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## UTILIZATION OF AN INNOVATIVE DECISION SUPPORT SOFTWARE SYSTEM TO ENHANCE DETECTION OF DECOMPENSATING

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**Learning Objectives:** Patients who require transfer from the medical wards to an intensive care unit (ICU) have increased morbidity and mortality compared to patients who are admitted to the ICU directly from the emergency department (ED). More specifically, patients who require transfer from the hospital ward to the ICU within 24 hours of admission from the ED may have higher rates of adverse events and death. Delayed recognition of early decompensation and intervention can lead to increased morbidity and mortality; some reports indicate an increase in mortality of up to 30%. Rapid response teams and systems were developed to identify and respond to these decompensation events and decrease hospital mortality and non-ICU cardiac arrests.

**Methods:** Historically at our institution (Baylor St. Luke's Medical Center; Houston, TX, USA), rapid response teams (RRT) respond to patient emergencies on the wards. Recently, in order to recognize decompensation events earlier, an innovative decision support software system was installed to alert RRTs to patient decompensation. In real-time, this software system continuously calculated a vital sign-based early warning score; once the score reached an abnormal threshold, the system alerted the RRTs to conduct a bedside evaluation. We analyzed data from patients who had an ICU transfer within 24 hours of hospital ward admission from the ED. We compared data for four months before and after installation of the early warning, decision support software system.

**Results:** During the study period, 2.1% of ward admissions from the ED (n=46) in the pre-intervention period versus 2.8% (n=78) in the post-intervention period required transfer to the ICU within 24 hours (p=0.141). Hospital mortality rates for these patients decreased from 21.7% (n=5) in the pre-intervention period to 6.4% in the post-intervention period (p=0.012).

**Conclusions:** These results demonstrate that utilization of this real-time surveillance and decision support system resulted in a significant reduction in mortality rates for this specific high-risk group of ICU transfers.

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## INADVERTENT EXTUBATIONS IN SURGICAL/TRAUMA ICUS: HIGHER RATES AMONG CHALLENGING PATIENT POPULATIONS

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**Learning Objectives:** Unplanned Extubation (UE) in the intensive care unit (ICU) results in increased ventilator days, length of stay, and morbidities from laryngospasm and aspiration to respiratory failure and death. Multidisciplinary interventions to decrease UEs have been proposed in broad med/surg populations however factors influencing UEs specifically in the traumatically brain injured (TBI), liver transplant, and trauma settings are poorly characterized. We hypothesize that these patient populations may have higher UE rates and sought to quantify incidence and describe potential associated causes.

**Methods:** 3-year retrospective chart review of UEs at a tertiary referral center, 30-bed surgical intensive care unit, and level I trauma center, 25-bed trauma intensive care unit, identified 53 UEs. Demographics, comorbidities including alcohol and drug history, head trauma, liver failure, sedation, fever, ventilatory support, proximity to shift change, and reintubation within vs after two hours (early vs late) were analyzed.

**Results:** 53 patients were identified (mean age 53yrs, 40% male) with a global UE rate of 11.7/100 ventilator days. 11.6% had TBI, 15% liver failure, 10% alcohol abuse. 70% of the cohort were post-surgical including 15% who underwent liver transplant. 22% sustained traumas or burns. 11/53 (18%) of UEs occurred within 1 hour of shift change and 35/53 (58%) during the 7pm-7am shift. 19/53 (32%) were on volume controlled ventilation, while 26/53 (43%) were on pressure support. 24/53 (40%) were on restraints while 33/53 (55%) were receiving sedation. Immediate reintubation rate was 24/53 (40%) with a delayed reintubation rate of 7/53 (11.6%). 22 patients avoided reintubation. Median Glasgow Coma Score was 11 (IQR 10-15) and median RASS score was (IQR -2 to +3). Absence of sedation was associated with a trend toward fewer early reintubations (27.7% vs 34.2%, p=0.6).

**Conclusions:** The higher rates of UEs seen at a high volume transplant and trauma center, combined with lower incidences of risk factors described elsewhere, suggest that multidisciplinary strategies effective in traditional populations may not sufficiently apply in these patients. Further process improvement is required to identify unique risk factors and develop institution specific solutions to decrease UEs.

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