CLABSI Prevention
Hardwiring Improvement

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Mount Sinai Health System
Professor of Medicine, Icahn School of Medicine
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CLABSI Prevention Hardwiring Improvement

1. Organization Factors Associated with Success
2. Governance Structure
3. Connecting Priority Areas to Programs to Targets
4. Accountability and Collaboration
5. The Program: Destination Zero
6. Focus on Results
7. Celebrating Success
The Role of Leadership in Hardwiring Improvement

Organizational Factors Associated with High Performance in Quality and Safety in Academic Medical Centers

Mark A. Keroack, MD, MPH, Barbara J. Youngberg, JD, MSW, Julie L. Cerese, MSN, Cathleen Krsek, MSN, MBA, Leslie W. Prellwitz, MBA, and Eoin W. Trevelyan, DBA
The Role of Leadership in Hardwiring Improvement

1. Shared sense of purpose:
   - Hospital leaders articulate that patient care comes first.
   - Leaders are dissatisfied with the current state of quality and safety.
   - Service excellence is added to the focus on quality and safety.
   - Service, quality, and safety are seen as a source of competitive advantage.

2. Leadership style:
   - The CEO is passionate about service, quality, and safety, and has an authentic, hands-on style.
   - Everyday events are connected to the larger purpose through stories and rituals.
   - Governance structures and practices minimize conflict between missions.
   - The institution is led as an alliance between the executive leadership team and the clinical department chairs.

3. Accountability system for service, quality, and safety:
   - Prioritizing, developing measures, and setting goals are centralized, and the tactics to improve are decentralized.
   - The chairs accept responsibility for quality and safety within their departments.
   - There is accountability, innovation, and redundancy at the unit level.

4. A focus on results:
   - There is a relentless effort to improve, employing performance against external standards as a measure of success.
   - Results outweigh the approach to performance improvement.
   - There is a focus on human behavior and work redesign as the keys to improvement.
   - Technology is employed as an accelerator and not as a substitute for work redesign.

5. Collaboration:
   - Collaboration characterizes the relationships between administration, physicians, nurses, and other staff.
   - Recognition of employee contributions at every level is frequent.
   - Employees value each other’s critical knowledge when problem solving.
Shared Sense of Purpose

Advancing Quality, Safety and Service across the Mount Sinai Health System

We intend to produce the safest care, the best outcomes, the highest satisfaction, and the best value of any health system or provider in the New York Metropolitan area.
Shared Sense of Purpose

2014 Priorities

- **Avoidable Readmissions**
- **Inpatient Harm**
  - All Hospital Central Line Associated Bacteremia
  - Catheter Associated UTI
  - Pressure Injury
  - C. diff
  - Surgical Site Infections
- **Risk Adjusted Mortality**
  - Sepsis
  - Moving palliative care upstream
  - Coding and documentation
- **Inpatient Likelihood to Recommend**
Infection Prevention – Governance Structure

MSHS Infection Prevention Committee

Core Group from Infection Control
- Define metrics
- Establish, spread and oversee standardized processes and structures across the Health System

Interdisciplinary Core Group
- Identify best practices
- Focus on audits and improvement
- Collaborate, challenge and coach
- Implement robust process improvement

Hospital Infection Control Committees
Quality Assessment & Performance Improvement
Interdisciplinary Core Groups
Create Partnerships

CLABSI Prevention

- Hospital Leadership
- Materials Management
- Infusion/Vascular Access Specialists
- Quality & Performance Improvement
- Staff Development
- Infection Preventionists, Epidemiologists
Infection Prevention Committee Implementation Science Model

- Lean Six Sigma Project Management Approach
  - Measuring current state
  - Determining root causes
  - Target improvements and solutions
  - Control of process after implementation

- Institute for Healthcare Improvement
  - Road Maps and Expeditions
  - Sustainable infection reduction takes 2 – 3 years
## Connecting Priority Areas to Programs to Targets

<table>
<thead>
<tr>
<th>Measure</th>
<th>Preparation</th>
<th>Initiation</th>
<th>Implementation</th>
<th>Monitoring</th>
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</thead>
<tbody>
<tr>
<td>CLABSI</td>
<td>• Review of evidence base&lt;br&gt; • Gap analysis&lt;br&gt; • Workgroups established&lt;br&gt; • Committed process owners identified</td>
<td>• Clinical bundles in place (hand hygiene, barrier precautions, skin antisepsis, optimal catheter site selection, daily review of lines)&lt;br&gt; • Checklists in place</td>
<td>• Interventions in place at unit level&lt;br&gt; • Data reported and monitored at unit level</td>
<td>• Ongoing QI activities in place at unit level&lt;br&gt; • Unit-level dyad accountability for improved outcomes</td>
</tr>
<tr>
<td>CAUTI</td>
<td></td>
<td>• Clinical bundles in place (daily review of orders, hand hygiene, continuous connection to drainage, regular emptying of drainage bags as separate procedures)&lt;br&gt; • Checklists in place</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Connecting Priority Areas to Programs to Targets

**Implementation Performance Tool**

- Visual Management Tool for project tracking
- Applied in this context to process implementation

<table>
<thead>
<tr>
<th>Legend</th>
<th>Phase</th>
<th>Key milestones</th>
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<tbody>
<tr>
<td></td>
<td>Preparation</td>
<td>• Leadership commitment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Workgroup / Roles established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Project plan developed</td>
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<tr>
<td></td>
<td>Initiation</td>
<td>• Communication to relevant staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pilot / “Small test of change” initiated</td>
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<tr>
<td></td>
<td></td>
<td>• Process redesign</td>
</tr>
<tr>
<td></td>
<td>Scale Up</td>
<td>• Tailor process for scale up; Define local accountability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Implementation across units / settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Validation of process via direct observation and process metrics</td>
</tr>
<tr>
<td></td>
<td>Sustain &amp; Improve</td>
<td>• Actionable data/ reports in hands of local leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Routine QI monitoring</td>
</tr>
<tr>
<td></td>
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<td>• Sustainability strategies in place</td>
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</table>

### MSHS Infection Prevention Priorities Implementation and Performance

<table>
<thead>
<tr>
<th>Program</th>
<th>Hand Hygiene</th>
<th>SSI</th>
<th>CLABSI</th>
<th>CAUTI</th>
<th>Hospital Onset C. difficile</th>
<th>MRSA BSI</th>
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<td>System</td>
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</table>

**Time**
- June 2014
Accountability and Collaboration

LEADERSHIP DYAD COMPETENCIES

- Shared understanding of our system vision
- Shared sense of ownership for all aspects of unit performance
- Ability to role model our health system values
- Ability to lead others to excellence
- Ability to successfully lead data-driven performance improvement efforts
- Expertise in crew resource management and the principles of high reliability
Accountability and Collaboration

HEALTH SYSTEM AND HOSPITAL LEADERS

LEADERSHIP LAYERS

FRONT LINE LEADERS
Accountability and Collaboration
Destination Zero

Preventing Central Line Associated Bloodstream Infections

Robbie Freeman, MSN, RN-BC  
CNS, Medical Surgical Quality
What is Destination Zero?

Destination Zero is multimodal initiative at Mount Sinai Beth Israel focusing on engagement, education and evidence-based practice to prevent Central Line Associated Blood Stream Infections (CLABSI)
Course Objective

At the end of this course you will be able to:

- Identify the Central Line insertion procedures that prevent infection and components of the insertion bundle
- Understand the sources of Central Line associated bloodstream infections
- Identify the Central Line maintenance procedures that prevent infection
- Recognize the different types of Central Lines

There are a series of questions within this course designed to stimulate thought that will not count toward your final score. This presentation is followed by a 10 question test.
Bacteria present on the surface of the catheter’s needleless access device or transferred by health care workers’ hands are introduced to the catheter when accessed. Organisms migrate along the inside lumen of the line, and attach to the fibrin sheath.

Contamination of the inside lumen of the catheter is more common with catheters in place for a longer period, such as tunneled catheters.

Source: Contaminated Needleless Access Device

Destination Zero

Chester Chest

DVD

Continuum Intranet

www.youtube.com/watch?v=jKGfz1v6hJ4
Destination Zero

BETH ISRAEL MEDICAL CENTER
VASCULAR ACCESS PROCEDURE NOTE

Date: _________________
Time Out at _______ AM/PM

Verified Correct (all must be verified):  ☐ Patient  ☐ Procedure  ☐ Site/Side
☐ Position  ☐ Supplies  ☐ Equipment

___________________________________________  ____________________________________________
RN/MD  RN/MD

Central vein: ☐ R  ☐ L
Pulmonary artery: ☐ R  ☐ L
Transvenous pacemaker: ☐ R  ☐ L
☐ subclavian  ☐ internal jugular  ☐ femoral  (if femoral, reason for choice)

Arterial: ☐ R  ☐ L  ☐ radial  ☐ femoral  ☐ other

Indication(s):
__________________________________________________________

Consent in chart ☐ Operator(s): _______________________________________

Central Line Check List:

1- ☐ all equipments at bedside  8- ☐ Time-out
2- ☐ Wash hands  9- ☐ Mask
3- ☐ Chlor- prep  10- ☐ procedure with sterile technique
4- ☐ Gown  11- ☐ Bio-Patch
5- ☐ Gloves  12- ☐ Dressing with date
6- ☐ Cap  13- ☐ Dispose sharps
7- ☐ Drape  14- ☐ wash hands

Anesthesia: _______________________________________________________

Technique: _______________________________________________________

Comments: _______________________________________________________

Complications: ___________________________________________________

Signature/Title
Time: ____________________________
Maintenance

- Performed weekly by nursing staff
- Performed weekly by infection prevention staff
- On the spot rounds

Central Line Maintenance Bundle

Hand Hygiene
- Wash hands with conventional soap and water or with an alcohol-based hand rub (ABHR) prior to and after accessing (Cat. ii):
  - The central line
  - The dressing
  - The needleless access device (including hubs, connectors and ports)

Dressing Change
- Dressing is clean, dry and intact (ii)
- Transparent dressing changed q 7 days (ii)
  OR
- If gauze dressing used, gauze dressing changed q 48 hours (ii)
- Site cleaned with chlorhexidine-based preparation using a back and forth motion for 30 seconds (ii)

Scrub the Hub
- Catheter hubs, needleless connectors and injection ports are cleaned before accessing the catheter with chlorhexidine, iodine or 70% alcohol (ii) and a twisting motion used for at least 15 seconds.

Tubing and Devices
- Administration sets not used for blood products or lipids are changed no more frequently than 96 hours (iia)
- IV tubing and devices for TPN and blood/blood products are replaced within 24 hours of starting the infusion (iii)
- Needleless access devices are changed using aseptic technique, no more frequently than 72 hours (iv)

Removing the Line When No Longer Needed
- The need for daily intravascular access with a central line is assessed daily to determine if the line is still indicated and documented in the medical record (iia). If not indicated, the central line is removed.

Optional
- If applicable, Chlorhexidine-impregnated sponge dressing in place (iii) or Chlorhexidine-impregnated dressing used. If a chlorhexidine-impregnated sponge dressing is used, it is oriented correctly and changed at the same time as the transparent dressing
- If applicable, A sterile, sure-free securement device for catheter stabilization is used and changed it at the same time as the transparent dressing (iv)
- If applicable, Patient bathed daily with 2% chlorhexidine (v)
Destination Zero

[Image of a dashboard interface with various categories and icons related to medical and health information.]
Destination Zero
Destination Zero
Destination Zero
Goal Setting: Benchmark and Targets

- **Benchmark (stretch goal):**
  - Perform at the NHSN and NYSDOH Top Decile by 2016
  - NHSN benchmark (top decile) is applied as the benchmark for CLABSI

- **2014 Targets:**
  - Alignment where possible
  - Variations between hospitals reflect differences in 2013 rates
  - Built upon Health and Human Services National Targets for Elimination of Healthcare-Associated Infections
Mount Sinai Health System Quality Dashboard

Total CLABSI (ICU and non-ICU) Rates (per 1,000 line days)

<table>
<thead>
<tr>
<th>Hospital</th>
<th>2013</th>
<th>2014 YTD</th>
<th>2014 Target</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount Sinai</td>
<td>23</td>
<td>1.06</td>
<td>1.25</td>
<td>0.56</td>
</tr>
<tr>
<td>Mount Sinai Beth Israel</td>
<td>8</td>
<td>1.35</td>
<td>0.85</td>
<td>0.85</td>
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<tr>
<td>Mount Sinai Hospital</td>
<td>60</td>
<td>0.97</td>
<td>0.69</td>
<td>0.51</td>
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<tr>
<td>Mount Sinai Queens</td>
<td>1</td>
<td>0.27</td>
<td>1.21</td>
<td>0.00</td>
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<tr>
<td>New York Eye &amp; Ear Infirmary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mount Sinai Saint Luke's</td>
<td>8</td>
<td>1.80</td>
<td>0.98</td>
<td>0.74</td>
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<tr>
<td>System Total</td>
<td>118</td>
<td>1.05</td>
<td>0.87</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Note: system level charts only display the aggregate for the oldest month of data available.

9/9/2014
Mount Sinai Health System Quality Dashboard

ICU CLABSI Rate (per 1,000 line days)

<table>
<thead>
<tr>
<th>Hospital</th>
<th>2015 Rate</th>
<th>2014 YTD Rate</th>
<th>2014 Target</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount Sinai Beth Israel</td>
<td>3.14</td>
<td>2.00</td>
<td>3.00</td>
<td>0.00</td>
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<tr>
<td>Mount Sinai Beth Israel Brooklyn</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Mount Sinai Hospital</td>
<td>0.81</td>
<td>0.57</td>
<td>1.00</td>
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<td>Mount Sinai Queens</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>New York Eye &amp; Ear Infirmary of Mount Sinai</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>System Total</td>
<td>1.77</td>
<td>1.53</td>
<td>1.89</td>
<td>0.00</td>
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</table>

Note: system level charts only display the aggregate for the oldest month of data available.

5/9/2014

PICC Line Infections
Petrie Division

PICC Line Maintenance Practice Compliance

Integrity of dressings and caps, Compliance with CUROS where applicable, and CHG bathing
Date:

Dear ________,

As part of our commitment to eradicate Central Line Associated Blood Stream Infections (CLABSI), we are performing a Root Cause Analysis of all CA-BSIs. Patient MR # ________ met CDC criteria for a possible CLABSI on ________. Because the event occurred >48 hours from the time of line insertion, it is clear that this possible CLABSI is more likely related to maintenance. Therefore we are asking the clinical personnel who cared for this patient in the several days prior to the CLABSI to help us in our Root Cause Analysis. Take a moment to think about the ________ maintained from ________ and please let our team know about any factors you think could have introduced infection. If nothing particular stands out in your mind, please answer any of these questions that you are able to:

1. Were there any observed breaches of proper hand hygiene by anyone involved in line care for this patient?
2. Was the dressing integrity and change date assessed/addressed during your shift?
3. If there was a dressing change on your shift, was 2% Chlorhexidine/70% alcohol used instead of iodine?
4. Was the hub scrubbed with 70% alcohol or 2% Chlorhexidine/70% alcohol followed by air dry each time the line was accessed?
5. Was this line manipulated/used by any other staff besides the unit’s physicians/nurses (e.g., anesthesia, radiology, etc.)?
6. If there was an IV administration set change on your shift, were the old IV administration sets outdated (24 hours for lipids and blood, 96 hours for all others)?
7. If you changed parenteral fluids on your shift, were the parenteral fluids you changed older than 24 hours?
8. Was the necessity of lines for this patient discussed on daily patient rounds?
9. What was the nursing ratio for this patient (e.g., 1:1, paired, etc.)?
10. Can you identify any other possible sources of contamination for the closed/sterile tubing-CVC circuit?
11. Were there any mechanical problems with CVC prior to infection date? (not drawing, difficult to infuse, repositioned, etc.)
12. Are there any significant patient factors that you believe may have contributed to this infection?
13. Are there any other issues related to central line care in the unit that you would like to share with the group?

Thank You,

The CLABSI Eradication Team
# Root Cause Analysis

Central Venous Catheter-Associated Laboratory-Confirmed Bloodstream Infection (CVC-LCDI) Evaluation Tool for Root Cause Analysis

<table>
<thead>
<tr>
<th>CVC Insertion (date, type, where inserted)</th>
<th>Date CVC Removed</th>
<th>Insertion Site</th>
<th>Maximum sterile barrier, full length drape, 2-minute skin prep with 2% Chlorhexidine 70% alcohol followed by air drying</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Patient Information and CVC Care Practices**

1. Patient's location/room number(s)

2. Proper hand hygiene was used by all personnel involved in care for this patient? Yes | ________ No | ________ If no, please explain ________

3. Date of last CVC dressing change and skin condition at insertion site at that time

4. A 2% Chlorhexidine 70% alcohol scrub followed by air dry used during last CVC dressing change? Yes | ________ No | ________ If no, please explain ________

5. A 70% alcohol or 2% Chlorhexidine 70% alcohol followed by any used prior to accessing the CVC? Yes | ________ No | ________ If no, please explain ________

6. 48-72 hours prior to infection date, who accessed the CVC system (check all that apply)? Floor Nurse | Nurse from Other Unit | Attending MD | Resident/Fellow | Radiology Personnel | Other (specify) |

7. Estimated number of CVC system works for each 24-hour period for 72 hours prior to infection date

8. Date of last IV administration set change(s)

9. Estimated hang time for parenteral fluids (over last 72 hours prior to infection)

10. Central line removal discussed daily? Yes | ________ No | ________ If no, please explain ________

11. Describe any mechanical problems with CVC prior to the infection date

12. Have there been any problems with the CVC or IV equipment or supplies?

13. Are there any significant patient factors that may have contributed to this infection?

14. After your assessment, do you believe this infection was potentially preventable? Yes | ________ Please explain ________

No | ________ Please explain ________

If defect(s) identified, use the Learning from Defects Tool to prevent future defect(s).

QSFG, Johns Hopkins University, 2009
## Estimate Costs of HAIs

<table>
<thead>
<tr>
<th>Number of HAI Events</th>
<th>Mount Sinai Health System</th>
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<tbody>
<tr>
<td>Jan – Jul 2014</td>
<td>Estimated Costs</td>
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<tr>
<td>58</td>
<td>$2,657,212</td>
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</table>

Zimlichman, E  
Study Estimates Costs of Health Care-Associated Infections  
*JAMA Intern Med.* Published online September 2, 2013
<table>
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<tr>
<th></th>
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<th>2014 DOH Rate</th>
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<tbody>
<tr>
<td>ICU</td>
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</table>
U. S. Department of Health and Human Services
and Critical Care Societies Collaborative

National Awards Program to
Recognize Achievement in Eliminating
Healthcare-Associated Infections

Outstanding Achievement and Leadership
Elimination of Central Line-Associated
Bloodstream Infections

Beth Israel Medical Center
New York, New York
2012
Great works are performed not by strength, but by perseverance.
—Samuel Johnson 1709-1784