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Getting Started Kit:
Reduce Surgical Complications

How-to Guide

5 Million Lives Campaign

We invite you to join the 5 Million Lives Campaign, a national initiative to dramatically improve the quality of American health care. The Institute for Healthcare Improvement (IHI) and its partners seek to engage thousands of U.S. hospitals in an effort to reduce harm for five million American patients between December 2006 and December 2008. This ambitious work builds upon the great energy and commitment shown by hospitals during the 100,000 Lives Campaign, a national, IHI-led initiative that focused on reducing unnecessary mortality and ran from December 2004 to June 2006. Complete details, including materials, contact information for experts, and web discussions, are on the web at http://www.ihi.org/IHI/Programs/Campaign/.

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This How-to Guide is dedicated to the memory of David R. Calkins, MD, MPP (May 27, 1948 – April 7, 2006) -- physician, teacher, colleague, and friend -- who was instrumental in developing the Campaign's science base. David was devoted to securing the clinical underpinnings of this work, and embodied the Campaign's spirit of optimism and shared learning. His tireless commitment and invaluable contributions will be a lifelong inspiration to us all.

Campaign Donors

The Institute for Healthcare Improvement extends its sincere gratitude to the distinguished group of individuals, foundations, and companies whose generous contributions support the 5 Million Lives Campaign:

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The 100,000 Lives Campaign, on which our current work builds, was generously supported by:

Blue Cross Blue Shield of Massachusetts
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Scientific Contributors

IHI is part of a steering committee of 10 national organizations for the Surgical Care Improvement Project (SCIP) (full list here). These partners, particularly the American College of Surgeons and the Centers for Disease Control and Prevention, were very helpful in compiling this guide."

Goal:

Significantly reduce surgical complications by reliably implementing the four changes in care recommended by the Surgical Care Improvement Project (SCIP):

1. Surgical Site Infection Prevention
2. Beta Blockers for Patients on Beta Blockers prior to Admission
3. Venous Thromboembolism Prophylaxis
4. Ventilator-Associated Pneumonia Prevention

The Case for Reducing Surgical Complications

SCIP is a national quality partnership of organizations focused on reducing the incidence of surgical complications nationally. The Institute for Healthcare Improvement (IHI) is one of the ten national organization members of the SCIP Steering Committee. Through the 5 Million Lives Campaign, we hope to accelerate the improvement efforts identified by SCIP and its partners.

Complications in surgical patients are unintended consequences of care, and occur at alarming rates. In a review of 15,000 patient records from 1992, it was found that 3,794 operative events had occurred (Thomas. *BMJ.* 2000;320:741-744). Such events increase length of stay in the hospital and risk of mortality for patients, as was found in an Australian study where 17% of surgical patients experienced a serious adverse event (Bellomo. *MJA.* 2002;176:216-218).

According to SCIP, there are 30 million inpatient surgeries in the United States every year and a “significant percentage result in preventable, often life-threatening complications” (see SCIP “Improving Surgical Care” report). If even half of those surgeries experience the rate of events noted in the above studies, there could be as many as 2.5 to 3.5 million surgical patients per year experiencing unintended harm resulting from or contributed to by surgical care.

A great many of these complications could have been prevented or reduced by the reliable application of evidence-based practices and by the implementation of known safety measures, such as standardizing and simplifying core processes, redesigning delivery systems using proven human factors principles, partnering with patients, and creating safety cultures that minimize blame and maximize communication and teamwork. Success has already been achieved in some areas (see SCIP "Improving Surgical Care" report) and we hope to build on these efforts to achieve even greater reductions in surgical harm.

Many resources are available on the SCIP website regarding the background of this important project, data on the incidence of these complications, and the evidence supporting best practices. A related initiative, the National Surgical Quality Improvement Program (NSQIP), began in the mid-1990s through the Department of Veterans Affairs (VA) and was later incorporated into non-VA hospitals. There are now two NSQIP programs, one in the VA Health System (VA NSQIP) and the other in the private sector managed by the American College of Surgeons (ACS NSQIP). While both programs use the same data protocols, they differ in organization, infrastructure, program management, and data management. The ASC NSQIP website contains many resources, including the history of these programs and the business case for improving surgical care.

For the purposes of the Campaign, IHI is linking with these and other national partners (such as the Joint Commission on Accreditation of Healthcare Organizations and the Centers for Medicare & Medicaid Services) to ensure alignment of measures. We hope to accelerate the rate of improvement through the Campaign and its members.

General Considerations for Improvement in Surgical Care

Any improvement process should be driven by leadership, with a commitment to providing adequate resources and attention to the initiative. It is also imperative to involve a multidisciplinary team in the surgical care improvement process. Successful teams set clear aims for their work, establish baseline measurements of performance, regularly measure and study the results of their work, and test various process and systems changes over a variety of conditions in order to find the ones that lead to improvement in their particular setting.

Reducing Surgical Complications

1. Surgical Site Infection Prevention

Surgical site infections are the second most common type of adverse events occurring in hospitalized patients (Brennan. *N Engl J Med*. 1991;324:370-376). Surgical site infections have been shown to increase mortality, readmission rate, length of stay, and cost for patients who incur them (Kirkland. *Infect Control Hosp Epidemiol.* 1999;20:725).

» What changes can we make that will result in improvement?

While nationally the rate of surgical site infection averages between 2% and 3% for clean cases, an estimated 40% to 60% of these infections are preventable by implementing four components of care:

1. Appropriate use of antibiotics
2. Appropriate hair removal
3. Postoperative glucose control for major cardiac surgery patients
4. Immediate postoperative normothermia for colorectal surgery patients

Surgical site infection (SSI) prevention is only one of the areas included in SCIP, yet by itself is a significant undertaking and was an intervention in the 100,000 Lives Campaign. If your organization is just starting to work on reducing surgical complications, consider working on SSI prevention first. A complete How-to Guide: Prevent Surgical Site Infections is available on www.IHI.org and resources are provided in the Infection section of the SCIP website.

Reducing Surgical Complications (continued)

2. Beta Blockers for Patients on Beta Blockers Prior to Admission

In the past few years, there has been much written about the use of beta blockers and beta blockade in surgical patients, including non-cardiac surgery, as prevention for intra-operative and postoperative cardiac events. Studies published seem to have conflicting results and there is lack of consensus about the appropriateness of this for some types of patients. One thing is universally agreed upon: patients on beta blockers preoperatively should be continued on beta blockers postoperatively.

The American College of Cardiology/American Heart Association Task Force on Practice Guidelines notes that: "Beta blockers should be continued in patients undergoing surgery who are receiving beta blockers to treat angina, symptomatic arrhythmias, hypertension, or other ACC/AHA Class I guideline indications" (ACC/AHA Practice Guidelines. *JACC.* 2006;47:11;2342-2355). In short, we need to have reliable systems in place to ensure that these patients have their beta blockers continued during the transition from preoperative to postoperative care.

Transition points always have the risk of inadvertent error. In the postoperative setting, it is not always clear who will be responsible for ordering preoperative medications: surgeons may prefer that a primary care physician (PCP) or internist address these medications, but the PCP may not see the patient in the hospital, especially if the surgical case is uncomplicated and length of stay is short; anesthesiologists may not be writing any postoperative orders at all; hospitalists may not exist in the organization or may not see surgical patients. These types of circumstances may lead to patients not receiving their beta blockers postoperatively and then experiencing withdrawal, which can result in harm. In a study of 140 patients who received beta blockers preoperatively, eight patients had their beta blockers discontinued postoperatively and mortality was

50%, compared to mortality of 1.5% in the other 132 patients who had beta blockers continued (odds ratio 65.0, P<.001) (Shammash JB, Trost JC, et al. *Am Heart J.* 2001;141(1):148-153). Hoeks and colleagues (Hoeks SE, Scholte Op Reimer WJ, van Urk H, et al. *Eur J Vasc Endovasc Surg.* 2006) studied 711 consecutive peripheral vascular surgery patients and beta blocker withdrawal was associated with an increased risk of one-year mortality compared to non-users (HR=2.7; 95% CI=1.2-5.9).

For SCIP and the Campaign, the goal focuses on this group of patients. A patient on beta blocker prior to admission is defined as one receiving beta blockers for 24 hours prior to incision.

» **What changes can we make that will result in improvement?**

Hospital teams across the United States have developed and tested process and systems changes that allowed them to improve performance on beta blocker measures. Some of these changes are:

- Identify patients preoperatively who are on beta blockers to ensure that they are continued postoperatively.
- Develop standard postoperative order sets or automatic protocols that include provision of beta blockers for patients receiving preoperatively.
- Designate responsibility for postoperative ordering of preoperative medications.
- Implement medication reconciliation.
- Educate patients preoperatively about the importance of continuing beta blockers postoperatively and informing the surgeon and anesthesiologist that they take these medications.

Examples of tools used by hospitals can be found in the Cardiac section of the SCIP website.

Reducing Surgical Complications (continued)

3. Venous Thromboembolism (VTE) Prophylaxis

Deep vein thrombosis (DVT) is estimated to occur in 10% to 40% of general surgical patients when prophylaxis is not provided. Surgical patients are at increased risk due to stasis in the operating room and postoperatively due to difficulty ambulating from pain, effects of anesthesia, and pain-relieving agents. This can result in a pulmonary embolism (PE) in some cases and can be fatal, sometimes instantly. In a study cited by the American College of Chest Physicians (ACCP), autopsies of surgical patients who died within 30 days postoperatively revealed that 32% had a PE and it was the cause of death for most (Lindblad B, Eriksson A, Bergqvist D. *Br J Surg.* 1991;78:849-852).

ACCP has published guidelines for VTE prophylaxis in surgical patients, based on surgery type. ACCP recommends routine prophylaxis for all patients in the target group; signs and symptoms of DVT in early stages are unreliable for preventing significant events. Adherence to these guidelines is the basis of the SCIP measures in this area.

» **What changes can we make that will result in improvement?**

Hospital teams across the United States have developed and tested process and systems changes that allowed them to improve performance on the VTE prophylaxis measure. Some of these changes are:

- Develop standard order sets for prophylaxis.
- Develop protocols for providing prophylaxis automatically, based on surgical procedure.
- Provide education and training for staff on the importance of VTE prophylaxis.
- Educate patients preoperatively about the prophylaxis they will receive and steps they can take to reduce risk.

Examples of tools used by hospitals can be found in the VTE section of the SCIP website.

Reducing Surgical Complications (continued)

4. Ventilator-Associated Pneumonia Prevention

According to SCIP, "postoperative pneumonia occurs in 9-40% of surgical patients and has an associated mortality of 30-45%" (Respiratory section on SCIP website). While not all surgical patients receive postoperative mechanical ventilation, those who do are at risk for one of the most serious types of pneumonia: ventilator-associated pneumonia (VAP). Hospital mortality of ventilated patients who develop VAP is 46% (Ibrahim EH, Tracy L, Hill C, et al. *Chest*. 2001;20(2):555-561) and VAP prolongs time spent on the ventilator, length of ICU stay, and length of hospital stay after discharge from the ICU (Rello J, Ollendorf DA, Oster G, et al. *Chest*. 2002;22(6):2115-2121).

» **What changes can we make that will result in improvement?**

The respiratory component of SCIP is currently under review and final measures have not yet been determined. However, in the 100,000 Lives Campaign, hospitals that implemented the Ventilator Bundle saw significant reductions in VAP, some having gone more than one year without any incidence of VAP. Hospitals seeking to aggressively reduce surgical complications should consider using the Ventilator Bundle for all surgical patients receiving postoperative mechanical ventilation, particularly those ventilated for more than 24 hours. A complete How-to Guide: Prevent Ventilator-Associated Pneumonia is available on the IHI website.

Additional Considerations: Teamwork and Organizational Culture

Surgical work generally occurs in teams, especially in the operating room itself. Teamwork is essential in health care today and communication within the team is indicative of the organizational culture. Hierarchy, handoffs and transitions, and different communication styles between professions all contribute to communication failures. Communication between members of the team is not always effective, sometimes because the message is delivered in an uncoordinated, unorganized manner, resulting in the message being received differently than intended. Communication failure is at the core of nearly every medical error and adverse event. The Joint Commission for Accreditation of Healthcare Organizations (JCAHO) collects voluntary reports of sentinel events, including the reporting organization's own analysis. Since January 1995, JCAHO has received reports of 3,811 events and communication has been identified as the most frequent root cause in more than 65% of events; communication is reported as the root cause in more than 70% of postoperative sentinel events (JCAHO Sentinel Event Statistics).

Everyone must be considered as an equally important member of the team, regardless of their role, and not only encouraged to speak up, but required to do so. If non-clinical or non-professional staff (i.e., non-licensed or certified) are not treated as equal members of the team, they will be less likely to point out an unsafe condition or potential error when they observe it. Sometimes these team members are more likely to see a potential issue as they do not have the same biases as those who know the process well, so it is important that they are empowered to speak up.

» **What changes can we make that will result in improvement?**

- Institute pre-procedural briefings in the OR before each surgical case to establish a sense of team, set an open environment for communication, and review the plan for the procedure, including additional risks. These

types of briefings are most successful when everyone is asked for input, first names are used, and good person-to-person communication skills are included.

- Use white boards in the OR to document names of patient and all team members, including first names. This is also a great place to note aspects of care such as time of prophylaxis antibiotic administration.
- Train staff in the use of SBAR, a structured format for communication that stands for Situation-Background-Assessment-Recommendation and establishes a clear layout of information in a manner that is non-threatening and allows for appropriate assertion.

Bibliography

There is extensive evidence supporting the care recommendations in this area, including the incidence of these complications and the research supporting the care. Both SCIP and NSQIP have bibliographies on their websites for reference.

Using the Model for Improvement

In order to move this work forward, IHI recommends using the Model for Improvement. Developed by Associates in Process Improvement, the Model for Improvement is a simple yet powerful tool for accelerating improvement that has been used successfully by hundreds of health care organizations to improve many different health care processes and outcomes.

The model has two parts:

- Three fundamental questions that guide improvement teams to 1) set clear aims, 2) establish measures that will tell if changes are leading to improvement, and 3) identify changes that are likely to lead to improvement.

- The Plan-Do-Study-Act (PDSA) cycle to conduct small-scale tests of change in real work settings — by planning a test, trying it, observing the results, and acting on what is learned. This is the scientific method, used for action-oriented learning.

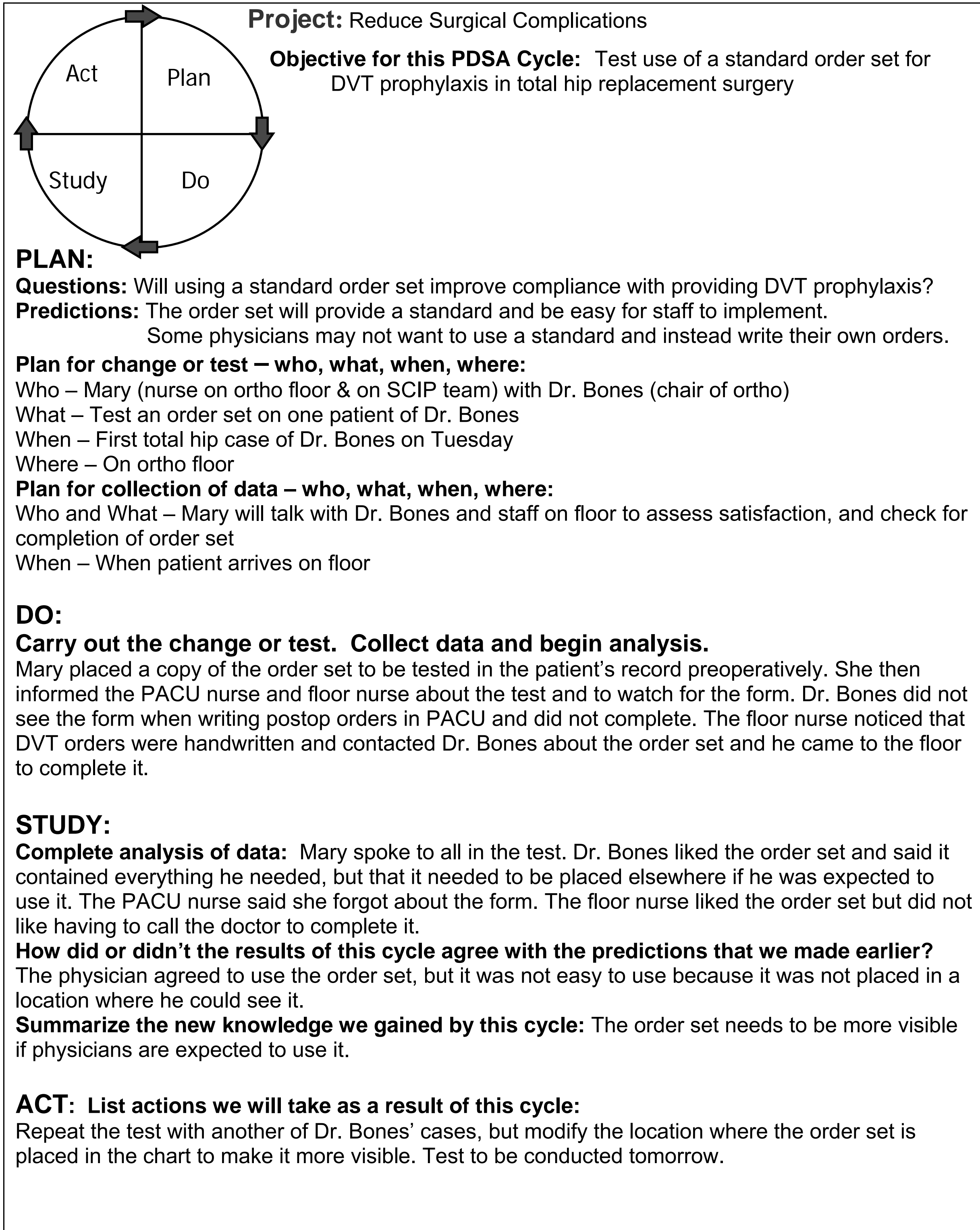
Implementation: After testing a change on a small scale, learning from each test, and refining the change through several PDSA cycles, the team can implement the change on a broader scale — for example, for an entire pilot population or on an entire unit.

Spread: After successful implementation of a change or package of changes for a pilot population or an entire unit, the team can spread the changes to other parts of the organization or to other organizations.

You can learn more about the Model for Improvement on www.IHI.org. The sample PDSA Worksheet that follows illustrates how an improvement team might document the first test cycle using this tool.

PDSA WORKSHEET

CYCLE: 1 **DATE: 12/8/06**



Project: Reduce Surgical Complications

Objective for this PDSA Cycle: Test use of a standard order set for DVT prophylaxis in total hip replacement surgery

PLAN:

Questions: Will using a standard order set improve compliance with providing DVT prophylaxis?
Predictions: The order set will provide a standard and be easy for staff to implement.
Some physicians may not want to use a standard and instead write their own orders.

Plan for change or test – who, what, when, where:
Who – Mary (nurse on ortho floor & on SCIP team) with Dr. Bones (chair of ortho)
What – Test an order set on one patient of Dr. Bones
When – First total hip case of Dr. Bones on Tuesday
Where – On ortho floor

Plan for collection of data – who, what, when, where:
Who and What – Mary will talk with Dr. Bones and staff on floor to assess satisfaction, and check for completion of order set
When – When patient arrives on floor

DO:

Carry out the change or test. Collect data and begin analysis.
Mary placed a copy of the order set to be tested in the patient's record preoperatively. She then informed the PACU nurse and floor nurse about the test and to watch for the form. Dr. Bones did not see the form when writing postop orders in PACU and did not complete. The floor nurse noticed that DVT orders were handwritten and contacted Dr. Bones about the order set and he came to the floor to complete it.

STUDY:

Complete analysis of data: Mary spoke to all in the test. Dr. Bones liked the order set and said it contained everything he needed, but that it needed to be placed elsewhere if he was expected to use it. The PACU nurse said she forgot about the form. The floor nurse liked the order set but did not like having to call the doctor to complete it.

How did or didn't the results of this cycle agree with the predictions that we made earlier?
The physician agreed to use the order set, but it was not easy to use because it was not placed in a location where he could see it.

Summarize the new knowledge we gained by this cycle: The order set needs to be more visible if physicians are expected to use it.

ACT: List actions we will take as a result of this cycle:

Repeat the test with another of Dr. Bones' cases, but modify the location where the order set is placed in the chart to make it more visible. Test to be conducted tomorrow.

Forming a Team

No single person can create system-level improvements alone. First, it is crucial to have the active support of leadership in this work. The leadership must make patient safety and quality of care strategic priorities in order for any surgical care improvement team to be successful.

Once leadership has publicly given recognition and support (dollars, person-time) to the program, the improvement team can be quite small. Successful teams include the following:

- A physician (a surgeon, ideally with an anesthesiologist);
- A perioperative room nurse (operating room or post-anesthesia); and
- A nurse from a postoperative nursing unit, and someone from the quality department.

(Note: In addition, consider including a patient or family member on the team.)

Each hospital will have its own methods for selecting a core team. The team should use the Model for Improvement to conduct small-scale, rapid tests of the ideas for improvement over various conditions in a pilot surgical population. The team should also track performance on a set of measures designed to help them see if the changes they are making are leading to improvement, and regularly report these measures back to leadership.

Measurement

See the Measure Information Forms (MIFs) linked to in Appendix A for specific information regarding the recommended outcome measures for reducing surgical complications.

In terms of process measures, the Campaign recommends that hospitals use those already designated by the Surgical Care Improvement Project and in the Specifications Manual for National Hospital Quality Measures used by the Centers for Medicare & Medicaid Services (CMS) and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). These measures are also listed and linked to in Appendix A.

(Note: Several SCIP measures are still under development and/or alignment and no measurement information forms exist for them at the present time. Therefore, we are not including these measures in the Campaign at this stage.)

Note that several of the SCIP infection measures include sub-measures for different populations. For example, SCIP-Inf-1 includes SCIP-Inf-1a for overall rate and SCIP-Inf-1b through 1h for rates in specific types of surgeries. For the purposes of the Campaign, we recommend focusing on the “a” measures of overall rate; however, you may be tracking the other sub-measures in your organization if working in those populations.

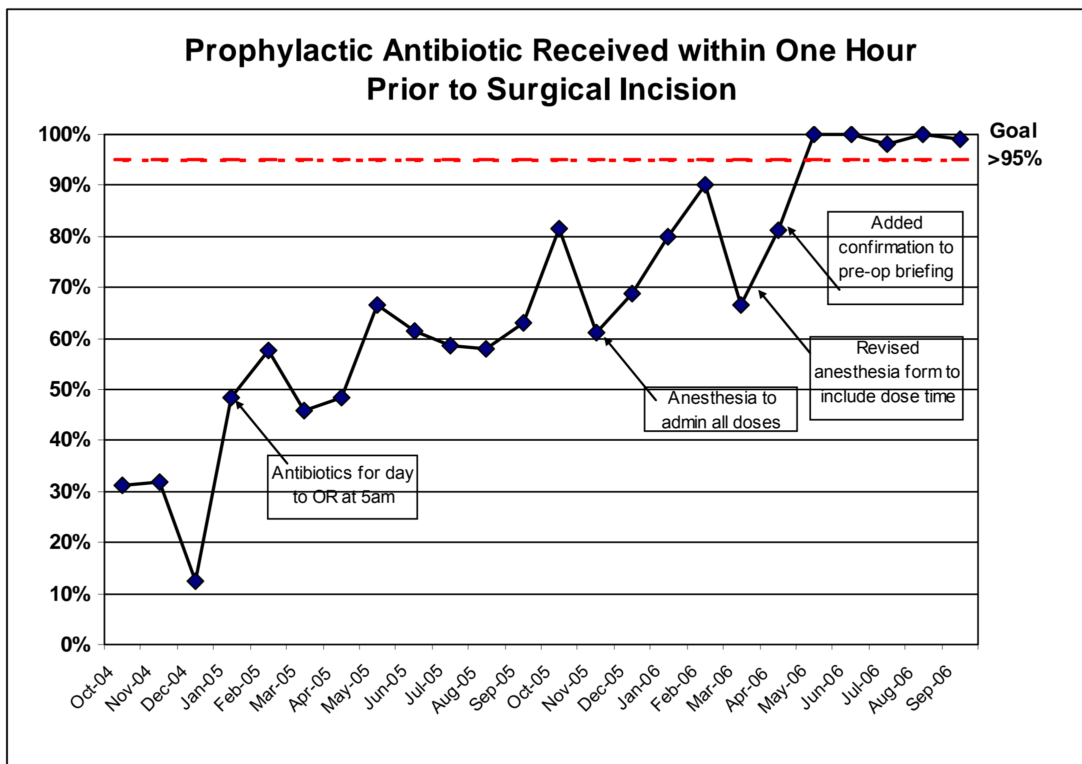
Run Charts

Improvement takes place over time. Determining if improvement has really happened and if it is lasting requires observing patterns over time. Run charts are graphs of data over time and are one of the single most important tools in performance improvement.

Using run charts has a variety of benefits:

- They help improvement teams formulate aims by depicting how well (or poorly) a process is performing.
- They help in determining when changes are truly improvements by displaying a pattern of data that you can observe as you make changes.
- As you work on improvement, they provide information about the value of particular changes.

Below is an example of a run chart measuring on-time prophylactic antibiotic administration, annotated to indicate when process changes were implemented:



First Test of Change

Teams may elect to work on any or all of the care components: SSI Prevention, Use of Beta Blockers, VTE Prophylaxis, or VAP Prevention. A first test of change should involve a very small sample size (typically, one patient) and should be described ahead of time in a Plan-Do-Study-Act format so that the team can easily predict what they think will happen, observe the results, learn from them, and continue to the next test.

Example:

PLAN: The team decides to test an order set for DVT prophylaxis with one physician for one surgical patient. They identify a surgeon who supports standard prophylaxis, and show the surgeon the order set that will be tested. On their PDSA Worksheet, they predict that the order set will be easy to use.

DO: They then conduct the test.

STUDY: They note that the surgeon forgets to use the form because when he writes his postoperative orders in the PACU, the order set is not in the section of the patient record where he is writing. The floor nurse notices that the order set has not been used when the patient arrives on the floor and contacts the surgeon.

ACT: The team's study of the data indicates that they should repeat this test, after first placing the order set in a part of the patient record that makes it more visible.

Ideally, teams will conduct multiple small tests of change simultaneously across all components of care. This simultaneous testing usually begins after the first few tests are completed and the team feels comfortable and confident in the process.

Implementation and Spread

For surgical complications, teams will usually choose to begin their improvement process by working with a "pilot" population. This pilot population may be the hip- and knee-replacement patients, for example, or cardiac operations, or gynecologic procedures, etc. It is possible to include the universe of surgical patients in the pilot population, if that number is small (fewer than 50 cases per month). We recommend including at least 50 cases per month in the pilot population in order to increase the ability to measure and detect improvement.

In order to maximize the reduction in overall harm related to surgical complications, however, hospitals must spread improvements begun in a pilot population to the universe of surgical populations. Organizations that successfully spread improvements use an organized, structured method in planning and implementing spread across populations, units, or facilities. You can find information about planning, tracking, and optimizing spread at www.ihi.org. (See IHI's Innovation Series white paper, "A Framework for Spread: From Local Improvements to System-Wide Change," downloadable for free at www.ihi.org.)

Barriers

Teams working on reducing surgical complications have learned a great deal about barriers to improvement and how to face them. Some common challenges and solutions are:

1. **Lack of support by leadership**

   Solution: Use opinion leaders (physicians) and data, if possible; a business case for the project may help to win leadership support.

2. **Uneven physician acceptance of new practices**

   Solution: Use physician opinion leaders, review the medical literature, and feed back data on a surgeon-specific or anesthesiologist-specific level. Remember that physicians may fall anywhere on the "Adoption of Innovations" curve; work first with your early adopters and use their stories to convince the majority.

3. **Lack of clear ownership for care practices**

   Solution: Work with physician leaders to develop standard approaches to postoperative care, including clear designation as to the physician owner.

Looking for advice from other organizations like yours? Ask a Campaign Mentor Hospital! The organizations on the Campaign Mentor Hospitals list have volunteered to provide support, advice, clinical expertise, and tips to hospitals seeking help with their implementation efforts.

Appendix A: Recommended Intervention-Level Measures

The following measures are relevant for this intervention. The Campaign recommends that you use some or all of them, as appropriate, to track the progress of your work in this area. In selecting your measures, we offer the following advice:

1. Whenever possible, use measures you are already collecting for other programs.
2. Evaluate your choice of measures in terms of the usefulness of the results they provide and the resources required to obtain those results; try to maximize the former while minimizing the latter.
3. Try to include both process and outcome measures in your measurement scheme.
4. You may use measures not listed here, and, similarly, you may modify the measures described below to make them more appropriate and/or useful to your particular setting; however, be aware that modifying measures may limit the comparability of your results to others'. (Note that hospitals using different or modified measures should not submit those measure data to IHI.)
5. Remember that posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful, and that they would be excited to see.

Process Measure(s):

Percent of Surgical Patients with Prophylactic Antibiotic Received within One Hour Prior to Surgical Incision – Overall Rate
Owner: **SCIP**
Owner Measure ID: **SCIP-Inf-1a**
Measure Information: **[NHQM Specifications Manual with Appendices]**
Comments: • From the link above, scroll down to find the link for SCIP-Inf-1; SCIP-Inf-1a is defined within.

Percent of Surgical Patients with Appropriate Selection of Prophylactic Antibiotic – Overall Rate
Owner: **SCIP**
Owner Measure ID: **SCIP-Inf-2a**
Measure Information: **[NHQM Specifications Manual with Appendices]**
Comments: • From the link above, scroll down to find the link for SCIP-Inf-2; SCIP-Inf-2a is defined within.

Percent of Surgical Patients with Appropriate Prophylactic Antibiotic Discontinuation – Overall Rate
Owner: **SCIP** Owner Measure ID: **SCIP-Inf-3a** Measure Information: **[NHQM Specifications Manual with Appendices]** Comments: • From the link above, scroll down to find the link for SCIP-Inf-3; SCIP-Inf-3a is defined within.

Percent of Major Cardiac Surgical Patients with Controlled Post-Operative Serum Glucose
Owner: **SCIP** Owner Measure ID: **SCIP-Inf-4** Measure Information: **[NHQM Specifications Manual with Appendices]** Comments: • From the link above, scroll down to find the link for SCIP-Inf-4

Percent of Surgical Patients with Appropriate Hair Removal
Owner: **SCIP** Owner Measure ID: **SCIP-Inf-6** Measure Information: **[NHQM Specifications Manual with Appendices]** Comments: • From the link above, scroll down to find the link for SCIP-Inf-6

Percent of Colorectal Surgical Patients with Normothermia in PACU
Owner: **SCIP** Owner Measure ID: **SCIP-Inf-7** Measure Information: **[NHQM Specifications Manual with Appendices]** Comments: • From the link above, scroll down to find the link for SCIP-Inf-7

Surgery Patients on Beta Blocker Therapy Prior to Admission Who Received a Beta Blocker During the Perioperative Period
Owner: **SCIP** Owner Measure ID: **SCIP-Card-2** Measure Information: **[NHQM Specifications Manual with Appendices]** Comments: • From the link above, scroll down to find the link for SCIP-Card-2

Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered
Owner: **SCIP**
Owner Measure ID: **SCIP-VTE-1**
Measure Information: **[NHQM Specifications Manual with Appendices]**
Comments: • From the link above, scroll down to find the link for SCIP-VTE-1

Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis Within 24 Hours Prior to Surgery to 24 Hours After Surgery
Owner: **SCIP**
Owner Measure ID: **SCIP-VTE-2**
Measure Information: **[NHQM Specifications Manual with Appendices]**
Comments: • From the link above, scroll down to find the link for SCIP-VTE-2

Outcome Measure(s):

Perioperative Adverse Events per 1,000 Surgical Inpatient Days
Owner: **IHI** Owner Measure ID: **N/A** Measure Information: **[Campaign MIF]** Comments: • This measure is very similar to Perioperative Adverse Events per 100 Surgical Inpatient Admissions, and both have their advantages. This measure is more sensitive to improvement, especially when patients are identified as experiencing more than one perioperative adverse event, and is more easily compared to other hospitals, because the denominator of patient days serves as a crude risk adjustment. Both measures can be collected simultaneously during record review, as the only difference is the denominator.

Perioperative Adverse Events per 100 Surgical Inpatient Admissions
Owner: **IHI** Owner Measure ID: **N/A** Measure Information: **[Campaign MIF]** Comments: • This measure is very similar to Perioperative Adverse Events per 1000 Surgical Patient Days, and both have their advantages. This measure is generally more easily understood by senior leaders and Board members and can really catch their attention when viewed as “percent of patients”. Both measures can be collected simultaneously during record review, as the only difference is the denominator.

Alignment with Other Measure Sets:

Measure Name	**JCAHO**	**CMS**	**SCIP**	**NQF**
Percent of Surgical Patients with Prophylactic Antibiotic Received within One Hour Prior to Surgical Incision – Overall Rate	√[1]	√[2]	√[3]	√[4]
Percent of Surgical Patients with Appropriate Selection of Prophylactic Antibiotic – Overall Rate	√[1]	√[2]	√[3]	√[4]
Percent of Surgical Patients with Appropriate Prophylactic Antibiotic Discontinuation – Overall Rate	√[1]	√[2]	√[3]	√[4]
Percent of Major Cardiac Surgical Patients with Controlled Post Operative Serum Glucose	√[1]	√[2]	√[3]	
Percent of Surgical Patients with Appropriate Hair Removal	√[1]	√[2]	√[3]	
Percent of Colorectal Surgical Patients with Normothermia in PACU	√[1]	√[2]	√[3]	
Surgery Patients on Beta Blocker Therapy Prior to Admission Who Received a Beta Blocker During the Perioperative Period	√[1]	√[2]	√[3]	
Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	√[1]	√[2]	√[3]	
Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis Within 24 Hours Prior to Surgery to 24 Hours After Surgery	√[1]	√[2]	√[3]	

[1] Matches a measure in the JCAHO National Hospital Quality Measures SCIP Core Measure Set
[2] Matches a measure in the CMS SCIP measure set
[3] Matches a measure in the SCIP measure set
[4] This measure is endorsed by the NQF