instrument were evaluated through interprofessional airway management simulation-based training sessions. This tool was selected to measure participant competency because it is pediatric-specific, contains technical and non-technical components, and has validity and reliability data available. Dr. Nishisaki extended formal approval for this project to utilize the JIT-PAPPS tool (refer to Appendix I).

Confidence Outcome Measure. Participant confidence was measured with a 10-question Pediatric Airway Management Confidence Survey. This Likert-scale survey was created to evaluate specific aspects of participants' perception of their pediatric airway management confidence.

Satisfaction Outcome Measure. Participants completed a satisfaction survey with multiple choice and open-ended questions upon completion. This helped to identify project weaknesses and strengths and allow participants to express possible improvements.

Analysis

Data Analysis

Analysis of all measured data was performed following each course offering and a cumulative analysis occurred upon project completion. Statistician, Dr. Kesheng Wang joined the project committee and helped to develop and perform statistical analysis of project data. This included appropriate statistical analysis, as determined by Dr. Wang and the project team, of the pre-and post-course JIT-PAPPS and Confidence Survey scores in Statistical Package for the Social Sciences software (SPSS). Additionally, the satisfaction survey was examined for common theme identification.

Variation Analysis

Additional participant data was collected including profession, work location, and experience level (years in the profession) to enhance the identification of variation within data and potential trends among the groups. Changes in standards, techniques, and airway equipment will require continued development of the course to provide the most current information to participants.

Ethical Considerations

The utilization of simulated patient encounters eliminates the potential for patient harm. Ethical considerations for this project included the recruitment and interaction between instructors and participants. Participants were ensured that their involvement in this project was voluntary and that they could discontinue the course at any time. Instructors had to maintain professionalism and acknowledge that simulated environments can cause real anxiety and stress for participants, especially when practicing pediatric airway management. Mutual respect was upheld between all individuals involved in the course to ensure ethical and productive training.

Results

Intervention Steps and Evolution Over Time

During the implementation phase of this project, the initial intervention steps and the proposed timeline were adjusted due to pandemic conditions, funding, and project approvals. Appendix J provides an updated timeline for the progression of the project. The intervention evolution attempted to streamline the process while meeting the objectives. Upon consultation with Adam Hoffman, a simulation education specialist, the interprofessional pediatric airway management course was condensed from an 8-hour course to a 3-hour offering to accommodate more participants during the first iteration. Mr. Hoffman was involved in all aspects of each course offering. The proposed plan to have participants cycle through individual skill stations was modified to a group practice station to facilitate improved communication and collaboration training. The decision was made to deliver the second simulation as a modification of the initial simulation rather than introduce additional scenarios to improve the comparability of participant performance. The initial plan to receive CE approval was not completed to expedite implementation.

Measures and Outcomes

The proposed measurable objectives to evaluate participants' competency and confidence were utilized during the intervention phase of the project. After the introduction to the course, participants completed a baseline Likert-scale survey assessing their confidence in managing a pediatric airway. Baseline competency was established through an initial team simulation. Each team encountered a simulated infant with respiratory distress and impending respiratory failure. The JIT-PAPPS was utilized to evaluate and quantify the performance. A debriefing session followed this initial simulation. Participants then attended an active discussion of concepts and

had group hands-on practice of different aspects of pediatric airway management (preparation, assessment, positioning, airway management and securement, and algorithms) and interprofessional collaboration (IPEC Core Competencies, presented by Adam Hoffman). Upon completion of this segment, the participants completed a modified version of the initial simulation with the addition of previously failed airway attempts before the teams arrived at the bedside. The JIT-PAPPS was utilized to evaluate performances during these simulations. All participants completed the confidence survey again after finishing the course.

The use of the JIT-PAPPS was limited to 23 of the 34 critical action items. All participants were given credit for the following items: (1) identify oneself, (2) call for help, (3) put gloves on, (11) notify the team for intubation, and (18) wear a facemask with eye protection. All of the simulation sessions were video, and audio recorded. The teams that worked together on the initial simulation were assigned together for the second simulation. Each session was then reviewed and the JIT-PAPPS tool was used to evaluate the team's performance on the initial and secondary simulations to compare performance after the discussion and practice session.

A paired t-test was performed with SPSS. Analysis of 23 items from the JIT-PAPPS showed that two actions had statistically significant ($p < 0.05$) improvements. These actions were (12) "calling for suction system" and (23) "confirm team crew at specific task". The action of (4) "Open airway with head-tilt chin-lift or jaw thrust within *first* 15 seconds" was not completed by any group during the initial simulation. However, all six groups completed this action during the second simulation. While this could not be statistically analyzed because there was no variation in means, it is a clinically significant change and of great importance. One item, (9) "ask for blood pressure measurement during bag and mask ventilation", was scored lower during the

second simulation. Seven items showed no change and twelve items showed improvement (not statistically significant).

Statistical analysis of the Pediatric Airway Management Confidence Survey was completed through a paired t-test on SPSS. The analysis showed that nine survey questions had statistically significant improvements. The first question, “I am confident in my ability to identify the impending respiratory failure of a pediatric patient” did not have a statistically significant change. Appendix K provides the statistical analysis results from SPSS.

Unintended Consequences

The design of in-person group simulations was presented with challenges due to pandemic-related gathering restrictions. This played a role in the adjusted timeline of the project. Obtainment of funding also presented a challenge to the initially proposed schedule. The research grant that was ultimately acquired had particular deadlines that did not line up with the initial implementation plan. However, the resulting changes aligned well with the adjustments needed for pandemic-related restrictions. The didactic active discussion sessions did not specifically discuss the JIT-PAPPS or its critical action items with the participants. While many key aspects of the tool were discussed, the decision was made to not show the checklist to participants in this first iteration of the course. This could be included in future offerings to inform participants of the expected actions and all evaluation criteria.

Missing Data

As previously discussed, only 23 of the 34 JIT-PAPPS critical action items were compared. Credit was given to all participants for (1) identify oneself, (2) call for help, (3) put gloves on, (11) notify the team for intubation, and (18) wear a facemask with eye protection. Additionally, item (34) “react to hypotension after intubation” was not used because the

simulation was designed to end upon securement and confirmation of an advanced airway. During the second modified simulation, the patient had already received induction medications at the start of the simulation, thus we did not evaluate for the use of (19) sedative and/or narcotic and (20) paralytic. Additionally, the following items were not evaluated during the second simulation: (23) Ask for blood pressure cycle measurement before induction, (24) Ask for cricoid pressure when sedative/narcotics are given (before paralytics), and (25) Stop bag and mask ventilation at *correct timing* (after paralyzed) for intubation due to the timing of the team's arrival to the bedside during the modified simulation. These items were not able to be included in the statistical analysis.

Discussion

Summary

The identified problem of segregated intraprofessional training and limited provider exposure to pediatric airway management potentially resulting in poor collaboration and low-quality pediatric airway management was addressed by this project. The interprofessional groups utilized their respective strengths and applied the IPEC Core Competencies and pediatric airway management strategies to work together and provide safe patient care.

The pairing of individuals with different experience levels during simulations enhanced group learning. During and upon completion of many simulations, the participants demonstrated shared learning and teaching behaviors that strengthened the group as a whole. The more experienced participants explained patient intervention rationale and techniques along with equipment selection and function. Several groups had the more experienced individuals intubate the manikin during the initial simulation but then had the more novice providers perform this skill during the second simulation. Several participants stated that they had limited previous

exposure to pediatric airway management during their education and expressed that this simulated exposure was elucidating. Participants expressed satisfaction with the training course and requested additional sessions.

Interpretation

As previously mentioned, limited experience with pediatric airway management was described by several participants. The hands-on practice, discussion of concepts, and repeated simulation experience appeared to influence participants' competence and were cited by several participants as key factors that increased confidence. Several outcome measures showed statistically significant improvement after completion of the course.

The results of this project align with the findings from other publications. Abu-Sultaneh et al. (2019) showed that interprofessional simulation training can improve providers' selection of age-appropriate emergency equipment, endotracheal tubes, and laryngoscope blades for the pediatric population. Leeper et al. (2018) demonstrated how this model of training can increase participants' knowledge of airway management and improve perceptions of teamwork and skillset. Targeted pediatric airway simulations improved interprofessional teamwork skills and change healthcare students' perceptions of each other (Liaw et al., 2014; Luctkar-Flude et al., 2013).

The impact of this project on individual participants included exposure to pediatric airway considerations, equipment, and management techniques coupled with interprofessional collaboration methods. This model of training and individual enrichment could impact the overall culture of healthcare systems led by participants who are equipped to deliver safe and collaborative practice. Translating the simulated teamwork and pediatric airway strategies into real-world situations is how evidence-based practice influences clinical practice.

This project showed that competency, as evidenced by the JIT-PAPPS, was improved in fifteen of the twenty-three measured actions. However, not all of these were statistically significant, and the small sample size limited the statistical power. Interprofessional pediatric airway management training was shown to improve participants' confidence in several aspects of pediatric airway management delivery. As revealed previously, the decision to not show the critical action checklist to participants in this first iteration of the course could have impacted the results. This could be included in future iterations of this course. A review of open-ended survey questions showed common themes for improvement. The most requested improvements included a variation of more hands-on practice with equipment, a discussion of equipment sizing, and ventilator management. Future offerings of this course will adjust the schedule to allow for increased hands-on time with equipment to coincide with more discussions of equipment sizing and ventilator management strategies.

Limitations

Familiarity with the simulation could have influenced participant performance on the second simulation rather than the direct impact of the intervention. The critical action checklist was evaluated after the course was concluded via video and audio recording. Having real-time completion of this checklist could have provided direct participant feedback. Moreover, the recordings were only reviewed by one individual. Having several raters could potentially impact the findings if there were unintended biases of interpretations of the data. Having two or more real-time raters could increase the data validity. Efforts were made to minimize and adjust for limitations by reviewing the session recordings multiple times using the same criteria on the JIT-PAPP scale. Finally, this project was aimed at a specific patient population and situation; therefore, generalizability to other areas of practice may be impacted.

Conclusions

This project brought together individuals from different professions that might encounter pediatric airway management needs. The foundational information delivered during the discussion sessions coupled with the hands-on practice and team collaboration was designed to equip providers with the pertinent knowledge, skill, and confidence required to deliver safe, high-quality, pediatric airway management. There was a promising improvement in all of these aspects of practice, suggesting that the project met the intended outcomes.

Based on the current resources available through the STEPS Center and the feedback from participants, this project appears sustainable and should be continued and modified to meet the needs of providers who may encounter pediatric patients in need of intervention. This project model could be utilized as a template to expand and meet other identified educational and training needs. Following the completion of this project, participant feedback will be utilized to adjust the course design and future offerings are planned to be offered to previous and new participants.

This project aligns with the goals of the STEPS Center and the University Hospital. This author plans to develop a partnership with the STEPS Center and help further the culture of interprofessional collaboration through continued simulation training courses with a specialty focus on pediatric practice. The overarching goal remains to equip providers to improve the health, wellbeing, and safety of the community through evidence-based practice.

Funding

This project was awarded the AANA, Dean and Fred Hayden Student Research Grant in the amount of $ 3,000. This grant along with the STEPS Center funding provided the use of the high-fidelity simulation rooms, practice manikins, equipment, and simulation specialist time.

References

American Association of Colleges of Nursing. (2006, October). *The essentials of doctoral education for advanced nursing practice.* https://www.aacnnursing.org/DNP/DNP-Essentials

American Association of Nurse Anesthetists. (2019). *Standards for nurse anesthesia practice*. https://www.aana.com/docs/default-source/practice-aana-com-web-documents-(all)/standards-for-nurse-anesthesia-practice.pdf?sfvrsn=e00049b1_18

Abu-Sultaneh, S., Whitfill, T., Rowan, C. M., Friedman, M. L., Pearson, K. J., Berrens, Z. J., Lutfi, R., Auerbach, M. A., & Abulebda, K. (2019). Improving simulated pediatric airway management in community emergency departments using a collaborative program with a pediatric academic medical center. *Respiratory Care, 64*(9), 1073–1081. https://doi-org.www.libproxy.wvu.edu/10.4187/respcare.06750

Bell, R. & Fredland, N. (2020). The Use of Theoretical Frameworks Guiding Interprofessional Simulation: An Integrative Review. *Nursing Education Perspectives, 41* (3), 141-145. doi: 10.1097/01.NEP.0000000000000615.

Cain, C. L., Riess, M. L., Gettrust, L., & Novalija, J. (2014). Malignant hyperthermia crisis: Optimizing patient outcomes through simulation and interdisciplinary collaboration. *AORN Journal, 99*(2), 300-311. https://doi.org/10.1016/j.aorn.2013.06.012

Curley, A. L. (2020). *Population-based nursing: Concepts and competencies for advanced practice*. New York, NY: Springer Publishing Company.

Duffy, J. R. (2018). *Quality caring in nursing and health professions, third edition: implications for clinicians, educators, and leaders*. Springer Publishing Company

Falcone, R. A., Jr, Daugherty, M., Schweer, L., Patterson, M., Brown, R. L., & Garcia, V. F. (2008). Multidisciplinary pediatric trauma team training using high-fidelity trauma simulation. Journal of Pediatric Surgery, 43(6), 1065–1071. https://doi-org.www.libproxy.wvu.edu/10.1016/j.jpedsurg.2008.02.033

Figueroa, M. I., Sepanski, R., Goldberg, S. P., & Shah, S. (2013). Improving teamwork, confidence, and collaboration among members of a pediatric cardiovascular intensive care unit multidisciplinary team using simulation-based team training. *Pediatric Cardiology, 34*(3), 612–619. https://doi-org.www.libproxy.wvu.edu/10.1007/s00246-012-0506-2

Hickey, J. V., & Brosnan, C. A. (2017). *Evaluation of health care quality for DNPs*. New York: Springer Publishing Company.

Interprofessional Education Collaborative. (n.d.). Retrieved June 26, 2020, from https://www.ipecollaborative.org/resources.html

Kerrey BT, Rinderknecht AS, Geis GL, Nigrovic LE, Mittiga MR, Kerrey, B. T., Rinderknecht, A. S., Geis, G. L., Nigrovic, L. E., & Mittiga, M. R. (2012). Rapid sequence intubation for pediatric emergency patients: higher frequency of failed attempts and adverse effects found by video review. *Annals of Emergency Medicine, 60*(3), 251–259. https://doi-org.www.libproxy.wvu.edu/10.1016/j.annemergmed.2012.02.013

Liaw, S. Y., Siau, C., Zhou, W. T., & Lau, T. C. (2014). Interprofessional simulation-based education program: A promising approach for changing stereotypes and improving attitudes toward nurse–physician collaboration. *Applied Nursing Research, 27*(4), 258-260. https://doi.org/10.1016/j.apnr.2014.03.005

Leeper, W. R., Haut, E. R., Pandian, V., Nakka, S., Dodd-O, J., Bhatti, N., Hunt, E. A., Saheed, M., Dalesio, N., Schiavi, A., Miller, C., Kirsch, T. D., & Berkow, L. (2018). Multidisciplinary difficult dirway course: An essential educational component of a hospital-wide difficult airway response program. *Journal of Surgical Education, 75*(5), 1264–1275. https://doi-org.www.libproxy.wvu.edu/10.1016/j.jsurg.2018.03.001

Luctkar-Flude, M., Baker, C., Medves, J., Tsai, E., Rivard, L., Goyer, M., & Krause, A. (2013). Evaluating an interprofessional pediatrics educational module using simulation. *Clinical Simulation in Nursing, 9*(5). https://doi.org/10.1016/j.ecns.2011.11.008

Melnyk, B. M., & Fineout-Overholt, E. (2019). *Evidence-Based Practice in Nursing and Healthcare (4th ed.)*. Philadelphia, Pennsylvania: Wolters Kluwer.

Mission and Vision. (2020, May 07). Retrieved June 26, 2020, from https://wvumedicine.org/about/leadership-and-more/mission-and-vision/

Nishisaki, A., Donoghue, A. J., Colborn, S., Watson, C., Meyer, A., Niles, D., Bishnoi, R., Hales, R., Hutchins, L., Helfaer, M. A., Brown III, C. A., Walls, R. M., Nadkarni, V. M., & Boulet, J. R. (2012). Development of an instrument for a primary airway provider's performance with an ICU multidisciplinary team in pediatric respiratory failure using simulation. Respiratory Care, 57(7), 1121–1128. https://doi-org.www.libproxy.wvu.edu/10.4187/respcare.01472

Weatherall, A. D., Menezes, M., Koh, S. M., & Lazarus, M. D. (2019). Learner and educator experiences and priorities in paediatric airway education: A qualitative study. *Anaesthesia and Intensive Care, 47*(3), 274-280. https://doi.org/10.1177%2F0310057X19845812

WV STEPS: David and JoAnn Shaw center for simulation training and education for patient safety. (2020). Retrieved June 26, 2020, from https://steps.wvu.edu/

WVU Medicine Children's Hospital. (2020, June 24). Retrieved June 26, 2020, from https://childrens.wvumedicine.org

Appendix A

Literature Search Log

Date	Database	Search Terms (key words)	# Hits	Limits applied	#
02/03/2020	CINAHL	Airway; Simulation; Multidisciplinary	23	none	8
02/04/2020	Cochrane Library	Pediatric (kw-ab or title); multidisciplinary (kw); simulation (kw-ab or title).	2	none	2
02/04/2020	Cochrane Library	Pediatric (kw-ab or title); airway(kw); simulation (kw-ab or title).	37	none	2
02/05/2020	MEDLINE	Pediatric; Airway; Simulation;	280	none	15
02/17/2020	MEDLINE/CINAHL	Pediatric; interdisciplinary; airway simulation	14	none	3
06/01/2020	CINAHL with Full Text, Health Source: Nursing/Academic Edition, MEDLINE	Simulation; Interdisciplinary	4,488	English language/ 2010-2020 pub date	16

06/01/2020	CINAHL with Full Text, Health Source: Nursing/Academic Edition, MEDLINE	Simulation; Interdisciplinary; Pediatric	175	English language/ 2010-2020 pub date	4
06/01/2020	CINAHL with Full Text, Health Source: Nursing/Academic Edition, MEDLINE	Simulation; Interdisciplinary; Airway	37	English language/ 2010-2020 pub date	2

Appendix B

Evaluation Table

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
Abu-Sultaneh, 2019, Improving Simulated Pediatric Airway Management in Community Emergency Departments Using a Collaborative Program with a Pediatric Academic Medical Center. Origin: United States	Improve CED's PAM and PERS	Quasi-Experimental Study pre/post-interventional study.	Convenience sample of CED workers available for study. n-176/193	IV-Received training course DV-Simulation critical action checklist and PERS	Pre/post PERS and critical action checklist scores	SPSS version 22.0 for statistical analysis of pre/post data Examined using chi-square or Fisher exact tests for checklist items, independent *t* tests for normal continuous data (i.e. team performance), and Wilcoxon-Mann	interprofessional team training strengthened PERS and airway management skills at a systems level.	**LOE-**III **S/-**System-related issues identified with participant performance. Simulation within CEDs provided info on specific gaps in that facility (i.e. equipment). Good follow-up **W/** 10% of the CEDs in the state. Lacked assessment of TTI and # of attempts because this did not align with the study aims. Actual patient outcomes were not measured after intervention. No control/crossover group. **Risk-** low risk due to simulation. **Feasibility**- Could be implemented by other academic hospitals **Conclusion**- Simulation outreach provided valuable training to improve CED preparedness for PAM. This demonstrates applicability of IPAT to improve systems for PAM. **Recommendation**- Use in situ simulations to improve PAM thru IPAT. Unit level

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
						Whitney *U* tests for nonparametric data (i.e. pediatric readiness scores).		improvements could incentivize funding for future projects
Armour, 2019, Anaesthetic Nurses' Perceptions of Learning During Interprofessional Simulation Education Origin: Australia	To explore anesthetic nurses' perceptions of learning during IPSE.	Qualitative design.	large multi-campus hospital in metropolitan Melbourne. Sample- Anesthetic nurses	Participants perceptions	Data were collected using semi-structured, face-to-face and group interviews after a prepared interview guide	Theme identification	Participants described both positive and negative aspects of learning and skill development, communication within the team, and transfer of new learning to practice	**LOE**-IV **S/-**Assessment of anesthetic nurses' perceptions after IPE **W/-** limited objective measures **Risk-** Low, interview **Feasibility**- Feasible **Conclusion**- Simulations provide benefit and should mimic the actual environments. **Recommendation**- Consider the themes when developing an IPE course.

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
Cain, 2014, Malignant hyperthermia crisis: Optimizing patient outcomes through simulation and interdisciplinary collaboration. Origin: United States	Increase team member knowledge through implementation of evidence-based criteria for the treatment of MH.	QI project	Academic medical facility in the Midwest Personnel included 19 RNs and 10 surgical technologists.	Subjective performance strengths and weaknesses.	Focused discussion with expert and participant assessment of simulations.	Theme identification role clarity, anticipatory response, and overall team cohesion and interaction	Simulation laboratories increase collaboration across disciplines with interdisciplinary team training and are particularly valuable in preparing personnel for infrequent, high-risk situations.	**LOE**-IV **S/-** Allowed expert and participant subjective evaluation of performance. **W/-**limited objective outcome measures **Risk-** Low, simulated encounter **Feasibility**- With access to HFS, this is a realistic training method. **Conclusion**- Provides evidence for benefit of interprofessional simulation. **Recommendation**- Apply this information to the low-frequency, high-risk complications with pediatric airways management.
Falcone, 2008, Multidisciplinary pediatric trauma team training using high-fidelity trauma simulation.	Improve trauma care through multidisciplinary education, including PAM.	Quasi-Experimental Study	n-160 Convenience Multidisciplinary team members participating in	IV-Received training course DV-Trauma multidisciplinary team simulation	Pre/post Trauma multidisciplinary team	statistical analyses of pre/post data were performed using paired t	interprofessional training of teams improves PAM actions. Improves efficiency of teamwork under	**LOE-**III **S/ -** Use of shared mental model. Overall performance and specific domains of the resuscitation are examined. **W/** Not designed with focus on simulation alone. Actual patient

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
Origin: United States			simulated trauma sessions	evaluation tool. This included a section on airway management.	simulation evaluation tool.	tests with SAS v9.1 software.	stressful circumstances and among unfamiliar team members.	outcomes were not measured after intervention. No control/crossover group. Intervention not isolated to simulation. **Risk-** low risk due to simulation. **Feasibility**- Could combine existing training program from different disciplines to create new IPAT. **Conclusion**- Interprofessional training improves communication and team performance, **Recommendation**- Utilize IPAT to enhance team delivery of PAM.
Figueroa, 2013, Improving teamwork, confidence, and collaboration among members of a pediatric cardiovascular intensive care unit multidisciplinary team using simulation-based team training.	Determine if participation in aids in improving teamwork, confidence, and communication during pediatric critical events.	Quasi-Experimental Study	Purposeful sampling of PCICU =nurses, physicians, respiratory therapists, and allied staff.	IV-Received training course DV-Assessment of confidence and skill: A-Team leader and B-	40-point survey questionnaire	Wilcoxon signed-rank test. A Holm (stepwise Bonferroni) adjustment, statistically significant	SBTT effective in improving communication and increasing confidence of multidisciplinary teams during crisis.	**LOE-**III **S/-** SBTT an effective means to introduce new clinical algorithms. Focus on teamwork and communication are effects on medical errors. 50 % of participants with no previous resuscitation experience with less than 2 years of experience. Good follow-up.

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
Origin: United States				Advanced airway management, cardioversion/ defibrillation		results are reported based on adjusted p values.		**W/-** Course instructors worked with participants. Actual patient outcomes were not measured after intervention. No control/crossover group. Intervention not isolated to simulation. Survey format limits data analysis. **Risk-** low risk due to simulation. **Feasibility**- Could be performed in units with simulation capabilities. **Conclusion**- Communication, confidence, and teamwork improved thru SBTT. Good tool for practice change implementation. **Recommendation**- Utilize IPAT to enhance team delivery of PAM.
Leeper, 2018, Multidisciplinary Difficult Airway Course: An Essential Educational Component of a Hospital-	Assess outcomes of educational pillar of the DART program, known as the MDAC	Quasi-Experimental Study	Multidisciplinary sample from a Tertiary care academic hospital center	IV- IV-Received training course DV-Evaluation form and MCQ test.	Pre/post MCQ and survey.	Likert scale was used to assess rating of components of the entire	Implementation of MDAC disseminated principles and protocols to all airway providers.	**LOE-**III **S/-** Qualitative and Quantitative data collected. Duration of study and sample size provide benefit. **W/-** Data collection missed evaluations and assessments of some participants. Actual

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
Wide Difficult Airway Response Program. Origin: United States			n-499			training course. Wilcoxon signed-rank test to compare the paired data from pre/post MCQ evaluation. A short survey with open ended questions was used to gather Qualitative data.	Data shows effectiveness of the MDAC include the overall positive results of the course evaluation survey and consistent improvement in post course MCQ scores.	patient outcomes were not measured after intervention. No control/crossover group. Intervention not isolated to simulation. **Risk-** low risk due to simulation. **Feasibility**- Limited resources might make this challenging for some hospitals to implement. **Conclusion**- Demonstrated the importance and success of incorporating MDAC to improve PAM. **Recommendation**- Evidence to support development of continued IPAT programs for improved as part of hospital wide training.

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
Liaw, 2014, Interprofessional simulation-based education program: A promising approach for changing stereotypes and improving attitudes toward nurse–physician collaboration.	examine the effects of an interprofessional simulation-based communication education program on medical and nursing students'	quasi-experimental	Simulation laboratory located in a large university. 3rd-year nursing students (N = 79), and 3rd and 4th year medical students (N = 23)	Student Stereotypes and Attitudes Toward Physician–Nurse Collaboration.	Pre-post questionnaires Student Stereotypes Rating Scale (SSRQ), and the Jefferson Scale of Attitudes Toward Physician–Nurse Collaboration (JSATPNC).	t-test for pre-post scores	Shows that the participants demonstrated a significant improvement in total post-test scores from baseline scores for perception of the other health profession	**LOE**-III **S/-**sample size. **W/-** subjective measures **Risk-** low **Feasibility**- feasible to recreate **Conclusion**- Targeted pediatric airway simulations can improve interprofessional teamwork skills and change healthcare students' perceptions of each other and attitudes concerning nurse-physician collaboration **Recommendation**-Appy these findings to IPE Sims
Luctkar-Flude, 2013, Evaluating an interprofessional pediatrics educational module using simulation.	evaluate an IP pediatric simulation module for undergraduate nursing and medical students	mixed methods, quasi-experimental study	Convenience sample of 96 students	Confidence, communication, critical actions, and IPE learning	Questionnaire/ 6-point Likert Scale/ performance checklist	SPSS to complete Standard univariate measures, such as means and standard	Team skills improved significantly for the IP groups between the two scenarios (p <	**LOE**-III **S/-** Pediatric simulation specific with medical and nursing students **W/-** No control group **Risk**- low

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
	in terms of learner confidence and ability to perform pediatric assessment and interventions, as well as communication and teamwork skills and comfort with IP learning.					deviations, were calculated to describe outcomes. Comparisons of groups were conducted using independent t tests for scale data and Manne Whitney U tests for ordinal data. Qualitative data analysis is in progress	.001), but not for the non-IP groups. Pediatric skills scores were lower than team scores in both sessions for all groups.	**Feasibility-** This project is feasible to reproduce with access to simulator and adequate sample **Conclusion-** High-fidelity simulations (HFS) are effective for practicing team management in complex healthcare settings **Recommendation-** Apply evidence from this study to help guide development of a pediatric airway IPE SIM

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
						and involves thematic analysis.		
Nishisaki, 2012, Development of an Instrument for a Primary Airway Provider's Performance with an ICU Multidisciplinary Team in Pediatric Respiratory Failure Using Simulation. Origin: United States	Develop scoring system for airway provider pediatric management of respiratory failure within multidisciplinary PICU team.	conducted as part of a quality improvement educational study	PICU at a single tertiary children's hospital. Multidisciplinary sample from PICU staff.	IV-JIT-PAPPS scores after training. DV-Comparison of JIT-PAPPS and Global (Holistic) Rating.	1 rater for performance on-site and 2 independent raters blinded to the participant training levels rated the performance, using the video file, in a randomized order to generate JIT-PAPPS and Global (Holistic)	Detailed psychometric analyses were performed. Mean score of teams from 3 raters was reported. Then evaluated the JIT-PAPPS scores against the global (holistic) rating by calculating correlation	Reliability and validity evaluation support the development of task-based scoring instrument for an airway provider's performance within a multidisciplinary PICU team on simulated pediatric respiratory failure. Mean total scores across the teams were positively associated with resident previous	**LOE-**III **S/-** JIT-PAPPS provides valuable assessment of pediatric airway training curricula and possibly in the clinical setting. **W/-** The specific weights assigned to each item came from HFMEA analysis with the focus group. several items for behavioral tasks had poor inter-rater correlation. Need for tool evaluation of expert airway management providers for further verification of tool. **Risk-** low risk due to simulation. **Feasibility**- This could be a viable tool to assess simulation, and possibly the clinical, PAM. **Conclusion**- The tool discussed in this study provides valuable tool to assess IPAT programs success. **Recommendation**- Use

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
					Rating for comparison.	between JIT-PAPPS scores and global rating for all, and for basic and advanced airway management separately. linear regression analysis applied to resident previous JIT-PAPPS training participation as an independent variable and	training participation suggesting good validity of the scale.	tool for additional evaluation of IPAT programs.

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
						the JIT-PAPPS scores as dependent variables.		
Weatherall, 2019, Learner and educator experiences and priorities in paediatric airway education: A qualitative study. Origin: Australia	Designed to address current gaps in the literature by reporting on the key questions of: (1) What areas of pediatric airway management do practitioners find most challenging to learn?; and (2) What techniques and approaches are perceived as most effective in	qualitative study	n-23. Nurses and physicians. At a medical center.	Guided interview questions	Themes identification	A process of decontextualization and recontextualization was undertaken to identify themes.	Five key themes emerged. Themes highlighting optimal learning and education practices included: The benefit of guided experiences with scope for learner problem- solving; and that Simulation is valuable for non-technical skills development. Themes highlighting challenges to	**LOE**-IV **S/-** Elucidated several key themes that can be applied to training **W/-** Subjective information **Risk-** low, interview **Feasibility**- Viable design to identify proceptions **Conclusion**- Several important learner desires were identified. **Recommendation**-Use the identified themes to guide future development of interprofessional training programs.

Citation: First Author, Date of Publication, & Title	Purpose/ Conceptual Framework	Design/ Method	Sample/Setting	Major Variables	Measurement of Variables	Data Analysis	Findings	Worth to Practice:
	help- ing learners develop their competency?						learning included: Variability for the learner in case exposure and teaching styles; Learning curves apply to basic and advanced technical skills; and that Current airway models are inauthentic.	

Evaluation Table Legend

CED = Community emergency departments

DART = Difficult Airway Response Team

DV = Dependent variable

IPAT = Interprofessional Pediatric Airway Training

IV = Independent variable

JIT-PAPPS = Just-in-Time Pediatric Airway Provider Performance Scale

LOE = level of evidence

MCQ = Multiple Choice Question

MDAC = Multidisciplinary Difficult Airway Course

MH = Malignant Hyperthermia

PAM = Pediatric airway management

PCICU = Pediatric Cardiac ICU

PERS = Pediatric emergency readiness score.

PICU = Pediatric Intensive Care Unit

PPCS-CA = Post-pediatric cardiac surgery cardiac arrest

SBTT = simulation-based team training

S/W = Strengths/Weaknesses

Team STEPPS = Team Strategies and Tools to Enhance Performance and Patient Safety

TTI = Time to Intubate

*Appendix B format used with permission, © 2007 Fineout-Overholt.

Appendix C

Synthesis Table

Studies	A	B	C	D	E	F	G	H	I	J
Interventions:										
Interprofessional Simulation	X	X	X	X	X		X	X		X
Simulation debriefing	X	X	X	X				X		X
Hands-On Skills Station	X			X	X					
Web-Based Core Curriculum		X								
On-Site Didactic Education			X	X				X		X
Guided Interview						X			X	
Outcomes:										
Critical Action Checklist or Evaluation Tool	X	X	X		X		X			
Evaluation Survey		X		X		X	X	X		
Open-Ended Survey				X						
Multiple Choice Questions Examinations				X						
Focused/Subjective Performance Evaluation						X			X	X

Legend: A = Abu-Sultaneh et al. (2019); B = Figueroa et al. (2013); C = Falcone et al. (2008); D = Leeper et al. (2018); E = Nishisaki et al. (2012), F= Weatherall et al. (2019), G= Luctkar-Flude et al. (2013), H= Liaw et al. (2014), I= Armour et al. (2019), J= Cain et al. (2014).

Appendix D

Pediatric Airway Management Confidence Survey

Pediatric Airway Management Confidence Survey	
(1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree.	
1. I am confident in my ability to identify the impending respiratory failure of a pediatric patient.	
2. I am confident in my ability to identify a potentially difficult airway of a pediatric patient.	
3. I am confident in my ability to provide emergency airway management for a pediatric patient.	
4. I am confident in my ability to select the age-appropriate equipment for a pediatric intubation (ETT - size, cuffed or not; blade – type and size).	
5. I am confident in my ability to successfully intubate a child (1-month to 8-years old).	
6. I am confident in my ability to successfully intubate a neonate (less than 4-weeks old).	
7. I am confident in my ability to select age-appropriate ventilator settings.	
8. I am confident in my ability to identify the role and capability of various interprofessional team members.	
9. I am confident in my ability to collaborate in an interprofessional team to provide pediatric airway management.	
10. I am confident in my ability to lead an interprofessional team to provide pediatric airway management.	

Appendix E

Proposed Course Schedule

Interprofessional Pediatric Airway Management

8:00 am - 8:45 am	Introductions and Pre-Course Confidence Survey
8:45 am - 9:15 am	Simulation Encounter
9:15 am - 10:00 am	Simulation Debriefing
10:00 am - 12:00 pm	Focused Teaching Stations
12:00 pm - 1:00 pm	Lunch
1:00 pm - 2:00 pm	Focused Teaching Stations
2:00 pm - 3:30 pm	Simulation Encounters
3:30 pm - 4:00 pm	Post-Course Survey
4:00 pm - 4:30 pm	Debriefing and Wrap-Up

Appendix F

SMART Workplan

Proposal Development	1st SMART Objective: Finalize and submit proposal to the Nursing Research Council and Institutional Review Board before December 2020.
Simulation Development	2nd SMART Objective: Initiate specific simulations development and skill/concept stations by December 2020.
Project Implementation	3rd SMART Objective: Implement project with two separate course offerings by end of Summer 2021 term.
Project Evaluation	4th SMART Objective: Evaluate course offering data by end of Summer 2021 term.

Appendix G

Project Budget

Budget Categories	Personal Funds	Organizational Contributions
ADMINISTRATIVE COSTS	$	$
Administrative Justification:		
MARKETING	$0	$0
Marketing Justification: Organizational emails and posting on NetLearning will serve as marketing.		
EDUCATIONAL MATERIALS/ INCENTIVES	$0	$ 3,400
Educational Materials/Incentives Justification: The STEPS Center will be an all-inclusive service including equipment and software for simulation development and delivery. Project team will be seeking to secure grant funding for the project. See attached Budget Proposal from STEPS Center.		
HOSPITALITY (food, room rentals, etc.)	$0	$0
Hospitality Justification:		
PROJECT SUPPLIES (office supplies, postage, printing, etc.)	$	$
Project Supplies Justification:		
TRAVEL EXPENSES	$0	$0
Travel Expenses Justification:		
OTHER	$	$
Other Justification:		
TOTALS	$	$3,400

Project Budget

WV STEPS Fees

Room Fees: (covers use of room, manikin or task trainers, gases, equipment, recording, staff to setup and operate room)

Classroom/Debriefing Room	$100/hr.
Patient Exam Rooms	$100/hr.
Clinical Skills Rooms (Basic manikin or Task trainers)	$150/hr.
High Fidelity Manikin Rooms	$200/hr.
ICU/Critical care Setup	$250/hr.
STEPS Staff (if used for teaching)	$ 75/hr.
Standardized Patients	$60/patient/hr.
	$55/patient/hr. (ultrasound model)
	$100/patient/hr. (GTA Ultrasound model)
Gynecological & Male Urological Teaching Assoc.	$225/session (total of 4 learners)
Replacement supplies	Depends on cost of supplies

High Fidelity Rm. (4 scenarios + debriefing)	$200/hr. for 4 hrs.	$800
Task Training (6 stations)	$150/hr. for 3 hrs.	$450
STEPS staff (set up/teach?/assist.)	$75/hr. for 6 hrs.	$450
	Total:	$1,700

Appendix H

Key Site Support Letter

Kenton Schrock <schrockk@mix.wvu.edu>

Schrock_DNP Project Plan

Lindstrom, Eric J. <lindstrome@wvumedicine.org> Tue, Jun 23, 2020 at 10:08 AM
To: "Kenton Schrock [*]" <schrockk@mix.wvu.edu>

Hey Kenton

Good ideas. Peds is always an area where most could use reinforcement. You have my support

Regarding insight on the project?

I would consider developing a 1 day course that could be used as AANA approved CME. That would draw a number of people for sure. It would be difficult to get something measureable out of this, as much of it will be based on subjective "what is your comfort level" data points. However, I think that it is an area of need.

Let me know how I can help

jake

Eric "Jake" Lindstrom CRNA

Chief and Manager: Certified Registered Nurse Anesthetists

Department of Anesthesiology

West Virginia University: Ruby Memorial Hospital

1 Medical Ctr Drive

Morgantown, WV 26506

lindstrome@wvumedicine.org

Office: 304-598-4000x 7-1126

Cell: 412-427-7331

From: Kenton Schrock [*] <schrockk@mix.wvu.edu>
Sent: Monday, June 22, 2020 7:39 PM

Appendix I

JIT-PAPPS Tool and Permission Letter

Just-in-Time Pediatric Airway Provider Performance Scale, Version 3
Checkpoint Points (done-2, partially done-1, not done-0)

1.	Identify oneself	x
2.	Call for help	x
3.	Put gloves on hands	x
4.	Open airway with head-tilt chin-lift or jaw thrust within *first* 15 s	
5.	Choose right size mask	
6.	Check O_2 source is turned on: if not, turn it on	
7.	Apply mask correctly	
8.	Provide bag and mask ventilation to see chest rise	
9.	Ask for blood pressure measurement during bag and mask ventilation	
10.	Decide to intubate within 60 s after bag and mask ventilation is started	
11.	Notify the team for intubation	x
12.	Call for suction system	
13.	Call for oral airway	
14.	Call for endotracheal tube	
15.	*Correct size* of endotracheal tube is called	
16.	Call for laryngoscope	
17.	Call for colorimetric end-tidal CO_2 detector	
18.	Wear mask with eye protection	x
19.	Call for sedative and/or narcotic medication	
20.	Call for paralytic medication	
21.	Confirm intravenous access is functional	
22.	Confirm team crew at specific task (intubation assistant, person to give medication, person who watches the monitor)	
23.	Ask for blood pressure cycle measurement before induction	
24.	Ask for cricoid pressure when sedative/narcotics are given (before paralytics)	
25.	Stop bag and mask ventilation at *correct timing* (after paralyzed) for intubation	
26.	Hold laryngoscope with left hand	
27.	Be able to visualize a vocal cord	
28.	Intubate in trachea	
29.	Primary confirmation of endotracheal intubation	
30.	Secondary confirmation of endotracheal intubation	
31.	Holding endotracheal tube until it is secured	
32.	Call for chest x-ray	
33.	Confirm endotracheal tube placement by chest x-ray	
34.	React to hypotension after intubation	x

Kenton Schrock <schrockk@mix.wvu.edu>

JIT-PAPPS Version 3. Request for use.

3 messages

Kenton Schrock <schrockk@mix.wvu.edu> Mon, Aug 3, 2020 at 4:37 PM
To: Nishisaki@email.chop.edu

Greetings, Dr. Nishisaki.
My name is Kenton Schrock, current student registered nurse anesthetists at the West Virginia University, School of Nursing DNP-Nurse Anesthetists program. I am working on a project to create an interprofessional pediatric airway management course. I wanted to request formal permission to use the Just-in-Time Pediatric Airway Provider Performance Scale Version 3 as a means to evaluate participants' performance. I would be happy to send any additional information at your request.

Thank you for your consideration.
Kenton Schrock

Nishisaki, Akira <NISHISAKI@chop.edu> Tue, Aug 4, 2020 at 8:36 PM
To: Kenton Schrock <schrockk@mix.wvu.edu>

Yes, you definitely have a permission.

Kindly send me more detaild description—I am happy to support in any way

Akira

Akira Nishisaki, MD, MSCE

Attending Physician, Critical Care Medicine

CHOP Wood 6 floor #6116

3401 Civic Center Blvd

Philadelphia, PA 19104

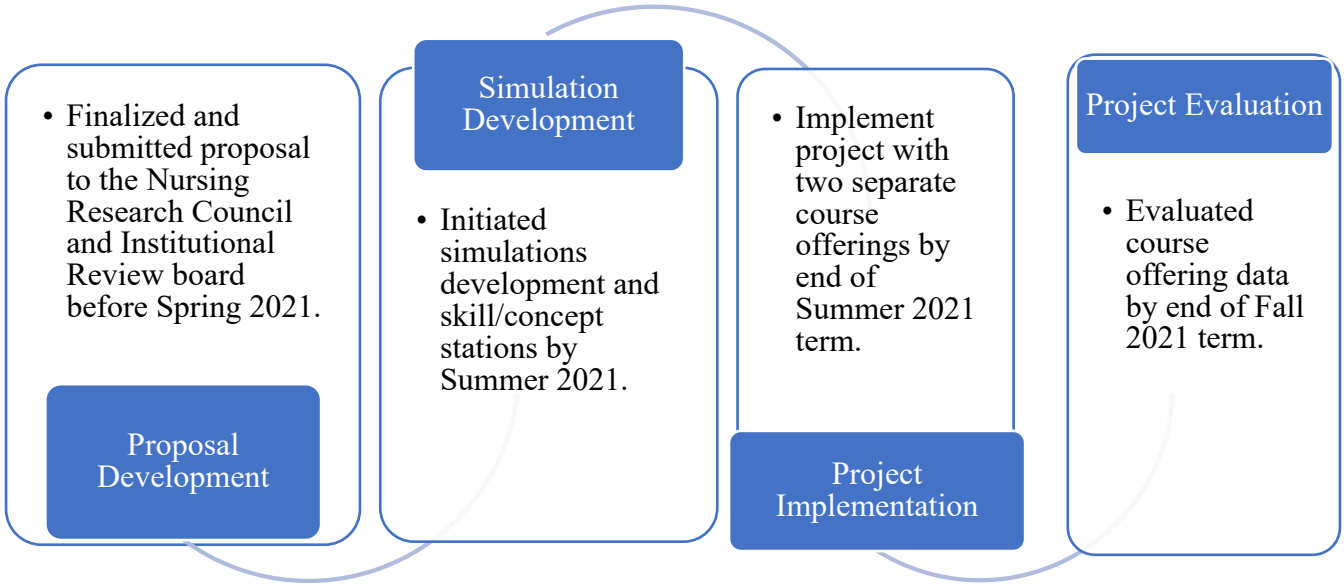
USA

215-590-5505

[Quoted text hidden]

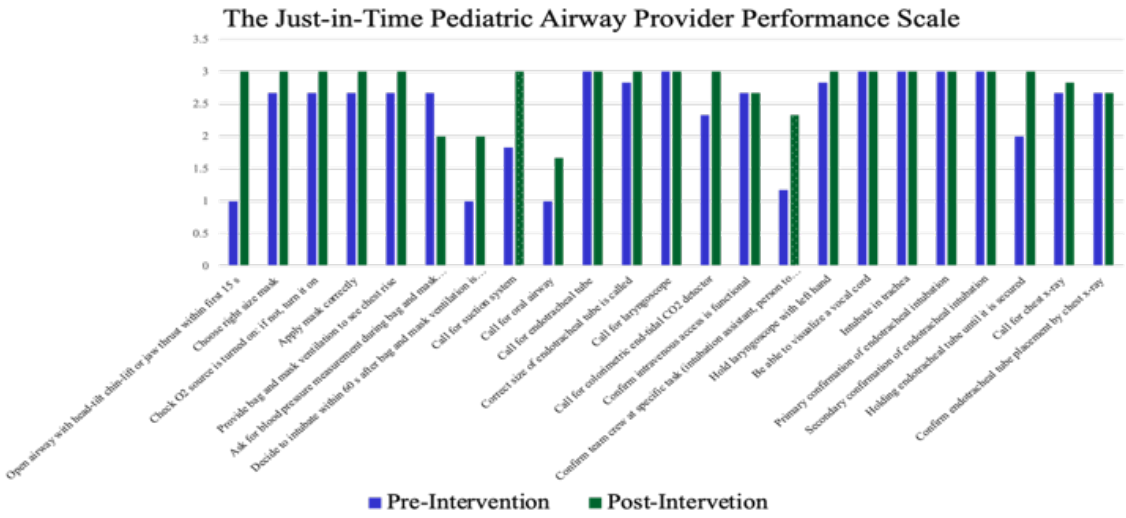
Appendix J

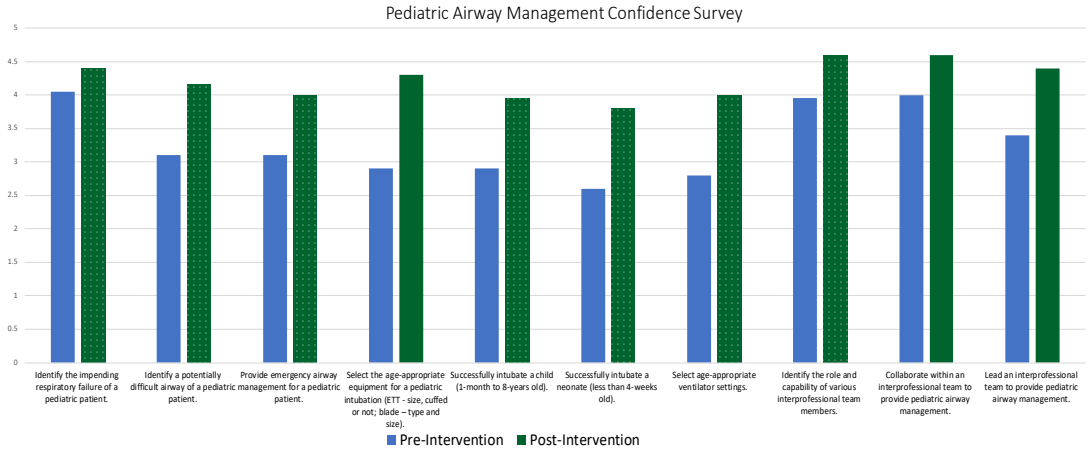
Updated Timeline



Appendix K

SPSS Data Summary Charts




Pediatric Airway Management Confidence Survey
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Identify the impending respiratory failure of a pediatric patient.
Identify a potentially difficult airway of a pediatric patient.
Provide emergency airway management for a pediatric patient.
Select the age-appropriate equipment for a pediatric intubation (ETT - size, cuffed or not; blade – type and size).
Successfully intubate a child (1-month to 8-years old).
Successfully intubate a neonate (less than 4-weeks old).
Select age-appropriate ventilator settings.
Identify the role and capability of various interprofessional team members.
Collaborate within an interprofessional team to provide pediatric airway management.
Lead an interprofessional team to provide pediatric airway management.
Pre-Intervention
Post-Intervention

SPSS Data Readouts

```
FREQUENCIES VARIABLES=DiffCSS1 DiffCSS2 DiffCSS3 DiffCSS4 DiffCSS5 DiffCSS6 D
iffCSS7 DiffCSS8
    DiffCSS9 DiffCSS10
  /HISTOGRAM NORMAL
  /ORDER=ANALYSIS.
```

Frequencies

Notes

Output Created		22-OCT-2021 12:02:...
Comments		
Input	Data	/Users/kenton/Working With IPE Pediatric Airway Management Confidence Survey.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	20
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=DiffCSS1 DiffCSS2 DiffCSS3 DiffCSS4 DiffCSS5 DiffCSS6 DiffCSS7 DiffCSS8 DiffCSS9 DiffCSS10 /HISTOGRAM NORMAL /ORDER=ANALYSIS.
Resources	Processor Time	00:00:01.78
	Elapsed Time	00:00:02.00

Statistics

		DiffCSS1	DiffCSS2	DiffCSS3	DiffCSS4	DiffCSS5	DiffCSS6	DiffCSS7
N	Valid	20	20	20	20	20	20	20
	Missing	0	0	0	0	0	0	0

Statistics

		DiffCSS8	DiffCSS9	DiffCSS10
N	Valid	20	20	20
	Missing	0	0	0

Frequency Table

DiffCSS1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.00	1	5.0	5.0	5.0
	.00	14	70.0	70.0	75.0
	1.00	3	15.0	15.0	90.0
	2.00	1	5.0	5.0	95.0
	3.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

DiffCSS2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	30.0	30.0	30.0
	1.00	8	40.0	40.0	70.0
	2.00	5	25.0	25.0	95.0
	3.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

DiffCSS3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.00	2	10.0	10.0	10.0
	.00	3	15.0	15.0	25.0
	1.00	10	50.0	50.0	75.0
	2.00	5	25.0	25.0	100.0
	Total	20	100.0	100.0	

DiffCSS4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	30.0	30.0	30.0
	1.00	5	25.0	25.0	55.0
	2.00	6	30.0	30.0	85.0
	3.00	1	5.0	5.0	90.0
	4.00	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

DiffCSS5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.00	1	5.0	5.0	5.0
	.00	5	25.0	25.0	30.0
	1.00	6	30.0	30.0	60.0
	2.00	8	40.0	40.0	100.0
	Total	20	100.0	100.0	

DiffCSS6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.00	1	5.0	5.0	5.0
	.00	5	25.0	25.0	30.0
	1.00	5	25.0	25.0	55.0
	2.00	7	35.0	35.0	90.0
	3.00	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

DiffCSS7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.00	1	5.0	5.0	5.0
	.00	5	25.0	25.0	30.0
	1.00	5	25.0	25.0	55.0
	2.00	7	35.0	35.0	90.0
	3.00	2	10.0	10.0	100.0
	Total	20	100.0	100.0	

DiffCSS8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	10	50.0	50.0	50.0
	1.00	8	40.0	40.0	90.0
	2.00	1	5.0	5.0	95.0
	3.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

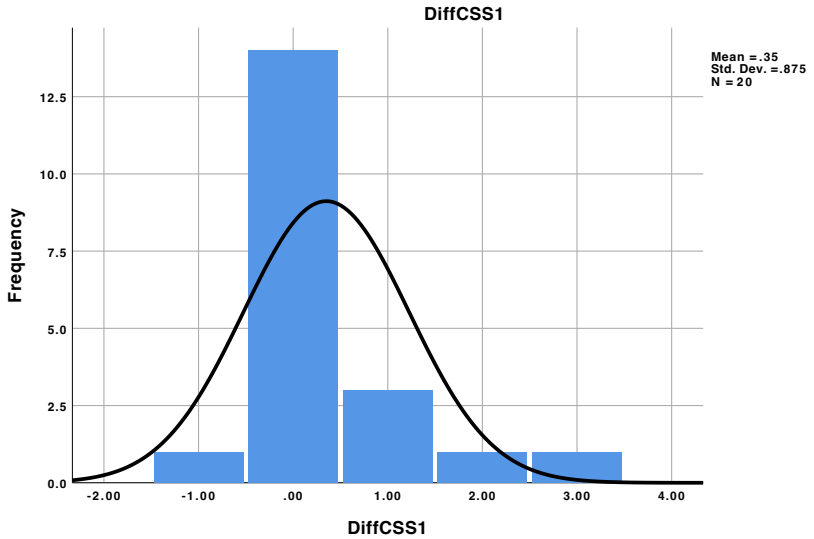
DiffCSS9

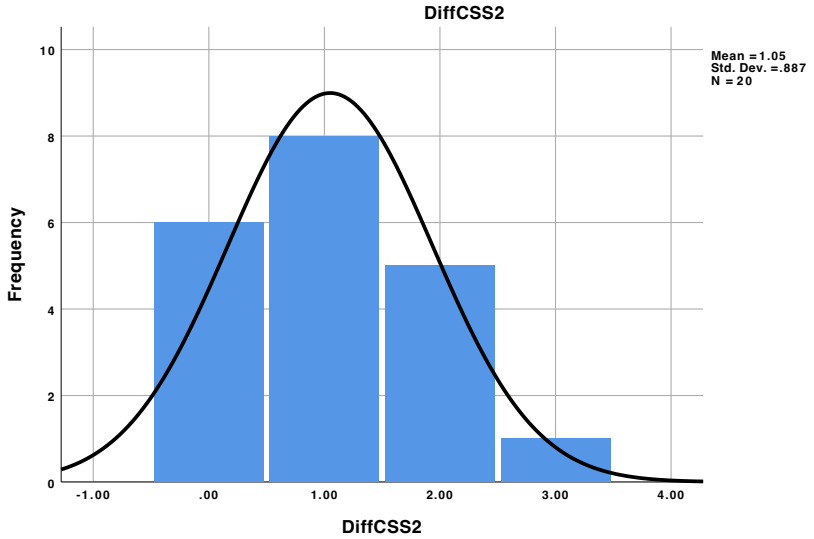
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	12	60.0	60.0	60.0
	1.00	6	30.0	30.0	90.0
	2.00	1	5.0	5.0	95.0
	4.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

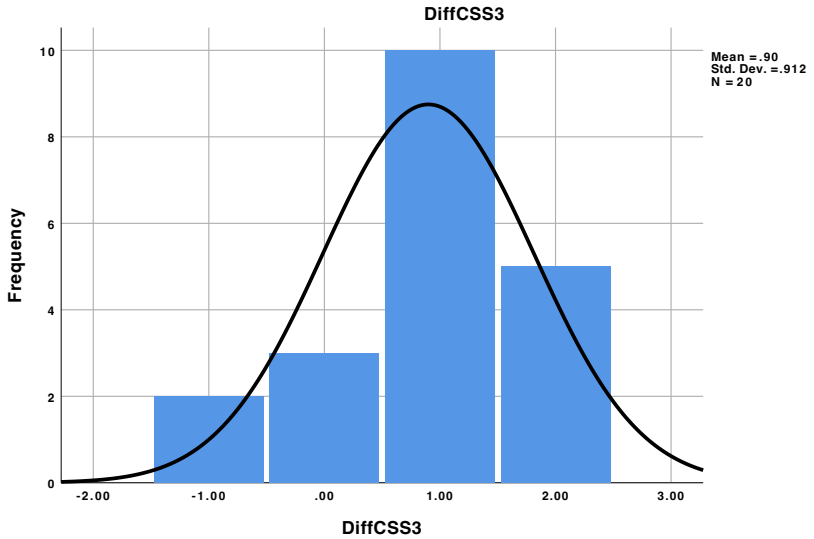
DiffCSS10

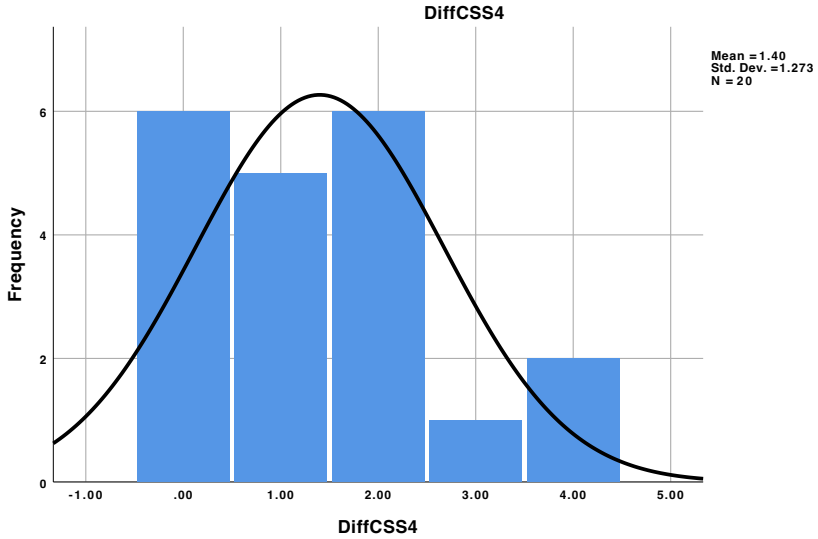
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	8	40.0	40.0	40.0
	1.00	7	35.0	35.0	75.0
	2.00	3	15.0	15.0	90.0
	3.00	1	5.0	5.0	95.0
	4.00	1	5.0	5.0	100.0
	Total	20	100.0	100.0	

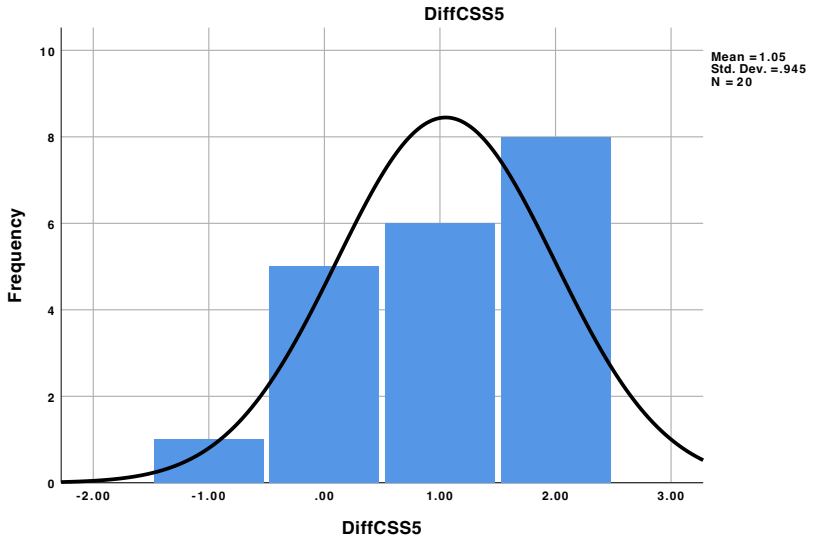
Histogram

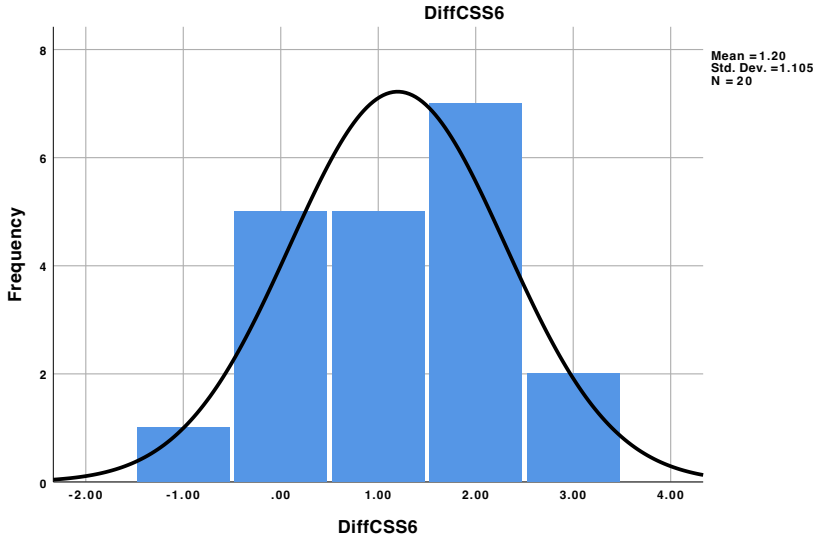

DiffCSS1
Mean =.35
Std. Dev. =.875
N = 20
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
-2.00
-1.00
.00
1.00
2.00
3.00
4.00
DiffCSS1

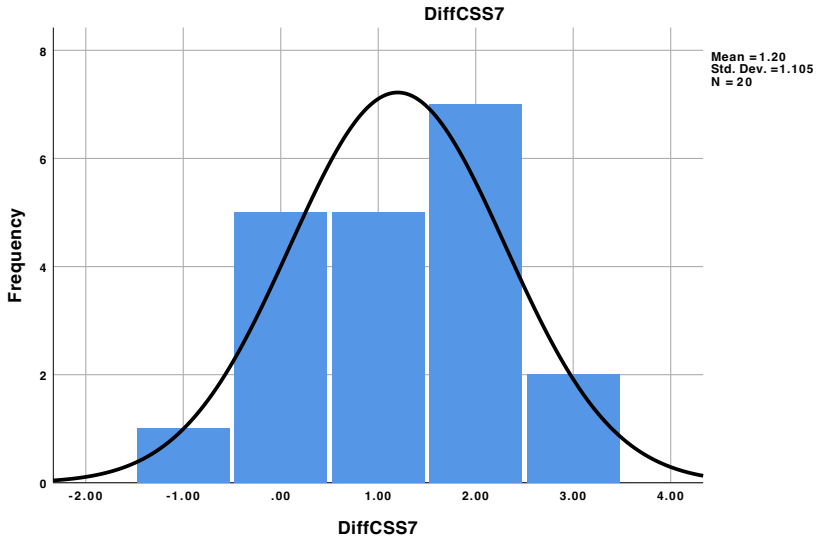

DiffCSS2
Mean =1.05
Std. Dev. =.887
N = 20
Frequency
10
8
6
4
2
0
-1.00
.00
1.00
2.00
3.00
4.00
DiffCSS2

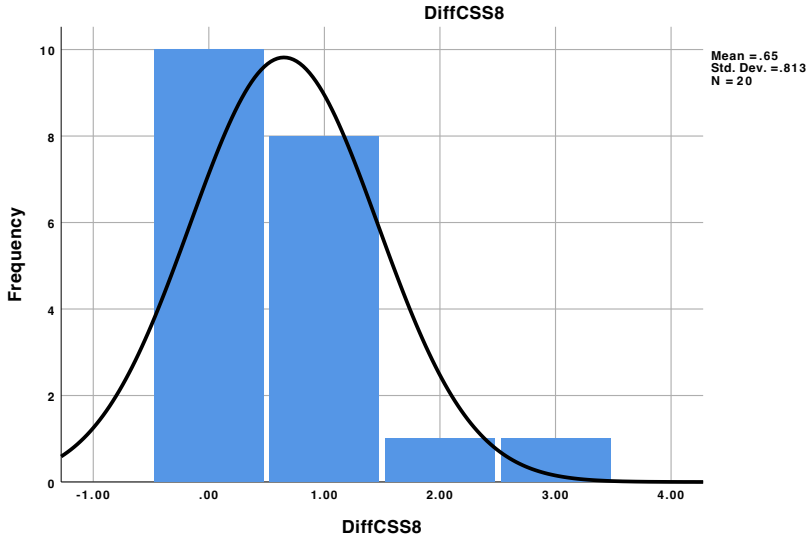

DiffCSS3
Mean =.90
Std. Dev. =.912
N = 20
Frequency
10
8
6
4
2
0
-2.00
-1.00
.00
1.00
2.00
3.00
DiffCSS3

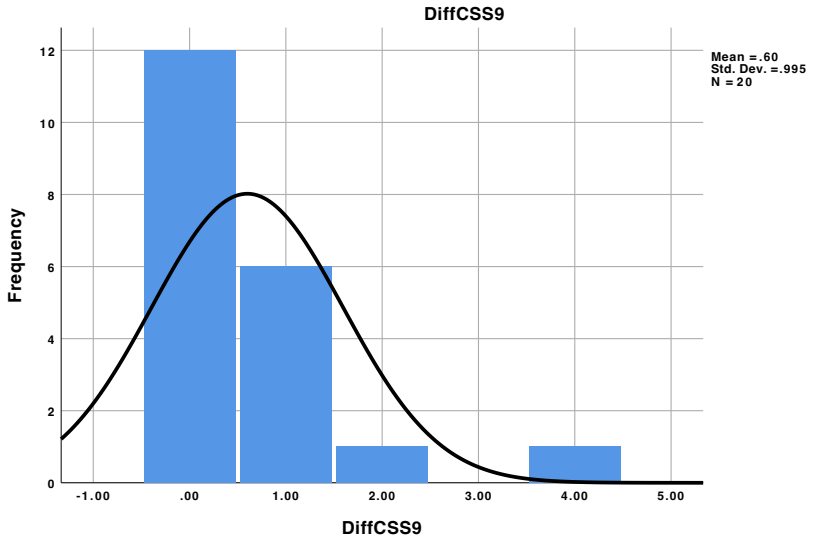

DiffCSS4
Mean =1.40
Std. Dev. =1.273
N = 20
Frequency
6
4
2
0
-1.00
.00
1.00
2.00
3.00
4.00
5.00
DiffCSS4

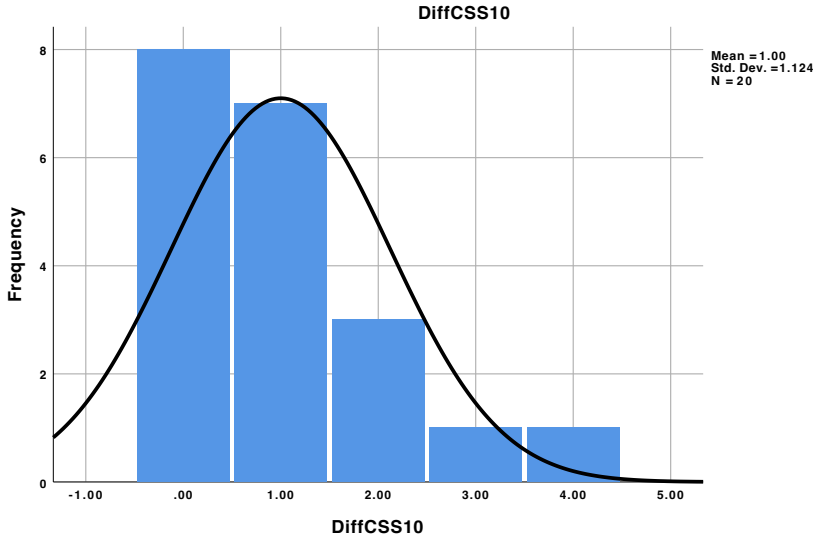

DiffCSS5
Mean =1.05
Std. Dev. =.945
N = 20
Frequency
10
8
6
4
2
0
-2.00
-1.00
.00
1.00
2.00
3.00
DiffCSS5


DiffCSS6
Mean =1.20
Std. Dev. =1.105
N = 20
Frequency
8
6
4
2
0
-2.00
-1.00
.00
1.00
2.00
3.00
4.00
DiffCSS6


DiffCSS7
Mean =1.20
Std. Dev. =1.105
N = 20
Frequency
8
6
4
2
0
-2.00
-1.00
.00
1.00
2.00
3.00
4.00
DiffCSS7


DiffCSS8
Mean =.65
Std. Dev. =.813
N = 20
Frequency
10
8
6
4
2
0
-1.00
.00
1.00
2.00
3.00
4.00
DiffCSS8


DiffCSS9
Mean =.60
Std. Dev. =.995
N = 20
Frequency
12
10
8
6
4
2
0
-1.00
.00
1.00
2.00
3.00
4.00
5.00
DiffCSS9


DiffCSS10
Mean =1.00
Std. Dev. =1.124
N = 20
Frequency
8
6
4
2
0
-1.00
.00
1.00
2.00
3.00
4.00
5.00
DiffCSS10

```
T-TEST PAIRS=PreCSS1 PreCSS2 PreCSS3 PreCSS4 PreCSS5 PreCSS6 PreCSS7 PreCSS8
PreCSS9 PreCSS10 WITH
    PostCSS1 PostCSS2 PostCSS3 PostCSS4 PostCSS5 PostCSS6 PostCSS7 PostCSS8 P
ostCCS9 PostCSS10 (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

T-Test

Notes

Output Created		22-OCT-2021 12:07:...
Comments		
Input	Data	/Users/kenton/Working With IPE Pediatric Airway Management Confidence Survey.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	20
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST PAIRS=PreCSS1 PreCSS2 PreCSS3 PreCSS4 PreCSS5 PreCSS6 PreCSS7 PreCSS8 PreCSS9 PreCSS10 WITH PostCSS1 PostCSS2 PostCSS3 PostCSS4 PostCSS5 PostCSS6 PostCSS7 PostCSS8 PostCCS9 PostCSS10 (PAIRED) /CRITERIA=CI(.9500) /MISSING=ANALYSIS.
Resources	Processor Time	00:00:00.01
	Elapsed Time	00:00:00.00

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreCSS1	4.0500	20	1.09904	.24575
	PostCSS1	4.4000	20	.59824	.13377
Pair 2	PreCSS2	3.1000	20	1.20961	.27048
	PostCSS2	4.1500	20	.87509	.19568
Pair 3	PreCSS3	3.1000	20	1.16529	.26057
	PostCSS3	4.0000	20	.72548	.16222
Pair 4	PreCSS4	2.9000	20	1.41049	.31539
	PostCSS4	4.3000	20	.73270	.16384
Pair 5	PreCSS5	2.9000	20	1.16529	.26057
	PostCSS5	3.9500	20	.75915	.16975
Pair 6	PreCSS6	2.6000	20	1.27321	.28470
	PostCSS6	3.8000	20	.76777	.17168
Pair 7	PreCSS7	2.8000	20	1.28145	.28654
	PostCSS7	4.0000	20	.79472	.17770
Pair 8	PreCSS8	3.9500	20	.94451	.21120
	PostCSS8	4.6000	20	.50262	.11239
Pair 9	PreCSS9	4.0000	20	1.02598	.22942
	PostCCS9	4.6000	20	.50262	.11239
Pair 10	PreCSS10	3.4000	20	1.18766	.26557
	PostCSS10	4.4000	20	.68056	.15218

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PreCSS1 & PostCSS1	20	.608	.004
Pair 2	PreCSS2 & PostCSS2	20	.681	.001
Pair 3	PreCSS3 & PostCSS3	20	.623	.003
Pair 4	PreCSS4 & PostCSS4	20	.438	.053
Pair 5	PreCSS5 & PostCSS5	20	.589	.006
Pair 6	PreCSS6 & PostCSS6	20	.506	.023
Pair 7	PreCSS7 & PostCSS7	20	.517	.020
Pair 8	PreCSS8 & PostCSS8	20	.510	.022
Pair 9	PreCSS9 & PostCCS9	20	.306	.189
Pair 10	PreCSS10 & PostCSS10	20	.378	.101

Paired Samples Test

		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence … Lower
Pair 1	PreCSS1 - PostCSS1	-.35000	.87509	.19568	-.75956
Pair 2	PreCSS2 - PostCSS2	-1.05000	.88704	.19835	-1.46515
Pair 3	PreCSS3 - PostCSS3	-.90000	.91191	.20391	-1.32679
Pair 4	PreCSS4 - PostCSS4	-1.40000	1.27321	.28470	-1.99588
Pair 5	PreCSS5 - PostCSS5	-1.05000	.94451	.21120	-1.49205
Pair 6	PreCSS6 - PostCSS6	-1.20000	1.10501	.24709	-1.71716
Pair 7	PreCSS7 - PostCSS7	-1.20000	1.10501	.24709	-1.71716
Pair 8	PreCSS8 - PostCSS8	-.65000	.81273	.18173	-1.03037
Pair 9	PreCSS9 - PostCCS9	-.60000	.99472	.22243	-1.06554
Pair 10	PreCSS10 - PostCSS10	-1.00000	1.12390	.25131	-1.52600

Paired Samples Test

		Paired … 95% Confidence Interval of the… Upper	t	df	Sig. (2-tailed)
Pair 1	PreCSS1 - PostCSS1	.05956	-1.789	19	.090
Pair 2	PreCSS2 - PostCSS2	-.63485	-5.294	19	.000
Pair 3	PreCSS3 - PostCSS3	-.47321	-4.414	19	.000
Pair 4	PreCSS4 - PostCSS4	-.80412	-4.918	19	.000
Pair 5	PreCSS5 - PostCSS5	-.60795	-4.972	19	.000
Pair 6	PreCSS6 - PostCSS6	-.68284	-4.857	19	.000
Pair 7	PreCSS7 - PostCSS7	-.68284	-4.857	19	.000
Pair 8	PreCSS8 - PostCSS8	-.26963	-3.577	19	.002
Pair 9	PreCSS9 - PostCCS9	-.13446	-2.698	19	.014
Pair 10	PreCSS10 - PostCSS10	-.47400	-3.979	19	.001

```
FREQUENCIES VARIABLES=Diff_Open_Airway Diff_Mask_Size Diff_Check_O2 Diff_Appl
y_Mask Diff_Bag_Mask
    Diff_Ask_for_BP Diff_Decide_to_Intubate Diff_Suction Diff_Oral_airway Dif
f_ETT Diff_ETT_Size
    Diff_Laryngoscope Diff_CO2 Diff_IV Diff_Team_Tasks Diff_Scope_Left_HandD
iff_Visualize_Cords
    Diff_Intubate Diff_Prime_Confirm Diff_Secondary_Confirm Diff_Hold_ETT Dif
f_Call_CXR
    Diff_Confirm_ETT_with_CXR
  /HISTOGRAM NORMAL
  /ORDER=ANALYSIS.
```

Frequencies

Notes

Output Created		23-OCT-2021 09:27:...
Comments		
Input	Data	/Users/kenton/Just-in-Time Pediatric Airway Provider Performance Scale, Version 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	6
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.

Notes

Syntax		FREQUENCIES VARIABLES=Diff_Open_Airway Diff_Mask_Size Diff_Check_O2 Diff_Apply_Mask Diff_Bag_Mask Diff_Ask_for_BP Diff_Decide_to_Intubate Diff_Suction Diff_Oral_airway Diff_ETT Diff_ETT_Size Diff_Laryngoscope Diff_CO2 Diff_IV Diff_Team_Tasks Diff_Scope_Left_Hand Diff_Visualize_Cords Diff_Intubate Diff_Prime_Confirm Diff_Secondary_Confirm Diff_Hold_ETT Diff_Call_CXR Diff_Confirm_ETT_with_CXR /HISTOGRAM NORMAL /ORDER=ANALYSIS.
Resources	Processor Time	00:00:05.84
	Elapsed Time	00:00:05.00

[DataSet1] /Users/kenton/Just-in-Time Pediatric Airway Provider Performance Scale, Version 3.sav

Statistics

		Diff_Open_Airway	Diff_Mask_Size	Diff_Check_O2	Diff_Apply_Mask	Diff_Bag_Mask
N	Valid	6	6	6	6	6
	Missing	0	0	0	0	0

Statistics

		Diff_Ask_for_BP	Diff_Decide_to_Intubate	Diff_Suction	Diff_Oral_airway	Diff_ETT
N	Valid	6	6	6	6	6
	Missing	0	0	0	0	0

Statistics

		Diff_ETT_Size	Diff_Laryngoscope	Diff_CO2	Diff_IV	Diff_Team_Tasks
N	Valid	6	6	6	6	6
	Missing	0	0	0	0	0

Statistics

		Diff_Scope_Left_Hand	Diff_Visualize_Cords	Diff_Intubate	Diff_Prime_Confirm	Diff_Secondary_Confirm
N	Valid	6	6	6	6	6
	Missing	0	0	0	0	0

Statistics

		Diff_Hold_ETT	Diff_Call_CXR	Diff_Confirm_ETT_with_CXR
N	Valid	6	6	6
	Missing	0	0	0

Frequency Table

Diff_Open_Airway

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	6	100.0	100.0	100.0

Diff_Mask_Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Check_O2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Apply_Mask

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Bag_Mask

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Ask_for_BP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2.00	3	50.0	50.0	50.0
	.00	2	33.3	33.3	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Decide_to_Intubate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	50.0	50.0	50.0
	2.00	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

Diff_Suction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	33.3	33.3	33.3
	1.00	1	16.7	16.7	50.0
	2.00	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

Diff_Oral_airway

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	50.0	50.0	50.0
	1.00	2	33.3	33.3	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_ETT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

Diff_ETT_Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	1.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Laryngoscope

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

Diff_CO2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4	66.7	66.7	66.7
	2.00	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

Diff_IV

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-2.00	1	16.7	16.7	16.7
	.00	4	66.7	66.7	83.3
	2.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Team_Tasks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	33.3	33.3	33.3
	1.00	1	16.7	16.7	50.0
	2.00	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

Diff_Scope_Left_Hand

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	1.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Diff_Visualize_Cords

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

Diff_Intubate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

Diff_Prime_Confirm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

Diff_Secondary_Confirm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

Diff_Hold_ETT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	50.0	50.0	50.0
	2.00	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

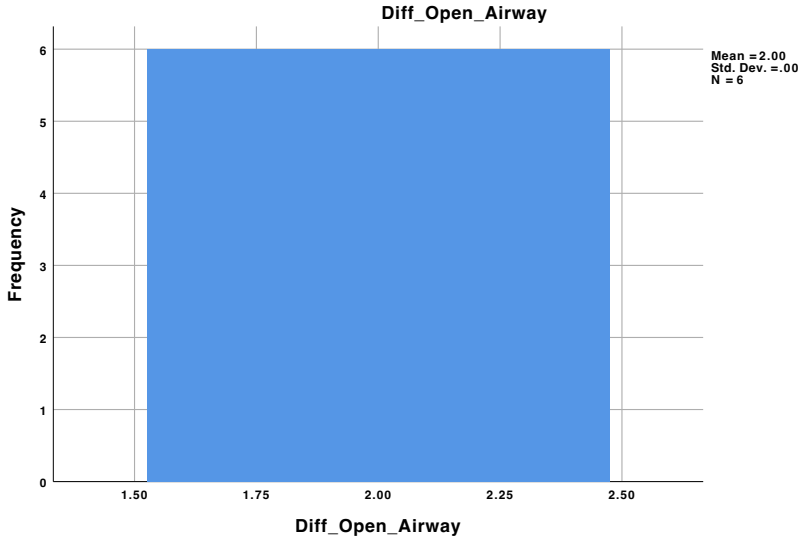
Diff_Call_CXR

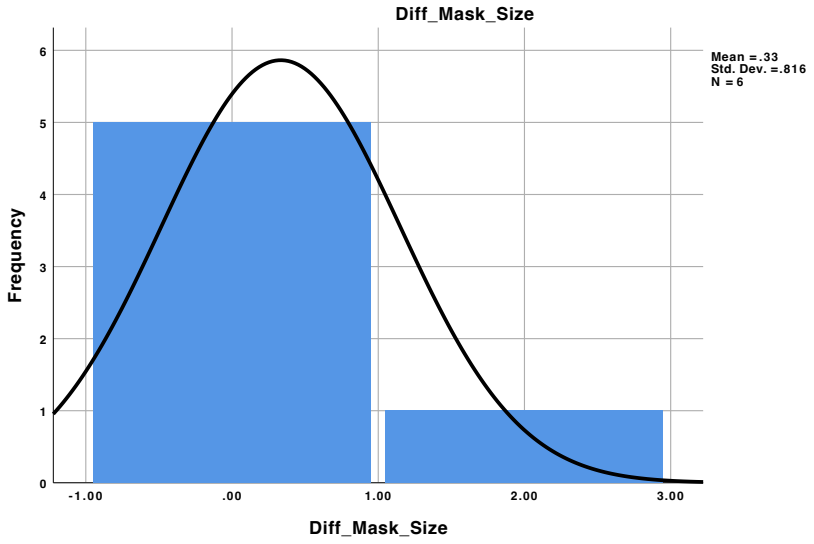
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	5	83.3	83.3	83.3
	1.00	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

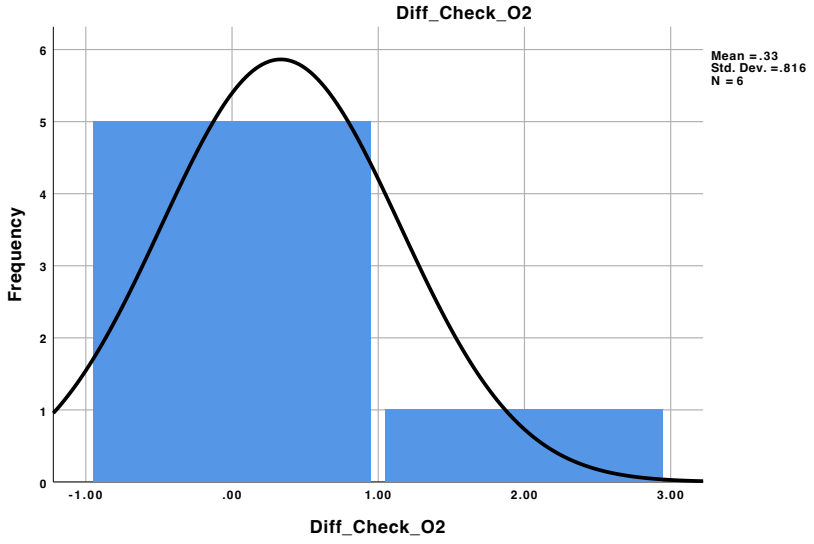
Diff_Confirm_ETT_with_CXR

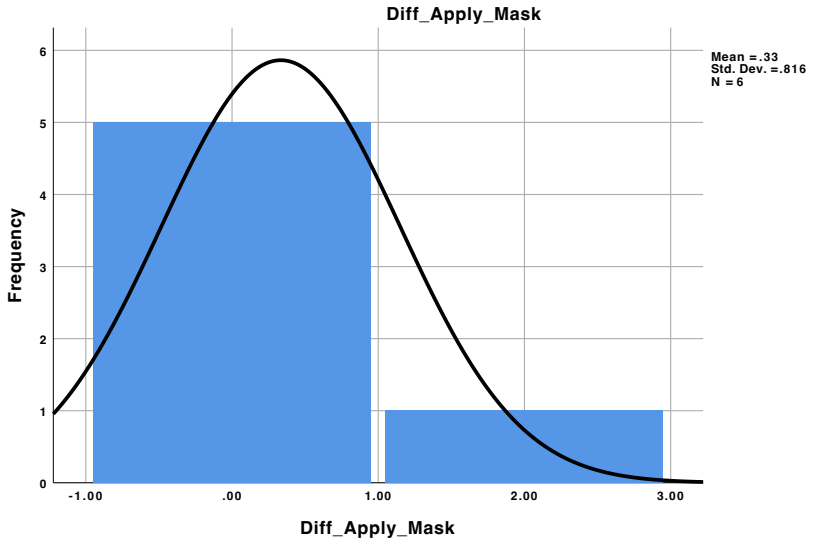
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	100.0	100.0	100.0

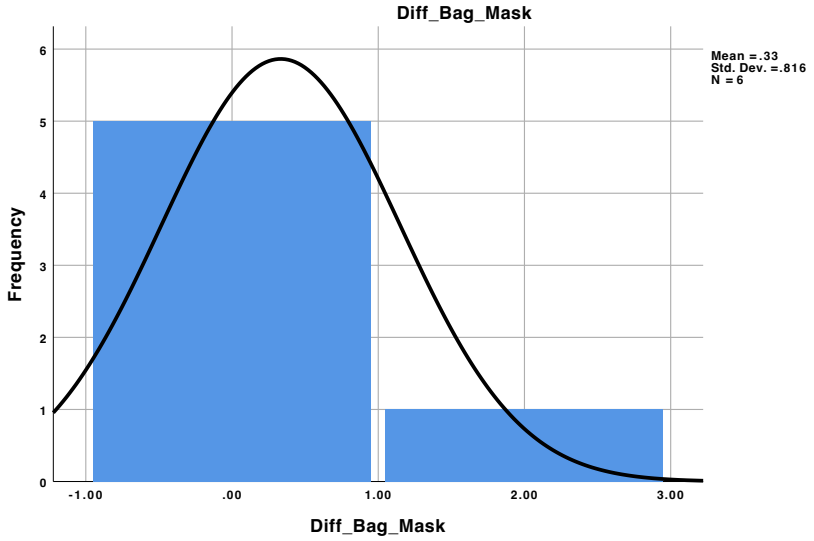
Histogram

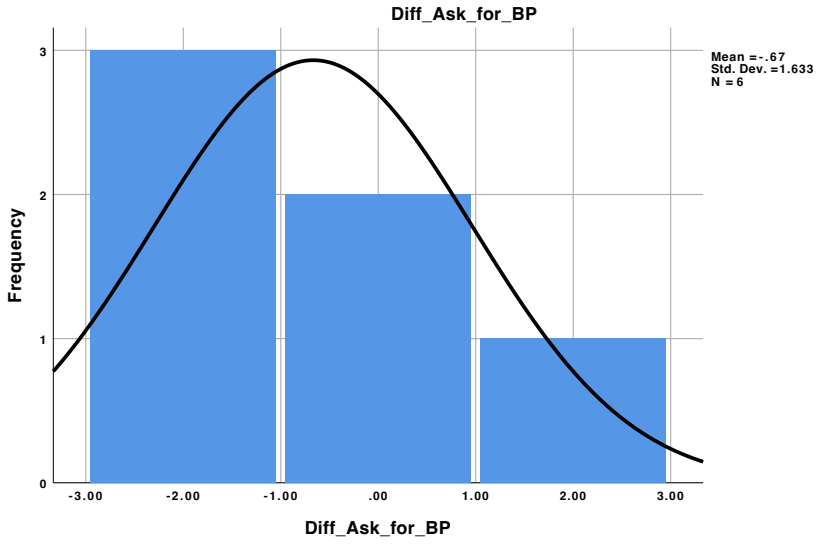


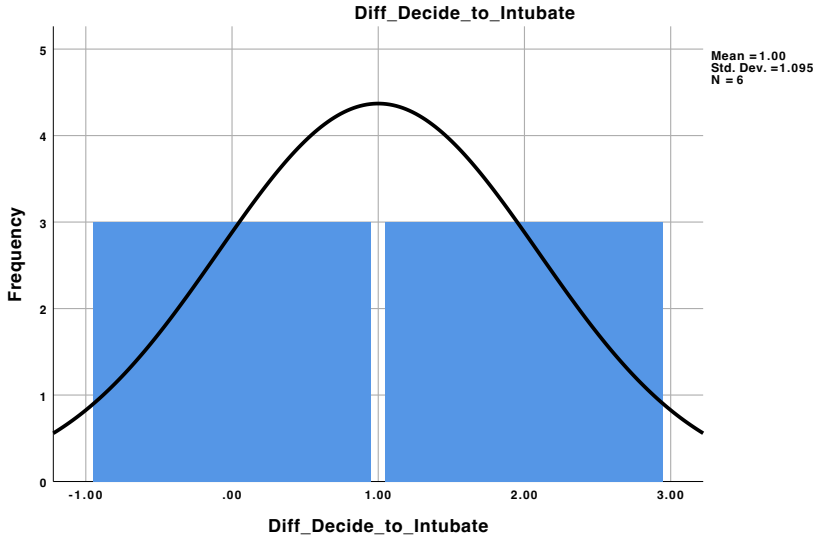

Diff_Mask_Size
Mean =.33
Std. Dev. =.816
N = 6
Frequency
0
1
2
3
4
5
6
-1.00
.00
1.00
2.00
3.00
Diff_Mask_Size

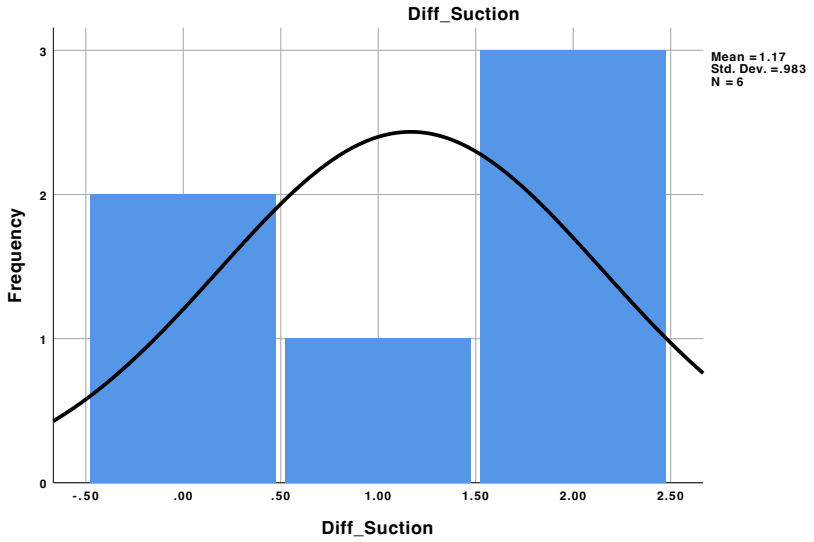

Diff_Check_O2
Mean =.33
Std. Dev. =.816
N = 6
Frequency
0
1
2
3
4
5
6
-1.00
.00
1.00
2.00
3.00
Diff_Check_O2

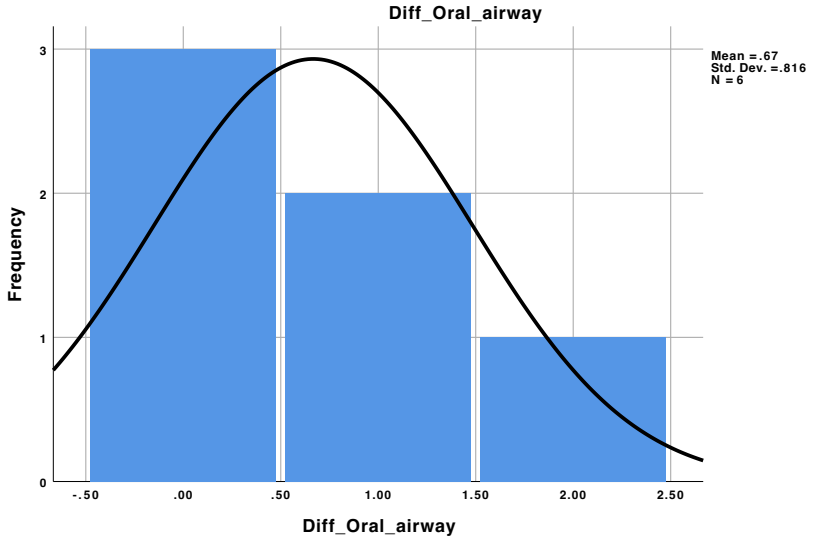

Diff_Apply_Mask
Mean =.33
Std. Dev. =.816
N = 6
Frequency
0
1
2
3
4
5
6
-1.00
.00
1.00
2.00
3.00
Diff_Apply_Mask

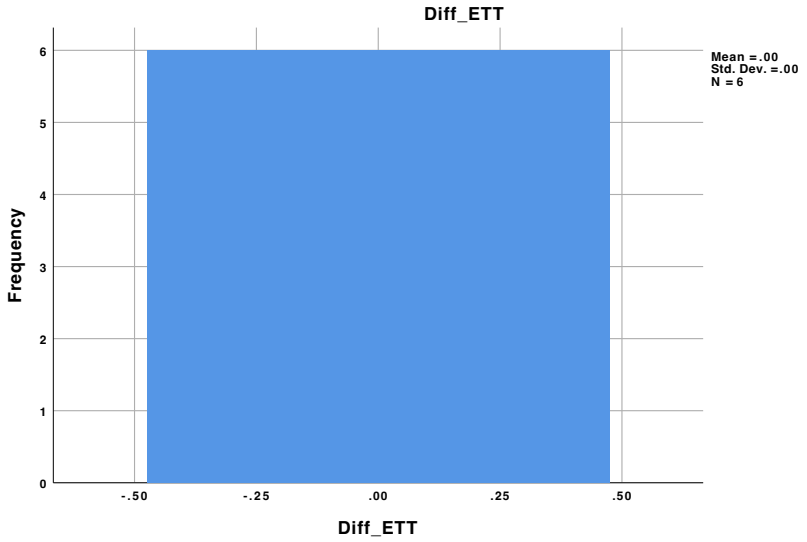

Diff_Bag_Mask
Mean =.33
Std. Dev. =.816
N = 6
Frequency
0
1
2
3
4
5
6
-1.00
.00
1.00
2.00
3.00
Diff_Bag_Mask

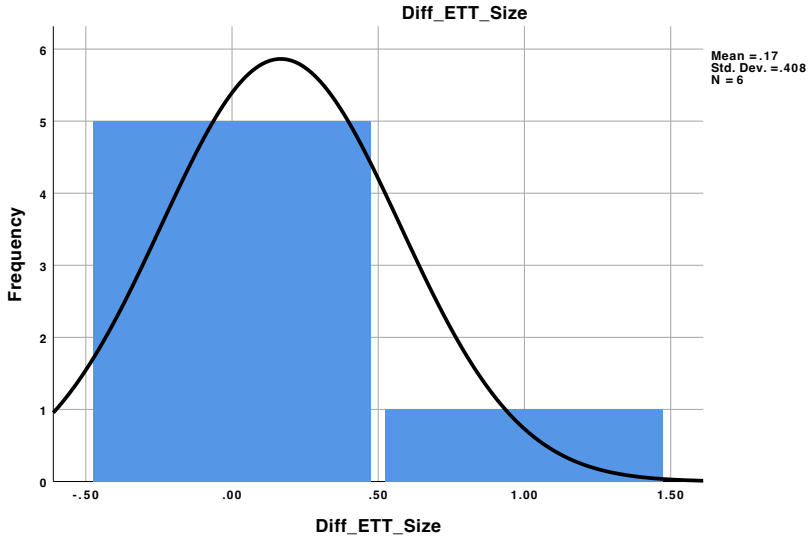

Diff_Ask_for_BP
Mean =-.67
Std. Dev. =1.633
N = 6
Frequency
0
1
2
3
-3.00
-2.00
-1.00
.00
1.00
2.00
3.00
Diff_Ask_for_BP

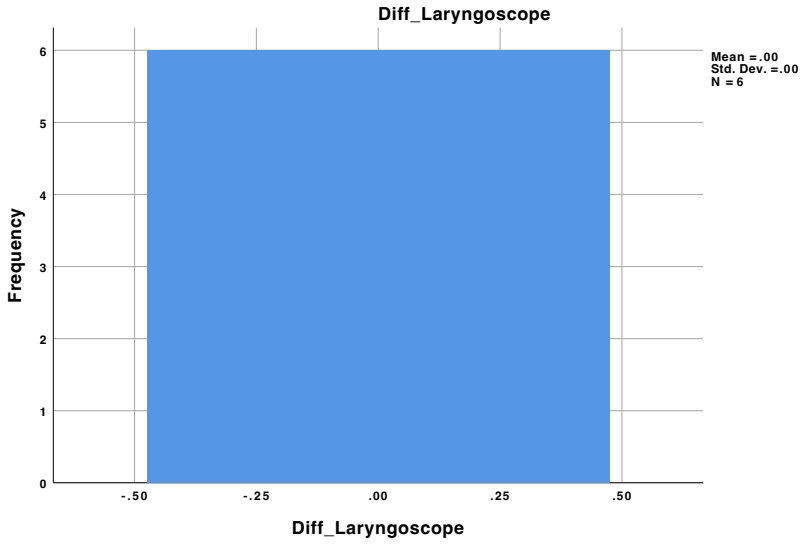

Diff_Decide_to_Intubate
Mean =1.00
Std. Dev. =1.095
N = 6
Frequency
0
1
2
3
4
5
-1.00
.00
1.00
2.00
3.00
Diff_Decide_to_Intubate

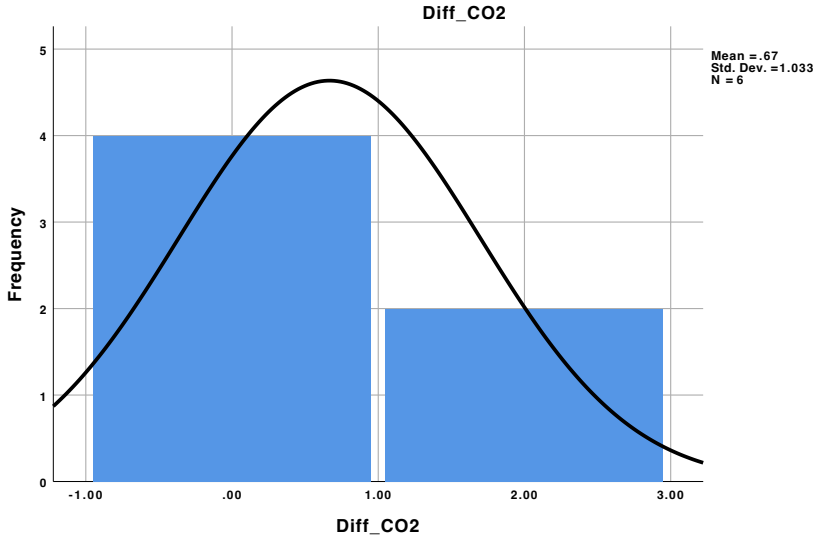

Diff_Suction
Mean =1.17
Std. Dev. =.983
N = 6
Frequency
3
2
1
0
-.50
.00
.50
1.00
1.50
2.00
2.50
Diff_Suction

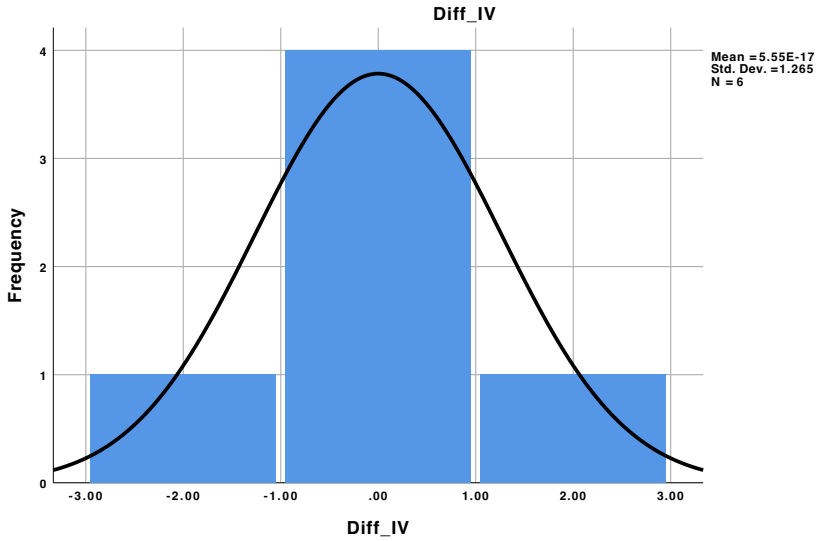

Diff_Oral_airway
Mean =.67
Std. Dev. =.816
N = 6
Frequency
3
2
1
0
-.50
.00
.50
1.00
1.50
2.00
2.50
Diff_Oral_airway

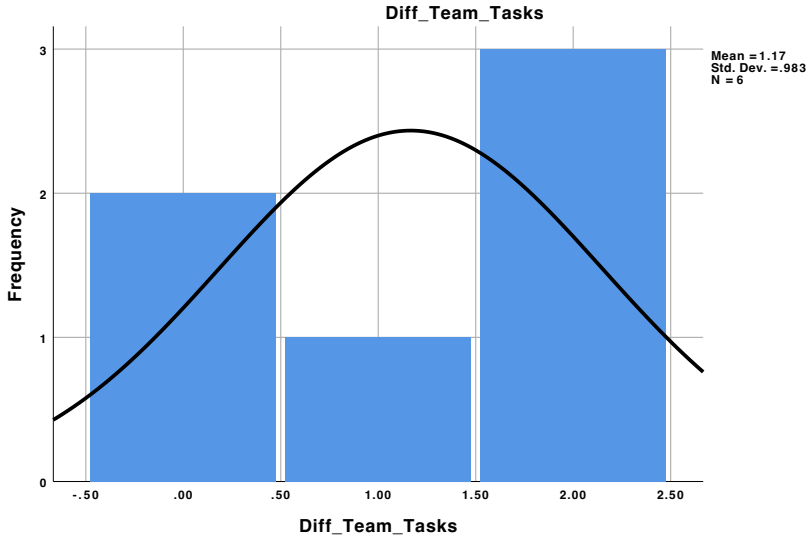

Diff_ETT
Mean =.00
Std. Dev. =.00
N = 6
Frequency
0
1
2
3
4
5
6
-.50
-.25
.00
.25
.50
Diff_ETT

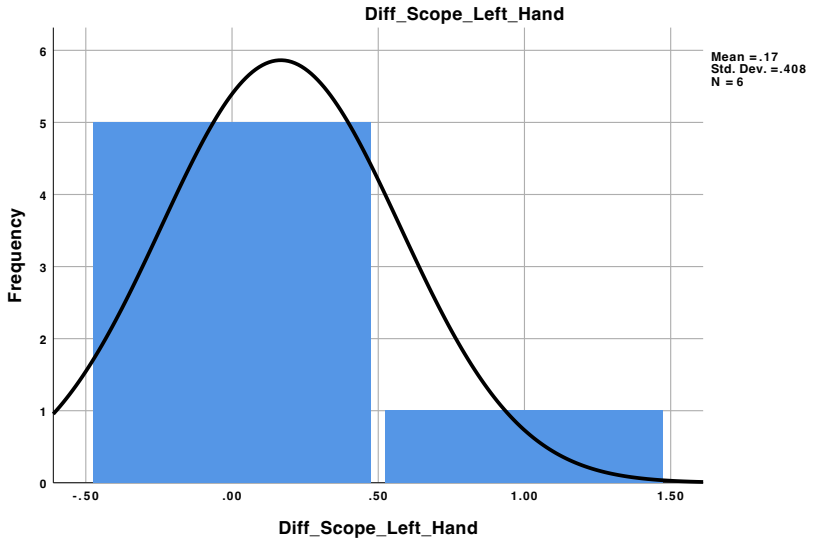

Diff_ETT_Size
Mean =.17
Std. Dev. =.408
N = 6
Frequency
0
1
2
3
4
5
6
-.50
.00
.50
1.00
1.50
Diff_ETT_Size

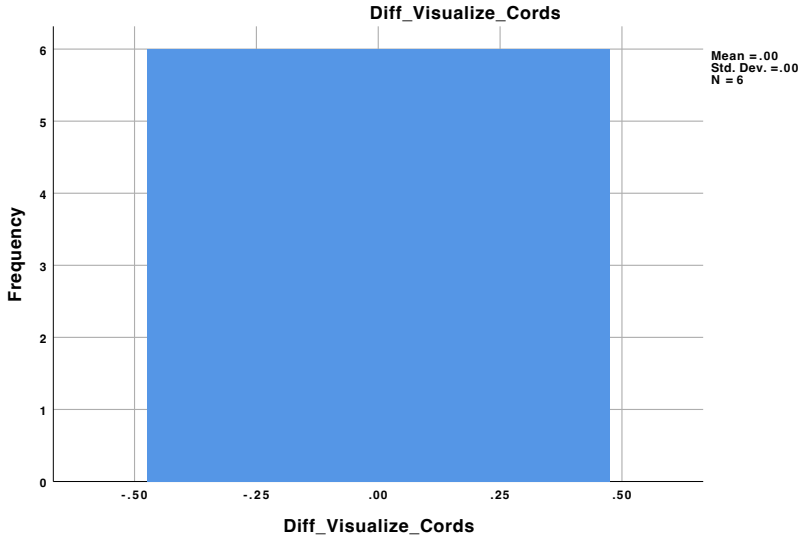

Diff_Laryngoscope
Mean =.00
Std. Dev. =.00
N = 6
Frequency
0
1
2
3
4
5
6
-.50
-.25
.00
.25
.50
Diff_Laryngoscope

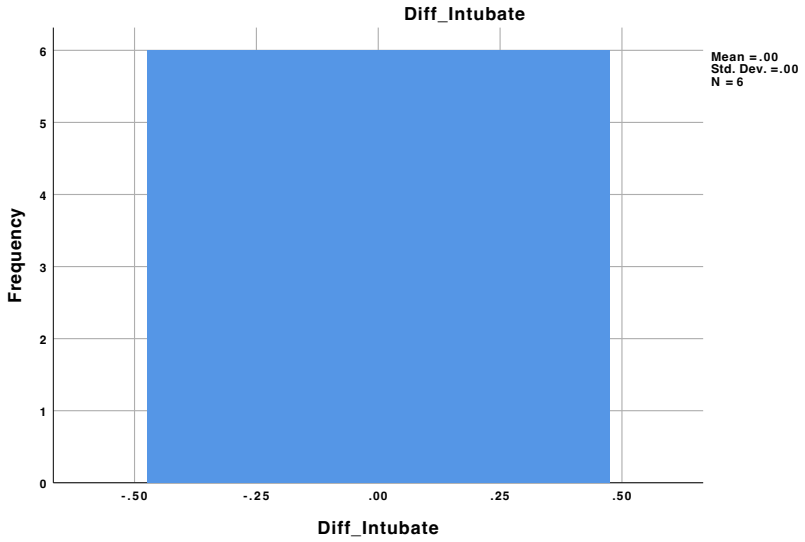

Diff_CO2
Mean =.67
Std. Dev. =1.033
N = 6
Frequency
0
1
2
3
4
5
-1.00
.00
1.00
2.00
3.00
Diff_CO2

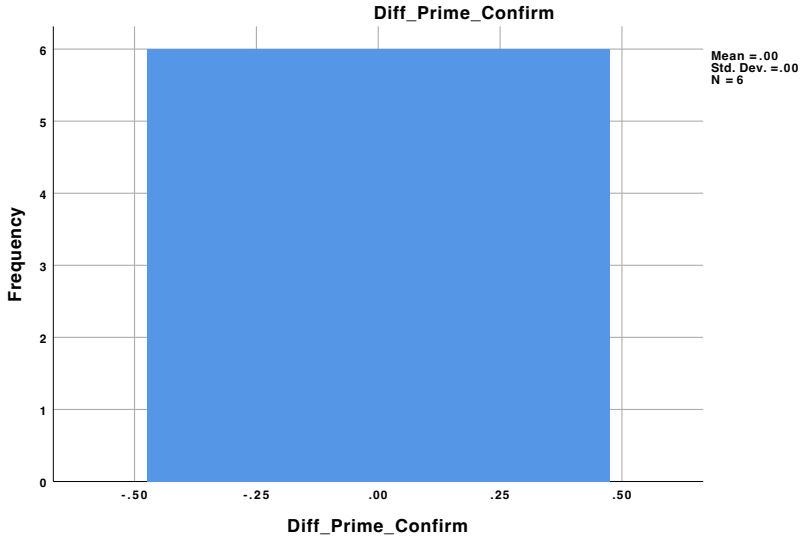

Diff_IV
Mean =5.55E-17
Std. Dev. =1.265
N = 6
Frequency
0
1
2
3
4
-3.00
-2.00
-1.00
.00
1.00
2.00
3.00
Diff_IV

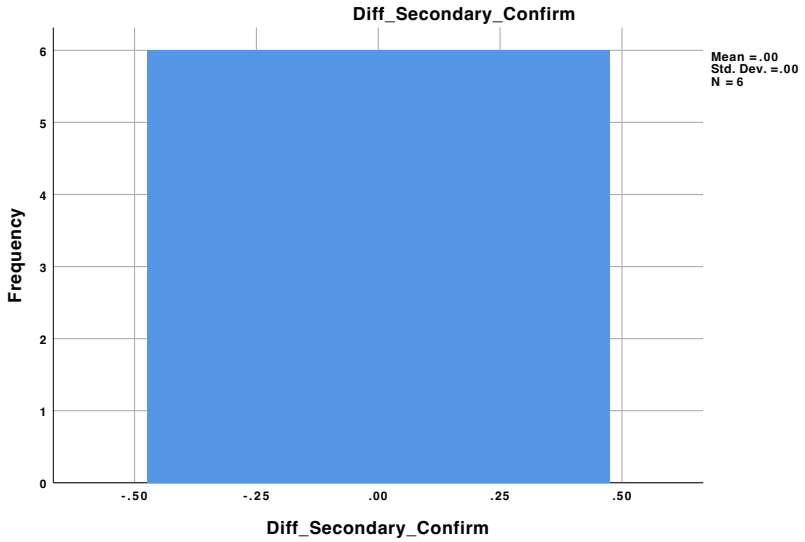

Diff_Team_Tasks
Mean =1.17
Std. Dev. =.983
N = 6
Frequency
0
1
2
3
-.50
.00
.50
1.00
1.50
2.00
2.50
Diff_Team_Tasks

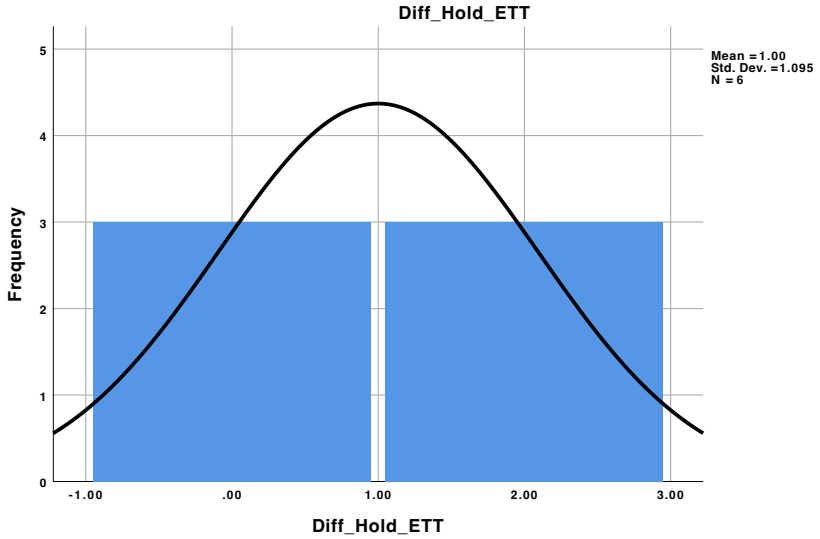

Diff_Scope_Left_Hand
Mean =.17
Std. Dev. =.408
N = 6
Frequency
0
1
2
3
4
5
6
-.50
.00
.50
1.00
1.50
Diff_Scope_Left_Hand

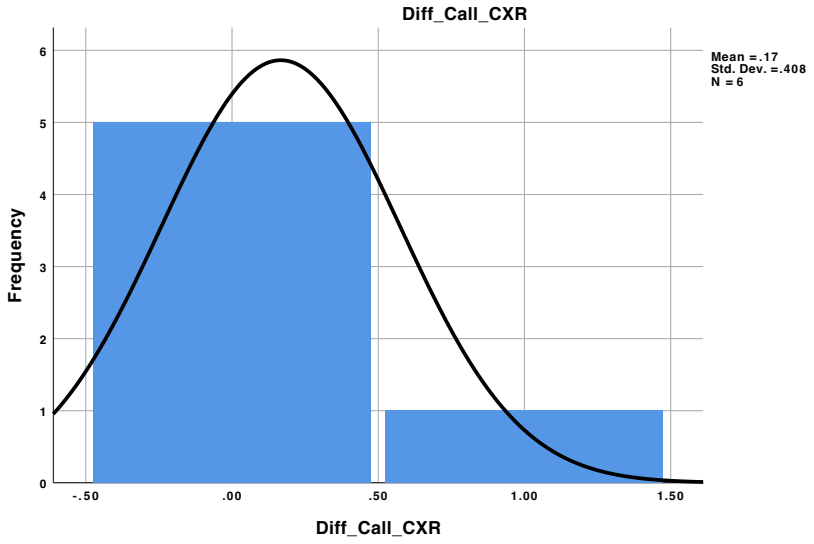

Diff_Visualize_Cords
Mean =.00
Std. Dev. =.00
N = 6
Frequency
0
1
2
3
4
5
6
-.50
-.25
.00
.25
.50
Diff_Visualize_Cords

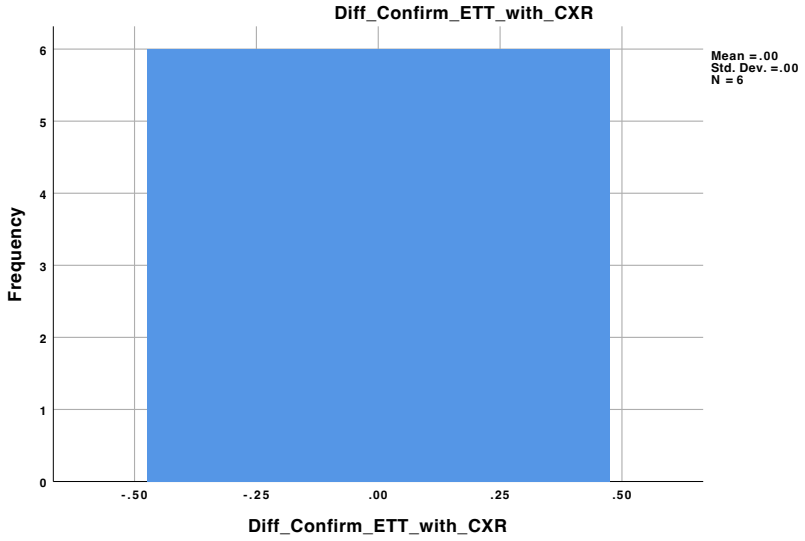

Diff_Intubate
Mean =.00
Std. Dev. =.00
N = 6
Frequency
0
1
2
3
4
5
6
-.50
-.25
.00
.25
.50
Diff_Intubate


Diff_Prime_Confirm
Mean =.00
Std. Dev. =.00
N = 6
Frequency
0
1
2
3
4
5
6
-.50
-.25
.00
.25
.50
Diff_Prime_Confirm


Diff_Secondary_Confirm
Mean =.00
Std. Dev. =.00
N = 6
Frequency
6
5
4
3
2
1
0
-.50
-.25
.00
.25
.50
Diff_Secondary_Confirm


Diff_Hold_ETT
Mean =1.00
Std. Dev. =1.095
N = 6
Frequency
5
4
3
2
1
0
-1.00
.00
1.00
2.00
3.00
Diff_Hold_ETT


Diff_Call_CXR
Mean =.17
Std. Dev. =.408
N = 6
Frequency
0
1
2
3
4
5
6
-.50
.00
.50
1.00
1.50
Diff_Call_CXR


Diff_Confirm_ETT_with_CXR
Mean =.00
Std. Dev. =.00
N = 6
Frequency
0
1
2
3
4
5
6
-.50
-.25
.00
.25
.50
Diff_Confirm_ETT_with_CXR

```
 GET
  FILE='/Users/kenton/Documents/CRNA SCHOOL FILES/Year 2_2021/Fall 2021/A_NSG
831 DNP Project Implementation Fall 2021/SPSS Data /Just-in-Time Pediatric Air
way Provider Performance Scale, Version 3.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
T-TEST PAIRS=Open_Airway Mask_Size Check_O2 Apply_Mask Bag_Mask Ask_for_BP Dec
ide_to_Intubate
    Suction Oral_airway ETT ETT_Size Laryngoscope CO2 IV Team_Tasks Scope_Left
_Hand Visualize_Cords
    Intubate Primary_Confirmation Secondary_Confirmation Hold_ETT Call_CXR Con
firm_ETT_with_CXRWITH
    Post_Open_Airway Post_Mask_size Post_Check_O2 Post_Apply_Mask Post_Bag_Mas
k Post_Ask_for_BP
    Post_Decide_to_Intubate Post_Suction Post_Oral_airway Post_ETT Post_ETT_Si
ze Post_Laryngoscpe
    Post_CO2 Post_IV Post_Team_Tasks Post_Scope_Left_Hand Post_Visualize_Cords
 Post_Intubate
    Post_Primary_Confirmation Post_Secondary_Confirmation Post_Hold_ETT Post_C
all_CXR
    Post_Confirm_ETT_with_CXR(PAIRED)
  /ES DISPLAY(TRUE) STANDARDIZER(SD)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

T-Test

Notes

Output Created		01-NOV-2021 16:55...
Comments		
Input	Data	/Users/kenton/Documents/CRNA SCHOOL FILES/Year 2_2021/Fall 2021/A_NSG 831 DNP Project Implementation Fall 2021/SPSS Data /Just-in-Time Pediatric Airway Provider Performance Scale, Version 3.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	6
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.

Notes

Syntax		T-TEST PAIRS=Open_Airway Mask_Size Check_O2 Apply_Mask Bag_Mask Ask_for_BP Decide_to_Intubate Suction Oral_airway ETT ETT_Size Laryngoscope CO2 IV Team_Tasks Scope_Left_Hand Visualize_Cords Intubate Primary_Confirmation Secondary_Confirmation Hold_ETT Call_CXR Confirm_ETT_with_CXR WITH Post_Open_Airway Post_Mask_size Post_Check_O2 Post_Apply_Mask Post_Bag_Mask Post_Ask_for_BP Post_Decide_to_Intubate Post_Suction Post_Oral_airway Post_ETT Post_ETT_Size Post_Laryngoscpe Post_CO2 Post_IV Post_Team_Tasks Post_Scope_Left_Hand Post_Visualize_Cords Post_Intubate Post_Primary_Confirmati on Post_Secondary_Confirm ation Post_Hold_ETT Post_Call_CXR Post_Confirm_ETT_with_ CXR (PAIRED) /ES DISPLAY(TRUE) STANDARDIZER(SD) /CRITERIA=CI(.9500) /MISSING=ANALYSIS.
Resources	Processor Time	00:00:00.08
	Elapsed Time	00:00:00.00

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Open_Airway	1.0000 [a]	6	.00000	.00000
	Post_Open_Airway	3.0000 [a]	6	.00000	.00000
Pair 2	Mask_Size	2.6667	6	.81650	.33333
	Post_Mask_size	3.0000	6	.00000	.00000
Pair 3	Check_O2	2.6667	6	.81650	.33333
	Post_Check_O2	3.0000	6	.00000	.00000
Pair 4	Apply_Mask	2.6667	6	.81650	.33333
	Post_Apply_Mask	3.0000	6	.00000	.00000
Pair 5	Bag_Mask	2.6667	6	.81650	.33333
	Post_Bag_Mask	3.0000	6	.00000	.00000
Pair 6	Ask_for_BP	2.6667	6	.81650	.33333
	Post_Ask_for_BP	2.0000	6	1.09545	.44721
Pair 7	Decide_to_Intubate	1.0000	6	.00000	.00000
	Post_Decide_to_Intubate	2.0000	6	1.09545	.44721
Pair 8	Suction	1.8333	6	.98319	.40139
	Post_Suction	3.0000	6	.00000	.00000
Pair 9	Oral_airway	1.0000	6	.00000	.00000
	Post_Oral_airway	1.6667	6	.81650	.33333
Pair 10	ETT	3.0000 [a]	6	.00000	.00000
	Post_ETT	3.0000 [a]	6	.00000	.00000
Pair 11	ETT_Size	2.8333	6	.40825	.16667
	Post_ETT_Size	3.0000	6	.00000	.00000
Pair 12	Laryngoscope	3.0000 [a]	6	.00000	.00000
	Post_Laryngoscpe	3.0000 [a]	6	.00000	.00000
Pair 13	CO2	2.3333	6	1.03280	.42164
	Post_CO2	3.0000	6	.00000	.00000
Pair 14	IV	2.6667	6	.81650	.33333
	Post_IV	2.6667	6	.81650	.33333
Pair 15	Team_Tasks	1.1667	6	.40825	.16667
	Post_Team_Tasks	2.3333	6	1.03280	.42164
Pair 16	Scope_Left_Hand	2.8333	6	.40825	.16667
	Post_Scope_Left_Hand	3.0000	6	.00000	.00000
Pair 17	Visualize_Cords	3.0000 [a]	6	.00000	.00000
	Post_Visualize_Cords	3.0000 [a]	6	.00000	.00000
Pair 18	Intubate	3.0000 [a]	6	.00000	.00000
	Post_Intubate	3.0000 [a]	6	.00000	.00000

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 19	Primary_Confirmation	3.0000 [a]	6	.00000	.00000
	Post_Primary_Confirmation	3.0000 [a]	6	.00000	.00000
Pair 20	Secondary_Confirmation	3.0000 [a]	6	.00000	.00000
	Post_Secondary_Confirmation	3.0000 [a]	6	.00000	.00000
Pair 21	Hold_ETT	2.0000	6	1.09545	.44721
	Post_Hold_ETT	3.0000	6	.00000	.00000
Pair 22	Call_CXR	2.6667	6	.81650	.33333
	Post_Call_CXR	2.8333	6	.40825	.16667
Pair 23	Confirm_ETT_with_CXR	2.6667 [a]	6	.81650	.33333
	Post_Confirm_ETT_with_CXR	2.6667 [a]	6	.81650	.33333

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Paired Samples Correlations

		N	Correlation	Sig.
Pair 2	Mask_Size & Post_Mask_size	6	.	.
Pair 3	Check_O2 & Post_Check_O2	6	.	.
Pair 4	Apply_Mask & Post_Apply_Mask	6	.	.
Pair 5	Bag_Mask & Post_Bag_Mask	6	.	.
Pair 6	Ask_for_BP & Post_Ask_for_BP	6	-.447	.374
Pair 7	Decide_to_Intubate & Post_Decide_to_Intubate	6	.	.
Pair 8	Suction & Post_Suction	6	.	.
Pair 9	Oral_airway & Post_Oral_airway	6	.	.
Pair 11	ETT_Size & Post_ETT_Size	6	.	.
Pair 13	CO2 & Post_CO2	6	.	.
Pair 14	IV & Post_IV	6	-.200	.704
Pair 15	Team_Tasks & Post_Team_Tasks	6	.316	.541

Paired Samples Correlations

		N	Correlation	Sig.
Pair 16	Scope_Left_Hand & Post_Scope_Left_Hand	6	.	.
Pair 21	Hold_ETT & Post_Hold_ETT	6	.	.
Pair 22	Call_CXR & Post_Call_CXR	6	1.000	.000

Paired Samples Test

		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence … Lower
Pair 2	Mask_Size - Post_Mask_size	-.33333	.81650	.33333	-1.19019
Pair 3	Check_O2 - Post_Check_O2	-.33333	.81650	.33333	-1.19019
Pair 4	Apply_Mask - Post_Apply_Mask	-.33333	.81650	.33333	-1.19019
Pair 5	Bag_Mask - Post_Bag_Mask	-.33333	.81650	.33333	-1.19019
Pair 6	Ask_for_BP - Post_Ask_for_BP	.66667	1.63299	.66667	-1.04705
Pair 7	Decide_to_Intubate - Post_Decide_to_Intubate	-1.00000	1.09545	.44721	-2.14960
Pair 8	Suction - Post_Suction	-1.16667	.98319	.40139	-2.19846
Pair 9	Oral_airway - Post_Oral_airway	-.66667	.81650	.33333	-1.52353
Pair 11	ETT_Size - Post_ETT_Size	-.16667	.40825	.16667	-.59510
Pair 13	CO2 - Post_CO2	-.66667	1.03280	.42164	-1.75052
Pair 14	IV - Post_IV	.00000	1.26491	.51640	-1.32744
Pair 15	Team_Tasks - Post_Team_Tasks	-1.16667	.98319	.40139	-2.19846
Pair 16	Scope_Left_Hand - Post_Scope_Left_Hand	-.16667	.40825	.16667	-.59510
Pair 21	Hold_ETT - Post_Hold_ETT	-1.00000	1.09545	.44721	-2.14960
Pair 22	Call_CXR - Post_Call_CXR	-.16667	.40825	.16667	-.59510

Paired Samples Test

		Paired … 95% Confidence Interval of the… Upper	t	df	Sig. (2-tailed)
Pair 2	Mask_Size - Post_Mask_size	.52353	-1.000	5	.363
Pair 3	Check_O2 - Post_Check_O2	.52353	-1.000	5	.363
Pair 4	Apply_Mask - Post_Apply_Mask	.52353	-1.000	5	.363
Pair 5	Bag_Mask - Post_Bag_Mask	.52353	-1.000	5	.363
Pair 6	Ask_for_BP - Post_Ask_for_BP	2.38039	1.000	5	.363
Pair 7	Decide_to_Intubate - Post_Decide_to_Intubate	.14960	-2.236	5	.076
Pair 8	Suction - Post_Suction	-.13487	-2.907	5	.034
Pair 9	Oral_airway - Post_Oral_airway	.19019	-2.000	5	.102
Pair 11	ETT_Size - Post_ETT_Size	.26176	-1.000	5	.363
Pair 13	CO2 - Post_CO2	.41719	-1.581	5	.175
Pair 14	IV - Post_IV	1.32744	.000	5	1.000
Pair 15	Team_Tasks - Post_Team_Tasks	-.13487	-2.907	5	.034
Pair 16	Scope_Left_Hand - Post_Scope_Left_Hand	.26176	-1.000	5	.363
Pair 21	Hold_ETT - Post_Hold_ETT	.14960	-2.236	5	.076
Pair 22	Call_CXR - Post_Call_CXR	.26176	-1.000	5	.363

Paired Samples Effect Sizes

			Standardizer[a]	Point Estimate	95% ... Lower
Pair 2	Mask_Size - Post_Mask_size	Cohen's d	.81650	-.408	-1.227
		Hedges' correction	.88486	-.377	-1.133
Pair 3	Check_O2 - Post_Check_O2	Cohen's d	.81650	-.408	-1.227
		Hedges' correction	.88486	-.377	-1.133
Pair 4	Apply_Mask - Post_Apply_Mask	Cohen's d	.81650	-.408	-1.227
		Hedges' correction	.88486	-.377	-1.133
Pair 5	Bag_Mask - Post_Bag_Mask	Cohen's d	.81650	-.408	-1.227
		Hedges' correction	.88486	-.377	-1.133
Pair 6	Ask_for_BP - Post_Ask_for_BP	Cohen's d	1.63299	.408	-.447
		Hedges' correction	1.76971	.377	-.412
Pair 7	Decide_to_Intubate - Post_Decide_to_Intubate	Cohen's d	1.09545	-.913	-1.855
		Hedges' correction	1.18716	-.842	-1.712
Pair 8	Suction - Post_Suction	Cohen's d	.98319	-1.187	-2.229
		Hedges' correction	1.06551	-1.095	-2.057
Pair 9	Oral_airway - Post_Oral_airway	Cohen's d	.81650	-.816	-1.728
		Hedges' correction	.88486	-.753	-1.594
Pair 11	ETT_Size - Post_ETT_Size	Cohen's d	.40825	-.408	-1.227
		Hedges' correction	.44243	-.377	-1.133
Pair 13	CO2 - Post_CO2	Cohen's d	1.03280	-.645	-1.510
		Hedges' correction	1.11926	-.596	-1.394
Pair 14	IV - Post_IV	Cohen's d	1.26491	.000	-.800
		Hedges' correction	1.37081	.000	-.738
Pair 15	Team_Tasks - Post_Team_Tasks	Cohen's d	.98319	-1.187	-2.229
		Hedges' correction	1.06551	-1.095	-2.057
Pair 16	Scope_Left_Hand - Post_Scope_Left_Hand	Cohen's d	.40825	-.408	-1.227
		Hedges' correction	.44243	-.377	-1.133
Pair 21	Hold_ETT - Post_Hold_ETT	Cohen's d	1.09545	-.913	-1.855
		Hedges' correction	1.18716	-.842	-1.712
Pair 22	Call_CXR - Post_Call_CXR	Cohen's d	.40825	-.408	-1.227
		Hedges' correction	.44243	-.377	-1.133

Paired Samples Effect Sizes

			95% ... Upper
Pair 2	Mask_Size - Post_Mask_size	Cohen's d	.447
		Hedges' correction	.412
Pair 3	Check_O2 - Post_Check_O2	Cohen's d	.447
		Hedges' correction	.412
Pair 4	Apply_Mask - Post_Apply_Mask	Cohen's d	.447
		Hedges' correction	.412
Pair 5	Bag_Mask - Post_Bag_Mask	Cohen's d	.447
		Hedges' correction	.412
Pair 6	Ask_for_BP - Post_Ask_for_BP	Cohen's d	1.227
		Hedges' correction	1.133
Pair 7	Decide_to_Intubate - Post_Decide_to_Intubate	Cohen's d	.087
		Hedges' correction	.080
Pair 8	Suction - Post_Suction	Cohen's d	-.084
		Hedges' correction	-.078
Pair 9	Oral_airway - Post_Oral_airway	Cohen's d	.151
		Hedges' correction	.139
Pair 11	ETT_Size - Post_ETT_Size	Cohen's d	.447
		Hedges' correction	.412
Pair 13	CO2 - Post_CO2	Cohen's d	.269
		Hedges' correction	.248
Pair 14	IV - Post_IV	Cohen's d	.800
		Hedges' correction	.738
Pair 15	Team_Tasks - Post_Team_Tasks	Cohen's d	-.084
		Hedges' correction	-.078
Pair 16	Scope_Left_Hand - Post_Scope_Left_Hand	Cohen's d	.447
		Hedges' correction	.412
Pair 21	Hold_ETT - Post_Hold_ETT	Cohen's d	.087
		Hedges' correction	.080
Pair 22	Call_CXR - Post_Call_CXR	Cohen's d	.447
		Hedges' correction	.412

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation of the mean difference.
Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.