

# Implementation of an Infection Prevention Bundle and Increased Physician Awareness Improve Surgical

## Outcomes and Reduce Costs Associated with Spine Surgery: A 10-Year Experience

Prateek Agarwal AB; Nitin Agarwal MD; Ashley Querry; Zachary J Tempel MD; Robert Max Friedlander MD; Peter C.

Gerszten MD MPH FACS; D. Kojo Hamilton MD; David O. Okonkwo MD, PhD; Adam S. Kanter MD

[Institution]

Click To  
Add Logo



### Introduction

Previous studies have demonstrated the efficacy of infection prevention protocols in reducing infection rates. However, there exists a lack of literature on the implementation of infection prevention bundles to reduce SSIs specifically in patients undergoing spine surgery. Furthermore, besides formal infection prevention bundles, the effect of physician awareness interventions on healthcare risks has not been adequately addressed. As such, we investigated the effects of an evolving infection prevention protocol augmented by increased physician awareness on spine surgery infection rates and resultant cost containment.

### Methods

Neurological spine surgeons at a single academic institution were informed of spine surgery infection control measures as well as individual, independently adjudicated, spine surgery infection rates and rankings amongst their institutional peers. The groups were divided into those that actively employed recommended infection control measure protocols, and those that did not.

### Results

With the implementation of postoperative surgical dressing measures and physician awareness, the postoperative spine surgery infection rate decreased by 45% from 3.8% to 2.1% for collaborative neurosurgeons (Risk Ratio = 0.55; 95% CI, 0.32 – 0.93;  $p = 0.03$ ), resulting in an estimated annual cost savings of \$291,000. This reduction in infection rate was not observed for non-collaborative neurosurgeons, though the overall infection rate amongst all neurosurgeons decreased from 3.3% to 1.5% (Risk Ratio = 0.46; 95% CI, 0.28 – 0.73;  $p = 0.0013$ ). Thus, it appears as if the infection rate reduction amongst collaborative neurosurgeons was driving the reduction in the overall infection rate amongst all neurosurgeons.

### Conclusions

A novel paradigm for spine surgery infection control combined with physician awareness methods resulted in significantly decreased infection rates and associated cost reduction. Thus, information sharing and physician engagement as a supplement to formal infection control measures results in improvements in surgical safety and costs.

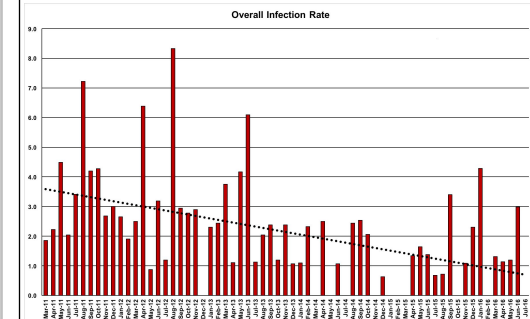
### Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of infection prevention bundles to reduce surgical site infections specifically in patients undergoing spine surgery, 2) Discuss, in small groups, the potential for cost savings associated with reduced infection rates, 3) Identify an effective methods to utilize physician awareness to augment infection prevention bundles to reduce surgical site infections.

### References

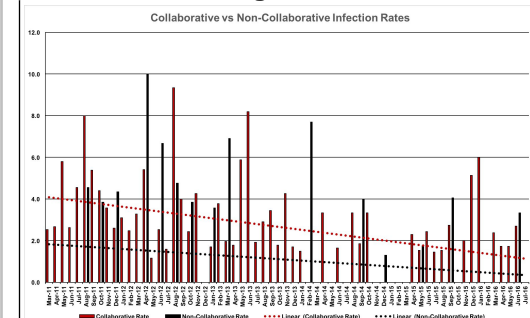
1. Bode LG, Kluytmans JA, Wertheim HF, Bogaers D, Vandembroucke-Grauls CM, Roosendaal R, et al: Preventing surgical-site infections in nasal carriers of *Staphylococcus aureus*. *N Engl J Med* 362:9-17, 2010
2. Caroom C, Tullar JM, Benton EG, Jr., Jones JR, Chaput CD: Intrawound vancomycin powder reduces surgical site infections in posterior cervical fusion. *Spine (Phila Pa 1976)* 38:1183-1187, 2013
3. Dennis HH, Wei DT, Darren KZ, Shantakumar JT, Kumar N, Lau LL, et al: Is Intraoperative Local Vancomycin Powder the Answer to Surgical Site Infections in Spine Surgery? *Spine (Phila Pa 1976)*, 2016
4. Epstein NE: Preoperative, intraoperative, and postoperative measures to further reduce spinal infections. *Surg Neurol Int* 2:17, 2011
5. Featherall J, Miller JA, Bennett EE, Lubelski D, Wang H, Khalaf T, et al: Implementation of an Infection Prevention Bundle to Reduce Surgical Site Infections and Cost Following Spine Surgery. *JAMA Surg*, 2016
6. Ghobrial GM, Cadotte DW, Williams K, Jr., Fehlings MG, Harrop JS: Complications from the use of intrawound vancomycin in lumbar spinal surgery: a systematic review. *Neurosurg Focus* 39:E11, 2015
7. Hickson GB, Pichert JW, Webb LE, Gabbe SG: A

Figure 1



Overall spine surgery postoperative infection rate including both collaborative and non-collaborative neurosurgeons, depicting a decrease in the infection rate after the implementation of postoperative surgical dressing measures in January 2013 and physician awareness in May 2015.

Figure 2



Spine surgery postoperative infection rate split into collaborative and non-collaborative neurosurgeons, depicting decrease in the infection rate for collaborative neurosurgeons after the implementation of postoperative surgical dressing measures in January 2013 and physician awareness in May 2015.