

# Improving Clinical Outcomes in a Neurocritical Intensive Care Unit Through Collaboration and Innovation.

Shweta Varade MD

*Lehigh Valley Health Network, Shweta.Varade@lvhn.org*

Keithan Sivakumar MD, MBA

*Lehigh Valley Health Network, Keithan.Sivakumar@lvhn.org*

Maureen T. Smith MSN, RN, CNRN

*Lehigh Valley Health Network, Maureen.Smith@lvhn.org*

Adam Edwards MD

*Lehigh Valley Health Network, Adam\_B.Edwards@lvhn.org*

Preet Varade MD

*Lehigh Valley Health Network, Preet\_M.Varade@lvhn.org*

Follow this and additional works at: <https://scholarlyworks.lvhn.org/medicine>



Part of the [Medical Sciences Commons](#), and the [Neurology Commons](#)

---

## Published In/Presented At

Varade, S. Sivakumar, K. Smith, M. Edwards, A. Varade, P. (2017, October). *Improving Clinical Outcomes in a Neurocritical Intensive Care Unit Through Collaboration and Innovation*. Poster Presented at: Neurocritical Care Society 15th Annual Meeting, Hawaii, the Big Island, Hawaii.

This Poster is brought to you for free and open access by LVHN Scholarly Works. It has been accepted for inclusion in LVHN Scholarly Works by an authorized administrator. For more information, please contact [LibraryServices@lvhn.org](mailto:LibraryServices@lvhn.org).

# Improving Clinical Outcomes in a Neurocritical Intensive Care Unit Through Collaboration and Innovation

Shweta Varade, MD, Keithan Sivakumar, MD, MBA, Maureen Smith, RN, MSN, Adam Edwards, MD, Preet Varade, MD  
 Department of Neurology, Lehigh Valley Health Network, Allentown, Pennsylvania

## INTRODUCTION

Reimbursement changes from the Centers for Medicare and Medicaid and value-based purchasing systems have made quality improvements linked to clinical outcomes more crucial than ever. Reimbursement for care related to hospital-acquired complications is not provided. Value-based purchasing programs reward good clinical outcomes and efficient health care practices with higher reimbursement rates. The Affordable Care Act enforces the necessity of improving care and reducing costs in federal and private health insurance programs. In one neurocritical care unit, various providers and nurses collaborated to address key infection parameters that impact patient outcomes in an attempt to improve overall healthcare practices and decrease mortality.

## METHODS

Bringing evidence-based medicine to the bedside in the form of protocols, guidelines, and practices.

- Practicing daily collaborative rounds with a team consisting of a neurointensivist, nurse, physician assistant, physical therapist, occupational therapist, nutritionist, pharmacist, and case manager.
- Using Adaptive Support Ventilation (ASV) mode for earlier vent weaning.
- Maintaining glucose levels below 80 mg/dl more than 85% of the time.
- Implementing a normothermia protocol in conjunction with bromocriptine administration.
- Displaying visible posters throughout the unit that outline quality data to raise awareness of performance.
- Integrating quality metrics into annual evaluation of all staff to ensure accountability.

All data points were collected from electronic surveillance systems.

## RESULTS

- Urinary catheter use has decreased by more than 10 % with a subsequent decrease in CAUTIs by 80% (p-value < 0.0001).
- CVC use decreased by 5% with 60% decrease in CLABSI (p-value < 0.45)
- Total ventilator days decreased by 1000 vent days per year. No incidence of ventilator-associated pneumonia over study period
- Number of patients with serum glucose within institutional goal of 70-180 mg/dl increased from 82.08% (FY2015) to 89% (FY2017)
- Observed/Expected mortality improved by 4.4%

Figure 1: Device Utilization in a Neurocritical Care Unit

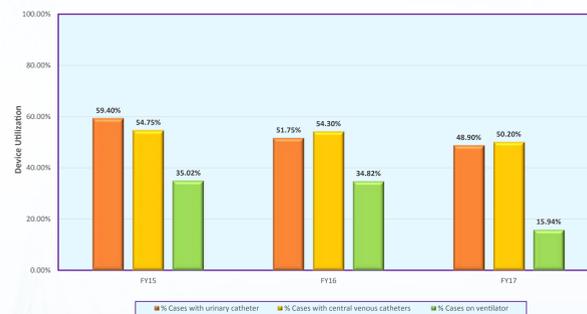


Figure 2: Device-associated Infections in a Neurocritical Care Unit

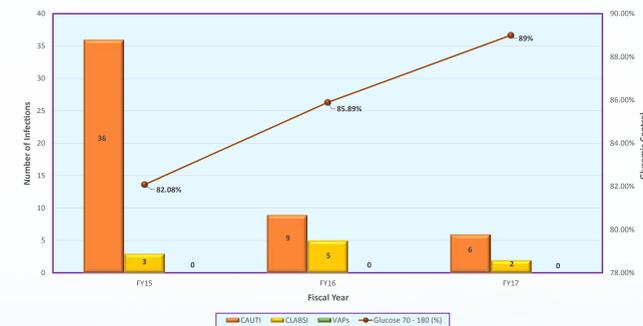


Figure 3: Expected and Observed Mortality in a Neurocritical Care Unit



## DISCUSSION

The intensive care unit is an expanding component of healthcare, accounting for approximately 82 billion US healthcare dollars. Thus, there is motivation for providers to reduce costs and improve patient outcomes. One neurocritical care unit achieved this by initiating simple measures such as daily multi-disciplinary rounds to determine patient needs. A new ventilator mode, ASV, was also implemented to better prepare patients for extubation. This not only decreased total ventilator days, but also prevented reintubation and as a result, no ventilator-associated pneumonias were recorded over the study period. Furthermore, staff accountability was increased by making unit performance data visible to patients and their families as well as integrating these quality metrics into performance evaluations. These methods ultimately resulted in earlier discontinuation of healthcare devices leading to a decrease in total device days. Though device utilization did not significantly decrease during the study period, the results show that optimization of variables such as infection control, temperature management, glycemic control, and ventilator strategies can have an overall positive impact on patient mortality and morbidity.

## CONCLUSION

As evidenced by these results, this institution is now a top performer when compared in a national clinical database. The quality initiatives discussed improved the overall observed/expected mortality ratio by 4.4%. This study presents pragmatic strategies that can be used in any neurocritical care unit or patient care organization to create a culture of quality improvement.

### References:

1. Barnhorst, A., Martinez, M., Gershengorn, H. (2015) Quality improvement strategies for critical care nursing. American Journal of Critical Care, 24 : 87-92.
2. Marsteller, I., Sexton J., Hsu, Y., et al. (2012). A multicenter, phased, cluster-randomized controlled trial to reduce central line-associated bloodstream infections in intensive care units. Critical Care Medicine, 40(11):2933-2939.
3. Martinez, E., Donelan, K., Henneman, J., et.al. (2014). Identifying meaningful outcome measures for the intensive care unit. American Journal of Medical Quality, 29(2) : 144-152.

© 2017 Lehigh Valley Health Network

610-402-CARE LVHN.org