

An Epic Intervention to Decrease Central Line Days

Ravi Patel, Jamie Allen, D. Jameson Dennis, Michelle Spiegel

Fellowships: Pulmonary/Critical Care and Critical Care

PROBLEM / OPPORTUNITY

- Hospital-acquired infections (HAIs) are associated with poorer patient outcomes and are costly to MUSC, an estimated \$48,108 incremental cost.
- Central venous line (CVL) associated bloodstream infection (CLABSI) incidence has increased since the start of the COVID-19 pandemic (Figure 1)

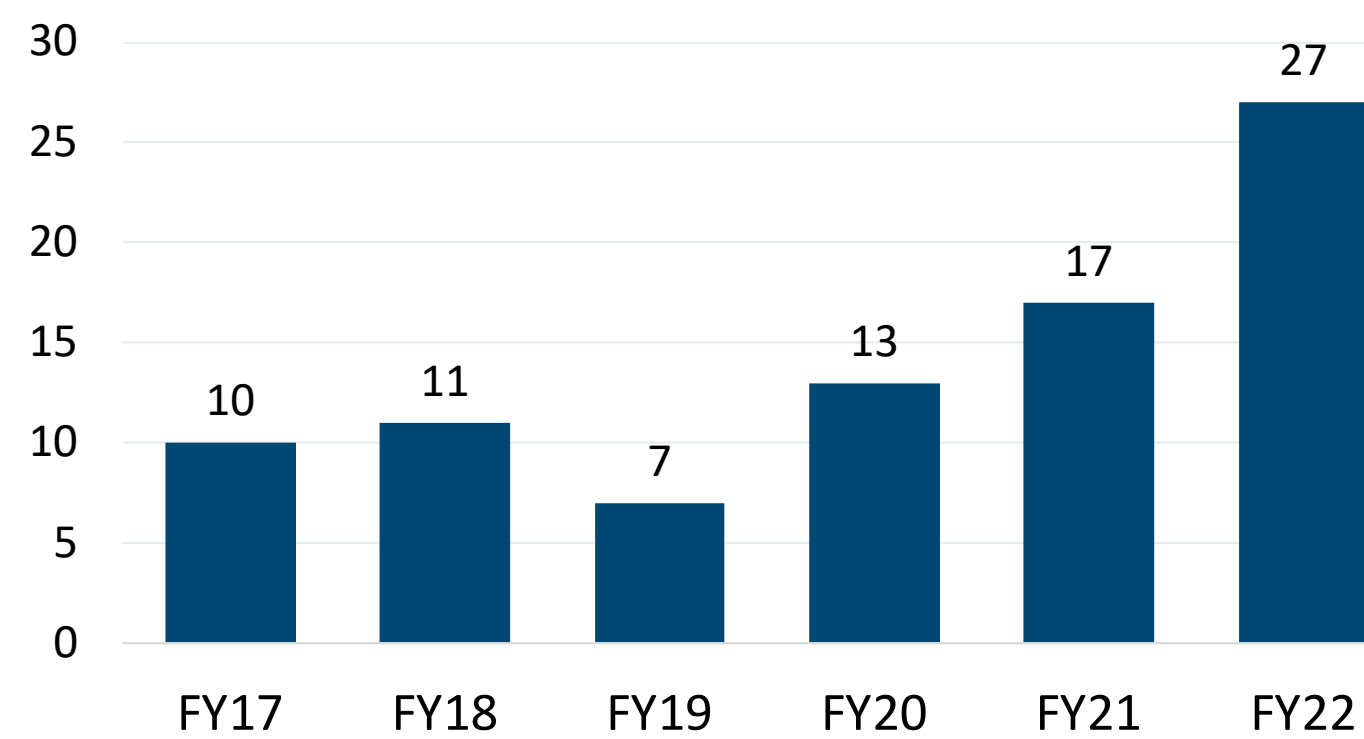


Figure 1: CLABSI incidence, Adult ICUs (Charleston)

- Delayed removal of unneeded CVLs contributes to CLABSIs
- Existing EMR clinical decision support systems for promoting device de-escalation are ineffective with a 97% override rate

QUALITY IMPROVEMENT INTERVENTION

- Develop and implement inpatient quality improvement lists, which utilize rule-based logic to identify and highlight CVLs that are potentially eligible for removal (Figure 2)
- Replaces ineffective pop-up BPAs, which contribute to alert fatigue

INTERVENTION GOALS

- Current Project Goal:** Increase the mean proportion of CVLs meeting criteria for removal that are removed each day in the MICU, AICU, and MSICU by 10%
- Long-Term Goal:** Reduce the incidence of CLABSIs in the MICU, AICU, and MSICU by > 20%

★ ICU CVL and Foley List - 6 MICU 6 Patients

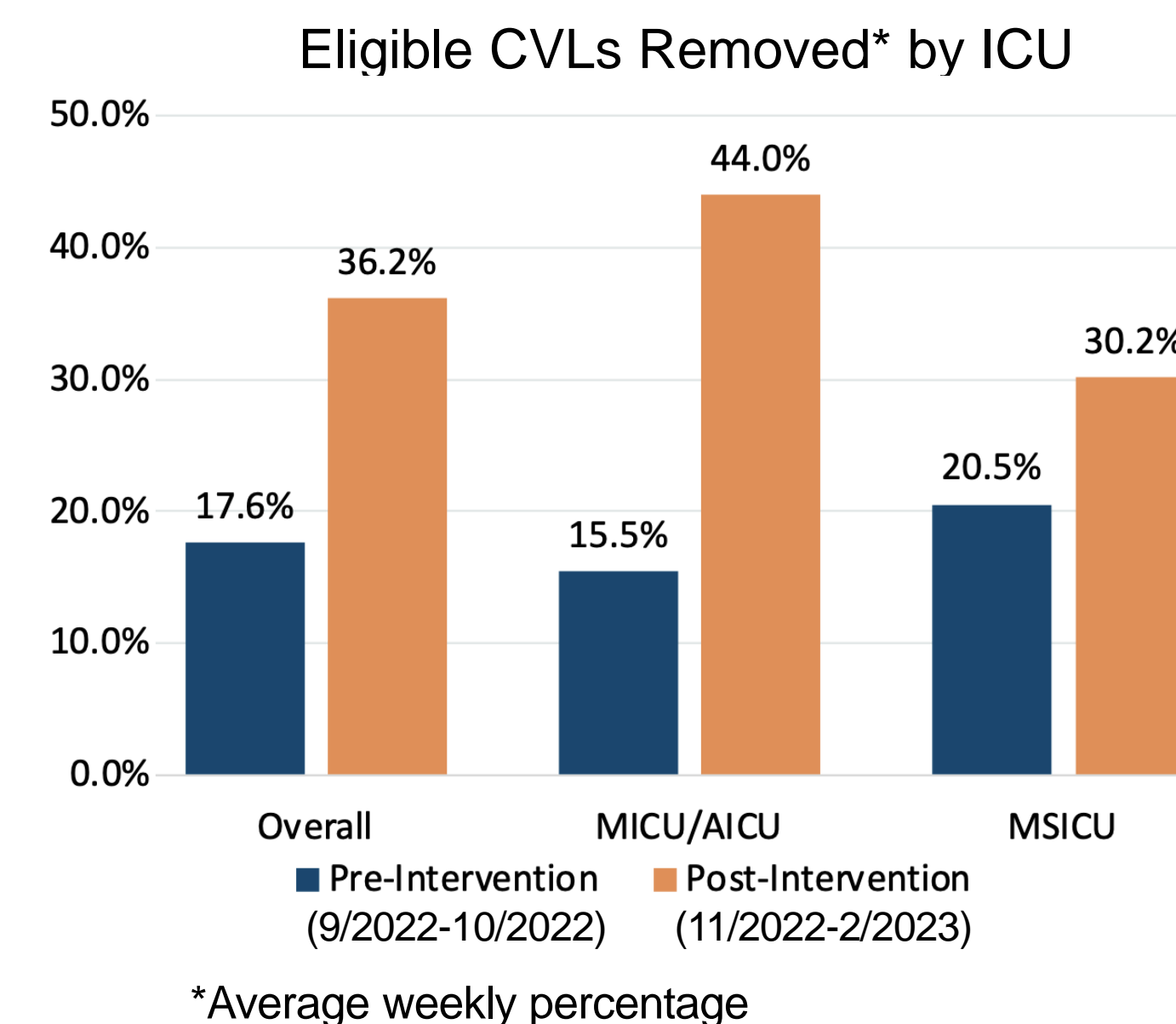
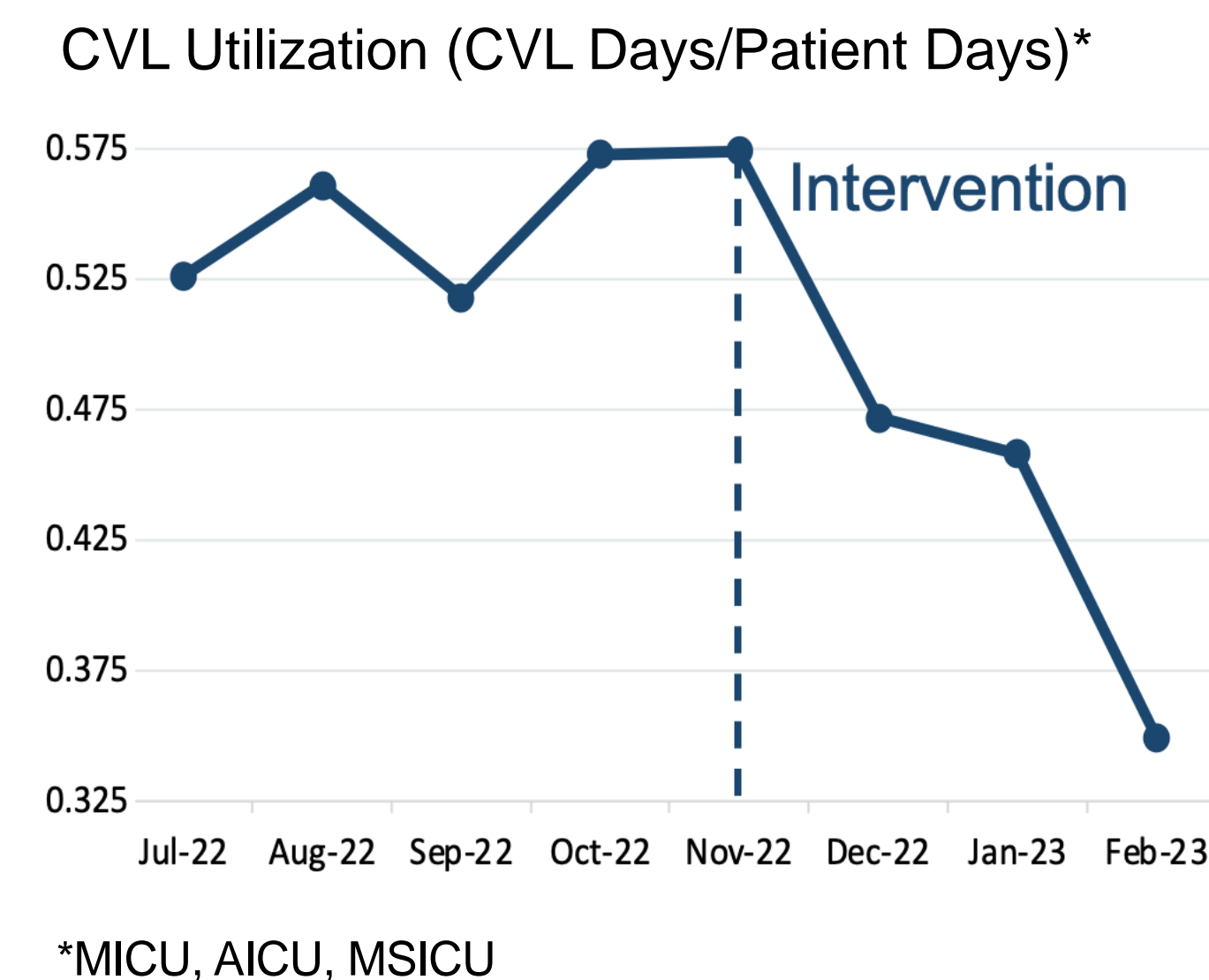
Patient Name (MRN) / Age / Sex or Bed Status	Active Central Lines	CVL/HD cath ready for removal?	Highest norepinephrine dose over the past 24h	On additional pressors in past 24h?	Other CVL Criteria?	RRT/PLEX within 3d?	Urinary Catheter Duration
Brogdon, Tommie Jr. (005544603) (58yrs NB)	Percutaneous Central Line - Triple lumen 01/06/21	No	—	Neo / Dobutamine	TPN	No	5
Testing, Retained (005546715) (40yrs M)	Percutaneous Central Line - Triple lumen 10/10/22 Percutaneous Central Line - Double lumen 9/15/22	HD cath Yes	—	—	TTM	No	1
Zzzoptime, Difficult (005546749) (23yrs M)	Percutaneous Central Line - Double lumen 10/14/22 Percutaneous Central Line - Triple lumen 10/15/22	CVL Yes	8	—	None	Yes	7

Figure 2: Inpatient QI list design

IMPLEMENTATION PLAN

- Physician builder built inpatient quality improvement lists for each ICU/ICU team
- ICU medical directors and nurse managers received education prior to implementation
- Lists available in Epic 11/1/2022
- Specialized reports run daily to track the number of eligible CVLs and the proportion of those CVLs that are removed. Data aggregated by week.
- Audit and feedback of performance each month starting 12/2022 (fellows) and 1/2023 (faculty)

RESULTS



BARRIERS

- Consistent use of tool before/during rounds with ICU team turnover
- Convenience of CVLs and difficulty establishing/maintaining reliable peripheral forms of access in critically-ill patients
- Clinical hesitancy or reluctance to de-escalate, which can be difficult to assess and measure; use of audit and feedback with peer comparison can help to overcome this
- Printer friendly version of tool is not available, and dedicated computer on rounds not always possible
- IS support is needed to further optimize lists, which were built by a physician builder

NEXT STEPS

- Identify ways to improve consistency of use amongst a rotating group of attendings and trainees
- Expand use of tool among ICU team members (beyond focus on ICU attendings, fellows, and APPs)
- Implement tool, with audit and feedback infrastructure, in other ICUs across MUSC (including regional health networks)

CONCLUSIONS

- CLABSIs have significant implications on patient care and associated costs, with an uptake in recent years.
- Development and implementation of our EHR-embedded clinical decision tool has improved the rate of removal of eligible CVLs (17.6% to 36.2%, QI project goal exceeded), and we expect this to eventually translate to a reduction in CLABSIs
- Implementation of this tool has further potential for growth among users and unit-based care
- Institutional investment in IS infrastructure/support is vital for supporting innovations that seek to improve patient safety, and this should be prioritized as part of MUSC's growth strategy