North Shore University Hospital
Leading the Way for High Impact Interventions to Reduce Hospital-Acquired Infections

Quality and Safety Improvements for Optimal Performance

Michael Gitman, MD
Medical Director
Andrea Restifo, RN MPA MHCDS
Associate Executive Director
Aradhana Khameraj, RN MSN
Director, Infection Prevention

North Shore University Hospital
Northwell Health℠
Please note that the views expressed are those of conference speakers and do not necessarily reflect the views of the American Hospital Association and Health Forum.
Agenda

- Background into Northwell Health System and North Shore University Hospital
- Report Cards/Vectors
- Cdiff
- CAUTI
- CLABSI
- SSI CABG
- Antimicrobial Stewardship
- High Level Disinfection Program
Objectives and Strategies for Reducing Hospital Acquired Infections

- Change the behavior of clinicians at the bedside and increase accountability
- Implement standardized evidence-based reduction strategies for central line care, indwelling urinary catheter care, Cdiff and surgical site infection prevention
- Implement a criteria based list in the medical record for ordering Cdiff that integrates with an IT hard stop for inappropriate orders
- Implement standardized root cause tools for CAUTI, CLABSI and SSI
- Implement standardized HLD program facility wide
- Increase communication, therefore raising consciousness of caregivers and increase understanding of their role in reducing infection
- Standardize reporting with analysis to create a Hospital/System metric to show the results of the improved infection measures in quality forums
Overview: Northwell Health

By the Numbers

276,495 Hospital Discharges

4 Million Patient Contracts

598,277 Emergency Visits

147,731 Ambulatory Surgeries

29,768 Babies Delivered

101,960 Ambulance Transports
North Shore University Hospital

By the Numbers

- 826 Beds
- 6,100 Employees
- 1,920 Nurses
- 4,000 Physicians
- 1,000 Volunteers

Manhasset, NY
North Shore University Hospital

2015 By the Numbers

87,069 Total Visits + Admissions
5.4 Average Length of Stay
1.51 Case Mix
2.68 Surgical Case Mix
22,328 Total Ambulatory Surgeries
6,645 Deliveries
Why is Infection Prevention Important?

- To improve health outcomes
- To decrease suffering
- To improve financial outcomes

Value Based Purchasing
  - Experience, Process of Care, Efficiency, Outcomes (CLABSI/CAUTI/SSI, PSI-90)

Hospitals Readmission Reduction Program
HAC Reduction Program
  - CLABSI/CAUTI/SSI, PSI-90
Data – Economic Impact

Value Based Purchasing

<table>
<thead>
<tr>
<th>Estimated Annual Impact</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(400,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(300,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(200,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(100,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hospital Readmissions Reduction Program

<table>
<thead>
<tr>
<th>Estimated Annual Impact</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(2,500,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(2,000,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(1,500,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(1,000,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$(500,000.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HAC Reduction Program

<table>
<thead>
<tr>
<th>Estimated Annual Impact</th>
<th>FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(2,500,000.00)</td>
<td></td>
</tr>
<tr>
<td>$(2,000,000.00)</td>
<td></td>
</tr>
<tr>
<td>$(1,500,000.00)</td>
<td></td>
</tr>
<tr>
<td>$(1,000,000.00)</td>
<td></td>
</tr>
<tr>
<td>$(500,000.00)</td>
<td></td>
</tr>
</tbody>
</table>

Source: HANYS
Data drives us

• Goals
• Incentives
• Case for Change
### Northwell Health System YTD 2015

<table>
<thead>
<tr>
<th>YTD as of</th>
<th>Indicator Name</th>
<th>YTD</th>
<th>Threshold</th>
<th>Goal</th>
<th>Stretch Goal</th>
<th>Desired Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 2015</td>
<td>Risk Adjusted AMI, HF, PNE Mortality Index</td>
<td>1.02</td>
<td>1.29</td>
<td>1.17</td>
<td>1.05</td>
<td>↓</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>Risk Adjusted Readmission Index</td>
<td>1.03</td>
<td>1.17</td>
<td>1.06</td>
<td>0.95</td>
<td>↓</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>All CLABSI Count (excludes NICU)</td>
<td>93.00</td>
<td>82.50</td>
<td>75.00</td>
<td>67.50</td>
<td>↓</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>ICU CAUTI Count</td>
<td>87.00</td>
<td>192.50</td>
<td>175.00</td>
<td>157.50</td>
<td>↓</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>Employee Influenza Participation Rate</td>
<td>99.64</td>
<td>95.00</td>
<td>100.00</td>
<td>100.00</td>
<td>↑</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>Employee Influenza Vaccination Rate</td>
<td>88.54</td>
<td>85.00</td>
<td>90.00</td>
<td>95.00</td>
<td>↑</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>Fluid Bolus Initiated Within 30 Minutes of Severe Sepsis</td>
<td>55.70</td>
<td>44.70</td>
<td>49.70</td>
<td>54.70</td>
<td>↑</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>HCAHPS Inpatient Likelihood to Recommend - Percentile</td>
<td>40.00</td>
<td>51.00</td>
<td>59.00</td>
<td>64.00</td>
<td>↑</td>
</tr>
</tbody>
</table>
## NSUH Scorecard Quality

<table>
<thead>
<tr>
<th>Metric</th>
<th>Jan</th>
<th>Feb</th>
<th>Apr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Mortality Index (AMI, HF, Pneum.)*</td>
<td>0.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission Index*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid Bolus Administration &lt;30 min of Sepsis*</td>
<td>51%</td>
<td>46%</td>
<td>51%</td>
</tr>
<tr>
<td>C-Diff</td>
<td>150</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
<td>CAUTIs (ICU &amp; Non ICU)*†</td>
<td>51</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>CLABSI (ICU &amp; Non ICU)*</td>
<td>26</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Falls</td>
<td>318</td>
<td>106</td>
<td>95</td>
</tr>
<tr>
<td>Hospital Acquired Pressure Ulcers Stage 2+</td>
<td>32</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------</td>
<td>-----------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>CABG chest/donor</td>
<td>522</td>
<td>18</td>
<td>1.31</td>
</tr>
<tr>
<td>CABG chest/only</td>
<td>65</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Colon</td>
<td>532</td>
<td>34</td>
<td>0.81</td>
</tr>
<tr>
<td>Total Hip</td>
<td>390</td>
<td>2</td>
<td>0.44</td>
</tr>
<tr>
<td>Total Knee</td>
<td>263</td>
<td>3</td>
<td>1.12</td>
</tr>
<tr>
<td>Abd Hyst</td>
<td>502</td>
<td>8</td>
<td>0.79</td>
</tr>
<tr>
<td>Craniotomy</td>
<td>617</td>
<td>7</td>
<td>0.42</td>
</tr>
<tr>
<td>Laminectomy</td>
<td>872</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Spinal Fusion</td>
<td>665</td>
<td>7</td>
<td>0.56</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C. difficile*</td>
<td>262019</td>
<td>150</td>
<td>5.73</td>
<td>0.65</td>
<td>112495</td>
<td>56</td>
<td>5</td>
<td>0.66</td>
<td>0.794</td>
<td>17</td>
<td>12</td>
<td>11</td>
<td>40</td>
<td>0.66</td>
<td>13</td>
<td>6</td>
<td>0.66</td>
<td>0.66</td>
</tr>
<tr>
<td>MRSA in Blood</td>
<td>285427</td>
<td>19</td>
<td>0.67</td>
<td>0.73</td>
<td>120826</td>
<td>12</td>
<td>1</td>
<td>1.11</td>
<td>0.767</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>0.04</td>
<td>3</td>
<td>3</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>CRE Klebsiella</td>
<td>285427</td>
<td>6</td>
<td>0.21</td>
<td>n/a</td>
<td>120826</td>
<td>5</td>
<td>0.41</td>
<td>n/a</td>
<td>N/A</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>n/a</td>
<td>2</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>CRE Enterobacter</td>
<td>285427</td>
<td>2</td>
<td>0.04</td>
<td>n/a</td>
<td>120826</td>
<td>1</td>
<td>0.08</td>
<td>n/a</td>
<td>N/A</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>CRE E.Coli</td>
<td>285427</td>
<td>1</td>
<td>0</td>
<td>n/a</td>
<td>120826</td>
<td>2</td>
<td>0.17</td>
<td>n/a</td>
<td>N/A</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VAE</th>
<th>2015</th>
<th>2016</th>
<th>2016 ICU &amp; PCU VAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVAC</td>
<td>10505</td>
<td>15</td>
<td>0.14</td>
</tr>
<tr>
<td>ICU/PCU PWAP</td>
<td>10607</td>
<td>2</td>
<td>0.02</td>
</tr>
<tr>
<td>RCU PWAP</td>
<td>1500</td>
<td>0</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Hospital Based HAC Report Card
# Hospital Based HAC Report Card

## DOMAIN 2 (CDC NHSN Measures)

<table>
<thead>
<tr>
<th>Measure</th>
<th>YTD Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAI 1 ICU CLABSI</td>
<td>3</td>
</tr>
<tr>
<td>HAI 2 ICU CAUTI</td>
<td>3</td>
</tr>
<tr>
<td>HAI 3 SSIs Composite</td>
<td>-</td>
</tr>
<tr>
<td>HAI 4 MRSA</td>
<td>6</td>
</tr>
<tr>
<td>HAI 5 C. Diff</td>
<td>4</td>
</tr>
</tbody>
</table>

### Domain 2 Composite Score

- **Points Against:** 4.5, 4.8, 3.3
- **Total Composite Score:** 4.0

## TOTAL HAC SCORE

<table>
<thead>
<tr>
<th>Measure</th>
<th>Goal</th>
<th>Penalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>15% Domain 1</td>
<td>2.0</td>
<td>NO</td>
</tr>
<tr>
<td>85% Domain 2</td>
<td>4.0</td>
<td>$0</td>
</tr>
<tr>
<td>Composite Score</td>
<td>3.5</td>
<td>6.8</td>
</tr>
</tbody>
</table>

*All HAC scores predicted based on prior HAC program year's expected results.*

---

**Data Source:** NHSN

**Company:** The Advisory Board Company

---

**North Shore University Hospital**

**Northwell Health**

---

15
### MD Department Dashboards

**North Shore University Hospital**

**Department of Orthopedic Surgery**

**Performance Dashboard**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Metric</th>
<th>Definition</th>
<th>2014 Baseline</th>
<th>Current Month</th>
<th>2015 YTD</th>
<th>2015 YTD Target</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Experience</strong></td>
<td>Data from HCAHPS</td>
<td>Recommend the Hospital</td>
<td>Percentile Rank</td>
<td>58</td>
<td>76</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication With Doctors</td>
<td>Percentile Rank</td>
<td>22</td>
<td>59</td>
<td>25</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Data from Premier and Infection Control</td>
<td>Readmission Index</td>
<td>Observed / Expected</td>
<td>1.05</td>
<td>0.88</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mortality Index</td>
<td>Observed / Expected</td>
<td>1.08</td>
<td>1.51</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>Hospital Acquired Conditions</td>
<td>SSI</td>
<td></td>
<td>0.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HIP SIR Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post OP DVT</td>
<td>PSI:12 HAC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

North Shore University Hospital
Northwell Health
Root Cause Analysis (RCA)

- All CAUTIs, CLABSIs, and SSI cases are being discussed to determine why they occurred
- Standardized process exists
- Frontline staff attend the meetings
Life-threatening infections caused by bacteria called *Clostridium difficile* now sicken nearly half a million Americans a year, health officials said Wednesday.

The number of these infections — which can cause "deadly diarrhea" and damage to the colon — doubled between 2000 and 2010, according to the Centers for Disease Control and Prevention.

In 2011, about 29,000 patients with the bacteria, also known as *C. difficile* or *C. diff*, died within a month of becoming sick, according to a CDC study published Wednesday in *The New England Journal of Medicine*. One out of three of these infections occurs in people 65 and older. People 65 and older also account for most deaths.
Why is Cdiff important?

- Avoid Suffering
- Patients who acquire C diff have:
  - Higher Mortality (10.2% vs. 7.9%)
  - Higher 30 day Readmissions (23.2% vs. 14.8%)
  - Longer lengths of Stay (10d vs. 6d)
  - Higher costs of care ($16,353 vs. $10,119)
- NSUH medicine/surgery capacity is currently 105%
- Publically reported
- Value Based Purchasing

Magee et all American Journal of Infection Control 43 (2015) 1148-53
Cdiff Baseline Outcomes Achieved

Cdiff SIR 2014

1.04

2014

237 Hospital Acquired Cases
Cdiff Collaborative Team

- Includes Leadership, EVS, Dietary, IT, Infectious Disease, Laboratory, Pharmacy, Patient Care Services, Logistics, Infection Prevention, Project Manager and Material Management.
- Meetings take place quarterly to discuss data, strategy and sustaining change.
- Innovation Pilot Team created
- Data made available monthly
- Shared data widely

![Graph showing data from Jan-14 to Dec-14 with 2014 average and Cdiff trends.](image)
Best Practice for Cdiff Infection

Patient with clinically significant liquid stool > 3 in 24 hour period

Yes

Has patient been taking laxatives over the past 24-48 hours?

No

Enter order for single stool specimen to be tested for C. difficile. Please place patient on Contact Precautions while awaiting results.

C. difficile test results positive?

No

Stop contact precaution.

Yes

Continue treatment and contact precautions. Do not re-test.

No

Observe for 24 hours to assess for persistence of symptoms. Do not order test for C. difficile.

Yes

Stop laxative (48 hours) gauge clinical response prior to ordering C. difficile testing.
To: The Medical Staff at NSUH-Manhasset
From: Bruce Farber, MD, Chief, Division of Infectious Disease
Michael Gitman, MD, Medical Director, NSUH
Re: Clostridium difficile Guidelines
Date: April 8th, 2014

Dear Colleagues,

**Clostridium difficile** Guidelines:

*Clostridium difficile* (C. difficile) colitis has emerged as the most important cause of hospital acquired infection, and morbidity in the United States. While early isolation, diagnosis, and treatment are essential to prevent and control transmission, it is also important for clinicians to realize the indications and limitations with the testing that is currently available.

Specifically:

- **C. difficile** should only be considered in the presence of three or more loose or liquid stools that occur in a 24 hour period of time. The polymerase chain reaction (PCR) test is not valid when it is performed on formed stools and such samples will be rejected if they are received in the laboratory. The PCR test is only valid for the initial diagnosis of colitis, and may remain positive for many months. It is of no value in following the course of the illness or in diagnosing relapse.
- Because the **C. difficile** PCR test is so sensitive, it should not be ordered unless there is a strong suspicion of colitis. It should **not be ordered** as part of a fever workup or evaluation of an elevated WBC unless there is accompanying diarrhea. In addition, it should not be ordered in patients that are on laxatives.
- If there is a suspicion of **C. difficile** in a new admission, it is very important to get the stool specimen to the laboratory promptly. This will allow for early diagnosis and isolation.
- **C. difficile** should **NOT** be ordered in patients that are on laxatives/stool softeners.
- **C. difficile** should **NOT** be ordered for patients who have an ileostomy.

To operationalize these guidelines the laboratory will not perform the PCR test in cases:

- who have previously had a positive PCR for **C. difficile** in the last 21 days
- when the stool specimen is received >36 hours after being ordered
- when the specimen received in the laboratory is formed stool

Please contact us if you have questions or concerns.
Bristol Stool Chart

- All types of stools sent to the laboratory for Cdiff testing
- An increase number of false positive results due to colonization, initiation of treatment and isolation of patients
- November 2014 only stool type 7 was acceptable
- Specimens that did not meet criteria for testing were cancelled and unit notified

Choose your Poo!

<table>
<thead>
<tr>
<th>Type</th>
<th>Visual</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | ![Image](image1) | Looks like rabbit droppings  
Separate hard lumps, like nuts (hard to pass) |
| 2    | ![Image](image2) | Looks like bunch of grapes  
Sausage-shaped but lumpy |
| 3    | ![Image](image3) | Looks like corn on the cob  
Like a sausage but with cracks on the surface |
| 4    | ![Image](image4) | Looks like sausage  
Like a sausage or snake, smooth and soft |
| 5    | ![Image](image5) | Looks like chicken nuggets  
Soft blobs with clear-cut edges |
| 6    | ![Image](image6) | Looks like porridge  
Fluffy pieces with ragged edges, a mushy stool |
| 7    | ![Image](image7) | Looks like gravy  
Watery, no solid pieces. Entirely Liquid |
IT Solution

Limiting inappropriate ordering

- Providers cannot re-order a Cdiff specimen if the patient had a previous positive within 21 days
- Orders will automatically be cancelled out if not collected within three days
## Cdiff Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Order Volume</th>
<th>Complete Volume</th>
<th>Cancel Volume</th>
<th>% Cancel Order to Cancel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>4,672</td>
<td>2,875</td>
<td>1,809</td>
<td><strong>39%</strong></td>
</tr>
</tbody>
</table>

### Laboratory Testing

<table>
<thead>
<tr>
<th></th>
<th>Orders</th>
<th>Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Orders</strong></td>
<td>4,672</td>
<td>$11.72</td>
<td>$54,755.84</td>
</tr>
<tr>
<td><strong>Completed Orders</strong></td>
<td>2,875</td>
<td>$11.72</td>
<td>$33,695.00</td>
</tr>
</tbody>
</table>

**Cdiff Initiative Savings**  

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cdiff Initiative Savings</td>
<td>1,797</td>
<td></td>
<td>$21,060.84</td>
</tr>
</tbody>
</table>
January 2015 a report was built to identify pending Cdiff orders.

Electronic medical records is reviewed for the presence of 3 or more liquid/watery stools and if laxatives were given.

If diarrhea is not present, the Infection Prevention Team notifies the nurse or provider and if appropriate to cancel the order.
Cdiff: Innovation and Pilot Team

- The dialysis and immunocompromised units were chosen to pilot
- Nurse champions became content experts and an online learning module
- Cdiff Tote contains disposable stethoscope, dedicated thermometer, BP cuff
- Cdiff Terminal Clean – activated by EVS
- Hook outside patient rooms to hang Lab Coats etc
“Cdiff terminal clean” takes approximately 45 to 75 minutes. When the rooms are completed, an adenosine triphosphate (ATP) device is used to detect levels of microbial contamination on high-touch surface areas. When contact isolation is discontinued as a result of a resolved Cdiff infection, the patient is given a shower and is escorted to the patient lounge area while the entire room is terminally cleaned.
Buddy’s Curtain
Cdiff Outcomes Achieved

Cdiff SIR 2014-2016

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>237</td>
</tr>
<tr>
<td>2015</td>
<td>150</td>
</tr>
</tbody>
</table>

2014 2015

Cdiff SIR 2014-2016

Year | Cases (n) |
---|-----------|
2014 | 237       |
2015 | 150       |
## Cdiff Financial Impact

<table>
<thead>
<tr>
<th></th>
<th>Cases</th>
<th>Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Onset Cdiff 2014</td>
<td>257</td>
<td>$14,755.00</td>
<td>$3,792,035.00</td>
</tr>
<tr>
<td>Hospital Onset Cdiff 2015</td>
<td>150</td>
<td>$14,755.00</td>
<td>$2,213,250.00</td>
</tr>
<tr>
<td><strong>Cdiff Initiative Savings</strong></td>
<td><strong>87</strong></td>
<td></td>
<td><strong>$1,283,685.00</strong></td>
</tr>
</tbody>
</table>

*This chart indicates that, in reducing Hospital Onset Cdiff by 87, we saved $1,283,685.00 for 2015.*
Executive Summary

Challenges Addressed
- Inappropriate C. Difficile specimen collection and C. Difficile orders
- Cdiff patient to patient spread

Steps/Process Created
- Laboratory cancellation of form stools
- IT Blocking Cdiff orders if patient was positive in the last 21 days
- Cancelling Cdiff orders if not collected within 72 hours
- Cdifficle Terminal Clean post Discharge or Transfer
- Cdifficle Tote Bag and Hooks outside room to hang lab coats/jackets

Key players involved
- Laboratory, Infectious Disease, Nursing, IT, Infection Prevention, EVS, Logistics, Leadership, Materials Management, Project Manager

Outcomes achieved
- Decrease in Hospital Onset Cdifficle
- Create a process in the Lab to reject formed stool
- Implementing IT fixes to help stop inappropriate (repeat or historic) Cdiff orders repeat Cdiff specimen orders

Success Factors/Pre-Requisites
- Cdifficle Collaboration Team
- Cdiff Project Manager
- Front Line Staff
- Partnership with Laboratory and IT
- Support from Hospital Leadership
Catheter-associated Urinary Tract Infections (CAUTIs)

Modern Healthcare
The leader in healthcare business news, research & data

National study shows decreased rate of catheter-associated UTIs

By Maria Castellucci | June 1, 2016

Despite national efforts to decrease the rates of incidence, catheter-associated urinary tract infections have remained a persistent issue in hospitals across the country.

In fact, the rate of catheter-associated UTIs (CAUTI) increased by 6% from 2009 to 2013 even as HHS issued related guidance and the CMS began to penalize hospitals that are frequent offenders.

But results from a national study may have found an effective solution.
Why are CAUTIs important?

- UTIs are the 4th most common type of HAI
- In the U.S., it is estimated that more than 13,000 deaths are associated with a UTI
- CAUTI was a problem at NSUH in 2014 with over 80 cases
- Due to the potential for patient harm and morbidity/mortality, everyone prioritized a CAUTI initiative to eliminate ICU and non-ICU CAUTIs across our hospital

Catheter-risk of bacteriuria increases each day of use:

- Per day: 5%
- 1 week: 25%
- 1 month: 100%
The CAUTI Problem
CAUTI Collaborative Team

- Includes Leadership, Nursing Education, Front Line Nursing and PCAs, Transport, ICU Physicians, Infection Control
- Meetings take place quarterly to discuss data, strategy, and sustaining change
- Data made available monthly or is shared as soon as a CAUTI is identified
CAUTI Best Practice Guidelines

Emergency Department
Operating Room and Post Anesthesia Care Unit
Outside of the ICU

- Indwelling Catheter Placement Requirement - Buddy System
- Catheter Insertion Checklist
- Staff have a validated competency
- Urine Output Monitoring Decision to Go with closed system urometers

Urine Culture Practice & Indications

- When appropriate, send a urine analysis STAT
- If clinically necessary, do not delay sending the urine culture
Have you ex...foley...ated?

**Urinary Catheters Indications:**

- Epidural anesthesia; urologic surgery, surgery contiguous in the pelvic & lower abdomen
- Major surgical procedures
- Acute urinary retention
- Intravesicular Instillation of chemotherapeutic agents
- Continuous bladder irrigation
- Uncorrectable bladder outlet obstruction
- Neurogenic bladder
- Palliative care in terminally ill or severely impaired incontinent patients
- Patient is incontinent with skin breakdown*

**Foley Catheters are NOT indicated for:**

- Urine output monitoring OUTSIDE intensive care
- Incontinence Prolonged postoperative use
- Patients transferred from intensive care to general units
- Morbid obesity
- Immobility Confusion or dementia

---

North Shore University Hospital
Northwell Health™
Straight Catheterization Algorithm

WITHIN 1-2 HOURS POST IUC OR STRAIGHT CATH REMOVAL –
ASSESS PATIENT FOR S/S OF URINARY RETENTION & BLADDER SCAN
*CONSIDER PO AND IV INTAKE*

IF PATIENT IS ASYMPTOMATIC & SCAN REVEALS:

- ≤ 300ml
  - CONTINUE TO REASSESS EVERY 2 HOURS FOR S/S OF URINARY DISTENTION & BLADDER SCAN

- ≥301ml
  - NOTIFY PRESCRIBER TO OBTAIN ORDER FOR STRAIGHT CATH
  - PERFORM STRAIGHT CATH (UP TO 3X IN 24 HRS)

IF PATIENT IS SYMPTOMATIC

- NOTIFY PRESCRIBER TO OBTAIN ORDER FOR Straight Cath/IUC INSERTION
- Evaluate for IUC

DOCUMENT PROCEDURE & OUTPUT IN NURSING NOTES

CONTINUE TO REPEAT PROCESS UNTIL PATIENT VOIDS AND ASSESS FOR DAILY NECESSITY
CAUTI Outcomes

<table>
<thead>
<tr>
<th>Year</th>
<th>ICU CAUTI</th>
<th>NON-ICU CAUTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td>2015</td>
<td>20</td>
<td>31</td>
</tr>
</tbody>
</table>
Executive Summary

Challenges Addressed
- High CAUTI rates
- No standardized practices
- Tailoring education to different areas

Steps/Process Created
- Compliance with indwelling catheter insertion and maintenance bundles requires strict adherence to evidence-based guidelines, tools and resources
- Ongoing monitoring of defined metrics with thresholds, goals, and stretch goals motivated improvement

Key Players Involved
- Frontline staff, Nursing, Nursing Education, Leadership

Outcomes Achieved
- Decrease in CAUTIs

Success Factors/Pre-Requisites
- Collaboration Team
- Support from Hospital Leadership
Central Line Associated Bloodstream Infections (CLABSIs)

Central line infection prevention bundles reduce number of deadly infections in newborns

New research shows interventions to be effective in reducing CVC use, dwell time, and bloodstream infections

Date: June 13, 2016
Source: Society for Healthcare Epidemiology of America
Summary: Infection prevention bundles, a package of evidence-based guidelines implemented in unison, are effective for reducing central line-associated bloodstream infections (CLABSI) in critical care newborn infants, according to a new study. The bundle helped reduce the number of lines placed, the duration of time used and the number of infections.
Why is it important?

- Catheter-related bloodstream infection (CRBSI) is the most common cause of HAI to the bloodstream.
- According to US CDC, between 12 and 25% of patients who acquire CRBSI die; many others have extended hospital stays, and increased overall treatment costs.
- A single incident of CRBSI can cost as much as US$56,000 to treat according to some studies, 48% of ICU patients have central venous catheters (CVCs), accounting for 15 million CVC-days per year in ICUs.
- The CDC estimates an increase length of stay by an average of 7 days.
- >250,000 CVC-related infections per year.
The CLABSI Problem
CLABSI Prevention

Collaborative Team
- Nursing, Dialysis, Interventional Radiology, IV Team Nurses, ICU Physician Assistants, Leadership
- Meets every Monday

Central Line Bundle Compliance
- Site check
- Daily Review of Line Necessity
- Dressing, tubing, biopatch, curos caps, or cap changes
- Any patient complaints, questions, or concerns.
- Any tests or procedures that may utilize the patient’s CVC
Bundle Compliance Documentation

Central Line Insertion Checklist

Central Line Catheter Insertion Note
1. From Current List: Select Patient
2. Click on ORDER ENTRY Icon
3. Search: type in CENTRAL
4. Select: Central line may be accessed/ select ADD
5. Complete required fields using drop down menu
6. Review order and select SUBMIT

Central Line Standardized Order Entry

1. From Current List: Select Patient
2. Click on ORDER ENTRY Icon
3. Search: type in CENTRAL
4. Select: Central line may be accessed/ select ADD
5. Complete required fields using drop down menu
6. Review order and select SUBMIT
In 2015, the National Health and Safety Network changed their definition of a CLABSI-mucosal barrier injury (MBI) which led to an increase number of infections reported.

<table>
<thead>
<tr>
<th>Year</th>
<th>7Monti</th>
<th>BMTU</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>CLABSI</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>MBI-CLABSI</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>CLABSI</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>MBI-CLABSI</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Interventions to decrease CLABSIs on 7M/BMTU

- Transparent dressing
- 2% CHG was reintroduced
- Bio Patch will still be available for use with Mediport
- Enhancing the cleaning of BMT rooms
- Introduction of CHG SAGE WIPES
- Bathing procedure are reviewed
- Curos cap use was reviewed
Documentation of the presence of mucositis in the medical record is paramount in being able to correlate the positive blood culture with the mucosal barrier injury.

<table>
<thead>
<tr>
<th>Date of Observation</th>
<th>Name</th>
<th>MRN</th>
<th>Room</th>
<th>Line Type</th>
<th>Dressing Change</th>
<th>Type of Dressing</th>
<th>Curos Caps</th>
<th>IV Fluids Meds Dated</th>
<th>Tubing Dated</th>
<th>CHG Bathing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>__tegaw/biopatch</td>
<td>__tegaw/CHG</td>
<td>On ☐ Off ☐</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>__tegaw/biopatch</td>
<td>__tegaw/CHG</td>
<td>On ☐ Off ☐</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
<tr>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>__tegaw/biopatch</td>
<td>__tegaw/CHG</td>
<td>On ☐ Off ☐</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td>Yes ☐ No ☐</td>
<td></td>
</tr>
</tbody>
</table>
CLABSI Outcomes

<table>
<thead>
<tr>
<th>Year</th>
<th>ICU CLABSI</th>
<th>NON-ICU CLABSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

2014 Cases
- ICU CLABSI: 5
- NON-ICU CLABSI: 9

2015 Cases
- ICU CLABSI: 5
- NON-ICU CLABSI: 20
Executive Summary

Challenges Addressed
- Maintaining bundle compliance
- Standardization for units

Steps/Process Created
- Frequent oversight
- Daily rounding
- Analyzing special populations

Key players involved
- Nursing, Infection Prevention, IV Team, Mid-level Providers, Environmental Services

Outcomes Achieved
- Decrease in CLABSIs

Success Factors
- Staff engagement, patient education, and accountability
**Surgical Site Infections**

**Surgical Site Infection (SSI) Event**

**Introduction:** In 2010, an estimated 16 million operative procedures were performed in acute care hospitals in the United States\(^1\). A recent prevalence study found that SSIs were the most common healthcare-associated infection, accounting for 31% of all HAI\(\text{s}\) among hospitalized patients\(^2\). The CDC healthcare-associated infection (HAI) prevalence survey found that there were an estimated 157,500 surgical site infections associated with inpatient surgeries in 2011\(^3\). NHSN data for 2006-2008 (16,147 SSIs following 849,659 operative procedures) showed an overall SSI rate of 1.9\(^4\).

While advances have been made in infection control practices, including improved operating room ventilation, sterilization methods, barriers, surgical technique, and availability of antimicrobial prophylaxis, SSIs remain a substantial cause of morbidity, prolonged hospitalization, and death. SSI is associated with a mortality rate of 3\%, and 75\% of SSI-associated deaths are directly attributable to the SSI\(^5\).
## Surgical Site Infections

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number of Procedures</th>
<th>NHSN Infections</th>
<th>NHSN SIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG Chest/donor</td>
<td>515</td>
<td>18</td>
<td>1.31</td>
</tr>
<tr>
<td>CABG Chest/only</td>
<td>64</td>
<td>1</td>
<td>0.62</td>
</tr>
<tr>
<td>Colon</td>
<td>528</td>
<td>32</td>
<td>1.45*</td>
</tr>
<tr>
<td>Total Hip</td>
<td>387</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>Total Knee</td>
<td>263</td>
<td>3</td>
<td>1.12</td>
</tr>
<tr>
<td>Abd Hyst</td>
<td>502</td>
<td>7</td>
<td>1.2*</td>
</tr>
<tr>
<td>Craniotomy</td>
<td>615</td>
<td>7</td>
<td>0.42</td>
</tr>
<tr>
<td>Laminectomy</td>
<td>948</td>
<td>5</td>
<td>0.51</td>
</tr>
<tr>
<td>Spinal Fusion</td>
<td>666</td>
<td>7</td>
<td>0.55</td>
</tr>
</tbody>
</table>
### Monitoring in the Operating Room

#### Today's Projected Minutes Gained Per OR

(as of: 06/20/16 4:21 PM)

<table>
<thead>
<tr>
<th>Avg. 1st Case Gain (mins)</th>
<th>AVG. Turnover Time Minutes Per Case: Baseline/Actual/Target</th>
<th>PS % for All ORs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient Exit - Cleaning Stop</td>
<td>Sign-ins</td>
</tr>
<tr>
<td></td>
<td>Cleaning Stop - Room Sterile Start</td>
<td>Timeouts</td>
</tr>
<tr>
<td></td>
<td>Room Sterile Start - Patient in Room</td>
<td>Sign-outs</td>
</tr>
</tbody>
</table>

#### Number of Completed Cases Audited Today

<table>
<thead>
<tr>
<th>OR#</th>
<th>PS</th>
<th>1st Case Gain (mins)</th>
<th>Turnover Time (mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyst</td>
<td>83%</td>
<td>7:42 BL</td>
<td>3</td>
</tr>
<tr>
<td>Lith</td>
<td>100%</td>
<td>7:42 BL</td>
<td>13</td>
</tr>
<tr>
<td>1</td>
<td>100%</td>
<td>7:42 BL</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>100%</td>
<td>7:42 BL</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>100%</td>
<td>7:57 BL</td>
<td>-11</td>
</tr>
<tr>
<td>4</td>
<td>100%</td>
<td>7:27 BL</td>
<td>63 BL</td>
</tr>
<tr>
<td>5</td>
<td>100%</td>
<td>8:12 BL</td>
<td>-20</td>
</tr>
<tr>
<td>6</td>
<td>100%</td>
<td>7:42 BL</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Arrowsight data

**06/20/16 Winners Circle ORs- GREAT JOB!**

<table>
<thead>
<tr>
<th>PS</th>
<th>1st Case starts</th>
<th>Turnover Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lith/1/2/3/4/5/6/7/8/9/10/11/12/14/15/16/18/21</td>
<td>Cyst/Lith/1/3/7/15/16/17/18/19/21</td>
<td>7/10/14/22</td>
</tr>
</tbody>
</table>
Cardiac Surgery Interventions

- Nasal screening
- Prepping
- Antimicrobial Prophylaxis
- Standardization of trays,
- Additional instruments ordered
- Maintain normothermia
- Blood Glucose
- Observe operating room personnel
  - OR Traffic Signs
  - Surgical Attire
  - Vocera
  - Stocking of various sizes of surgical gowns
- Disinfection: Ultraviolet light
- Arrowsight & OR Team: Terminal Cleaning being assessed
- Cardiac Operating Rooms relocated and Air Handler Unit replaced
- Post op-Chlorhexidine gluconate impregnated wipes for 5 days postoperatively
- Root Cause Analysis- reviewing all Cardiac Post Operative Surgical Site Infections
- Monthly Environment of Care Rounds
- External consult
- Physician champion
As part of the cardiac services model, a subcommittee was developed for SSI, lead by an MD.
SSI Colon and GYN Prevention

Optimize skin preparation

Optimal delivery of preoperative antibiotics and intra-operative antibiotics if indicated

Temperature >36°C

Use of end of case wound closure with unused sterile instruments and a fresh pair of sterile gloves

Blood sugar glucose level <200 mg/dl

Anesthesia Class

Standardized wound management

Wound Closure/Class
Education - Wound Class is a predictor of surgical site infection (SSI) rates

Risk of Developing Surgical Site Infection (SSI)

<table>
<thead>
<tr>
<th>Risk</th>
<th>Wound Class 1: Clean</th>
<th>Risk</th>
<th>Wound Class 2: Clean - Contaminated</th>
<th>Risk</th>
<th>Wound Class 3: Contaminated</th>
<th>Risk</th>
<th>Wound Class 4: Dirty/Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%</td>
<td></td>
<td>5% - 15%</td>
<td></td>
<td>&gt;15%</td>
<td></td>
<td>&gt;30%</td>
<td></td>
</tr>
</tbody>
</table>

Risk Classifications:
- Wound Class 1: Clean
- Wound Class 2: Clean - Contaminated
- Wound Class 3: Contaminated
- Wound Class 4: Dirty/Infection

Risk of Developing Surgical Site Infection (SSI): 61
Executive Summary

Challenges Addressed
- Team functioning
- Data availability
- Data transparency

Steps/Process Created
- Understanding processes pre-post surgery
- OR monitoring
- Standardization of practices
- Reporting through QA structure

Key players Involved
- Surgeons, PST, OR, nursing, infection prevention

Outcomes Achieved
- Decrease in SSIs
- Success factors
- MD accountability
Antimicrobial Stewardship

To fight antibiotic resistance, we need to fight bad prescribing habits

June 21, 2018 6:01am EDT
Goals of Antimicrobial Stewardship

Optimize Patient Safety:
- Optimized treatment of infections to decrease selective pressure

Reduce:
- Resistant organisms
- Clostridium difficile
- Drug toxicity

Decrease or Control Costs:
- Antibiotics
- Patient length of stay
- Mortality
Goals of Antimicrobial Stewardship

An Antibiotic Stewardship Program ensures that every patient gets:

- an antibiotic only when needed
- the right antibiotic
- an antibiotic at the right dose
- an antibiotic through the right route
- an antibiotic for the right duration
Structure and Goals

- Prospective audit and review of patients on antibiotics across the hospital to ensure the appropriate course of antibiotic for a given syndrome
- Review antibiotic regimen of patients with positive blood stream infections and other positive sterile site infections
- Guidelines created for specific last line antibiotics
- Creating guidelines for ordering the testing and management of C. Diff associated diarrheal syndrome
## 2015 NSUH Interventions

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>Number, (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discontinue Antibiotics</td>
<td>257 (23.3)</td>
</tr>
<tr>
<td>Streamline Antibiotics</td>
<td>104 (9.4)</td>
</tr>
<tr>
<td>Change Antibiotics/Bug Drug Mismatch</td>
<td>63 (5.7)</td>
</tr>
<tr>
<td>Optimize Dose</td>
<td>171 (15.6)</td>
</tr>
<tr>
<td>Recommend Shorter Duration of Therapy</td>
<td>81 (7.4)</td>
</tr>
<tr>
<td>Therapy Recommended (IV to PO, Cultures Recommended, Start Antibiotics, Other)</td>
<td>423 (38)</td>
</tr>
<tr>
<td>Total</td>
<td>1099</td>
</tr>
</tbody>
</table>
2015 Northwell Financial Impact

Daptomycin Purchases ABC/Cardinal 2015

Q1 Average: 7.924
Q2 Average: 2.850
Q3 Average: 1.810
Executive Summary

Challenges addressed
– Inappropriate antimicrobial choice, route, dosage
– Antimicrobial resistance
– Physician autonomy / Physician lead team to review antimicrobial use
– Steps/process created
– Guidelines for C. Diff testing
– Guidelines for use of last line antibiotics

Key Players Involved
– Infectious Disease, Infection Prevention, Laboratory, IT, Pharmacy

Outcomes Achieved
– Decrease in Hospital Onset Cdifficle
– Optimization of antimicrobial use

Success Factors/Pre-Requisites
– Support from Hospital Leadership
High Level Disinfection (HLD) Program
High Level Disinfection (HLD) Program

- Five different types of high level disinfectants are utilized facility wide to clean different types of scopes and probes
- All areas are audited by Infection Prevention
- Cardiology & Endoscopy, Respiratory, Ultrasound, Human Reproduction Clinic, Maternal Fetal Medicine, Labor and Delivery, OR
- Competencies created
- Feedback from rounds are shared with unit leadership and administration
Summary
Summary

Challenges

Cdiff
CAUTIs
CLABSI
SSIs

Keys to Success

Understand Data
Define the Team
Engage Frontline Staff
Initiate Test of Change
Encourage Innovation
Hold People Accountable
Involve Leadership
Questions
Thank you