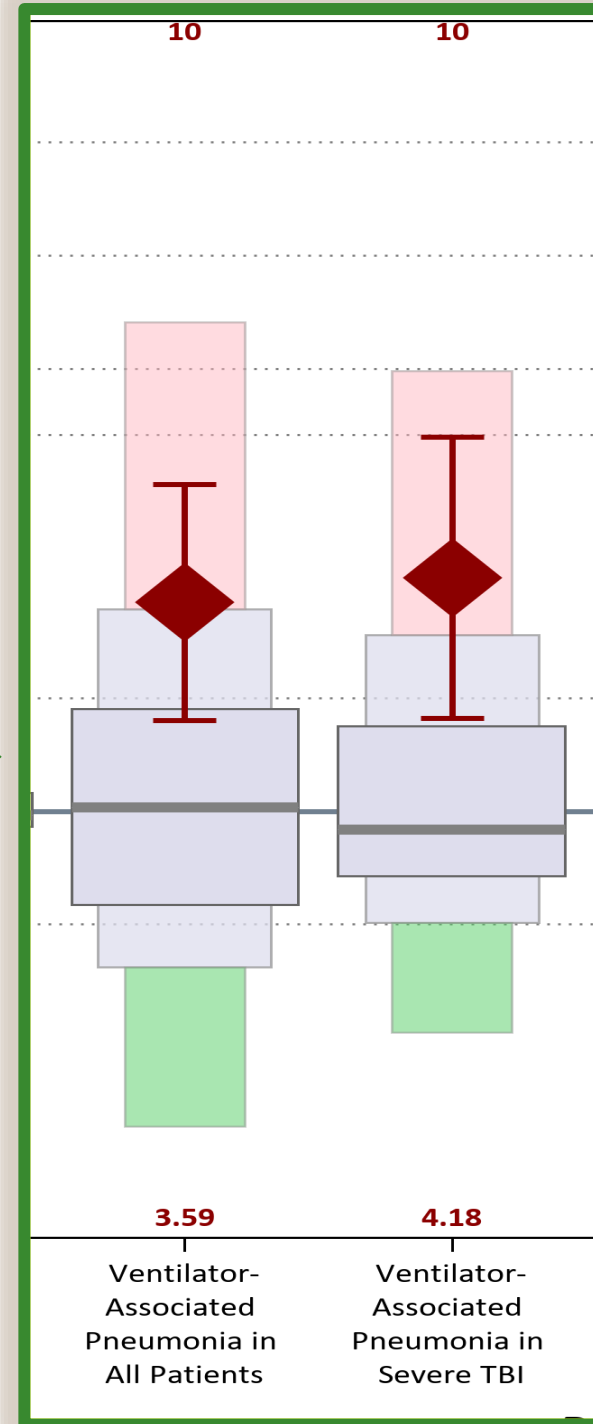
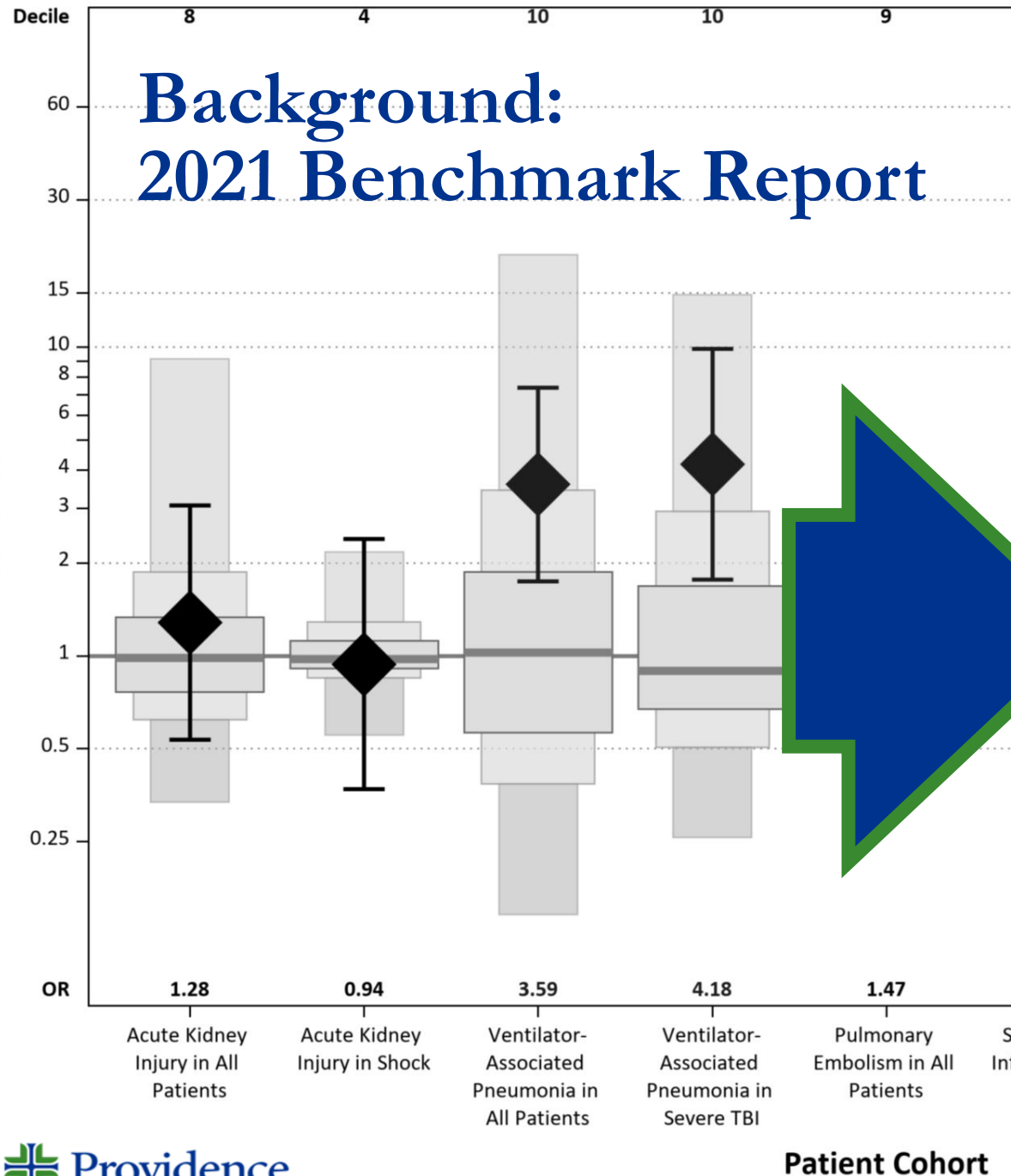


Empiric Antibiotic Management Pathway (EAMP)

Michelle Brunelle, RN, BSN, BS, BA, CCRN-CSC-TCRN



10th Decile for
VAPS



7 of 9 total VAPS
are from severe
TBI cohort

Literature Review

What is a VAP?

Why is it important?

- VAP is the most commonly infection in patients requiring mechanical ventilation
- VAP prologs days of mechanical ventilation and ICU length of stay
- National Trauma Data Base (NTDB) definition

VENTILATOR-ASSOCIATED PNEUMONIA (VAP)

DEFINITION

A pneumonia where the patient is on mechanical ventilation for > 2 calendar days on the date of event, with day of ventilator placement being Day 1,

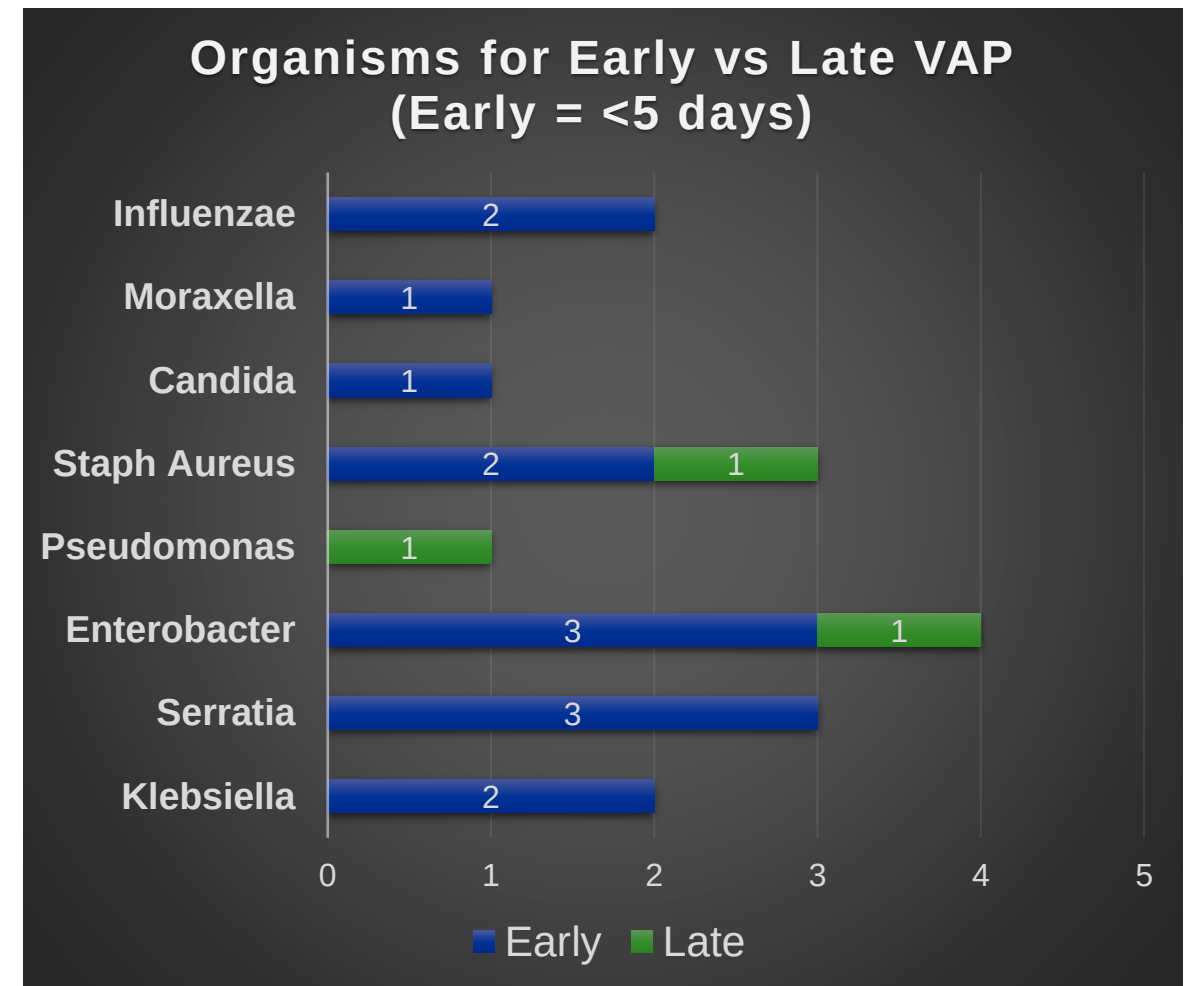
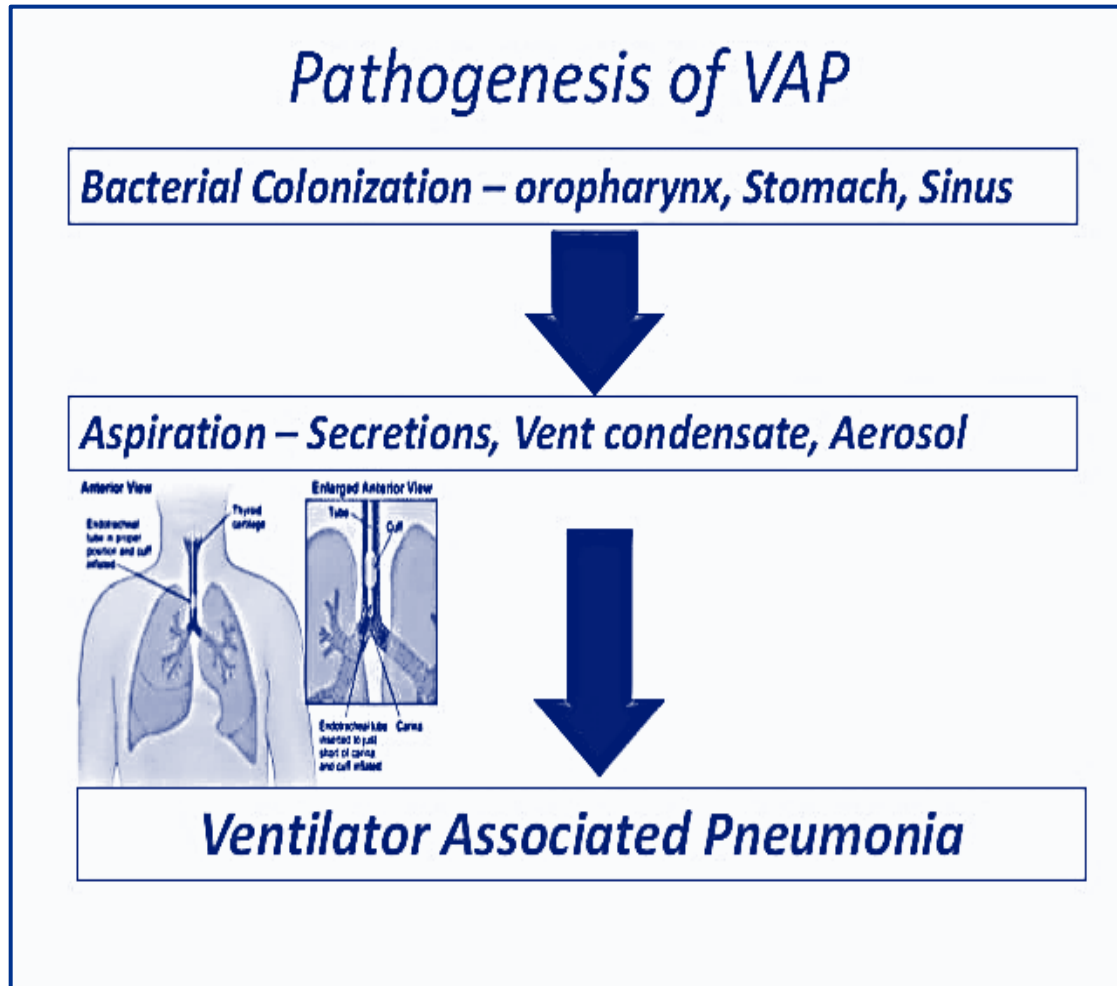
AND

The ventilator was in place on the date of event or the day before.

VAP Algorithm (PNU2 Bacterial or Filamentous Fungal Pathogens):

IMAGING TEST EVIDENCE	SIGNS/SYMPTOMS	LABORATORY
Two or more serial chest imaging test results with at least <u>one</u> of the following: • New and persistent or progressive and persistent • Infiltrate • Consolidation • Cavitation • Pneumatoceles, in infants ≤1-year-old	At least <u>one</u> of the following: • Fever (>38°C or >100.4°F) • Leukopenia (<4000 WBC/mm³) or leukocytosis (≥12,000 WBC/mm³) • For adults ≥70 years old, altered mental status with no other recognized cause AND at least <u>one</u> of the following: • New onset of purulent sputum or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements • New onset or worsening cough, or dyspnea, or tachypnea • Rales or bronchial breath sounds • Worsening gas exchange (for example: O2 desaturations [for example: PaO2/FiO2 <240], increased oxygen requirements, or	At least <u>one</u> of the following: • Organism identified from blood • Organism identified from pleural fluid • Positive quantitative culture or corresponding semi-quantitative culture result from minimally-contaminated LRT specimen (specifically, BAL, protected specimen brushing or endotracheal aspirate) • ≥5% BAL-obtained cells contain intracellular bacteria on direct microscopic exam (for example: Gram's stain) • Positive quantitative culture or corresponding semi-quantitative culture result of lung tissue • Histopathologic exam shows at least <u>one</u> of the following evidences of pneumonia: – Abscess formation or foci of consolidation with intense PMN accumulation in bronchioles and alveoli

Severe TBI/ Early VAP/ Causative Organisms



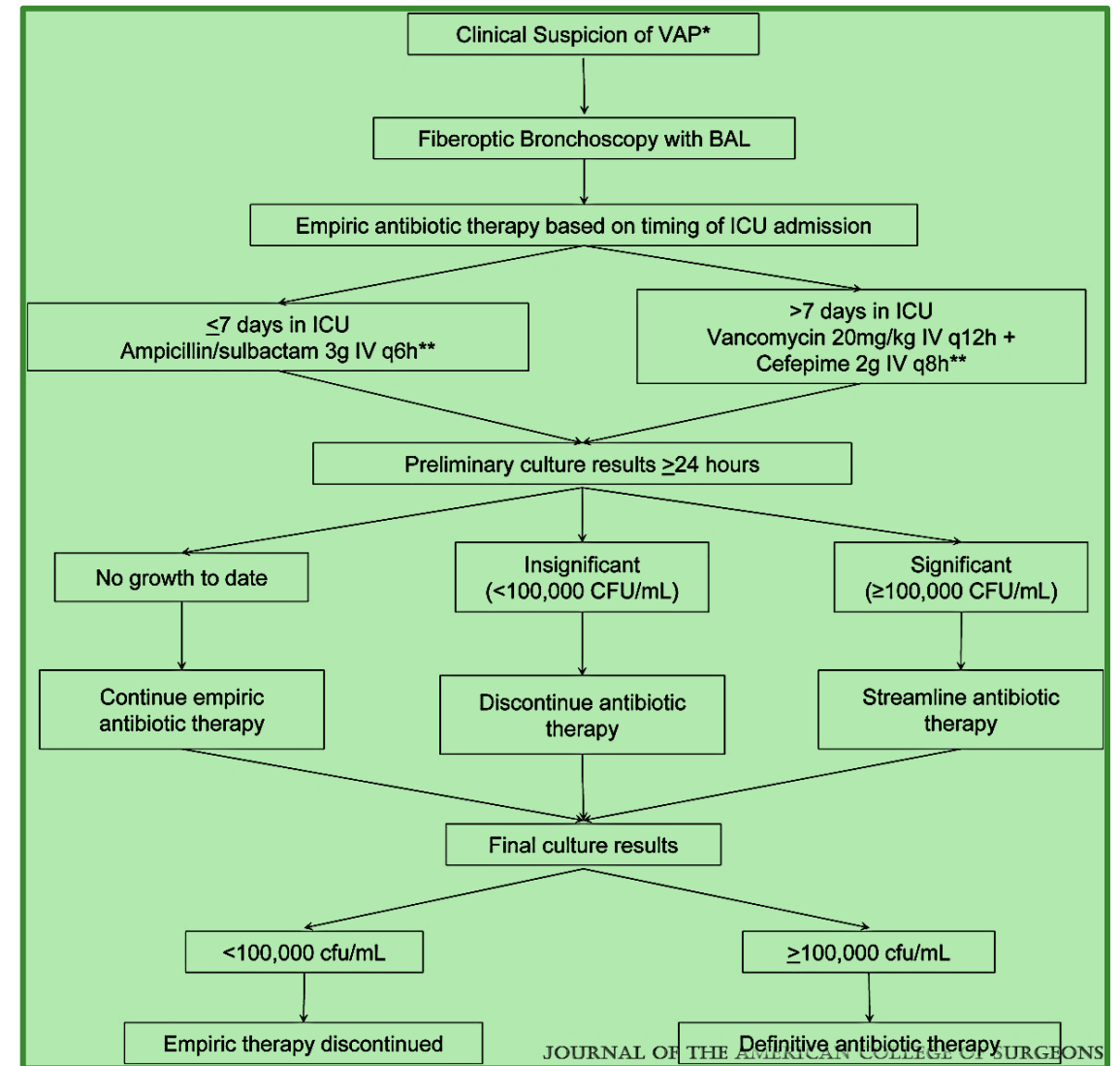
Literature Review

Author	Year	# Centers	Findings
A. Acquarolo et al	2005	1, Prospective random open	Empiric unasyn reduced occurrence of early onset pneumonia
C. Righy et al	2017	Meta analysis	Empiric antibiotics reduced early onset pneumonia and decreased ICU length of stay
C. Evans et al	2018	1, Retrospective analysis	Comprehensive empiric protocol and antibiotic stewardship can prevent the development of bacterial resistance to therapy
F. Reizine et al	2019	2 multicenter double-blind studies, Post hoc analysis	Early use of antibiotics delayed and may prevent the occurrence of VAP in severe TBI patients
B. François et al	2019	16 ICUs, RCT, double blind	The incidence of early ventilator-associated pneumonia was lower with antibiotic prophylaxis

Literature Review

Prevent the development of bacterial resistance to empiric therapy:

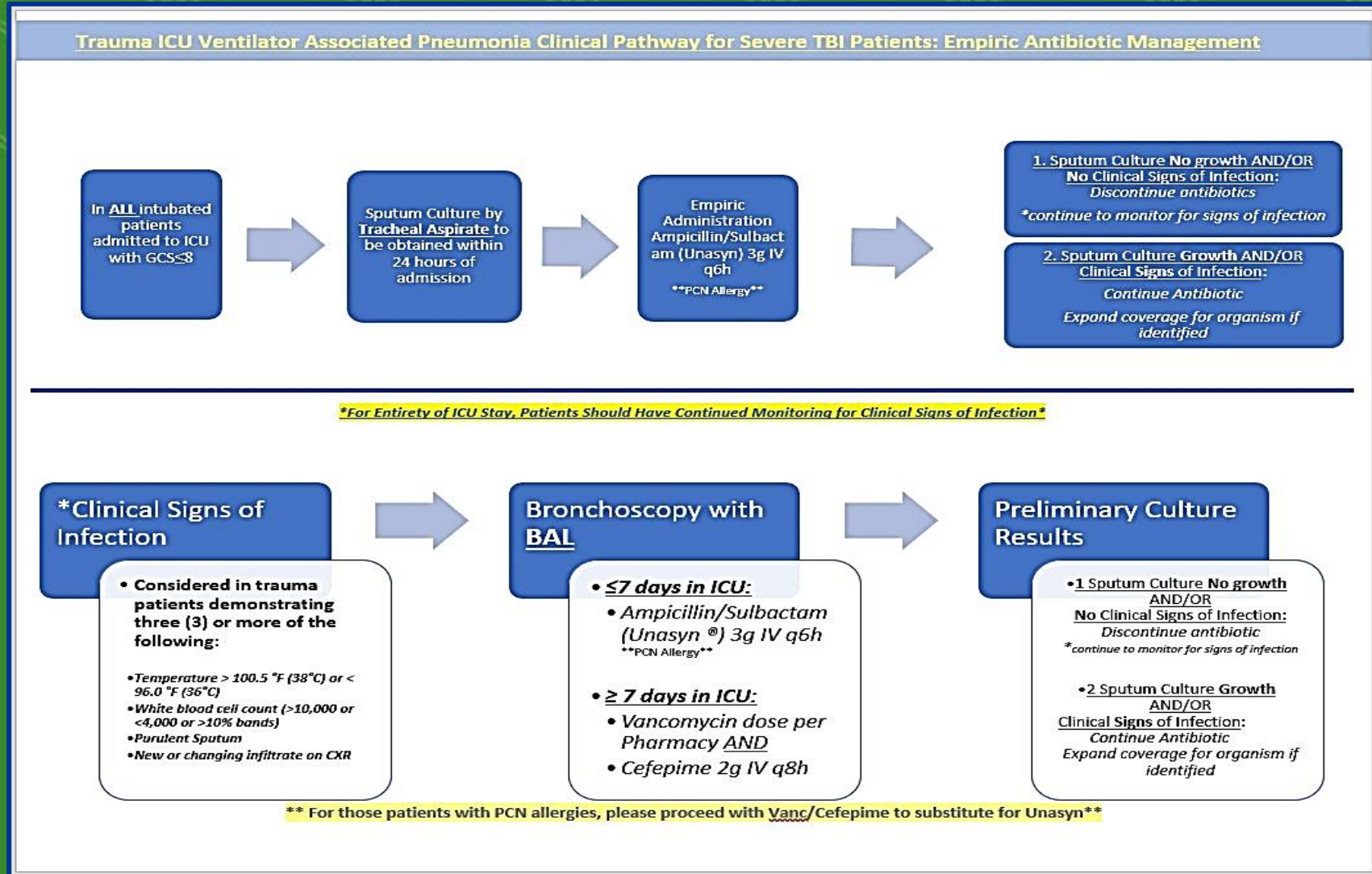
- Comprehensive Protocol
- Antibiotic Stewardship
- Timely Antibiotic De-escalation



Quality Improvement Project

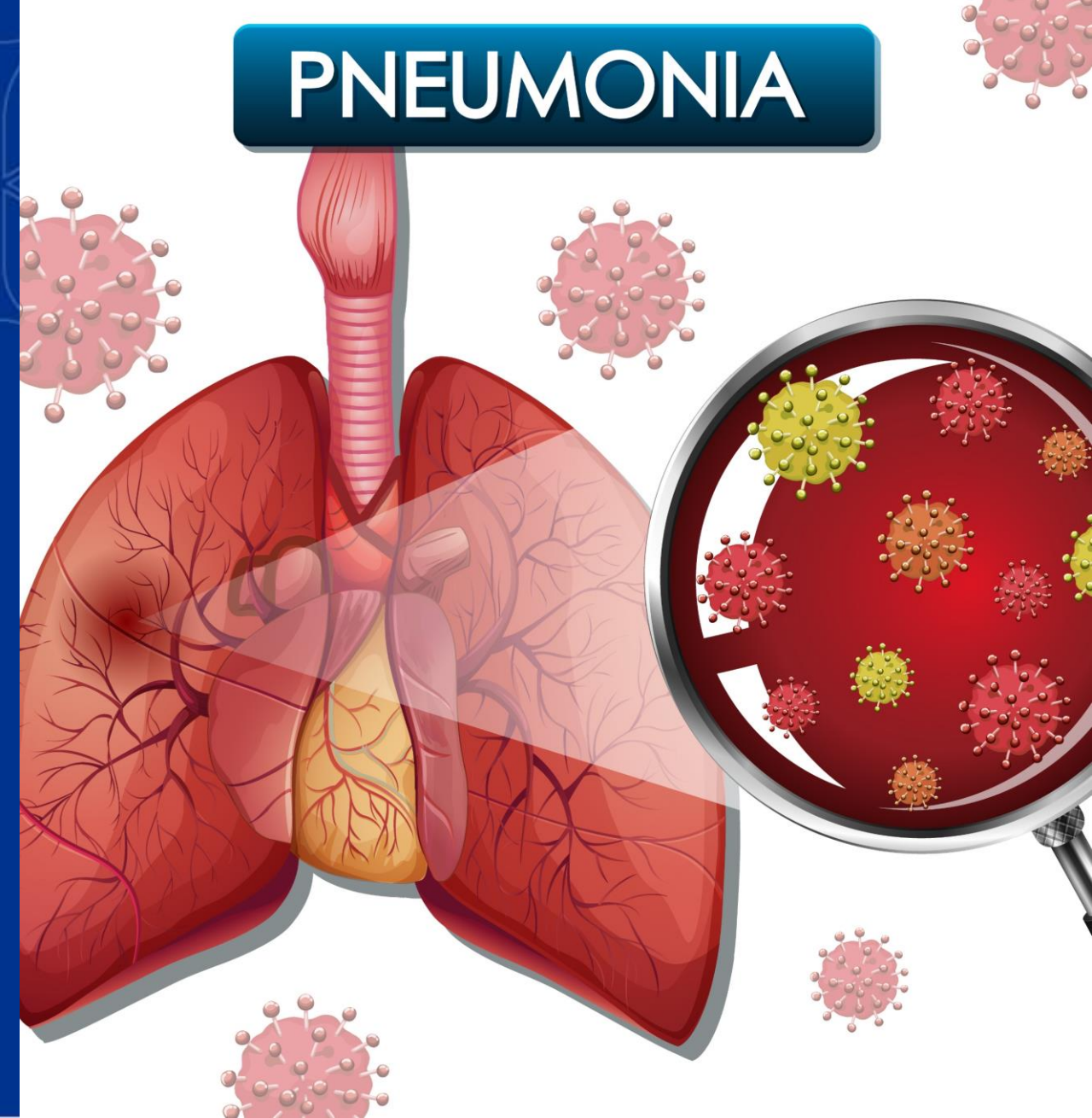
Empiric Antibiotic Management Pathway (EAMP)

- Reduce incidence of VAP in patients with severe TBI
- 7/1/22-12/31/22
- Providence IRB approval

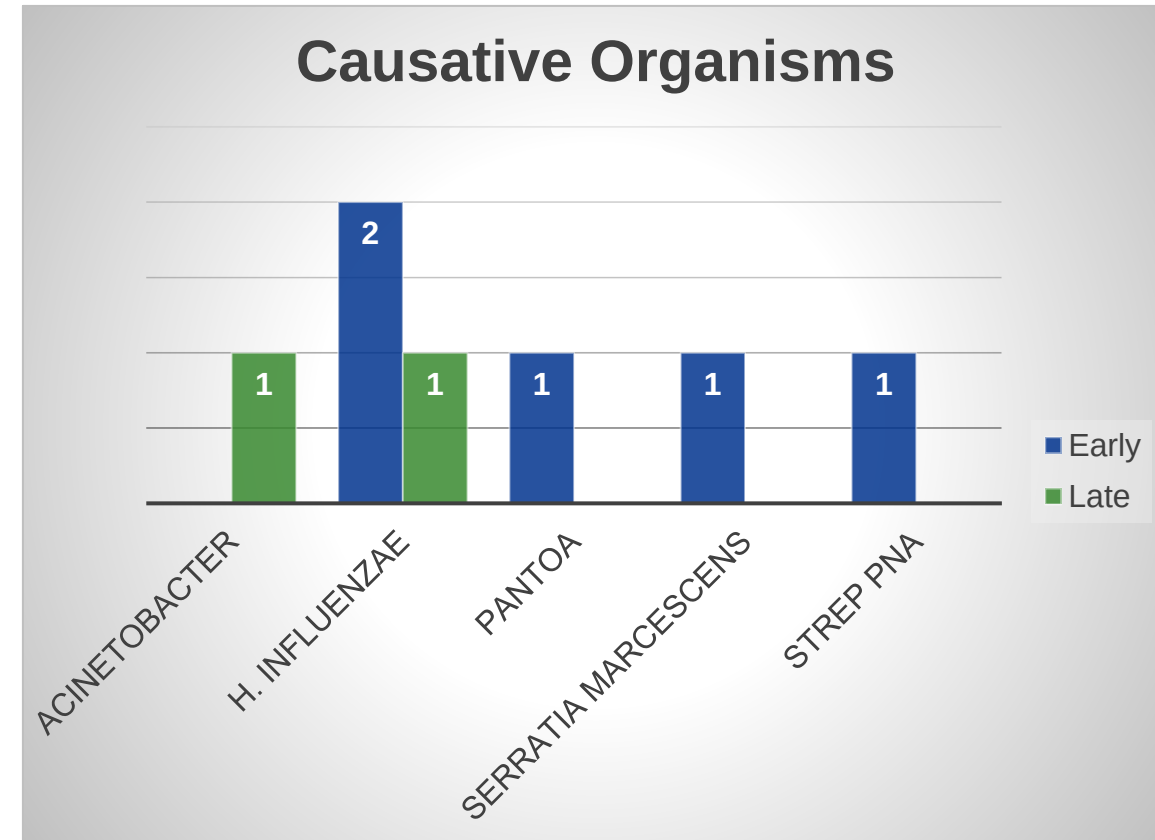
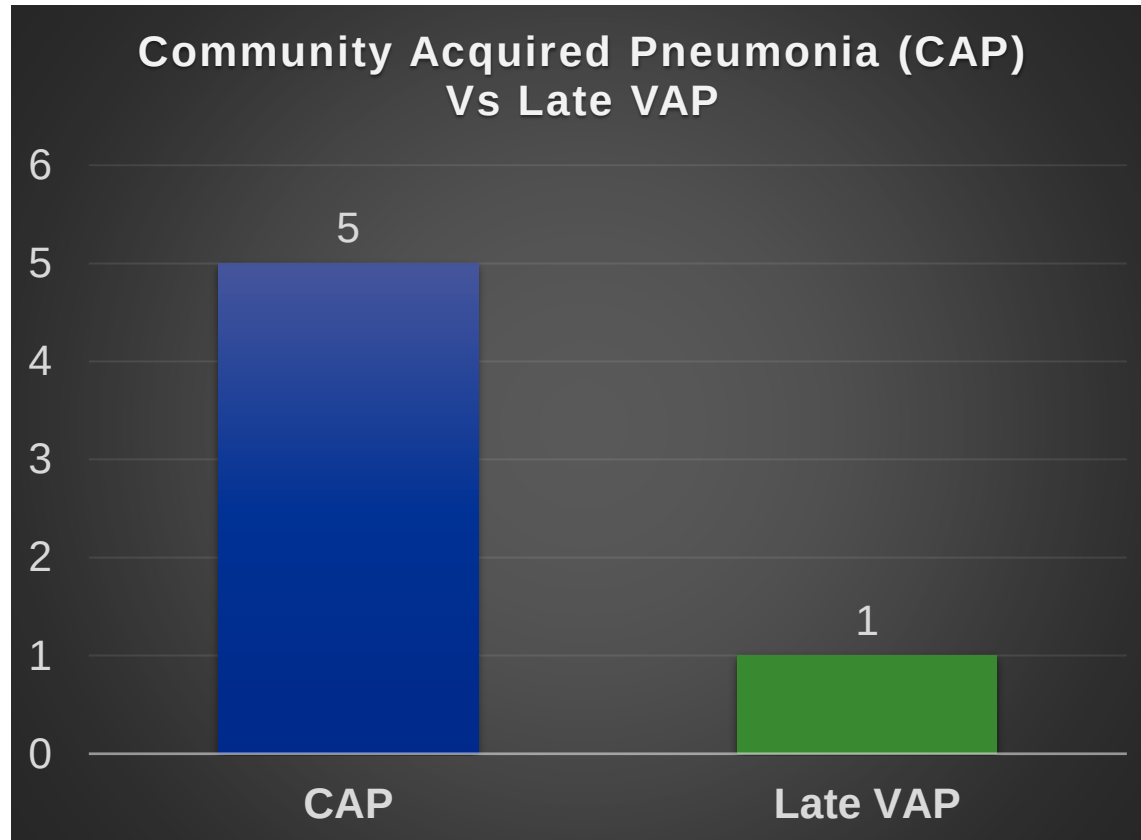


Methods/Approach

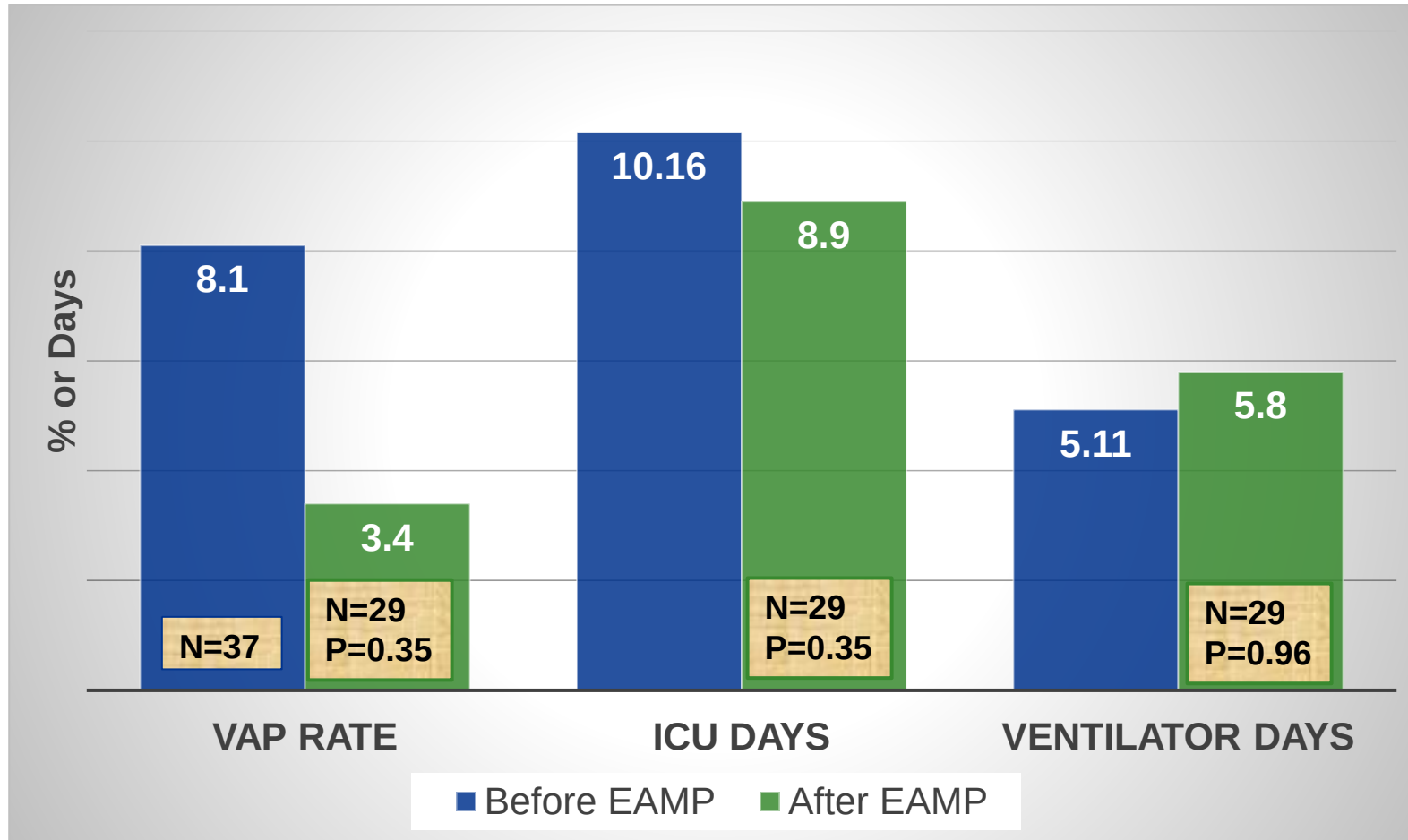
- Design: EBP
- Sample: Intubated adult trauma patients suffering from severe TBI
- Where: 28 bed Adult ICU
- Intervention: Sputum collection and Empiric antibiotic administration
- Time frame: 7/1/22-12/31/22
- Data: All imaging, clinical symptoms and laboratory findings for the diagnosis of VAP, Age, Sex, Diagnosis, ISS, GCS on admission, Date and time antibiotic administration and discontinuation
- Analysis: 6 consecutive month Pre and Post project data comparing VAP incidence, average ICU days and average ventilator days



Preliminary Results



Preliminary Results



Project extension
1/1/23-6/30/23

Goals:

- Lower VAP incidence rate
- Data Analytics

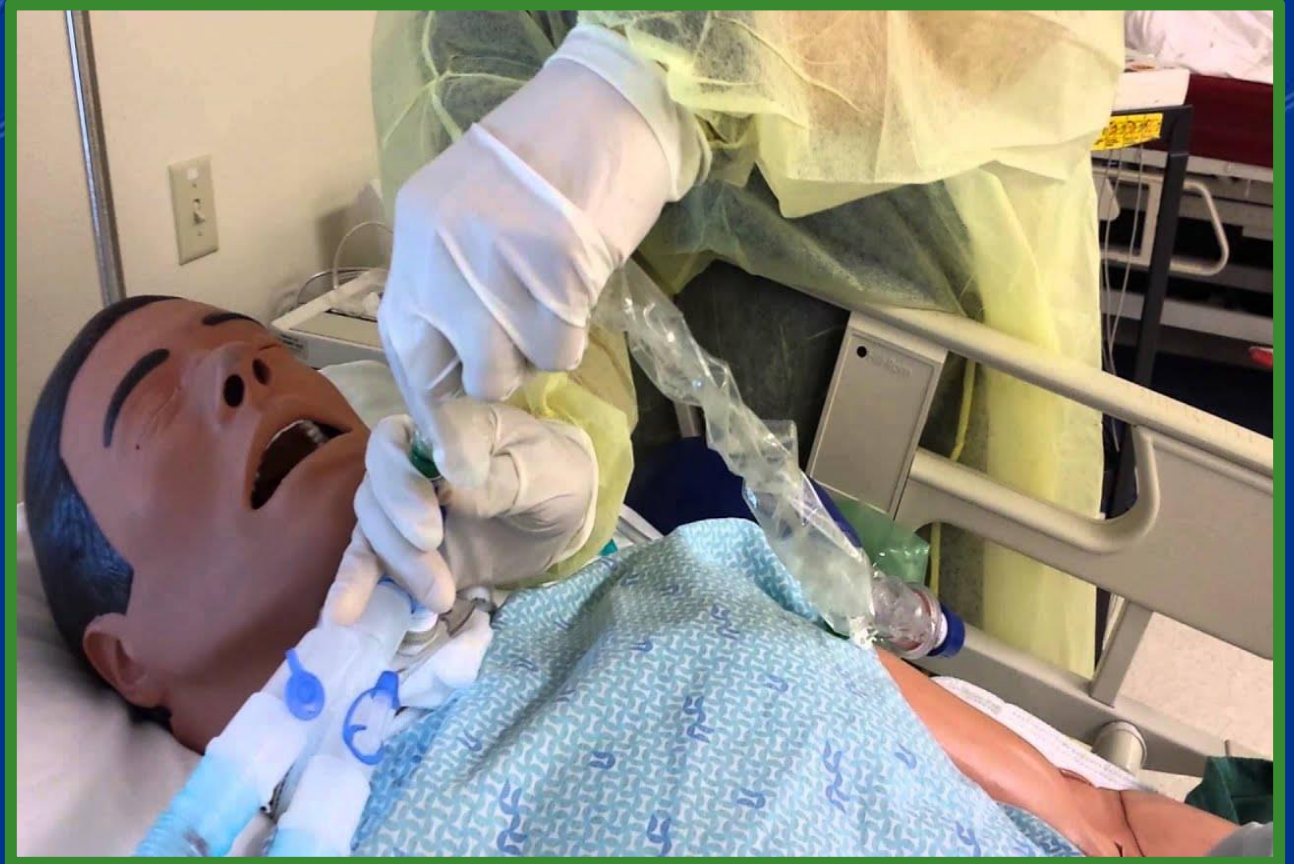
Limitations

Early antibiotic administration

Sputum Cultures often delayed

Nursing or Respiratory Therapy?

Exemplary Care



References

- Acquarolo, A., et al. "Antibiotic prophylaxis of early onset pneumonia in critically ill comatose patients. A randomized study." *Intensive care medicine* 31.4 (2005): 510-516.
- Evans, C. R., Sharpe, J. P., Swanson, J. M., Wood, G. C., Fabian, T. C., Croce, M. A., & Magnotti, L. J. (2018). Keeping it simple: Impact of a restrictive antibiotic policy for ventilator-associated pneumonia in trauma patients on incidence and sensitivities of causative pathogens. *Surgical Infections*, 19(7), 672–678. <https://doi.org/10.1089/sur.2018.087>
- François, B., Cariou, A., Clere-Jehl, R., Dequin, P. F., Renon-Carron, F., Daix, T., Guitton, C., Deye, N., Legriel, S., Plantefève, G., Quenot, J. P., Desachy, A., Kamel, T., Bedon-Cardé, S., Diehl, J. L., Chudeau, N., Karam, E., Durand-Zaleski, I., Giraudeau, B., Vignon, P., ... CRICS-TRIGGERSEP Network and the ANTHARTIC Study Group (2019). Prevention of Early Ventilator-Associated Pneumonia after Cardiac Arrest. *The New England journal of medicine*, 381(19), 1831–1842. <https://doi.org/10.1056/NEJMoa1812379>
- Reizine, Florian, et al. "Effects of antibiotic prophylaxis on ventilator-associated pneumonia in severe traumatic brain injury. A post hoc analysis of two trials." *Journal of Critical Care* 50 (2019): 221-226.
- Righy, C., do Brasil, P., Vallés, J., Bozza, F. A., & Martin-Loeches, I. (2017). Systemic antibiotics for preventing ventilator-associated pneumonia in comatose patients: A systematic review and meta-analysis. *Annals of Intensive Care*, 7(1), 67. <https://doi.org/10.1186/s13613-017-0291-4>
- Robba C, Rebora P, Banzato E, Wieggers EJA, Stocchetti N, Menon DK, Citerio G; Collaborative European NeuroTrauma Effectiveness Research in Traumatic Brain Injury Participants and Investigators. Incidence, Risk Factors, and Effects on Outcome of Ventilator-Associated Pneumonia in Patients With Traumatic Brain Injury: Analysis of a Large, Multicenter, Prospective, Observational Longitudinal Study. *Chest*. 2020 Dec;158(6):2292-2303. doi: 10.1016/j.chest.2020.06.064. Epub 2020 Jul 4. PMID: 32634435.

Acknowledgements

Contact/Questions?

Michelle Brunelle, BSN, RN, BS, BA, CCRN-CSC-TCRN

Providence Alaska Medical Center
Performance Improvement Coordinator for Trauma Services
Michelle.Brunelle@providence.org

Rose Timmerman, DNP, APRN, CCNS, CCRN-CSC-CMC

Providence Alaska Medical Center
Research Scientist Nurse
Rose.Timmerman@providence.org

Krista Ralls, MSN, RN, TCRN-CEN

Providence Alaska Medical Center
Manager of Trauma Services
Krista.Ralls@providence.org