Near-Miss Event Reporting: Optimizing the Power / Weight Ratio

SHOT/NBTC Educational Update Meeting
20 November 2006
London, UK
11/20/06

H S Kaplan
Columbia University
“The simplest way to achieve simplicity is through thoughtful reduction”

- “When in doubt – just remove.
- But be careful of what you remove.”

1. Maeda, J. : The Laws of Simplicity
Safety and Reliability are *Dynamic* Non-Events

- They are *not* static nonevents
- Safety and reliability have to be re-accomplished over and over.
- “Safety Is Not Bankable”
Event reporting widely used to drive transfusion safety
Event reporting criticized for being solely reactive
Near-miss reporting adds more proactive focus
SHOT definition near-miss event

• Any error which, if undetected, could result in the determination of a wrong blood group, or issue, collection or administration of an incorrect, inappropriate or unsuitable component, but which was recognized before transfusion took place.
Near-misses make event reports PROACTIVE

– Unlinking Causal Chain
Near-miss reporting has numerous advantages

• Greater numbers provide better insight.
• No burden of patient harm.
• Mindfulness - directly engage staff in safety
• Study recovery – planned or not
National Transfusion Reporting Systems and Near-Miss Events

• **UK**: SHOT. 2000.. Near-miss events - errors recognized *before transfusion*.”

• **US**: FDA. 2001.. Near-miss events - from the time of component *issue* from the transfusion service.

  AABB. 2005.. Near-miss: “An unexpected occurrence that did not adversely affect the outcome, but could have resulted in a serious adverse event”.

• **France**: Hemovigilance. 2002.. Grade 0 events - the *transfusion* of inappropriate products with no initial measurable effect -
Classification of Events in MERS-TM

- Event with Harm
  - Misadventure
- Event Without Harm
- Near-Miss Event
  - planned or unplanned recovery
- Dangerous Situation
Our Definitions Define What We See

• We disregard events not classified

• Compliance often limits visibility
Swelling numbers of reports can create excessive noise

Near-Miss as a Rumble Strip

- Both prevent harm
- Both create unwanted noise
MERS-TM Event Reports

Total: 100%
Near Miss: 72%
High Risk: 2% (243)

22+ Hospitals ’03 –’04
Looking more closely at high risk

How are they distributed?
91% of high-risk events found in near-miss reports
Many near-miss reports are noise, creating unneeded complexity.
Filter noisy near-miss reports to improve signal-to-noise ratio (SNR)
Two steps are used to enhance SNR
\[
\text{Risk} = (\text{Freq.}) \cdot (\text{Harm})
\]

### Highest Credible Harm

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Major</th>
<th>Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Remote</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- High: 1/ 1mo.
- Moderate: 1/ 3mos.
- Low: 1/ 1yr.
- Remote: 1/ >5 yrs.
Matrix cut-off values

Highest Credible Harm

Frequency

High
1/ 1mo.

Moderate
1/ 3mos.

Low
1/ 1yr.

Remote
1/ >5 yrs.

Minimal

Moderate

Major

Fatal

Frequency
Use barrier analysis to further enhance signal-to-noise ratio
If recovery is **unplanned**, barrier is considered absent.
If incorrect component issued, barrier is considered absent.
Distribution of Near Miss Events Pre and Post-Issue

- Near Miss: 100%
- NM Not Issued: 85%
- NM Issued: 15%
Barrier Characteristics are another useful sorting means

- Conditional on another variable?
- Dependant on single human performance?
- If computer supported, is it readily over-ridden?
- Failure readily detected?
How do we track all reports including the filtered ones?

- Similarity “Fuzzy” Matching (“HAWK”)
- Statistical Process Control (SPC)
Monitoring: Case Retrieval “HAWK”

- Have we seen this before?
- How often?
- How similar?
  - Assigns similarity score from 0-100.
  - Compares cases attribute by attribute
  - Differential weighting of each attribute: 0-5
Statistical Process Control is an effective means of tracking & trending "Buckets"

- Prelab
  - Ordering
  - Sample collection
- Intralab
  - Sample handling & testing
  - Component selection, storage & handling
- Issue
- Post Issue
  - Transport & handling
  - Administration
Statistical Process Control is an effective means of tracking & trending

- Sample collection errors
- Ordering errors

Special Cause Variation

UCL

LCL
Errors of Medication vs. Specimen Collection: Awareness

Error Rates

CAP phone survey’99
Exemplar cases
Labeling problem detected at sample accession

- Sample for 4 unit crossmatch for OR.
- Nurse took second sample in case lab needed more sample.
- Second sample not labeled - missing patient name.
Risk = (Freq.) \cdot (Harm)

Highest Credible Harm

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Major</th>
<th>Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remote</strong></td>
<td>1/ &gt;5 yrs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>1/ 1yr.</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>1/ 3mos.</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>1/ 1mo.</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

11 22 33 44
WBIT detected at sample testing.

- Patient: John Calhoun
  - MRN B723575
  - DOB 7/14/1957
  - 4 units PRBC

- Blood Type in tube:
  - A Pos.

- Blood Type on record:
  - O Pos. 10/15/2005

- Blood Type redrawn tube:
  - O Pos.
Risk = (Freq.) \cdot (Harm)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Major</th>
<th>Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1/ &gt;5 yrs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>1/ 1yr.</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>1/ 3mos.</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>High</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>1/ 1mo.</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

Highest Credible Harm

- Minimal
- Moderate
- Major
- Fatal
Consider characteristics of planned recovery step

- Conditional on another variable? **YES**
- Dependant on single human performance alone? **No**
- If computer supported, is it readily overridden? **No**
- Failure difficult to detect? **YES**
Near-Miss Issue Event

- Protocol not followed.
- 2 unit attribute flags overridden at issue.
- Busy lab. tech overrode issue barrier thinking she would add attributes later but did not.
Risk = (Freq.) \cdot (Harm)

### Highest Credible Harm

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Major</th>
<th>Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>High 1/ 1mo.</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Moderate 1/ 3mos.</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Low 1/ 1yr.</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Remote 1/ &gt;5 yrs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Risk Matrix:**

- **Minimal**
  - High: 4
  - Moderate: 3
  - Low: 2
  - Remote: 1
- **Moderate**
  - High: 8
  - Moderate: 6
  - Low: 4
- **Major**
  - High: 12
  - Moderate: 9
  - Low: 6
- **Fatal**
  - High: 16
  - Moderate: 12
  - Low: 8

**Legend:**
- Minimal
- Moderate
- Major
- Fatal
Consider characteristics of planned recovery step

- Conditional on another variable?  **No**
- Dependant on single human performance alone?  **No**
- If computer supported, is it readily overridden?  **YES**
- Failure difficult to detect?  **No**
Near-Miss Post-Issue Event

- Wrong unit issued
- Detected before administration at bedside
- Causal analysis
Risk = (Freq.) \cdot (Harm)

Highest Credible Harm

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Major</th>
<th>Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>High 1/1mo.</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Moderate 1/3mos.</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Low 1/1yr.</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Remote 1/5 yrs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Since incorrect component issued, barrier is considered absent
RCA of Wrong Blood Issue NM

Failure Side

Wrong Blood Issued

- Two pick-up slips in hand at once
- Pick-up slips from printer and transporter
- Multitasking

Wrong blood from refrigerator

- Used printer pick-up slip

Issued MR# of compatibility slip not pick-up slip

- Did not follow protocol
- Unit in hand not pickup slip

Unit returned before transfusion

Error detected at 3 way check

Recovery Side
Multitasking Makes You Stupid: Studies Show Pitfalls of Doing Too Much at Once

You know the feeling. You’re trying to save time by doing two or three things at once—sending e-mail while on the phone with your boss, listening to a colleague while sorting junk mail, making a list during a meeting.

Suddenly, your brain crashes. It can’t recall what you just did, what was just said. Accusing eyes turn on you awaiting a response—to what?

Ted Ruddock calls it “having a senior moment”—and he’s only 44. Making three points in a conversation recently, he got to No. 3—and blanked. “It’s a little scary,” says Mr. Ruddock, a Newtown, Conn., chief corporate learning officer, father of three, husband, caregiver to his aged parents and—not surprisingly—invertebrate multitasker.

A growing body of scientific research shows one of jugglers’ favorite time-saving techniques, multitasking, can actually make you less efficient and, well, stupider. Trying to do two or three things at once or in quick succession can take longer overall than doing them one at a time, and may leave you expected to work on too many tasks at once, says a study of 1,003 employees by the Families and Work Institute, New York.

Though the research has been applied mostly to the debate over driving with cellphones, or aiding people in mind-boggling jobs like air-traffic control, it has quality-of-life implications too. Some findings:

- People who multitask are actually less efficient than those who focus on one project at a time, according to a study published in the Journal of Experimental Psychology. The time lost switching among tasks increases with the complexity of the tasks, according to the research by Dr. Meyer and others.

- The process of switching back immediately to a task you’ve just performed, as many multitaskers try to do, takes longer than switching after a bit more time has passed, say findings published last fall by researchers from the National Institute of Mental Health. The reason is that the brain has to overcome “inhibitions” it imposed on itself to stop doing the first task in the first place; it takes time, in effect, to take off the brakes. If you wait several seconds...
Multi-Tasking: an Unsafe Practice
Control Desk Technologist

- Telephone communications
- Process orders/requests
- Accession Patient Samples
- Prioritize workload
- Prepare components
- Issue components
- Release units into inventory
- Daily refrigerator QC
The simplest way to achieve simplicity is through thoughtful reduction

- When in doubt – just remove.
- But be careful of what you remove. ¹
- Triage by risk matrix and barrier analysis aid in these decisions

¹ Maeda, J. : The Laws of Simplicity
Thank You For Your Attention

www.MERS-TM.net
hsk18@columbia.edu