

Impact of Early Alert to Antimicrobial Stewardship Interventions with the Prospective Audit and Feedback Strategy



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ABSTRACT

Introduction: Prospective audit-feedback is the primary strategy adopted by our hospital antibiotic stewardship program (ASP). It is labor-intensive and successful uptake relies on the visibility of the written intervention note. A rapid notification system (RNS), whereby the physical note is replaced by an electronic document followed by immediate prescriber alert through text messaging, was recently implemented. We seek to quantify the impact of this initiative on patient outcomes and ASP resource utilization.

Method: Interventions to discontinue, de-escalate or switch from intravenous to oral antibiotics in the pre-implementation (P1: January 2016 – February 2017) and post-implementation (P2: March 2017 – February 2018) periods were identified from the ASP database. Same-day intervention acceptance rate (IAR), duration of antibiotic therapy (DOT) and hospital length of stay (LOS), measured from day of intervention to discharge, were compared. Manpower time saved from having to perform next-day intervention follow-up (15mins/intervention) was calculated.

Results: A total of 1904 (11.4%) and 1311 (12.4%) interventions of 16723 and 10545 antibiotic audits were made during P1 and P2 respectively. There were no significant differences in antibiotic or intervention types between both periods – piperacillin-tazobactam (85.4%) was most common, followed by meropenem (11.4%); intervention to discontinue antibiotic (68.4%) was most frequent. Implementation of RNS led to a pronounced 2.5-fold increase in same-day IAR (19.3% vs. 47%, $p < 0.01$). Potential savings in ASP manpower was estimated at 75 hours/year. Overall improvement in IAR at 48-hours was also observed (79.2% vs. 82.5%, $p = 0.02$). Patients with ASP interventions accepted on the same day had significantly shorter DOT (4.4 vs. 5.4 days, $p < 0.01$) but not LOS (13.4 vs. 11.6 days, $p = 0.08$). 30-day infection-related mortality rates were similar across the 2 periods (3.3% vs. 3.3%).

Conclusion: Early alert to ASP interventions strengthens impact of ASP in reducing unnecessary antibiotic use without compromise in patient safety. ASPs, particularly those serving large and busy hospitals, should consider having a RNS in place to improve program efficiency and visibility.

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INTRODUCTION

- Written intervention notes, made by the antimicrobial stewardship team to the primary prescriber, is a core component of the prospective audit-feedback strategy
- Successful uptake of recommendations depends on the visibility of the physical note, which may be particularly challenging in a busy and large tertiary-care hospital
- A rapid notification system (electronic note followed by text messaging alert) to prompt prescribers for early review of antibiotic therapy was recently implemented
- We seek to quantify its impact on patient outcomes and ASP resource utilization

METHOD

- Study site:** Singapore General Hospital, a 1700-bed acute tertiary care hospital in Singapore
- Study period:**
 - Pre-implementation (P1: January 2016 – February 2017)
 - Post-implementation (P2: March 2017 – February 2018)
- Inclusion criteria:**
 - Adult inpatients prescribed piperacillin-tazobactam, a carbapenem, or intravenous quinolone **AND**
 - Received ASP interventions to discontinue, de-escalate or switch from intravenous to oral antibiotics
- Outcomes:**
 - Same-day intervention acceptance rate
 - Duration of antibiotic therapy (DOT)
 - Length of hospital stay (LOS) from day of intervention
 - ASP manpower time savings (calculated using estimated 15mins/intervention)

RESULTS

- 1904 (11.4%) and 1311 (12.4%) interventions were made during P1 and P2 respectively
- Piperacillin-tazobactam (85.4%) was most commonly prescribed as empirical treatment for unspecified sepsis (46.5%) and lower respiratory tract infections (42.2%)
- Majority of interventions recommended antibiotic discontinuation (68.4%)

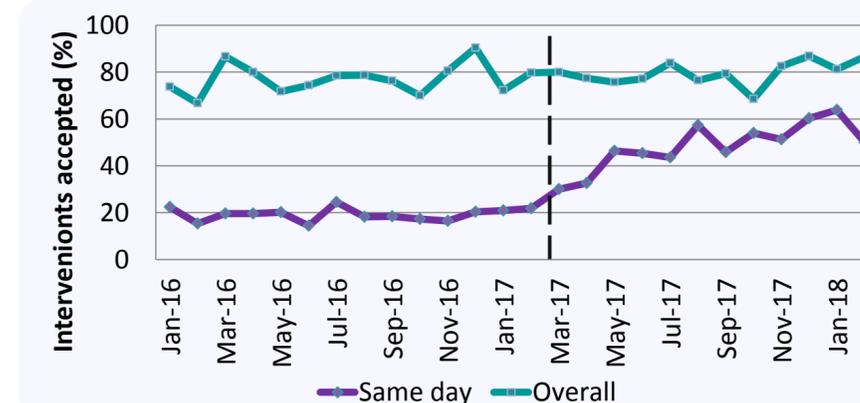


Fig 1. Time to intervention acceptance relative to day of intervention

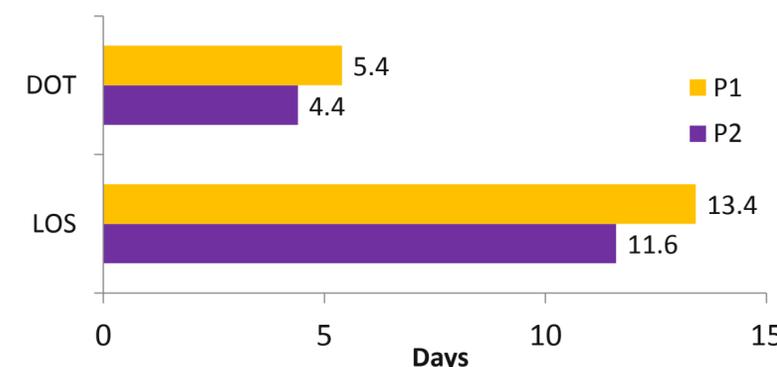


Fig 2. Impact on patient outcomes

- No difference in 30-day infection-related mortality rates (3.3% vs. 3.3%)

- Implementation of the rapid notification system led to a 2.5-fold increase in same-day acceptance (19.3% vs. 47%, $p < 0.01$), and marginal increase in overall acceptance rates (79.2% vs. 82.5%, $p = 0.02$)
- Potential manpower savings in need for next-day reminder of ASP intervention was estimated at 75 hours/year.

CONCLUSION

- Increased visibility and accessibility to ASP interventions strengthens impact of ASP in reducing unnecessary antibiotic use without compromise in patient safety.
- ASP of large and busy hospitals should strongly consider having a RNS in place to improve program efficiency.

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