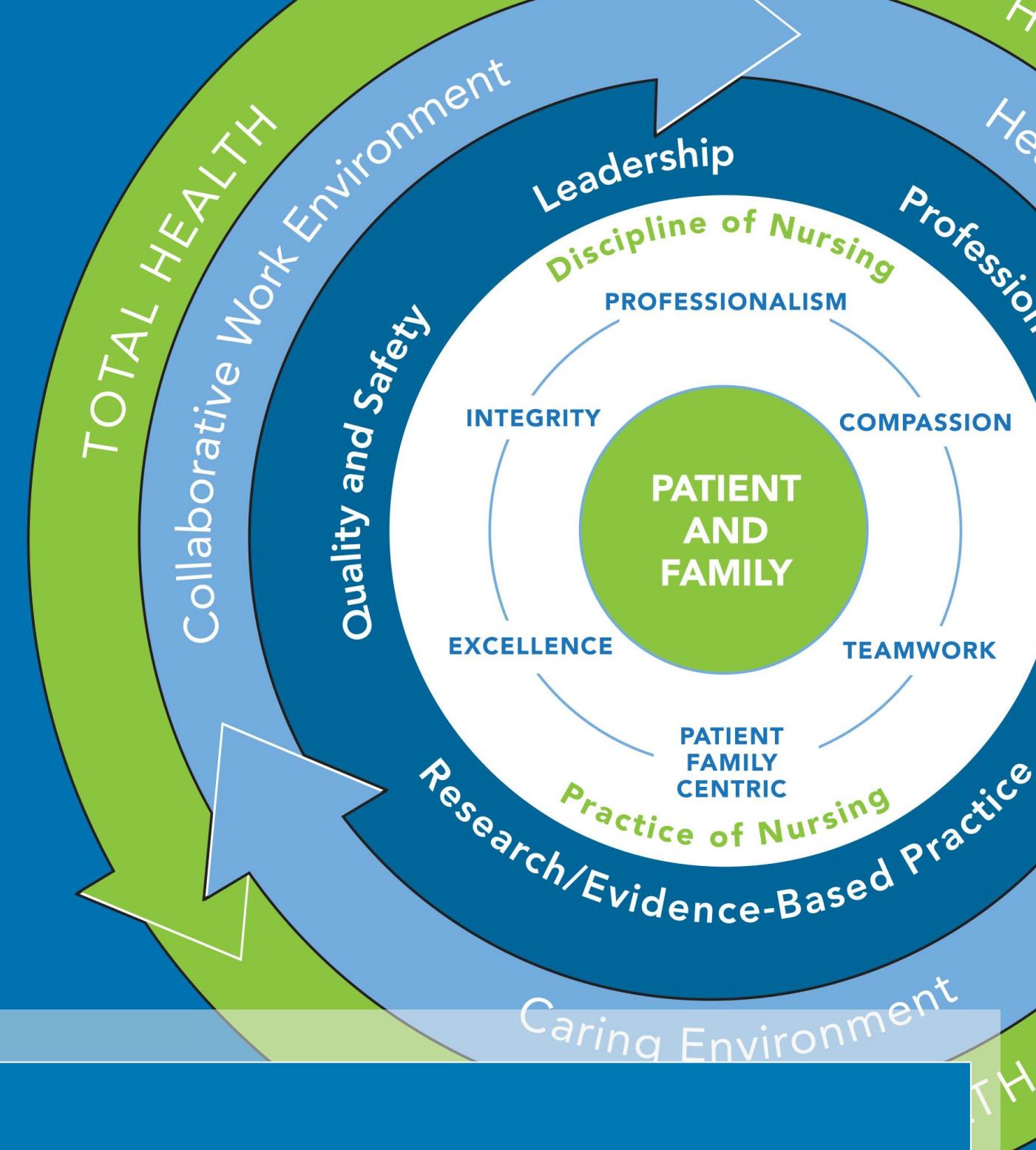


# Bundles, Tools, Education, and Time: Decrease Neonatal Ventilator-Associated Pneumonia and Ventilator-Associated Events

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## INTRODUCTION

**Background and Significance.** Ventilation is crucial in life saving measures in the NICU. In 2017-2018, this Level III-c Neonatal Intensive Care Unit (NICU) was attributed 32 ventilator-associated pneumonia (VAP) cases. Potential causes of VAPs are associated with poor hand hygiene, environmental hygiene, unplanned extubations, reintubations, low birthweight, duration of mechanical ventilation, opiate treatment or sedation, frequent suctioning, and inconsistency and reliability of interpretation of chest x-rays. VAP prevention is a nurse sensitive indicator and reported as a hospital acquired condition.

**Definitions.** VAP an episode of pneumonia in a patient who requires a device to assist or control respiration through a tracheostomy or endotracheal tube within 48 hours before the onset of the infection. VAE identified by using a combination of objective criteria: deterioration in respiratory status after a period of stability or improvement on the ventilator, evidence of infection or inflammation, and laboratory evidence of respiratory infection.

**Purpose.** This quality improvement project initiated the creation, implementation, and maintenance of a bundle to decrease VAP cases utilizing plan-do-study-act (PDSA) cycles for all patients with respiratory support greater than high flow nasal cannula.

**Overall Goal.** Zero VAP cases and VAE.



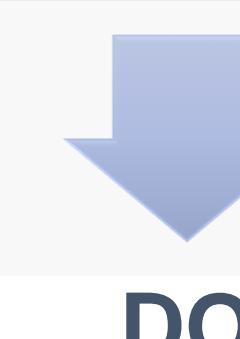
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## METHODS

### PLAN

- 2019 – NICU Skills Day: changes in ventilator location, suction tubing length, location of head in bed, RN/RCP huddle, use of chest physiotherapy, ETT tape not neobar, introduce IPAT, removal of misused/infrequently used positioning aides, unplanned extubation (UPE) debrief
- 2020 – Monthly NICU Respiratory Infection Prevention Meetings; NICU VAP Prevention Bundle
- 2021 – Centralize respiratory supplies, streamline crash cart
- 2022 – Regional UPE algorithm and debrief; NICU Professional Practice Update: new positioning aides



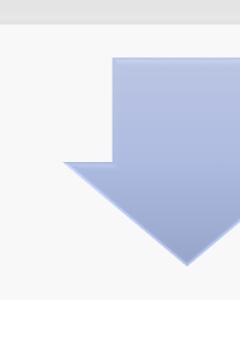
### DO

- Onboarding new experienced NICU CNS (March 2019)
- Intubation rounds and individual remediation (March-September 2019)
- NICU Skills Day Go Live (September 2019)
- ETT Compliance Audit Tool (November 2019)
- NICU ETT Daily Rounds Tool (December 2019)
- NICU Respiratory Infection Prevention Meeting, NICU VAP Rounding Audit Tool (July 2020)
- NICU VAP Prevention Bundle Education, terminology change from VAP to VAE (August 2020)
- NICU VAP Prevention Bundle Cares and Documentation Go Live (September 2020)
- Intubation Checklist Go Live (October 2020)
- Staff Meeting Bundle Review (June, August, September, November 2020)
- SharePoint NICU VAP Bundle Pop-Quiz (December 2020)
- Regional Unplanned Extubation Algorithm and Debrief (February 2022)



### STUDY

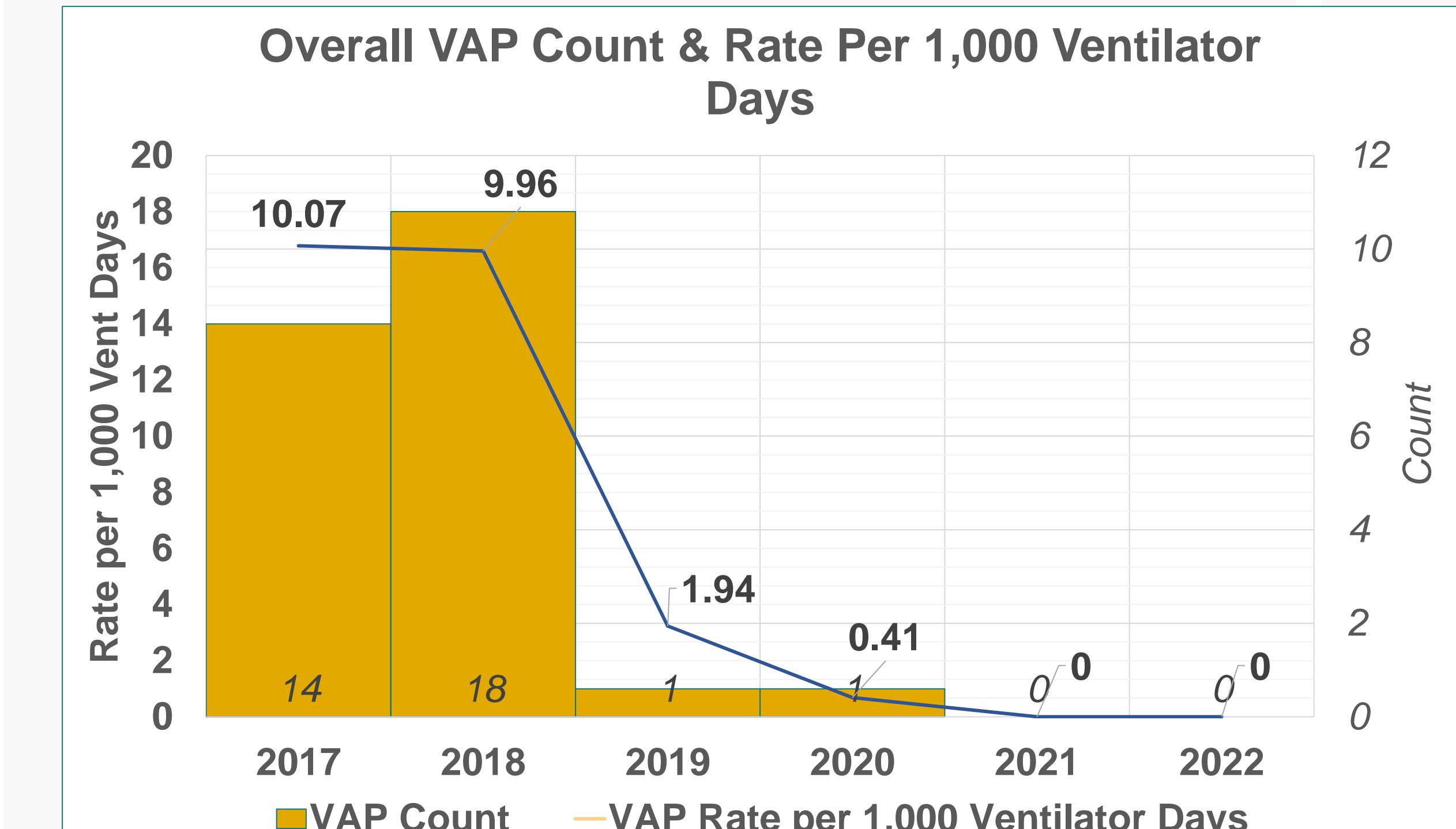
- Daily rounds and "just in time"/ongoing education
- Assess, analyze, and reflect upon staff reaction and compliance to changes
- Review monthly VAP data and RN VAP documentation



### ACT

- 2019 – Staff unable to adapt to physical changes in work environment
- 2020 – Create progress note NICU VAP Bundle smartphrase to enforce clinical practices
- 2021 – Create unplanned extubation algorithm workflow and improve debriefing

## RESULTS



The number of VAP cases decreased between 2019-2022.

- 32 (2017-2018)
- 2 (2019-2020)
- 0 (2021-2022Q3)

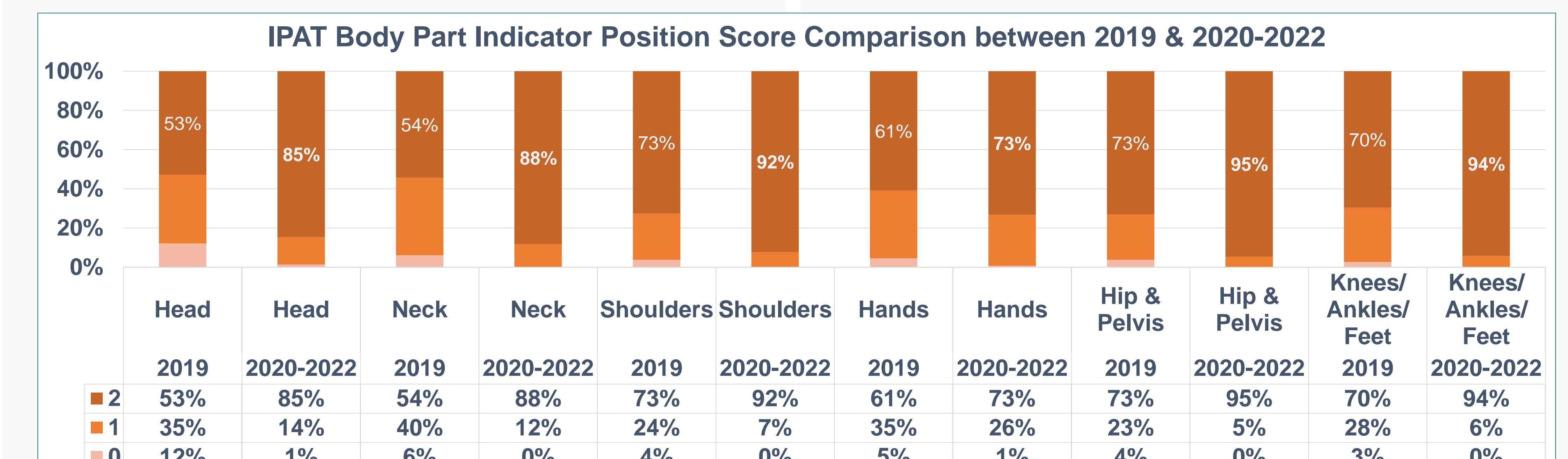
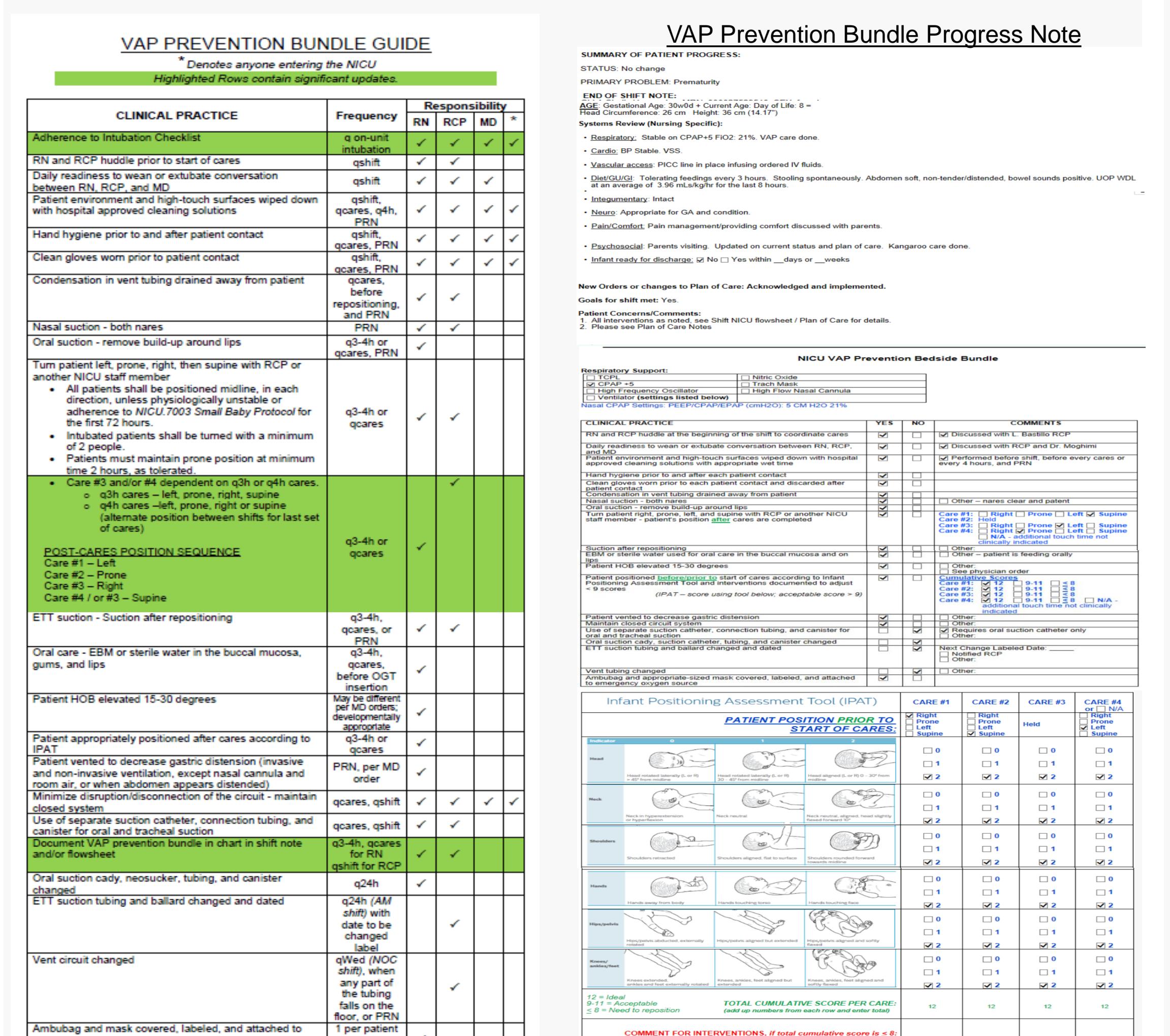
The VAP rate decreased from

- 10.07 (2017)
- 0 (2022 Q1-Q3)

Sample size of charts audited = 263 (2019), 460 (2020-2022).

Overall RN VAP Prevention Bundle Documentation completion rate = 86%.

The average total IPAT score improved from 9.5 (2019; min: 0, max: 12) to 11.8 (2020-2022; min: 6, max: 12).

## CONCLUSION

Use of an evidence-based VAP prevention bundle prevents potential causes of ventilator associated pneumonia (VAP) and ventilator-associated events (VAE).

These findings demonstrate the necessity of positioning and handling, communication and partnership with the NICU team, clinical practice and documentation standardization, and staff accountability, to decrease the number of ventilator days, overall ventilatory infections and events.

## CONTACT INFORMATION

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