

Background

Effective cleaning, disinfection, and sterilization of surgical instruments is critical to prevent surgical site infections. Pre-treatment of instruments includes removing bioburden and treating at the point of use (POU) to prevent gross soils from drying on instruments. If not removed, bioburden can inhibit complete sterilization and/or lead to corrosion. Guidelines¹ clearly indicate the necessity for POU treatment, but it is often not consistently performed. The Four E's model (Engage, Educate, Execute, Evaluate)² was utilized to inform a mixed methods approach to improving compliance with POU treatment of instruments in five operating suites, with a total of 57 operating rooms, at an academic medical center.

Methods

A multidisciplinary group consisting of perioperative nursing, sterile processing and infection control was assembled. Supplementary evaluation and recommendations were provided by engineering students from an affiliated university. Strategies for the mixed-methods approach (Figure 1) included:

- Measurement of baseline POU treatment compliance.
- Identification of local barriers to POU treatment through staff interviews and direct observation (Table 1).
- Systematic testing of the amount of enzymatic product required to keep all surfaces visibly moist.
- Engaging perioperative nursing staff who handle instruments through nurse-led education.
- Implementing an intervention involving clarity of expectations (e.g., amount of enzymatic product needed to prevent drying) and consistent supply of required equipment (e.g., spray nozzles), along with real-time feedback.
- Collaborating with nurse leaders to develop a tool to evaluate the effectiveness of the intervention.

Figure 1. Application of the Four E's Model to Improve POU Treatment

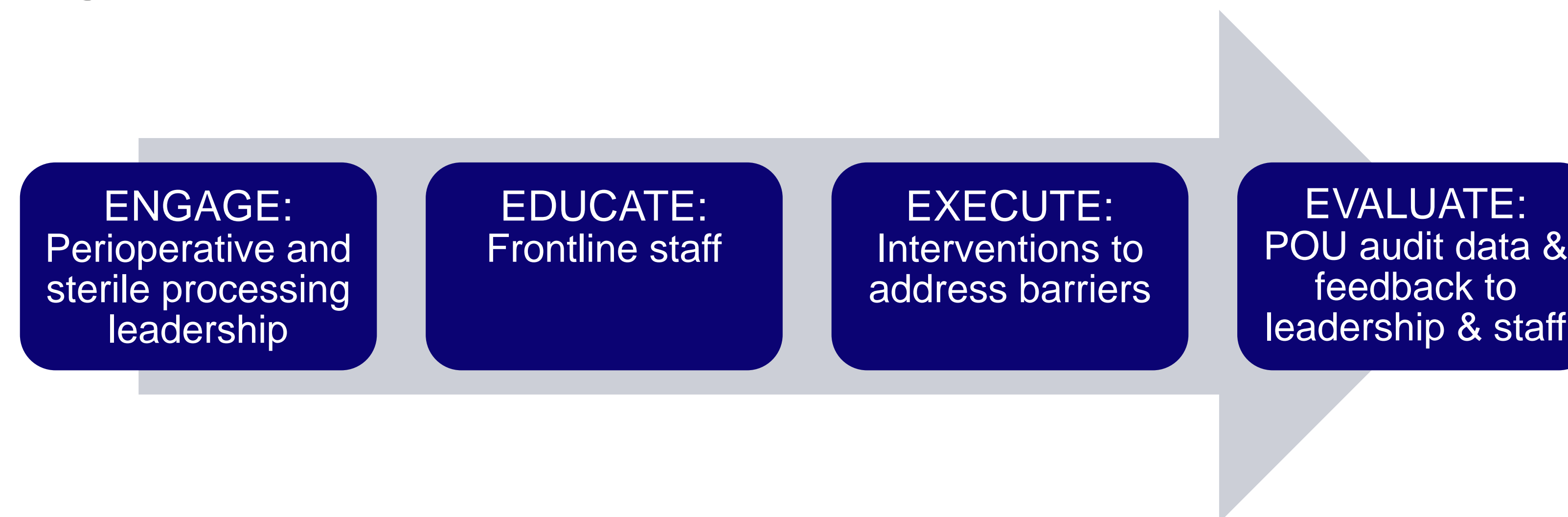
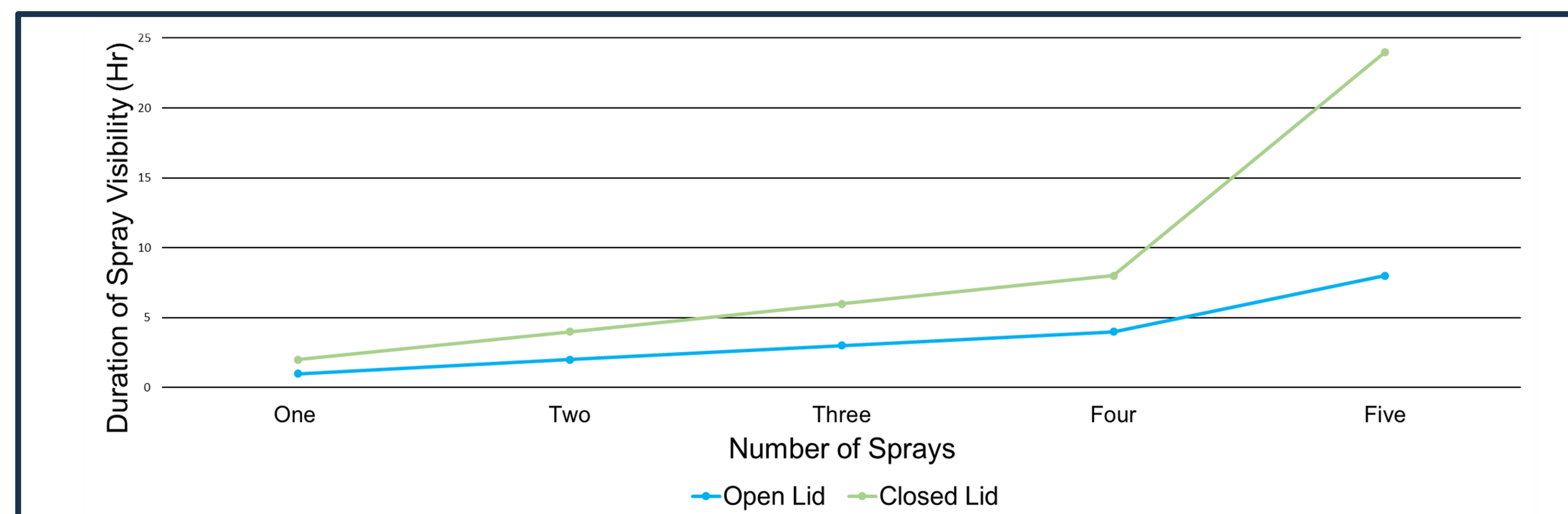


Table 1. Local Barriers Identified to POU Treatment in the ORs

Barriers to POU Treatment
Access to required supplies and equipment
Gaps in staff knowledge on appropriate application of enzymatic spray
Difficulty keeping instruments moist

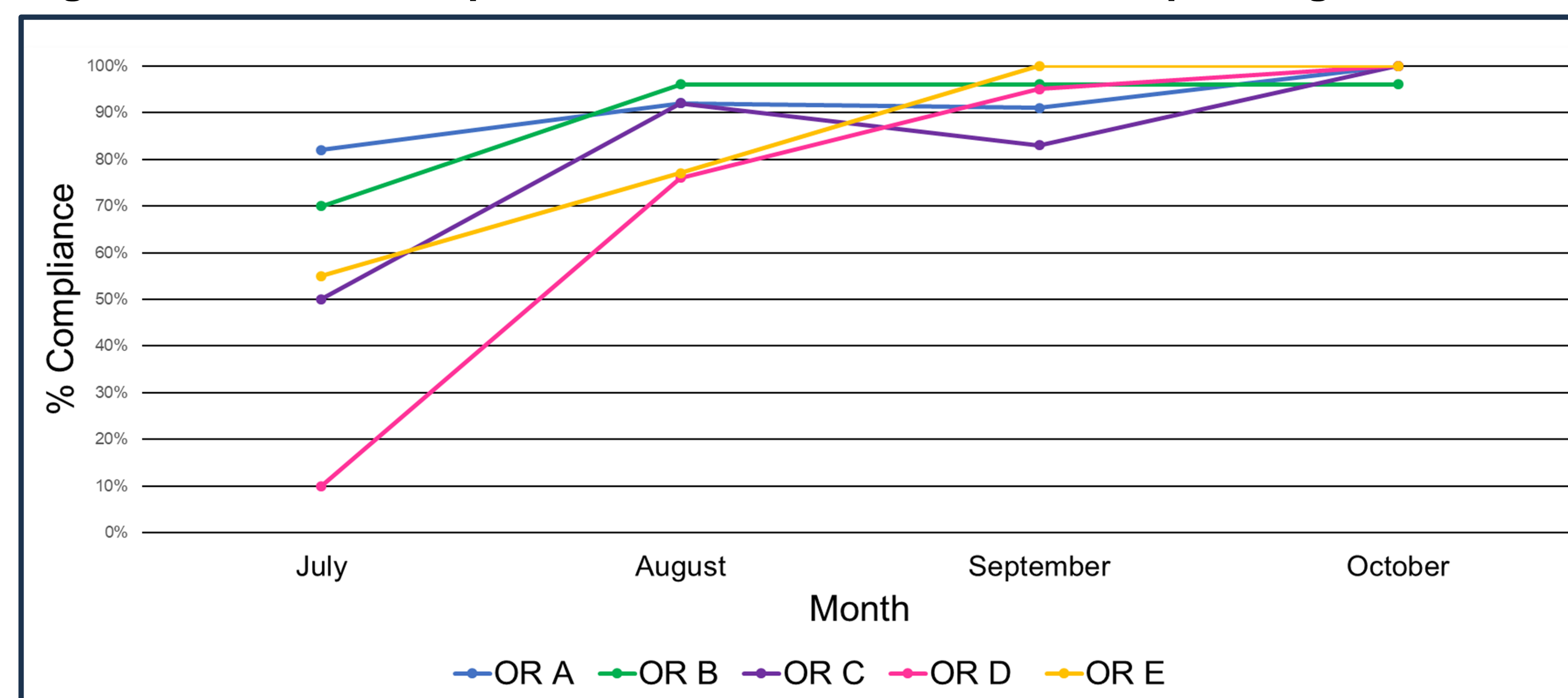
Results

Figure 2. Relationship Between Duration of Product Visibility and Number of Sprays to Each Surface in Open and Closed Containers



Systematic testing of enzymatic product demonstrated that multiple sprays of the product were required to maintain visibly moist surfaces (Figure 2). Using these strategies over four months resulted in an increase in POU treatment compliance from 54% to 99% ($p=0.012$). Compliance improved in all ORs (Figure 3).

Figure 3. Percent Compliance of POU Treatment in Five Operating Suites

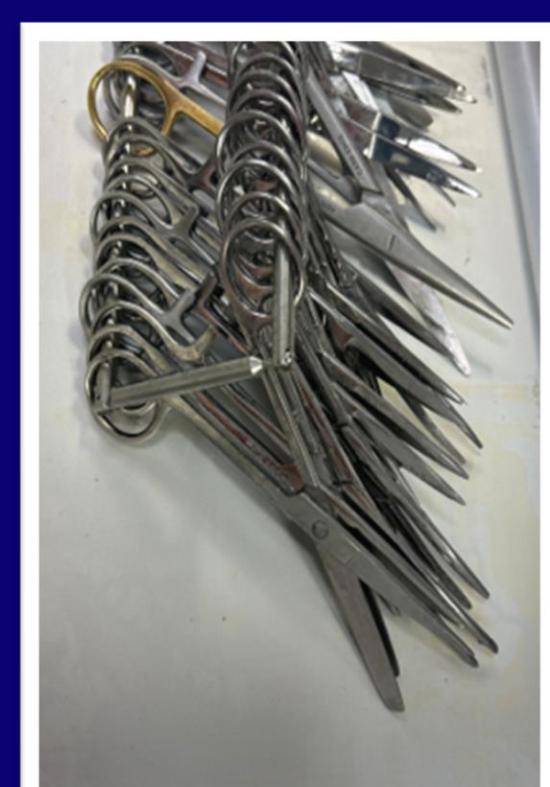


Conclusions

Engaging a multidisciplinary team, educating staff on recommendations, addressing barriers, executing a plan, and evaluating progress increases compliance with POU treatment of instruments. The Four E's model is a useful tool to guide performance improvement in the perioperative setting.

References

1. American National Standard Institute/Association for the Advancement of Medical Instrumentation. ST79:2017 Comprehensive Guide to Steam Sterilization and Sterility Assurance in Health Care Facilities. 2020.
2. Peter J Pronovost, Sean M Berenholtz, Dale M Needham. Translating evidence into practice: a model for large scale knowledge translation. *BMJ* 2008; 337:a1714



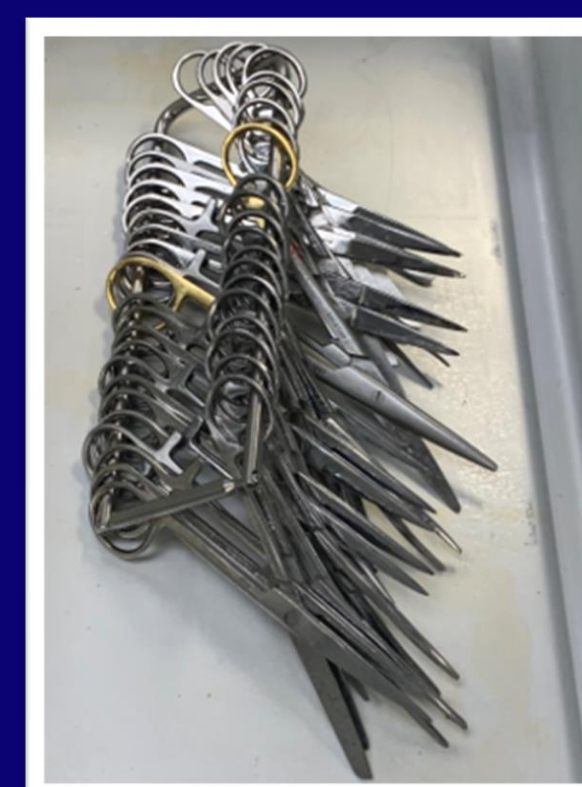
Control/No Sprays



4 Sprays at 0 Hours



4 Sprays at 4 Hours



4 Sprays at 8 Hours