

Reducing Ventilator Associated Pneumonia in the PICU

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BACKGROUND

Ventilator-associated pneumonia (VAP) is defined as a pneumonia where the patient is on mechanical ventilation for greater than two consecutive calendar days on the date of the event, with day of ventilator placement being day one **AND** the ventilator was in place on the date of the event or the day before.¹

In December 2020, the Pediatric Intensive Care Unit (PICU) nurse manager and a direct care nurse asked for an interprofessional group to be formed to review the PICU VAP data from 2nd Quarter 2020 and 3rd Quarter 2020 to see if the group could help answer the question “will the addition of an interprofessional team approach coupled with an evidence-based prevention bundle reduce the rate of VAPs in the PICU to zero?”

The project was postponed until January 2022, due to unanticipated workload requirements secondary to COVID-19, but was picked back up under new leadership and interprofessional team members.

PURPOSE

This quality improvement project aimed to reduce the Pediatric Intensive Care Unit’s (PICU) VAP rate to less than the national benchmark.

The second aim was to restructure the ventilator bundle using an interprofessional approach to meet current evidence-based practice for the pediatric population.

METHODS

Using the Johns Hopkins Evidence Based Practice (JHEBP) Model for Nursing and Healthcare Professionals the team compiled articles from the diverse group of healthcare providers on the team and completed an evidence summary. The evidence summary was then synthesized by the Pediatric Clinical Nurse Specialist to determine where the evidence showed consistencies and inconsistencies. The synthesis of evidence was presented to the group for discussion of the best evidence recommendations to consider based on quantity, consistency and strength of the evidence. The implementation of the new PICU Ventilator Bundle occurred on April 22, 2022.

In May 2022, in a collaborative effort, the Society for Healthcare Epidemiology (SHEA), Infectious Diseases Society of America (IDSA), and the Association for Professionals in Infection Control (APIC) released their 2022 Update on strategies to prevent ventilator-associated pneumonia, ventilator-associated events, and nonventilator hospital-acquired pneumonia in acute-care hospitals in the *Infection Control and Hospital Epidemiology* journal.² On October 7, 2022, the interprofessional group reconvened to review the new recommendations. The only new recommendation not already adopted by the group was the removal of Chlorhexidine Gluconate (CHG) mouthwash. Due to the recent changes, the adoption of this change was delayed until 2nd quarter of 2023, as positive results were being seen in 3rd and 4th quarters of 2022.

In April 2023, the PICU Ventilator Bundle was updated to remove CHG from practice in the pediatric population.

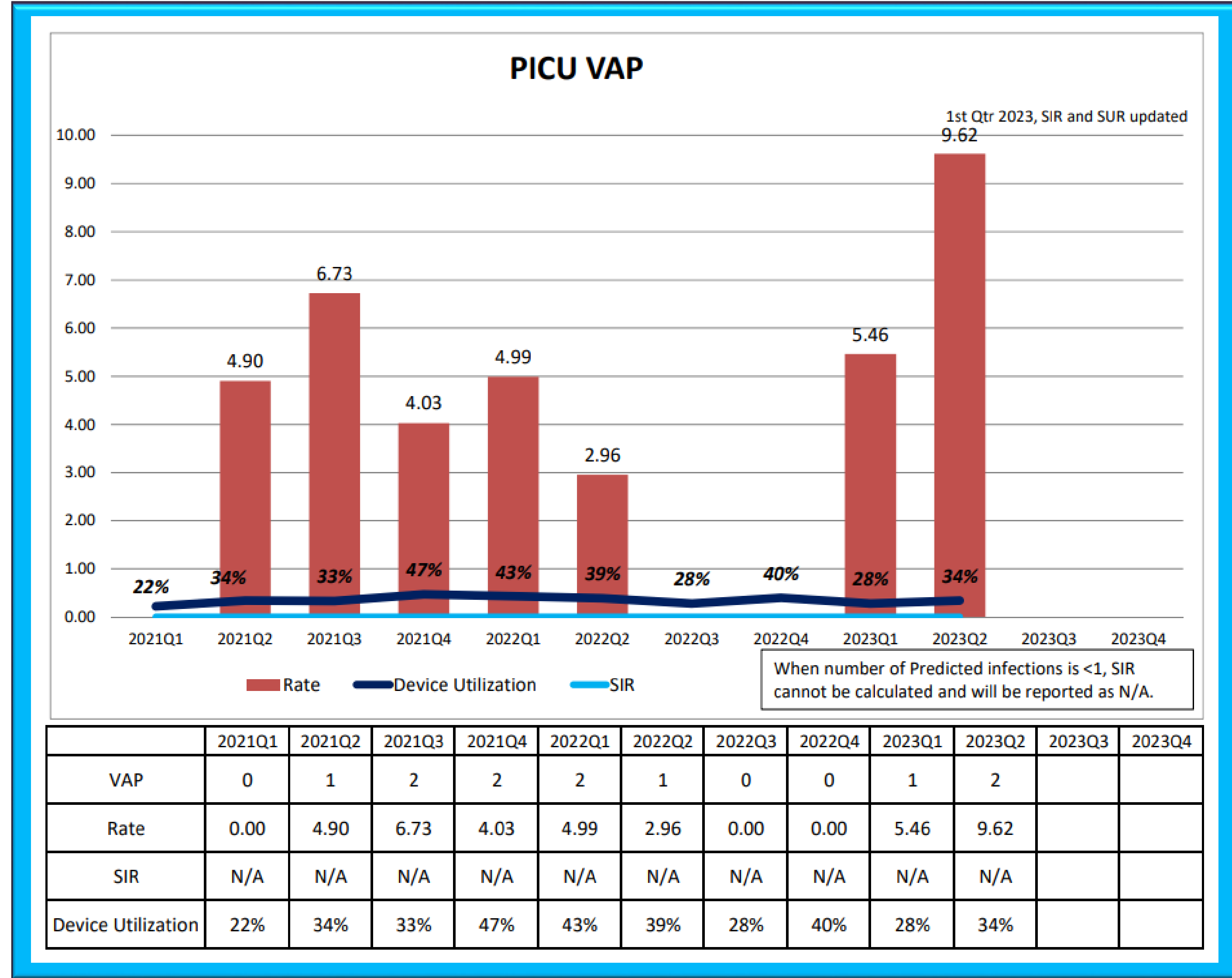
Children's Hospital of Nevada at UMC
PICU Nurse Daily Maintenance & Access Bundles

Instructions: All "No" responses require a Nursing action with documentation in the EHR. Write "DIC" on the day if a device is discontinued. The reviewing nurse must sign at the bottom of each date column.

DATE							
VENTILATOR							
Intubation Date: _____	Vent Day: _____	Vent Day: _____	Vent Day: _____	Vent Day: _____	Vent Day: _____	Vent Day: _____	Vent Day: _____
1. Head of bed (HOB) ≥ 30° or documented exception?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Oral care every 4 hours with suctioning?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Deep oral suctioning, per protocol?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Teeth brushing every 12 hours?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Daily assessment of readiness to extubate?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
NURSE SIGNATURE _____							

PEDIATRIC VAP PREVENTION

1. Head of bed (HOB) ≥30° or documented exception
2. Oral care every 4 hours with suctioning
3. Deep oral suctioning per protocol
4. Teeth brushing every 12 hours
5. Daily assessment of readiness to extubate



RESULTS

With the collaborative efforts of this interprofessional team consisting of direct care nurse, nurse manager, advanced practice registered nurse–pediatric clinical nurse specialist, physician champion, pharmacist, respiratory therapist, and infection preventionist, the team was able to update the ventilator bundle to current evidence-based practice using an interprofessional approach. Education was provided to all staff in the PICU, including nurses, respiratory therapists, and providers, and supplies were updated, reducing the total number of supplies needed in the unit.

After implementing the interventions, the PICU saw two consecutive quarters with ZERO cases of ventilator-associated pneumonia. The group continues to meet quarterly to review data presented by the infection preventionist and continue to monitor bedside practice.

DAILY SAFETY BRIEFING NOTES

March 10, 2023

Today's Safety Story

SITUATION: Preventing ventilator associated pneumonia.

BACKGROUND: Ventilator-associated pneumonia (VAP) is a lung infection that develops in a person who is on a ventilator. An infection may occur if germs enter through the tube and get into the patient's lungs.

ASSESSMENT: A multidisciplinary team recently met to review The Society for Healthcare Epidemiology of America (SHEA) most recent recommendations and proven strategies in the prevention of VAPs. The team compared our current practices against the best practice recommendations and discovered an opportunity for improvement. SHEA notes that meta-analyses of randomized trials and observation studies found chlorhexidine's lack of clear impact on VAP rates and the possibility of increased mortality rates with its use. Based on the study findings, SHEA recommends daily oral care with toothbrushing but without chlorhexidine. The multidisciplinary team will bring the data to the Critical Care committee with recommendation to eliminate the use of chlorhexidine for oral care.

RECOMMENDATION: Daily toothbrushing of vented patients is an essential practice in the prevention of ventilator associated pneumonia.

CONCLUSIONS

VAPs are associated with higher mortality when a patient has numerous comorbidities. Preventative techniques in patient care can reduce the risk when the interprofessional team works together to manage care. Addressing modifiable risk factors such as keeping the head of bed greater than 30 degrees, providing oral care every four hours with suctioning, providing deep oral suctioning, brushing teeth every 12 hours, and completing a daily assessment of readiness to extubate can improve patient outcomes, decrease ventilator-associated pneumonia and has the potential to decrease the economic impact of a VAP on an organization.

REFERENCES

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