Surgical Site Infection (SSI) Reporting:

Electronic Surveillance with Surgery Interface Streamlines the Process

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Introduction

The impact of surgical site infections (SSIs) on patients, hospitals, and the healthcare system is enormous. Nearly 300,000 SSIs occur in U.S hospitals each year, representing 22% of all healthcare-associated infections (HAIs).[1] Surgical site infections impact 2–5% of patients undergoing inpatient surgery, and patients with an SSI have significantly higher risk of death compared with patients without an SSI.[2,3,4]

Surgical site infections also add 7–10 postoperative hospital days and cost an additional $3,000–$19,000 each, depending on the procedure and pathogen—for an estimated $10 billion annually.[3,5,6,7,8] Importantly, these figures do not include the additional costs of rehospitalization, post-discharge outpatient expenses, and long-term disabilities.[1]

To address this significant and costly patient safety threat, a growing number of state health departments have mandated that hospitals publicly report SSIs in order to provide incidence, trend, and benchmarking information for hospitals and public health officials, as well as help patients make more informed decisions about their healthcare. Many state SSI mandates include a requirement that healthcare facilities report SSIs through the CDC's National Healthcare Safety Network (NHSN), an online system that facilitates standardized reporting of infections and other patient safety information.

For example, the California Department of Public Health recently began requiring that hospitals collect and report through the NHSN data on 29 different surgical procedures and resulting site infections, including denominator data for each procedure.[9] Other states that mandate use of the NHSN for reporting SSIs include Colorado, Illinois, Massachusetts, New Hampshire, New Jersey, New York, Nevada, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Vermont, and Washington.[10] In addition, hospitals nationwide participating in the Centers for Medicare and Medicaid Services Reporting Hospital Quality Data for Annual Payment Update program will be required to submit data via the NHSN for SSIs beginning January 2012.[11]

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While SSI reporting requirements are essential in the battle against HAIs, infection preventionists (IPs) and hospitals are rightly concerned that the increased time needed for data collection and reporting will further tax already over-burdened infection prevention staffs, taking away time that could be spent on other important patient safety efforts. For example, California SSI reporting requirements call for surveillance for an SSI for up to 30 days post-procedure, or for one year for any procedure with a surgical implant. As a result, the amount of time spent on monitoring and data collection quickly adds up.

In fact, the California Association for Professionals in Infection Control and Epidemiology (APIC) Coordinating Council recently estimated that it would take about 60 minutes per chart to complete all required surgical implant case reviews.[12] The CDC estimates that the annual time burden for reporting SSIs among all hospitals in the country at 540,000 hours.[13] Finding extra staff and resources to manually collect and review the required data and enter it into the NHSN online system will be difficult and costly for most hospitals. According to the California APIC Coordinating Council, facilities may face the difficult choice of eliminating other critical infection prevention tasks in order to comply with mandatory reporting of SSIs.[12]

These and other infection reporting requirements highlight the growing need for clinical surveillance systems such as the TheraDoc® Infection Control Assistant® from Premier, Inc. to facilitate electronic data collection and reporting, and to prevent IPs from becoming bogged down in cumbersome manual data collection and reporting activities.[14] For facilities using the TheraDoc system, a surgery interface is available to help hospitals meet these new infection data reporting requirements in an efficient and cost-effective manner. This white paper provides key considerations for ensuring the most streamlined and efficient process for gathering data and reporting it via the NHSN online system in order to comply with the SSI mandate, as well as other state infection reporting requirements.

Getting Started

Infection preventionists should begin by talking to their surgery and information technology (IT) departments about factors such as the data elements required for SSI reporting, availability of key data in surgery and other information systems, methods for extracting data, and data standardization. Coordination among departments is imperative in light of the shared goal of meeting the various reporting requirements and improving the quality and safety of surgical procedures at their institutions.

Processes should be designed to collect the required data elements in a structured manner. The NHSN requires a number of attributes for all surgical procedures, plus additional data for specific surgical procedures. Infection preventionists must ensure that their facility's surgery information system is collecting these data, or that the data are available in other information systems, in order to reduce the need for time-consuming manual chart audits.

The NHSN requires the following attributes for all surgical procedures:

- NHSN category
- Procedure start and stop date/duration
- Wound class
- ASA class
- Outpatient
- Emergency
- General anesthesia
- Trauma
- Endoscope
- Implant

The NHSN conditionally requires the following attributes for specific procedures:

- For FUSN (spinal fusion) or RFUSN (refusion of spine)—Diabetes mellitus, spinal level, and approach technique
- For KPRO (knee prosthesis)—Knee replacement type
- For HPRO (hip prosthesis)—Hip replacement type
- For CSEC (caesarean section)—Duration of labor, height, and weight

Extracting Data From Surgery Information Systems

There are several methods for extracting required data from the surgery information system to send to a facility's clinical surveillance system. As a result, infection preventionists should consult with their IT departments to discuss possible options, including:

- HL7 interface—This is the real-time method for sending data from the facility's surgery system to its surveillance vendor (to then export to the NHSN). Note that some surgery vendors may charge additional fees to build or enable this outbound interface.
- Batch flat file extraction—Some facilities are able to have their IT staff write a database query or extraction program to pull the required data from the surgery system (or a combination of multiple systems) and produce a daily extract that could then be sent to their surveillance vendor. This is the most common method of extracting data.
- Excel file augmented by IP—In rare instances, the IP will receive a file of surgery patients and then manually augment it before it is sent to the clinical surveillance system. This augmentation typically includes required NHSN data elements such as wound class, ASA score, duration of labor for C-section procedures, etc.

NHSN Operative Procedure Categories

In In order to submit data to the NHSN and benchmark with NHSN data, an NHSN operative procedure category must be assigned for each procedure reported.[9] There are various methods for assigning the appropriate NHSN operative procedure category. Consultation with the facility's IT department will help infection preventionists determine and implement the best approach. Possible methods include:

- Provide data in the interface record. Some facilities build a relationship table in their surgery system or interface engine that will supply the correct NHSN operative procedure code for each surgical record. This can then be sent across the interface to their surveillance vendor.
- Provide a lookup table for the vendor. This allows the vendor to assign the correct NHSN operative procedure code when a specific procedure comes across the interface.
- Vendor to assign an NHSN operative procedure. The vendor would assign NHSN operative procedure categories based on the ICD-9 codes sent via the surgery interface. Some vendors, such as TheraDoc, provide vocabulary-mapping services to convert ICD-9 codes to NHSN operative procedure code as part of their system implementation. This mapping service also can be used to help pre-populate additional NHSN-required data fields as described below.

If facilities are able to provide ICD-9 codes from their medical records billing database, some systems, such as the TheraDoc Infection Control Assistant, can use these codes to infer some procedure attributes when the surgery system does not provide the data. For example, for ICD-9 code "81.04–Dorsal and dorsolumbar fusion anterior technique," the TheraDoc system can assign the correct NHSN operative procedure category of "FUSN," assign the approach technique of "Anterior," and assign the spinal level of "Dorsal/Dorsolumbar."

Some surgery systems use current procedural terminology (CPT) codes rather than ICD-9 codes. While the NHSN currently does not provide a CPT to ICD-9 conversion table, one is expected to be available 2012. In addition, the Department of Health and Human Services (HHS) is continuing their plans for the go live of the ICD-10 coding system for medical diagnosis and inpatient procedures electronic claims submission with a proposed compliance date of October 1, 2014.[16,17]

Compiling Data from Multiple Sources

If a facility is able to provide an interface from its surgery documentation (or anesthesia) system, this should be used instead of a surgery scheduling system, provided all required data elements can be supplied in the interface. Often it is the documentation or coding system that best reflects what was actually performed, and this system may also contain ICD-9 codes that are needed for assigning the correct NHSN operative procedure code for required procedures.

Occasionally, facilities will need both the documentation system and the scheduling system (and sometimes even a billing interface for ICD-9 codes) to have a complete record with all required data

elements. If the facility is not able to combine these data into one interface record prior to sending it to the surveillance vendor, some vendors, including TheraDoc, can accept data from multiple interfaces. If each interface provides similar patient identifiers, account number, and procedure date, the data can be combined.

Infection preventionists also should check with their surgery departments to see if all NHSN-required procedures performed at their facility are recorded in their systems. For example, C-section procedures often are documented in a separate labor and delivery information system and may not be available in the surgery interface. In this case, a separate interface or extraction from the labor and delivery system is needed in order to obtain procedure records for surveillance and reporting.

Benefits of TheraDoc for SSI Reporting

The TheraDoc system allows facilities to carry out focused and targeted SSI surveillance by only looking at microbiology data or readmission data for patients who had a surgical procedure. It streamlines the process of identifying actual SSI infections, classifying them using NHSN criteria, linking supporting data to the record to justify classification, and finalizing the confirmed infections—making them available for reporting and analysis.

Re-admission Surveillance

The TheraDoc system also makes surgery data available for prospective and real-time surveillance. For example, historical records can be used to watch for surgery patients being readmitted to the hospital within 30 or 365 days and generate an alert when a surgical patient is readmitted.

Exporting to NHSN

The TheraDoc system provides the ability to aggregate surgical procedures, validate against NHSN business rules, and then export batched (denominator) records to the NHSN using the TheraDoc NHSN Clinical Document Architecture (CDA) export capability. This capability can streamline the process and significantly reduces the time it takes to enter these data into the NHSN.

The process of reporting SSI (numerator) cases using the TheraDoc NHSN CDA export capability ensures that cases are valid and comply with NHSN business rules, correct and valid procedures are linked to the case, and

all appropriate case attributes are assigned. TheraDoc clients have been successfully using the CDA export functionality to report SSIs since 2009.

Risk-Stratified SSI Reports

The TheraDoc system also makes multiple surgery data points available so that surgical procedure denominators, required by the NHSN for SSI reporting, can easily be acquired by the user — eliminating significant staff time that would otherwise be required to obtain this data. The SSI risk index is computed for each procedure, allowing users to build robust SSI rate reports and dashboards that include the ability to compare with NHSN benchmarks for specific infection types and the ability to produce surgeon-specific and other ad hoc SSI reports. (Note that in order to calculate a risk index and benchmark with NHSN, the data must contain the correct start and stop times, NHSN operative code, ASA score, and wound class for each procedure.)[18]

Collaboration is Key

For IPs, a key to successful implementation of NHSN reporting for SSIs is obtaining a commitment from the facility's IT and surgery staffs to work on obtaining and validating the required data. Collaboration is needed to ensure that as much data as possible is obtained from the surgery system. This may require changes in the surgery extract or interface to make sure the needed data are coming across correctly. Understanding the time and effort needed and allocating sufficient time to the process is critical to success. This upfront effort can result in streamlined collection and reporting of good, valid data, as well as a reduced need for manual processes.

Conclusion

Putting the procedures in place to facilitate efficient SSI data collection and reporting requires a robust and flexible clinical surveillance system, as well as close collaboration with a facility's surgery and IT departments. TheraDoc has successfully implemented more than 50 surgery interfaces from more than 15 different source systems. Infection preventionists taking a leadership role in the collection and reporting of SSI data can leverage TheraDoc's knowledge and expertise in helping to set up an effective system that will meet the dual goals of complying with state SSI reporting requirements, while minimizing the burden on infection prevention staff.

Important Considerations about Reporting SSI Data via NHSN

Interfacing surgery data with a facility's clinical surveillance system such as the TheraDoc Infection Control Assistant® is an effective way to meet SSI reporting requirements through the NHSN. Below are a number of important considerations in order to make the process run as smoothly as possible.

One NHSN Code Per Surgery Record

The NHSN will support only one NHSN operative procedure code per surgery record, so facilities must follow NHSN business rules for reporting surgical procedure denominators.

"If procedures in more than one NHSN operative procedure category are performed during the same trip to the OR, even if performed through the same incision, a Denominator for Procedure (CDC 57.121) record is reported for each operative procedure being monitored. For example, if a CARD[i] and CBGC[ii] are done through the same incision, a Denominator for Procedure record is reported for each."[15] Therefore, two (or more) separate surgery records should be created prior to transmitting the records across the interface to the surveillance vendor.

Multiple Procedures Through Same Incision Within 24 Hours

If more than one procedure is performed through the same incision within 24 hours, users should modify the end time of the procedure to reflect the combined operative times for both procedures. "If a patient goes to the OR more than once during the same admission and another procedure is performed through the same incision within 24 hours of the original operative incision, report only one procedure on the Denominator for Procedure form combining the duration for both procedures."[15]

Bilateral Procedures

For bilateral procedures, the NHSN requires that facilities split the procedure, which should be done before sending procedure information to their surveillance vendor. "For bilateral operative procedures (e.g. KPRO[iii]), two separate Denominator for Procedure (CDC 57.121) records are completed. To document the duration of the procedure, indicate the incision time to closure time for each procedure separately or, alternatively, take the total time for both procedures and split it evenly between the two."[15]

i   CARD - cardiac surgery
ii CBGC - coronary artery bypass graft
iii KPRO - knee prosthesis

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Glossary:

Interface—A point of interaction between components, applicable to both computer hardware and software. An interface allows a component to communicate with other components via an input/output system and an associated protocol.

HL7 Interface—Health Level Seven (HL7) is an all-volunteer, nonprofit organization involved in the development of international healthcare informatics interoperability standards. HL7 also refers to some of the specific standards created by the organization.

Operative Procedure Category—Categories of medical procedures and codes created by the Centers for Disease Control and Prevention, which are used in the reporting of surgical site infections to the NHSN.

Lookup Table—An array or matrix of data that contains items that are searched, for example an invoicing system that looks up the price of various products.

NHSN Business Rules—NHSN rules that require specific information to be included for each type of infection reported. If any of the required information is missing, an error message will result, and the information will need to be entered in order to successfully complete the NHSN reporting process.

Clinical Document Architecture (CDA)—A Health Level 7 (HL7) standard that provides the framework for formatting of electronic documents. The NHSN system has been enabled to accept electronic infection reports, denominator data, and process of care data from commercial infection surveillance systems such as TheraDoc using CDA.

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