

**The Joint Commission's
Implementation Guide
for
NPSG.07.05.01
on
Surgical Site Infections:
The SSI Change Project**

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The Joint Commission's Mission

The mission of The Joint Commission is to continuously improve health care for the public, in collaboration with other stakeholders, by evaluating health care organizations and inspiring them to excel in providing safe and effective care of the highest quality and value.

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The Joint Commission's NPSG.07.05.01: Prevention of Surgical Site Infections

2011 National Patient Safety Goal 07.05.01 Prevention of SSIs

07.05.01 Implementing evidence-based practices for preventing surgical site infections.

Elements of Performance

1.	Educate staff and licensed independent practitioners involved in surgical procedures about surgical site infections and the importance of prevention. Education occurs upon hire, annually thereafter, and when involvement in surgical procedures is added to an individual's job responsibilities.
2.	Educate patients, and their families as needed, who are undergoing a surgical procedure about surgical site infection prevention.
3.	Implement policies and procedures aimed at reducing the risk of surgical site infections: These policies and procedures meet regulatory requirements and are aligned with evidence-based guidelines (for example, The Centers for Disease Control and Prevention (CDC) and/or other professional organizational guidelines).
4.	As part of the effort to reduce surgical site infections: <ul style="list-style-type: none"> - Conduct periodic risk assessments for surgical site infections in a time frame determined by the hospital. - Select surgical site infection measures using best practices or evidence-based guidelines. - Monitor compliance with best practices or evidence-based guidelines. - Evaluate the effectiveness of prevention efforts. <p>Note: Surveillance may be targeted to certain procedures based on the hospital's risk assessment.</p>
5.	Measure surgical site infection rates for the first 30 days following procedures that do not involve inserting implantable devices and for the first year following procedures involving implantable devices. The hospital's measurement strategies follow evidence-based guidelines. Note: Surveillance may be targeted to certain procedures based on the hospital's risk assessment.*
6.	Provide process and outcome (for example, surgical site infection rate) measure results to key stakeholders.
7.	Administer antimicrobial agents for prophylaxis for a particular procedure or disease according to evidence-based practices.
8.	When hair removal is necessary, use a method that is cited in the scientific literature or endorsed by professional organizations.

* The Joint Commission plans to revise element of performance 5 in 2013 so that it aligns with the Centers for Disease Control and Prevention's (CDC) new surveillance requirement. See <http://www.cdc.gov/nhsn/CPTcodes/ssi-cpt.html>

Acknowledgements

Phase One of The Joint Commission's SSI Change Project

The Joint Commission would like to thank all of the accredited hospitals that completed the environmental assessment for phase one of the SSI Change Project.

Phase Two of The Joint Commission's SSI Change Project: Participating Organizations

The Joint Commission would like to thank the accredited hospitals that participated in phase two of the SSI Change Project including:

Hospitals Participating in Phase Two of The Joint Commission's SSI Change Project

- 1. Baptist Hospital of Miami, Miami, Fla.**
- 2. Children's National Medical Center, Washington, D.C.**
- 3. Hillcrest Hospital, Mayfield Heights, Ohio**
- 4. Lucile Packard Children's Hospital at Stanford, Palo Alto, Calif.**
- 5. Mercy Hospital - Part of Allina Health, Coon Rapids, Minn.**
- 6. Methodist Willowbrook Hospital, Houston, Texas**
- 7. Mobile Infirmary Medical Center, Mobile, Ala.**
- 8. NYU Langone Medical Center, New York, N.Y.**
- 9. Our Lady of Lourdes Regional Medical Center, Lafayette, La.**
- 10. Saint Mary's Regional Medical Center, Russellville, Ark.**
- 11. Sinai Hospital of Baltimore, Baltimore, Md.**
- 12. Sonora Regional Medical Center, Sonora, Calif.**
- 13. St. Christopher's Hospital for Children, Philadelphia, Pa.**
- 14. St. Tammany Parish Hospital, Covington, La.**
- 15. United Regional, Wichita Falls, Texas**
- 16. University Medical Center, Lubbock, Texas**
- 17. Vail Valley Medical Center, Vail, Colo.**

Acknowledgements

Joint Commission Editorial and Production Support

Many thanks to the following staff for editorial support:

William Bullerman, Senior Graphic Designer, Department of Communications and Corporate Marketing

Maureen Carr, M.B.A., Project Director, Division of Healthcare Quality Evaluation

Linda Kusek, M.P.H., CIC, R.N., Associate Project Director, Division of Healthcare Quality Evaluation

Caron Wong, Associate Director of Publications & Multi-Media, Department of Communications and Corporate Marketing

Special Thanks

Special thanks to the following individuals for assistance and support:

Barbara Braun, Ph.D., Project Director, Division of Healthcare Quality Evaluation

Harold J. Bressler, General Counsel

Mary Brockway, M.S.N., R.N., Director, Division of Healthcare Quality Evaluation

Nancy Kupka, Ph.D., M.S., M.P.H., R.N., Project Director, Division of Healthcare Quality Evaluation

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Jerod Loeb, Ph.D., Executive Vice President, Division of Healthcare Quality Evaluation

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Robert Wise, M.D., Medical Advisor, Division of Healthcare Quality Evaluation

The Joint Commission's Implementation Guide for NPSG.07.05.01 on Surgical Site Infections (SSIs)

1

Executive Summary

Surgical site infections (SSIs) are a serious health care concern. Approximately 500,000 SSIs occur every year with significant morbidity and mortality for patients and additional costs for hospitals. With the ongoing national concern about healthcare-associated infections (HAIs) in hospitals and other health care settings, The Joint Commission has published, since 2010, four National Patient Safety Goals (NPSGs) that focus on HAIs, including: multi-drug resistant organisms (MDRO), central line-associated blood stream infections (CLABSI), surgical site infections (SSIs), and catheter-associated urinary tract infections (CAUTI). All four NPSGs specify the evidence-based requirements for preventing or reducing HAIs. These HAI-prevention focused NPSGs do not, however, provide direction to accredited hospitals on how to effectively implement them. Accredited health care organizations have stressed to Joint Commission's leadership that they require guidance and direction to achieve success with the implementation of the standards and NPSGs. The purpose of this project, The Joint Commission's SSI Change Project, was to focus on one of the aforementioned NPSGs namely, NPSG.07.05.01, to identify, confirm, and provide accredited hospitals with effective practices that could be used to effectively implement The Joint Commission's evidence-based SSI NPSG.07.05.01.

The Joint Commission's SSI Change Project was designed by using a specific methodology that focused on learning effective implementation practices from currently accredited hospitals, confirming these processes, and providing these implementation practices free of charge to accredited hospitals. The various activities of The Joint Commission's SSI Change Project have resulted in this publication: *The Joint Commission's Implementation Guide for NPSG.07.05.01 on Surgical Site Infections.*

Objectives

The Joint Commission's SSI Change Project had three specific objectives:

1. **Identify**, through an environmental assessment survey (EAS), effective practices used by accredited hospitals to successfully implement the evidence-based SSIs NPSG.
2. **Confirm** the effective practices used to implement the SSIs NPSG through "learning conference calls" with select hospitals that participated in the EAS.
3. **Develop an SSI implementation guide** for accredited hospitals describing the confirmed, effective practices identified in The Joint Commission's SSIs Change Project for implementing NPSG.07.05.01.

Process

There were three phases to The Joint Commission's SSI Change Project which were correlated to the objectives. In phase one, an environmental assessment was conducted with accredited hospitals to learn about effective practices for implementing the NPSG.07.05.01 on Surgical Site Infections in August and September 2010. In phase two, the effective practices identified in the environmental assessment were confirmed through structured interviews with select hospitals about the identified effective practices through the use of "learning conference calls." Learning conference calls were conducted with hospitals that met specified criteria for participating in phase two of this project.

In phase three, after analysis of the first and second phases of The Joint Commission's SSI Change Project's data, the SSI Implementation Guide was developed. The final results indicated there were **23 effective practices** used to implement the NPSG.07.05.01. These effective practices were used by organizations that experienced a minimum decrease in a SSI rate by 30 percent or more for one surgical procedure for at least one year.

Outcome

The Joint Commission's Implementation Guide for NPSG.07.05.01 on Surgical Site Infections defines the 23 effective practices identified through the project, provides information from the hospitals participating in phase two on the effective practices, and is provided free of charge to hospitals.

The Joint Commission's SSI Change Project: Introduction

The seriousness of healthcare-associated infections (HAIs) in United States hospitals cannot be overemphasized. HAIs jeopardize patient safety at an alarming rate and cost the health care system billions of dollars annually. A study conducted in 2002 reported that there were 99,000 deaths attributed to HAIs in that year, which exceeded the number of deaths associated with any other conditions (Klevens, et al., 2007). This study also noted that both children and adult patients receiving intensive care are at an increased risk for developing a serious HAI. HAIs negatively impact the safety, quality of care, and outcomes provided to hospitalized patients.

Surgical site infections (SSIs) are one type of HAI. They occur in more than 500,000 patients annually (Meeks, et al., 2011). Patients with an SSI have a two-to-11-fold increased risk of death compared to operative patients without an SSI. SSIs contribute to an increased length of stay, a reduced quality of life and death (Anthony, et al., 2011). On average, 2.7 percent of surgeries result in SSIs (Haessler, et al., 2010) and up to 4 percent of children with surgical procedures experience an SSI (Butcher, Warner, & Dillon, 2011). From a cost perspective, SSIs are believed to account for up to \$7 billion annually in health care expenditures (AHRQ, 2009). It is estimated that 40-60 percent of SSIs are preventable. (Hawn, et al., 2011).

The evidence-based practices (EBP) to prevent SSIs have been well-described in the infection prevention and control literature for several years (Anderson, et al., 2008). However, current literature indicates that many hospitals have yet to adopt EBP to decrease SSIs (Meeks et al., 2011; Anthony, et al., 2011). With these statistics about the impact of SSIs, it is understandable why there are governmental initiatives to address SSIs. The Department of Health and Human Services (HHS) Action Plan identified SSIs as a Tier 1 priority in 2010. Additionally, the National Healthcare Safety Network's (NHSN) SSIs measure has been adopted for the CMS Hospital Inpatient Quality Program (HIQR) with data collection beginning in fiscal year 2012.

Since January 2010, The Joint Commission has published four NPSGs focusing on HAIs, including: NPSG.07.03.01 on Multidrug-resistant Organisms (MDROs), NPSG.07.04.01 on Central Line-associated Bloodstream Infections (CLABSI), NPSG.07.05.01 on Surgical Site Infections (SSIs), and NPSG.07.06.01 on Catheter-associated Urinary Tract Infections (CAUTI). Each HAI-focused NPSG was developed using evidence-based implementation strategies that can be used to prevent HAIs. However, no information, direction, or guidance was provided to accredited hospitals regarding effective methods for implementation of these HAI-focused NPSGs. A notable exception is the Joint Commission Center for Transforming Healthcare's Targeted Solutions Tool (TST) that has a solution set and module designed to prevent HAIs through a robust hand hygiene program. The Joint Commission estimates that since its launch in September 2010 and through the end of 2012, health care organizations using the TST to increase their hand hygiene compliance have collectively prevented 25,000 HAIs (18,000-30,500) including CLABSI and CAUTI, prevented 1,450 deaths (1,050-1,800), and saved \$300-\$650 million in direct medical costs. To access the TST, please go to your Joint Commission Connect site or to http://www.centerfortransforminghealthcare.org/tst_hh.aspx.

Accredited health care organizations have stressed to Joint Commission's leadership that guidance and direction are needed for these organizations to successfully implement the standards and NPSGs. The Joint Commission recognizes that there is a lack of knowledge about the methods and practices accredited hospitals are using to most *effectively* implement the HAI NPSGs. The Joint Commission's SSI Change Project was designed to focus on NPSGs.07.05.01, with the intent of The Joint Commission learning from currently accredited hospitals about the effective practices and methods they are using to implement NPSG.07.05.01 on Surgical Site Infections.

Based on the aforementioned information, providing only the evidence-based requirements, such as the NPSG.07.05.01 on Surgical Site Infections, to health care organizations may not be sufficient to decrease or eliminate SSIs in some hospitals. The evidence-based requirements in NPSG.07.05.01 clearly describe *what* hospitals should do to prevent SSIs. The Joint Commission's SSI Change Project was designed to identify and describe "how" to effectively implement this NPSG with three key objectives:

1. **Identify** through an environmental assessment survey (EAS), specific effective practices used by accredited hospitals to successfully implement the evidence-based SSIs NPSG.
2. **Confirm** the effective practices used to implement the NPSG.07.05.01 on Surgical Site Infections, through learning conference calls with select hospitals that participated in the EAS.
3. **Develop a SSI implementation guide** for accredited hospitals describing the confirmed, effective practices identified in The Joint Commission's SSIs Change Project for implementing NPSG.07.05.01.

The Implementation Guide for NPSG.07.05.01 will describe:

- The Joint Commission's SSIs Change Project's methodology
- The 23 identified effective practices used to implement NPSG.07.05.01
- Special considerations for the pediatric population

3 Methodology: The Two Phases of The Joint Commission's SSI Change Project

3a. Phase One

The SSI Change Project's EAS was reviewed by experts in the field for content and construct validity, including two Ph.D.-R.N.s, one Ph.D.-epidemiologist, one M.P.H./CIC R.N., one infection preventionist (currently practicing in an acute care hospital) and one senior research associate with expertise in survey construction. The final version of the EAS was based on this review.

The focus of phase one of The Joint Commission's SSI Change Project was to identify, through an environmental assessment survey (EAS), effective practices used to implement NPSG.07.05.01 at accredited hospitals. EASs are used by The Joint Commission when there is an identified need to learn about current health care practices or issues which may impact standards or NPSGs.

An EAS was designed, with predominantly qualitative data elements, to elicit information about effective practices used by accredited hospitals to implement each of the nine elements of performance (EPs) in the SSIs NPSG.07.05.01.

Additionally, the EAS requested that each participating hospital:

- Provide defined demographic data
- Describe their hospital's story of SSI reduction or elimination
- Identify barriers the hospital had to overcome to decrease or eliminate SSIs
- Identify the three most effective practices to implement the NPSG.07.05.01
- Describe the role of leadership in the hospital's efforts to decrease, prevent, and eliminate SSIs
- Describe the numerical rate decrease of SSIs for at least one procedure

The Joint Commission's SSI Change Project's EAS was sent electronically to all accredited hospitals in August 2010 (with the exception of psychiatric hospitals), and was conducted for four weeks.

When the EAS closed in September 2010, 161 hospitals had submitted data for phase one. However, of the 161 EAS, several hospitals did not answer a significant number of questions. The SSI Change Project's Advisors established criteria to be used to objectively select the EAS to be analyzed during phase one. These criteria include:

- Completion of at least 50 percent of The Joint Commission's SSI Change Project's EAS

- Identification of a SSI rate decrease for at least one surgical service

Based on these criteria, 96 of the 161 submitted EASs were selected for phase one data analysis.

In phase one, content analysis, a type of qualitative data analysis was employed to analyze the data from the 96 EAS. The end result of data analysis indicated that there were 24 **effective practices** used by Joint Commission accredited hospitals to effectively implement NPSG.07.05.01. Working definitions were developed for each of the 24 identified effective practices during this phase.

To assure accuracy of the 24 identified effective practices, an inter-rater reliability process was conducted with members of The Joint Commission's SSI Change Project's Advisors. In this process the advisory group members were provided with the draft definitions of the effective practices used to implement the SSIs NPSG as well as several of the selected EAS data from phase one. The advisory group members were instructed to identify the effective practices, using the draft definitions, for their assigned EAS data. The results of this inter-rater reliability process proved to be very successful. All of the effective practices initially identified by the principle investigator were confirmed in the inter-rater reliability process. As a result of this process, the draft definitions of the SSIs effective practices were further developed and enhanced.

3b. Phase Two

Phase two of The Joint Commission's SSI Change Project was designed to *confirm* the 24 effective practices identified in phase one through the use of Learning Conference Calls (LCC). The LCC provided an additional form of qualitative data that was used to confirm the phase one data as well as provide a further source of information about the 24 effective practices. Additionally, the confirmation process was used to substantiate that the effective practices reported from the phase one hospitals were actually implemented as described.

For participation in phase two of The Joint Commission's SSI Change Project, a hospital participating in phase one had to be selected.

Pre-established criteria were developed for selection, including:

- The hospital had current Joint Commission accreditation with good standing
- At least 50 percent of the EAS was completed with clear and logical answers
- The hospital described an SSI rate decrease of at least 30 percent for a minimum of one surgical procedure for one year, or
- The hospital described an SSI rate of 0 (zero) percent for a minimum of one surgical procedure for one year

From the 96 EAS that were analyzed in phase one, 19 of the hospitals met criteria for participation in phase two. Of the 19 hospitals, 17 participated in phase two of the project; one hospital declined to participate and another hospital did not respond regarding participation.

It was emphasized during initial contact by the principle investigator (PI) that participation in the Joint Commission's SSI Change Project was strictly voluntary and would have no effect on their accreditation status with The Joint Commission. During the LCCs, the PI interviewed the hospital's SSI team, using a structured interview. Information was collected on:

- Identified effective practices to implement NPSG.07.05.01
- The type of surveillance methodology employed at the hospital
- The barriers related to patient education
- How physicians, nurses, and other health care staff were educated about NPSG.07.05.01
- The approaches used to engage physicians, nurses, and other health care staff to implement NPSG.07.05.01
- How the implementation of the NPSG.07.05.01 was evaluated
- The resources that were used and any additional costs that were incurred
- Additional information on the barriers that were encountered during implementation

- Identification of critical success factors needed for effective implementation
- Identification of any lessons learned

The hospitals were also asked to confirm that the effective practices identified by The Joint Commission were in fact used by their organization to effectively implement NPSG.07.05.01. The LCC participants were provided the opportunity to comment on and provide recommendations regarding the definitions of the effective practices used to implement NPSG.07.05.01. By the end of phase two of The Joint Commission's SSI Change Project, 23 effective practices to implement NPSG .07.05.01 were identified and confirmed. One effective practice identified in phase one was not confirmed through the phase two process.

3c. Limitations of The Joint Commission's SSI Change Project

The Joint Commission's SSI Change Project is a qualitative study with the goal of transferring knowledge from accredited hospitals that have successfully implemented NPSG.07.05.01 and reduced SSIs, to accredited hospitals that have had less success in implementing NPSG.07.05.01 and/or are interested in preventing or decreasing SSIs. The project's results are a synthesis of information provided to The Joint Commission through a structured process, but does not constitute clinical research. There are limitations to The Joint Commission's SSI Change Project, including:

- The surveillance methodology used to identify SSIs by each organization participating in phase two was not directly verified
- The process each organization used to determine the percentage of decrease in their SSI rate was not directly verified. The information provided by hospitals participating in the SSI Change project was accepted on a "good faith" concept as is used in The Joint Commission's accreditation process

3d. Current Joint Commission Projects on SSIs

As SSIs are a national issue, The Joint Commission Enterprise has the following SSI projects in process:

1. In August 2010, the Center for Transforming Healthcare launched its fourth project which aims to reduce surgical site infections (SSIs) in patients having colorectal surgery and colorectal procedures. This project was launched by the Center in partnership with the American College of Surgeons, in collaboration with the following seven leading hospitals and health systems: Cedars-Sinai Medical Center, Cleveland Clinic, Mayo Clinic, North Shore-Long Island Jewish Health System, Northwestern Memorial Hospital, OSF Saint Francis Medical Center, and Stanford Hospital. Recognizing the complexity of SSI prevention, participating hospitals used Lean Six Sigma and change management methods to understand why infections were occurring at their facilities and how to prevent them. After two-and-a-half years, there was an overall reduction in superficial incisional SSIs by 45 percent and all types of colorectal SSIs by 32 percent. Participants attained cost savings of more than \$3.7 million for the 135 estimated colorectal SSIs avoided during the project period. Applying the reduction in SSIs to the annual case load of colorectal surgeries at participating hospitals suggests that they will experience 384 fewer SSI cases and save \$10.6 million per year as the result of this work. The average length of stay for hospital patients with any type of colorectal SSI decreased from an average of 15 days to 13 days. Solutions and findings from the project were published in November 2012. For more information see: <http://www.centerfortransforminghealthcare.org/projects/detail.aspx?Project=4>
2. The STOP SSIs (Study to Optimally Prevent Surgical Site Infections) project is funded under an AHRQ ACTION I contract and is a collaboration between a team of researchers from the The Joint Commission, the University of Iowa, and The University of Maryland. The goal of this project is to determine whether screening, decolonization, and selective use of vancomycin can substantially reduce *S. aureus* SSI rates. This project is currently in process (2013).

Results: Phase One of The Joint Commission's SSI Change Project

4a. Barriers and Effective Practices

During phase one of the Joint Commission's SSI Change Project, participating hospitals completing the Environmental Assessment Survey (EAS) were asked to identify barriers encountered during implementation of The Joint Commission's NPSG.07.05.01. Of the 96 hospitals whose phase one data was analyzed, 76 percent (n=73) indicated that they experienced barriers to implementing the SSIs NPSG. Some of the barriers included:

- **Physician resistance: 56 percent (n=41)**
- **Staff issues (including resistance): 12 percent (n=9)**
- **Patient/family education: 10 percent (n=7)**

For the hospitals that reported physician resistance as a barrier, it was also reported that high level leadership intervention was necessary to assist with overcoming this barrier. Additional information about this barrier was found in phase two. Staff issues included resistance to change, but a lack of education was also identified related to the evidence-based practices (EBP) to prevent and reduce SSIs as described in NPSG.07.05.01. The phase one data did not clearly identify what the issues were surrounding patient education and SSIs.

4b. Initial Identification of Effective Practices to Implement NPSG.07.05.01

During analysis of the phase one data of the Joint Commission's SSI Change Project, 24 effective practices were identified to implement NPSG.07.05.01.

These effective practices clustered into three major categories, including:

- **Effective leadership practices**
- **Effective practitioner-focused practices**
- **Effective process improvement practices**

One of the key learning points from the phase one data is that to improve adherence to NPSG.07.05.01, all of the elements of performance (EPs) needed to be addressed by a surgical service simultaneously using a focused approach. The requirements of NPSG.07.05.01, the EPs, could not be implemented independently, nor could the improvement activities be implemented by different surgical teams in one project. It was determined that to effectively implement NPSG.07.05.01, all of the EPs needed to be implemented jointly for a surgical procedure or a department of surgical procedures, such as cardiology or orthopedics. These initial learning points became clarified during phase two of The Joint Commission's SSI Change Project.

The effective practices identified from the phase one data analysis of the Joint Commission's SSI Change Project are identified below according to each of the three cluster categories:

Effective Leadership Practices for Implementing NPSG.07.05.01 on Surgical Site Infections	
1	Resources are dedicated to decrease SSI rates
2	Support of SSI reduction by top level leadership
3	Financial incentives for practitioners to reduce SSIs
Effective Practitioner-Focused Practices for Implementing NPSG.07.05.01 on Surgical Site Infections	
4	Practitioners accept and/or take accountability/responsibility
5	Highly engaged physicians are champions to reduce SSIs in their service
6	Anesthesia practitioners provide the prophylactic antibiotics
Effective Process Improvement Practices for Implementing NPSG.07.05.01 on Surgical Site Infections	
7	Preoperative/postoperative order sets are developed/revised to match NPSG.07.05.01 and other evidence-based practices (EBP) used in the hospital
8	Decreasing OR traffic
9	Direct observation of EBP in the OR by infection prevention and control (IC) staff (M.D. or R.N.)
10	Using chlorhexadine, for preoperative baths
11	Daily SSI vigilance
12	One-to-one education of physicians
13	Post discharge surveillance of SSIs with report-back to hospital committees
14	Aligned and coordinated education for staff and licensed independent practitioners (LIP)
15	Participation in an SSI-focused collaborative (e.g., SCIP, IHI etc)
16	Focus on implementing EBP in the hospital
17	Acting on identified SSI issues
18	Support of migration of SSI EBP from one surgical service to another
19	Use of specific SSI tools for patient education
20	Use of performance improvement tools
21	Use of multidisciplinary teams
22	Use of benchmarking/comparison of SSI rates
23	Use of information technologies
24	Focus on improving organizational integration

5

Results: Phase Two of The Joint Commission's SSI Change Project**5a. Defining the Effective Practices to Implement NPSG.07.05.01**

The results of phase two of The Joint Commission's SSI Change Project resulted in:

- Confirmation of the three conceptual categories of effective practices to implement NPSG.07.05.01: Leadership effective practices, practitioner-focused effective practices, and process improvement effective practices
- Confirmation of 23 of the 24 identified effective practices to implement NPSG.07.05.01
- Final definitions of the 23 effective practices with supporting statements from the phase two hospitals

The following section will define each of the 23 effective practices by the identified organizational concepts.

5b. Phase Two Specific Results: Confirmed Leadership Effective Practices

The three effective leadership practices to implement NPSG.07.05.01, as identified in phase one, were confirmed in phase two of the SSI Change Project, including:

1. Support of SSI reduction by top level leadership
2. Dedicated resources to decrease SSI rates
3. Financial incentives provided to practitioners to reduce SSIs

Fourteen of the hospitals participating in phase two of this project confirmed leaderships' impact on reducing SSIs and implementing NPSG.07.05.01.

Although many of the phase two hospitals related that they were working on reducing SSIs prior to the publication of NPSG.07.05.01, such as the Surgical Care Improvement Project (SCIP), several hospitals identified that this NPSG provided further motivation for hospital leadership to focus on and provide resources for reducing SSIs. The three effective leadership practices are focused on the hospital's leadership supporting SSI prevention through providing additional resources and initiating financial incentives to decrease SSIs.

However, many of the phase two hospitals were able to reduce SSI rates without any additional resources; this points to the need for each organization to assess the need for additional resources based on their unique circumstances, including their current SSI rates.

Each of the three effective leadership practices is defined on the next page including the number of phase two hospitals that *confirmed* the effective practices to implement NPSG.07.05.01. Supporting statements from the phase two hospitals are provided. These statements were obtained from the environmental assessment data or the structured interview and are used with the permission of each organization.

#	Effective Practice	Definition of Effective Practice for Implementing NPSG.07.05.01 on Surgical Site Infections and Supporting Statements from Phase Two Hospitals	Number of Phase Two Hospitals that Used the Effective Practice
Effective Leadership Practices			
1	Support of SSI reduction by top level leadership	<p>Leadership support at the highest levels of the hospital was consistently cited as a factor contributing to SSI rate decreases. Leadership can include the hospital's board, president, chief operating officer, chief medical officer, and chief nursing officer.</p> <ul style="list-style-type: none"> • “Leadership, including the board of managers, has been extremely supportive both financially and in regards to implementing evidence-based policies and procedures. Leadership has tied our yearly bonus to our HAI rates which makes all health care workers responsible for preventing HAIs.” – University Medical Center, Lubbock, Texas • “Leadership empowered all shareholders to achieve “zero” hospital-acquired infections as the number one organizational goal.” – St. Tammany Parish Hospital, Covington, La. • “Senior leadership support is the most effective method for implementing NPSG.07.05.01.” – Hillcrest Hospital, Mayfield Heights, Ohio • “Leadership supports all infection prevention activities and assists with both implementation and resources.” – St. Christopher’s Hospital for Children, Philadelphia, Pa. • “The role of leadership in our organizational effort has been essential – and highly effective. The prevention of SSI is a top institutional priority – this is voiced clearly by leadership in multiple venues.” – NYU Langone Medical Center, New York, NY. • “Our Board of Directors and Senior Team have made infection prevention and patient safety an organizational priority. Access to the top is easy and resolution is quick when needed.” – Vail Valley Medical Center, Vail, Colo. 	14
2	Resources are dedicated to decrease SSI rates	<p>As part of the hospital's SSI improvement activities, the hospital acknowledged that it dedicated specific resources for SSI prevention. Resources identified include: increased staff, increase in SSI surveillance, improvement in information technology, and additional funding for chlorhexidine preoperative baths.</p> <ul style="list-style-type: none"> • “Two full time employees (FTEs) were provided for SCIP and also a new RN infection control practitioner.” – United Regional, Wichita Falls, Texas • “It wasn't until leadership allocated resources to improvement through a SCIP steering committee that we were able to begin making improvements. ... Our president and senior leadership team approved free distribution of preoperative chlorhexidine for our high risk populations. ... Senior leadership dedicated resources and helped to remove barriers.” – Mercy Hospital - Part of Allina Health, Coon Rapids, Minn. • “Leadership, including the board of managers, has been extremely supportive, both financially and in regards to implementing evidence-based policies and procedures.” – University Medical Center, Lubbock, Texas • “A dedicated nursing unit for special surgical populations was implemented to provide nursing expertise and consistency of care.” – St. Christopher’s Hospital for Children, Philadelphia, Pa. 	6
3	Financial incentives for practitioners to reduce SSIs	<p>Several hospitals indicated that financial incentives were used to promote adherence to the evidence-based practices (EBP) of the SCIP measures, to NPSG.07.05.01, and to decrease SSIs. Anesthesia, surgeons, and nurses were identified as the recipients of financial incentives. Financial incentives were written into physician contracts or bonuses were provided for achievement of SSI target rates.</p> <ul style="list-style-type: none"> • “Leadership has tied our yearly bonus to our HAI rates, which makes all health care workers responsible for preventing HAIs. Health care workers, including physicians, are held accountable if observed not performing hand hygiene.” – University Medical Center, Lubbock, Texas • “Anesthesiology has a contract and needs to meet certain quality measures to get the full 100 percent reimbursement – core measures and the NPSGs are included.” – Mercy Hospital - Part of Allina Health, Coon Rapids, Minn. 	5

5c. Phase Two Specific Results: Confirmed Effective Practitioner-Focused Practices

Three effective practices to implement NPSG.07.05.01 were specifically focused on the role of practitioners and were confirmed in phase two of the SSI Change Project, including:

4. Practitioners accept and/or take accountability/responsibility
5. Highly-engaged physicians are champions to reduce SSIs in their service(s)
6. Anesthesia practitioners provide prophylactic antibiotics

Based on information provided in the LCCs, each of these three effective practices are inexorably linked. Preventing and reducing SSI rates is a multidisciplinary endeavor and previous roles and responsibilities may change as a result of the implementation of the SCIP measures or the evidence-based practices of NPSG.07.05.01. Non-physician practitioners can accept new responsibilities (effective practice 4) but there must be highly-engaged physicians as part of this process (effective practice 5). Several of the phase two hospitals indicated they met resistance from physicians regarding the implementation of the SCIP measures and NPSG.07.05.01, and that it was instrumental to have physician champions focused on reducing SSIs to work through medical staff resistance. Each of the three effective practitioner practices is defined on the next page, including the number of phase two hospitals that confirmed that they used the effective practice to implement the NPSG.07.05.01.

#	Effective Practice	Definition of Effective Practice for Implementing NPSG.07.05.01 on Surgical Site Infections and Supporting Statements from Phase Two Hospitals	Number of Phase Two Hospitals that Used the Effective Practice
Effective Practitioner-Focused Practices			
4	Practitioners accept and/or take accountability/responsibility	<p>Licensed independent practitioners (LIP) or staff became formally accountable for SSI prevention activities or became accountable for a process or evidence-based practice (EBP) related to NPSG.07.05.0.1. Accepting responsibility or accountability could be voluntary or mandated.</p> <ul style="list-style-type: none"> • “The surgery department took ownership of the SCIP measures from their inception. Over time, there has been a cultural shift with a greater facility-wide awareness and participation.” – Our Lady of Lourdes Regional Medical Center, Lafayette, La. • “Build accountability into the nursing annual evaluation process and the physician re-credentialing process.” – Baptist Hospital of Miami, Miami, Fla. 	8
5	Highly engaged physicians are champions to reduce SSIs in their service(s)	<p>Medical staff are highly engaged in SSI prevention activities and champion SSI prevention throughout the hospital. Examples include a physician champion who provides education on strategies to reduce SSIs to other physicians and staff, and a physician involved in leading or being highly involved in the SSI multidisciplinary team. In summary, the physician champion provides leadership to medical and other staff on SSI prevention and implementation of NPSG.07.05.01 and other evidence-based practices (EBP).</p> <ul style="list-style-type: none"> • “SSI reduction requires a team effort, and a close involvement and leadership by physician champions is critical for success. Physician champions are a critical part of our Hospital Infections Reduction Task Force – without them, I question whether we would be as successful as possible.” – NYU Langone Medical Center, New York, N.Y. • “The chief of anesthesia, chief of surgery, and the director of the operating room all championed the changes to reduce SSI.” – Lucile Packard Children’s Hospital at Stanford, Palo Alto, Calif. • “Having both physician and nursing collaboration and input in establishing patient care policies is vital for successful implementation of new practices.” – Mobile Infirmary Medical Center, Mobile, Ala. 	14
6	Anesthesia practitioners provide prophylactic antibiotics	<p>Anesthesia practitioners became responsible for providing the prophylactic antibiotic within one hour prior to the surgical incision. Although staff nurses historically administered the prophylactic antibiotic, the evidence clearly indicates the antibiotic must be administered within the one hour prior to the surgical incision, which in most hospitals could not be done on time by the staff nurses. Anesthesiology has been identified as the discipline to administer the prophylactic antibiotic based on the work flow prior to the surgical incision.</p> <ul style="list-style-type: none"> • “Anesthesiologists are responsible for administering the prescribed antibiotic within the recommended time frame prior to surgery start. A final check that the antibiotic has been given is done as part of the final procedure time out.” – Mobile Infirmary Medical Center, Mobile, Ala. • “Anesthesia administering antibiotics is an effective method.” – St. Tammany Parish Hospital, Covington, La. 	8

5d. Phase Two Specific Results: Confirmed Effective Process

Improvement Practices

Seventeen effective practices to implement NPSG.07.05.01 were focused on the improvement of organizational processes and were confirmed in phase two of the SSI Change Project. Each of the process improvement effective practices is defined. However, some initial analysis of these process improvement effective practices is needed.

Effective practices seven through 10 are effective process improvement practices used in most performance improvement projects. They are described in the quality literature and are not unique to SSI prevention projects. These techniques include the use of multidisciplinary teams (effective practice 7), use of performance improvement tools (effective practice 8), benchmarking (effective practice 9) and use of information technologies (effective practice 10).

Effective practices 11 through 13 are effective process improvement practices that include significant cooperation between several departments and disciplines in a hospital and are focused on SSI prevention. However, these effective practices could also be used for other projects, such as the reduction of catheter-associated urinary tract infections. The effective practices include aligned education for multidisciplinary practitioners (effective practice 11), participation in a multi-hospital collaborative (effective practice 12), and development of pre-printed orders (effective practice 13). The majority of the phase two hospitals used these effective practices.

The final process improvement effective practices (14 through 23) are predominately focused on **clinical interventions used to implement NPSG.07.05.01 and other evidence-based practices (EBP) to prevent SSIs.** Some of these effective practices are not yet well described in the literature and need further study, such as direct observation of EBP in the operating room (OR) by infection prevention staff (effective practice 15), daily SSI vigilance (effective practice 17), and support of migration of EBP from one service to another (effective practice 22).

Each of the 17 effective process improvement effective practices is defined on the following pages, including the number of phase two hospitals that confirmed that they used the effective practice to implement NPSG.07.05.01.

#	Effective Practice	Definition of Effective Practice for Implementing NPSG.07.05.01 on Surgical Site Infections and Supporting Statements from Phase Two Hospitals	Number of Phase Two Hospitals that Used the Effective Practice
Effective Process Improvement Practices			
10	Use of information technologies (IT)	<p>As part of the hospital's SSI improvement activities, IT is used innovatively. IT can be used for electronic surveillance, automatic stops for prophylactic antibiotic orders, education online for patients and/or staff/licensed independent practitioners (LIPs), etc. May also include televised education for patients and families.</p> <ul style="list-style-type: none"> • “Our institution has implemented a CPOE system which enables infection control staff to download information for surgical procedures. The office of Hospital Epidemiology and Infection Control also has access to an electronic database for microbiology culture results. Infection control staff review medical records for these suspected SSI patients, apply the CDC National Healthcare Safety Network (NHSN) definition and confirm the presence of SSIs.” – Children’s National Medical Center, Washington, D.C. • “The organization purchased a data mining system. The system helps to track infections and trends in real time. Electronic documentation has assisted us in finding those patients with devices, such as indwelling catheters, central lines, and ventilators. Automated reports are sent to the IC department daily regarding central line insertion, and intubations.” – University Medical Center, Lubbock, Texas • “The CDC NHSN definition is used for all infections. Surgical procedures without implants are monitored for 30 days and those with implants for one year. At Sinai, the use of an electronic surveillance tool allows for tagging of surgical patients with real time alerts through the e-mail system. Alerts are also used for all wound cultures (growth and no growth), collaboration with risk management/performance improvement, reviews of daily admissions, reviews of daily operating room schedules, reporting by the wound care nurses, licensed independent practitioners, mid-levels and surgeon self-reporting has allowed for success with identifying infections.” – Sinai Hospital of Baltimore, Baltimore, Md. • “Staff are educated annually through computerized reorientation. A NPSG module must be completed by clinical staff. SSI prevention is included in this module. Completion of reorientation is a requirement; this was the best way to ensure compliance.” – Sonora Regional Medical Center, Sonora Calif. 	14

#	Effective Practice	Definition of Effective Practice for Implementing NPSG.07.05.01 on Surgical Site Infections and Supporting Statements from Phase Two Hospitals	Number of Phase Two Hospitals that Used the Effective Practice
Effective Process Improvement Practices			
11	Aligned and coordinated SSI education of staff and licensed independent practitioners	<p>Education for licensed independent practitioners (physicians and mid-level practitioners) and other practitioner staff (RNs) is aligned and coordinated. The focus of SSI education is multidisciplinary. Physicians are not exempt from SSI education. Licensed independent practitioners and staff may not receive the education at the same time or in the same manner, but there is coordination of the content, which focuses on the continuum of the patient’s care and evidence-based practices (EBP) to prevent SSI.</p> <ul style="list-style-type: none"> • “Educating patients, families, hospital staff, and physicians has increased awareness of the best practices for surgical site infection prevention and created a shared sense of responsibility.” – Mobile Infirmary Medical Center, Mobile Ala. • “Clinical employees are introduced to NPSG 7 in general orientation as part of the Quality Pillar. An overview of the Surgical Care Improvement Project is presented with emphasis on prevention of surgical site infections. A hospital-wide “Education Extravaganza” was held for two weeks in March. Staff was given a one-on-one verbal review of best practice and preventing surgical site infection with an interactive Q&A. Posters were used as a visual reference. Departmental section meetings are used as an education portal facilitated by the Chief Medical Officer. The CMO authors a Physician Update that is mailed to all medical staff bi-monthly. Physician and employee pocket guides were distributed and information about SSIs was included in the booklet. The Quality and Safety Management staff has provided strong support in disseminating the information.” – United Regional, Wichita Falls, Texas • “Education is provided at the initial hire of the employee and at the initial time of hire for the physician. Education on infection prevention is provided at house-wide orientation, nursing orientation, physician credentialing, nurse aide orientation, Patient Safety Fridays, as a mandatory annual competency, the IC/Skin Care Fair, Education Council, Nurse Directors Council, Performance Improvement Committee, Infection Prevention and Control Reps committee meeting, the Patient Safety Committee, and on a one-on-one basis as needed. As an organization, we have worked hard through our SSI Performance Improvement committee to ensure our patients are kept safe.” – University Medical Center, Lubbock, Texas • “Hospital staff were required to complete a health stream (computer-based training) module, information is covered in new hire orientation, and repeatedly reviewed in staff meetings as needed. Licensed independent practitioners were sent a self-directed module and they had to return a portion to demonstrate completion. Also discussed in Medical Staff meetings.” – Saint Mary’s Regional Medical Center, Russellville, Ark. 	14

#	Effective Practice	Definition of Effective Practice for Implementing NPSG.07.05.01 on Surgical Site Infections and Supporting Statements from Phase Two Hospitals	Number of Phase Two Hospitals that Used the Effective Practice
Effective Process Improvement Practices			
12	Participation in an SSI-focused collaborative (e.g., SCIP, IHI)	<p>The majority of hospitals in the SSI Change Project participated in SCIP. Examples of other SSI collaboratives include the American College of Surgeons' (ACS) National Surgical Quality Improvement Program (NSQIP), and the Child Health Corporation of America's Collaborative to Reduce SSI in Pediatric Hospitals.</p> <ul style="list-style-type: none"> • "Participation in Partnership for Patient Care 2006, a collaborative of the Delaware Valley Healthcare Council; its main purpose was to provide a teaching, learning, and hands on experience for a failure mode and effects analysis (FMEA) related to Surgical Site Infection (SSI) Control. We also participated in the Kids Campaign 2007 coordinated by the Pediatric "Affinity" Node of the 5 Million Lives Campaign; its purpose was to improve the quality of care delivered to pediatric patients who undergo surgery through the application of evidence-based surgical infection prevention processes before, during, and after the surgical procedure. With the learning experience from the collaboratives, the infection control team gained the knowledge and evidence to develop, organize, and lead a pertinent multidisciplinary team for the purpose of improving surgical site infections." – Saint Christopher's Hospital for Children, Philadelphia Pa. • "In 2006, the leadership of Baptist Hospital of Miami made a strategic decision to voluntarily join the American College of Surgeons' National Surgical Quality Improvement Program (NSQIP), an innovative program focused on general and vascular services and committed to improving surgical patients' outcomes (such as reducing surgical site infections)." – Baptist Hospital of Miami, Fla. 	14
13	Preoperative/post-operative order sets are developed/ revised to match SSI evidence-based practices (EBP) (such as NPSG.07.05.01 and the SCIP measures)	<p>The SSI multidisciplinary team takes responsibility for developing specific order sets for a surgical procedure(s), the requirements of NPSG.07.05.01 and other evidence-based practices (EBP). These order sets are approved by the medical staff and updated when the EBP changes. The development of order sets is a labor intensive process necessitating skills and expertise of several disciplines including medicine, nursing, and pharmacy. All relevant disciplines are educated in the use of the order sets. The order sets may also be used for education of new nurses and residents.</p> <ul style="list-style-type: none"> • "A method used to implement policies and procedures aimed at reducing SSI included developing order sets with best practices put into Form Fast (Electronic order sets)." – St. Tammany Parish Hospital, Covington La. • "Improved compliance with each of the best practices was accomplished by the following: Revising of perioperative order sets, operative forms, department policies, and hospital-wide policies to reflect each best practice." – Baptist Hospital of Miami, Miami, Fla. • "Our organization used standardized order sets for all orthopedic and cardiovascular procedures with an antibiotic selection and duration included. This method provided ease of use and efficiency for physicians and staff." – Our Lady of Lourdes Regional Medical Center, Lafayette, La. 	12

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Effective Process Improvement Practices			
14	Decreasing operating room (OR) traffic	<p>As part of the hospital's SSI improvement activities the hospital made specific changes to procedures and practices concerning personnel entering the surgical suite during an operative procedure. The goal was to reduce traffic of non-essential personnel in the OR during surgical/invasive procedures. Decreasing OR traffic has been described by the Association of periOperative Registered Nurses.</p> <ul style="list-style-type: none"> • "Limit the number of people in the OR suite. We are very focused on this; it's an AORN standard. We have been doing this for years." – Sonora Regional Medical Center, Sonora, Calif. • "We are looking at the number of times the OR door is open and why. This is a work in progress; we are analyzing the data." – NYU Langone Medical Center, New York, N.Y. • "It was noted that the staff in the preop areas, holding room, OR, and PACU were not following isolation precautions and did not have an easy means for holding appropriate barrier precautions supplies. Caddies with isolation supplies were added, and intravenous poles were rolled into the patient's cubicle or outside of the operating room, to provide supplies as needed. The infection preventionist reviews the operating room schedule daily and informs the operating room staff of patients with a previous history so they can be isolated." – St. Tammany Parish Hospital, Covington, La. 	4
15	Direct observation of evidence-based practices (EBP) in the OR by IC staff (M.D. or R.N.)	<p>As part of the hospital's SSI improvement activities, an infection preventionist (M.D. or R.N.) observes surgery to assure that evidence-based practices (EBP) (such as NPSG 07.05.01) are implemented in the OR. This activity is used to educate and reinforce EBP with the OR practitioners and to reduce or eliminate SSIs.</p> <ul style="list-style-type: none"> • "... direct observation of the surgical procedure with immediate feedback (if needed) and/or summation of findings for the observations. I believe that the direct observation by infection control staff during the procedure validates that what they say is being done, is being done!" – Hillcrest Hospital, Mayfield Heights, Ohio • "Observational audits are a validity check to make sure that what should be done is done. Our OR practitioners are used to this." – Lucile Packard Children's Hospital, Palo Alto, Calif. 	5
16	Using chlorhexadine for preoperative baths	<p>Several hospitals reported implementation of chlorhexadine preoperative baths for the patients (i.e., the night before and/or day of surgery). Patient and/or family members required preoperative education of how and when to use the chlorhexadine product prior to surgery.</p> <ul style="list-style-type: none"> • "The following best practices were provided and implemented: Preop showers with chlorhexidine gluconate (CHG) the night before and morning of surgery." – St. Tammany Parish Hospital, Covington, La. • "Implemented the use of 2 percent chlorhexidine (CHG) preoperative skin preparation bath the night before and the morning of surgery. This included development of multilingual instructions for health care personnel and patients/ parents." – St. Christopher's Hospital for Children, Philadelphia, Pa. • "Education was provided to surgeons on research-based best practice use of a chlorahexidine-prep as the most effective prep; we're targeting surgeons who are still using iodine..." – Baptist Hospital of Miami, Miami, Fla. • "Chlorahexidine preps are encouraged with a 95 percent compliance rate. The non-rinsable 2 percent chlorahexidine prep cloths are used for all pre-op CABGs, total joint replacements and spine cases. The 2 percent cloth is also used for all patients in the units every day following their daily bath." – United Regional, Wichita Falls, Texas • "Cardiovascular surgery SSI rates decreased by 54 percent with the implementation of three interventions: chlorahexidine preop baths, improved antibiotic prophylaxis administration dosing, and standardized wound care." – Children's National Medical Center, Washington, D.C. 	12

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Effective Process Improvement Practices			
17	Daily SSI vigilance	<p>As part of the hospital's intention to reduce SSI rates there is an increase in the frequency of surveillance, monitoring, and feedback related to SSI. The frequency of these activities was usually described as daily rather than weekly or monthly. Daily vigilance may include rounds of the hospital's surgical patients daily to observe for any indication of infection, daily review of culture reports, and wound nurses reporting any wound issues daily to the IP and surgeon/resident.</p> <ul style="list-style-type: none"> • "Our nurse epidemiologist utilizes daily reports on antimicrobial use, discharge code data, walking rounds, and monthly surveillance lists to surgeons to capture infections incurred at our hospital." – Vail Valley Medical Center, Vail, Colo. • "Effective methods used at our hospital include: <ul style="list-style-type: none"> o Infection prevention daily rounding with the infection preventionist o Daily review of all patients readmitted to the hospital o Daily rounding on all nursing units..." – St. Tammany Parish Hospital, Covington, La. • "Daily vigilance is about real-time feedback. Nurses observe as part of surveillance and know quickly if there is an SSI in the hospital and community. There is streamlined communication. This is not just about reports but watching and assessing on a daily basis. Patients and family are also educated. Using multiple interventions daily is only one method. Every six hours after surgery there is assessment. So SSI vigilance is more than daily." – Children's National Medical Center, Washington, D.C. • "Electronic surveillance can make a big impact to lower SSI. Daily reports can be reviewed." – University Medical Center, Lubbock, Texas • "We also continue daily concurrent review of our hip and knee surgeries for compliance." – Methodist Willowbrook Hospital, Houston, Texas 	11
18	One-to-one education of physicians when an SSI issue is identified	<p>Education is provided one-to-one to surgeons whose SSI rates require improvement. This education may be conducted by another surgeon, infection preventionist, etc. The focus is that the education is non-confrontational with the intent to help the surgeon improve SSI rates. Patient safety is emphasized. Lack of adherence to the evidence-based practices (EBP), such as NPSG.07.05.01 and the SCIP measures, is discussed and an action plan developed.</p> <ul style="list-style-type: none"> • "Education is an effective method to implement the SSI NPSG .07.05.01. It includes one-to-one follow-up with individual staff members and physicians. ...If there is a trend, our medical director will do one-to-one education with the physician and provides the evidence." – St. Tammany Parish Hospital, Covington, La. • "...We have surgeon champions who discuss peer-to-peer, presented literature summary, and expert opinions." – Mercy Hospital - Part of Allina Health, Coon Rapids, Minn. • "We met with the physicians one-on-one, helped tweak their order sets, and involved them in the planning process. Once we turned the tide on physician compliance, many of the other issues went away." – Methodist Willowbrook Hospital, Houston, Texas 	11

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Effective Process Improvement Practices			
19	Post discharge surveillance of SSIs are reported to a hospital committee	<p>After discharge, SSI rates are monitored and reported back to a hospital committee, such as surgical or IC. Post discharge surveillance can be conducted electronically, verbally, or by mail. Hospitals have specific processes to ensure the process works effectively. The return rate of information received back from the surgeons is calculated and reviewed at medical and infection prevention meetings.</p> <ul style="list-style-type: none"> • “Post discharge surveillance letters are sent to surgeons 30 days after surgeries. We monitor readmissions, ICD-9 reports, lab results, and op reports. We have no data mining system; therefore, we needed to build in redundancies for finding SSIs.” – Mercy Hospital - Part of Allina Health, Coon Rapids, Minn. • “Infection rates are monitored using the National Healthcare Safety Network (NHSN) definitions and criteria. SSI surveillance consists of a combination of the following: <ul style="list-style-type: none"> o Review of microbiology reports and patient medical records o Surgeon and/or patient surveys o Screening for readmission of surgical patients o Other information, daily patient bed board updates, operative reports, radiological information and rounding to the patient units. – St. Christopher’s Hospital for Children, Philadelphia, Pa. • “First 30 days following procedures that does not involve inserting implantable devices: ACS NSQIP is a data-driven, risk-adjusted, outcomes-based surgical quality improvement program with a systematic sampling process of all surgical services. This program collects outcomes data including 30 day follow-up through patient phone calls, review of medical records, and post-op follow-up information from the individual surgeons’ offices. The NSQIP data base provides real-time SSI data benchmarked against the 492 hospitals in its database and risk-adjusted rates every six months.” – Baptist Hospital of Miami, Miami, Fla. • “The organization is currently using a data mining system. It is a data mining system that interfaces with our admitting department and laboratory. The IC department is able to run multiple reports as well as find trends as they are occurring. HAI reports and rates can be run by the unit. These reports are shared with department directors and other leaders within the organization. At the time of discharge, patients receive an educational handout with the phone number for the IC nurses. Instructions are given to the patient at the time of discharge to call the IC nurses with any symptoms of infection. The IC nurses are available by phone 24/7. Symptoms are listed on the instruction sheet.” – University Medical Center, Lubbock, Texas 	5
20	Focus on implementing evidence-based practices (EBP) in the hospital	<p>The hospital’s clinical leaders have adopted and focused on the implementation of evidence-based practices (EBP) throughout the organization including those such as in NPSG 07.05.01. All relevant departments and disciplines are included in this focus.</p> <ul style="list-style-type: none"> • “We have followed the measures from IHI’s 100,000 Lives campaign as it has developed into the Surgical Care Improvement Project (SCIP). Since these are evidence-based measures, we feel that these measures will provide optimum care for our surgical patients. Monthly, we look at compliance with the SCIP measures and give feedback to the caregivers (physician or nurse manager) about the fallouts. We look at processes that will help us comply with the measures. Overall, our SSI rates are low - a root cause analysis is done when there is an increase in the rates.” – Sonora Regional Medical Center, Sonora, Calif. • “The infection prevention specialists reviewed the current literature for best practices and recommendations and compared these with the current hospital practices. They discussed potential causes of the surgical site infections and suggestions for infection prevention with the cardiovascular surgeons and nurses in the surgical intensive care unit and medical surgical unit. The changes in practices were then put into place.” – Mobile Infirmary Medical Center, Mobile, Ala. 	15

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Effective Process Improvement Practices			
21	Acting on identified SSI issues	<p>When SSI issues are identified, the hospital takes action to resolve the identified issue. Several hospitals indicated that root causes analyses (RCA) are conducted with a multidisciplinary team to identify the reasons for the SSI and any break in the evidence-based practices (EBP).</p> <ul style="list-style-type: none"> • “Even with those efforts, the trend continued in 2009. In November, it was recommended by infection prevention that all C-section patients be wiped down with chlorhexidine gluconate cloths immediately prior to the surgery. Data demonstrated no infections for six (6) months following implementation. – St. Tammany Parish Hospital, Covington, La. • “We continued to audit and drill down to find causes of noncompliance, to follow-up and to re-educate as needed.” – Baptist Hospital of Miami, Miami, Fla. • “A Critical event analysis (CEA) is performed on every SSI. A RCA is performed on all escalated cases from the CEA process.” – Mercy Hospital - Part of Allina Health, Coon Rapids, Minn. • “Overall, our SSI rates are low - a RCA is done when there is an increase in rates.” – Sonora Regional Medical Center, Sonora, Calif. • “One hundred percent of SSIs are reviewed. We try to break down and find the real issue. We need to distinguish between process and other errors that resulted in the SSI, like antibiotics not given in time.” – Saint Mary’s Regional Medical Center, Russellville, Ark. 	7
22	Support of migration of SSI evidence-based practices (EBP) from one medical service to another	<p>Once one medical service has successfully implemented the evidence-based practices (EBP) of NPSG 07.05.01 and the SCIP measures and reduced their SSI rates, other surgical services became interested in adopting SSI prevention EBPs. Support of this knowledge migration from one surgical service to another is supported and advocated by the hospital’s clinical and administrative leadership.</p> <ul style="list-style-type: none"> • “IC noted that most SSIs centered around our ortho cases, so prior to all ortho surgical procedures, we started a chlorhexidine gluconate (CHG), two-step bath prior to all ortho surgical procedures (night prior to surgery, a shower/bath, 2 minute/2 percent CHG scrub, then repeated 2 minute/2 percent CHG scrub during preop period). We saw a 66 percent reduction in ortho SSIs. Based on these results, we expanded the program to most surgical cases.” – Saint Mary’s Regional Medical Center, Russellville, Ark. • “Physicians became aware of the improved outcomes and supported the initiative. The orthopedic surgeons started utilizing what we learned from the cardio-vascular (CV) service.” – United Regional, Wichita Falls, Texas 	6
23	Use of specific SSI-focused processes for patient education	<p>Hospitals place significant focus on patient education to decrease SSI, including presurgical classes, television education, and one-to-one education with the patient and family. Several hospitals provide instructions in more than one language, based on the population served. SSI prevention education crosses the continuum of care and usually starts in the ambulatory setting.</p> <ul style="list-style-type: none"> • “Families are involved in writing our educational materials. Letters from the Family Advisory Council, along with the preop bathing kit, are provided to families. There is a family bulletin board, and online family/patient education sheets that are used to standardize patient teaching at the bedside.” – Lucile Packard Children’s Hospital, Palo Alto, Calif. 	6

#	Effective Practice	Definition of Effective Practice for Implementing NPSG.07.05.01 on Surgical Site Infections and Supporting Statements from Phase Two Hospitals	Number of Phase Two Hospitals that Used the Effective Practice
Effective Process Improvement Practices			
23	Use of specific SSI-focused processes for patient education	<ul style="list-style-type: none"> • “Patient education is a top priority for the organization. Patients and/or their families are educated on SSI prevention, central line infection prevention, urinary catheter-associated infection prevention, etc., before the device or procedure is performed. Patients receive written educational information as well as one-on-one education with the patient’s health care provider. The health care provider documents the education on an "Infection Prevention and Control Educational Record" that is kept in the patient’s chart. The Infection Prevention and Control department conducts surveillance in order to ensure the education and record are being completed as required. – University Medical Center, Lubbock, Texas • “Patients who will be having an orthopedic (total hip and knee replacement) surgical procedure attend a multidisciplinary (MDA) day where they are educated on all aspects of surgery, including the patient’s role in the prevention of infection, and preop assessment and screening appointments. The patient is also given an educational brochure that discusses hand hygiene, smoking cessation, and other topics. Staff also can access online patient education material that can be provided at the time of service. The convenience of having these education materials for patients, and the availability of personnel at MDA day and during the preop assessment to answer questions, helps to ensure patient comfort and increase their knowledge.” – Sinai Hospital of Baltimore, Baltimore, Md. • “We utilize the Society for Healthcare Epidemiology of America (SHEA) SSI Patient Guide (http://www.shea-online.org/Assets/files/patient%20guides/NNL_SSI.pdf) and have altered it slightly to meet our pediatric population needs. We also utilize a chlorhexidine information instruction sheet for families. We believe this works because the families have written information to keep and refer to.” – St. Christopher’s Hospital for Children, Philadelphia, Pa. • “Patient and family education regarding surgical site infection prevention is offered at different points in the surgical process. First, patients are instructed during their preadmission visit on the surgical preparation activities needed prior to surgery, which includes their showering with an antibacterial soap. Patients are also given a pamphlet with information on surgical site infections and prevention. The importance of infection prevention practices is reviewed individually with patients to ensure their understanding. Efforts are made to include the patient’s family members in this teaching whenever possible. Second, on the morning of surgery, surgical site infection prevention practices are again reviewed by the presurgical staff with patients and their family members. The education includes the rationale for surgical site preparation, antibiotic coverage, and surgical staff practices of wearing sterile gowns, gloves and hair coverings. Patients are given opportunities to voice any concerns regarding infections with their surgeon and preoperative nurses. Overall staff compliance with patient education prior to surgery is 92 percent. Postoperatively, patients and their family members have surgical site infection prevention practices reviewed with them by the nurse providing their care. This method of patient education is successful for many reasons. First, providing patient information in both written form and in verbal one-on-one teaching meets the needs of both visual and auditory learners. Second, the accountability of patient teaching is shared among staff involved in the various stages of the surgical stay continuum. Also, educating patients and families on different occasions gives patients and families time to assimilate the information as well as an opportunity to ask questions. In addition, hearing the same prevention strategies voiced by different hospital staff emphasizes the importance the organization has placed on surgical site infection prevention and providing quality care.” – Mobile Infirmiry Medical Center, Mobile, Ala. 	6

6a. Analysis of the SSI Change Project's Phase Two Data

The Joint Commission's SSI Change Project resulted in the identification of 23 effective practices that accredited organizations have used to successfully implement NPSG.07.05.01 and other evidence-based practices (EBP) to reduce SSIs. These effective practices were grouped into three major categories: Leadership effective practices, practitioner-focused effective practices, and process improvement effective practices. The process category includes three sub-categories: performance improvement-focused techniques; process improvement activities; and clinical interventions used to decrease SSIs. An interesting finding of the SSI Change Project was that organizations that were successful in implementing NPSG.07.05.01 and decreasing SSIs did so by addressing the **evidence-based elements of performance as a whole**, rather than focusing on each of this NPSG's elements of performance separately.

Additionally, organizations focused implementation efforts on one type of surgical procedure rather than many surgical procedures simultaneously. Migration of EBP (effective practices 22) occurred when practitioners of one surgical area became knowledgeable of successful SSI reductions in another area and subsequently adopted the EBP.

Finally, the SSI Change Project indicated that the hospitals participating in phase two of the project had for the most part been involved in SSI reduction activities prior to the publication of NPSG.07.05.01. This seems to support the concept that multiple national efforts such as SCIP, ACS NSQIP, IHI and The Joint Commission have had an impact and that national intervention should continue.

Since the phase two data was collected and analyzed for The Joint Commission's SSI Change Project, there have been additional scientific publications that have addressed SSIs and the lack of adherence to the EBP by many hospitals. This scientific literature addresses multifactorial reasons for noncompliance with SSI guidelines.

6b. Additional Literature Independently Verifies Several of the Effective Practices Described in The Joint Commission's SSI Change Project.

In their 2011 article, Meeks, et al., focus on compliance with current evidence-based guidelines to prevent surgical site infections and report that a number of hospitals have decreased infections through utilization of these guidelines (p. 76). However, the authors also identify that use of SSI focused guidelines is suboptimal in many hospitals, and indicate that careful implementation of SSI evidence-based guidelines may not be effective or applicable to other hospitals (p. 77). This article indicates that noncompliance is multifactorial. Other authors recently indicated that, despite the national focus on SSIs, EBP are not routinely implemented (Salkind et al., 2011; Skoufalos, et al., 2012; Anthony et al. 2011). The number of effective practices identified in the SSI Change Project is an indication of the complex, multifactorial nature of effective implementation of EBP and guidelines. Consequently, the basis for noncompliance of EBP becomes more clear.

Current SSI literature substantiates the effective practices identified in The Joint Commission's SSI Change Project:

- Skoufalos, et al., (2012) describe a unique multi-stakeholder approach to reducing SSIs and focus on patient education and the patient's/family's role regarding methods to prevent SSIs (p. 2).
- Skoufalos, et al., (2012) also focus on the role of leadership accountability, staff education, decreasing traffic in the operating room and skin antisepsis. Each of these concepts is described as effective practices in The Joint Commission's SSI Change Project. This article describes additional concepts related to the OR environment such as OR ventilation, instrument sterilization, and terminal OR cleaning.
- Meeks, et al., (2011) describe evidence that adhering to evidence-based guidelines improves outcomes (p. 76). In comparison, the SSI Change Project's results reveal that hospitals that focused on implementing EBP also reported a reduction in SSIs.

- Haessler, et al., (2010) describe the usage of a quality improvement project in response to an increase in SSIs. This article is a clear example of a hospital acting on identified SSI issues. Additionally, this article refers to other interventions described as effective practices for implementing NPSG.07.05.01, such as observation of OR teams, use of quality improvement processes, education of surgical staff, and limiting OR “foot traffic.” Implementation of these and other practices resulted in a marked decrease in SSIs (p. 1047). The authors indicated that “interviews with clinicians and direct observation of practices proved to be the most fruitful measures” (p. 1047).
- Alexander et al., (2011) emphasize that limiting OR traffic is essential for reducing airborne bacteria. Additionally, these authors recommend preoperative showering with chlorhexadine.

7

7a. Phase Two Results: Pediatric Hospitals

Three of the 17 hospitals that participated in phase two of the SSI Change Project were pediatric hospitals. The pediatric hospitals had some similar characteristics in regards to SSIs:

- Use of NHSN definitions and reporting SSIs
- Began focusing on SSIs prior to The Joint Commission’s NPSG.07.05.01
- Significantly decreased their SSIs

Additionally, all three hospitals identified a barrier that is exclusive to the pediatric population: **the lack of pediatric-focused evidence-based practices (EBP) for reducing/eliminating SSIs**. This barrier was emphasized in the Learning Conference Calls (LCCs) for all three hospitals and each hospital had to develop strategies to address this barrier. Both Lucile Packard Children’s Hospital at Stanford and St. Christopher’s Hospital for Children indicated that clinical staff spent significant time researching the evidence-based literature of adult patients for applicability to the pediatric population. St. Christopher’s Hospital for Children and Children’s National Medical Center both indicated that their SSI teams had to develop their own “bundle” of clinical interventions for reducing surgical site infections, since a bundle was not available in the pediatric literature. Lucile Packard Children’s Hospital at Stanford indicated that they researched the safe medication doses for prophylactic antibiotics. St. Christopher’s Hospital for Children requested that The Joint Commission help in promoting pediatric studies in this area.

Since the lack of evidence-based literature for the pediatric population was identified as a formidable barrier, Children’s National Medical Center was willing to share the process it used to determine if the adult-based literature on EBP for SSIs could be applicable to the pediatric population. Children’s National Medical Center emphasized that the adult data has to be synthesized and adapted for the pediatric population. They used the following multidisciplinary process for their SSIs reduction project:

- i. Team members conducted an in-depth review of the adult SSIs literature
- ii. The adult SSIs literature was shared with the surgeons
- iii. The pediatric surgeons conducted further literature review on SSIs in the pediatric population

- iv. All literature was synthesized and the surgeons made decisions about the applicability of an adult intervention to the pediatric population
- v. Interventions implemented via their SSI team

All of these three hospitals engaged in pediatric-focused collaboratives that focused on SSI prevention. Both St. Christopher's Hospital for Children and Lucile Packard Children's Hospital at Stanford participated in the Kids Campaign 2007 to reduce SSIs. Both hospitals expressed that participation in a collaborative was a very important activity for reducing SSIs.

St. Christopher's Hospital for Children's SSIs bundle for pediatric patients includes a specific focus on **post-operative prevention**. Since the traditional SSI (SCIP) bundle is lacking post-op prevention, the hospital developed additional bundle interventions addressing postoperative infection prevention care in the hospital and after discharge. The perioperative bundle covers:

- a post-op nursing standard of care
- designated nursing units for high-risk procedure patients (e.g., spinal fusion surgery) for the purpose of nursing expertise and consistency of care
- specific dressings and post-op protocols, a nursing teach-back, surgery-specific, educational tool for teaching patients and parents
- products needed for home care, including how to meet the needs of low socioeconomic families
- early, consistent, scheduled, post discharge follow-up with the surgeon to help with the early identification of infection, should one occur

The bundle was implemented in February 2011 for spinal fusion surgery patients. Since then, the hospital has had a 76 percent reduction in SSI rates and bundle compliance has remained at 100 percent. The perioperative and post-discharge bundle has been extended to its cardiothoracic and neurosurgery pediatric patient populations. Long term data is not yet available for these surgeries.

St. Christopher's Hospital for Children has demonstrated innovation in dealing with SSIs for the pediatric population resulting in a significant decrease in SSIs. This organization has shared their perioperative and post-discharge SSI prevention bundle with The Joint Commission for use in this implementation guide. (See Appendix A.)

7b. Effective Practices Used at the Pediatric Hospitals

The pediatric hospitals that participated in phase two of the SSIs Change Project all used the following eight effective practices to reduce SSIs and implement NPSG.07.05.01:

Leadership-focused effective practices

1. Support of SSI reduction by top level leadership

Practitioner-focused effective practices

2. Highly engaged physicians are champions to reduce SSIs in their service(s)
3. Anesthesia practitioners provide prophylactic antibiotics

Process-Improvement effective practices

4. Focus on implementing evidence-based practices (EBP) in the hospital
5. Daily SSI vigilance
6. Use of multidisciplinary team(s)
7. Use of chlorhexadine, for preoperative baths
8. Use of specific SSI-focused processes for patient education

8a. Implementing the Effective Practices for NPSG 07.05.01: Prevention of Surgical Site Infections

There are several ways an organization can use the effective practices identified for implementing NPSG .07.05.01. Whether the effective practices are discussed at the leadership level, at a surgical multidisciplinary team or quality meeting, or specific effective practices are selected for implementation by a surgical procedure, it is recommended that any organization considering a serious assessment of the effective practices conduct a gap analysis.

A gap analysis is an assessment tool that can be used by a broad sector of businesses, government, and service organizations. There are several known definitions of a gap analysis with specific application in education, information technology, and marketing. Gap analysis is also a useful tool in health care.

A useful definition of a gap analysis is: An evaluation of differences between the organization's current position and its desired future. Gap analysis results in the development of specific strategies and allocation of resources to close the gap analysis (Reference: <http://whatiskt.wikispaces.com/Gap+Analysis>).

Another definition of a gap analysis is: A "technique for determining the steps to be taken in moving from a current state to a desired future state." (Reference: <http://whatiskt.wikispaces.com/Gap+Analysis>).

Conducting a formal gap analysis with the 23 effective practices to implement NPSG.07.05.01 is a powerful tool that will provide an organization with a road map, based on an organization's priorities, for implementing all or a subset of the 23 defined effective practices.

8b. Instructions for Conducting a Gap Analysis

The Joint Commission has developed a gap analysis tool for the effective practices identified in the SSI Change Project for implementation of NPSG.07.05.01 (see Appendix B). To begin, it is important that the multidisciplinary team involved in the surgical procedure should conduct the gap analysis as a team. All members need to be familiar with the effective practices for implementing NPSG.07.05.01 and their definitions. The team should include a member of leadership who has responsibilities for resource allocation.

Meetings should be scheduled to conduct the gap analysis and a meeting facilitator should lead the meetings. The following steps can be followed to conduct the gap analysis using the tool in Attachment B:

1. In column 1, the team should review each effective practice and determine if there are any questions regarding its meaning.
2. In column 2, determine if the effective practice has been implemented in the designated surgical area. If yes, skip to the next effective practice. If no, move to column 3.
3. In column 3, the team identifies that the effective practice is not implemented, or not currently implemented **effectively**. The team may need to come to consensus if there is disagreement. When the team is in agreement that the effective practice is not implemented in their surgical area, the team should proceed to column 4.
4. In column 4, determine if the implementation of this effective practice is a priority for the surgical area. Reviewing NPSG.07.05.01 may be beneficial for the team at this time along with a review of the current SSI rate. The effective practice can be prioritized as:
1= High priority, 2=Medium priority, 3= Low priority
5. In column 5, the team should determine preliminary next steps. These steps could be to determine a projected implementation date, develop a detailed project plan, or notification of leadership regarding the priority and necessary resources.
6. Column 6 is a place on the gap analysis to document any issues, concerns, or concepts that the team has identified.

Once the gap analysis is completed, the multidisciplinary team will need to review the selected effective practices. Be clear if additional resources will be needed from the organization to support implementation of the effective practice. The team will need to identify the next steps needed to be taken for implementation. It is imperative that leadership support the project both financially and from an operations perspective.

With the gap analysis complete and with leadership support, the multidisciplinary team has a road map for implementing the effective practices associated with NPSG.07.05.01.

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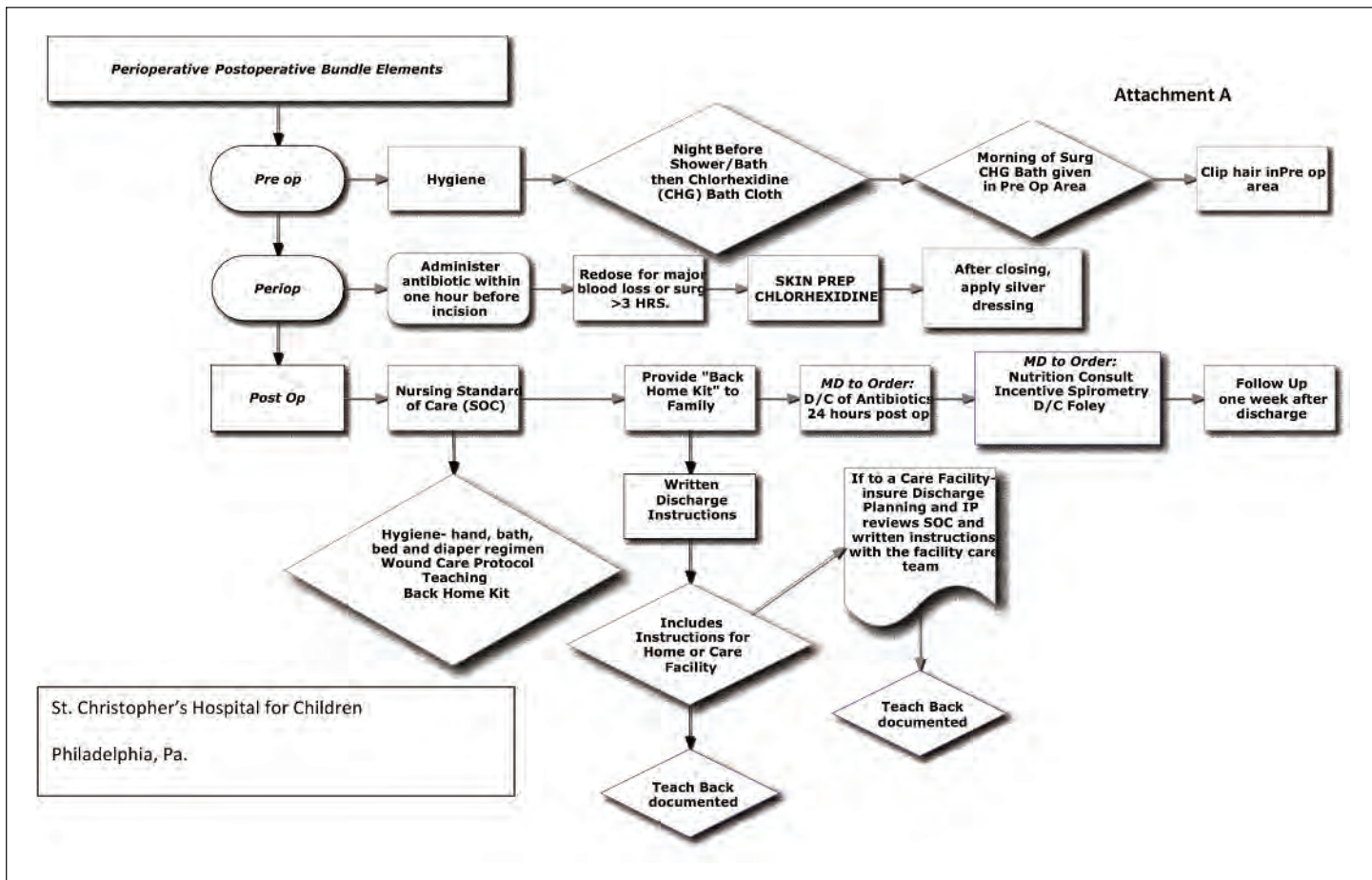
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Appendix B
Effective Strategies for Implementing NPSG 07.05.01: Surgical Site Infections
GAP Analysis

Organization: _____ Date: _____

*Priority Value: 1= High Priority, 2=Medium priority, 3= Low Priority

#	1. Effective Practice (EP) to Implement NPSG 07.05.01: SSI	2. EP Currently Implemented? Yes	3. EP Currently Implemented? No	4. If No, Identify Priority Value*: 1, 2, 3	5. Next Steps	6. Notes
Effective Leadership Practices for Implementing the SSI NPSG.07.05.01						
1	Support of SSI reduction by top level leadership			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
2	Resources are dedicated to decrease SSI rates			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
3	Financial incentives for practitioners to reduce SSIs			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
Effective Practitioner-Focused Practices for Implementing the SSI NPSG.07.05.01						
4	Practitioners accept and/or take accountability/ responsibility			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
5	Highly engaged physicians are champions to reduce SSIs in their service(s)			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
6	Anesthesia practitioners provide prophylactic antibiotics			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
Effective Process-Focused Practices for Implementing the SSI NPSG.07.05.01						
7	Use of a multidisciplinary team(s)			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
8	Use of performance improvement tools			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
9	Use of benchmarking/ comparison of SSI rates			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
10	Use of information technologies (IT)			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
11	Aligned & coordinated education for staff and licensed independent practitioners			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
12	Participation in an SSI-focused collaborative (e.g. SCIP, IHI etc.)			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
13	Pre-operative/post-operative order sets are developed/ revised to match SSI EBPs such as the NPSG.07.05.01 and the SCIP measures			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
14	Decreasing operating room(OR) traffic			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
15	Direct observation of EBPs in the OR by IC staff (MD or RN)			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
16	Using chlorhexadine for pre-operative baths			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
17	Daily SSI Vigilance			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
18	One-to-one education for physicians when an SSI issue is identified			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
19	Post discharge surveillance of SSIs are reported to hospital committee			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
20	Focus on implementing Evidence-Based Practices (EBP) in the hospital			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
21	Acting on identified SSI Issues			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
22	Support of migration of SSI EBPs from one medical service to another			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		
23	Use of specific SSI-focused processes for patient education			1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>		

