

Intubation and Universal Airway Box Quality Improvement

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Background

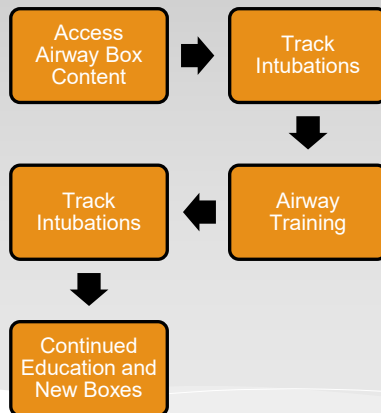
- Difficult airways present with unique challenges outside of operating theaters, increasing the risk of complications, including anoxic brain injury, death, and long-term disability.¹
- Airway management is a skill clinicians taking care of critically ill patients need to be proficient with.
- Nationally, first pass success rate at training institutions is approximately 77%.²
- Few institutions have formalized airway management curricula.
- Prior to study, hospital airway boxes were not standardized between departments.

Objectives

- Create formal difficult airway training process to improve first pass intubation success rates in resident trainees
- Create a universalized airway box to decrease equipment failures

Methods

- Airway boxes in the Emergency Department and Intensive Care Unit were randomly evaluated to assess the consistency of contents and equipment functionality.
- Intubation first pass attempts were recorded for out-of-operating theater intubations by Internal Medicine and Emergency Medicine residents.
- Additional data collected: patient age, gender, indication for intubation, RSI medication used, tube size, equipment used, equipment malfunction, attending presence, and backup available.
- Difficult airway lecture and simulation lab were held with EM and IM residents.
- Difficult Airway Course was provided for IM residents.
- Airway box inconsistencies were identified for optimization



Results

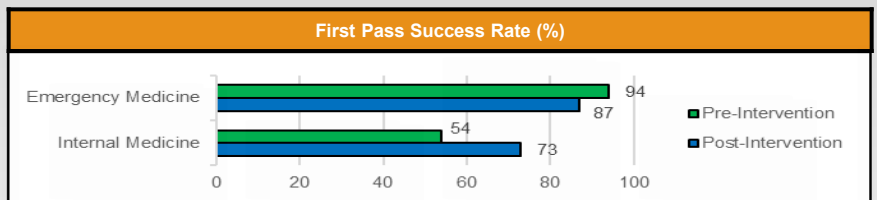
AIRWAY BOX ASSESSMENT

- Assessment of airway boxes during intubations revealed that there was malfunctioning or missing equipment 15% of the time pre-intervention.
- Examples of equipment malfunctions or absences include missing laryngoscope blades, dead batteries in laryngoscope handles, and missing syringes
- Post-intervention review demonstrated an improvement to less than 10% missing or malfunctioning equipment during intubations attempts.

FIRST PASS SUCCESS

- Emergency Medicine had previously instituted formal airway control training, leading to a pre-intervention first pass success rate of 94%, with a post intervention success rate of 87%, without statistical significance.
- Internal Medicine had a pre-intervention first pass success rate of 54%, with a post-intervention first pass rate 73%, showing improvement with education.
- Emergency Medicine had a higher first pass success rate than the national average, while Internal Medicine had a post-intervention first pass success rate much closer to the national average.

Successful First Attempt Intubation Rates by Service							
	All		Pre-Intervention		Post-Intervention		P-value
	n	%	n	%	n	%	
Internal Medicine	60 / 88	68	13 / 24	54	47 / 64	73	0.34
Cardiac Arrest	6 / 17	35					
Emergency Medicine	35 / 39	90	15 / 16	94	20 / 23	87	0.41
Cardiac Arrest	8 / 11	73					



Outcomes & Lessons Learned

- Deficiencies in Internal Medicine difficult airway training were identified.
- Intubations during cardiac arrests demonstrated lowest first pass success rates.
- After difficult airway education, first pass success percentage rates improved for IM residents.
- Airway boxes were optimized by obtaining Mac McGraths and standardizing the contents of each box using a checklist
- Device failures decreased with standardization of airway boxes.

Next Steps

- Continue difficult airway training throughout EM and IM residencies.
- Research optimal airway control strategies during in-hospital cardiac arrests.
- Assess continued airway box standardization throughout hospital to ensure consistency and availability of equipment.
- Track first pass success rates to identify areas where continued education and improvement is needed.
- Implementation of more robust airway boxes with increased availability.



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2. Nolan, J. P., & Kelly, F. (2011). Airway challenges in critical care. Anesthesia, Online