

Title: Utilization of Electronic Medical Record Clinical Tools to Improve Antibiotic Re-dose Rate in Pediatric Cardiopulmonary Bypass Surgeries

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Background: Post-operative wound infections occur in 2.3–8% of pediatric patients undergoing cardiothoracic surgery, with a financial burden over \$1.6 billion annually in hospital costs.^{1,2} During cardiopulmonary bypass (CPB) surgery, the priming volume may be particularly high in proportion to the circulating volume in the pediatric population resulting in subtherapeutic perioperative antibiotic levels if the re-dose does not occur.³ At our institution, a clinical challenge was identified in 2019 when the number one source of fallouts for the Surgical Site Infection (SSI) Bundle Compliance monitoring was due to missed re-dosing of antibiotics after CPB. The aim of this study is to improve antibiotic re-administration compliance upon CPB initiation.

Methods: The Plan Do Study Act method of quality improvement was utilized. Each month, we recorded the number of CPB cases and the percentage in which antibiotics were successfully re-administered shortly after CPB initiation. After identifying the problem and the stakeholders involved, multiple interventions were instituted via repeated reminder emails, operating room (OR) discussions, involvement of cardiovascular (CVA) division chiefs, and attendance of CVA division meetings. Lastly, we implemented an electronic medical record (EMR) automatic reminder, which triggers a pop-up antibiotic re-dosing message on the electronic intraoperative record when CBP is charted.

Results: Before November 2020, the monthly re-dose rate was as low as 83.3%, and various interventions had sub-optimal and even reduction of re-dosing rates. However, since the EMR reminder was implemented in December 2020, the re-dose rate had increased to and remained at 100%.

Discussion: We demonstrated a significant improvement of antibiotic re-dose rate upon CPB initiation with implementation of an EMR tool, which was found to be superior to many traditional methods. This clinical tool increases antibiotic compliance which may reduce surgical site infections and associated healthcare costs. By providing a system change, it also reduces the provider’s burden during CPB initiation.

References:

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2. Martone, WJ et al. (1992). *Incidence and nature of endemic and epidemic nosocomial infections.* p. 577–96.
3. Jaworski R, et al. *Eur J Cardiothorac Surg.* 2021 Dec 27;61(1):27-33.

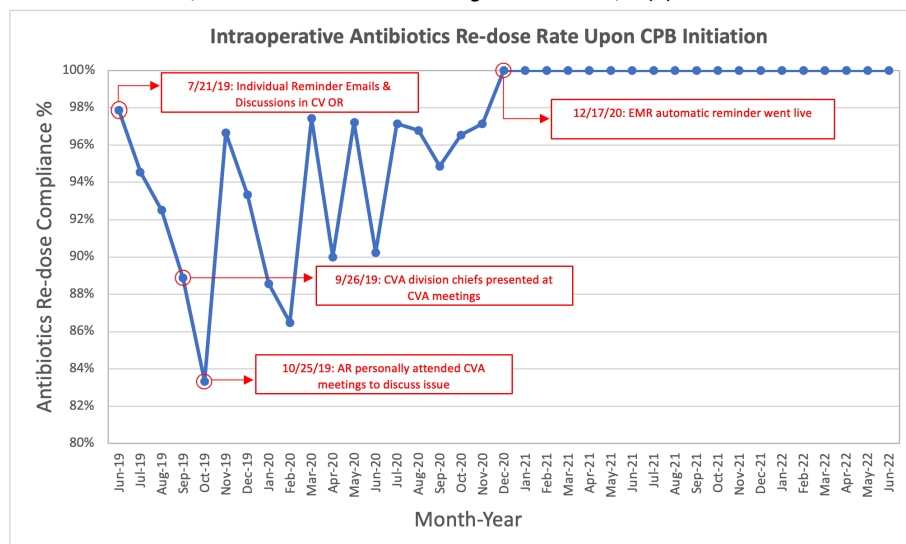


Fig. 1 Intraoperative Antibiotics Re-dose Rate with Interventions