

# Reducing Time on the Ventilator Using the ABCDEF Bundle

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## Introduction

- Teamwork is essential for patient centered care. This is a multidisciplinary initiative to implement an evidence-based bundle of interventions to reduce time on the ventilator for patients in the intensive care unit (ICU).
- The ventilator bundle components include: **A**irway, **B**reathing, **C**oordination, **D**elirium, **E**xercise/Early mobility and **F**amily (**ABCDEF**).
- A**irway strategies include introduction of subglottic endotracheal tubes to reduce ventilator-associated pneumonia (VAP). **B**reathing strategies include use of sedation targets using a sedation scale, sedation awakening trials (SAT) and spontaneous breathing trials (SBT) to shorten time to extubation. Also, use of low-tidal volume ventilation to prevent lung damage from ventilator volumes and pressures. **C**oordination of care is by the ICU bedside nurse. **D**elirium screening is a hallmark of this initiative. **E**arly Mobility initiative is led by the Physical Therapist. **F**amily is involved throughout this process.

## Methods

- We partnered with the John's Hopkins Armstrong Institute to initiate a Comprehensive Unit Safety Program for Mechanically Ventilated patients (CUSP4MVP) over two years. This is a national cohort in the United States. The purpose is to use evidence-based practice (EBP) strategies to improve outcomes for mechanically ventilated patients.
- Three ICUs in an academic medical center were involved in this initiative. Monthly multidisciplinary team meetings are held. Team includes: Nurses, Doctors, Respiratory Therapists, Physical Therapists, Pharmacists and hospital administrators.
- The team does chart-audits and bedside rounds on each of the ABCDE components on a pre-set schedule. Team presents the results of audits at staff meetings and change-of-shift huddles. Team provides staff education.

## Cited Literature

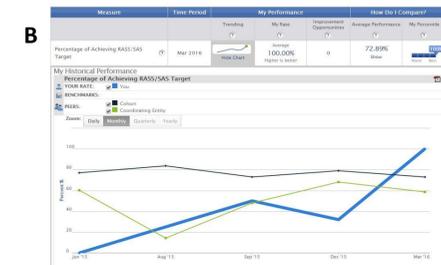
- Balas MC, et al: Critical care nurses' role in implementing the "ABCDE bundle" into practice. *Crit Care Nurse* 2012, 32(2):35-38, 40-37.
- Balas MC, et al: Effectiveness and safety of the awakening and breathing coordination, delirium monitoring/management, and early exercise/mobility bundle. *Crit Care Med* 2014, 42(5):1024-1036.
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## Results

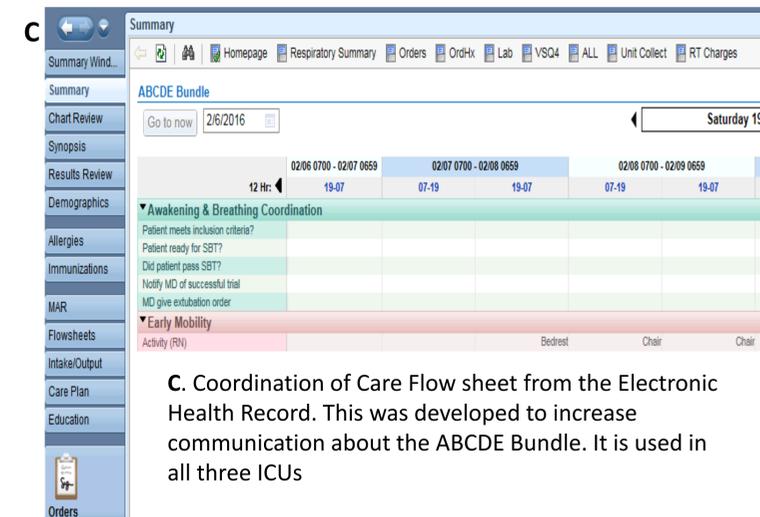
- All three ICUs participated in this initiative. Improvements, engagement and outcomes varied by unit. All made progress.



**A:** Subglottic endotracheal tube use has increased in the Cardiovascular Surgical ICU (above left) and Medical-Surgical-Neuroscience-Trauma ICU (above right). These specialized endotracheal tubes are used to reduce VAP in patients who remain ventilated for more than 72 hours.

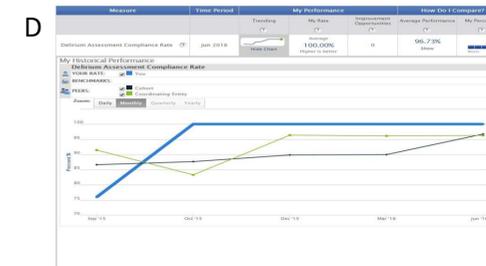


**B:** Sedation target (patient responsive and alert) was met by 100% of mechanically ventilated patients in the Coronary Care ICU, using a standardized sedation scale.



**C.** Coordination of Care Flow sheet from the Electronic Health Record. This was developed to increase communication about the ABCDE Bundle. It is used in all three ICUs

## Results



**D:** Delirium screening daily increased from 16% to 100% and was sustained in the medical-surgical neuroscience trauma ICU.



**E.** Early mobility for mechanically ventilated patients has been challenging to implement even with the addition of a full-time Physical Therapist and Rehabilitation -Aid from Monday – Friday in each of the larger ICUs. In the Cardiovascular Surgical ICU (above left) early mobility is influenced by the number of patients on ventricular assist devices (VAD) and extracorporeal membrane oxygenation (ECMO). In the Medical-Surgical-Neuroscience-Trauma ICU (above right), mobility is influenced by patient acuity and level of consciousness in the neuroscience population. Order sets have also been changed to state 'activity as tolerated' versus 'bed rest' to increase early mobility.

## LEGEND

**BLUE LINE** shows progress in a Stanford Health Care ICU

**GREEN LINE** shows progress of 8 University Hospital ICUs (this group includes the 3 Stanford ICUs)

**BLACK LINE** shows progress in all 67 ICUs in cohort

All 67 ICUs are following the same time line for data collection

## Discussion

- BENEFITS OF BEING IN A NATIONAL COHORT:** This is the first time that our ICUs have participated in a national cohort for an EBP quality improvement project. The benefits of joining a cohort include a structured timeline for data collection; having a peer group to compare ourselves against for process outcomes; access to educational webinars; use of a portal to enter data that is used to produce the graphs shown on the poster.
- BENCHMARKING:** The peer group of 67 ICUs (BLACK LINE) is essential to understand where we are relative to other ICUs. While we hoped to achieve 100% adherence with the bundle, we found this was challenging for some components. Seeing the aggregated data from other ICUs allowed us to benchmark our progress and to plan alternative methods to improve outcomes in our ICUs.
- CHALLENGES:** Some of the challenges include: changes in team personnel, turnover of staff nurses, new travel nurses, educating a large number of medical teams with monthly rotations of residents.
- EDUCATION:** Adherence to the ABCDE ventilator bundle components increased following ICU staff education. However, sustaining change over time has required sustained education. We are increasing the use of laminated 'tip sheet' reminders at the bedside. An ABCDE ventilator flow sheet has been added to the EHR to increase communication. Changing clinical culture remains a challenge.

## Conclusion

- Implementation of an evidence-based bundle of ventilator interventions in three ICUs is both rewarding and challenging. Joining a national cohort provides a framework for data collection. Teamwork is essential for improvement in outcomes in the ICU.

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