

Achieving Appropriate Prophylactic Antibiotic Administration While Simultaneously Implementing an Automated Anesthesia Record

David Sumrall, MD, James Douglas, MD, PhD

Department of Anesthesiology, Ochsner Clinic Foundation, New Orleans, LA

ABSTRACT

The Surgical Care Improvement Project (SCIP) is a national quality partnership involving organizations interested in improving surgical care by significantly reducing surgical complications. As a partner in this effort, our group focused on improvement in antibiotic selection and timing as related to surgical incision. After forming a multidisciplinary rapid response team in 2008, enacting a plan-do-study-act (PDSA) strategy, and implementing an anesthesia information management system, we were able to improve compliance and documentation to our goal of 90% compliance in both measures.

BACKGROUND

In fall 2003, The Joint Commission initiated the Surgical Infection Prevention (SIP) program. Hospitals began collecting core measurement data for SIP with patient discharges beginning July 1, 2004. The SIP set subsequently transitioned to the Surgical Care Improvement Project (SCIP) effective July 1, 2006.

SCIP is a national quality partnership of organizations interested in improving surgical care by significantly reducing surgical complications. SCIP partners include the steering committee of 10 national organizations that have pledged their commitment and full support for SCIP, including the Agency for Healthcare Research and Quality, the American College of Surgeons, the American Hospital Association, the American Society of Anesthe-

siologists, the Association of periOperative Registered Nurses, the Centers for Disease Control and Prevention, the Centers for Medicare & Medicaid Services, the Institute for Healthcare Improvement, The Joint Commission, and the Veterans Health Administration.

In response to SCIP, the Rapid Change Group at Ochsner Medical Center set the goal to meet and exceed the performance target in appropriate prophylactic antibiotic administration for our surgical patients. SCIP set a target of 90% compliance for appropriate patient care. For antibiotic timing, SCIP set a target of administration within 1 hour of surgical incision. When this project was initiated, Ochsner Medical Center had an antibiotic on-time compliance rate of 40% and an antibiotic selection rate of 89%.

METHODS

Physician champions from the Department of Anesthesiology and the Department of Surgery took ownership of the antibiotic timing indicator and the process of antibiotic selection by assembling a Rapid Change Group and forming collaborations. The group consisted of hospital nursing performance improvement staff, a surgeon champion, the clinical director of the operating room, an anesthesiologist, and the lead certified registered nurse anesthetist. The Rapid Change Group educated surgical staff physicians and residents on the changes via direct meetings with each department. These meetings included information on correct antibiotic selection and correct ordering of the antibiotic. Because this process involved multiple departments, it was important to get full buy-in from many different groups. The process of ensuring both appropriate antibiotic selection and timing would not have been possible without a collaborative effort of surgeons, anesthesiologists, nurses, and administrators.

SCIP data were reported to surgery staff at the Surgery Performance Improvement Committee, at monthly surgery staff meetings, at surgery council, and to various medical and nursing leaders through the Performance Improvement Committee.

On the basis of the group's observations, the Rapid Change Group implemented multiple changes, using the plan-do-study-act (PDSA) method¹ of performance improvement (Table 1). Deficiencies in documentation of antibiotic administration were the

Address correspondence to
David Sumrall, MD
Department of Anesthesiology
Ochsner Clinic Foundation
1514 Jefferson Highway
New Orleans, LA 70121
Tel: (504) 842-2724
Fax: (504) 842-2036
Email: wsumrall@ochsner.org

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Table 1. Process of Surgical Care Improvement Project (SCIP) Measure—Improvement at Ochsner Medical Center

Plan:

- **Improve** antibiotic timing and selection for surgery patients.
- **Seek** buy-in from nursing, medical, and other healthcare workers.
- **Create** urgency for improvement.
- **Reach** staff with an effective campaign.
- **Educate** staff on the importance of antibiotic timing and selection for surgery patients.
- **Analyze** data and **provide** feedback to staff at meetings.
- **Maintain** surveillance and identify areas where poor compliance occurs.
- **Educate** again to reinforce.

Do:

- **Assemble** Rapid Change Group to drive SCIP antibiotic timing and selection compliance.
- **Collect** data on antibiotic selection and timing (1Q 2006-ongoing).
- **Provide** data to surgery leadership.
- **Obtain** Anesthesiology Department leadership support and implementation of prompt documentation of antibiotic time given and antibiotic choice.
- **Assign** Anesthesiology Department ownership of antibiotic appropriateness SCIP measure.
- **Educate** surgeons and surgery staff on antibiotic appropriateness SCIP measure.
- **Report** data to surgery PI, performance improvement, and surgery leadership.

Study:

- **Observe** incremental improvements.
- **Collect** and **report** results each quarter.
Data are represented in bar graph format.
Data are submitted to CMS and The Joint Commission.
Data are publicly available at <http://www.hospitalcompare.hhs.gov>.
- **Give** reports and feedback to staff.
Surgery PI
Interdisciplinary Practice Council
Infection Control Committee
Performance Improvement

Act/Next Steps:

- **Continue** data collections.
- **Continue** educating staff on the importance of antibiotic appropriateness.
- **Identify** the surgery teams with deficiencies as soon as data are available to correct matters.
- **Continue** collaboration between surgery, pharmacy, and infection control to reach target of 90% or better for SCIP antibiotic-related measures.

Abbreviations: CMS, Centers for Medicare & Medicaid; PI, performance improvement; Q, quarter.

source of most compliance failures. The DocuSys (Mobile, AL) Anesthesia Information Management System (AIMS) was implemented in early 2009. A redesign of the AIMS record improved documentation by adding a pop-up box that forced the provider to enter antibiotic administration information after induction of anesthesia was completed. Antibiotic selection improved after the surgeon champion made visits to each surgical section's monthly meeting, but only after the automated prompts and additional forced documentation steps were added did the group see an increase to more than 90% for antibiotic timing. Additional follow-up now is based on patterns of failure, such as a specific provider who fails to properly

administer and document the antibiotic or specific surgical service lines that are not in compliance.

Antibiotic selection continues to be an individual surgeon intervention and is handled by a set of surgeon champions.

RESULTS

Data collection for antibiotic timing began in the first quarter of 2006, but the Rapid Change Group was not formed until the fourth quarter of 2008. Incremental improvements were observed over time. Preoperative antibiotic timing compliance was as low as 40% in 2006. Rates rose in 2009, reaching 76.5%, 80.2%, 83.9%, and 88.5% in quarters 1 through 4, respec-

Table 2. Surgical Care Improvement Project (SCIP) Measure—Performance at Ochsner Medical Center

SCIP	Q1 2009, %	Q2 2009, %	Q3 2009, %	Q4 2009, %	Q1 2010, %	Q2 2010, %
Prophylactic antibiotic received						
within 1 hour before incision	76.5	80.2	83.9	88.5	93.7	96.7
Prophylactic antibiotic selection	98.9	98.9	96.6	89.3	92.2	96.7

Abbreviations: Q, quarter.

tively (Table 2). In the first quarter of 2010, compliance improved to 93.7% and in quarter 2 of 2010, for which the most recent results are available, the rate of appropriate antibiotic timing reached 96.7% (Table 2). The compliance rate for appropriate antibiotic selection was as low as 89% in 2006. Rates were higher in 2009: 98.9%, 98.9%, 96.6%, and 89.3% in quarters 1 through 4, respectively (Table 2). For the first 2 quarters of 2010, compliance rates were 92.2% and 96.7%, respectively (Table 2).

The rate of appropriate antibiotic timing reached our target, but surpassed 90% only after the automated prompts and additional forced documentation steps were added in the AIMS in quarter 4 of 2009. Further improvement toward 100% is being sought now, with attention to patterns of failure for specific providers and surgical cases.

DISCUSSION

Antibiotic timing and selection are important SCIP indicators that improve perioperative morbidity and mortality. Reaching a target compliance rate of 90% or better required a collaborative effort among perioperative physicians, nurses, pharmacists, and performance improvement staff. We report reaching and sustaining the desired target level of greater than 90% performance after 12 months of ongoing process redesign.

According to the Institute for Healthcare Improvement SCIP report, 30 million inpatient surgeries are performed every year in the United States and a “significant percentage result in preventable, often life-threatening complications.”² Surgical care guidelines provided by the Centers for Medicare & Medicaid and The Joint Commission emphasize best practices to minimize surgical site infections: appropriate hair removal (clip not shave), postoperative glucose control for patients undergoing major cardiac surgery, immediate postoperative normothermia for patients undergoing colorectal surgery, use of chlorhexidine-based skin preparation, and effective environmental cleaning. Appropriate antibiotic selection

and timing also reduce complications related to postsurgical infections.

Anesthesiologists have had prominent roles in such achievements. Our experience highlights the short time frame of improvement facilitated by our newly implemented AIMS. AIMS allowed our Rapid Change Group using the PDSA method to rapidly review data and implement changes. Before implementation of AIMS, all data were collected by hand and then cross-referenced to specific providers who might not have been in compliance for antibiotic timing or selection. After implementation of AIMS, the Rapid Change Group was able to obtain the data faster, act on patterns observed, and implement the observations obtained from multiple PDSA reviews. In addition, AIMS allowed the group to place forced documentation prompts after induction, improving documentation compliance and reinforcing the importance of documenting the antibiotic information.

Achieving desired SCIP measure levels represents a coordinated effort by the major stakeholders in perioperative quality and safety, laying the foundation for surgical outcome improvement. Ochsner Health System has fully adopted the SCIP recommendations and places a priority on improving these metrics. Antibiotic timing and selection were the SCIP measures targeted during the early phases of this performance improvement program. Through the use of the PDSA method, we reached our compliance goal of 90% in 12 months and continue to make improvements. Critical success factors were careful planning, a multidisciplinary approach, multiple short PDSA cycles, and adaptation of AIMS technology.

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