AMERICAN COLLEGE OF SURGEONS
Inspiring Quality: Highest Standards, Better Outcomes
SSI Measure Harmonization
ACS NSQIP and CDC NHSN

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2012 ACS NSQIP National Conference
Salt Lake City, July 21-24
National Surgical Quality Improvement Program- NSQIP

Private QI

National Healthcare Safety Network- NHSN

Government Surveillance
What is the National Healthcare Safety Network?

“The NHSN is a secure, Internet-based surveillance system that expands and integrates former CDC surveillance systems, including the National Nosocomial Infections Surveillance System (NNIS), National Surveillance System for Healthcare Workers (NaSH), and the Dialysis Surveillance Network (DSN). Some U.S. states utilize NHSN as a means for healthcare facilities to submit data on healthcare-associated infections (HAIs) mandated through their specific state legislation.”

-cdc.gov

“Within the Patient Safety Component, like-types of surveillance are grouped into modules, each concerned with healthcare procedures, devices, or medications associated with HAIs.”

-cdc.gov
“Specific types of surveillance within the Patient Safety Component are:

Device-associated Module:
- CLABSI - Central line-associated bloodstream infection
- CLIP - Central line insertion practices adherence
- VAP - Ventilator-associated pneumonia
- CAUTI - Catheter-associated UTI
- Dialysis Event

Procedure-associated Module:
- SSI - Surgical site infection
- PPP - Post-procedure pneumonia

- Medication-associated Module
- Multidrug-Resistant Organism/CDiff Module
- Vaccination Module

-cdc.gov
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-cdc.gov
“Modules may be used singly or simultaneously and each module has its own minimum time period for required participation (see individual modules). Regardless of the combination of modules in which a facility chooses to participate, a total of 6 months of data must be reported annually to NHSN for continued participation.”

-cdc.gov
“Some of the options in the following modules require active, patient-based, prospective surveillance of events and their corresponding denominator data by a trained Infection Preventionist (IP). This means that the IP shall seek out infections during a patient’s stay by screening a variety of data sources, such as laboratory, pharmacy, admission/discharge/transfer, radiology/imaging, and pathology databases, and patient charts, including history and physical exam notes, nurses/physicians notes, temperature charts, etc. Others may be trained to screen data sources for these infections, but the IP must make the final determination. Retrospective chart reviews should be used only when patients are discharged before all information can be gathered.”

-cdc.gov
“Surgical site infection (SSI) and post-procedure pneumonia (PPP) monitoring … require active, patient-based, prospective surveillance. PPP events are monitored only for patients undergoing inpatient operative procedures and only during the patient’s stay (i.e., post-discharge surveillance methods are not used for PPP). However both post-discharge and ante-discharge surveillance methods should be used to detect SSIs following in- and outpatient operative procedures.”

-cdc.gov
“… methods include
1) direct examination of patients’ wounds during follow-up visits to either surgery clinics or physicians’ offices,
2) review of medical records or surgery clinic patient records,
3) surgeon surveys by mail or telephone, and
4) patient surveys by mail or telephone (though patients may have a difficult time assessing their infections).

Any combination of these methods is acceptable for use; however, CDC criteria for SSI must be used.”

-cdc.gov
In 2010, both the ACS-NSQIP and the CDC-NHSN developed and submitted measures related to SSI following surgical procedures to the NQF for consideration of approval.

Neither organization had known beforehand that the other was developing an SSI measure.

The CDC-NHSN had a previous NQF approval of the NHSN surveillance system.

Both measures (NSQIP, NHSN) were favorably received by the NQF, but the NQF the two organizations to see if the two approaches to measurement could be “harmonized” into one consolidated approach.
The ACS NSQIP Measure was based on
Deep and Organ Space infections (derived CDC definitions)
Within 30 d of NSQIP index procedures.
Normal NSQIP CPT-based inclusion / exclusion rules.
Endovascular included.
>=18yo

Hierarchical Risk Adjustment based on a parsimonious set:
   CPT linear risk
   ASA Class
   Wound Class
Rigorous definitions of all variables

Reliability-
   0.4    with    428 cases
   0.7    with    1495 cases
The CDC NHSN Measure was based on Deep and Organ Space infections identified “during admission or readmission after selected inpatient operative procedure categories” in the NHSN (not 30d). Follow up for one year if implant.
10 eligible procedure areas, all ages:
AAA, HPRO,
CABG, HYST,
CARD, PVBY,
COLO, REC,
KPRO, VHYS.
Areas defined textually & with ICD examples. No endovasc.

“Cases are included if the date of the procedure to which the SSI is attributed is a month in which that procedure was selected for surveillance.” 100% sample within period.
“A “NHSN Operative Procedure”

“… takes place during an operation (defined as a single trip to the operating room where a surgeon makes at least one incision through the skin or mucous membrane, including laparoscopic approach, and closes the incision before the patient leaves the OR…”

“If a patient has several NHSN operative procedures prior to an infection, report the operation that is performed most closely in time to the infection, unless there is evidence that the infection is associated with a different operation.”

“Assign the date when the first signs or symptoms (clinical evidence) appeared…”
“If more than one NHSN operative procedure was done through a single incision, attempt to determine the procedure that is thought to be associated with the infection.

If it is not clear (as is often the case when the infection is superficial) or if the infection site being reported is not an SSI, use the NHSN principal operative procedure selection lists to select which operative procedure to report.”

Selection list:  
1. small bowel surgery  
2. kidney transplant  
3. liver transplant  
4. bile duct, liver, or pancreatic surgery  
5. rectal surgery  
6. colon surgery  
7. gastric surgery … (cont)
Other NHSN criteria

Implant: “A non-human derived object, material, or tissue that is permanently placed in a patient during an operative procedure and is not routinely manipulated for diagnostic or therapeutic purposes.
Examples:
Heart valves
Mechanical heart
Metal rods
Mesh
Sternal wires
Screws, cements, tacks, staples…

Implant mandates 1 yr. followup…”
Risk Adjustment based on Multivariable logistic regression
Duration (additive 24 hrs), wound class, age, gender, ASA, emergency ("non-elective not scheduled case"), endoscope use, primary vs revision, partial vs total, bed size, med school, blood loss

Reliability- (?)

“A data sample of sufficient size will be necessary to generate meaningful SIRs therefore the time window [of data collection] may vary…”

SIRs- across categories (indirect standardization)
Outliers- p-test, “changes over time”
CDC estimated 8 minutes to gather case information, additional 30 mins to gather event information if pertains.

“If a hospital performs 70 procedures per month with 2 infections this requires 124 hrs per year.” Data collection personnel cost of $4464 per hospital per year
From Dec 2010 to April 2011, the ACS and CDC worked toward creating a measure model that could be satisfied at present through EITHER system (NSQIP, NHSN),

With both programs making any necessary adjustments in the short or intermediate term.
NQF 0753: “American College of Surgeons – Centers for Disease Control and Prevention (ACS-CDC) Harmonized Procedure Specific SSI Outcome Measure.”

Prototype for facility adjusted SIR of deep / organ space SSI. (NHSN- “DIP”- deep incisional primary or OS)

Systematic retrospective sampling of NHSN Routine NSQIP Data collection for period

Two operative procedure areas- COLO, HYST, more to come ICD/text vs CPT (investigated others- KPRO, REC….)
Events before discharge, on readmission to same, during postop care, or admission to another hospital (“post discharge surveillance”). Limited to 30d.

NSQIP / NHSN Indicator

Ignore implants

“patients without primary closure of the surgical incision are not considered eligible cases…(NHSN)”
-NSQIP variable on wound closure

NSQIP PATOS qualifier- NHSN cant match now but working on this
NQF 0753:

Sampling on 8-day cycles
Risk adjustment: Hierarchical with reliability adjustment of age, ASA, (wound class removed)
(no CPT linear risk in focused groups)

Reliability: 42 Colon surgeries
  Reliability 0.5
  61% of hospitals
  92% of surgeries

200 Abdominal Hysterectomies
  Reliability of 0.4
  14% of hospitals
  50% of surgeries
Submission of data through NSQIP or NHSN for the current data period 2012.

Reporting according to Federal Register in 2013

Many states mandating NHSN- ignorance of NSQIP?
Submission of data through NSQIP or NHSN for the current data period 2012.

“We (CMS) are working with CDC on the collection of the Surgical Site Infection data. The data collection is consistent with the specifications, and as recommended by the CDC, we will be collecting data on 2 surgical procedure categories. This will not only reduce burden, but will allow the CDC to collect data in a phased roll out. Consistent with current NQF harmonization efforts underway for this measure, and based on recommendations by CDC, we will be collecting Surgical Site Infection data only for colon and abdominal.”

Federal Register 76(160)2011:51615
“We also note that the House Committee on Appropriations asked in its 2009 Report that CMS include in its “pay for reporting” system two infection control measures developed by the Hospital Quality Alliance (HQA)—Central line-associated bloodstream infections and a surgical site infection rate (H. Rep. No. 111–220, at 159 (2009)). In the report, the Committee stated that “if the measures are included in Hospital Compare, the public reporting of the data is likely to reduce HAI occurrence, an outcome demonstrated in previous research.”

Federal Register 76(160)2011:51616
“In the FY 2011 IPPS/LTCH PPS final rule, we adopted the two HAI measures identified by the House Committee on Appropriations in its 2009 report: Central Line [catheter] Associated Blood Stream Infection (CLABSI) measure, and Surgical Site Infection (SSI) measure. The CLABSI measure is currently being collected as part of the FY 2013 Hospital IQR measure set, and data submission on the measure began with January 2011 events. The Surgical Site Infection (SSI) measure is currently part of the FY 2014 Hospital IQR measure set, and data submission on the measure will begin with January 2012 events.”

Federal Register 76(160)2011:51616
The two-way exchange with the CDC has been very useful and appears to have benefitted both organizations.

ACS now has representatives on the CDC HICPAC working group (Ko, Hall, Dibbins).

ACS and CDC have signed MOU that each organization will contribute to ongoing collaborative efforts, including building out this SSI framework and exploring new areas (ie DVT).