Tracking Surgical Site Infections How, What, and When

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Susan has over 20 years of experience in infection prevention and control. She has been certified in infection prevention since 1991 and was the director of infection prevention and employee health for a large healthcare system in Missouri for many years. In this role, she developed insight and skills for applying infection prevention in all types of settings from acute care hospital to out-patient ambulatory. She worked extensively with her facility to investigate SSI's. Susan also has experience in teaching infection prevention and has recently begun a new career path as an infection prevention consultant. She is particularly interested in the development of effective infection prevention programs in settings with limited resources such as ambulatory and other stand-alone facilities.

Presenting: *Tracking Surgical Site Infections; How, What, When*

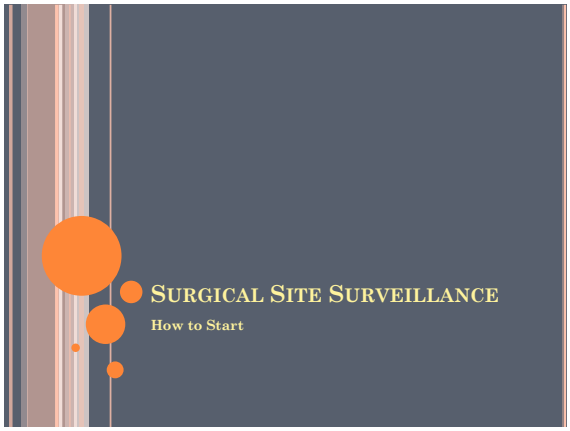
Purpose of Surveillance

- Provides **meaningful** data
  - Provides baseline information for prioritizing efforts for prevention
  - Provides follow-up information after changes are made
  - Allows for internal and external comparisons

Surveillance is your compass

Objectives

- Describe surveillance methods
- Define surgical site infections (SSI)
- Provide basic data analysis
- Introduce risk stratification



Risk Assessment

- Examine ASC scope of service
  - Determine type and volume of procedures
  - Assess patient populations
- Classify procedures by risk for complication
- Target specific procedures based on risk

Risk Assessment, con't

- Determine available methods for identifying SSI cases
- Determine reliable source(s) for denominator data
- Know who is interested in outcomes

Standardize All Definitions

- Surgical procedure
- Surgical site infection
- Peri-operative process
- Rates

Procedure Definition

- Skin or mucous membrane incision
  - including laproscopy
- Incision is primarily closed
  - Before the patient leaves the operating room (OR)

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

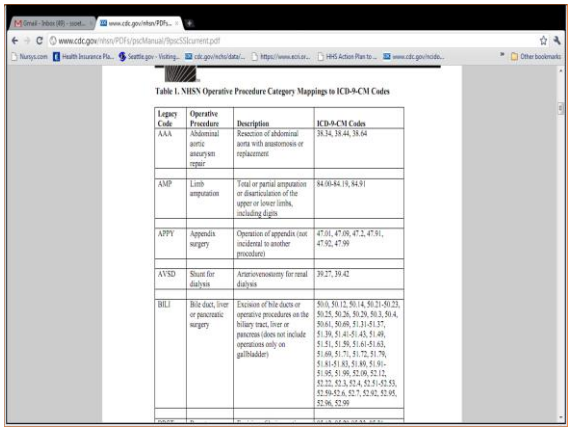


Table 1. NHSN Operative Procedure Category Mappings to ICD-9-CM Codes

Legacy Code	Operative Procedure	Description	ICD-9-CM Codes
AAA	Abdominal aortic aneurysm repair	Resection of abdominal aorta with anastomosis or replacement	38.34, 38.44, 38.64
AMP	Limb amputation	Total or partial amputation or disarticulation of the upper or lower limbs, including digits	84.00-84.19, 84.91
APPY	Appendix surgery	Operation of appendix (not incidental to another procedure)	47.01, 47.09, 47.2, 47.91, 47.92, 47.99
AVSD	Shunt for dialysis	Arteriovenostomy for renal dialysis	39.27, 39.42
BILI	Bile duct, liver or pancreatic surgery	Excision of bile ducts or operative procedures on the biliary tract, liver or pancreas (does not include operations only on gallbladder)	50.0, 50.12, 50.14, 50.21-50.23, 50.25, 50.26, 50.29, 50.3, 50.4, 50.61, 50.69, 51.31-51.37, 51.39, 51.41-51.43, 51.49, 51.51, 51.59, 51.61-51.63, 51.69, 51.71, 51.72, 51.79, 51.81-51.83, 51.89, 51.91-51.95, 51.99, 52.09, 52.12, 52.22, 52.3, 52.4, 52.51-52.53, 52.59-52.6, 52.7, 52.92, 52.95, 52.96, 52.99

SSI Definition

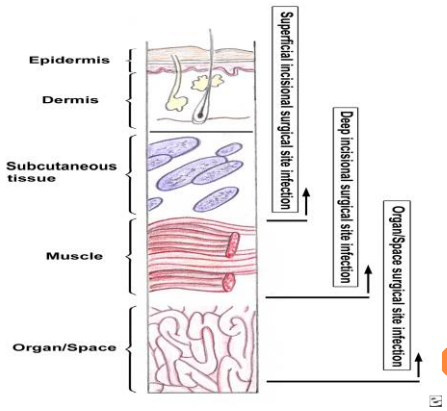
- Risk-Stratified
  - Procedure type
  - Depth of infection
  - Patient and procedure-specific risks for post-op infection
- National Healthcare Safety Network (NHSN)
  - Established, commonly used

Stratification

- The act of dividing into layers, classes, subpopulations in an ordered system
- Risk stratification divides a population into subpopulations based on certain risk factors
- In epidemiology, risk stratification allows for more meaningful comparisons

Definition by Depth of Infection

- "Types" of SSI
  - Level of tissue or body site involved
    - Superficial
    - Deep
    - Organ/space
- Deeper infection more significant
  - Morbidity/mortality
  - Cost



Basic Criteria for Each SSI Type

- Time interval between procedure and onset
  - 30 days
  - 12 months if implant present
- Signs or symptoms of infection
  - Positive culture alone does NOT meet definition!
- Presence of a prosthetic implant
  - Foreign body increases risk of infection
  - Onset may be delayed for months

Definition of Superficial SSI

- Onset must be within 30 days of procedure AND
- Infection limited to skin and/or subcutaneous tissue AND
- At least one of the following is present:
  - Purulent drainage
  - Aseptically obtained positive culture
  - Redness, swelling, heat, or pain AND incision deliberately opened by surgeon AND aseptically obtained culture positive or no culture obtained. Negative result not acceptable.
  - Surgeon or attending physician diagnosis

http://www.cdc.gov/nhsn/PDFs/slides/NHSN_PAModule.pdf

Definition of Deep SSI

- Time interval for onset
  - No implant limited to 30 days
  - With implant, up to 12 months and appears to be related to procedure
- Deep soft tissues (fascia and muscle) AND
- One or more of the following:
  - Purulent drainage
  - Fever, redness, pain AND spontaneous dehiscence or surgeon opens incision AND culture positive or no culture obtained. Negative culture not acceptable.
- Surgeon or attending physician diagnosis

http://www.cdc.gov/nhsn/PDFs/slides/NHSN_PAModule.pdf

Definition of Organ/Space SSI

- Time interval
  - No implant - 30 days
  - With implant - 12 months
- Involves organ or body space manipulated during the procedure AND
- One or more of following:
  - Purulence from drain into organ/space (O/S)
  - Positive aseptically obtained culture of fluid or tissue from O/S
  - Observation of abscess or other evidence of infection during reoperation or by radiologic or histopathologic exam
  - Surgeon or attending physician diagnosis

http://www.cdc.gov/nhsn/PDFs/slides/NHSN_PAModule.pdf

Questions?

SSI Surveillance Methods

How to Search for SSIs

Searching for Infected Cases

- Paper
  - Computer
- Phone
- People

SSI Surveillance Methods

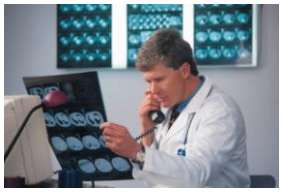
- Admission to hospital
  - ICP collaboration
- Hospital OR records
  - ICP collaboration
- Return to ASC for wound care
- ER or Urgent Care visits
  - Reporting form

Surveillance Methods, con't

- Office/clinic visits
  - Rapport with office staff
  - Reporting form
- Micro lab results
  - Requires lab affiliation with ASC
  - Requires additional follow-up
- Follow-up with patient
  - Phone call
  - Reporting form

Surveillance Methods, con't

- Surgeon self-report



Establishing Rapport

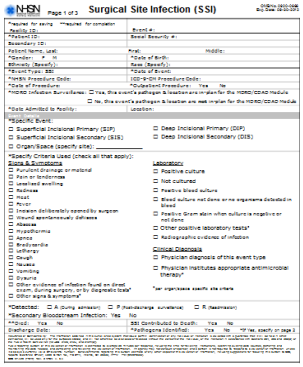
- Be credible
- Put face to name
- Give feedback

Example of Data Collection Form

Patient demographics

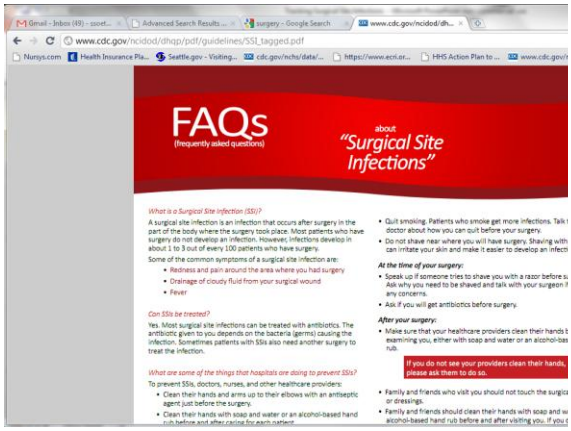
Details of Procedure

Details of SSI



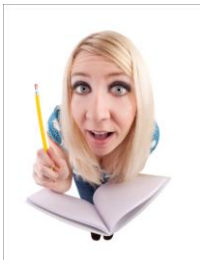
Surgical Site Infection (SSI)

http://www.cdc.gov/nhsn/PatientSafety.html



FAQs (frequently asked questions) about "Surgical Site Infections"

Questions?



Data Analysis

What to do with surveillance findings

Calculating SSI Rates

- Numerator (N) = # SSI case(s) related to specific procedure in specified time period
- Denominator (D) = # specific procedures in same specified time period
- Constant = 100

(N/D) X 100 = SSI rate per 100 procedures

Example

From Jan-June, 2010 500 lap choley procedures were done at your ASC. You identified 5 of these cases resulted in SSI. What is the **rate** of infection for this time period?

Numerator = 5 Denominator = 500

5/500 = 0.01

0.01 X 100 = 1 = 1 SSI for every 100 procedures
or
1%

Why Use a Rate?

- ***Meaningful*** comparisons

From Jan-March, 10 SSI's occurred
200 procedures were done
Rate is 5%

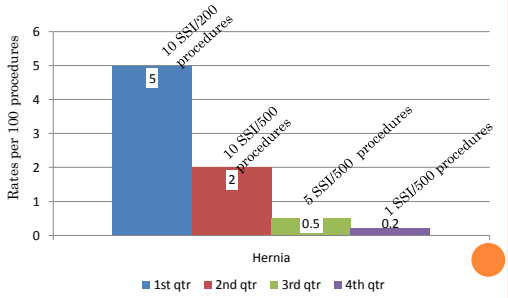
From Apr-July, 10 SSI's occurred
500 procedures were done
Rate is 2%

Example of Rate Comparison, con't

From July-September, 10 SSI's occurred
500 procedures were done
Rate is 2%

From September-December, 5 SSI's occurred
500 procedures were done
Rate is 0.5%

Hernia Surgical Site Infection Data by Quarter, 2010



Risk Stratified Rates

- Means of grouping similar population by risks
  - Better "apples to apples" comparisons
- NHSN risk stratification
  - Same procedure
  - Surgeon
  - ASA score
  - Duration
  - Wound class

Risk Index (Stratification Score)

- Risk index is group with same risks for post-op infection
  - Co-morbidities at time of surgery (ASA score)
  - Degree of wound contamination
  - Incision time (duration from cut to close)
- Risk index groups range from 0, 1, 2, or 3
  - ASA >2 = 1 point
  - Duration> T time = 1 point
  - Wound class contaminated or dirty = 1 point

Examples: Risk Stratification and Index

- Patient A underwent lap chole
  - ASA score 4 = 1
  - Wound class clean = 0
  - Duration < time = 0
  - Risk index = 1
- Patient B had lap chole
  - ASA score 2 = 0
  - Wound class 1 = 0
  - Duration <T time = 0
  - Risk index = 0

Example of Risk Stratification Table for Each Case

	Patient A	Patient B	Patient C	Patient D
Lap chole	Yes	Yes	Yes	Yes
Surgeon	Jones	Smith	Jones	Jones
ASA score >2	0	1	1	1
Wound class >2	0	0	0	1
Duration > T time	0	0	1	1
Risk index	0	1	2	3

Example of Risk Stratification Table for Sum of All Cases

OP Lap Chole	Total Cases	Risk Index 0	Risk Index 1	Risk Index 2	Risk Index 3
Total # of cases	1605	500	1000	100	5
# Cases by Dr. Jones	1005	400	500	90	5
# Cases by Dr. Smith	600	100	500	10	0

Example of Risk Stratification Table for Infected Cases Only

OP Lap Chole SSI	Total	Risk Index 0	Risk Index 1	Risk Index 2	Risk Index 3
# SSI	9	0	5	3	1
# SSI by Dr. Jones	7	0	4	2	1
# SSI by Dr. Smith	2	0	1	1	0

Example of Risk Stratified Rates

OP Lap Chole	Pooled (No Risk Index)	Risk Index 0	Risk Index 1	Risk Index 2	Risk Index 3
Total # Cases Performed	1605	500	1000	100	5
# SSI	9	0	5	3	1
SSI rates	9/1605 0.56	0/500 0.00	5/1000 0.5	3/100 3.0	1/5 20.0

Comparison of Stratified Rates to NHSN Rates

Out-patient lap chole	Risk Index 0	Risk Index 1,2,3
NHSN rates	6/5696 0.11	15/4379 0.34
ASC A rates	0/500 0.00	9/1105 0.81

Questions?

Summary for SSI Surveillance

- Assess risks
- Prioritize
- Define methodology
- Collect data
- Analyze
- Give feedback

Resources

- Centers for Disease Control and Prevention (CDC)
  - http://www.cdc.gov/ncidod/dhqp/pdf/hicpac/PublicReportingGuide.pdf
  - http://www.cdc.gov/nhsn/
  - http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/SSI.pdf
- Society for Healthcare Epidemiology of America (SHEA)
  - http://www.shea-online.org/about/compendium.cfm
- Institute for Healthcare Improvement (IHI)
  - http://www.ihi.org
- National Quality Forum (NQF)
  - http://www.qualityforum.org

What Have You Learned?