Hospital-Acquired Infections

Overview

What?

Hospital-acquired infections (HAIs) are infections that patients acquire while they are receiving treatment for another condition in a health care setting.
So what?
The CDC found 1 in 25 patients acquires an infection during a hospital stay. 75,000 (1 in 9) people with HAIs died in 2011; it couldn’t be determined if deaths were due to an HAI. (NEJM)

Incidence of E. Coli infection at community hospitals is increasing (most from UTIs)

So what (cont.)?
Many HAIs are considered hospital-acquired conditions and are not reimbursed by Medicare/Medicaid:

- Catheter-associated UTI
- Vascular catheter-associated infection
- Certain kinds of surgical site infections

Risk to health care personnel: Simulation found 46% of health care workers’ skin or clothing was contaminated while removing PPE (gloves & gowns)
So what (cont.)?
Infections are becoming more difficult to treat

A 2015 study published in The Lancet estimated that between 38.75 and 50.9% of pathogens causing surgical site infections (SSIs) are resistant to standard prophylactic antibiotics in the US.

It also estimated a 30% reduction in efficacy of antibiotic prophylaxis would result in 120,000 additional surgical site infections & infections after chemo, with 6,300 additional deaths.

Overview (cont.)

Now What?
- Learn about causes of health care-associated infections
- Review case studies
- Identify possible improvements to process

Then What?
- Implement improvements
- Educate your staff
- Pass it on!
Agenda

- Cause Mapping method of problem solving
- Causes of HAIs
- Case study 1
- Case study 2
- Suggestions for improvement
- Questions

Problem Solving Methods

<table>
<thead>
<tr>
<th>Conventional Problem Solving</th>
<th>CAUSE MAPPING Method</th>
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<tbody>
<tr>
<td>1. Identify the Problem</td>
<td>1. Identify the Impact to the Goals</td>
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<tr>
<td>2. Identify the Cause (Root Cause)</td>
<td>2. Identify the Causes (Cause Map)</td>
</tr>
<tr>
<td>3. Identify the Solution</td>
<td>3. Identify the Best Solutions</td>
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Hospital Acquired Infections

1. Problem

2. Analysis

3. Solutions

**Cause Mapping®**

Problemsolving Steps

<table>
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<th>Step</th>
<th>Problem Outline</th>
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<tbody>
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<td>1.</td>
<td>What</td>
</tr>
<tr>
<td></td>
<td>When</td>
</tr>
<tr>
<td></td>
<td>Where</td>
</tr>
<tr>
<td></td>
<td>GOALS</td>
</tr>
</tbody>
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<tr>
<th>Step 2</th>
<th>Cause Mapping</th>
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<tr>
<td></td>
<td>Why?</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Step 3</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Possible Solutions</td>
</tr>
<tr>
<td></td>
<td>BEST Solutions</td>
</tr>
<tr>
<td></td>
<td>Action Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Goal</th>
<th>Impact</th>
<th>Possible Solutions</th>
<th>BEST Solutions</th>
<th>Action Plan</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tbody>
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© BEST Solutions

- Owner
- Due Date

**Cause Mapping®**

Starts with the Impact to the Goals.
Builds backwards through time.
Collects and organizes all the Why? questions.
Goal
Impacted

Because...

Because...

Because...

Because...

AND

Both causes required to produce the effect

Common Causes of HAIs

- Use of indwelling medical devices such as bloodstream, endotracheal and urinary catheters (UTIs, pneumonia)
- Surgical procedures (surgical site infections)
- Injections (Bloodstream infections)
- Improperly sterilized reused devices (Bloodstream infections)
- Overuse or improper use of antibiotics
**Case study 1: Duodenoscope contamination**

**Step 1. Outline**

<table>
<thead>
<tr>
<th>What</th>
<th>Problem(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why</td>
<td>Patients infected, killed by superbug, scopes contaminated, unable to be sterilized</td>
</tr>
<tr>
<td>When</td>
<td>Date: October 2014 to January 2015</td>
</tr>
<tr>
<td>Where</td>
<td>Different, unusual, unique Facility, site</td>
</tr>
<tr>
<td></td>
<td>Design of devices makes cleaning difficult</td>
</tr>
<tr>
<td></td>
<td>Different, unusual, unique Unit, area, equipment</td>
</tr>
<tr>
<td></td>
<td>UCLA Medical Center</td>
</tr>
<tr>
<td></td>
<td>Task being performed</td>
</tr>
<tr>
<td></td>
<td>Duodenoscopes</td>
</tr>
<tr>
<td></td>
<td>Procedures on digestive system</td>
</tr>
<tr>
<td>Impact to the Goals</td>
<td></td>
</tr>
<tr>
<td>Patient Safety</td>
<td>2 patient deaths</td>
</tr>
<tr>
<td>Employee Safety</td>
<td>Risk from gas sterilization of scopes</td>
</tr>
<tr>
<td>Environmental</td>
<td>CRE contamination of duodenoscopes</td>
</tr>
<tr>
<td>Patient Services</td>
<td>7 patients infected with CRE</td>
</tr>
<tr>
<td>Property/Equipment</td>
<td>Difficulty properly cleaning equipment</td>
</tr>
<tr>
<td>Frequency</td>
<td>Numerous infections since 1987</td>
</tr>
</tbody>
</table>

**Duodenoscope Contamination**

**Step 2. Cause Map (continued)**

- **Patient Safety Goal Impacted**: 2 patient deaths
- **CRE contamination of duodenoscopes** AND **Duodenoscope reused**
- **7 patients infected with CRE** AND **CRE resistant to most antibiotics**
Duodenoscope Contamination
Step 2. Cause Map (continued)

- CRE contamination of duodenoscopes
  - Duodenoscope used on patient with CRE
    - AND
      - Difficulty properly cleaning equipment
      - Design of scopes
        - AND
          - Gas sterilization not recommended

Duodenoscope Contamination
Step 3. Solutions

- CRE contamination of duodenoscopes
  - Duodenoscope used on patient with CRE
    - Solution: Culture each scope before use
    - Solution: Screen, isolate patients
    - Solution: Updated reprocessing protocol
      - AND
        - Difficulty properly cleaning equipment
        - Gas sterilization not recommended
      - Design of scopes
### Case study 2: Catheter-Associated Urinary Tract Infection (CAUTI)

#### Step 1. Outline

<table>
<thead>
<tr>
<th>What</th>
<th>Problem(s)</th>
<th>Urinary tract infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>When</td>
<td>Date</td>
<td>Proactive</td>
</tr>
<tr>
<td>Where</td>
<td>Different, unusual, unique</td>
<td>Health care facilities</td>
</tr>
<tr>
<td></td>
<td>Facility, site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit, area, equipment</td>
<td>Uninary tract</td>
</tr>
<tr>
<td></td>
<td>Task being performed</td>
<td>Uninary catheterization</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact to the Goals</th>
<th>Frequency</th>
<th>Annualized Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Safety</td>
<td>&gt;500,000/ year in the US</td>
<td>&gt;$1,000</td>
</tr>
<tr>
<td>Patient Services</td>
<td></td>
<td>&gt;$500M</td>
</tr>
</tbody>
</table>

### CAUTI

#### Step 2. Cause Map

- **Patient Safety Goal Impacted**: Urinary tract infection
- **Pathogens access the urinary tract**: Pathogens in, on catheter

- **Pathogens in, body**
- **AND/OR**
  - Drainage system contaminated
- **AND/OR**
  - Pathogens on medical personnel
- **AND/OR**
  - Non-sterile insertion
CAUTI
Step 2. Cause Map

Patient Safety Goal Impacted

Urinary tract infection

Pathogens access the urinary tract

Pathogens in, on catheter

AND

Catheter inserted

Pathogens not removed from body

Obstructed urinary flow

Catheter inserted improperly

Catheter improperly secured

Pathogens not excreted

Damage to urinary tract

AND/OR

Obstructed urinary flow

Catheter inserted improperly

Catheter improperly secured
How can health care personnel reduce the risk of catheter-associated UTIs?

- Infection control measures
- Use other options when possible
- Catheter insertion procedure
- Catheter checks & need assessment

**ANA CAUTI prevention tool**

**Success Story: Columbus Children’s reduction of surgical infections**

Key: give an appropriate antibiotic within a 60-minute window prior to incision

- In 2005, >1/3 of appendectomy patients did not get the right antibiotic at the right time
- Designed “Cleared for takeoff” checklist
- Provided a visual reminder
- After 3 months, 89% of appendectomy patients got the right antibiotic at the right time
- (100% after 10 months)
General Disinfection

Step 3. Solutions

- Use of single-bed hospital rooms
- Enhanced cleaning (bleach, UV)
- More careful prescribing of antibiotics
- Use of anonymous observers
- Use of lights that look for germs
- Bacteria-fighting paint
- Kaiser bans antimicrobial additives to surfaces

Cause Mapping

Problem Solving • Incident Investigation • Root Cause Analysis

Health Care Case Study

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