NATIONAL QUALITY FORUM

Measure Evaluation 4.1
December 2009

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).*

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few subcriteria as indicated)

(for NQF staff use) **NQF Review #:** PSM-002-10 **NQF Project:** Patient Safety Measures
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** American College of Surgeons – Centers for Disease Control and Prevention (ACS-CDC) Harmonized Procedure Specific Surgical Site Infection (SSI) Outcome Measure
De.2 **Brief description of measure**: Prototype measure for the facility adjusted Standardized Infection Ratio (SIR) of deep incisional and organ/space Surgical Site Infections (SSI) at the primary incision site among adult patients aged >= 18 years as reported through the ACS National Surgical Quality Improvement Program (ACS-NSQIP) or CDC National Health and Safety Network (NHSN). Prototype also includes a systematic, retrospective sampling of operative procedures in healthcare facilities. This prototype measure is intended for time-limited use and is proposed as a first step toward a more comprehensive SSI measure or set of SSI measures that include additional surgical procedure categories and expanded SSI risk-adjustment by procedure type. This single prototype measure is applied to two operative procedures, colon surgeries and abdominal hysterectomies, and the measure yields separate SIRs for each procedure.
1.1-2 **Type of Measure:** Outcome De.3 **If included in a composite or paired with another measure, please identify composite or paired measure**
De.4 **National Priority Partners Priority Area:** Safety De.5 **IOM Quality Domain**: Safety De.6 **Consumer Care Need:** Staying healthy

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the**	**A** **Y**☐ **N**☐

right to use aspects of the measure owned by another entity (e.g., risk model, code set)? Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Government entity and in the public domain - no agreement necessary A.4 **Measure Steward Agreement attached:**	
B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public Reporting, Quality Improvement (Internal to the specific organization)	**C** Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** Yes, fully developed and tested D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	**D** Y☐ N☐
(for NQF staff use**) Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Frequently performed procedure, Leading cause of morbidity/mortality, High resource use, Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Estimated to account for 20% of all HAIs[1] SSIs estimated to account for 20% of all HAIs[1] 290,485 estimated SSIs/yr[2] Estimated 8,205 deaths associated with SSIs each year[1] Estimated 11% of all deaths occurring in intensive care units are associated with SSIs[1] $34,670 medical cost/SSI[2] Total >$10 billion attributable to SSI in U.S. each year[2] Estimated additional 7-10 days of hospitalization for each SSI per patient[1] 1a.4 **Citations for Evidence of High Impact:** [1] Klevens RM, Edwards JR, et al. Estimating healthcare-associated infection and deaths in U.S. hospitals, 2002. Public Health Reports 2007; 122:160-166. [2] Scott, RD. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the	**1a** C☐ P☐ M☐ N☐

Comment [KP1]: 1a. The measure focus addresses:
•a specific national health goal/priority identified by NQF's National Priorities Partners; OR
•a demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).

Benefits of Prevention. http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf accessed April 12, 2010.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: It is envisioned the use of this measure will promote SSI prevention activities which will lead to improved patient outcomes including reduction of avoidable medical costs, and patient morbidity and mortality.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
When SIRs are compared over time, assessment of performance can be made. In separate analyses, CDC and ACS have demonstrated a significant performance gaps in SIRs across facilities.

1b.3 Citations for data on performance gap:
The data cited above are unpublished, obtained from an internal analysis of ACS NSQIP and CDC NHSN data. These gaps have been repeatedly demonstrated since the inception of the program in published semiannual reports to ACS NSQIP participants. CDC NHSN data are presented (Figure 2).

1b.4 Summary of Data on disparities by population group:
Certain patient-related factors have been associated with an increased risk of SSI, including: advanced age, [1] [2], ASA classification>2, [2, 3].

1b.5 Citations for data on Disparities:
1. Mangram, A.J., et al., Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. Infect Control Hosp Epidemiol, 1999. 20(4): p. 250-78; quiz 279-80.
2. Neumayer, L., et al., Multivariable predictors of postoperative surgical site infection after general and vascular surgery: results from the patient safety in surgery study. J Am Coll Surg, 2007. 204(6): p. 1178-87.
3. Culver, D.H., et al., Surgical wound infection rates by wound class, operative procedure, and patient risk index. National Nosocomial Infections Surveillance System. Am J Med, 1991. 91(3B): p. 152S-157S.

1b C☐ P☐ M☐ N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** SSI SIRs are relevant to the patient populations because SSIs are a recognized complication of surgery and prevention recommendations have been published to reduce their incidence. A high SIR indicates an opportunity for improvement.

1c.2-3. Type of Evidence: Cohort study, Observational study, Evidence-based guideline, Randomized controlled trial, Expert opinion, Systematic synthesis of research, Meta-analysis

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Two guidelines address the prevention of SSI:
1) Strategies to Prevent Surgical Site Infections in Acute Care Hospitals, 2008 (Society for Healthcare Epidemiology of America) and
2) The Guideline for Prevention of Surgical Site Infection, 1999 published by the Healthcare Infection Control Practices and Advisory Committee (HICPAC).
Both of these publications cite multiple studies (over 500 in the HICPAC guideline), scientific evidence, and recommendations of other prevention organizations which show that actions taken before, and at the time of, surgery can decrease the rate of SSI. The publications provide recommendations for healthcare practitioners and infection preventionists that can be implemented in efforts to reduce the incidence of SSIs.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom*)**:**
The Guideline for Prevention of Surgical Site Infection, 1999, provides recommendations concerning reduction of surgical site infection risk. Each recommendation was categorized on the basis of existing

1c C☐ P☐ M☐ N☐

Comment [KP2]: 1b. Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating considerable variation, or overall poor performance, in the quality of care across providers and/or population groups (disparities in care).

Comment [k3]: 1 Examples of data on opportunity for improvement include, but are not limited to: prior studies, epidemiologic data, measure data from pilot testing or implementation. If data are not available, the measure focus is systematically assessed (e.g., expert panel rating) and judged to be a quality problem.

Comment [k4]: 1c. The measure focus is:
•an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;
OR
•if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
oIntermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
oProcess – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
oStructure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
oPatient experience – evidence that an association exists between the measure ... [1]

Comment [k5]: 4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve ... [2]

Comment [k6]: 3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system ... [3]

scientific data, theoretical rationale, and applicability. See Additional Information, Ad.11.

1c.6 Method for rating evidence: See Ic.5.

1c.7 Summary of Controversy/Contradictory Evidence: Contradictory evidence exists on the effect of process measures on outcomes. In a highly controlled setting (controlled clinical study) high performance on SCIP measures is related to high performance on outcomes, but in an observational setting, there is little correlation between process and outcomes. As mentioned above, ACS NSQIP data were used to conduct a cross-sectional study (unpublished data) to determine whether adherence with Surgical Care Improvement Project (SCIP) process measures correlates with risk-adjusted ACS NSQIP outcomes. Thirty-day risk-adjusted outcomes after colorectal surgery, including mortality, serious morbidity, morbidity, surgical site infections, venous thromboembolism (VTE), and cardiac events, at ACS NSQIP hospitals that submitted performance on seven process measures to The Joint Commission between July 1, 2007, and June 30, 2008, were correlated with process measure compliance. Multivariable forward step-wise logistic regression models were constructed to assess 30-day morbidity and mortality adjusted for patient comorbidities, operative risk factors, and process measure compliance. The results of the regression models showed that SCIP process measure compliance was not an important predictor of ACS NSQIP risk-adjusted outcomes. The above study illustrates that occurrence of SSI is probably multifactorial and it is quite likely that the process measures identified by SCIP for prevention of SSI do not accurately reflect ALL of the processes that account for risk-adjusted SSI outcomes. Obtaining risk adjusted outcomes will both evaluate and likely improve patient care as well as enable ongoing and future investigations of process effectiveness.

1c.8 Citations for Evidence (*other than guidelines***):**

1. Arrowsmith, V.A., et al., Removal of nail polish and finger rings to prevent surgical infection. Cochrane Database Syst Rev, 2001(4): p. CD003325.
2. Auerbach, A.D., Chapter 20. Prevention of Surgical Site Infections. Making Health Care Safer: A Critical Analysis of Patient Safety Practices.
3. Barie, P.S., Surgical site infections: epidemiology and prevention. Surg Infect (Larchmt), 2002. 3 Suppl 1: p. S9-21.
4. Belda, F.J., et al., Supplemental perioperative oxygen and the risk of surgical wound infection: a randomized controlled trial. JAMA, 2005. 294(16): p. 2035-42.
5. Bratzler, D.W. and P.M. Houck, Antimicrobial prophylaxis for surgery: An advisory statement from the National Surgical Infection Prevention Project. The American Journal of Surgery, 2005. 189(4): p. 395-404.
6. Bratzler, D.W. and D.R. Hunt, The surgical infection prevention and surgical care improvement projects: national initiatives to improve outcomes for patients having surgery. Clin Infect Dis, 2006. 43(3): p. 322-30.
7. Bucher, P., et al., Mechanical bowel preparation for elective colorectal surgery: a meta-analysis. Arch Surg, 2004. 139(12): p. 1359-64; discussion 1365.
8. Chow, T.T. and X.Y. Yang, Ventilation performance in operating theatres against airborne infection: review of research activities and practical guidance. J Hosp Infect, 2004. 56(2): p. 85-92.
9. Chura, J.C., A. Boyd, and P.A. Argenta, Surgical site infections and supplemental perioperative oxygen in colorectal surgery patients: a systematic review. Surg Infect (Larchmt), 2007. 8(4): p. 455-61.
10. Dellinger, E.P., Preventing surgical-site infections: the importance of timing and glucose control. Infect Control Hosp Epidemiol, 2001. 22(10): p. 604-6.
11. Dellinger, E.P., Increasing inspired oxygen to decrease surgical site infection: time to shift the quality improvement research paradigm. JAMA, 2005. 294(16): p. 2091-2.
12. Dellinger, E.P., Roles of temperature and oxygenation in prevention of surgical site infection. Surg Infect (Larchmt), 2006. 7(Suppl 3): p. s27-32.
13. Dellinger, E.P., What is the ideal time for administration of antimicrobial prophylaxis for a surgical procedure? Ann Surg, 2008. 247(6): p. 927-8.
14. Dellinger, E.P. and D.A. Anaya, Infectious and immunologic consequences of blood transfusion. Crit Care, 2004. 8 Suppl 2: p. S18-23.
15. Dharan, S. and D. Pittet, Environmental controls in operating theatres. J Hosp Infect, 2002. 51(2): p. 79-84.
16. Digison, M.B., A review of anti-septic agents for pre-operative skin preparation. Plast Surg Nurs, 2007. 27(4): p. 185-9; quiz 190-1.
17. Edmiston, C.E., Jr., et al., Comparative of a new and innovative 2% chlorhexidine gluconateimpregnated cloth with 4% chlorhexidine gluconate as topical antiseptic for preparation of the skin prior to surgery. Am J Infect Control, 2007. 35(2): p. 89-96.
18. Edwards, P.S., A. Lipp, and A. Holmes, Preoperative skin antiseptics for preventing surgical wound

infections after clean surgery. Cochrane Database Syst Rev, 2004(3): p. CD003949.
19. Greif, R., et al., Supplemental perioperative oxygen to reduce the incidence of surgical-wound infection. Outcomes Research Group. N Engl J Med, 2000. 342(3): p. 161-7.
20. Kluytmans, J.A. and H.F. Wertheim, Nasal carriage of Staphylococcus aureus and prevention of nosocomial infections. Infection, 2005. 33(1): p. 3-8.
21. Latham, R., et al., The association of diabetes and glucose control with surgical-site infections among cardiothoracic surgery patients. Infect Control Hosp Epidemiol, 2001. 22(10): p. 607-12.
22. Leaper, D., Effects of local and systemic warming on postoperative infections. Surg Infect (Larchmt), 2006. 7 Suppl 2: p. S101-3.
23. Niel-Weise, B.S., J.C. Wille, and P.J. van den Broek, Hair removal policies in clean surgery: systematic review of randomized, controlled trials. Infect Control Hosp Epidemiol, 2005. 26(12): p. 923-8.
24. Perl, T.M., et al., Intranasal mupirocin to prevent postoperative Staphylococcus aureus infections. N Engl J Med, 2002. 346(24): p. 1871-7.
25. Pryor, K.O., et al., Surgical site infection and the routine use of perioperative hyperoxia in a general surgical population: a randomized controlled trial. JAMA, 2004. 291(1): p. 79-87.
26. Tanner, J., K. Moncaster, and D. Woodings, Preoperative hair removal: a systematic review. J Perioper Pract, 2007. 17(3): p. 118-21, 124-32.
27. Webster, J. and S. Osborne, Preoperative bathing or showering with skin antiseptics to prevent surgical site infection. Cochrane Database Syst Rev, 2007(2): p. CD004985.

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
" Additionally, the NNIS risk index does not adequately discriminate the SSI risk for all types of operations.27,410
It seems likely that a combination of risk factors specific to patients undergoing an operation will be more predictive. A few studies have been performed to develop procedure specific risk indices 218,411-414 and research in this area continues within CDC's NNIS system." The Guideline for Prevention of Surgical Site Infection, 1999, HICPAC, pp 264-265.

1c.10 Clinical Practice Guideline Citation: 1) Strategies to Prevent Surgical Site Infections in Acute Care Hospitals, 2008 (Society for Healthcare Epidemiology of America)
http://www.journals.uchicago.edu/doi/full/10.1086/591064 Accessed April 26, 2010.
2) The Guideline for Prevention of Surgical Site Infection, 1999, HICPAC.
http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/SSI.pdf Accessed April 26, 2010.

1c.11 National Guideline Clearinghouse or other URL:

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom***):**
See above.

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)***:**

1c.14 Rationale for using this guideline over others:
These utilized guidelines are published by two internationally recognized organizations, Centers for Disease Control and Prevention and Society for Healthcare Epidemiology of America.

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?* — **1**

Steering Committee: Was the threshold criterion, *Importance to Measure and Report***, met?** — **1** Y☐ N☐
Rationale:

2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria) — **Eval Rating**

Comment [k7]: USPSTF grading system **http://www.ahrq.gov/clinic/uspstf/grades.htm**: **A -** The USPSTF recommends the service. There is high certainty that the net benefit is substantial. **B -** The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. **C -** The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. Offer or provide this service only if other considerations support the offering or providing the service in an individual patient. **D -** The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. **I -** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

2a. MEASURE SPECIFICATIONS

S.1 Do you have a web page where current detailed measure specifications can be obtained?
S.2 If yes, provide web page URL:

2a. Precisely Specified

2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):**
Deep incisional primary (DIP) and organ/space SSIs during the 30-day postoperative period among patients = 18 years of age, who undergo inpatient colon surgeries or abdominal hysterectomies. SSIs will be identified before discharge from the hospital, upon readmission to the same hospital, or during outpatient care or admission to another hospital (post-discharge surveillance). Case accrual will be guided by sampling algorithms as described below.

2a.2 Numerator Time Window (*The time period in which cases are eligible for inclusion in the numerator***):**
Cases with evidence of disease onset identified per infection definition criteria stated below within 30 days of a colon surgery or abdominal hysterectomy, where the surgical procedure occurs during the twelve month period starting July 1, 2011, in facilities participating in ACS-NSQIP or NHSN SSI surveillance during the month that the procedure was performed.

2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions***):**
Colon surgeries: Defined by the ICD-9-CM procedure codes that comprise the NHSN colon surgery category for that program, or the corresponding set of CPT procedure codes used in ACS/NSQIP for that program (see Appendix 1).

Abdominal hysterectomy: Defined by the ICD-9-CM procedure codes that comprise the NHSN abdominal hysterectomy category for that program, or the corresponding set of CPT procedure codes used in ACS/NSQIP for that program (see Appendix 1).

Inpatient: A patient for whom the discharge date is at least one day later than the admission date
Adult: A person =18 years of age

A deep incisional SSI must meet one of the following criteria:
Infection occurs within 30 days after the operative and the infection appears to be related to the operative procedure and involves deep soft tissues (e.g., fascial and muscle layers) of the incision
and patient has at least one of the following:
a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured and the patient has at least one of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination
d. diagnosis of a deep incisional SSI by a surgeon or attending physician.

NOTE: There are two specific types of deep incisional SSIs:
1. Deep Incisional Primary (DIP) – a deep incisional SSI that is identified in a primary incision in a patient that has had an operation with one or more incisions (e.g., C-section incision or chest incision for CBGB)
2. Deep Incisional Secondary (DIS) – a deep incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB)

REPORTING INSTRUCTIONS:
• Classify infection that involves both superficial and deep incision sites as deep incisional SSI.

An organ/space SSI involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure. The table below lists the specific sites that must be used to differentiate organ/space SSI. Specific sites are assigned to organ/space SSI to further identify the location of the infection. Specific sites of organ/space have specific criteria which must be met in order to

2a-specs
C☐
P☐
M☐
N☐

Comment [KP8]: 2a. The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF's Health Information Technology Expert Panel (HITEP) .

qualify as an NHSN event. These criteria are in addition to the general criteria for NHSN organ/space SSI.

Code	Site
BONE	Osteomyelitis
BRST	Breast abscess or mastitis
CARD	Myocarditis or pericarditis
DISC	Disc space
EAR	Ear, mastoid
EMET	Endometritis
ENDO	Endocarditis
EYE	Eye, other than conjunctivitis
GIT	GI tract
IAB	Intraabdominal, not specified elsewhere
IC	Intracranial, brain abscess or dura
LUNG	Other infections of the respiratory tract
MED	Mediastinitis
MEN	Meningitis or ventriculitis
ORAL	Oral cavity (mouth, tongue, or gums)
OREP	Other infections of the male or female reproductive tract
OUTI	Other infections of the urinary tract
SA	Spinal abscess without meningitis
SINU	Sinusitis
UR	Upper respiratory tract
VASC	Arterial or venous infection
VCUF	Vaginal cuff

An organ/space SSI must meet one of the following criteria:
Infection occurs within 30 days after the operative procedure, infection appears to be related to the operative procedure, infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure and patient has at least one of the following:
a. purulent drainage from a drain that is placed through a stab wound into the organ/space
b. organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
c. an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
d. diagnosis of an organ/space SSI by a surgeon or attending physician.

REPORTING INSTRUCTIONS:
• Occasionally an organ/space infection drains through the incision. Such infection generally does not involve reoperation and is considered a complication of the incision. Therefore, classify it as a deep incisional SSI.

Patient Specific Data:
1. Age
2. American Society of Anesthesiologists (ASA) Class (at index operation)

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):**
Using multivariable logistic regression models for colon surgeries and abdominal hysterectomies, the expected number of SSIs is obtained. These expected numbers are summed by facility and surgical procedure and used as the denominator of this measure (see also 2a.8).

2a.5 Target population gender: Female, Male
2a.6 Target population age range: Adult: A person =18 years of age

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
The estimated risk of SSI for colon surgeries and abdominal hysterectomies is calculated using the corresponding procedure-specific logistic regression model (see 2a. 15). The risk estimates for each case are

summed for the twelve month period starting July 1, 2011 to yield the expected number of SSIs (denominator). The expected number of SSIs will be influenced by the number of operative procedures in the facility and the distribution of the factors relevant to each procedure's logistic model.

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
Data required to calculate the denominator:

1) Data for each operative procedure

Colon surgeries: Defined by the ICD-9-CM procedure codes that comprise the NHSN colon surgery category for that program, and or the corresponding set of CPT procedure codes used in ACS/NSQIP for that program (see Appendix 1).

Abdominal hysterectomy: Defined by the ICD-9-CM procedure codes that comprise the NHSN abdominal hysterectomy category for that program, or and the corresponding set of CPT procedure codes used in ACS/NSQIP for that program (see Appendix 1).

2) Parameter estimates for operative procedure-specific logistic regression models are needed to calculate the expected number of SSIs. See 2a.15 attachment.
3) Patient Specific Data:
Age
American Society of Anesthesiologists (ASA) Score

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** Persons under the age of 18, those having a procedure performed on an outpatient basis, those with ASA Class VI (6) are excluded. In the NHSN, patients without primary closure of the surgical incision are not considered eligible cases and are excluded- the NSQIP will match this practice for this measure, although this is not standard practice within the NSQIP.

Comment [k9]: 11 Risk factors that influence outcomes should not be specified as exclusions.
12 Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Age
Date of admission and date discharge
ASA Class (6)
Incision left open

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
None
If desired by an implementing organization or agency, race and ethnicity information could be added to data collection to allow for post-hoc stratification to identify disparities by these groupings. Risk adjustment based on these variables is not proposed.

2a.12-13 Risk Adjustment Type: Other The measure reports the individual adjusted Standardized Infection Ratio (SIR) for colon surgeries and abdominal hysterectomies for each facility during the specified reporting period. SIR is an indirect standardization method for summarizing healthcare associated infection (HAI) experience across any number of stratified groups of data. Because the facility SIR has lower precision for facilities with few expected events relative to the number of procedures performed, i.e. low reliability, empirical Bayes techniques are used to derive the final reported SIR or reliability-adjusted SIR.

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
The SSI models were developed through step-wise logistic regression from a set of potential predictors shown in section 2a.8.

Procedure	Effect
Colon Surgery	Intercept
	Age/10
	ASA Class

Abdominal Hysterectomy Intercept
Age/10
ASA Class

Age = Age in years/10. Age is a continuous variable

ASA Class 1-5 = American Society of Anesthesiology Physical Status Classification.
ASA 1 - Normal healthy patient.
ASA 2 - Patient with mild systemic disease.
ASA 3 - Patient with severe systemic disease.
ASA 4 - Patient with severe systemic disease that is a constant threat to life.
ASA 5 - Moribund patient who is not expected to survive without the operation.

[Note: ASA Class 6 - Declared brain-dead patient whose organs are being removed for donor purposes - EXCLUDED from Eligibility].

2a.15-17 Detailed risk model available Web page URL or attachment: Attachment NHSN SSI Models for SCIP procedures for NQF.xlsx

2a.18-19 Type of Score: Other Adjusted Ratio: The reliability adjusted SIR is the reliability adjusted number of SSIs divided by the expected number of SSIs. The reliability adjustment for each facility is based on procedure volume.
2a.20 Interpretation of Score: Better quality = Lower score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
An SIR <1.0 indicates that the number of SSIs was fewer than expected for that facility, whereas an SIR >1.0 indicates that the number of SSIs was more than expected, given the patients treated.

The reliability adjusted SIR is calculated as follows:
1. Using random effects logistic regression models with risk factors from applicable models; we generated empirical Bayes predictions of SSI risk for each procedure.
2. Sum these predictions by hospital for the adjusted observed SSI total.
3. For every patient undergoing the operative procedure in the period, calculate the probability of SSI using the patient data and parameter estimates of the factors in the applicable model.
4. Sum the probabilities to obtain the total expected number of SSI.
5. Divide the total number of adjusted observed SSIs by the total number of expected SSIs for the resulting reliability adjusted SIR.

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Performance evaluation can be conducted through at least 2 processes. First an SIR can be compared to the nominal value of 1.0 through significance testing, i.e., P value and confidence intervals. Second, successive SIRs obtained for a given reporting entity can be compared to each other to assess changes in relative performance over time.

2a.23 Sampling (Survey) Methodology *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:
The sampling scheme seeks to limit the level of data collection, based on achieving an acceptable level of reliability (R=0.4).

Colon surgeries: The sampling method will include all colon surgeries for facilities that perform fewer than 42 colon surgeries annually. For facilities that perform more than 42 colon surgeries, the sampling method will include only the first colon surgery per 8-day cycle. Institutions participating in NSQIP may accrue cases per standard NSQIP protocol, with checks on achieving the minimum case accrual requirement. Within NSQIP, there are considered to be 42 working 8-day cycles per year, and 4 "off" 8-day cycles per year.

Abdominal hysterectomies: The sampling method will include all abdominal hysterectomies for facilities that perform fewer than 200 annually. For facilities that perform more than 200 abdominal hysterectomies, the sampling method will include only the first 5 abdominal hysterectomies per 8-day cycle. Institutions participating in NSQIP may accrue cases per standard NSQIP protocol, with checks on achieving the minimum case accrual requirement. Within NSQIP, there are considered to be 42 working 8-day cycles per year, and 4 "off" 8-day cycles per year.

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Electronic Clinical Data, Electronic Health/Medical Record, Lab data, Paper medical record/flow-sheet, Special or unique data

2a.25 Data source/data collection instrument (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.***):**
Data from ACS-NSQIP and NHSN will be reported using the formats in the following form:

1) NHSN SSI Event form (CDC 57.120)
2) NHSN Denominator for Procedure form (CDC 57.121)

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.cdc.gov/nhsn/forms/57.120_SSI_BLANK.pdf,
http://www.cdc.gov/nhsn/forms/57.121_DenomProc_BLANK.pdf

2a.29-31 Data dictionary/code table web page URL or attachment: Attachment 2a29 Data Dictionary-634082211083812400.docx

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Facility/Agency, Population : National, Population : states

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)***:** Risk Adjustment Modeling of Prototype Measures: Modeling for risk adjustment was derived using all NHSN data for 2006-2008, which contained 62,782 colon surgeries and 54,877 abdominal hysterectomies, from 847 hospitals.

Facility Adjusted SIR:
The SIR is the ratio of the observed number of SSI (deep or organ space surgical site infection) divided by the expected number of SSI. To calculate the expected SSI incidence for a facility, the probabilities of SSI for each of the patients in the facility are summed; the individual probabilities can be calculated by using the procedure specific risk-adjustment model. To obtain a final adjusted SIR, mixed models are used (glimmix, SAS 9.2) to generate random effects, which adjusts the point estimate of the observed SSI rate back toward the average risk adjusted SSI rate, with the amount of adjustment proportional to the Reliability for each hospital. Reliability is a measure of precision and is a function of both the number of procedures performed by the hospital and the amount of variation in number of events across all hospitals. The resulting adjusted SIR is considered a better estimate of a hospital's "true" SIR relative to other facilities.

Reference for reliability adjustment
Morris, C. N. 1983. Parametric Empirical Bayes Inference: Theory and Applications. Journal of the American Statistical Association (JASA) 78 (22): 47–55.
Normand, S. T., M. E. Glickman, and C. A. Gatsonis. 1997. Statistical Methods for Profiling Providers of Medical Care: Issues and Applications. Journal of the American Statistical Association (JASA) 92 (439): 803–14.
Dimick JB, Staiger DO, Birkmeyer JD. Ranking hospitals on surgical mortality: the importance of reliability adjustment. Health Serv Res 2010;45:1614-29.

Sampling Method:
The sampling method proposed for use in the prototype SSI measures will be applied retrospectively to the operative procedure and infection data. This will require all hospitals to continue reporting surveillance

2b
C ☐
P ☐
M ☐
N ☐

Comment [KP10]: 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

data on 100% of all operative procedures during the time-limited use of the prototype SSI measure. The retrospective sampling method introduced with the prototype SSI measure anticipates a prospective approach to sampling procedures that will closely follow the ACS NSQIP methodology and that could serve as a model for future iterations of a harmonized SSI measure. The ACS NSQIP sampling strategy calls for surveying all procedures if the facility performs less than a pre-defined number of procedures, while the remaining facilities survey a predefined number of procedures, in every 8-day rolling cycle, in order of occurrence.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)***:**
Risk Adjustment Modeling of Prototype Measures
Models for procedure specific risk adjustment were developed using step wise logistic regression and bootstrapping sampling was used to validate them.

A SIR is identical in concept to a standardized mortality ratio (SMR) and can summarize HAI experience across any number of stratified groups of data using indirect standardization. The SMR is a widely accepted method of measurement within the public health community. An SIR is felt to be a good measurement for SSI experiences within facilities because it:
1. provides a single measure that is simple to interpret for assessing SSI incidence problems and prevention efficacy, and
2. gives a better estimate of the infection experience when there are small numerators or denominators in some or all strata.

Facility Adjusted SIR:
Reliability adjustment results in more stable estimates of SIR that better measure quality performance. (Figures 1 & 2 in 2b.3).

Sampling Method:
Level of sampling was based on determining the number of procedures (N) that would maximize the percentage of facilities with a level of reliability >0.4, while also attempting to limit the burden of data collection, using the formula:
N=R/[ICC(1-R)] - R/(1-R)
Where R = reliability and ICC = Intraclass correlation. ICC was estimated using a GEE (generalized estimating equation) approach (SAS PROC GENMOD) with compound symmetry, which is reported in GENMOD as the exchangeable working correlation. NHSN data for 2006-2008 for colon surgeries and abdominal hysterectomies was used to calculate the ICCs for these respective procedures.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)***:**

Comment [k11]: 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)***:** The SSI data used in this measure have been endorsed by NQF in a previous measure set (see 3b.1) and as described in 2b.2, the SMR, upon which the SIR is based, is a widely accepted method for summarizing mortality experience. Therefore, we conclude the SIR measure has inherent face validity. However, we are undertaking validity studies beginning in July 2010 (see 2c.2).

3 states have independently completed and reported validity testing in their state HAI report. Those reports can be found at the following URLs:
• New York – 2007 annual report described methods and results for "CLABSI surveillance audit" http://www.nyhealth.gov/statistics/facilities/hospital/hospital_acquired_infections/2008/docs/hospital-acquired_infection-full_report.pdf). Validation methods have increased in complexity, but have not been published again in great detail since the 2007 report; though the validation was briefly referred to in the 2008 and 2009 reports. They hope to publish in greater detail in their next report.
• South Carolina -http://www.scdhec.gov/health/disease/hai/docs/2010%20HIDA%20Annual%20Report.pdf (Annual report makes reference to validation study but does not describe methodology or findings in-depth.)
• Pennsylvania - www.portal.state.pa.us/portal/server.pt/.../padoh_2009_hai_report_pdf

2c
C ☐
P ☐
M ☐
N ☐

Comment [KP12]: 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

(Annual Report identifies current methods of monthly internal consistency checks that are completed, as well as annual on-site facility audits that are scheduled to begin the summer of 2010.

Validity testing has begun in July, 2010 in one state and in 2 states in August, 2010 and is expected to begin in 7 other states in August, 2010. Using ARRA funding, another state has also started validation testing in May, 2010 and 2 others are presently working on protocols to do so.

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*:
To address concerns regarding validity, HHS has provided funding, utilizing Recovery Act of 2009 funds, to CDC to support 10 state Emerging Infections Programs in validating NHSN-related measures and to support reporting on HHS metrics through NHSN.

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
See 2c.1 and 2c.2

2d. Exclusions Justified

2d.1 **Summary of Evidence supporting exclusion(s):**
Exclusion based on ACS/NSQIP not collecting data on patients <18 years of age and inability to collect data from outpatient facilities, ASA 6, wounds left open.

2d.2 **Citations for Evidence:**

2d.3 **Data/sample** *(description of data/sample and size)*:

2d.4 **Analytic Method** *(type analysis & rationale)*:

2d.5 **Testing Results** *(e.g., frequency, variability, sensitivity analyses)*:

2d
C☐
P☐
M☐
N☐
NA☐

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 **Data/sample** *(description of data/sample and size)*: See 2b.1.

2e.2 **Analytic Method** *(type of risk adjustment, analysis, & rationale)*:
Expected numbers of SSI are calculated from operative procedure-specific logistic regression models that account for differences in SSI risk. See 2b.2 and 2a.15 attachment.

2e.3 **Testing Results** *(risk model performance metrics)*:
See 2.b3

2e.4 **If outcome or resource use measure is not risk adjusted, provide rationale:**

2e
C☐
P☐
M☐
N☐
NA☐

2f. Identification of Meaningful Differences in Performance

2f.1 **Data/sample from Testing or Current Use** *(description of data/sample and size)*: SIRs have been used as metrics for identifying differences in performance by state. http://www.cdc.gov/nhsn/index.html.

2f.2 **Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*:
The SIR by nature identifies variation from an expected rate of occurrence of an event and a sense of the magnitude of that variation (e.g., a facility SSI SIR of 2.0 represents twice as many SSIs as expected for the patient population). Additionally, the confidence interval provides further information regarding the likelihood that the SIR occurs within a specified range. See NHSN State Report for an example. http://www.cdc.gov/nhsn/index.html.

2f.3 **Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by*

2f
C☐
P☐
M☐
N☐

Comment [k13]: 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

Comment [KP14]: 2d. Clinically necessary measure exclusions are identified and must be:
•supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
AND
•a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
AND ... [4]

Comment [k15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
•an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;Error! Bookmark not defined. OR ... [5]

Comment [k17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by ra ... [6]

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [k19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically ... [7]

quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance): The SIR and 95% confidence interval will be calculated and graphically represented to show relationship to the nominal value of 1.0 (i.e., where observed equals expected).	
2g. Comparability of Multiple Data Sources/Methods 2g.1 **Data/sample** *(description of data/sample and size)*: Data submitted for the prototype measure will come from facilities participating in SSI surveillance either through ACS-NSQIP or CDC NHSH. ACS and CDC have engaged in extensive discussion and comparison of surveillance protocols to ensure comparability of data for this prototype measure. 2g.2 **Analytic Method** *(type of analysis & rationale)*: After the first 12 months of data collection, reliability-adjusted SIRs will be stratified by data source (ACS-NSQIP compared to NHSN) and tested for confounding and interaction. After the first 12 months of data collection, reliability-adjusted SIRs will be stratified by data source (ACS-NSQIP compared to NHSN) and differences in the distributions will be compared statistically. 2g.3 **Testing Results** *(e.g., correlation statistics, comparison of rankings)*: See above	**2g** C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care 2h.**1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: 2h.2 **If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:**	**2h** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, **met?** **Rationale:**	*2* C☐ P☐ M☐ N☐
3. USABILITY	
Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information 3a.1 **Current Use:** In use 3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years*): 3a.1. The SMR is a widely accepted measurement tool within the public health community and the SIR is identical in concept applied to HAI. The SIR has been available and used by NHSN member facilities for surgical site infection rate surveillance since 2005 and in NNIS facilities before that. 3a.2. SSI data from ACS-NSQIP is not used in public reporting initiative at this time. Used within existing ACS NSQIP program for most recent annual reports (confidential reporting to participants). A Centers for Disease Control and Prevention report on HAIs with SIRs for individual U.S. states is scheduled for publication in 2011. A precedent has been set for using SIRs for public reporting of HAIs by several states. Such states include Pennsylvania	**3a** C☐ P☐ M☐ N☐

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.

Comment [KP21]: 2h. If disparities in care have been identified, measure specifications, scoring, and analysis allow for identification of disparities through stratification of results (e.g., by race, ethnicity, socioeconomic status, gender);OR rationale/data justifies why stratification is not necessary or not feasible.

Comment [KP22]: 3a. Demonstration that information produced by the measure is meaningful, understandable, and useful to the intended audience(s) for both public reporting (e.g., focus group, cognitive testing) and informing quality improvement (e.g., quality improvement initiatives). An important outcome that may not have an identified improvement strategy still can be useful for informing quality improvement by identifying the need for and stimulating new approaches to improvement.

(http://www.portal.health.state.pa.us/portal/server.pt/community/department_of_health_home/1745), Tennessee (http://health.state.tn.us/Downloads/TN_HAI_Report_2008_Jan_Dec_final.pdf), and South Carolina (http://www.scdhec.gov/health/disease/hai/reports.htm).

3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years***):**
Current ACS NSQIP semiannual reporting: roughly 300 participating institutions currently receiving measure performance feedback.

For NHSN See 3a.2.

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)
3a.4 **Data/sample** *(description of data/sample and size)***:** Although this specific measure has not been formally tested for interpretability, ACS-NSQIP has been using similar O/E ratios to measure outcomes in the program for over 15 years from its inception in the VA. The success of this program and the satisfaction of participants provide evidence of interpretability of this outcome measure. Hospitals are able to compare their observed complications with their number of expected complications in a ratio that provides a very straightforward measure of performance, while simultaneously being complex enough to adjust for each hospital's case mix. Hospitals are also able to benchmark their performance against other participating hospitals, so that better and worse performers are easily identified.

The SMR is a widely accepted measurement tool within the public health community and the SIR is identical in concept applied to HAI. The SIR has been available and used by NHSN member facilities for surgical site infection rate surveillance since 2005 and in NNIS facilities before that.

3a.5 **Methods** *(e.g., focus group, survey, QI project)***:**

3a.6 **Results** *(qualitative and/or quantitative results and conclusions)***:**

3b/3c. Relation to other NQF-endorsed measures

3b.1 **NQF # and Title of similar or related measures:**

(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**

3b. Harmonization — **3b** C☐ P☐ M☐ N☐ NA☐

If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population):
3b.2 **Are the measure specifications harmonized? If not, why?**
Yes

3c. Distinctive or Additive Value — **3c** C☐ P☐ M☐ N☐ NA☐

3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:**
Proposed measure will increase the number of facilities that will be able to report SSI surveillance data without increasing the data collection burden under their existing ACS NISQP or NHSN protocols.

The current proposal differs from NQF #0299 in several important ways. These modifications were necessary to achieve a protoype proposal that was feasible to implement across NHSN and NSQIP facilities. First, the current measure specifies a followup period of 30 days posteroperatively, whereas NQF #0299 specifies that followup occur for one year postoperatively if an implant is in place. Second, the current measure proposal is restricted to colon surgeries and abdominal hysterectomies

5.1 **If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the**

Comment [KP23]: 3b. The measure specifications are harmonized with other measures, and are applicable to multiple levels and settings.

Comment [k24]: 16 Measure harmonization refers to the standardization of specifications for similar measures on the same topic (e.g., *influenza immunization* of patients in hospitals or nursing homes), or related measures for the same target population (e.g., eye exam and HbA1c for *patients with diabetes*), or definitions applicable to many measures (e.g., age designation for children) so that they are uniform or compatible, unless differences are dictated by the evidence. The dimensions of harmonization can include numerator, denominator, exclusions, and data source and collection instructions. The extent of harmonization depends on the relationship of the measures, the evidence for the specific measure focus, and differences in data sources.

Comment [KP25]: 3c. Review of existing endorsed measures and measure sets demonstrates that the measure provides a distinctive or additive value to existing NQF-endorsed measures (e.g., provides a more complete picture of quality for a particular condition or aspect of healthcare, is a more valid or efficient way to measure).

same target population), Describe why it is a more valid or efficient way to measure quality: Similar measures have been submitted as proposed measures to NQF for catheter-associated urinary tract infection (CAUTI) SIR and central line-associated bloodstream infection (CLABSI) SIR outcome measures. The currently proposed measure, SSI SIR, uses data from the same NHSN system for development of the logistic regression models used for calculating the expected number of SSIs. As already described, SIRs are useful risk-adjusted summary metrics that complement the existing NQF-endorsed measures.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability*?	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, **met?** **Rationale:**	**3** **C☐** **P☐** **M☐** **N☐**
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes **4a.1-2 How are the data elements that are needed to compute measure scores generated?** Other SSI data must be collected by trained hospital staff from information available in clinical data sources. The NHSN analysis tool will automatically calculate SIRs.	**4a** **C☐** **P☐** **M☐** **N☐**
4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) No **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.** Some of the data may be available electronically, but not all.	**4b** **C☐** **P☐** **M☐** **N☐**
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No **4c.2 If yes, provide justification.**	**4c** **C☐** **P☐** **M☐** **N☐** **NA☐**
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **4d.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.** ACS NISQP Based upon experience with ACS NSQIP data collection, there are very few problems with errors or inaccuracies. Data collectors in the ACS NSQIP receive extensive training and support for accurate data collection. Similar online training would be available for this measure. In addition, data collectors are audited in NSQIP for inter-rater reliability and are held to a 95% or better concordance rate for all variables. Similarly, chart audits have been planned in accordance with CMS stipulations for measure participants who are not ACS NSQIP participants. NHSN Patient medical records and other sources of patient data must be reviewed to determine if the patient meets the necessary criteria for a SSI. It is possible that reviewers may miss symptoms or fail to identify that patients meet criteria thereby underreporting SSI events. Data collectors might also intentionally underreport SSIs. Both of these actions would result in an SIR that is calculated to be lower than actual. Alternatively, patients may be identified as having a SSI when in fact they do not meet SSI criteria and	**4d** **C☐** **P☐** **M☐** **N☐**

Comment [KP26]: 4a. For clinical measures, required data elements are routinely generated concurrent with and as a byproduct of care processes during care delivery. (e.g., BP recorded in the electronic record, not abstracted from the record later by other personnel; patient self-assessment tools, e.g., depression scale; lab values, meds, etc.)

Comment [KP27]: 4b. The required data elements are available in electronic sources. If the required data are not in existing electronic sources, a credible, near-term path to electronic collection by most providers is specified and clinical data elements are specified for transition to the electronic health record.

Comment [KP28]: 4c. Exclusions should not require additional data sources beyond what is required for scoring the measure (e.g., numerator and denominator) unless justified as supporting measure validity.

Comment [KP29]: 4d. Susceptibility to inaccuracies, errors, or unintended consequences and the ability to audit the data items to detect such problems are identified.

thereby calculate an SIR that is higher than actual. Numbers of operative procedures may be collected inaccurately thereby impacting the SIR. In addition, it is possible SIRs may be miscalculated. The NHSN reporting tool includes business logic to minimize misclassification of SSI. In addition, site visits can be conducted to audit data validity and this has been done for other infection types by some of the states using NHSN as their mandatory reporting tool (for example, see New York's audit process summary: http://www.health.state.ny.us/statistics/facilities/hospital/hospital_acquired_infections/2008/docs/hospital-acquired_infection.pdf, p20).

4e. Data Collection Strategy/Implementation

Comment [KP30]: **4e.** Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, etc.) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use).

4e.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:

ACS NSQIP

ACS NSQIP has been open to subscription by private sector hospitals since 2004. Ten years prior to this time the program was implemented in the U.S. Department of Veterans Affairs. Thus we have long term experience with the data collection and operational use of the O/E ratio for quality improvement and benchmarking on which this measure is based. Historically, the use of trained data collectors within ACS NSQIP and a comprehensive support system has resulted in high reliability of data and very few problems with missing data. Data definitions are continually evaluated and inter-rater reliability audits are regularly performed.

ACS NSQIP has placed a very high value on accuracy of data collection while maintaining a sample size large enough for statistical modeling and keeping within regulations for patient confidentiality. The methodology of the program has been highly successful with increasing numbers of participants every year, and measureable improvements in surgical outcomes over time based on the O/E ratios for mortality and various post surgical complications. Due to the much smaller number of variables needed for participation in this measure than in the full program, we expect that hospitals that are not ACS NSQIP participants will also be able to achieve highly reliable results.

NHSN

SSI rates and SIR using the methodologies described above have been in use by hospitals participating in CDC surveillance systems since 1986, and the rate measure has been endorsed by NQF in a previous measure set since 2007. Risk models for specific operative procedure categories have been developed using aggregate data from over 805 facilities in order to better reflect factors influencing the development of SSI in different patient populations. SIR has proven to be a useful metric for summarizing HAI experience especially when sample sizes within strata are small and when a summary statistic is desired.

4e.2 Costs to implement the measure (*costs of data collection, fees associated with proprietary measures*)**:**

Time for identifying and reporting an SSI is estimated to be 30 minutes. Eight minutes per operative procedure record for collecting and reporting denominator information manually is estimated. Example of the cost to implement the measure: if a hospital identifies and reports 2 SSIs per month and performs 70 of the selected procedures per month for a year, it would take approximately 124 hours of effort. If the salary of the data collectors averaged $36 per hour, the level of effort would cost $4464 per year for the hospital.

4e.3 Evidence for costs:

ACS NSQIP

Costs are based upon estimates from historical ACS NSQIP data collection, in which one FTE can reliably collect >1600 cases per year, even though the full NSQIP program requires collection of a much larger number of variables. In contrast, this measure does not require many variables: only one outcome and three risk adjustment variables. Furthermore, sample size is such that reliable results can be achieved after collection of fewer than 200 cases per procedure.

NHSN

See OMB submission number 0920-0666, expires 09-30-2012 (labor cost adjusted for inflation).

4e.4 Business case documentation: A business case has not been developed for this measure; however, literature results show that the direct costs for each surgical site infection can range from $6,000 to $29,000 and require an extra 7 days of hospitalization per infected patient. The previously quoted work on

4e
C☐
P☐
M☐
N☐

improvement in NSQIP indicates that large numbers of events could be avoided for a large hospital (>200 events avoided).	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility*?	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**

CONTACT INFORMATION

Co.1 **Measure Steward (Intellectual Property Owner)**
Co.1 **Organization**
* Centers for Disease Control and Prevention, 1600 Clifton Rd, Atlanta, Georgia, 30329

Co.2 **Point of Contact**
Daniel, Pollock, Medical Epidemiologist, dap1@cdc.gov, 404-639-4237-

Measure Developer If different from Measure Steward
Co.3 **Organization**
* Centers for Disease Control and Prevention, 1600 Clifton Rd, Atlanta, Georgia, 30329

Co.4 **Point of Contact**
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Co.5 **Submitter If different from Measure Steward POC**
Daniel, Pollock, Medical Epidemiologist, dap1@cdc.gov, 404-639-4237-, Centres for Disease Control and Prevention

Co.6 **Additional organizations that sponsored/participated in measure development**

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 **Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.**

Ad.2 **If adapted, provide name of original measure:** NQF #0299 Surgical Site Infection Rate
Ad.3-5 **If adapted, provide original specifications URL or attachment** URL
http://wwwdev.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 **Year the measure was first released:** 2008
Ad.7 **Month and Year of most recent revision:** 11, 2007
Ad.8 **What is your frequency for review/update of this measure?** annuallly and when needed
Ad.9 **When is the next scheduled review/update for this measure?** 04, 2011

Ad.10 **Copyright statement:**

Ad.11 **Disclaimers:**

Ad.12 -14 Additional Information web page URL or attachment: Attachment Ad11- SSI-NQF additional info.docx
Date of Submission (*MM/DD/YY*)**:** 04/30/2010

Page 3: [1] Comment [k4] **Karen Pace** **10/5/2009 8:59:00 AM**

1c. The measure focus is:

- an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;

OR

- if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
  - Intermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
  - Process – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
    if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
  - Structure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
  - Patient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
  - Access – evidence that an association exists between access to a health service and the outcomes of, or experience with, care.
  - Efficiency – demonstration of an association between the measured resource use and level of performance with respect to one or more of the other five IOM aims of quality.

Page 3: [2] Comment [k5] **Karen Pace** **10/5/2009 8:59:00 AM**

4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., mammography) or measures for multiple care processes that affect a single outcome.

Page 3: [3] Comment [k6] **Karen Pace** **10/5/2009 8:59:00 AM**

3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system changes). When qualitative studies are used, appropriate qualitative research criteria are used to judge the strength of the evidence.

Page 12: [4] Comment [KP14] **Karen Pace** **10/5/2009 8:59:00 AM**

2d. Clinically necessary measure exclusions are identified and must be:

- supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;

AND

- a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;

AND

- precisely defined and specified:
  - if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);

if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

Page 12: [5] Comment [KP16] **Karen Pace** **10/5/2009 8:59:00 AM**

2e. For outcome measures and other measures (e.g., resource use) when indicated:

- an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;**Error! Bookmark not defined.** OR

rationale/data support no risk adjustment.

Page 12: [6] Comment [k17] **Karen Pace** **10/5/2009 8:59:00 AM**

13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

Page 12: [7] Comment [k19] **Karen Pace** **10/5/2009 8:59:00 AM**

14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

NHSN Logistic Regression Models for Deep Incisional and Organ Space SSIs Detected Upon Admission or Readmission Among SCIP Procedures (2006-2008)

Code	Factor	Parameter Estimate	oddsRatioEst	LowerCL	UpperCL	probchisq	fit
AAA	Intercept	-3.963	.	.	.	.	0.084
	duration10	0.043	1.044	1.019	1.069	0.0004	
	swclass_cat CO/D vs C/CC	1.186	10.718	3.184	36.077	0.0001	
CABG	Intercept	-5.504	.	.	.	.	0.735
	age10	-0.061	.	.	.	0.0064	
	age10*gender	-0.125	.	.	.	<.0001	
	asa (1/2,3,4/5)	0.447	1.564	1.383	1.768	<.0001	
	duration10	0.027	1.027	1.022	1.032	<.0001	
	gender	1.106	.	.	.	<.0001	
	medaff Y vs N	0.112	1.252	1.114	1.407	0.0002	
CARD	Intercept	-5.27	.	.	.	.	0.085
	age_cat <=56 vs >56	0.309	1.363	1.041	1.785	0.0245	
	duration_cat >306 vs <=306	0.649	1.913	1.455	2.515	<.0001	
	emergency Y vs N	0.519	1.681	1.12	2.523	0.0121	
COLO	Intercept	-4.501	.	.	.	.	0.449
	age10	-0.048	0.953	0.927	0.979	0.0005	
	asa(1,2,3/4/5)	0.33	1.391	1.269	1.525	<.0001	
	duration10	0.031	1.032	1.027	1.036	<.0001	
	endoscope N vs Y	0.145	1.156	1.015	1.317	0.0287	
	medaff N vs Y	0.16	1.173	1.051	1.31	0.0046	
	numbeds_cat >500 vs <=500	0.263	1.301	1.159	1.459	<.0001	
	swclass_cat CO/D vs C/CC	0.194	1.214	1.081	1.363	0.001	
HPRO	Intercept	-5.826	.	.	.	.	0.866
	HPRO(TP:0, PP:1, PR/TR: 2)	0.335	1.398	1.29	1.515	<.0001	
	age10	-0.065	0.937	0.896	0.98	0.0047	
	anesthesia Y vs N	0.187	1.205	1.04	1.397	0.0131	
	asa(1/2,3,4/5)	0.603	1.827	1.653	2.019	<.0001	
	duration10	0.039	1.039	1.028	1.051	<.0001	
	medaff Y vs N	0.19	1.209	1.057	1.383	0.0055	
	numbeds_cat 201-500 vs <=200	0.259	1.296	1.118	1.502	0.0006	

	numbeds_cat >500 vs <=200	0.444	1.559	1.319	1.842	<.0001	
HYST	Intercept	-5.738	.	.	.	.	0.722
	age10	-0.17	0.844	0.769	0.927	0.0004	
	asa(1,2,3/4/5)	0.748	2.112	1.742	2.562	<.0001	
	duration10	0.041	1.042	1.026	1.057	<.0001	
	numbeds_cat <=500 vs >500	0.191	1.466	1.107	1.943	0.0077	
KPRO	Intercept	-5.518	.	.	.	.	0.07
	age10	-0.156	0.856	0.809	0.905	<.0001	
	asa_cat 3 vs 1/2	0.55	1.733	1.519	1.977	<.0001	
	asa_cat 4/5 vs 1/2	1.022	2.779	2.044	3.777	<.0001	
	duration10	0.051	1.052	1.039	1.066	<.0001	
	gender M vs F	0.304	1.355	1.194	1.538	<.0001	
	kpro R vs T	0.7	2.013	1.683	2.408	<.0001	
	medaff Y vs N	0.245	1.277	1.117	1.461	0.0004	
	numbeds_cat >200 vs <=200	0.237	1.267	1.093	1.469	0.0017	
	trauma Y vs N	0.666	1.947	1.119	3.387	0.0183	
PVBY	Intercept	-5.452	.	.	.	.	0.716
	age_cat <=58 vs >58	0.581	1.788	1.305	2.45	0.0003	
	asa_cat >3 vs <=3	0.44	1.552	1.13	2.132	0.0067	
	duration10	0.022	1.023	1.008	1.037	0.0018	
	medaff N vs Y	0.739	2.094	1.528	2.871	<.0001	
	numbeds_cat >200 vs <=200	1.044	2.84	1.727	4.671	<.0001	
REC	Intercept	-5.531	.	.	.	.	0.678
	duration10	0.049	1.05	1.029	1.072	<.0001	
	gender M vs F	1.021	2.776	1.34	5.75	0.006	
	swclass_cat CO/D vs C/CC	1.115	3.049	1.558	5.964	0.0011	
VHYS	Intercept	-3.918	.	.	.	.	0.93
	age10	-0.496	0.609	0.503	0.738	<.0001	
	duration_cat >99 vs <=99	0.409	1.505	1.023	2.213	0.0377	
	medaff Y vs N	1.093	2.984	1.936	4.598	<.0001	

Gamma
0.442
0.282
0.242
0.229
0.374

0.323
0.382
0.344
0.554
0.457

2a.29. Data Dictionary or Code Table

http://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf

http://www.cdc.gov/nhsn/PDFs/OperativeProcedures.pdf

http://www.cdc.gov/nhsn/PDFs/ImportingProcedureData_current.pdf

http://www.cdc.gov/nhsn/PDFs/pscManual/14_Tables_of_Instructions.pdf

http://www.cdc.gov/nhsn/PDFs/pscManual/16pscKeyTerms_current.pdf

National Healthcare Safety Network (NHSN) Surgical Site Infection (SSI) Outcome Measure

Additional Information Section Attachment Ad.11

SPECIFICATIONS

2a.3. Numerator Details

5) Definition of SSI

b) organ/space

REPORTING INSTRUCTIONS: (NOTES)

Table 1. Specific sites of an organ/space SSI.

Code	Site	Code	Site
BONE	Osteomyelitis	LUNG	Other infections of the respiratory tract
BRST	Breast abscess or mastitis	MED	Mediastinitis
CARD	Myocarditis or pericarditis	MEN	Meningitis or ventriculitis
DISC	Disc space	ORAL	Oral cavity (mouth, tongue, or gums)
EAR	Ear, mastoid	OREP	Other infections of the male or female reproductive tract
EMET	Endometritis	OUTI	Other infections of the urinary tract
ENDO	Endocarditis	SA	Spinal abscess without meningitis
EYE	Eye, other than conjunctivitis	SINU	Sinusitis
GIT	GI tract	UR	Upper respiratory tract
IAB	Intraabdominal, not specified else-w -where	VASC	Arterial or venous infection
IC	Intracranial, brain abscess or dura	VCUF	Vaginal cuff
JNT	Joint or bursa		

Table 2. NHSN Principal Operative Procedure Selection Lists To be used to determine operative procedure to attribute SSI to when multiple procedures were performed through the same incision and during the same trip to the operating room, when the SSI cannot clearly be attributed to one.

The following lists are derived from Table 1, NHSN Operative Procedure Categories. The operative procedures with the highest risk of surgical site infection are listed before those with a lower risk.		
Priority	**Code**	**Abdominal Operations**
1	SB	Small bowel surgery
2	KTP	Kidney transplant
3	LTP	Liver transplant
4	BILI	Bile duct, liver or pancreatic surgery
5	REC	Rectal surgery
6	COLO	Colon surgery
7	GAST	Gastric surgery
8	CSEC	Cesarean section
9	SPLE	Spleen surgery
10	APPY	Appendix surgery
11	HYST	Abdominal hysterectomy
12	VHYST	Vaginal Hysterectomy
13	OVRY	Ovarian surgery
14	HER	Herniorrhaphy
15	CHOL	Gall bladder surgery
16	AAA	Abdominal aortic aneurysm repair
17	NEPH	Kidney surgery

The following lists are derived from Table 1, NHSN Operative Procedure Categories. The operative procedures with the highest risk of surgical site infection are listed before those with a lower risk.		
18	XLAP	Laparotomy
Priority	**Code**	**Thoracic Operations**
1	HTP	Heart transplant
2	CBGB	Coronary artery bypass graft with donor incision(s)
3	CBGC	Coronary artery bypass graft, chest incision only
4	CARD	Cardiac surgery
5	THOR	Thoracic surgery
Priority	**Code**	**Neurosurgical (Spine) Operations**
1	RFUSN	Refusion of spine
2	FUSN	Spinal fusion
3	LAM	Laminectomy
Priority	**Code**	**Neurosurgical (Brain) Operations**
1	VSHN	Ventricular shunt
2	CRAN	Craniotomy
Priority	**Code**	**Neck Operations**
1	NECK	Neck surgery
2	THYR	Thyroid and or parathyroid surgery

2a.19. Describe (Type of Score-Ratio)

The SIR is the ratio of the observed number of SSI to the expected number of SSI.

2a.20. Interpretation of Score

An SIR of 1.0 should be interpreted as indicating that the number of SSIs the facility observed is no different than if its experience had been the same as that of the standard population. Because the SIR is an estimate based on calculations of reported data, confidence limits are calculated to allow for accurate interpretation of the SIR. If these confidence limits include a value of 1.0, the SIR should be interpreted as if it was 1.0. An SIR significantly greater than 1.0 (i.e., where the confidence limits exclude 1.0) indicates an excess of observed events over the predicted number of events; conversely, an SIR of significantly less than 1.0 indicates that fewer events were observed than predicted. The confidence intervals around the SIR depend on several factors, including the number of facilities reporting data regarding the relevant operative procedures, the number of operative procedures reported, and the types of facilities reporting.

IMPORTANCE

1c.5. Rating of Strength/Quality of Evidence *(Also provide narrative description of the rating and by whom)*

The Guideline for Prevention of Surgical Site Infection, 1999, provides recommendations concerning reduction of surgical site infection risk. Each recommendation was categorized on the basis of existing scientific data, theoretical rationale, and applicability. Below is what was published regarding the methods of prioritizing recommendations:

Category I recommendations, including IA and IB, are those recommendations that are viewed as effective by HICPAC and experts in the fields of surgery, infectious diseases, and infection control. Both Category IA and IB recommendations are applicable for, and should be adopted by, all healthcare facilities; IA and IB recommendations differ only in the strength of the supporting scientific evidence.
Category II recommendations are supported by less scientific data than Category I recommendations; such recommendations may be appropriate for addressing specific nosocomial problems or specific patient populations. No recommendation is offered for some practices, either because there is a lack of consensus regarding their efficacy or because the available scientific evidence is insufficient to support their adoption. For such unresolved issues, practitioners should use judgement to determine a policy regarding these practices within their organization. Recommendations that are based on federal regulation are denoted with an asterisk.

B. RANKINGS

Category IA. Strongly recommended for implementation and supported by well-designed experimental, clinical, or epidemiological studies.
Category IB. Strongly recommended for implementation and supported by some experimental, clinical, or epidemiological studies and strong theoretical rationale.
Category II. Suggested for implementation and supported by suggestive clinical or epidemiological studies or theoretical rationale.