

Pediatric Post-Operative Tracheostomy Care: Improving Quality

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INTRODUCTION

Topic

Does improving standardization of post-operative clinical care for children with a new tracheostomy decrease adverse events and average length of stay?

• Literature emphasizes the significance of standardizing clinical care for complex, vulnerable patient populations to decrease adverse events and length of stay (LOS).

Background and Population

- Lanvin et al., 2016, describes patients needing tracheostomies as medically complex, who are at risk for clinical complications and require care from a multi-disciplinary team.
- Surgical complication rates in the acute post-operative period following tracheostomy placement range from 10-58% (Campisi, 2016).
- Co-morbidities and complications increase opportunities for system failures throughout the post-operative phase of care.

Problem and Location

The pediatric postoperative tracheostomy patient population at Monroe Carell Jr. Children's Hospital at Vanderbilt has a history of a long LOS and averages up to 75 days, some with length of stay >150 days.

- A root cause analysis identified the opportunity to create a written evidence based post-operative plan of care for this population.
- The existing order set in the electronic medical record was out of date and did not reflect current clinical standards.

Team Members

Executive sponsor, Chief Nursing Officer, Monroe Carell Division Chief, Pediatric Otolaryngology Co-Chairs Pediatric Tracheostomy Care Committee Pediatric Nurse Practitioner Otolaryngology Inpatient Team Pulmonary Medicine, Department of Pediatrics NICU and PICU Nursing and Nurse Practitioner team members Nursing Education Performance Management and Improvement Office Health Informatics

Aim

To decrease ALOS, measured from tracheostomy placement to discharge, for the pediatric post-operative tracheostomy population by 10%, from current ALOS of 66 days, to <60 days, and to reduce tracheostomy related adverse events by implementing an evidencebased plan of care and by updating the post-operative order set in the electronic medical record.

QR CODE: NEW PLAN OF CARE & REFERENCES



Plan

Do

Study

Act

- Plan to adopt the change

Post-O	
Drimary Lilannos	Age in months
Respiratory Failure, Prematurity, Bronchopulmonary Dysplasia (BPD) Tracheomalacia, Sub Stenosis, Tracheoesophageal F	5
Apert syndrome, Midf Hypoplasia with Seve Obstructive Sleep	9
Respiratory Failure, Prematurity, Pulmona Vascular Disease, BP Tracheoesophageal F Tracheomalacia	7
Prematurity, Pulmona Vascular Disease, Pulmonary Hypertens BPD	10
Respiratory Failure, Stenosis of the Trache repair, Bronchomalac Tetraology of Fallot w Pulmonary Atresia s/p Repair	12
Respiratory Failure, Prematurity, Pulmona Vascular Disease, BP Subglottic Stenosis, Pulmonary Hypertens	5
Respiratory failure, laryngomalacia, cleft Tetralogy of Fallot with pulmonic stenosis s/p pulmonary sling	2

Vanderbilt University School of Nursing

METHODS

Develop action plan with the multi-disciplinary Pediatric Tracheostomy Care Committee Meet with stakeholder groups to develop new evidence-based post-operative plan of care and make updates to the existing post-operative order set

• Meet with Health IT to pilot and test order set changes with clinicians Educate and share the new post-operative plan of care and revised order set with the multi-disciplinary neonatal and pediatric intensive care (ICU) teams

Implement order set December 2022 in the ICUs

• Monitor for adherence to the new plan of care with routine rounding and chart audits

• Data Collection, December 14, 2022 – March 14, 2023 (90 days) • Analyze demographic, ALOS and adverse event data via chart review to determine how the change impacts process measures and patient outcomes Review nursing feedback for changes to the new evidence-based plan of care

• The new evidence-based plan of care will be presented to the Monroe Carell Clinical Practice Committee for approval as a Standard Operating Procedure in April 2023

RESULTS

Tracheostomy Pediatric Population Characteristics, Adverse Events and Compliance with Process Measures, n= 7 Data Collection 12/14/22 - 3/14/23 🖌 = Yes / 🗷 = No

iosis	Secondary Diagnosis	Blue Trach Equipment Bag at Bedside on admission (Yes/No)	New Post- op Order Set Utilized (Yes/No)	Journey Board at Bedside Before First Trach Change (Yes/No)	New Care Plan at Bedside Before First Trach Change (Yes/No)	Weekly Chart Audit for Tracheostomy Related Adverse Events or Complications		Date of Discharge to Home	Length of Stay (days)
	Persistent Primary	Process Measures				Clinical Outcome Operational Outcome			
l Fietula	Pulmonary Hypertension of the Newborn, Twin gestation, Mitral Valve Insufficiency, Inguinal Hernia and Hypospadias	~	Fi00e		~	None	12.15.22	2.27.23	74
idface vere	Craniosynostosis, s/p Craniotomy, Atelectasis	~	✓	✓	\checkmark	None	1.13.23	1.30.23	17
nary BPD,	Intraventricular Hemorrhage grade III, Chylothorax s/p Multiple Thoracic Duct Ligations, Scoliosis	~	~	~	~	Tracheostomy skin complication: leak around trach site, packed with dressing, with successful healing 2.13.23	1.30.23	*	53
nary Insion,	Twin Gestation	✓	✓	×	~	None	1.30.23	*	53
acia,	Cleft Palate, Micrognathia s/p Mandibular Distraction, Oropharyngeal Dysphagia, Full Term Gestation	~	~	~	~	None	2.15.23	*	27
, nary 3PD, , nsion	Gastroschisis with Dilated Bowel	~	~	~	~	None	2.24.23	*	18
viuri s/m	DiGeorge Syndrome, feeding intolerance, complete repair of TOF in 3-4 months	~	~	~	~	None	3.6.23	*	8
	* patient v	was not discha	rged by 3/14	/23, inpatient len	gth of stay shown	as of 3/14/23			

Of the seven patients, two were discharged during the data collection period, with ALOS of 46 days. All seven patients studied have multiple co-morbidities that increase risk for complications, long length of stay and mortality including prematurity, pulmonary vascular and congenital heart disease. The five patients who remain hospitalized require additional surgical interventions for unrepaired heart disease, thoracic duct ligation, or chronic feeding intolerance. Three of the five patients have social/economic circumstances preventing discharge including identifying caregivers with a home setting capable of supporting long term mechanical ventilation. A longer period of study is necessary to draw additional conclusions.

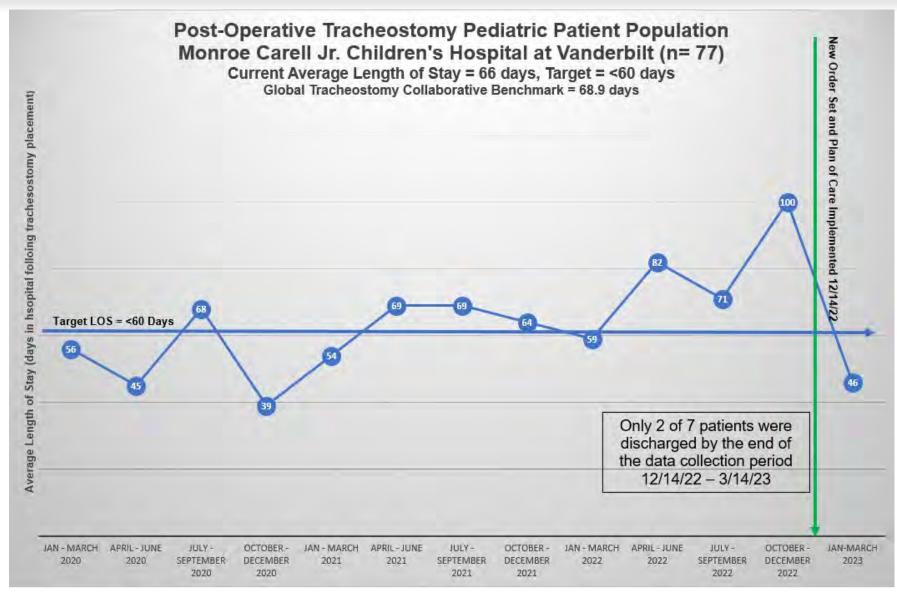
Strengths

Cost of Care

Next Steps



RESULTS



IMPLICATIONS FOR PRACTICE

Limitations

• Small sample size

Time limited pilot

• No control for confounding variables (patient complexity, economic or social barriers to discharge)

• Discharge readiness structure and interventions for family education, equipment safety and journey board interventions are specific operational clinical care processes for Monroe Carell and may be adapted for use in other organizations.

Success of the PDSA cycles are a result of the engagement of the tracheostomy care committee and the >ten multidisciplinary groups who informed the clinical changes, design and implementation of the interventions.

 Rogerson et al., 2020, documents an ALSO of 155 days, with average cost patient cost of \$622,671 in the initial hospitalization, or \$4017 per day.

• At Monroe Carell 24 new tracheostomies are placed annually and the current LOS is 66 days. Thus, a reduction in length of stay by 10%, to 60 days, may result in approximately \$600,000 in annual savings.

• Future efforts will focus on implementing additional strategies to improve outcomes for this population and may be applicable to improving care for other complex pediatric patient populations.

Post-Operative Tracheostomy Pediatric Population Characteristics, Adverse Events and Compliance with Process Measures, n= 7 Data Collection 12/14/22 – 3/14/23

Age in months	Primary Diagnosis	Secondary Diagnosis	Blue Trach Equipment Bag at Bedside on admission	Order Set Utilized (Yes/No)	Journey Board at Bedside Before First Trach Change (Yes/No) SS Measures	New Care Plan at Bedside Before First Trach Change (Yes/No)	Weekly Chart Audit for Tracheostomy Related Adverse Events or Complications Clinical Outcome	Date of Tracheostomy Insertion	Date of Discharge to Home ational Outcom	Length of Stay (days)
5	Respiratory Failure, Prematurity, Bronchopulmonary Dysplasia (BPD) Tracheomalacia, Subglottic Stenosis, Tracheoesophageal Fistula	Persistent Primary Pulmonary Hypertension of the Newborn, Twin gestation, Mitral Valve Insufficiency, Inguinal Hernia and Hypospadias					None	12.15.22	2.27.23	74
9	Apert syndrome, Midface Hypoplasia with Severe Obstructive Sleep	Craniosynostosis, s/p Craniotomy, Atelectasis	\checkmark	\checkmark			None	1.13.23	1.30.23	17
7	Respiratory Failure, Prematurity, Pulmonary Vascular Disease, BPD, Tracheoesophageal Fistula, Tracheomalacia	Intraventricular Hemorrhage grade III, Chylothorax s/p Multiple Thoracic Duct Ligations, Scoliosis					Tracheostomy skin complication: leak around trach site, packed with dressing, with successful healing 2.13.23	1.30.23	*	53
10	Prematurity, Pulmonary Vascular Disease, Pulmonary Hypertension, BPD	, Twin Gestation					None	1.30.23	*	53
12	Respiratory Failure, Stenosis of the Trachea s/p repair, Bronchomalacia, Tetraology of Fallot with Pulmonary Atresia s/p Repair	^e Cleft Palate, Micrognathia s/p Mandibular Distraction, Oropharyngeal Dysphagia, Full Term Gestation					None	2.15.23	*	27
5	Respiratory Failure, Prematurity, Pulmonary Vascular Disease, BPD, Subglottic Stenosis, Pulmonary Hypertension	Gastroschisis with Dilated Bowel					None	2.24.23	*	18
2	Respiratory failure, laryngomalacia, cleft palate, Tetralogy of Fallot with pulmonic stenosis s/p pulmonary sling	DiGeorge Syndrome, feeding intolerance, complete repair of TOF in 3-4 months					None	3.6.23	*	8

