Intervention to improve performance of automatic stop orders for antimicrobials

Alyssa Yeager BA, Yevgeniy Gitelman MD, Steven Morgan PharmD, BCPS, AQID, Jillian Dougherty PharmD, Daniel Timko PharmD, BCPS, AQID, Shawn Binkley BS PharmD, Keith Hamilton MD

Abstract

Background: Antimicrobial stewardship programs (ASPs) have been shown to decrease inappropriate antibiotic use, improve patient outcomes, and decrease antimicrobial resistance. Automatic stop orders (ASOs) of antimicrobial medications have been recommended as a component of ASPs and have been shown to reduce duration of therapy. However, some studies have revealed that ASOs can unintentionally discontinue or interrupt treatment. In our health system, which uses 7-day antimicrobial ASO, the ASP teams introduced a multifaceted intervention, which included increasing visibility of prophylactic antibiotic orders with a 90-day ASO and implementing a prospective review of all ASOs that expired by ASO using a novel electronic dashboard.

Methods: This study was a retrospective, descriptive analysis of interventions made by the ASP teams over the 4-month period following implementation. As a proxy measure for missed medication doses, the rates of missed doses of trimethoprim-sulfamethoxazole (TMP-SMX) single strength (SS) daily before and after implementation were determined. Because TMP-SMX SS daily is almost exclusively used in prophylaxis, it would be unlikely to be interrupted inadvertently.

Results: A total of 833 medications were reviewed by the ASP teams in our health system from November 2, 2015 – April 30, 2016. This review resulted in 216 interventions in which a member of the patient’s care team was contacted. The rate of missed Bactrim TMP-SMX doses decreased from 3.8% in the 2 months prior to the intervention to 1.6% in the 2 months after (p=0.001).

Conclusions: Although ASOs have been shown to reduce inappropriate antimicrobial use, they may also interrupt or prematurely shorten treatment courses. By increasing provider awareness of the ability to order longer courses of prophylactic antimicrobials and by streamlining the process of reviewing ASOs, ASPs can prevent potential medication errors resulting from ASOs.

Introduction

• Antimicrobial Stewardship Programs (ASPs) were developed in hospitals to optimize the use of antibiotics, with the goals of improving patient outcomes, reducing adverse medication effects, and preventing the formation of resistance.
• Automatic stop orders (ASOs), in which a medication is discontinued after a specified number of days unless it is re-ordered, have been an important component of ASPs and have been shown to reduce inappropriately prolonged courses of antimicrobials.
• However, ASOs have the potential to lead to inadvertent interruption or discontinuation of treatment, which can possibly lead to patient harm.

Objective

• Antimicrobial Stewardship Programs (ASPs) at 3 hospitals within the University of Pennsylvania Health System instituted a multifaceted intervention designed to maximize the benefits of ASOs.
  - The intervention included: (1) Daily review of 7-day antimicrobial ASOs by ASO using a novel dashboard with intervention by contacting primary providers if medications were inadvertently discontinued, and (2) Increasing the visibility of prophylactic antibiotic order sets in the Electronic Medical Record, which have a 90-day ASO.
  - Our goals are to describe the number of interventions on ASOs since the implementation of this intervention in November 2015 and to determine whether there has been any effect on the rate of missed antimicrobial doses.

Methods

• Review of ASOs was completed using Agent (University of Pennsylvania, Pennsylvania, PA)
• Descriptive analysis was completed of the total number of interventions required and whether the medications were low, medium, or high risk.
• A retrospective review of missed doses of single-strength trimethoprim-sulfamethoxazole (TMP-SMX) for hospitalized patients who received at least a 7-day course was completed before and after the intervention. TMP-SMX single strength daily was chosen as a proxy to assess the effects of the intervention because it is almost exclusively used in prophylaxis and would be unlikely to be intentionally interrupted.
• Differences between the rate of missed TMP-SMX doses were analyzed using a z-test with a significance level of 0.05.

Table: Total Number of Interventions on Automatic Stop Orders by Medication Risk

<table>
<thead>
<tr>
<th>November 1, 2015 – October 31, 2016</th>
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<tbody>
<tr>
<td>Low Risk</td>
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<tr>
<td>Pre-Intervention</td>
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<tr>
<td>Post-Intervention</td>
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Results

Review of ASOs for antimicrobials at 3 hospitals resulted in 364 interventions (i.e., contacting the primary provider) by ASOs. The breakdown by number of low risk (i.e. prophylaxis), medium risk, and high risk medications that required intervention are shown below.

Conclusions

• Though automatic stop orders have been shown to reduce inappropriate duration of antimicrobial use, they also have the potential to lead to interruption or discontinuation of indicated medications.
• Review of automatic stop orders at our institution led to a significant number of interventions for medications that were inadvertently discontinued, with 15% of the interventions being done for high risk medications.
• A combination of increasing provider awareness of a long-term prophylactic antibiotic order set and streamlining the process of automatic stop order review has resulted in a significant reduction in missed doses of single-strength TMP-SMX daily.
• With a multifaceted approach to optimizing automatic stop orders, it is possible to reduce the risk of interruptions in treatment without losing their benefit of reducing antimicrobial overuse.

Contact Information:
Alyssa Yeager
Alyssa.yeager@uphs.upenn.edu