



Central Line Infections: Surveillance.... Where does one begin?

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Objectives

- To understand what is surveillance
 - Definition
 - general, CL, CLI
 - Data collection
 - (numerator/denominator)
- To apply our learnings into a case scenario

Abbreviations

CCIS=Critical Care Information System

CDC=Centers for Disease Control and Prevention

CVC=central venous catheter

CL=central line

CLI=central line infection

HAIs=Health care-associated Infections

Abbreviations

IHI = Institute for Healthcare Improvement

LCBSI = Laboratory-confirmed bloodstream infection

NHSN = National Healthcare Safety Network

NNIS = National Nosocomial Infections Surveillance

PIDAC = Provincial Infectious Diseases Advisory Committee

Surveillance

- “Surveillance is the systematic ongoing collection, collation and analysis of data with timely dissemination of information to those who require it in order to take action.
- The actions usually relate to improvements in prevention or control of the condition. “

Ministry of Health and Long-Term Care, Provincial Infectious Diseases Advisory Committee (PIDAC), *Best Practices for Surveillance of Health Care-Associated Infections in Patient and Resident Populations*, June 2008.

Why Should We Do It?

Background

○ HAIs

- 4th leading cause of death in Canada
8,000 deaths per year¹
- 220,000 patients acquire an infection
- Costs billions of dollars! (national)
- 1/3 to 1/2 are preventable

1. Zoutman DE, Ford BD, Bryce E, Gourdeau M, Hebert G, Henderson E, et al. The state of infection surveillance and control in Canadian acute care hospitals. *Am J Infect Control* 2003; 31(5):266-72; discussion 72-3.

Why Should We Do It?

- Evidence: a surveillance system for HAIs is assoc. with reductions in infection rates
- Useful to monitor the effectiveness of the infection prevention and control program
- CCIS data showed more than CL (50%) as common in the ICU setting
- 3rd HAI in the ICU setting

It's Harder Than You Think!

- NB to program plan to include surveillance goals and objectives
 - Determine available resources
- Standardize written definitions
 - Validate where possible
 - Use same definitions over time
 - Be aware of any changes in definitions or interpretation

Getting Started.....

- Commitment to implementing changes in care that have been proven to prevent avoidable deaths
 - Safer Healthcare Now (SHN)
 - <http://www.saferhealthcarenow.ca>
 - 5,000,000 Lives Campaign (Institute for Healthcare Improvement)
 - http://www.cdc.gov/ncidod/dhqp/nhsn_documents.html

Definition CL/CVC (denominator data)

- CVC is an intravascular catheter or a venous access device that terminates at or close to the heart or one of the great vessels
 - Great vessels as aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic, internal jugular, subclavian, external iliac and common femoral veins and umbilical artery and vein

Venous Access Devices

CVC/venous access devices include the following:

- **Temporary CL**
 - Non-tunneled CVC (standard, coated or non-coated)
 - Peripherally inserted CVC (PICC)
 - Umbilical artery and vein catheters
- **Permanent Central Line**
 - Tunneled devices (Broviac, Hickman, tunneled hemodialysis line which are external)
 - Implanted catheters (including ports, Groshong)



Hickman CVC



Porta cath



Venous Access Devices

CVC/venous access devices DO NOT include the following:

- Arterial catheters
- Pacemaker leads and other non-infusion devices inserted into the central blood vessels or heart

Definition CLI (Numerator Data)

- NB that you have a written case definition to follow
 - Do not sway from your case definition
 - Be strict and stick to it!
 - CDC: The National Healthcare Safety, Network (NHSN) Manual (Jan 2008)
 - http://www.premierinc.com/quality-safety/tools-services/safety/topics/guidelines/downloads/NHSN_Manual_PatientSafetyProtocol_CURRENT_b.pdf

Definition CLI

- Catheter in place at onset of BSI or within the 48 hours before the onset of BSI (if CVC removed >48 hours before onset there must be compelling evidence that the infection was associated with the CVC, e.g. purulent thrombophlebitis)

Definition BSI

Primary bloodstream infections are classified according to the criteria used, either as

- a) laboratory-confirmed bloodstream infection (LCBSI) or
- b) clinical sepsis (CSEP)
 - report only a primary BSI in neonates (< 30 days old) and infants (< 1 year old)

LCBSI Criterion 1

Patient has a recognized pathogen cultured from one or more blood cultures and

- organism cultured from blood is not related to an infection at another site

LCBSI Criterion 2

Patient has at least one of the following signs or symptoms (S/S): fever (>38oC), chills, or hypotension

and

- S/S and positive laboratory results (blood cultures) that are not related to an infection at another site

and

- common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*], spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans, group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures* drawn on separate occasions

LCBSI Criterion 3

Patient < 1 year of age has at least one of the following signs or symptoms: fever (>38°C, rectal), hypothermia (<37°C, rectal), apnea, or bradycardia

and

- signs and symptoms and positive laboratory results are not related to an infection at another site

and

- common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B.anthraxis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S.epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions

Relapse vs New Infection

Same microorganism:

Relapse

If < than 10 days from a neg culture
OR < than 10 days from completion
of appropriate antibx tx

New infection

If > than 10 days from a neg culture
and > 10 days from completion of
appropriate antibx tx



Sources of Data

- Microbiology
 - Significant findings: review and take immediate investigative action before the organism has been definitively ID
- Medical charts
- Interviews/ward rounds
- Temperature charts
- Diagnostic imaging



Denominator Data

- # of catheter days
- Count and record the # of patients with one or more CVC
 - If a patient has more than one CVC, this is counted as 1
- Count at approx the same time each day
- If you cannot obtain this information, then DO NOT PROCEED

Calculate Rates

CVC-associated BSI

of CVCBSI **X 1000**

of CVC-days

Neonates stratified by birth-weight per 1000
catheter days

Device utilization rate (CVC)

of CVC days

of patient days

Reporting

Reporting and using surveillance information

- Good report design (consistent)
- Interpret data with people who are trained in epi/data methodology
- Beware of potential problems with external comparisons
- Reports should stimulate improvement in process being measured

Case Scenario

- You are the ICP at a 500 bed facility
 - Non-Teaching facility
- From your goals and objectives for the year, you would like to collect CLI (mandatory) for the 10 bed medical-surgical ICU
- What are your immediate steps?

Step one

- Ask the question...do you have the resources to collect this data?
- Are you able to have one person collect the catheter days at approximately the same time each day?
 - The patient days can be obtained from the admitting department

Next Steps

- Define your case definition
- Use various sources of data collection
 - Microbiology
 - Significant findings
 - Medical charts
 - Interviews/ward rounds
 - Temperature charts
 - Diagnostic imaging

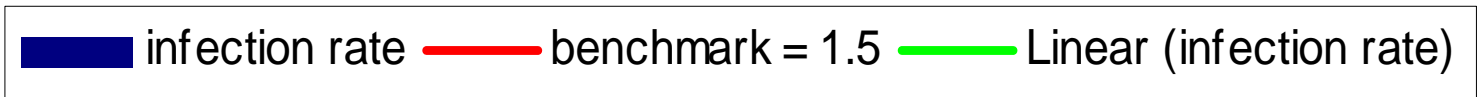
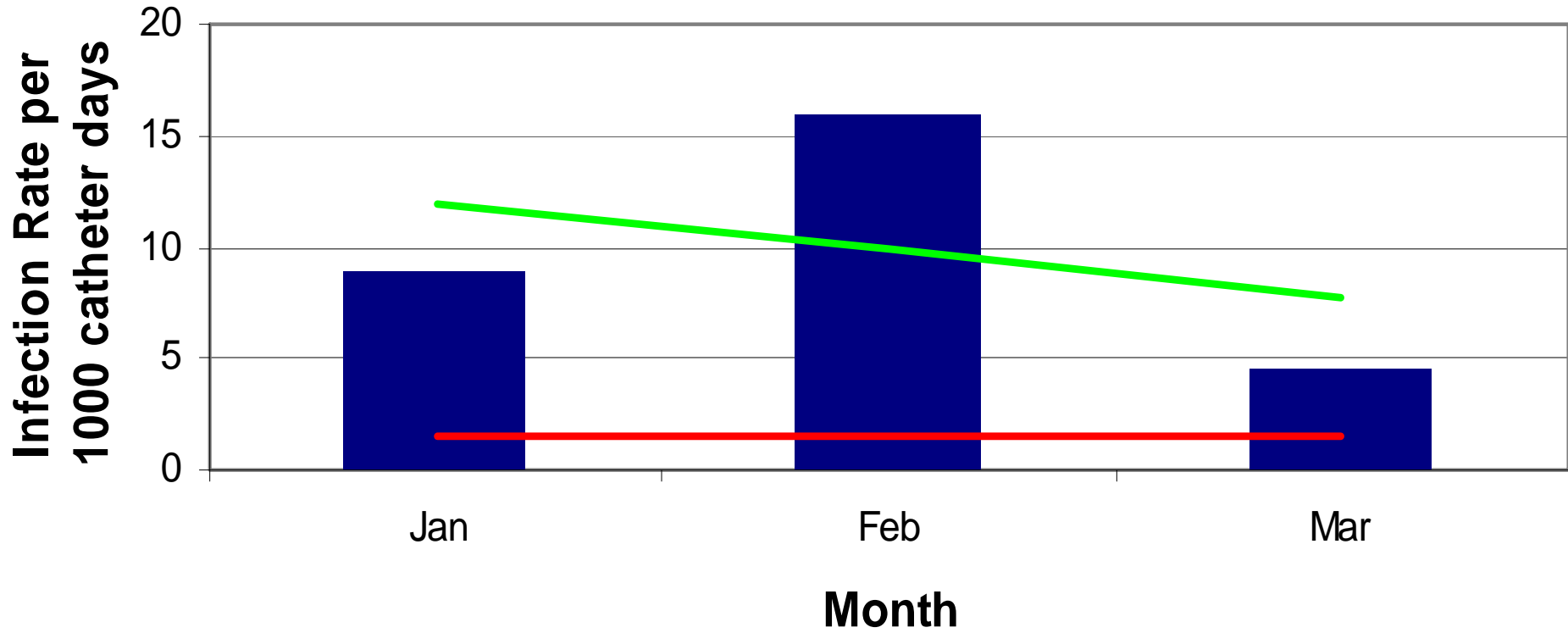
Next Steps

- Establish and collect the CLI
- Collate the following data
 - Jan: 224 CL days; 6813 pt. days; 2 CLI both organisms CNS
 - Feb: 250 CL days; 6113 pt. days; 4 CLI with Entfaecalis, pseaeer, CNS, MSSA
 - Mar: 218 CL days; 6950 pt. days; 1 CLI with MRSA

Next Steps

- Express data in a report and include graphs
- Use NHSN benchmark as comparison
 - Recognized published data (NHSH, AJIC, Nov 2008)
- If low, then instead of quarterly reporting, q6months

CR-BSI rates Q1

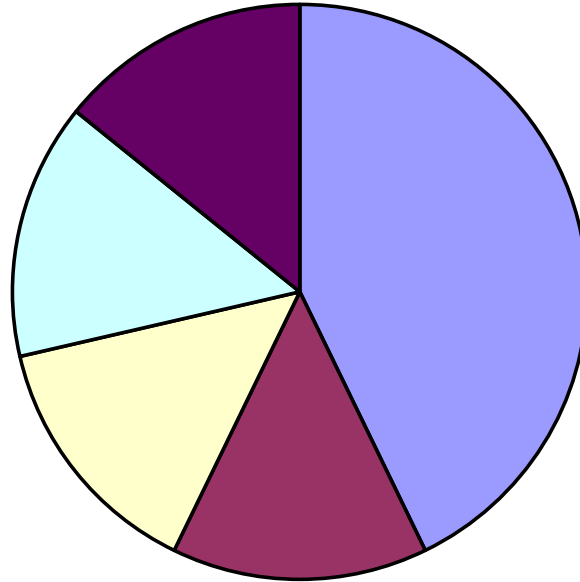




Next Steps

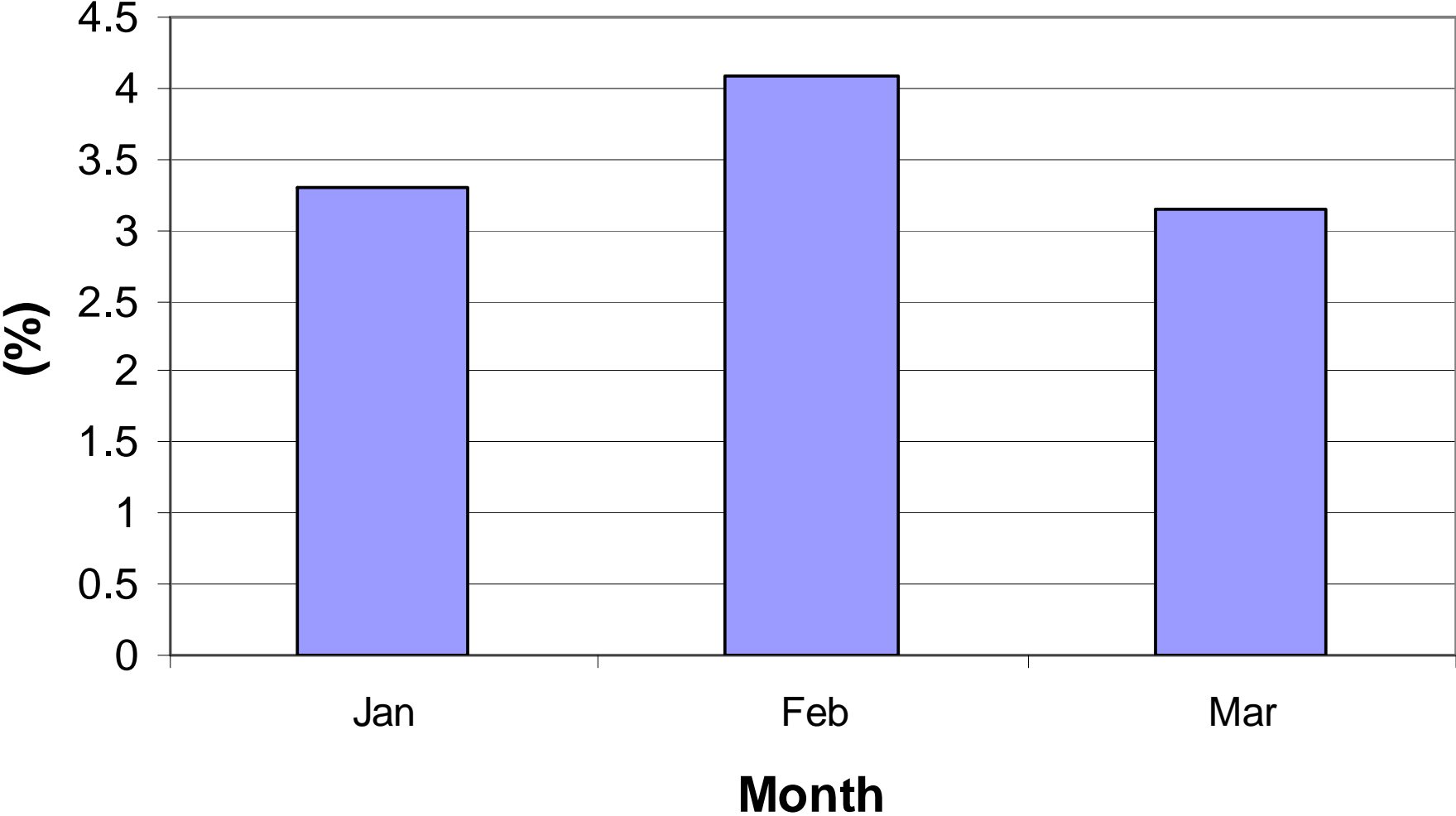
- Show trends with organisms
- Get the breakdown each month, quarter, then yearly

CR-BSI Q1 Microbiology



■ CNS ■ MRSA ■ MSSA ■ Pseudomonas aeruginosa ■ Enterococcus faecium

Line Utilization Q1



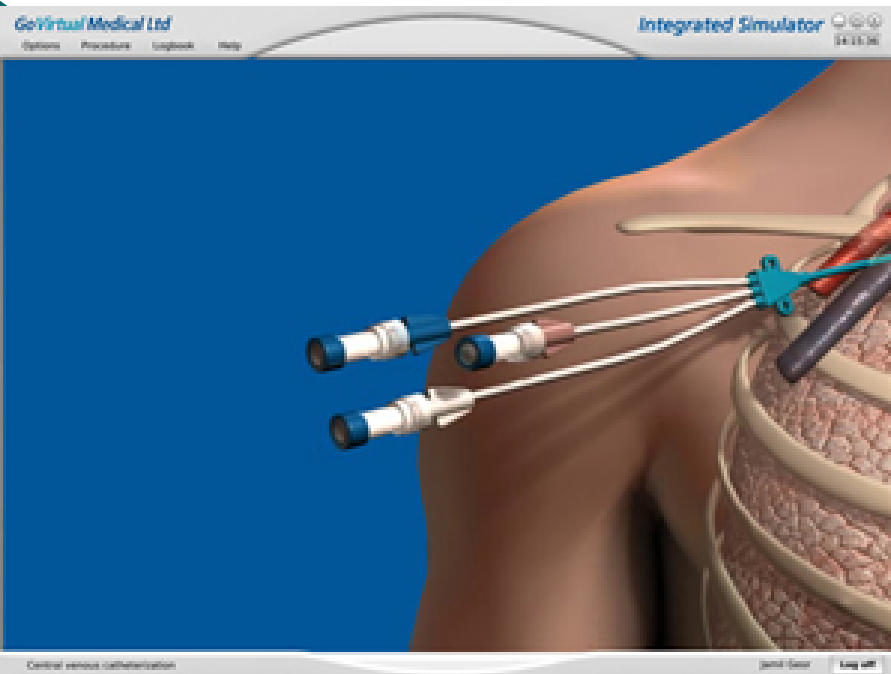


Next Steps

- Show next steps with preventative strategies
- CEO, senior leadership want to see improved results
- Can you explain a “blip”?
 - Check list on observation of practice
 - New staff inserting
 - Staffing shortages

Challenges

- Inter-hospital comparisons
- Surveillance programs in today's health care environment is an expectation (hospital leadership, general public, legislative bodies)
 - resources
- Interventional epidemiology such as building in the cost/benefit component
 - Show the trends!
 - Show them the money!



QUESTIONS?

THANK YOU!



References

- CDC http://www.cdc.gov/ncidod/dhqp/nhsn_documents.html
- CDC: National Healthcare Safety Network (NHSN) Manual, PATIENT SAFETY COMPONENT PROTOCOL, Jan 2008
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- MMWR, March 3, 2000/49(08):149-153

References

- Institute for Healthcare Improvement (IHI) 100,000 Lives Campaign Getting Started Kit: Prevent Central Line Infections; <http://www.ihl.org/NR/rdonlyres/OAD706AA-OE76-457B-A4B0-78C31A5172D8/0/CentralLinesHowtoGuide2006v06postedtotheweb60806.doc>
- *National Healthcare Safety Network (NHSN), data summary for 2006, issued June 2007. American Journal of Infection Control*