

Under Pressure: An Evidence-Based Practice Improvement Approach to Reducing Injuries Related to Endotracheal Tube Cuff Pressures

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BACKGROUND

- An endotracheal tube (ETT) is an artificial airway placed by anesthesia providers to facilitate general anesthesia in adults.
- ~ 15 million placed each year by anesthesia providers.¹
- ETT cuffs are filled with air or fluid to achieve an adequate occlusion pressure.
 - Underinflation - Microaspiration and inadequate ventilation.
 - Overinflation - Pressure related injuries (i.e., sore throat, cough, nerve palsies, tracheomalacia, and tracheal stenosis).^{2, 3}
- Accurate measurement of ETT cuff pressure requires use of a manometer to achieve **20-30 cm H₂O**.^{1, 5, 6, 7, 8}
- No national or organizational guidelines.

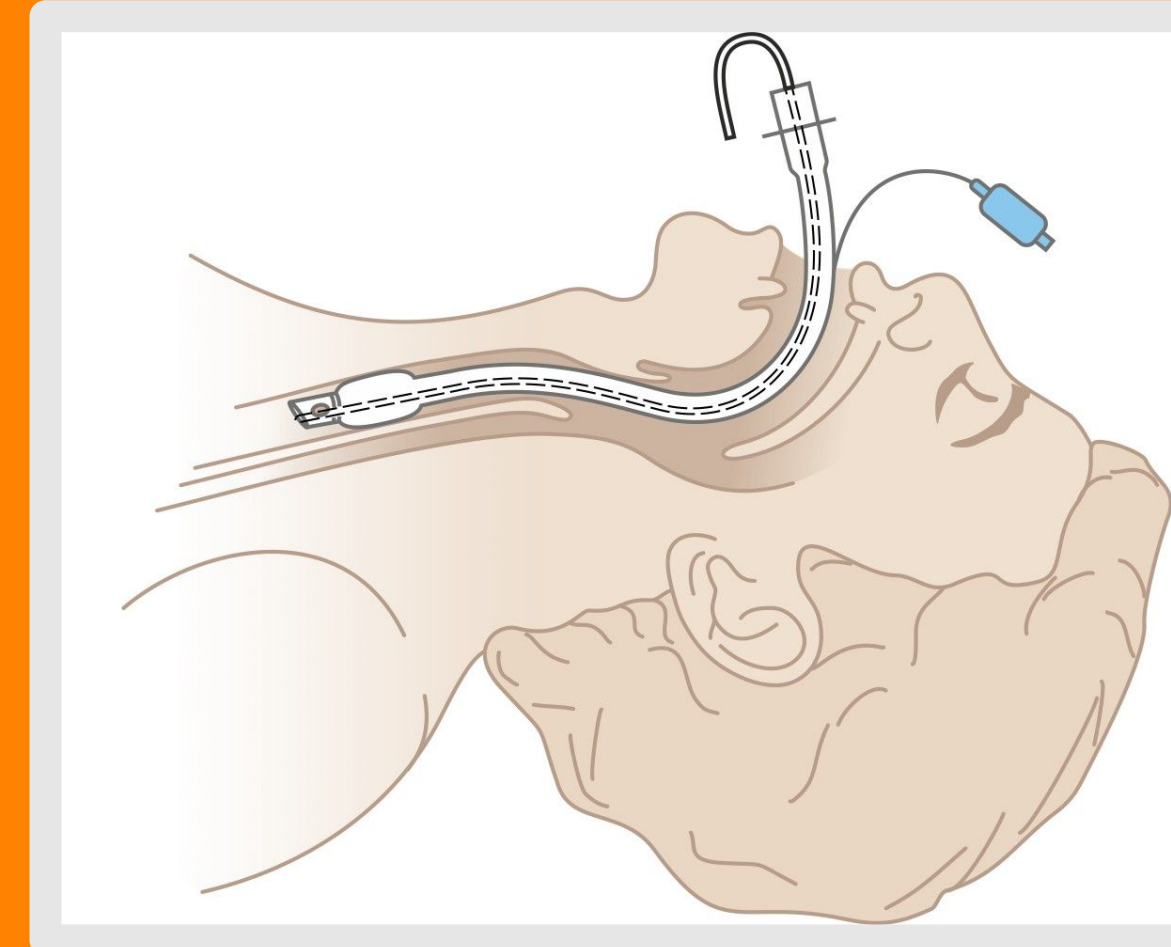
LOCAL PROBLEM

- The project site is a large academic medical center located in Southeast region of the U.S.
- Currently, there is no standardization of practice for measuring ETT cuff pressures at the project site.
- The purpose of this project is to implement a standard of practice for ETT cuff monitoring with a manometer.

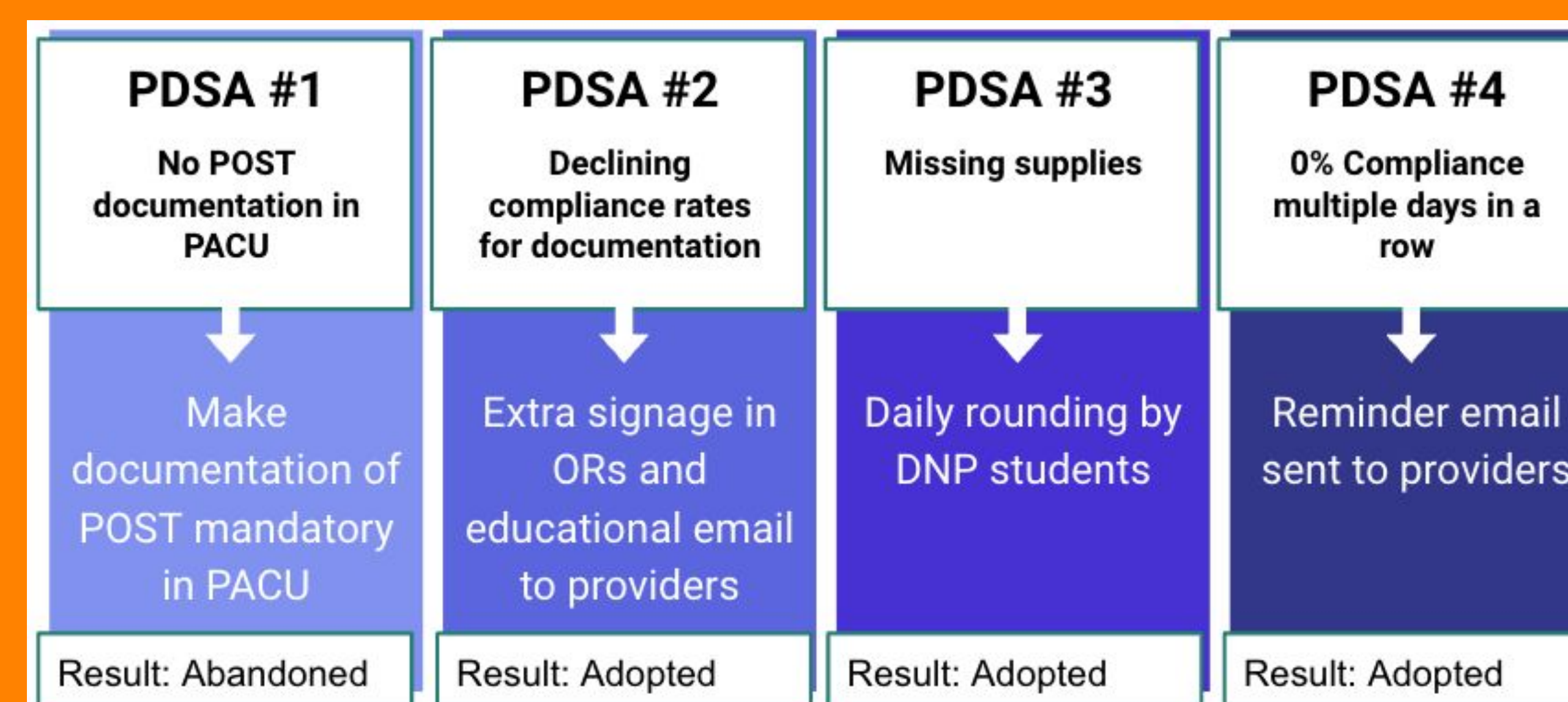
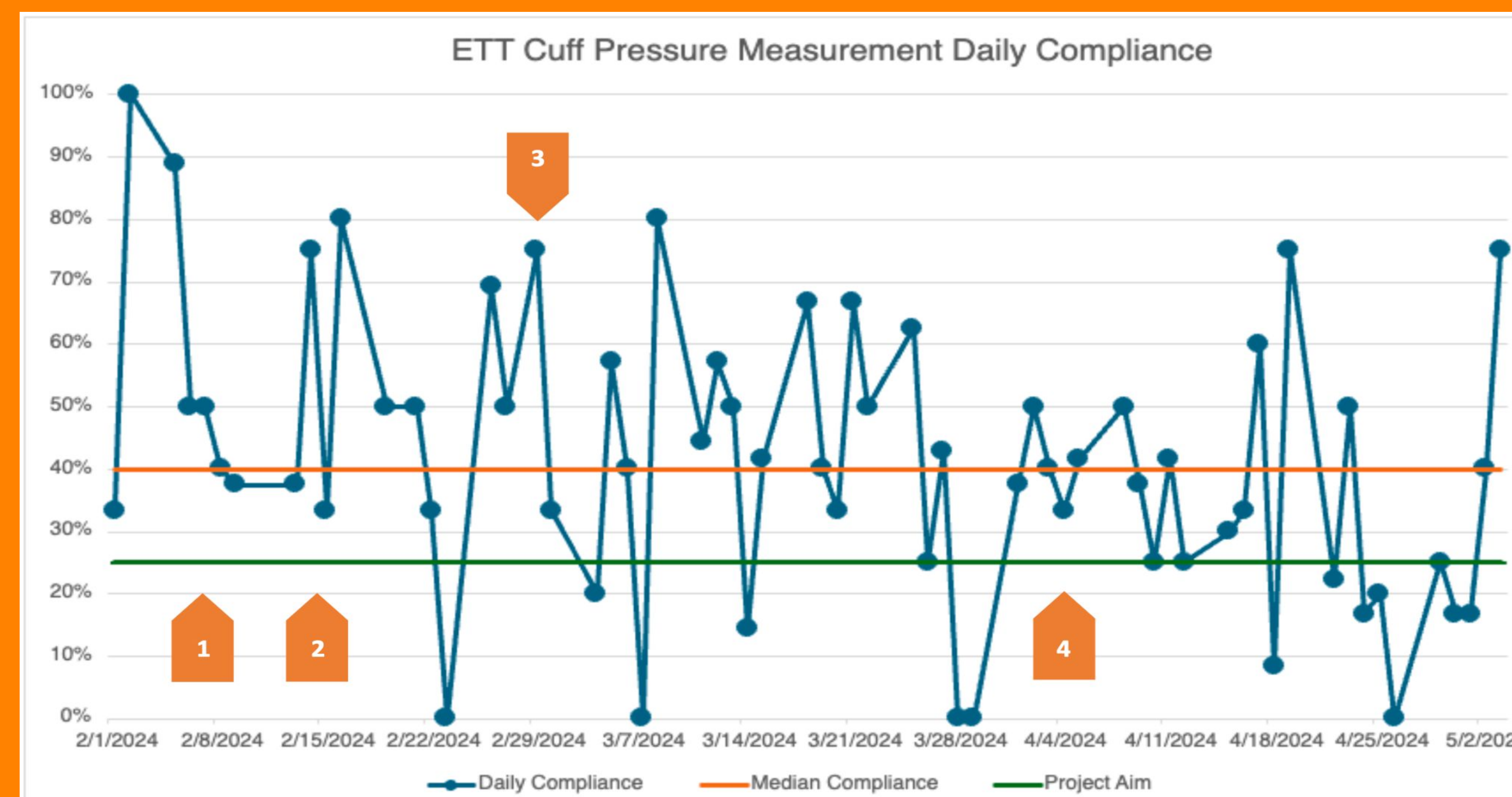
METHODS



- The Evidence-Based Practice Improvement model was used as the framework for this project.
- The evidence strongly supported the objective measurement of ETT cuff pressures with a manometer as a means of decreasing the incidence of endotracheal injuries and **postoperative sore throat (POST)** in adults undergoing general anesthesia.^{1, 5, 6, 7, 8}
- Process measures were assessed for ETT cuffs filled to **20-30 cm H₂O** for a 3 month.
- Outcome and balancing measures were assessed pre- and post-implementation.

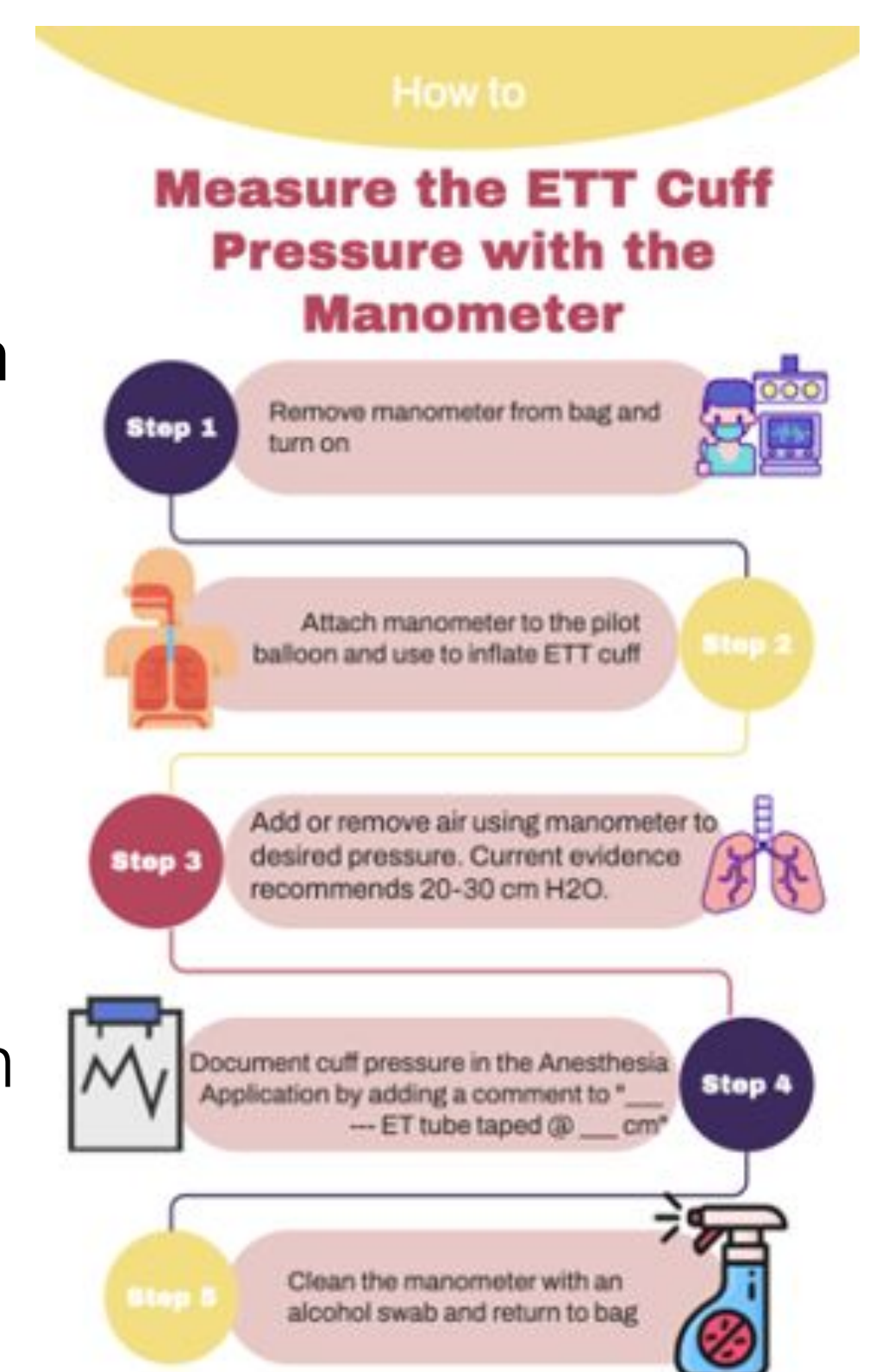


This project aimed to increase the number of ETT cuffs filled to 20-30 cm H₂O, as measured with a manometer and documented on the anesthesia record, to 25% within a three - month time frame.



INTERVENTIONS

- We initiated the use of a manometer in designated ORs to maintain ETT cuff pressures between **20-30 cm H₂O** in order to reduce POST.
- All adult patients that had an ETT and received general anesthesia in the designated ORs were included.
- Compliance was evaluated on an ongoing basis and PDSA cycles were performed as needed.



RESULTS

	Pre-Implementation (n=15)	Post-Implementation (n=10)
Median ETT cuff pressures	32 cm H ₂ O	28 cm H ₂ O
POST	26.7%	30%
% ETT cuff pressures within 20-30 H ₂ O	33.3%	80%
AIS-AIR times	5 min	4 min

- Overall mean Compliance **41.4%** (n=476)
 - Exceeding project aim of 25%
- 85.7%** of patient who reported POST had an ETT cuff pressure outside 20-30 cm H₂O

CONCLUSIONS

- The use of a manometer resulted in a clinically significant increase in the number of appropriately filled ETT cuff pressures.
- The use of a manometer is cost effective (only adds \$0.10 per intubation) and resulted in no delay in anesthesia ready.
- Future projects could encompass additional procedures, patient characteristics, and other factors.

REFERENCES

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