Why Maintenance is High Maintenance

How to Achieve Success

Abby Norfleet, RN
Vice President Clinical Outcomes
Ivera Medical Corporation
Learning Objectives

• Importance of CABSIs and CLABSIs
• 10 reasons maintenance is high maintenance
• Understand the compliance dynamics associated with port protection
• Overcoming port protection challenges with process change
CLABSI Timeline

2001
“Never Events” phrase coined

2008
CMS declares no reimbursement for Vascular Catheter Related BSIs (no CL modifier)

2011
Mandatory reporting of CLABSI to NHSN begins

2012
Updated CLABSI definitions from CDC

2013
Updated CLABSI definitions from CDC

2014
Updated CLABSI definitions from CDC
CDC Definition: CLABSI

Central Line-Associated Blood Stream Infection

A laboratory-confirmed bloodstream infection (LCBI) where:

- the central line (CL) or umbilical catheter (UC) was *in place for >2 calendar days on the date of the event*, with day of device placement being Day 1,

  **AND**

- a CL or UC was *in place on the date of event or the day before*.

If a CL or UC was in place for >2 calendar days and then removed, the LCBI criteria must be fully met on the day of discontinuation or the next day. If the patient is admitted or transferred into a facility with a central line in place (e.g., tunneled or implanted central line), day of first access is considered Day 1.

Great Vessels — A reminder

- Aorta
- Pulmonary Artery
- Superior Vena Cava
- Inferior Vena Cava
- Brachiocephalic Veins
- Internal Jugular Veins
- Subclavian Veins
- Common Iliac Veins
- External Iliac Veins
- Femoral Veins
- Umbilical Artery/Vein in Neonates
Central Lines

- Central Venous Catheter (CVC)
- **Peripherally Inserted Central Catheter (PICC)**
- Implantable Port
- Dialysis Catheter
- Umbilical Catheter
- Hickman Catheter
- Broviac Catheter
- Groshong Catheter
Impact of CLABSI

250,000 CLABSI’s/year
- Moreau N. Nursing 2009;34:14-15

80,000 ICU BSI’s/year — top cause of ICU nosocomial infections

30,665 deaths/year from CLABSI

$70,000 and LOS of 21 added days of LOS in pediatric hem/onc.

$54,000-$75,000 in adult surgical ICU

$45,814/infection
Mechanisms Leading to CLABSI

Pathogen migration along external surface typically occurs within the first 7 days.

Contamination of the hub or needleless connector leading to intraluminal colonization

Skin Organisms

Hematogenous from a distant source

Protecting Patients

- Implementation of “Bundles” - a structured way of improving the processes of care and patient outcomes: a small, straightforward set of evidence-based practices — generally three to five — that, when performed collectively and reliably, have been proven to improve patient outcomes.

Source: http://www.ihi.org/explore/bundles/Pages/default.aspx
Central Line Insertion Practices (CLIP)

- Hand Hygiene
- All Five Maximal Barrier Precautions
  1. Sterile Gloves
  2. Sterile Gown
  3. Cap
  4. Mask Worn
  5. Sterile drape covering entire patient
- Chlorhexidine gluconate (CHG)
- Avoid femoral site
- Daily assessment to determine need

Source: http://www.cdc.gov/nhsn/PDFs/pscManual/5psc_CLIPcurrent.pdf
CLIP vs. MAINTENANCE

- Extraluminal vs. Intraluminal
- CLIP: happens one time on a patient

“Bloodstream infections related to long-term CVC use are almost always a result of intraluminal biofilm development.”

James Davis, RN, CIC
Senior Infection Prevention Analyst
Pennsylvania Patient Safety Authority
Central Line Maintenance “Guidelines”

✔ Hand hygiene compliance

✔ Scrub access port or hub immediately prior to each use with appropriate antiseptic (70% IPA, CHG, provodine iodine)

✔ Access catheters with only sterile devices

✔ Dressing care. Replace wet, soiled or dislodged (using aseptic technique with clean or sterile gloves)

✔ Replacement of administration sets and needleless connectors

✔ Perform daily assessments to determine need for CVL
Successful Disinfection of Needleless Access Ports: A Matter of Time and Friction

Wendy Kaler, MT, MPH, CIC and Raymond Chinn, MD, FACP

Abstract

**Background:** There is controversy as to whether the design of the needleless access port or the method used to clean it prior to access impacts successful disinfection. The authors studied the disinfection effectiveness for needleless access ports. **Method:** The ports of 4 models of needleless access ports were inoculated with bacteria. The ports were disinfected for 15 seconds with 70% alcohol alone or 3.15% chlorhexidine/70% alcohol (Chlorascrub, PDI, Orangeburg, NY). Saline flush solutions were collected and cultured. **Results:** Disinfection with either 70% alcohol alone or with 3.15% chlorhexidine/70% alcohol for 15 seconds was effective. **Conclusions:** All models of needleless access ports were effectively disinfected using these two methods.
Needleless Connector Disinfection

Scrub the Hub — 15 Seconds
IS 15 SECONDS A PRACTICAL EXPECTATION FOR EVERY ACCESS?

Ideal Web-page load time = < 3.5 seconds

Source: (2010 PhoCusWright/Akamai Study)
And The Surveys Say...

Feedback from Nursing Staff
We scrub less than 5 seconds.

If you scrub the connector, select the description closest to your process.

- Quick swipe with alcohol pad
- Short scrub motion (less than five seconds)
- Long vigorous scrub (15 seconds)
- Other (please specify)
CLABSI CHALLENGES

You can’t see contamination on a valve.

Clean?

Culture from a patient’s needleless connector.
– Wendy Kaler, MT, MPH, CIC
Many “ports of entry” into the bloodstream

CLABSI CHALLENGES
A patient does not yell OUCH!

Neither the nurse nor the patient can see, hear, or feel the moment bacteria enters the bloodstream.
Dynamic bedside environment ...

CLABSI CHALLENGES

... nurses are interrupted every two minutes
“When given a choice between relying on human behavior or a tool that addresses human behavior, always take the tool.”

-unknown
PORT PROTECTION

What is a Port Protector?

- 70% IPA in a cap
- To be placed on any swabable, luer-activated device
- To disinfect and act as a physical barrier between accesses when not in use
HOW A PORT PROTECTOR WORKS

Passive Disinfection

• Chemical agent – 70% Isopropyl Alcohol
• Time of exposure – 3-5 minutes (per DFU)
• Physical barrier – up to 4-7 days if not removed (per DFU)
• No scrubbing necessary (for first access)
• FDA 510(k)
• Single use
TYPES OF PORT PROTECTORS
ADVANTAGES TO PORT PROTECTION

- **Minimizes risk** - disinfected and protected vs. exposed and contaminated
- **Consistent disinfection** without user variability
- **Saves time** - hub scrub not necessary for first access if port protector is in place for specified time
- **Visible tool for managing compliance** - allow for complete compliance with TJC NPSG 07.04.01
- **Peer-Reviewed Data** - studies demonstrate reduction in CLABSI, Contaminated Blood Cultures, and Intraluminal contamination
MERRILL, 2014

This quasi-experimental study was done at a 430 bed Trauma Level I facility

- **CLABSI rates decreased 40%, from 1.5/1000 catheter-days, to 0.88.**

- At an estimated cost of $25,000 per CLABSI, they determined a net savings of $282,000.

- With estimates of a 6% mortality and an extended LOS of 4 days for a CLABSI, they prevented one death and avoided 68 patient days.

- A 10% increase in compliance, resulted in a 7% decrease in infections.
Observational before-after study in adult oncology nursing unit

Control period (1 year) – manual cleaning with alcohol wipes, retrospective CLABSI data
472 patients, 6851 central line days
16 CLABSIs; 2.3 infections/1000 catheter days

Intervention period (6 mos) – using port protectors on neutral mechanical valves
282 patients; 3005 central line days
1 CLABSI, 0.3 infections/1000 catheter days

Reduction of contaminated blood cultures taken from catheters

87% fewer CLABSI; 92% fewer contaminated blood cultures
Wright, 2012

3 hospitals case-crossover study with PICCs indwelling =>5 days

- 1.5 mls of blood drawn from PICC for culture on days 5, 6, 7 and twice weekly thereafter
- 3 phases; 799 patients enrolled
  - Manual scrubbing – 32/252 (12.7%) contaminated. 4 cfu/mL median
  - Use of port protector 20/364 (5.5%) contaminated, p=0.002, 1 cfu/mL median
  - Return to manual scrubbing – 22/183 (12%) contaminated, 2 cfu/mL median

21 CLABSI s avoided
4 fewer deaths
13 new admissions
Central Venous Catheter Protective Connector Caps Reduce Intraluminal Catheter-Related Infection.

- During 2010, the CLABSI rate reduced from 1.9 in 2010 to 0.5 during the one-year trial period.
- The implementation of Strip dispensers during month five of the trial increased compliance rates from 63% to 80%.
STANGO, 2014

Successful Approach to Reducing Bloodstream Infections Based on a Disinfection Device for Intravenous Needleless Connector Hubs.

- CLABSIs were reduced 50%, from 38 to 19.
- “The cap may provide a superior means of complying with The Joint Commission requirement that hospitals have a standard and measurable protocol for hub disinfection.”
Reducing Bloodstream Infection Risk in Central and Peripheral Intravenous Lines: Initial Data on Passive Intravenous Connector Disinfection

- Device trial in three intensive care units for central venous catheters including PICC and peripheral lines.
- The BSI rate dropped 43% for PIVs, 50% for central lines, and 45% overall (PIVs + central lines).
**Texas Hospital • Six Sigma Project**

**Scrub-The-Hub Method**

*66 seconds per IV injection* (average time spent in 12-hr shifts)

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<td>Scrub 15 Sec</td>
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<td>Give Med</td>
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Port Protector Method

23.7 seconds per IV injection over 12-hr shift

62% Time Reduction!
Even simple solutions have challenges

The “Silver Bullet Syndrome”

• Hand Hygiene
• Clean, Dry, Intact Dressings
• Confusing Protocol
Maintenance Items

**Dressings**
- Clean
- Dry
- Intact
- Dated

**Tubing**
- Dated
- Not looped

**Port Protectors**
- All in place
CLABSI CHALLENGES

Forced Compliance vs. Non-Forced Compliance

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<th>Forced Compliance</th>
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<td>![Image of Forced Compliance item]</td>
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Non-forced compliance items require MONITORING
It only takes ONE exposure...

THE MAINTENANCE CHALLENGE

Organizations where ONE breach in process can impact lives...
Monitoring Process Compliance

• High reliability organizations, i.e. military, aviation, nuclear power

• Continuous monitoring of critical processes
  – # of observations
  – Multidisciplinary/multi-departmental
    Process examples
    – Line insertion
    – Line entry

• Provide feedback - immediate and monthly

• Monitoring & Effect on CLABSI rate
  – Bundle use alone not associated with lower CLABSI rate.
  – Rate ↓ when process monitored & achieved ≥ 95% compliance

Source: Furuya et al; Presentation at Fifth Decennial International Conference on HAI. March 2010, Atlanta.
IF YOU SEE A PROBLEM,
BE PART OF THE SOLUTION.
COMPLIANCE DYNAMICS

Product Location

- Easy Access — Grab and Go

Education: Reinforce “Why”

- Process vs. Product

Simple Protocols

- ALL Patients, ALL Lines, ALL the Time
  - Eliminates confusion
  - Supports behavioral changes

Auditing

- 21 days to form a habit
- Management engagement
- Visibility to actual practice
AFFECTING PROCESS CHANGE
Unit-Based Audit Program

- Nursing leadership support
- Accountability
- Sends a message of importance

Champions
- Clinical ladder
- Magnet story
- CUSP
- HEN
- IP Liaisons

“If can not measure it, you can not improve it.”
– Lord Kelvin
The single biggest problem with COMMUNICATION is the illusion that it has taken place.

- George Bernard Shaw
## Advantages to Port Protection

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**LEGEND**

- **>90%** in green
- **75%-89%** in yellow
- **<75%** in red
Real-Time Communication

Post Compliance Rates
Staff nurses, management, CLABSI committee

Share Success Stories
Prime tubing in med room, place PP on

Celebrate Victories
Reward positive
Gain more champions
Looking for support?

Respond to the “I don’t have time” pushback
2014 Update

• Section 6: Examples of Implementation Strategies

“Accountability is an essential practice for preventing HAIs. It provides the necessary translational link between science and implementation. Without clear accountability, scientifically based implementation strategies will be used in an inconsistent and fragmented way, decreasing their effectiveness and preventing HAIs.”

I. Engage
II. Educate
III. Execute
IV. Evaluate

Source: Infection control and hospital epidemiology, vol. 35, no. 7 (July 2014) pp. 753-771
Section 6 Highlights

I. Engage

– The first step toward successful reduction of CLABSIs is to engage both frontline and senior leadership champions in the process and outcome improvement plan.

D. Local champions increase the chance for success by engaging and educating peers, thereby increasing buy-in and ownership by all involved.

III. Execute

B. Consider conducting structured daily multidisciplinary rounds.
C. Building redundancy or independent checks into the care process to increase staff compliance.

Source: Infection control and hospital epidemiology, vol. 35, no. 7 (July 2014) pp. 753-771
12. Use a standardized protocol to disinfect catheter hubs and injection ports before accessing the ports.

R – indicates RISK area
C – indicates scoring category
D – indicates documentation is required
M – indicates Measure of Success is needed
3 – indicates direct impact requirements apply
NEED MORE INCENTIVES?
### FY 2015

**HAC Reduction Program (1%)**
- Penalty enforced after VBP & Readmission adjustments
- Domain 1 – AHRQ 35%
  - PSI-7 CLABSI
  - PSI-13 Sepsis
- Domain 2 – CDC Measure 65%
  - CAUTI
  - CLABSI

**VBP (Zero Sum Bucket) (1.5% - 2% in 2017)**
- Improvement (Self) – current performance vs baseline
- Achievement (Others) – how does current performance stack up to others
  - Both make up your Total Performance Score

**Readmission Reduction Program (3%)**
8 ways CLABSI impacts Reimbursement

1. In 2008 CMS stopped payment of 10 hospital acquired conditions including VASCULAR CATHETER RELATED INFECTIONS

2. 2015 HAC Program: Domain 1 – PSI 90

3. 2015 HAC Program: Domain 2 – CLABSI

4. VBP: Outcomes Domain (VBP)-CLABSI specific line item

5. VBP: Outcomes Domain (VBP)-CLABSI is one of 8 items making up composite score for PSI-90 which is a subset of VBP outcomes domain

6. VBP: Efficiency Domain (VBP)-CLASBI can potentially elevate Medicare spending per beneficiary

7. VBP: Potential Impact to Patient Satisfaction

8. Readmission Program

Recap
1. Maintenance happens all day by many different people
2. Maintenance requires many interventions
3. Proper maintenance takes time
4. There are many ports of entry into the bloodstream
5. You cannot see contamination on a valve
6. No immediate accountability at the point of infection
7. Dynamic bedside environment
8. Human variance
9. Maintenance does NOT have forced compliance
10. It only takes ONE exposure
SUMMARY
SUMMARY

1. CABSIs and CLABSIs are not reimbursed
2. Maintenance has a lot of moving parts
3. Non-forced compliance items need to be monitored
4. Because you can see port protectors, you can consistently manage/monitor NC disinfection

Bloodstream infections are preventable, not inevitable.
Questions?