Learning From Defects
Exercise

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Learning Objectives

• To understand the difference between first order and second order problem solving

• To address each of the 4 questions in learning from defects
  – What happened, why, what will you do to reduce risk, and how do you know it worked?
Healthcare can be dangerous..

• 3.7% of patients in hospitals experience 1 or more adverse events\(^1\)
• ICUs are particularly high risk areas:
  – 17% of ICU patients suffer serious adverse events\(^2\)
  – 1.7 errors per patient day: 29% potentially serious\(^3\)
  – 85,000 errors every day
  – 24,650 potentially life threatening
  – On average, every patient admitted suffers a potentially life threatening error
    (Based on 55,000 daily, 5 million annually)

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Assessing Defects

• Frontline Providers Safety assessment
  – Please describe how you think the next patient in your clinical area will be harmed.
• Adverse event reporting systems
• Sentinel events
• Complications
• Infection rates
• Mortality and morbidity conference
• Claims data

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Problem Solving*

• First Order
  – Recovers for that patient yet does not reduce risks for future patients
  – Example: You go get the supply or you make do

• Second Order
  – Reduces risks for future patients by improving work processes
  – Example: You create a process to make sure line cart is stocked


What is a Defect?

Anything you do not want to have happen again
4 Questions to Learn from Defects

• What happened?
• Why did it happen?
• What will you do to reduce the chance it will recur?
• How do you know that you reduced the risk that it will happen again?

What Happened?

• Reconstruct the timeline and explain what happened
• Put yourself in the place of those involved, in the middle of the event as it was unfolding
• Try to understand what they were thinking and the reasoning behind their actions/decisions
• Try to view the world as they did when the event occurred

Reason J. Human Error. Cambridge, UK: Cambridge Univ Pr; 1990.
Why did it Happen?

• Develop lenses to see the system (latent) factors that lead to the event
• Often result from production pressures
• Damaging consequences may not be evident until a “triggering event” occurs

Reason J. Human Error. Cambridge, UK: Cambridge Univ Pr; 1990.

Why did it Happen?

• Review the list of factors that contributed to the incident and check off those that negatively contributed and positively contributed to the defect

• **Negative contributing factors** are those that harmed or increased risk of harm for the patient

• **Positive contributing factors** limited the impact of harm
What will you do to reduce the risk?

• Safe design principles
  – Standardize what we do
    – Eliminate defects
  – Create independent checks
  – Make it visible

• Safe design applies to technical and team work

Rank Order of Error Reduction Strategies

1. Forcing functions and constraints
2. Automation and computerization
3. Standardization and protocols
4. Checklists and double check systems
5. Rules and policies
6. Education / Information
7. Be more careful, be vigilant
Strength of Interventions

<table>
<thead>
<tr>
<th>Weaker Actions</th>
<th>Intermediate Actions</th>
<th>Stronger Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Check</td>
<td>Checklists/Cognitive Aid</td>
<td>Architectural/physical plant changes</td>
</tr>
<tr>
<td>Warnings and labels</td>
<td>Increased Staffing/Reduce workload</td>
<td>Tangible involvement and action by leadership in support of patient safety</td>
</tr>
<tr>
<td>New policy, procedure, or memorandum</td>
<td>Redundancy</td>
<td>Simplify the process/remove unnecessary steps</td>
</tr>
<tr>
<td>Training and/or education</td>
<td>Enhance Communication (read-back, SBAR etc.)</td>
<td>Standardize equipment and/or process of care map</td>
</tr>
<tr>
<td>Additional Study/analysis</td>
<td>Software enhancement/modifications</td>
<td>New device usability testing before purchasing</td>
</tr>
<tr>
<td></td>
<td>Eliminate look alike and sound-a-likes</td>
<td>Engineering Control of interlock (forcing functions)</td>
</tr>
<tr>
<td></td>
<td>Eliminate/reduce distractions</td>
<td></td>
</tr>
</tbody>
</table>

Remember sometimes a weaker action is your only option.

What will you do to reduce the risk?

- Select top interventions (2 to 5) and develop intervention plan
- Assign person and task follow-up date

Adapted from John Gosbee, MD, MS Human Factors Engineering
How do you know risks were reduced?

• Did you create a policy or procedure (weak)?
• Do staff know about policy or procedure?
• Are staff using the procedure as intended?
  – Behavior observations, audits
• Do staff believe risks were reduced?

How do you know risks were reduced?

• Once interventions have been implemented complete the “Describe Defect” and “Interventions” portion of section IV of the Learning from Defect Tool.
• Distribute to staff to rate:
  – The effectiveness of the implementation
  – How effective the intervention has been at reducing reoccurrence of the defect
Summarize and Share Findings

- Summarize findings (Case Summary)
- Share within your organizations
- Share de-identified findings with other organizations

Critical Care Fellowship Program*

<table>
<thead>
<tr>
<th>Fellow</th>
<th>Defect</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unstable oxygen tanks on beds</td>
<td>Oxygen tank holders repaired or new holders installed institution-wide</td>
</tr>
<tr>
<td>2</td>
<td>Nasoduodenal tube (NDT) placed in lung</td>
<td>Protocol developed for NDT placement</td>
</tr>
<tr>
<td>3</td>
<td>Medication look-alike</td>
<td>Education, physical separation of medications, letter to manufacturer</td>
</tr>
<tr>
<td>4</td>
<td>Bronchoscopy cart missing equipment</td>
<td>Checklist developed for stocking cart</td>
</tr>
<tr>
<td>5</td>
<td>Communication with surgical services about night coverage</td>
<td>White-board installed to enhance communication</td>
</tr>
<tr>
<td>6</td>
<td>Inconsistent use of Daily Goals rounding tool</td>
<td>Gained consensus on required elements of Daily Goals rounding tool</td>
</tr>
<tr>
<td>7</td>
<td>Variation in palliative care/withdrawal of therapy orders</td>
<td>Orderset developed for palliative care/withdrawal of therapy</td>
</tr>
<tr>
<td>8</td>
<td>Inaccurate information by residents during rounds</td>
<td>Developing electronic progress note</td>
</tr>
<tr>
<td>9</td>
<td>No appropriate diet for pancreatectomy patients</td>
<td>Developing appropriate standardized diet option</td>
</tr>
<tr>
<td>10</td>
<td>Wrong-sided thoracentesis performed</td>
<td>Education, revised consent procedures, collaboration with institutional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>root-cause analysis committee</td>
</tr>
<tr>
<td>11</td>
<td>Inadvertent loss of enteral feeding tube</td>
<td>Pilot testing a ‘bridle’ device to secure tube</td>
</tr>
<tr>
<td>12</td>
<td>Inconsistent delivery of physical therapy (PT)</td>
<td>Gaining consensus on indications, contraindications and definitions,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>developing an interdisciplinary nursing and PT protocol</td>
</tr>
<tr>
<td>13</td>
<td>Inconsistent bronchoscopy specimen laboratory ordering</td>
<td>Education, developing an order set for specimen laboratory testing</td>
</tr>
</tbody>
</table>

Key Lessons

• Focus on systems… not people
• Prioritize
• Use safe design principles
• Go mile deep and inch wide rather than mile wide and inch deep
• Pilot test
• Answer the 4 questions

Case Example:

Osler 4
Learning from Defects
Staff Safety Assessment

Ask all staff to complete the Staff Safety Assessment, include clerical associates, nurses, support associates, techs, and housestaff (if possible).

Name (optional):
Job Category:
Date:
Unit:

Please describe how you think the next patient in your unit/clinical area will be harmed.

Please describe what you think can be done to prevent or minimize this harm.

Staff Safety Assessment: How the Next Patient Will be Harmed (N=22)

- Falls: 14%
- Staffing: 4%
- Miscommunication: 14%
- Iatrogenic: 14%
- Medication Error: 14%
- Other: 9%

45%
What Happened?

The next CUSP meeting the team started the Learning from Defects tool.

I. What happened? (Reconstruct the timeline and explain what happened. For this investigation, put yourself in the place of those involved, in the middle of the event as it was unfolding, to understand what they were thinking and the reasoning behind their actions/decisions. Try to view the world as they did when the event occurred.)

What Happened?

• To answer section I the Osler 4 team needed to understand if there were any common themes/risk factors related to the falls on their unit.

• Reviewed 12 months of fall data:
  – 90% of falls occurred on night shift, within 1 hour of change of shift, and on weekends
  – Nurses reported they had forgotten to turn bed alarm back on after giving care.
What Happened?

Reviewed 15 months of fall data:
- 90% of falls occurred on night shift, within 1 hour of change of shift, and on weekends

Why did it Happen?

Review the above list of contributing factors and identify the most important factors related to this event. Rate each contributing factor on its importance to this event and future events.

<table>
<thead>
<tr>
<th>Contributing Factors</th>
<th>Importance to current event, 1 (low) to 5 (high)</th>
<th>Importance to future events, 1 (low) to 5 (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver factor- distractions lead to patient's bed alarm not turned on</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Team factor- adequate communication during care w/ ancillary staff</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
What will you do to reduce the risk?

- Safe design principles
  - Standardize what we do
  - Eliminate defects
  - Create independent checks
  - Make it visible

- Safe design applies to technical and team work

<table>
<thead>
<tr>
<th>Interventions to reduce the risk of the defect</th>
<th>Ability to mitigate the contributing factor, 1 (low) to 5 (high)</th>
<th>Teams belief that the intervention will be implemented and executed, 1 (low) to 5 (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add column to report sheet for patients with high fall risk</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Every 4 hours staff will check Hill-Rom system to ensure bed alarms are on</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

III. How will you reduce the likelihood of this defect happening again? Develop an intervention for each of the important contributing factors identified above. Develop interventions to defend against the 2 to 5 most important contributing factors. Refer to the Strength of Interventions chart below for examples of strong and weak interventions. Then, rate each intervention on its ability to mitigate the contributing factor and on the team’s belief that the intervention will be implemented and executed. Make an action plan for 2-5 of the highest scoring interventions.
Make it Visible

Remember your fall precaution interventions

It has been...

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

weeks since Osler 4 has had a fall !!!

Falls per 1,000 Patient Days

Osler 4 Fall Rate

Baseline Fall Rate
2.92 falls/1000 pt-days

Incidence Rate Ratio
0.72 (P value = 0.35)

Post-Intervention Fall Rate
2.10 falls/1000 pt-days

Relative Risk Reduction
28%
References

- Reason J. Human Error. Cambridge, UK: Cambridge Univ Pr; 1990.