Acknowledgments

Many organizations and individuals contributed to the development of this handbook and the Surgical Infection Prevention Collaborative Northwest. We would like to recognize the following organizations and individuals for providing direction, funding, and expertise.

The Oklahoma Foundation for Medical Quality, Inc., in collaboration with the Centers for Disease Control and Prevention (CDC) provided valuable assistance in identifying the quality measures for this Collaborative.

The Collaborative Experience Project: Surgical Infection Prevention, a national Collaborative involving hospital and quality improvement organization (QIO) staff from across the country, provided the model for the work of this Collaborative. Slight improvements/revisions have been made to the model due to information about changes implemented by participating teams and “lessons learned.”

The Institute for Healthcare Improvement (IHI) developed the Collaborative learning methodology with colleagues from Associates in Process Improvement. IHI and Qualis Health worked with a panel of clinical experts (see below) to develop the charter, change concepts, and measurement strategy for this Collaborative.

Qualis Health and OMPRO, not-for-profit quality improvement organizations, jointly sponsor this Collaborative through their contracts with the Centers for Medicare & Medicaid Services.

A panel of experts worked with the national Collaborative (Collaborative Experience Project) leadership and faculty to develop the framework for this Collaborative, which has been updated slightly based on the experiences of participating teams. Much gratitude to those who provided clinical expertise:

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This material was prepared by Qualis Health and OMPRO under a contract with the Centers for Medicare & Medicaid Services (CMS). The contents presented do not necessarily reflect CMS policy.

7SOW-WA/ID-SIP-03-02 (QH-0607 01/03) 7SOW-OR-SIP-02-02
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About This Handbook

The purpose of this handbook is to provide you with background and reference information on the Collaborative and to help you prepare for a successful start to this exciting year of quality improvement.

**Getting Started** contains an overview of the Collaborative, a schedule of major events and periods, and a checklist of pre-work activities—tasks your team should accomplish before the first learning session on March 20–21, 2003.

The section on **Completing Pre-work** will walk your team step-by-step through preparing for the first learning session.

The **Collaborative Charter** contains the mission and rationale for this Collaborative along with a description of the methods that will be used and lists of Collaborative expectations—what your team can expect from the Collaborative and what the Collaborative expects from your team.

The **Change Package** contains a variety of strategies for preventing surgical infection. You will refer to it throughout the Collaborative.

The **Measurement Strategy** section provides you with data definitions for the required measures and provides teams with optional measures, and it describes the data that your team will collect to monitor your progress during the Collaborative.

A **Glossary of Terms and Concepts** and a list of **Collaborative Leadership** will also serve as references throughout the Collaborative.

In addition, please find included with this handbook a detailed **Calendar of Activities and Events** and a list of recommended antibiotics from the Centers for Medicare & Medicaid Services.
Getting Started

This section provides you with an overview of the Collaborative, a schedule of activities, and a list of pre-work activities—tasks for you to accomplish before the first learning session.

Overview

A Collaborative is a systematic approach to healthcare quality improvement in which hospital teams or other healthcare providers test and measure practice innovations, then share their experiences in an effort to accelerate learning and widespread implementation of best practices.

History of Collaboratives

In 1995, the Institute for Healthcare Improvement held the first BTS Collaborative, and since then, more than 700 teams from over 465 U.S. and Canadian healthcare organizations have participated in BTS Collaboratives. IHI has conducted 26 Collaboratives and has begun training other organizations to facilitate Collaboratives modeled after their BTS Collaboratives.

This Collaborative

The Surgical Infection Prevention Collaborative Northwest will involve hospital teams from Idaho, Oregon, and Washington working together for 13 months to individually test system changes aimed at preventing surgical infections and to collectively share learning.

Collaborative Events and Working Times

Four components of the Collaborative are pre-work activities, learning sessions, action periods, and the outcomes congress. Pre-work is the period between receipt of this handbook and Learning Session 1, March 20–21, 2003. During this time, the hospital team has several important tasks to accomplish. These tasks are listed later in this section and described in detail in the following section.

Learning sessions are the major interactive events of the Collaborative. Through plenary sessions, small-group discussions, and team meetings, attendees have the opportunity to

- learn from faculty and colleagues,
- receive individual coaching,
- gather knowledge on the subject matter and on process improvement,
- share experiences and collaborate on improvement plans, and
- problem-solve barriers to improving care.
Action periods are the time between learning sessions. During action periods, your team will work within your organization to test and implement changes aimed at preventing surgical infections. Teams will share the results of their improvement efforts in brief monthly reports and also participate in shared learning through an electronic mailing list (e-mail list), monthly conference calls, and a Web site. Participation in action periods is not limited to those who attend learning sessions; we encourage and expect the participation of other team members and supporters in the hospital.

An outcomes congress where teams will publicly share their findings and celebrate their achievements will take place April 1–2, 2004.

Schedule
The sequence of events for the Collaborative is as follows:

- **Pre-work** February–March, 2003
- **Learning Session 1** March 20–21, 2003
- **Action Period 1** March–June, 2003
- **Learning Session 2** June 19–20, 2003
- **Action Period 2** June–November, 2003
- **Learning Session 3** November 17–18, 2003
- **Action Period 3** November 2003–March 2004
- **Outcomes Congress** April 1–2, 2004

Please also see the attached Calendar of Activities and Events. It provides a more detailed schedule which includes conference calls and due dates for senior leader reports, monthly reports your team will submit to a senior leader in your organization and to the e-mail list your team will join as part of the Collaborative.

Each team is expected to participate in monthly conference calls with the Collaborative leadership. The first conference call is scheduled for April 24, 2003, one month after the first learning session. The Calendar of Activities and Events provides the dates of all the conference calls for the duration of the Collaborative. All calls will occur at 2 PM pacific time, 3 PM mountain time.

To connect to the teleconferences, call 1-888-632-5950 and ask for the Surgical Infection Prevention call with host Lynn Masciarotte.
Checklist of Pre-work Activities

To prepare for Learning Session 1, each participating hospital needs to complete the following pre-work activities:

- 1. Read the Collaborative charter.
- 2. Form a team.
- 3. Sign a Memorandum of Understanding with Qualis Health (if your hospital is in Washington or Idaho) or with OMPRO (if your hospital is in Oregon).
- 4. Schedule a pre-work call with the Collaborative leadership from your state.
   - Washington hospitals contact: Kathryn Bunt, Qualis Health, 206-364-9700, ext. 2259.
   - Idaho hospitals contact: Jane Burgman, Qualis Health, 208-389-5035.
   - Oregon hospitals contact: Lynn Masciarotte, OMPRO, 503-279-0100.
- 5. Obtain Internet access (if needed) for accessing the Collaborative e-mail list.
- 6. Register and arrange for travel to the learning sessions.
- 7. Develop an aim statement.
- 8. Define (or identify) a pilot population.
- 10. Begin to collect baseline data.

The next section of this handbook contains instructions for completing pre-work activities.
Instructions for Completing Pre-work Activities

The following pages provide information about how to complete each pre-work activity. A worksheet to help you complete pre-work activities follows.

1. Collaborative Charter

Please read the Collaborative charter, which is the next section of this handbook. The charter defines the Collaborative mission, summarizes the evidence that will direct your work, outlines methods that your team will use to achieve the mission, and lists what teams can expect from the Collaborative leadership as well as what the leadership expects of teams.

2. Forming a Team

Having an appropriate and effective team is a key component of successful improvement efforts. Choose your team members based on their knowledge of, involvement with, and enthusiasm for the systems and processes that you will work to improve.

Each hospital needs to form a team to test and implement system changes related to the prevention of surgical infection. Four to ten members is a typical size for the team. However, not all team members will need to travel to the learning sessions. Teams should include people from departments and work areas that will be affected by the changes, to ensure that the team understands the system it is trying to redesign and to promote buy-in for the changes.

In the national Surgical Infection Prevention Collaborative, lessons learned included the importance of having both a surgeon and anesthesiologist on the team as co-clinical champions. Your “at home” team may include other vital team members such as nursing staff (circulating, preoperative, surgical, and postoperative), medical records staff, infection control staff, etc.

Selecting team leaders

When forming your team, you will need to fill four leadership roles: senior leader, system leader, clinical champion, and day-to-day leader. The system leader, clinical champion, and day-to-day leader represent the team at the learning sessions and the outcomes congress, and they share their learning with other members of the team. It is occasionally possible for a single person to fill more than one leadership role, depending on the organization. Team members will report progress to a senior leader at the hospital who often attends only the second learning session and the outcomes congress. Ideal team members are described below.
Pre-Work Activities

Senior leader
The ideal senior leader
- has ultimate authority to allocate the time and resources to achieve the team’s aim,
- has administrative authority over all areas affected by the changes the team will test and implement, and
- will champion the spread of successful changes throughout the organization.
Examples of senior leaders include a vice president, CEO, or senior director. The senior leader is encouraged to attend all learning sessions and the outcomes congress and is expected to at least attend the second learning session and the outcomes congress.

System leader
The ideal system leader
- has direct authority to allocate the time and resources to achieve the team’s aim,
- has direct authority over the particular systems affected by the changes the team will test and implement, and
- will champion the spread of successful changes throughout the department or service area.
An example of a system leader would be the administrative (or operational) vice president (or director) of the surgical services or perioperative department. The system leader attends all learning sessions and the outcomes congress.

Clinical champions
The ideal clinical champions
- are practicing providers (both a surgeon and anesthesiologist) who are opinion leaders and are respected by peers,
- understand the processes of care,
- have good working relationships with colleagues and the day-to-day leader, and
- want to drive improvements in the system.
It is essential to have clinical champions on the team. At least one clinical champion should attend each learning session and the outcomes congress.

Day-to-day leader
The ideal day-to-day leader
- drives the project, ensuring that cycles of change are tested, implemented, and documented,
- coordinates communication between the team and the Collaborative,
• oversees data collection, and
• works effectively with the clinical champion.

The day-to-day leader should understand how changes will affect systems and should have the time to keep the project moving forward. The day-to-day leader is typically from the QI department of the hospital but could also be a perioperative staff nurse or infection control nurse. The day-to-day leader attends all learning sessions and the outcomes congress.

Other Team Members
In addition to team leaders, the team includes members from hospital departments potentially affected by system changes related to surgical infection prevention. These members learn about the Collaborative from team leaders and participate in implementation at the hospital. Potential team members include
• infection control practitioners,
• perioperative personnel,
• surgeons,
• anesthesiologists,
• information specialists, and
• medical records personnel.

Checklist for selecting team members
An effective team has members who work well together and who have a combination of skills, styles, and competencies. An effective team has members who
✅ are leaders,
✅ are team players,
✅ have specific skills and technical proficiencies relevant to prevention of surgical infection,
✅ possess excellent listening skills,
✅ communicate well verbally,
✅ are problem-solvers,
✅ are motivated to improve current systems and processes, and
✅ are creative, innovative, and enthusiastic.

3. Completing a Memorandum of Understanding
The purpose of the Memorandum of Understanding (MOU) is to specify the responsibilities of participating teams and Collaborative sponsors. The MOU is signed by
the person in your hospital with contract-signing authority. Please work with the Collaborative contact in your state to complete an MOU. In Washington contact Kathryn Bunt, 206-364-9700, ext. 2259; in Idaho contact Jane Burgman, 208-389-5035; in Oregon contact Lynn Masciarotte, 503-279-0100.

4. Scheduling a Pre-work Call

Contact your QIO to schedule a pre-work call with the Collaborative leadership from your state.

Washington hospitals contact: Kathryn Bunt, Qualis Health, 206-364-9700, ext. 2259.
Idaho hospitals contact: Jane Burgman, Qualis Health, 208-389-5035.
Oregon hospitals contact: Lynn Masciarotte, OMPRO, 503-279-0100.

The pre-work call is an opportunity for you to ask additional questions and for the Collaborative leadership to help ensure that your team is ready for Learning Session 1 and that the content for Learning Session 1 will address the most common questions and concerns from participants.

Before the call, your team should have reviewed the Collaborative Handbook and begun the pre-work activities. The call can typically be completed in a half hour.

5. Obtaining Internet Access

We strongly urge participants who do not have access to e-mail to subscribe to an Internet service provider for the duration of the Collaborative. Obtaining Internet access is necessary for teams to have access to the electronic mailing list, or e-mail list, for the Collaborative. The Collaborative leadership and hospital team members will use the list to distribute information and tools, ask questions and receive replies, and conduct ongoing discussions of changes tested, barriers encountered, and lessons learned. At least one member from each team must join the e-mail list and take responsibility for distributing information to the rest of the team; however, we encourage all team members to join the list. Information on how to join the e-mail list will be available at the first learning session.

6. Registering and Arranging for Travel, Lodging

Team leaders represent the team at the learning sessions and the outcomes congress, and they share their learning with other members of the hospital team. The senior leader typically plans to attend the second learning session (June 19–20, 2003) and the outcomes congress (April 1–2, 2004). The system leader, a clinical champion, and the day-to-day leader should attend all learning sessions and the outcomes congress.
Registering

Prior to registering for the individual learning sessions, teams must first complete the Memorandum of Understanding (see #3 above) and submit the $1800 participation fee, which covers the cost of three team members attending the three learning sessions. Upon submitting the MOU, teams register for each learning session at the Collaborative Web site: www.ompro.org/sip-nw. Note: teams must register for each session separately.

Arranging for lodging

The Collaborative learning sessions and the outcomes congress will be held in different locations as follows:

<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Session 1</td>
<td>March 20–21, 2003</td>
<td>Portland, OR</td>
</tr>
<tr>
<td>Learning Session 2</td>
<td>June 19–20, 2003</td>
<td>Seattle, WA</td>
</tr>
<tr>
<td>Learning Session 3</td>
<td>November 17–18, 2003</td>
<td>Boise, ID</td>
</tr>
<tr>
<td>Outcomes Congress</td>
<td>April 1–2, 2004</td>
<td>Site TBA</td>
</tr>
</tbody>
</table>

To arrange for lodging for Learning Session 1, call the Sheraton Portland Airport Hotel at 1-800-808-9497 or 503-281-2500. To receive the group rate, you must identify yourself as an attendee of the SIP Collaborative. The deadline to receive the group rate is March 6th.

To arrange for lodging for Learning Session 2, call the DoubleTree Hotel Seattle Airport at 1-800-222-8733 or 206-246-8600. Ask for the Surgical Infection Prevention Collaborative group rate.

To arrange for lodging for Learning Session 3, call the Grove Hotel in Boise, 1-800-325-4000 or 208-333-8000. Ask for the Surgical Infection Prevention Collaborative group rate.

7. Developing an Aim Statement

The present Collaborative is modeled after the IHI Breakthrough Series Collaboratives, which use the Model for Improvement, a “trial-and-learn” approach to quality improvement. The Model for Improvement couples three fundamental questions with plan-do-study-act (PDSA) cycles:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What changes can we make that will result in an improvement?

The first question is answered in an aim statement. An aim statement is a concise written statement describing what the team expects to accomplish in the Collaborative; it provides guidance for the team’s specific improvement efforts. The aim statement ensures that team activities align with the strategic goals of the team’s organization.
Involving senior leadership in developing an aim statement can help teams ensure support for their work.

An example of an aim statement consistent with the goals of this Collaborative is as follows:

*To improve the care of patients undergoing surgery at General Hospital, we will redesign practice to better prevent surgical site infections. The number of surgical site infections identified during routine inpatient surveillance of patients who have undergone surgery will be cut by half. 100% of eligible surgical patients will receive appropriate prophylactic antibiotics. 100% of eligible surgical patients will receive the prophylactic antibiotic within one hour before surgical incision time. To ensure that our efforts to prevent infection do not lead to undesirable antibiotic resistance levels, 100% of prophylactic antibiotics delivered prior to surgery will be discontinued within 24 hours after surgery. Changes to improve the delivery of prophylactic antibiotics will be tested for the patients of two surgeons (collectively approximately 50 patients per month). Effective changes will be spread to the remaining surgical staff at the hospital within one year after effective changes have been identified.*

In setting your aim, be sure to

**Involve senior leaders.** Senior leaders must align the aim with strategic goals of the organization. They must also provide for support personnel and resources from information systems, finance and reimbursement, medical affairs, etc. Senior leaders are also responsible for leading the spread of the results from the pilot population across the organization. Senior leaders are also responsible for leading the spread of the results from the pilot population across the organization.

**Base your aim on data or organizational needs.** Examine data within your organization. Refer to the Collaborative charter and focus on issues that matter at your hospital.

**State the aim clearly and use numerical goals.** Teams make better progress when they have an unambiguous, specific aim. Setting numerical targets clarifies the aim, helps create tension for change, and directs measurement. For example, an aim to “ensure that 100% of eligible patients will have their blood glucose level monitored such that it is not greater than 200 mg/dL” will be more effective than an aim to “improve blood glucose monitoring.”

There will be time to refine your work at the first learning session and time during the year to complete work on the aim statement.

Having a measurement and tracking system in place is the answer to the second question: How will we know that a change is an improvement? Continue reading for more information on how to select a pilot population for which four required and two to four optional measures will be tracked over the course of the Collaborative.
Finally, the changes that will result in improvements are contained within the change package (see page 31). This change package was tested on a national level and has been modified based on the experience of 56 hospitals from across the country.

8. Defining a Pilot Population

One important way to accelerate quality improvement in your hospital is to test possible system changes with a small subset of patients (a pilot population). If changes appear to improve care, you can then spread the changes to the rest of your patients.

For surgical infection prevention, the easiest way to define a pilot population is to begin by identifying particular surgeons who will test changes. For example, if two of the three surgeons at your hospital are willing to test and implement changes during the Collaborative, the patients seeing those two surgeons in a given month could represent your pilot population for that month. Note: it is important to recruit surgeons and anesthesiologists who are willing to test changes. If all three surgeons’ patients are included and only two surgeons make changes, the performance data will be diluted by the third, non-participating surgeon.

Hospitals should select initial pilot populations based on internal infection data and/or based on the following suggested surgical procedures: coronary artery bypass grafts (CABG); cardiac, colon, hip and knee arthroplasty; abdominal and vaginal hysterectomy; or selected vascular surgery procedures. Ideally, the surgeons and anesthesiologists you choose should interact with between 50 and 100 patients undergoing surgery in a given month. Improvements can be seen with less than 100 patients, particularly regarding process measures; however, small numbers may make it difficult to see changes in the number of cases between surgical site infections.

9. Defining Measures

See Measurement Strategy for more details (page 35). Measuring performance during the Collaborative will enable the team to evaluate the impact of changes it makes to improve the delivery of care to patients undergoing surgery. Performance measurement is not an end in itself. Measurement should be designed to accelerate improvement, not slow it down.

Each team will monitor progress on four required measures and two to four additional, or “optional,” measures selected by the team.

**Required measures**

The required measures address an outcome of care, processes of care, and the potential impact on competing, or balancing, system priorities (for example, prevention of resistant strains of bacteria or control of costs):
Outcome measure

Number of surgical cases between each surgical site infection

The required outcome measure (the number of surgical cases between identified infections) is a proxy measure identified by the expert panel that IHI convened in December 2001. Similar measures have been used in previous Collaboratives. If the hospital is already calculating an infection rate for the pilot population, we encourage you to continue to track that data as an optional measure. When numbers of infections are small (e.g., 1% or less), staff may not be motivated to improve care; in fact, providers may feel good about this data. However, if providers are presented with a number each month telling them how many cases it has been since the last surgical infection prevention, there is a heightened awareness.

Process measures

Percent of surgical cases with prophylactic antibiotics started within one hour prior to surgical incision

Percent of surgical cases in which appropriate antibiotic was selected according to adopted guidelines

Balancing measure

Proportion of patients who received prophylactic antibiotics whose antibiotics were discontinued within 24 hours after surgery

Optional measures

Each team will specify two to four additional measures that are important to the team; examples include measures related to normothermia, glucose control, oxygenation, avoiding shaving the surgical site, and other basic prevention strategies. Teams should consider outcome measures as well as process measures and should clearly define the numerator and denominator for their measures (including the type of surgeries that will be involved).

A complete description of the measures and associated statistics, data collection methods, and corresponding Collaborative goals can be found beginning on page 35.

10. Collecting Baseline Data

Hospitals are encouraged to collect baseline data on required and optional measures before Learning Session 1. The pre-work activities worksheet (page 17) and Measurement Strategy section include suggestions for places to begin gathering baseline data. This will vary based on the measures selected and possibly the pilot population. The process of collecting baseline data may help the team to identify which measures might be the most important and feasible for their hospital.
Note: Intense data collection for baseline is not necessary, nor recommended. Capturing baseline data from the previous month’s patients is sufficient. However, if you are a small hospital, you may wish to collect three to six months of baseline data for the outcome measure.

Many hospitals conduct retrospective review for quality improvement projects. This can be a very time consuming activity. We encourage teams to identify systems in which prospective data collection may occur. A data collection tool for capturing the numerator and denominator data for the required measures and any optional measures should be used.

**Senior leader report**

Beginning in May 2003, each hospital will be expected to prepare a monthly report tracking the team’s progress on the selected measures and documenting the system changes tested during that month. The audience for the report is the senior leadership at the hospital. Each hospital also shares the report with other Collaborative participants, faculty, and the QIO for their state (Qualis Health or OMPRO). More information about the senior leader report (templates, tools, etc.) will be distributed at the first learning session.

**Annotated run chart**

The minimum standard for monitoring the progress of your team throughout the Collaborative is an annotated run chart of each of the required measures and the optional measures that you selected. Data points should be plotted monthly on a run chart and submitted with senior leader reports. The following run chart is one example of appropriate presentation of a measure for the Collaborative:

![Percent of Patients Receiving Appropriate Antibiotic](image)

A: Systematic documentation of antibiotic administration on every patient chart.
B: Developed guidelines and order sets for prophylactic antibiotics specific to the surgical site, based on national guidelines and local consensus.
C: Pharmacy standardized process to ensure timely delivery of appropriate antibiotic to the holding area or OR.
Annotations on the run chart should include changes that are being evaluated or implemented, as well as other circumstances that could impact service levels. A tool for producing run charts will be provided at Learning Session 1.

11. Preparing a Storyboard

At each learning session, your team will be provided with a 30” x 40” foam-core board, pushpins, tape, an easel, and other supplies, so that your team can create a storyboard to present what it has accomplished and learned so far. Storyboards help create an environment conducive to sharing and learning from the experiences of others.

At the first learning session in March, your storyboard will be a way to introduce your team to the other Collaborative participants. The storyboard is an opportunity to have some fun and show the unique character of your hospital and your team.

The storyboard should be clear and concise. The audience for storyboards consists of other hospital teams, the Collaborative leadership, observers, and faculty who are not familiar with your facility, your aim, and your work.

Your Storyboard

Suggested contents for your first storyboard:
- team name, with team members and their titles;
- brief description of your hospital;
- draft aim statement;
- draft description of your pilot population;
- draft list of measures;
- any baseline data that you have collected so far;
- and description of progress so far.

Future storyboards will highlight
- PDSA cycles,
- your progress on measures,
- tools you have created, and
- other learning that might interest other teams.

Bring photos, figures, colored paper, and other creative materials.

We’ll provide board, pushpins, and a team sign.

Have fun!
Pre-work Activities Worksheet

The purpose of this worksheet is to facilitate your pre-work and to help you prepare for a conference call with the Collaborative leadership. You are not required to turn in this worksheet.

1. **General information**

   Name of hospital
   
   State

2. **Team members (Name) (Title)**

   Senior leader

   System leader

   Day-to-day leader

   Clinical champion

   Clinical champion

   Other team members

3. **Working draft of aim statement**
4. Definition of pilot population

*Please describe your pilot population (i.e., the surgeon(s) and type(s) of surgeries for which you will test changes). Your pilot population will ideally include at least 100 surgeries per month.*

5. Working list of measures selected

*For additional information, please refer to the Measurement Strategy section.*

**Required measures:**

1. Number of surgical cases between each surgical site infection.

2. Percent of surgical cases with prophylactic antibiotics started within 0–1 hour prior to surgical incision.

3. Percent of surgical cases in which appropriate antibiotic was selected according to adopted guidelines.

4. Proportion of patients who received prophylactic antibiotics whose antibiotics were discontinued within 24 hours after surgery.

**Potential issues in collecting data for the required measures:**
Optional measures selected:
Select between two and four. Pick from measurement strategy or generate your own.

1. _________________________________________________________________
2. _________________________________________________________________
3. _________________________________________________________________
4. _________________________________________________________________

Potential issues in collecting data for the optional measures selected:

6. Does my hospital currently track an infection rate by any means, and if so, how?

7. Baseline data collected so far

Could include any of the following, as available:

a. Overall hospital surgical infection rate:

b. In an average month, our hospital performs ______ surgeries.

c. In an average month, the surgeons we have selected for our pilot team collectively perform approximately ______ surgeries.
d. A retrospective audit of ____ charts indicated that we have the following proportions on the required process measures:

_____% of cases had an appropriate prophylactic antibiotic given

_____% of cases had the prophylactic antibiotic hung within one hour of surgery

_____% of cases had the prophylactic antibiotic administered for no more than 24 hours after surgery

e. Currently, the average number of surgeries between cases in which an infection is identified is _______.

f. A retrospective audit of ____ charts in which a surgical infection was identified indicated that the following proportions of infections were potentially preventable:

_____% of cases with identified infections did not have an appropriate prophylactic antibiotic

_____% of cases with identified infections did not have the prophylactic antibiotic begun within one hour of surgery

g. Additional baseline data we collected and how we collected it:
Collaborative Charter

The Collaborative charter includes the mission and goals for the Collaborative, a problem statement that describes opportunities to prevent surgical site infections, a methods section that describes how the Collaborative works and what models will be used; a section on expectations, and references and recommended reading. The charter, measurement strategy, and change package (described in following sections) were developed by the Institute for Healthcare Improvement (IHI) and Qualis Health, with a panel of clinical experts.

Charter

The purpose of the Collaborative is to improve the quality of care delivered to patients during surgery in a cost-effective manner through system redesign using proven, evidence-based practices. The goal, as reflected in process measures, is that 100 percent of eligible patient populations receive appropriate and timely prophylactic antibiotics. Hospitals are also strongly encouraged to select additional prevention-related measures related to normothermia, glucose control, oxygenation, hair removal, and other infection-prevention procedures to improve redesign of their systems of care.

Mission

The mission of this Collaborative is to achieve, in 13 months, a breakthrough improvement in surgical infection prevention. The primary emphasis of this Collaborative is to create systems of care that dramatically improve the prevention of surgical infections. The Collaborative will take a preventive approach, which includes, but is not limited to, preventing SSIs. Hospitals will prevent infections by implementing a system-wide model of care, which focuses on assuring the safe delivery of care on a day-to-day basis for patients undergoing surgery. The mission encourages hospitals to redesign systems within a safety culture.

A safety culture can be defined as “the product of individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and style and proficiency of, an organization’s health and safety programs.” Hospitals with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventive measures.

The Collaborative faculty will help each hospital achieve this mission and their hospital-specific aim. The faculty will support the teams in meeting the Collaborative goals by sharing the best available scientific knowledge on creating safe systems in clinical areas and by teaching and applying methods for organizational change.
Goals

The main goals of the Collaborative are to

1. Double the number of surgical cases between SSIs.
2. Achieve 100% compliance with appropriate selection and timing of prophylactic antibiotic administration:
   - 100% of patients will have antibiotic prophylaxis initiated within one hour prior to incision*,
   - 100% of patients will be given prophylactic antibiotics consistent with published guidelines, and
   - 100% of patients given prophylactic antibiotics will have those antibiotics discontinued within 24 hours after surgery.

* See Measurement Strategy section for exceptions, which include patients receiving vancomycin, with tourniquets or those undergoing C-sections. The measurement strategy also includes a list of optional measures. Teams will have additional optional measures related to other surgical infection prevention strategies.

Problem Statement

Americans rely on their healthcare system for the maintenance and improvement of health, which often involves care in the hospital setting. Although most patients believe that the American healthcare system provides the highest quality and safest care in the world, it is estimated that four out of every one hundred hospitalized patients in the United States suffers a serious adverse event, many of which are avoidable. In the Institute of Medicine report *To Err is Human* it is estimated that between 44,000 and 98,000 deaths per year result from adverse events. In comparison, there are approximately 45,000 deaths yearly from auto accidents.

Sixty-nine percent of adverse events and deaths in healthcare are due to an error in management and thus are potentially preventable. Dr. Lucian Leape and colleagues have described these types of errors, which include diagnostic failures, treatment errors, errors in prevention, and others including communication failure and equipment failure. Some of these errors lead to perioperative infections, a major cause of patient injury, mortality, and healthcare cost. An estimated 2.6 percent of nearly 30 million operations are complicated by surgical site infections (SSIs) each year.

Established in 1970, the CDC’s National Nosocomial Infections Surveillance (NNIS) system monitors reported trends in nosocomial infections in participating US acute-care hospitals. According to the NNIS system reports, SSIs are the third most frequently reported nosocomial infection, accounting for 14–16% of all nosocomial infections among hospitalized patients. Surgical site infections are a common complication of care, occurring in 2–5% of patients after clean extra-abdominal operations (e.g., thoracic and orthopedic operations) and in up to 20% of patients undergoing intra-abdominal procedures. Among surgical patients, SSIs were the most common nosocomial...
infection, accounting for 38% of all such infections. When surgical patients with nosocomial SSI died, 77% of the deaths were reported as related to the infection, and the majority (93%) were serious infections involving organs or spaces accessed during the operation. Cruse estimated that an SSI increased a patient’s hospital stay by approximately ten days and cost an additional $2,000 in 1980. There are more recent studies, including a 1992 analysis by Martone, which corroborate an increase in length of stay and cost (7.3 additional postoperative hospital days and $3,152 in extra charges) in patients with SSIs. If a hospital with an annual surgical volume of 10,000 operations could reduce their 300 SSIs by half, this would result in an average annual cost savings of approximately $450,000, based on 1992 cost estimates. Deep SSIs involving organs or spaces are associated with even greater increases in hospital stays and costs.

An estimated 40–60% of SSIs are preventable with appropriate use of prophylactic antibiotics. Overuse, under use, improper timing, and misuse of antibiotics occurs in 25–50% of operations. A large number of hospitalized patients develop infections caused by Clostridium difficile, and 16% of this type of infection in surgical patients can be attributed to inappropriate prophylaxis use alone. Inappropriate use of broad spectrum antibiotics or prolonged courses of prophylactic antibiotics puts all patients at even greater health risks due to the development of antibiotic-resistant pathogens. In addition to the proper use of prophylactic antibiotics and good surgical technique, other factors under the control of the operative team have been demonstrated to affect significantly the risk of SSI. These other factors include preventing hypothermia during the procedure, maintaining high levels of inspired oxygen, controlling serum glucose within certain limits, avoiding shaving the operative site, and other basic prevention strategies. All of these preventive measures provide opportunities for improvement in most hospitals.

Although the primary focus of the Collaborative work is SSIs, infections in patients undergoing surgery are not limited to those that involve the surgical site. Other types of infections occurring in patients undergoing surgery include, but are not limited to, infections of centrally inserted venous access lines for perioperative monitoring, urinary tract infections, and pneumonia.

Effective surgical infection prevention and harm reduction therefore require redesigning systems with safety in mind. The fundamental law of improvement is this: every system is perfectly designed to achieve exactly the results it gets. In order to attain a new level of performance in safety, there must be a new system. This applies to all forms of performance—such as selection, timing, and duration of antimicrobial prophylaxis; thermoregulation; oxygen tension; glucose control; hair removal and other basic prevention strategies. Some healthcare organizations have succeeded in creating new and safer systems for SSIs. Major opportunities still exist to reduce the incidence of surgical infections, create safer care for patients requiring surgery and a more satisfactory work environment for healthcare workers, and reduce costs and improve efficiency.

Reducing surgical infections while minimizing antibiotic resistance remains a challenge to many healthcare institutions. Healthcare providers are faced with the additional challenge of trying to integrate new evidence-based infection prevention strategies, such
as perioperative glycemic control, into practice. Enlightened management teams, regulatory agencies, health plan providers and purchasers, and medical associations need to provide the support required to create a culture of patient safety in our healthcare systems. With this support, informed, activated hospital teams can be empowered to make key changes to their subsystems (e.g., surgical units) and to incorporate safety considerations into their everyday work.

**Methods**

Each hospital is expected to develop an aim statement (a statement on what the team expects to accomplish during the Collaborative) that includes specific goals relating to preventing surgical infections. Hospitals should begin by working initially within a specific surgical population (pilot population) or with one or two surgeons (clinical champions) and anesthesiologist(s) (also clinical champions). The ultimate goal is to spread the improvements to other populations and throughout the entire system. Hospitals should select initial pilot populations based on internal infection data and/or based on the following suggested surgical procedures: coronary artery bypass grafts (CABG), cardiac, colon, hip and knee arthroplasty, abdominal and vaginal hysterectomy, or selected vascular surgery procedures. To facilitate learning during the Collaborative, hospitals should try to identify a pilot population that is expected to result in at least 100 surgeries per month or 100% of surgical cases for selected surgeries listed above.

Both process and outcome measurement strategies will be used to assess organizational progress toward achieving Collaborative goals. Hospitals will learn an improvement strategy that includes breakthrough goals and a method to develop, test, and implement changes in their systems. Hospitals will be expected to collect well-defined data that relate to their aim at least monthly and to plot these data over time for the duration of the Collaborative. An annotated time series or run chart will be used to assess the impact of changes.

The Collaborative faculty will aid hospitals in capitalizing on the learning and improvement from the focused project by simultaneously coaching senior leaders in hospitals to develop a system for spreading improvement to other surgical populations, sites, units, or surgical staff.

**Expectations**

The Collaborative faculty will

- provide information on subject matter, application of that subject matter, and methods for process improvement, both during and between learning sessions;
- offer coaching to teams;
- provide an electronic mailing list (e-mail list) and other communication venues for shared learning;
- assess team progress and provide feedback to teams monthly;
• plan and implement the four face-to-face meetings (three learning sessions and an outcomes congress);

• maintain and safeguard the confidentiality of privileged data or information—whether written, photographed, or electronically recorded and whether generated or acquired by the team—which can be used to identify an individual patient, practitioner, hospital, facility, health plan, or patient population.

**Hospitals** are expected to

• perform pre-work activities as outlined in section II of the handbook;

• connect the goals of the Collaborative work to a strategic initiative in the hospital;

• provide a senior leader to sponsor and actively support the team;

• provide the resources to support the team, including resources necessary for learning sessions and staff time to devote to this effort (approximately one FTE for the duration of the Collaborative);

• participate in each learning session (participation by all core team members is highly recommended, and participation in the congress that concludes the Collaborative is desirable);

• identify the performance measures that the team is going to target, including the required performance measures related to appropriate antibiotic prophylaxis;

• plan, design and implement plan-do-study-act (PDSA) improvement cycles to meet the targeted performance measures;

• submit monthly reports to the team’s senior leader and Collaborative faculty, identifying progress and PDSA cycles implemented;

• create storyboards for presentation at each learning session;

• share information with the Collaborative, including details of changes made and data to support these changes, both during and between learning sessions; maintain and safeguard the confidentiality of privileged data or information—whether written, photographed, or electronically recorded and whether generated or acquired by the team—which can be used to identify an individual patient, practitioner, hospital, facility, health plan, or patient population.
References


26. Houck PM, Bratzler DW. Personal communication.


Recommended Reading


Change Package

The change package is a collection of ideas for changing processes of care. The following figure and table present ideas for preventing surgical infection.

Surgical Infection Prevention

- Use Antibiotics Appropriately
- Maintain Normal Body Temperature
- Maintain Normal Blood Glucose
- Optimize Oxygen Tension
- Avoid Shaving Site
- Other Basic Prevention

Surgical Infection Prevention Strategies

Informed, Activated Surgical Team Working in a Safety Culture
<table>
<thead>
<tr>
<th>Prevention Strategies</th>
<th>Key Changes for Surgical Infection Prevention</th>
</tr>
</thead>
</table>
| Use prophylactic antibiotics appropriately | • Designate responsibility and accountability for preoperative prophylactic antibiotic administration (e.g., preoperative nurse, circulating nurse, anesthesiologist) connected to key point in process  
• Standardize administration process to occur with commonly performed activity within one hour prior to incision  
• Through the use of antibiotic standing orders specific to surgical site, administer prophylactic antibiotics according to guidelines based on local consensus  
• Make agreed upon antibiotics available in the operating room (OR)  
• Standardize delivery process to ensure timely delivery of preoperative antibiotics to the holding area  
• Provide visible reminder or checklist to give antibiotics on each case (e.g., brightly colored sticker)  
• Ensure systematic documentation of antibiotic administration on every patient chart (paper or electronic)  
• Develop system where antibiotic is hanging at head of patient’s bed ready for administration  
• Design protocols to deliver antibiotic to OR with patient  
• Educate OR staff regarding the importance and reasoning of antibiotic timing, selection, and duration  
• Provide feedback on prophylaxis compliance and infection data monthly  
• Involve pharmacy staff to ensure timing, selection, and duration are maintained |
| Maintain normothermia perioperatively | • Provide devices and protocol for consistent measurement of patient temperature  
• Designate responsibility and accountability for thermoregulation  
• Standardize use of warming devices (warming blankets, hot air blankets, IV fluid heaters, filter heater hydrator for laparoscopic procedures) to ensure patient temperature <36°C perioperatively  
• Limit heat loss in patients prior to operative procedure  
• Assure engineering controls allow surgical staff to control room temperature  
• Provide surgical staff with cooling gear/devices |
| Maintain glucose control | • Design standardized protocol for intraoperative and postoperative glucose monitoring  
• Use standardized treatment protocol to maintain serum glucose ≤200 mg/dL |
## Prevention Strategies

**Key Changes for Surgical Infection Prevention**

<table>
<thead>
<tr>
<th>Prevention Strategies</th>
<th>Key Changes for Surgical Infection Prevention</th>
</tr>
</thead>
</table>
| Optimize oxygen tension | • Design protocols to administer supplemental O2, which is defined as (a) intraoperative FIO2 >80% in the intubated patient or a non-rebreathing face mask at >12 L/min fresh gas flow in the non-intubated patient and (b) postoperative FIO2 >80% in the intubated patient or a non-rebreathing face mask at >12 L/min fresh gas flow in the non-intubated patient for 2 hours  
• Design educational training programs for postoperative staff |
| Avoid shaving operative site | • Remove all razors from operating room  
• Perform hair removal when necessary with clippers right before surgery  
• Establish protocol for when and how to remove hair in affected areas  
• Provide patient education and materials on appropriate hair removal techniques to prevent shaving at home |
| Basic prevention strategies* (Based on organizational self-assessment of adherence to practice) | • Exclude patients with prior infections  
• Stop patient tobacco use prior to surgery  
• Apply sterile dressing for 24–48 hr  
• Shower with antiseptic soap  
• Provide positive pressure ventilation in OR with at least 15 air changes/hr  
• Keep OR doors closed  
• Use sterile instruments  
• Wear a mask  
• Cover hair  
• Prepare skin with appropriate agent  
• Wear sterile gloves; double-glove  
• Maintain short nails; remove artificial nails  
• Handle tissue gently  
• Ensure that surgeons/staff clean hands with appropriate agents and methods  
• Delay primary closure for heavily contaminated wounds  
• Exclude infected surgeons  
• Use closed suction drains (when used) |

*Category IA CDC Recommendations
Measurement Strategy

The following table lists required and optional measures that teams can select or adapt. Teams can also develop new measures based on the issues that are of most interest and importance to their hospital. There are three types of measures: outcome measures, process measures, and balancing measures. The table below provides definitions of each type of measure. Also provided on page 43 is a sample data collection tool. This tool will also be available electronically on the e-mail list.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Statistic</th>
<th>Definition</th>
<th>Data Collection</th>
<th>Appropriate Collaborative Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome Measures</strong> (Measures of change [or lack of change] in the well-being of a defined population related to an intervention. Improvement in outcome measures reflects the health status of the patient, whereas process measures reflect the care delivery to the patient. Improvement in outcome measures has a direct effect on mortality and morbidity.)</td>
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<tr>
<td>O1. Number of surgical cases between surgical site infections (SSIs)</td>
<td>Number of surgical cases between each SSI</td>
<td>Infections acquired in the hospital by a surgical patient at the surgical site. SSI may be of three types: ♦ superficial incisional ♦ deep incisional ♦ organ or space infection</td>
<td>Create system to capture data prospectively on 100% of patients in the pilot population</td>
<td>Double number of surgical cases between SSIs</td>
</tr>
<tr>
<td><em>(Required)</em></td>
<td></td>
<td></td>
<td>May require revising run charts continuously</td>
<td></td>
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</table>
### Process Measures

*(What is done to, for, with, or by defined individuals or groups as part of the delivery of services.)*

<table>
<thead>
<tr>
<th>Measure</th>
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<th>Appropriate Collaborative Goals</th>
</tr>
</thead>
</table>
| P1. Percent of surgical cases with on-time prophylactic antibiotic administration (Required) | N = number of patients with prophylactic antibiotics within one hour prior to surgical incision (see “Exceptions” to the right)  
D = number of surgical cases with documented antibiotic administration time and time of surgical incision | Antibiotic started means administration has begun but is not necessarily completed  
Cases in which time of antibiotic administration or time of surgical incision is not documented should be excluded from the numerator and denominator  
Exceptions: (1) within two hours if patient receiving vancomycin due to beta-lactam allergy, (2) patients with tourniquets need to have all antibiotic administration completed before the tourniquet is inflated and within one hour prior to surgical incision and (3) patients undergoing C-section should receive the antibiotic as soon as the umbilical cord is clamped | Create system to capture data prospectively on 100% of patients | 100% beginning within one hour prior to surgical incision (see “Exceptions” to the left) |
<table>
<thead>
<tr>
<th>Measure</th>
<th>Statistic</th>
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<th>Data Collection</th>
<th>Appropriate Collaborative Goals</th>
</tr>
</thead>
</table>
| P1-2. Percent of surgical cases with timing documented (Optional) | \( N = \) number of patients with times documented  
\( D = \) number of surgical cases receiving prophylactic antibiotics | Proportion of patients receiving a prophylactic antibiotic who have antibiotic administration time and time of surgical incision documented | Create system to capture data prospectively on 100% of patients | 100% of patients receiving prophylactic antibiotics |
| P2. Percent of surgical cases with appropriate selection of prophylactic antibiotic (Required) | \( N = \) number of patients receiving antibiotic consistent with adopted guidelines  
\( D = \) number of surgical cases | Proportion of patients given right antibiotic as determined by published guidelines  
Organizations will adopt a published guideline (CMS or other) or adapt a published guideline to local circumstances and use this to determine if the correct antibiotic was given to the patient  
Note: See back pocket of handbook for CMS recommended guidelines | Create system to capture data prospectively on 100% of patients  
If events very rare, may use the number of cases between inappropriate selection | Achieve 100% compliance with appropriate selection of prophylactic antibiotics |
| P3. Percent of patients with perioperative glucose control (Optional) | \( N = \) number of surgical patients (all procedures) whose serum glucose was controlled  
\( D = \) number of surgical patients undergoing cardiac surgery or number of surgical patients with diabetes (all procedures) | Alternate proposed definition is percent of patients with serum glucose \( \leq 200 \) mg/dL intraoperatively and during the first 48 hours postoperatively | Create system to capture data prospectively on 100% of patients | Achieve 100% compliance with perioperative glucose control (alternatively, \( \leq 200 \) mg/dL) during the first 48 hours after an operation for the pilot population |
<table>
<thead>
<tr>
<th>Measure</th>
<th>Statistic</th>
<th>Definition</th>
<th>Data Collection</th>
<th>Appropriate Collaborative Goals</th>
</tr>
</thead>
</table>
| P4. Percent of surgical patients with perioperative normothermia  
*(Optional)* | N = number of surgical patients with temperature >36 °C  
D = number of patients not excluded from normothermic maintenance | Normothermia occurs when temperature >36 °C  
Exclusion: patients for whom hypothermia is deliberately sought for therapeutic reasons (e.g., hypothermic total circulatory arrest) | Record last intraoperative temperature (alternatively, record temperature upon arrival to PACU)  
Create system to capture data prospectively on 100% of patients | 100% for those not excluded from normothermic maintenance |
| P5. Percent of surgical patients provided supplemental O\textsubscript{2} perioperatively  
*(Optional)* | N = number of patients receiving supplemental O\textsubscript{2} perioperatively  
D = number of patients meeting inclusion criteria | Supplemental O\textsubscript{2} is defined as (a) intraoperative FIO\textsubscript{2} >80% in the intubated patient or a non-rebreathing face mask at >12 L/min fresh gas flow in the non-intubated patient and (b) postoperative FIO\textsubscript{2} >80% in the intubated patient or a non-rebreathing face mask at >12 L/min fresh gas flow in the non-intubated patient for 2 hours  
Exclusions: (1) ambulatory patients (not admitted as inpatients) and (2) patients with COPD and evidence for CO\textsubscript{2} retention | Create system to capture data prospectively on 100% of patients  
Teams might want to start with high-risk population | 100% surgical patients not excluded |
<table>
<thead>
<tr>
<th>Measure</th>
<th>Statistic</th>
<th>Definition</th>
<th>Data Collection</th>
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</tr>
</thead>
</table>
| P6. Percent of surgical staff who are knowledgeable in surgical infection prevention (Optional) | N = number of staff who obtain a score of 100% on post-test  
D = number of staff surveyed | Resembles a spread measure in that it may be cumulative by month | Use survey after education detailing surgical infection prevention practices | 100% of surgical staff knowledgeable in surgical infection prevention |
| P7. Percent of patients with appropriate hair removal (Optional) | N = number of surgical patients with hair removed appropriately  
D = number of patients requiring hair removal | Exclusion: patients for whom hair removal is not necessary | Create system to capture data prospectively on 100% of patients  
Define appropriate hair removal for each type of surgery in pilot population (e.g., depilatory may be appropriate, clipping may be appropriate, usually shaving is not appropriate) | Achieve 100% compliance with appropriate hair removal |
## Measurement Strategy

<table>
<thead>
<tr>
<th>Measure</th>
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<th>Definition</th>
<th>Data Collection</th>
<th>Appropriate Collaborative Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balancing Measures</strong> (Measures that together with the selected process and outcome measures describe a great system of care. These measures may be process or outcome measures, and usually measure some aspect of the system that may inadvertently be affected by changes in specific areas of the model.)</td>
<td></td>
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</tr>
<tr>
<td>B1. Percent of surgical patients who received prophylactic antibiotics whose antibiotics were discontinued within 24 hours after surgery</td>
<td>• N = number of patients receiving prophylactic antibiotics who had them discontinued within 24 hours</td>
<td>Discontinued is defined as discontinued within 24 hours of the surgery end time</td>
<td>Create system to capture data prospectively on 100% of patients</td>
<td>100% of surgical patients with prophylactic antibiotics discontinued within 24 hours of the surgery end time</td>
</tr>
<tr>
<td>Note: this measure linked to cost and to prevention of resistant strains of bacteria</td>
<td>• D = number of patients who received prophylactic antibiotics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Required)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>B2. Cost per surgery</td>
<td>• N = dollars allocated to surgical accounting codes per month</td>
<td></td>
<td></td>
<td>No increase in direct costs, or increase in direct cost is less than the cost of SSIs prevented</td>
</tr>
<tr>
<td>(Optional)</td>
<td>• D = number of surgical cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3. Volume of surgical workload per month</td>
<td>Number of surgical cases per month</td>
<td>Surgery defined as involving an incision and occurring in an operating room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure</td>
<td>Statistic</td>
<td>Definition</td>
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</tbody>
</table>
| B4. Incidence of resistant bacterial strains  
(Optional) | 1. N = number of different resistant strains. If the same strain is isolated several times from the same patient, it should only be reported once. If the apparently same strain is isolated from several patients, it should be reported for each patient.  
D = number of surgical ICU patient days/1000 days | 1. Number of resistant strains per 1000 patient days; use laboratory determination of resistant strain  
2. Defined daily dose of antibiotics per 1000 patient days | Laboratory data | |
SSl Prevention Collaborative Data Collection Record Sample

Surgical Case Information:

Patient Name: ____________________________________________________________

Patient Medical Record Number #: _____________ Age (in years): _______ Sex: 1 = Male 2 = Female

Date of Surgery: _________________ Surgical Procedure #1:  1 = Laminectomy without fusion 2 = Fusion

Time of Incision: ____________________ CRNA: ____________________________

Hair Removal:

☐ Clippers   ☐ Razor   ☐ None

Prophylaxis Information: (Circle One)

Pre-op surgeon antibiotic order on patient’s medical record? 1 = Yes 0 = No 7 = Missing data 9 = Unknown

Pre-op antibiotic started 0-1 hour before surgery start time? 1 = Yes 0 = No 7 = Missing data 9 = Unknown

Antibiotic doses documented (pre-op, intra-op):

_____ Dose given:______ Gm or _________mg H H M M H H M M

_____ Dose given:______ Gm or _________mg H H M M

_____ Dose given:______ Gm or _________mg H H M M

0 = None

1 = Cefazolin (Kefzol, Ancef)

2 = Vancomycin

3 = Clindamycin (Cleocin)

4 = Nafcillin

5 = Cefepine

6 = Cefuroxime

7 = Other – specify: _______________________

8 = Missing data

9 = Unknown

Supplemental Oxygen 1 = Yes 0 = No 3 = Does not apply 7 = Missing data 9 = Unknown

_____ Intraoperative FIO2>80% in intubated patient

_____ Exclusion: Patient with COPD and evidence for CO2 retention

Normothermia

_____ Last temperature taken prior to leaving OR

Postoperative Antibiotic Order: 1 = Yes 0 = No 3 = Does not apply 7 = Missing data 9 = Unknown

_____ Antibiotic ordered (see above)

_____ Antibiotic ordered to be discontinued within 24 hours after surgery

Other comments:

____________________________________________________________________________________

Please place form in infection control box found in PACU. If this form is found on chart, please return to Infection Control Department.
**Glossary of Terms and Concepts**

**action period**
The time between learning sessions when teams work on improvement in their organizations. They are supported by the Collaborative leadership team and faculty and other Collaborative team members via an e-mail list, a Web site, monthly teleconferences, and site visits.

**aim, or aim statement**
A written, measurable, and time-sensitive statement of the accomplishments a team expects to make from its improvement efforts. The aim statement contains a general description of the work, the pilot population, and the numerical goals.

**annotated run chart, or annotated time series**
A line graph showing results of improvement efforts plotted over time. Implemented changes and other relevant information are noted on the line chart, allowing the viewer to connect changes and events with specific results. Example:

![Percent of Patients Receiving Appropriate Antibiotic](image)

A: Systematic documentation of antibiotic administration on every patient chart.
B: Developed guidelines and order sets for prophylactic antibiotics specific to the surgical site, based on national guidelines and local consensus.
C: Pharmacy standardized process to ensure timely delivery of appropriate antibiotic to the holding area or OR.

**assessment scale**
A numerical scale used to assess the progress of participating teams toward reaching their aim: 1 = forming team, and 5 = outstanding, sustainable improvement. In each Collaborative, faculty assess teams and also ask them to evaluate their own progress using this scale. The expected level of attainment by the end of the Collaborative is a 4 (significant progress).

**balancing measures**
Optional measures that track unintended consequences of improvement efforts.

**chair**
The leader of the Collaborative, usually an expert in the topic.
champion
An individual in the organization who believes strongly in quality improvement and is willing to work with others to test, implement, and spread changes. Teams need at least one clinical champion. Champions in other disciplines who work on the process are important as well.

change concept
A general idea for changing a process, usually developed by an expert panel based on literature and practical application of evidence. Change concepts are usually at a high level of abstraction, but evoke multiple specific ideas for how to change processes. “Simplify,” “reduce handoffs,” and “consider all parties as part of the same system,” are all examples of change concepts.

change idea
An actionable, specific idea for changing a process. Change ideas can be tested to determine whether they result in improvements in the local environment. An example of a change idea is, “Ensure patients are warm (>36°C) by using Bairhugger blanket preoperatively and then transporting the patient to the OR with the blanket in place.”

change package
A collection of change concepts and key changes.

Collaborative
A systematic approach to healthcare quality improvement in which organizations and providers test and measure practice innovations, then share their experiences in an effort to accelerate learning and widespread implementation of best practices. Everyone teaches, everyone learns.

Collaborative leadership and faculty
The small group of experts on the topic who assist the chair and director in developing the Collaborative and in teaching and coaching participating teams. The Collaborative leadership and other faculty members generally represent the spectrum of healthcare professionals involved in the change process.

Collaborative team
All individuals from the participating organizations that drive and participate in the improvement process. A core team of three to four individuals attends the learning sessions, but a larger team of three to six people, often from various disciplines, participates in the improvement process in the organization.

coordinator
Staff person responsible for the day-to-day activities of the Collaborative, including scheduling conference calls, collecting and disseminating materials, receiving and tracking monthly reports, and managing the e-mail list.
**core team members**
The individuals who attend the learning session and fulfill the roles of senior leader, system leader, clinical champion, and day-to-day leader.

**cycle**
See “PDSA cycle.”

**data collection plan**
A specific description of the data to be collected, the interval of data collection, and the subjects from whom the data will be collected. The plan is included in all senior leader reports. It emphasizes the importance of gathering samples of data to obtain “just enough” information.

**day-to-day leader**
The person on the team who is responsible for driving the improvement process every day. This person manages the team, arranges meetings, and assures that tests are being completed and that data are collected. This role usually requires 0.25 FTE or more.

**director**
The manager of a Collaborative who works with the faculty, teaches and coaches teams, and plans and executes activities at learning sessions and during action periods.

**early adopter**
In the improvement process, the opinion leader within the organization who brings in new ideas from the outside, tries them, and uses positive results to persuade others in the organization to adopt the successful changes.

**early majority and late majority**
The individuals in the organization who will adopt a change only after it is tested by an early adopter (early majority) or after the majority of the organization is already using the change (late majority).

**electronic mailing list, or e-mail list**
A communication system that allows teams to stay connected with the leadership team and each other during the action periods. Sharing information, getting questions answered, and solving problems are all part of e-mail list activity.

**handbook**
Pages containing a complete description of the Collaborative, along with what to expect and activities to complete before the first meeting of the Collaborative.

**implementation**
Taking a change and making it a permanent part of the system. A change may be tested first and then implemented throughout the organization.
improvement advisor
The expert in process improvement and measurement who assists the chair and director in guiding the Collaborative’s work and coaching teams.

improvement cycle
See “PDSA cycle.”

IS
Refers to the information system of an organization, which is usually the computerized information system.

key change, or process change
A change in a system or process in an organization that may lead to breakthrough improvement. Key changes are more focused and detailed than change concepts, but they are not specific to the local environment like change ideas. An example of a key change is, “Maintain normal body temperature perioperatively.”

late majority and early majority
See “early majority and late majority.”

learning session
A two-day meeting during which team members and faculty meet to learn what key changes are and to learn how to test and implement them, accelerate improvement, and overcome obstacles. Teams leave these meetings with new knowledge, skills, and materials that prepare them to make immediate changes.

measure
A focused, reportable, unit that will help a team monitor its progress toward achieving its aim.

Model for Improvement
An approach to process improvement, developed by Associates in Process Improvement, that helps teams accelerate the adoption of proven and effective changes. The model includes use of “rapid-cycle improvement,” successive cycles of planning, doing, studying, and acting (PDSA cycles).

outcomes congress
A large public meeting at the end of the Collaborative during which the best practices in the topic area are presented to others interested in making improvements.

PDSA cycle
A structured trial of a process change. Drawn from the Shewhart cycle, this effort includes the following steps:
   - plan—a specific planning phase;
   - do—a time to try the change and observe what happens;
study—sometimes called “check,” an analysis of the results of the trial; and
act—devising next steps based on the analysis.

This PDSA cycle will naturally lead to the “plan” component of a subsequent cycle. PDSA cycles are also called rapid cycles or improvement cycles.

**pilot population, or population of focus**
A designated set of patients who will be tracked to determine whether changes have resulted in improvements. For this Collaborative, the pilot population will generally consist of (1) identifying particular surgeons/anesthesiologists who are interested and excited about testing changes (e.g., all patients of Dr. Smith and Dr. Jones), or (2) identifying groups of patients undergoing a particular kind of surgery (e.g., all coronary artery bypass grafts [CABG]). Ideally, the surgeons and anesthesiologists you choose should interact with between 50 and 100 patients undergoing surgery in a given month.

**population of focus**
See “pilot population.”

**pre-work**
The time before the first learning session when teams prepare for their work in the Collaborative. Pre-work activities include forming a team, registering for the first learning session, scheduling initial meetings, preparing an aim statement, defining a pilot population, selecting measures, and populating a registry.

**process change**
See “key change.”

**rapid cycle**
See “PDSA cycle.”

**run chart**
See “annotated run chart.”

**senior leader**
The executive in the organization who supports the team and controls the resources employed in the processes to be changed. The senior leader works to connect the team’s aim to the organization’s mission, provides resources for the team, and promotes the spread of the team’s work to other populations.

**senior leader report**
The concise format for reporting monthly progress during the Collaborative. This concise report (usually about two pages) includes an aim statement, measures to be used, a data collection plan, a listing of the changes made, the results displayed as run charts, and a self-assessment score. The team prepares the report and sends it to the senior leader at the organization, in addition to posting it to the e-mail list. The Collaborative leadership reviews the reports and prepares a summary of all senior leader reports.
spread
The intentional and methodical expansion of the number and type of people, units, or organizations using the improvements. The theory and application of spread comes from the literature on the concept of Diffusion of Innovation.

storyboard
A 30" x 40" foam-core board that displays information about a team and its progress and that is displayed at learning sessions to help create an environment conducive to sharing and learning from the experiences of others. For more information, see the Completing Pre-work section.

system leader
The core team member who has direct authority to allocate the time and resources to achieve the team’s aim, has direct authority over the particular systems affected by the change, and will champion the spread of successful changes throughout the department or service area. The system leader attends all three learning sessions and the outcomes congress.

technical expert
The team member in the organization who has a strong understanding of the process to be improved and changes to be made. A technical expert may also provide expertise in process improvement, data collection and analysis, and team function.

test
A small-scale trial of a new approach or a new process. A test is designed to learn whether the change results in improvement or to fine-tune the change to fit the organization and patients. Tests are carried out using PDSA cycles.
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