

# Tube Hero: Paving the Road to Zero "A Decade in the Making"

Anel Godfrey, MSN, APRN, FNP-C, CPN, RNC-NIC, C-ELBW •  
Flor Tena, MSN-Ed, RN, CBE, CCRN-K • Maily Padilla, MHA, RRT



## Background

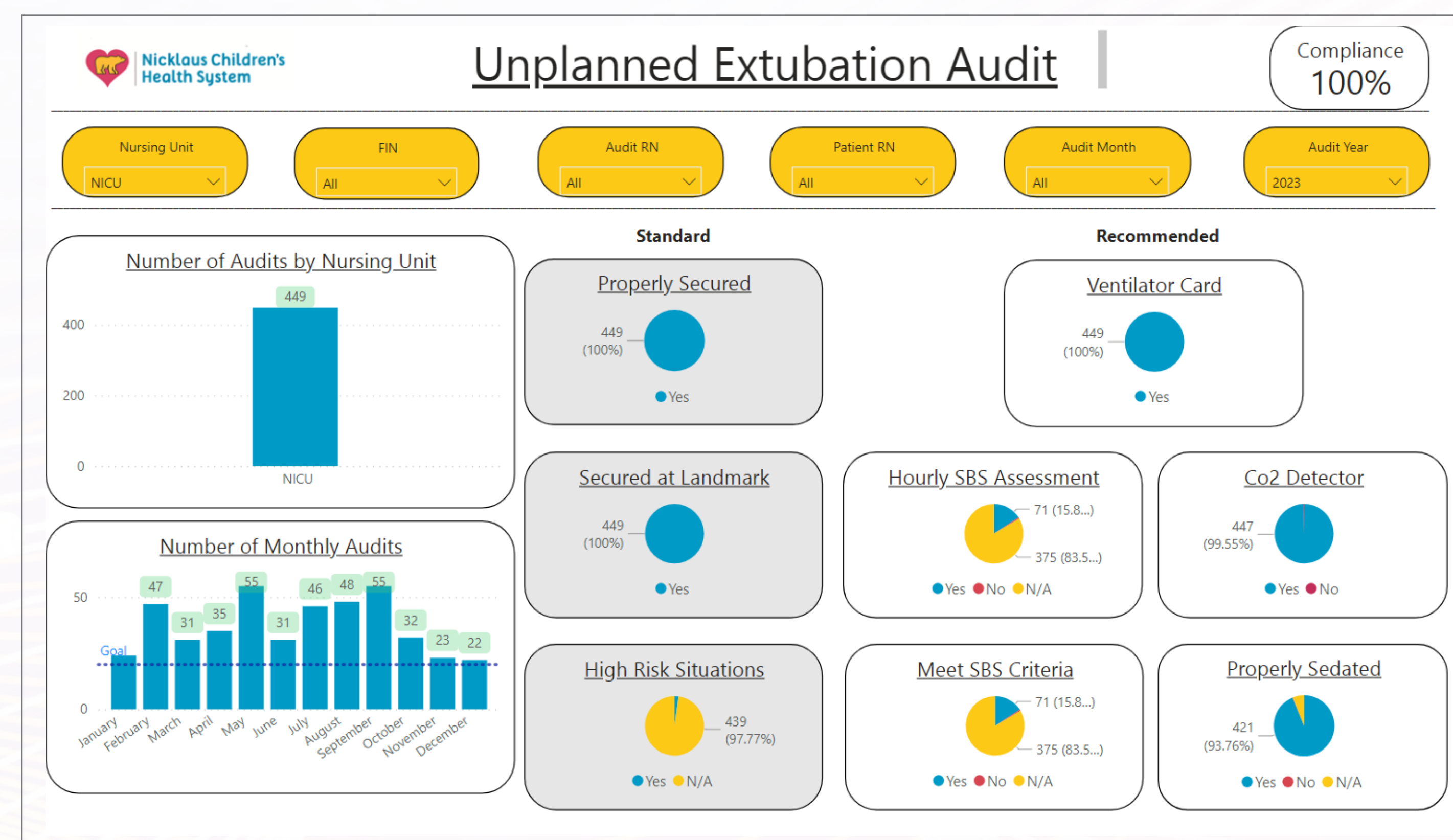
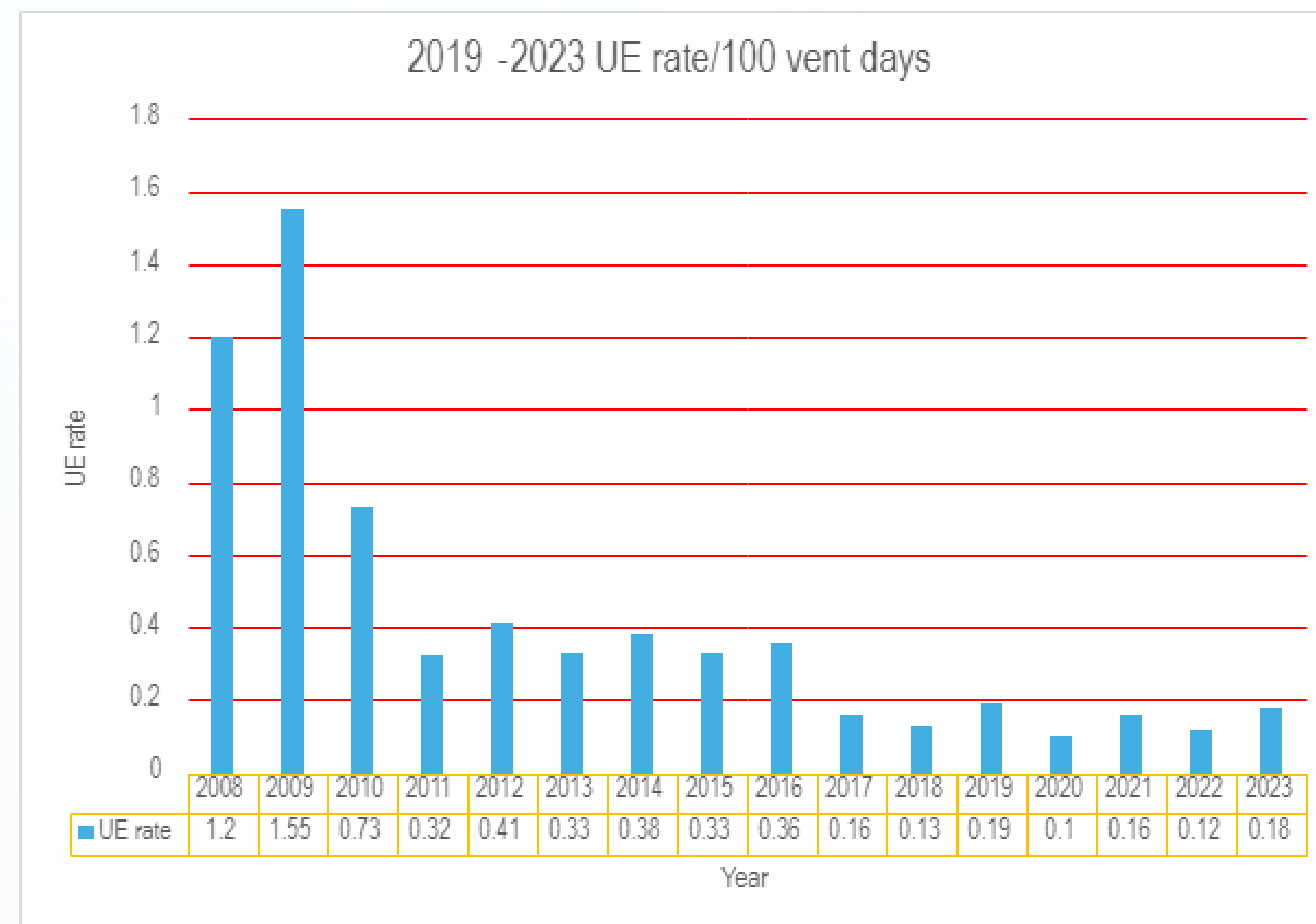
- A common procedure in a NICU is endotracheal intubation for the treatment of prematurity and airway management. Unplanned extubations (UE) can bring about many dangers that result in traumatic, emergent re-intubation, and hemodynamic instability including the need for increased ventilatory support.
- Our Neonatal Intensive Care Unit (NICU) has established standardized processes to decrease and sustain the rate of UE using a multidisciplinary team approach.
- Airway rounds were implemented to assess placement and securement of ETT. Implementation of standardized taping method and supplies for ETT securement, and implementation of ventilator cards placed at each ventilator with ETT size and placement for quick reference.
- Introduction of interdisciplinary team huddles post UE event, which aids in identifying prevention opportunities and reinforces lessons learned.
- Most recently, we have established Redcap audits for live auditing of UE prevention bundle elements.
- In 2009, before implementation our UE rate was 1.55 per 100 ventilator days. After one year of implementation, our UE rate decreased to 0.73 per 100 ventilator days. We have been able to sustain our UE rate below benchmark since, with 2022 being at 0.12 per 100 ventilator days.

## Objectives

- To identify and implement strategies to reduce and sustain the rate of UE in the NICU
- Identify practice gaps to decrease the NICU UE rate.
- Establish standardized processes to decrease and sustain the rate of UE using a multidisciplinary team approach.
- Implement new processes and interventions that assist with identifying high risk patients/ situations.

## Results

In 2009, before implementation our UE rate was 1.55 per 100 ventilator days. After one year of implementation, our UE rate decreased to 0.73 per 100 ventilator days. We have been able to sustain our UE rate below benchmark since, with 2023 being at 0.18 per 100 ventilator days.



NCH NICU  
ETT Re-taping Protocol

Date: \_\_\_\_\_ RN: \_\_\_\_\_ RT: \_\_\_\_\_ MD/NP: \_\_\_\_\_ Charge RN: \_\_\_\_\_

- RN & RT perform airway rounds - completed every 2 hours - and assess need for re-taping endotracheal tube (ETT). Reason: \_\_\_\_\_
- RT/RN review last CXR. Date of x-ray: \_\_\_\_\_
- Notify provider and charge nurse of need to re-tape. Time: \_\_\_\_\_


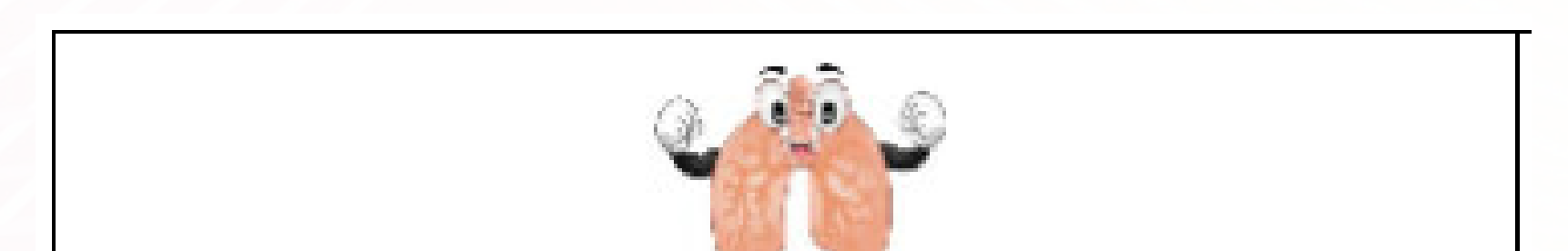
**Precaution:** A provider who can re-intubate should be notified and available in case of accidental dislodgment

- Patients >34 wks GA: Assess SBS Score  
SBS Score: \_\_\_\_\_ SBS Goal: \_\_\_\_\_  Adequately sedated before procedure
- Patients <34 wks GA: If active/agitated or if patient has been identified as having a "critical airway" obtain order for sedation before manipulating ETT  
 Patient does not need sedation  Patient is not agitated  Other \_\_\_\_\_

- Obtain standing sedation PRN order for re-taping with agitation if not in Corner. Notify physician if concerns regarding risk for self-extubation. Check all that apply:  
 PRN sedation already in place in MAR  New PRN ordered obtained  
Med given: \_\_\_\_\_ Number of doses: \_\_\_\_\_
- Re-taping must include at least one RN and one RT or 2 RTs with RN at the bedside.
- Stabilize head and secure arms with swaddling.
- Monitor VS and position of ETT.
- Retape ETT using appropriate skin barrier and method of taping procedure.
- Reassess breath sounds, etCO<sub>2</sub>, and ETT depth/markings at lip. Confirm with chest x-ray as ordered by physician.
- Provide CC with this completed form.

PATIENT LABEL

Version: 1.4  
Date: 05/2019  
Initials: [Signature]

Patient Name: \_\_\_\_\_

Cuffed/Uncuffed ETT \_\_\_\_\_ Taped @ \_\_\_\_\_

Cuffed/Uncuffed Tracheostomy size \_\_\_\_\_

Trach last changed on: \_\_\_\_\_

## Methods / Implementation

- In 2009, the NICU leadership team conducted a retrospective apparent cause analysis to mitigate high rates of UE.
- In collaboration with physicians, respiratory department and nursing we were able to establish education, and implementation of practice changes
- Airway rounds were implemented to assess placement and securement of ETT and discuss possible needed interventions.
- A standardized taping method and supplies for ETT securement, to avoid variation in practices
- Ventilator cards were placed at each ventilator with ETT size and placement for quick reference
- Implementation of interdisciplinary team huddles post UE event, which aids in identifying prevention opportunities and reinforces lessons learned
- We established Redcap audits for live auditing of UE prevention bundle elements

## Conclusion

With the collaboration of the NICU team including physicians, nurses, RTs and families, we have reduced drastically and sustained the NICU numbers below benchmark. We have been able to sustain our UE rate below benchmark with 2023 being at 0.18 per 100 ventilator days. The sustainment of this quality improvement project has had major impact on patients, families, costs and patient outcomes and safety.

## References

- Mahaseth, M., Woldt, E., Zajac, M. E., Mazzeo, B., Basirico, J., & Natarajan, G. (2020). Reducing Unplanned Extubations in a Level IV Neonatal Intensive Care Unit: The Elusive Benchmark. *Pediatric quality & safety*, 5(6), e337. <https://doi.org/10.1097/pq9.0000000000000337>
- Klugman D, Melton K, Maynard PD, et al. Assessment of an Unplanned Extubation Bundle to Reduce Unplanned Extubations in Critically Ill Neonates, Infants, and Children. *JAMA Pediatr*. 2020;174(6):e200268. doi:10.1001/jamapediatrics.2020.0268
- Hatch, L. D., 3rd, Scott, T. A., Slaughter, J. C., Xu, M., Smith, A. H., Stark, A. R., Patrick, S. W., & Ely, E. W. (2020). Outcomes, Resource Use, and Financial Costs of Unplanned Extubations in Preterm Infants. *Pediatrics*, 145(6), e20192819. <https://doi.org/10.1542/peds.2019-2819>