THE ROLE OF HUMAN FACTORS FOR INFECTION PREVENTION IN THE EMERGENCY DEPARTMENT

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INFECTION PREVENTION IN EMERGENCY CARE: STRATEGIES TO IMPROVE PRACTICE
Sunday, October 7th, 2012
Objectives

• Describe infection prevention from an organizational perspective
• Demonstrate how human factors are critical to successful implementation of an infection prevention initiative
• Apply similar strategies to an ED setting
“EVERY DAY, 247 PEOPLE DIE IN THE USA AS THE RESULT OF A HEALTHCARE ASSOCIATED INFECTION. THIS IS EQUIVALENT TO A 767 AIRCRAFT CRASHING EVERYDAY OR MORE THAN 90,000 DEATHS ANNUALLY”

Adapted from the Joint Commission Center for Transforming Healthcare

Why Should We Care About Human Factors in Infection Prevention

• Error can be reduced through human factors design techniques
  • Focus on human capabilities and limitations
  • Look at breakdown between system and human operator and provide a solution
## Infection Prevention Priorities from the Organizational Perspective

<table>
<thead>
<tr>
<th>Infection</th>
<th>Number of HAIs</th>
<th>Estimated Case Fatality Rate, %</th>
<th>Range of $ estimates based on 2007 CPI for Inpatient hospital services</th>
<th>Range of estimate using CPI for Inpatient hospital services (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSI</td>
<td>290,485</td>
<td>2.8</td>
<td>$11,874 - $34,670</td>
<td>$3.45 - $10.07</td>
</tr>
<tr>
<td>CLABSI</td>
<td>92,011</td>
<td>12.3</td>
<td>$7,288 - $29,156</td>
<td>$0.67 - $2.68</td>
</tr>
<tr>
<td>VAP</td>
<td>52,543</td>
<td>14.4</td>
<td>$19,633 - $28,508</td>
<td>$1.03 - $1.50</td>
</tr>
<tr>
<td>CAUTI</td>
<td>449,334</td>
<td>2.3</td>
<td>$862 - $1,007</td>
<td>$0.39 - $0.45</td>
</tr>
<tr>
<td>CDI</td>
<td>178,000</td>
<td>--</td>
<td>$6,408 - $9,124</td>
<td>$1.14 - $1.62</td>
</tr>
</tbody>
</table>

Human Error Reduction Strategies

• Right PEOPLE
  • personnel selection

• Right BEHAVIOR
  • training, coaching

• Right ENVIRONMENT
  • design of equipment, the work itself, the environment and its interface with the worker

Adapted from Doug Bonacum
Institute for Healthcare Improvement (IHI)
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# Examples: Engineering for HAI Prevention

<table>
<thead>
<tr>
<th>Human Factor</th>
<th>Healthcare-Associated Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use visual controls</td>
<td>Hand Hygiene</td>
</tr>
<tr>
<td>Avoid reliance on memory</td>
<td>CAUTI</td>
</tr>
<tr>
<td>Simplify and Standardize</td>
<td>SSI</td>
</tr>
<tr>
<td>Use constraints/forcing functions</td>
<td>CLABSI</td>
</tr>
<tr>
<td>Use protocols and checklists</td>
<td>CLABSI, SSI</td>
</tr>
<tr>
<td>Reduce interruptions and distractions</td>
<td>CLABSI, SSI</td>
</tr>
<tr>
<td>Take advantage of habits and patterns</td>
<td>Hand hygiene</td>
</tr>
<tr>
<td>Promote effective team functioning</td>
<td>Hand Hygiene, CLABSI</td>
</tr>
</tbody>
</table>
“HAND HYGIENE IS THE SIMPLEST AND MOST EFFECTIVE, PROVEN METHOD TO REDUCE THE INCIDENCE OF HEALTHCARE ASSOCIATED INFECTIONS.”

The Centers for Disease Control (CDC)
What was your ED’s hand hygiene compliance on the last audit?

Text a **CODE** to **22333**  | Submit responses at **PollEv.com/Clean**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25%</td>
<td>347792</td>
</tr>
<tr>
<td>25-50%</td>
<td>347812</td>
</tr>
<tr>
<td>50-75%</td>
<td>347909</td>
</tr>
<tr>
<td>75-100%</td>
<td>348554</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>348555</td>
</tr>
</tbody>
</table>

Total Responses: 8
What is your personal hand hygiene compliance?

- 0-25%: 500559
- 25-50%: 500560
- 50-75%: 327155
- 75-100%: 341088

Text a CODE to 22333. Submit responses at PollEv.com/Clean.
## Published Compliance with Hand Hygiene

<table>
<thead>
<tr>
<th>Year</th>
<th>Setting</th>
<th>Compliance</th>
<th>Author</th>
<th>Reference and comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICUs-priv</td>
<td>28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ICU rooms</td>
<td>30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>All wards</td>
<td>45%</td>
<td>Larson</td>
<td>Am J Infect Control 1983;11:221-5</td>
</tr>
<tr>
<td>1987</td>
<td>PICU</td>
<td>30%</td>
<td>Donowitz</td>
<td>Am J Dis Child 1987;141:683-5. wearing gowns did not improve hw compliance</td>
</tr>
<tr>
<td>1990</td>
<td>ICU</td>
<td>32%</td>
<td>Graham</td>
<td>Am J Infect Control 1990;18:77-81. alcohol rubs increased compliance to 45%</td>
</tr>
<tr>
<td>1999</td>
<td>All wards</td>
<td>48%</td>
<td>Pittet</td>
<td>Ann Intern Med 1999;130:126-30</td>
</tr>
<tr>
<td></td>
<td>ICUs</td>
<td>36%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Adapted from Pitett, D. Emerg Infect Dis 2001. 7(2): 234-240
Denver Health
Rapid Improvement Event

Value Stream: Complex Discharge
RIE: Hand Cleansing
October 8-12, 2007
Understanding Violations of Human Factors that Set Us Up

- Ineffective placement of sinks and waterless dispensers within actual workflow processes
- Hand hygiene compliance data not collected or reported accurately or frequently
- Lack of accountability
- Safety culture does not stress hand hygiene enough at all levels
- Ineffective or insufficient education
- Hand often full when entering or exiting a room
- Hand to put on gloves after hand hygiene
- Workers are busy and get distracted
- Dispensers often found empty
Address the Violations: Build a Better System

- **Mitigate**
  - Policies, training, inspection
  - Minimize consequences of errors

- **Facilitate**
  - Make errors visible
  - Make it easy to do the right thing

- **Eliminate**
  - Make it hard to do the wrong thing
  - Eliminate the opportunity for error

Adapted from Doug Bonacum
Institute for Healthcare Improvement (IHI)
Strategy: Simplify

Before

After
Strategy: Visual Controls

Adapted from Amber Miller, RN, CIC
Strategy: Standardize
The WHO 5 Moments for Hand Hygiene

1. Before patient contact
2. Before aseptic task
3. After body fluid exposure risk
4. After patient contact
5. After contact with patient surroundings
Strategy: Shared Cognition

EVERYONE understand needs and expectations by others

• PROVIDERS
  • New Employee Orientation
  • Annual Training

• PATIENTS
  • Safety Video for all patients to view
  • Information for patient in admission packets
  • “it’s OK to Ask” campaign
I. PURPOSE
To ensure that all employees of Denver Health (DH) are practicing safe hand hygiene for the safety of themselves and patients to prevent the transmission of micro-organisms.

II. RESPONSIBILITY
A. The Unit Manager shall have the authority to enforce the policy for all direct care providers and others who have direct contact with patients on the unit. The Unit Manager will report violators to the appropriate Director of Service or Executive Staff Member.

B. All employees have the responsibility of reporting violators of this policy to the Unit Manager.
Strategy: Data Feedback

Overall HH Compliance Hospital-wide by Quarter
2Q 2005 - 3Q 2012
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Hand Hygiene: ED vs Other Units (2012, n=1110)

- Other Units: 87%
- ED: 49%
**Unexpected Increased Mortality After Implementation of a Commercially Sold Computerized Physician Order Entry System**

<table>
<thead>
<tr>
<th>Violations</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not account for the context in which system was being used</td>
<td>Increased clinician time at computer</td>
</tr>
<tr>
<td>Implementation in 6 days</td>
<td>Reduction in time at bedside</td>
</tr>
<tr>
<td>Off the shelf, no customization</td>
<td>Changes in work process</td>
</tr>
<tr>
<td>Order sets</td>
<td>Increases in delays</td>
</tr>
<tr>
<td>No Pediatric ICU module</td>
<td>Increased mortality by 100%</td>
</tr>
</tbody>
</table>

Han et al, Pediatrics Vol. 116 No. 6 Dec 2005)
Conclusions

- Healthcare-associated infections have significant morbidity, mortality and cost consequences and decreasing them is a national priority.
- Human factors should be considered in order to achieve successful implementation of an infection prevention initiative.
- The ED setting may require interventions unique from other settings.
Questions?

We could design the product with a simple point-and-click interface...

Or we could require the user to choose among thousands of poorly documented commands, each of which must be typed exactly right on the first try.

Bear in mind, we'll never meet a customer ourselves.

Make it so they have to reboot after every typo.

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