Simulation Development in the Respiratory Care Orientation Process

-Philip Stark

No Disclosures

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RRT

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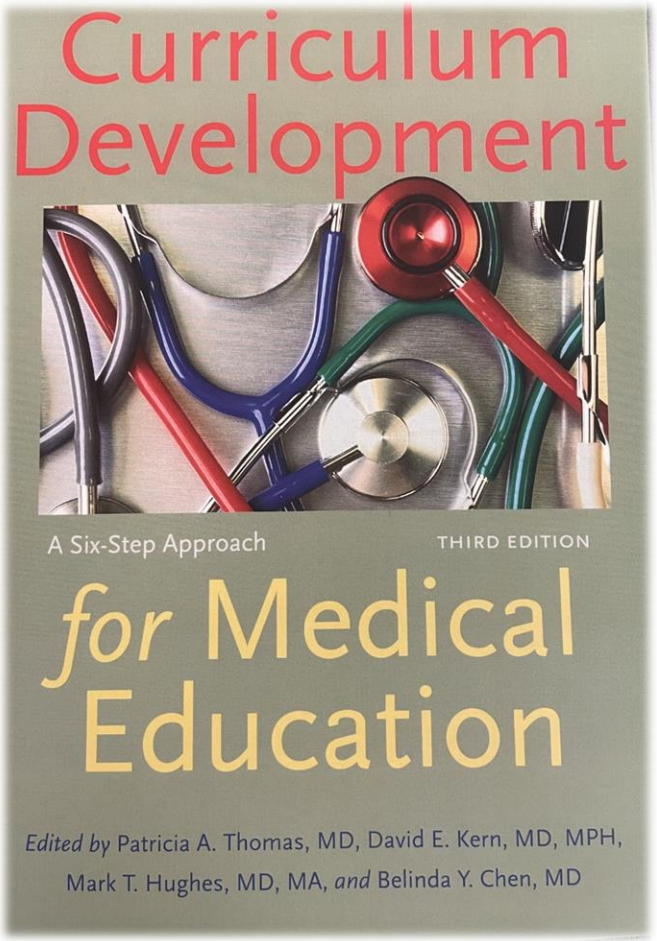
ACLS, ACLS-EP, PALS Instructor

Simulation Development in the Respiratory Care Orientation Process

PennState Health
Milton S. Hershey Medical Center
Clinical Simulation Center

This five-day highly interactive certificate course features a multi-disciplinary faculty who teach how to combine simulation with traditional methodologies, apply assessment tools, and choose among various simulation modalities for specific applications. The course provides a practical framework in learning theory, group dynamics, and psychology of the learner, focusing on debriefing skills.


Curriculum Development
A Six-Step Approach
THIRD EDITION
for Medical Education
Edited by Patricia A. Thomas, MD, David E. Kern, MD, MPH,
Mark T. Hughes, MD, MA, and Belinda Y. Chen, MD

Educational Designer

Effective Debriefer

1st Simulation Project

2012

- Sentinel Event
- Established as required, yearly competency
- Recreating the actual event over 80 times
- Expanding the simulation into a multifaceted learning/remediation event
- Submitting/presenting project as research at AARC Congress

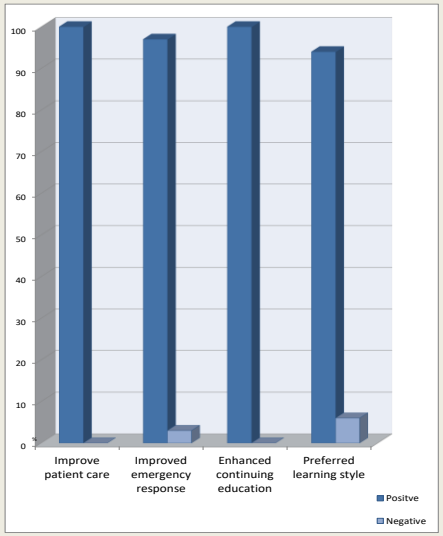
Utilizing high fidelity simulation as a comprehensive experiential teaching[1] tool in respiratory care

Kimberly Beers RRT-NPS, Richard Piekutowski RRT-NPS, Phillip Stark RRT-NPS, Bradley Satteson.

The Pennsylvania State University's Milton S. Hershey Medical Center, Hershey, Pa.

Background

In the past, obtaining proficiency in high risk-low volume emergency procedures was gained only through real clinical experience. In efforts to prepare for situations that may lead to sentinel events, a high fidelity simulation was developed as a departmental competency.



Methods

The focus of the simulation was emergency management of a dislodged ETT, where the therapist would extubate and effectively bag mask ventilate the patient. Prior to the start of the simulation, therapists were introduced to the layout of the ICU room, available resources, and the interactive environment but were not informed of the scenario. The METI-HPS (METI Learning, Sarasota, FL) was utilized as the high fidelity patient. The simulation was videotaped, allowing each participant to review their performance. An hour was allocated for each participant to complete the simulation which consisted of a briefing, simulation run, and debriefing. Therapists were then asked to complete a survey.

Results

67 therapists completed the simulation. Providing an online survey at the end of the simulation ensured 100% participation in completing the survey. 100% of the participants thought that utilizing high fidelity simulation has the ability to improve patient care. 97% of therapists felt that they are better equipped to deal with the same clinical emergency in an actual ICU setting. Using high fidelity simulation, 100% of the participants felt that it enhanced their continuing education and 94% felt that simulation learning was their preferred learning style.

Additional Findings

The impact and effectiveness of the simulation training created a larger teaching agenda than expected. This agenda included: airway management, patient assessment, waveform analysis, capnography, hospital policies and the new AHA guidelines[2].

Conclusions

Participants reported increased confidence in their ability to approach this type of high risk-low volume emergency situation. The reduction of sentinel events was not directly measured however, therapists felt better prepared in their prevention.

References

1.R. J. Sternberg and L. F. Zhang (Eds.), Perspectives on cognitive, learning, and thinking styles. NJ: Lawrence Erlbaum, 2000.

2.Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S640–S656.

Assessing the Respiratory Therapists' Effectiveness in Managing a Pre-existing Surgical Airway Emergency

Phillip Stark, Kimberly Group, Mandy Harshberger, Ashley Grim, Janelle Reed, James Rudegeair, Emily Scicchitano

The Penn State Milton S. Hershey Medical Center

BACKGROUND

Effectively managing a pre-existing surgical airway[1] should be an essential skill for any respiratory therapist. We wanted to assess our own therapists' performance in managing such an airway in an emergent condition. We also wanted to ensure that situational awareness, critical thinking, and appropriate interventions in managing this situation were well understood and executed.

METHOD

A high fidelity medical mannequin[2] was altered for a surgical airway with a complete upper airway obstruction (i.e. laryngectomy). The mannequin was then placed in respiratory arrest. A simulation scenario was then enacted where the respiratory therapist was a first responder to manage this medical emergency. The participants had no prior knowledge as to the scenario. Ten clinical objectives for managing this situation were established and measured (see table). The scenario was video recorded for review during a detailed, individual debriefing. In all, sixty-nine (69), therapists were evaluated in this study.

RESULTS

Response times for each objective were averaged for the study group. Standard deviations were also derived for each objective.

Objective	Average Time (minutes : seconds)	Standard Deviation
Checks for Respiration	*1:12*	*(+/-) 0:54*
Checks for a Pulse	*1:24*	*(+/-) 1:10*
Activates Emergency Response	*3:29*	*(+/-) 2:44*
Requests Code Cart	*3:34*	*(+/-) 2:08*
Applies Supplemental O_2	*5:53*	*(+/-) 2:57*
Attempts Upper Airway Ventilation	*5:08*	*(+/-) 2:25*
Acquires SpO_2	*7:45*	*(+/-) 3:55*
Performs Lower Airway Ventilation	*7:28*	*(+/-) 3:18*
Acquires $EtCO_2$	*8:38*	*(+/-) 3:26*
Correct Identification of Airway	*9:28*	*(+/-) 3:38*

CONCLUSION

Response times were longer than we anticipated. The standard deviation of each response time was larger than expected. An opportunity presented itself for individual as well as departmental improvement. Simulation based education and the power of an effective debriefing gave the ability for any deficiencies of knowledge or skill to be addressed and corrected on an individual basis. We will continue to provide simulation based education and evaluation as a measure of individual and departmental effectiveness.

REFERENCES

1. National Tracheostomy Safety Project http://www.tracheostomy.org.uk/
2. S300.100 Code Blue® III Adult Advanced Life Support Training Simulator

REASSESSING THE RESPIRATORY THERAPIST'S EFFECTIVNESS IN MANAGING A PRE-EXISTING SURGICAL AIRWAY EMERGENCY

Stark, Phillip; Scicchitano, Emily; Grim, Ashley; Erkinger, Jennifer; Civettini , Gina

PennState Health Milton S. Hershey Medical Center , Hershey, PA, United States

BACKGROUND

In 2015, we designed a simulation competency that tested and measured our therapists' response times in managing a surgical airway emergency. Our response times were longer than we had anticipated and we saw an opportunity for improvement. In 2017 we designed another simulation with a different scenario, but identical objectives. We wished to see if any significant improvement in performance had occurred.

METHOD

An emergent surgical airway scenario was designed as our department's yearly competency. The scenario was that of an emergent surgical airway management for a patient with a complete upper airway obstruction. Specific clinical objectives were determined and then time measured as to their success. The participants had no prior knowledge of the scenario or its clinical objectives. All competencies were video recorded for debriefing purposes and time stamping. Comparisons were then made between the years 2015 and 2017.

RESULTS

Five common clinical objectives were pre-determined and time measured as to their obtainment. We compared the 2015 times to the newer 2017 times. The percentage change was then derived (see table).

Clinical Objective	2015 (n=65) minutes : seconds	2017(n=77) minutes : seconds	Percentage Change
Checks for respiration	1:12	0:58	24% improvement
Requests Code Cart	3:34	2:27	45% improvement
Acquires SpO_2	7:45	6:13	24% improvement
Performs lower airway ventilation	7:28	6:08	21% improvement
Acquires $EtCO_2$	8:38	7:36	14% improvement

CONCLUSION

There was a significant improvement in times. During a resuscitation effort, even a moderate improvement in time can greatly affect outcomes. We feel these improvements have substantial clinical significance. The un-measurable variables in these studies were the scenarios themselves. Most participants felt the more recent scenario was the more challenging one and thus may have hindered their response times. Overall, we were pleased that simulation identified areas of clinical vulnerability and provided the tools necessary for improvement.

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MAGNET RECOGNIZED

PennState Health

inspired together

IS SIMULATION AN EFFECTIVE ENVIRONMENT FOR EVALUATING DOCUMENTATION?

Camacci, Joe; Stark, Phillip; Scicchitano, Emily; Civettini, Gina

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INTRODUCTION

Proper documentation is paramount in ensuring institutional integrity and avoiding needless legal repercussions. When our department was met with a challenge in addressing some serious deficits of proper documentation, we decided to investigate if incorporating documentation into a simulation was an effective way to evaluate and improve this skill.

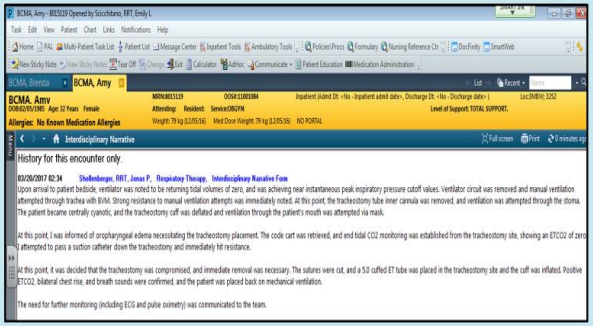
METHOD

At our institution, complex medical management scenarios are frequently enacted to assess our therapists' knowledge and skill in clinical situations. These simulations require appropriate interventions to be performed and predetermined objectives to be met. But rather than end these scenarios with the typical overhead announcement of "*simulation has ended*," we now require our participants to give a 'hand-off' communication of the scenario to another therapist entering the room. We also established a trainer charting area of our electronic medical record where the participants were given 10 minutes to document the scenario. We utilized SBAR (Situation-Background-Assessment-Recommendation), as our framework for assessing effective and thorough charting. We determined 17 separate aspects that needed to be documented in order to be considered thorough charting. We then calculated the overall success rates for charting all of these 17 items. In all, 47 participants were included for this study.

RESULTS

Based upon the 17 individual aspects we deemed necessary for thorough charting, we calculated the successful achievement percentages documented by the entire study group.

Documentation Scoring Grid		
Situation	Clearly identified the environmental and clinical situation	**31%** achievement
Background	Ascertained and charted pertinent background information	**33%** achievement
Assessment	Performed and charted necessary clinical assessments	**30%** achievement
Recommendation	Identified decision tree that led to recommendation and ultimate action	**65%** achievement



CONCLUSION

Simulation has become the premier method for enhancing critical thinking and developing kinesthetic skills. We have also found it to be effective in evaluating proper documentation of complex medical situations. Our study demonstrated serious deficiencies in what we considered thorough documentation. Ineffective charting leaves both the therapist and institution vulnerable. The realism of post scenario charting is an effective instructional method for assessing and addressing charting insufficiencies. For these reasons, we will continue to incorporate charting and its assessment into future simulation sessions.

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IS SIMULATION AN ADEQUATE SUBSTITUTE FOR CLINICAL EXPERIENCE?

Scicchitano, Emily; Stark, Phillip; Group, Kimberly; Civettini, Gina;

PennState Health Milton S. Hershey Medical Center, Hershey, PA United States

INTRODUCTION

Managing complex medical airway emergencies is one of the most challenging aspects for the Respiratory Care Practitioner. In the past, proficiency could only be obtained with years of experience. In newer therapists, that experience may be lacking or even non-existent. We were concerned that this lack of experience in managing airway emergencies could lead to poor performance and jeopardize patient safety. Our solution was to invest in a vigorous simulation component into our orientation process. Although we felt we were making qualitative improvements to the orientation process, we still wanted to see if there was a measurable, quantitative component to our investment in simulation

METHOD

Our facility performs yearly competencies in managing complex medical airway emergencies. Each year, these scenarios are changed, but essential clinical objectives remain the same. As part of our redesigned orientation process, we had all newer therapists with less than 2 years experience complete the simulation training of all past emergency airway scenarios. This placed all 65 participants in our study at the same training level. We then created a new airway emergency simulation that was unknown to all participants. We compared times to reach clinical objectives to that of the participant's years of clinical experience.

DATA

The entire sample was subdivided into 5 study groups based upon years of clinical experience. Time measurements (minutes : seconds) were collected for the obtainment of each clinical objective. The standard deviations (STDEV) were calculated for the entire group as a whole.

	< 2 yrs (n=15)	2-4 yrs (n=12)	5-9 yrs (n=12)	10-20 yrs (n=11)	> 20 yrs (n=15)	STDEV (n=65)
Checks for Respirations	0:22	0:31	0:25	0:31	0:36	0:06
Requests Code Cart	2:41	1:53	1:41	1:43	2:34	0:29
Acquires SpO2	6:32	5:54	6:17	6:56	5:29	0:33
Ventilates Lower Airway	6:58	5:05	5:13	6:44	6:28	0:52
Acquires EtCO2	8:12	7:05	6:56	8:17	7:49	0:37

CONCLUSION

We anticipated our more experienced therapists to outperform our lesser experienced ones and a much larger standard deviation. However, the results showed no significant difference in performance based upon years of clinical experience. Critical thinking, appropriate interventions, and swiftness of action are all key components in managing airway emergencies. Our findings suggest that simulation training is an effective technique that may effectively substitute for years of experience in this specific area of expertise. As many of our new hires are new graduates, we will continue to invest in extensive simulation training for these therapists to improve patient safety and good outcomes.

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Advanced Life Support Training
for
Respiratory Care Providers

- Intra-departmental ACLS & PALS
  - 'We teach our own'
- Specific 'Case Studies' added to recertification sessions

COVID-19

COVID-19

- Increased SBL orientation from 8 to 40 hours
- Began assessing even the basics with new hires
- Created clinical & technical procedural check-offs
- Equipment reviews and check-offs in center
- See one – Do one – Teach one
- Created summative simulations

- ☐ History of Simulation with tour of center
- ☐ Benefits of experiential learning
- ☐ Philosophy and techniques of Simulation
  - Suspending disbelief
  - Confidentiality & safe learning environment
  - Confederates and use of video recording
  - Critical thinking ("*it takes a lot to clinically kill someone*")
  - Self-reflection
- ☐ Concepts and terms of simulation
  - - High risk / Low volume
  - - Crisis Resource Management
  - - Situational awareness
  - - Task fixation
  - - Resource utilization
  - - Debriefing
  - - "It takes a lot to kill someone"
- ☐ Emergency responses at PSHMC
- ☐ Perfusion ↔ Ventilation ↔ Oxygenation
- ☐ Code cart review, ZOLL check-off, and CPR coach
- ☐ Review of BLS and ALS techniques with mannequin introduction
  - - 4 proven interventions
  - - 3 physiological parameters
  - - Proper BVM technique
  - - Importance of $EtCO_2$ monitoring and interpretation
  - - Importance of early defibrillation
  - - SpO_2 during cardiac arrest
- ☐ AMBU bag anatomy and function
  - Airway adjuncts
  - Michigan lung for 'feel of bagging'
- ☐ O_2 tank and delivery interfaces (high vs. low flow)
- ☐ Istat & ABG puncture with GC8+
- ☐ Introduction to NIV – therapy vs. rescue
  - V30 & V60 and Trilogy overview
  - Introduction to Sim Man and ASL 5000
  - Suspending disbelief exercises
- ☐ Dyspnea differential and role respiratory therapy
- ☐ Introduction to advanced airway procurement – roles and responsibilities
- ☐ Servo I & V500 overview
- ☐ Philips bedside monitoring system

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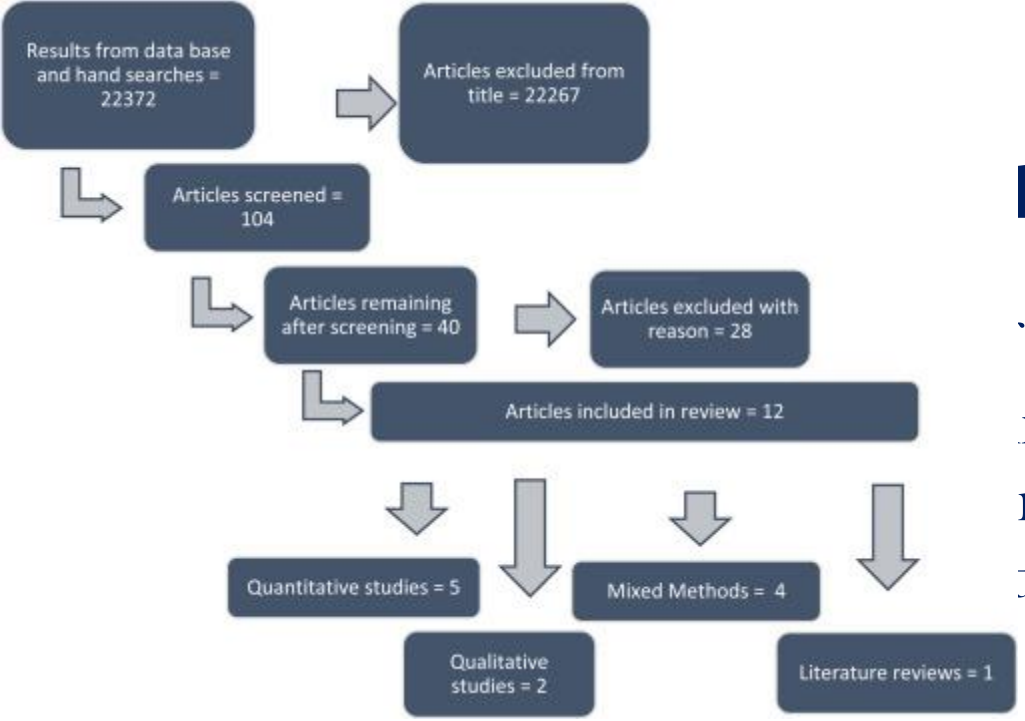
Post COVID-19



mulated

`Nursing (NCSBN) published
ng study that found that up to
re-licensure nursing programs
y patient scenarios for students

Simulation to Replace Clinical Hours in Nursing: A Meta-narrative Review
Elizabeth Roberts, RN, BNurs, GradDipClinNursTeach, MNurs, (Clinical Leadership)
Vera Kaak, RN, BNurs
John Rolley, RN, BN(Hons), PhD, FACN
Published:September 13, 2019DOI:https://doi.org/10.1016/j.ecns.2019.07.003

Advantages & Benefits of SBO

- Protected and safe learning environment
- Competent and consistent instruction
- Focused and tailored sessions
- Deliberate practice
- Self-reflection and Critical thinking

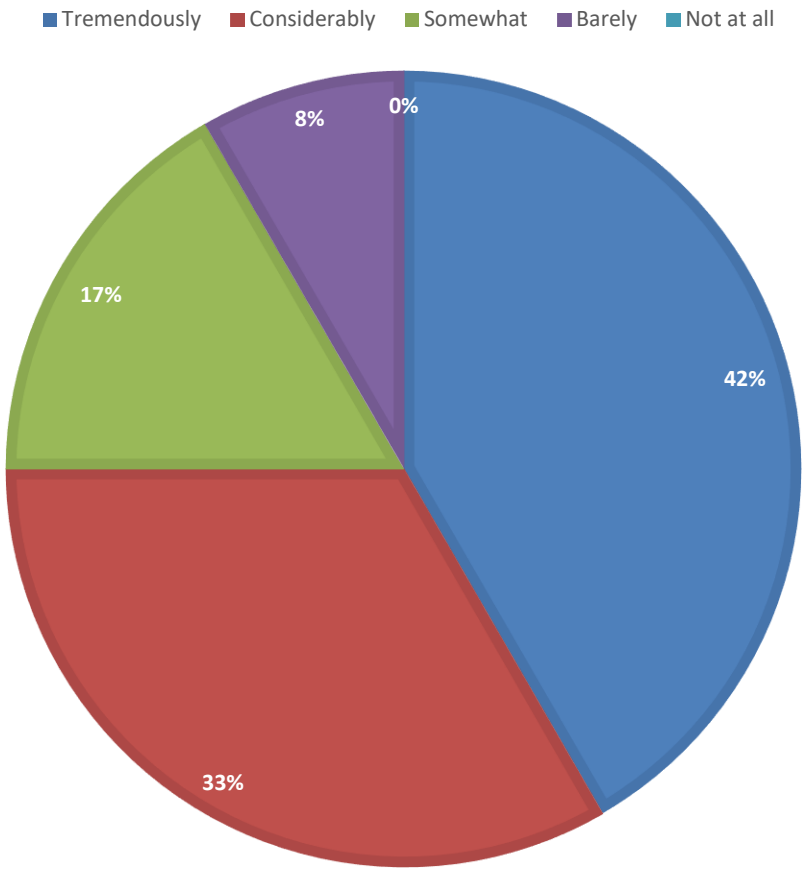
Barriers & Drawbacks of SBO

- Adequate facility for SBL and its expense
- Training and developing Instructors
- Equipment and its expenses
- Non-clinical (non-revenue) time

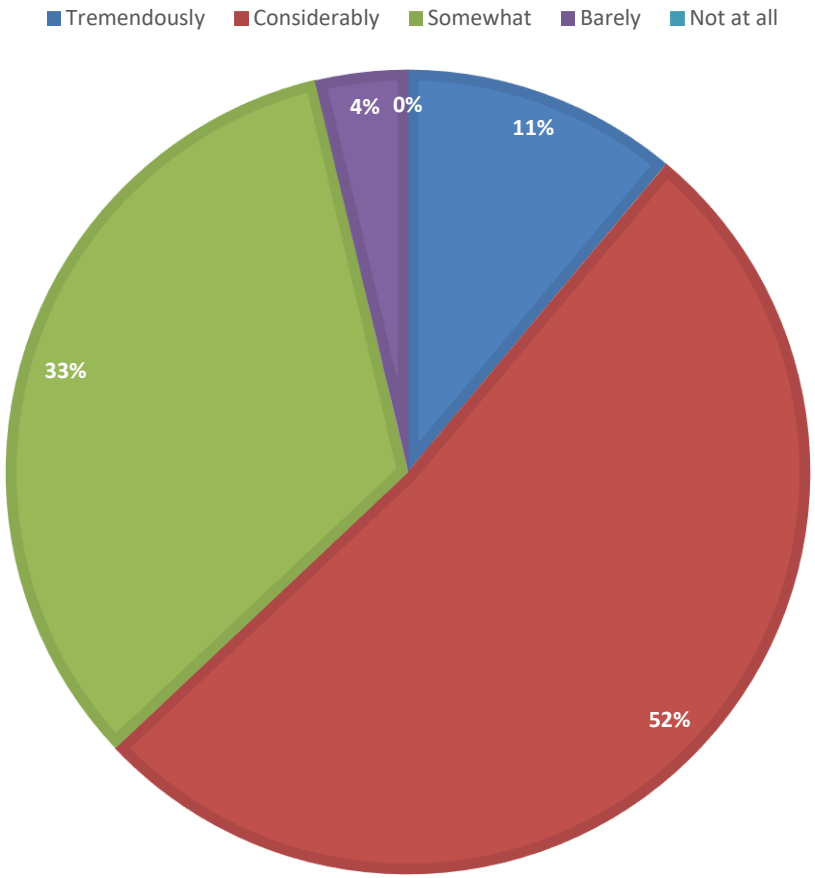
Current Research & Development
for
SBO

Is SBO Effective?

HOW MUCH HAS SBL PREPARED YOU TO WORK IN AN ACADEMIC MEDICAL CENTER?



HOW MUCH OF AN IMPROVEMENT HAVE YOU SEE IN THE NEW EMPLOYEES' SKILLS AND VENTILATOR MANAGEMENT SINCE THE EXPANSION OF SBL?



Current Research & Development

for

SBO

Is SBO Efficient ?

Current Research & Development

for

SBO

Is SBO Economical ?

Questions?