

**TITLE: Retrospective Analysis of Process Improvement Strategies to Decrease Ventilator LOS**

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**Background:** Ventilator length of stay (VLOS) impacts patient outcomes and overall hospital LOS. The length of time a patient spends on a ventilator increases the possibility of a VAE (ventilator-associated event) previously called a VAP. Increased LOS is associated with increased morbidity and mortality.

**Objective:** To develop a series of procedural changes in a step approach that would result in a reduction of ventilator LOS.

**Methods:** Data from the VMC ventilator database was compiled. A retrospective analysis of all strategies employed at VMC to decrease overall ventilator length of stay (VLOS) was also completed. A comparison of ventilator LOS data to implemented strategy dates was then compared.

The VLOS data was analyzed beginning in 2005. All VLOS data was captured except for the year of 2008 due to a new EHR implementation. Ventilator database calculations: Actual start time to actual stop time of ventilator. Patients who are restarted within 48 hours of extubation are considered the same LOS.

**Results:** Notable baseline strategy review began with 2005 and previous ventilator management protocols. No significant changes occurred until 2008. A few of the implementations reviewed include:

2008 – Added vent weaning unit (RIU) - 4 bed unit

2009 – Increased RIU to 12 bed unit (added a dedicated Pulmonary Medicine PA)

2009 – Added Pediatric Transitional Care Unit (TCU)

2009 – East Carolina Heart Institute opened- added 40 ICU level beds

**2007-2009 a 7.6% decrease in VLOS from 5.61 to 5.18**

2010 – Increased respiratory therapy positions by 20

2011 – A Q6 respiratory post extubation evaluation by RCP's initiated

2011 – An obesity weaning study began and increasing mobility of ventilator patients

**2009- 2011 an insignificant change in VLOS from 5.18 to 5.17**

2012 – 2013 Sedation Vacation /SBT's implemented

**2011-2013 a 25.7 % decrease in VLOS from 5.17 to 3.84**

**Conclusions:** VMC had a 45 % increase in the number of ventilator patients from 2005-2013. The overall VLOS decreased by 34.9% (5.90 days to 3.84 days). Between June 2007 and June 2009 a 38 % increase in ventilator patients is noted with the opening of the East Carolina Heart Hospital (ECHI) in Jan 2009, adding significantly to the RCP workload. The VMC average respiratory case mix index (CMI) is consistently at 2.5 throughout this timeframe. We also noted the percentage of patients on the ventilator remain constant.

The AARC benchmark compare group VLOS is currently 4.46 days (university affiliated > 500 bed facilities) our average LOS is approximately 14 % below the AARC benchmark reporting.

The key steps taken appear to show that this study reveals the impact of increasing respiratory staffing on ventilator LOS which resulted in our ability to implement respiratory driven protocols such as post extubation evaluation and follow up, and a Sedation Vacation/SBT team concept in TCU and RIU

We are continuing to evaluate the sedation medication usage over this timeframe. This will be added to the study.