Background: The Surviving Sepsis Campaign (SSC) recommends routine screening for severe sepsis and a bundled treatment approach that includes early administration of broad-spectrum antibiotics (BSA). Healthcare facility-onset * Clostridium difficile* infection (HO CDI) is an increasing healthcare problem and BSA are a major risk factor. The impacts of sepsis screening programs and sepsis treatment bundles on BSA use and HO CDI rates are unknown.

Methods: This was a retrospective chart review conducted at The Mount Sinai Hospital (MSH) in New York, NY. In 2012, MSH launched an initiative called “STOP Sepsis” (SS), based on SSC guidelines, which has resulted in a 40% decrease in sepsis related mortality. We extracted admission data of commonly used BSA, including those featured in the SS treatment bundle (cefepime (FEP) and imipenem (IPM)), ordered for adult patients on medicine and oncology wards before, during, and after SS implementation. BSA use was expressed as days of therapy (DOT) per 1,000 patient-days. Rate of HO CDI (cases per 10,000 patient-days) affecting the same patient was also collected. Data were plotted over time and segmented regression-based hypothesis tests were performed.

Results: Although overall BSA use changed little pre- and post-SS implementation (-0.9%), there was an increase in the trend of BSA administration in the year during SS implementation (+6.5 DOT per 1,000 patient-days per month, P=0.03), which subsequently declined post-SS implementation (-7.9 DOT per 1,000 patient-days per month, P=0.002). The change was driven primarily by FEP and IPM use (+3.7 DOT per 1,000 patient-days per month, P=0.03). HO CDI rates mirrored BSA use; the implementation period saw an increase in trend (+1.4 cases per 10,000 patient-days per month, P=0.04). This reversed a declining trend (-1.5 cases per 10,000 patient-days per month, P=0.01) prior to SS implementation. Overall, HO CDI rates increased by 23.3% comparing pre- and post-SS implementation.

Conclusion: These data show that an increase in trend of BSA use on medicine and oncology wards followed the implementation of an integrated sepsis performance improvement program, which coincided with an increase in HO CDI rate.

**ABSTRACT**

**INTRODUCTION**

Based on SSC recommendations, the New York State Department of Health recommends inpatient screening for severe sepsis and a bundled approach to sepsis care. This includes early administration of broad-spectrum antibiotics (BSA). Antibiotic use is associated with Clostridium difficile infection (CDI). In 2012, MSH launched STOP Sepsis— an EHR-based screening and treatment protocol (Figure 1). The campaign was launched in a stepwise fashion (Figure 2). The first areas to implement SS were 4 high-risk medical and oncology units in May, 2012. We compared BSA use and HO CDI rates before, during, and after SS implementation on the index units.

**METHODS**

- **Study design:** Retrospective review of BSA use and HO CDI rates among adult inpatients over a 3-year period.
- **Inclusion criteria:** Patients included in the analyses were adults admitted to high-risk medicine and oncology units. Antibiotics included were FEP, IPM, ceftazidime (CRO), ertapenem (ETP), ceftriaxone (CIP), levofloxacin (LVX), clindamycin (CLI), and piperacillin-tazobactam (TDP). HO CDI rate was determined in accordance with the National Healthcare Safety Network definition.
- **Data Collection:** Antibiotic administration data were abstracted from medication administration records over a 3-year period and then divided into 3 time segments based on the stepwise implementation of SS.
- **Statistics:** Interpolated, time series-design with segmented regression analysis. All statistics were performed using SAS 9.4 (SAS Institute Inc., North Carolina).

**RESULTS**

- **Figure 1.** STOP Sepsis screening protocol.
- **Figure 2.** STOP Sepsis timeline. In May, 2012, SS was implemented on medicine followed by oncology units. Implementation continued in a stepwise fashion until the program was hospital-wide in late 2013.
- **Figure 3.** Broad-spectrum antibiotic (BSA) use and HO CDI rate before, during, and after STOP Sepsis introduction.
- **Figure 4.** Cefepime (FEP) and imipenem (IPM) use and HO CDI rate before, during, and after STOP Sepsis introduction.

**LIMITATIONS**

- We cannot causally link increased BSA use in the setting of the SS campaign to increased CDI; however, BSA use is a known risk factor for HO CDI.
- This was a single-center, retrospective study in a subset of high-risk medical and oncology patients and may not be applicable to all clinical settings and patient populations.
- Analyses were limited to commonly used BSA and changes in use of other agents were not studied.

**REFERENCES**


**ACKNOWLEDGMENTS**

Special thanks to Allison Glasser BSPT, MBA, the Office for Excellence in Patient Care, Jimmy Huang, Scott Linh MD, MBA; Charles A. Powell MD, Akwaeke Alike, and the STOP Sepsis Team for their support and contributions.

**FURTHER READING**

- **ABSTRACT**
- **FIGURES**
- **REFERENCES**
- **LIMITATIONS**
- **CONCLUSIONS**
- **ACKNOWLEDGMENTS**