Approaches to Healthcare Event Analysis

Partnering for Improvement
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Healthcare systems are complex adaptive systems

- Complexity
- Threats
- Resilience
Healthcare systems - from Microsystems to Organizations – are complex adaptive systems

- Complexity is a feature of the system as a whole, not necessarily of each component inside it
- Networks include many agents each of whom constantly acts, and reacts to the others
- Systems are influenced by the environment in which they operate, and influence that environment
- Environment is not in equilibrium
- Constant evolution, with fluid, dynamic changes
- Interactions are non-linear; small events can produce large results
- Control is highly dispersed and decentralized

*Dekker, Drift into Failure; Charles Vincent, Patient Safety*
Safety is not inherent in systems

- The systems themselves are contradictions between multiple goals that people must pursue simultaneously.
- People have to create safety.

Attributed to Dekker 2002 and Hollnagel & Woods 2005, by Holden RJ. People or systems? To blame is human. The fix is to engineer. Prof Saf 2009
### Failure Modes and Effects Analysis

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Impact</th>
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<tbody>
<tr>
<td></td>
<td>Minor</td>
<td>Moderate</td>
<td>Catastrophic</td>
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<tr>
<td>Rare</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Occasional</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td></td>
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<tr>
<td>Frequent</td>
<td>3</td>
<td>6</td>
<td>9</td>
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Additional consideration: detectability
Root Cause Analysis

- 5 Whys
- Ishikawa fishbone diagram
- Veterans Administration National Center for Patient Safety:
  - “What, Why, What, How”
- National Patient Safety Foundation:
  - RCA² Improving Root Cause Analysis and Action to Prevent Harm
Audience response questions

- Do you aggregate or conduct annual reviews of your RCA findings? ("Common Cause Analysis")

- Do you have a formal follow-up process for your RCA recommendations? (i.e. 6 or 12 months later)

- Do you use simulation as a component of RCAs?
Simulation to investigate incidents or serious events

- Simulation of medication administration using actual equipment revealed:
  - Dose double-check protocol not well understood
  - The infusion pump “stuttered” (duplicated a keystroke), delivering 22.3 mg, rather than 2.3 mg
In situ simulation can help us understand and improve “Work as Done”

- Work as imagined
- Work as abstracted
- Work as simulated
- Work as Done
In theory there’s no difference between theory and practice.

In practice there is.

Yogi Berra (1925-2015)
There’s rules to riding a horse

▶ But the horse won’t necessarily know ‘em

Texas Bix Bender
Employees must wash hands – really?
To err is human
To err is human: building a safer health system. Institute of Medicine 1999

To err is human, don’t forget
Pat Croskerry, CMAJ March 2010
The search for a human in the path of a failure is bound to succeed.

If not directly at the sharp end – as a ‘human error’ or unsafe act – one can usually be found a few steps back.

The assumption that humans have failed therefore always vindicates itself.

It's not bad people it's bad systems
- Lucian Leape. NPSF conference April 30 2015

To better is human

To blame is human. The fix is to engineer
- Holden RJ. People or systems? To blame is human. The fix is to engineer. Prof Saf 2009
People working in health care are among the most educated and dedicated work force in any industry

The problem is not bad people, the problem is that the system needs to be made safer

Preventing errors and improving safety for patients require a system approach in order to modify the conditions that contribute to errors

To Err is Human. IOM 2000
Threats to our patients

► Situation I: Regular threat
  - Occurs often enough to develop a standard response e.g. ACLS, PALS

A typology of Resilience Situations by Ron Westrum in Resilience Engineering: Concepts and Precepts
Situation II: Irregular threat

- Unexpected but not impossible or unimaginable
- Requires improvisation

A typology of Resilience Situations by Ron Westrum in Resilience Engineering: Concepts and Precepts
Situation III: Unexampled Event

- So awesome or unexpected that it requires more than the improvisation of Situation II.
  - Tsunami in Southeast Asia 2009
  - Other??...
Resilience

- refers to a property of organizations, as well as individuals, which have the “ability to recognize, and adapt to handle unanticipated perturbations ...[which] demand a shift of processes, strategies, and coordination.”

- Four essential capabilities of resilience:
  - Monitor: know what to look for
  - Respond: know what to do, be capable of doing it
  - Learn: know what has happened
  - Anticipate: find out; know what to expect


Safety-I and Safety-II

Safety-I:
- What goes wrong

Safety-II:
- What goes right

Hollnagel, Wears, Braithwaite, 2015
Questions?

Thank You
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