

# SSI Trends in Community Hospitals from 2013 to 2018



Duke Center for Antimicrobial Stewardship and Infection Prevention

Jessica Seidelman, MD, MPH<sup>1,2</sup>, Arthur W. Baker, MD, MPH<sup>1,2</sup>, Sarah Lewis MD, MPH<sup>1,2</sup>, Sonali D. Advani MD, MPH<sup>1,2</sup>, Becky Smith, MD<sup>1,2</sup>, Deverick Anderson MD, MPH<sup>1,2</sup>

1. Division of Infectious Diseases and International Health, Department of Medicine, Duke University School of Medicine, Duke University, Durham, North Carolina, 2. Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke University Medical Center, Durham, North Carolina.



## Abstract

**Background:** Surgical site infections (SSIs) are common causes of hospital-acquired infection. However, only sparse data are available on the recent epidemiology of SSIs in community hospitals.

**Methods:** We performed a retrospective analysis of prospectively collected SSI data at 32 community hospitals in the southeastern United States from 2013 to 2018. We calculated the annual prevalence rates (PRs) of SSI for 26 commonly performed procedures and stratified results by causative pathogen. We used log-binomial regression models to examine trends of SSI prevalence over time.

**Results:** Over the 6-year study period, 3,561 complex (i.e., deep incisional or organ space) SSIs occurred following 669,467 total procedures (PR, 0.53 infections per 100 procedures). The complex SSI PR did not change significantly during the study period (0.58/100 procedures in 2013 versus 0.53/100 procedures in 2018; PR ratio [PRR], 0.84; 95% CI 0.66–1.08, p=0.16). For commonly performed procedures, rates of SSI in community hospitals were higher than 2018 National Healthcare Safety Network (NHSN) benchmark SSI rates for colon surgery, hip arthroplasty, knee arthroplasty, and spinal fusion (Table 1). Staphylococcus aureus was the most common pathogen to cause SSI each year and was responsible for 23.7% (n=843) of all complex SSIs. Methicillin-susceptible S. aureus (MSSA) complex SSIs [13.5%, n=480] were more common than complex SSIs caused by methicillin-resistant S. aureus (MRSA) [10.2%, n=363] (Figure 1). Compared to the 2013, the only significant decrease in S. aureus SSI PR occurred in 2017 (PRR 0.67 95% CI 0.49-0.90, p=0.01), which was primarily driven by the significant decrease in MRSA SSI PR in 2017 compared to 2013 (PRR 0.61 95% CI 0.42-0.89, p-value=0.01). The Escherichia coli SSI PRs did not change significantly during the study period, but E. coli became the second most prevalent pathogen in 2018, surpassing MRSA.

**Conclusion:** The complex SSI rate did not significantly decline in our cohort of community hospitals from 2013 to 2018. Baseline SSI rates were low, and statistically significant decreases in SSI rates may be difficult to achieve. However, the epidemiology of community hospital SSIs may be changing with a shift away from MRSA SSIs.

## Methods

- Retrospective analysis of prospectively collected data in 32 community hospitals in the Southeastern U.S. from 2013 to 2018
- Calculated annual prevalence rates of complex SSIs (deep-incisional or /organ space SSIs) for 26 commonly performed procedures stratified by causative pathogen
- Examine SSI trends using log-binomial regression

## Results

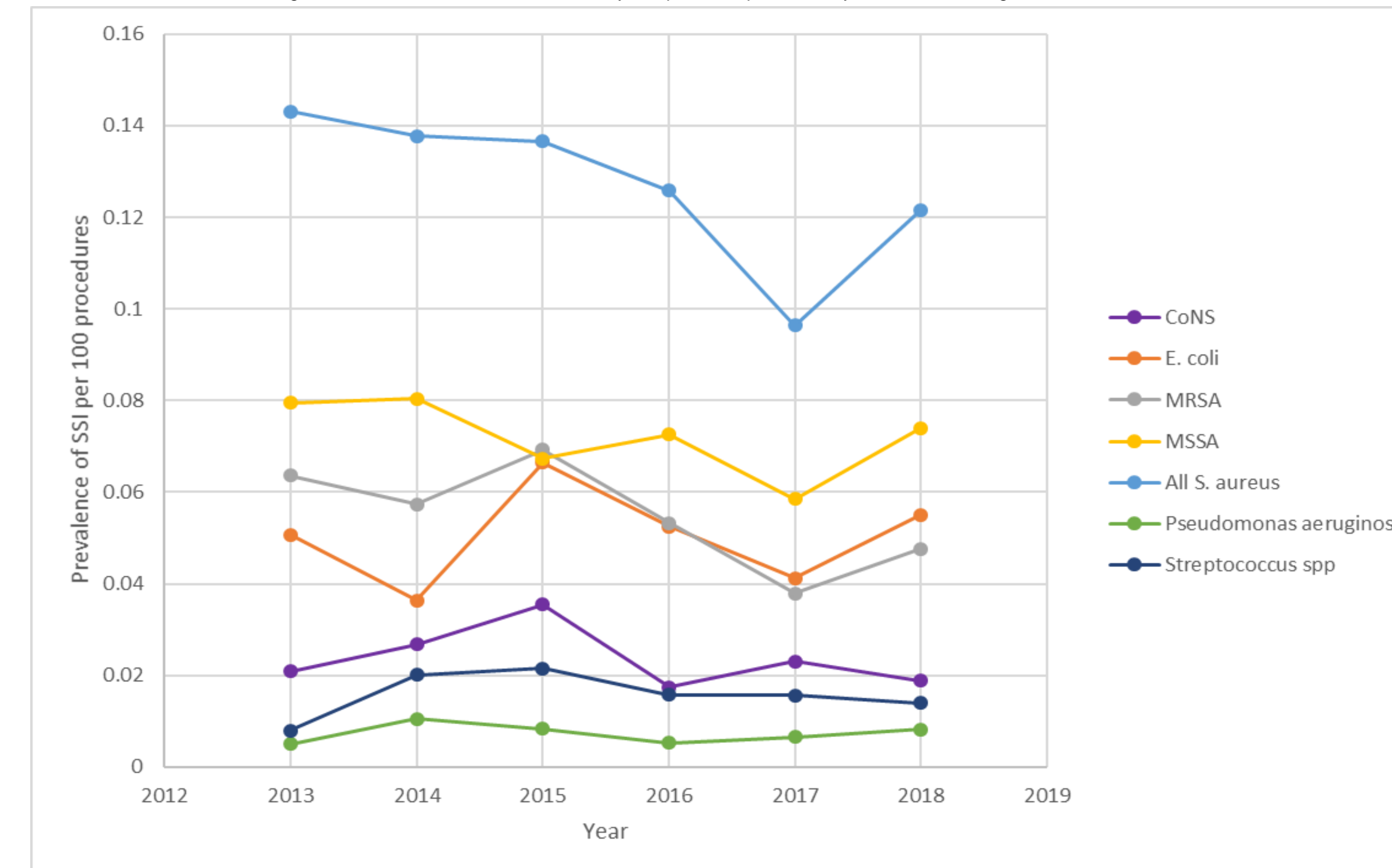
- 3,561 complex SSIs following 669,467 procedures (PR, 0.53 infections per 100 procedures)
- Complex SSI PR did not change significantly during the study period (0.58/100 procedures in 2013 versus 0.53/100 procedures in 2018; PR ratio [PRR], 0.84; 95% CI 0.66–1.08, p=0.16)
- SSI rates for colon surgery, hip arthroplasty, knee arthroplasty, and spinal fusion were higher compared to 2018 National Healthcare Safety Network (NHSN) benchmark SSI rates

Table 1. Community Hospital SSI Prevalence Rates for Commonly Performed Procedures

NHSN Procedure Category	# Procedures	# Complex SSIs	Prevalence Rate, Complex SSI	# Total SSI	Prevalence Rate, Total SSI	NHSN Benchmark Complex SSI Prevalence Rate (2018)
Colon Surgery	23551	584	2.48	887	3.77	2.27
Hip arthroplasty	40126	341	0.85	471	1.17	0.65
Knee arthroplasty	60294	344	0.57	434	0.72	0.38
Spinal fusion	40862	228	0.56	348	0.85	0.20
Abdominal hysterectomy	28381	167	0.59	241	0.85	0.62

- Staphylococcus aureus was the most common pathogen to cause SSIs each year and was responsible for 23.7% (n=843) of all complex SSIs
- MRSA complex SSIs (10.2%, n=363) were less common compare to MSSA complex SSIs (13.5%, n=480)
- Compared to 2013, the only significant S. aureus complex SSI PR decrease occurred in 2017 (PRR 0.67 95% CI 0.49-0.90, p=0.01), which was primarily driven by the significant decrease in MRSA SSI PR in 2017 compared to 2013 (PRR 0.61 95% CI 0.42-0.89, p-value=0.01).
- E. coli SSIs became the 2<sup>nd</sup> most prevalent SSI in 2018, surpassing MRSA SSIs

Figure 1: Prevalence Rates of Community Hospital Complex SSIs by Causative Pathogen from 2013 to 2018



## Background

- SSIs are common causes of hospital-acquired infections
- There is sparse data available on the recent epidemiology of SSIs in community hospitals

## Conclusions

- Complex SSI rate did not decline significantly in the cohort of community hospitals from 2013 to 2018
- Low baseline SSI rates makes statistically significant SSI decreases difficult to achieve
- Community SSIs are shifting away from MRSA SSIs

