When All the Cheese Holes Line Up: Errors and the Respiratory Therapist

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“I need someone well versed in the art of torture—do you know PowerPoint?”
Comedies

• A man comes into the ER and yells, "My wife's going to have her baby in the cab!"

• I grabbed my stuff, rushed out to the cab, lifted the lady's dress, and began to take off her underwear.

• Suddenly I noticed that there were several cabs, and I was in the wrong one...Dr. Mark MacDonald, San Antonio, TX

Comedies

• At the beginning of my shift I placed a stethoscope on an elderly and slightly deaf female patient's anterior chest wall. "Big breaths," I instructed.

• "Yes, they used to be," remorsefully replied the patient...Dr. Richard Byrnes, Seattle, WA
Comedies

• One day I had to be the bearer of bad news when I told a wife that her husband had died of a massive myocardial infarct.

• Not more than five minutes later, I heard her reporting to the rest of the family that he had died of a "massive internal fart…..Dr. Susan Steinberg, Manitoba, Canada

Comedies

• While acquainting myself with a new elderly patient, I asked, "How long have you been bedridden?"

• After a look of complete confusion she answered, "Why, not for about twenty years-when my husband was alive…..Dr. Steven Swanson, Corvallis, OR
Murphy’s Law

• 2005: Barrels labeled as instrument cleaning detergent were incorrectly filled with used hydraulic fluid and delivered to hospitals.
• One hospital did not catch the mistake.
• 4000 surgical cases were done with instruments that were in-part, cleaned with used hydraulic fluid

Never Buy a Car Made on a Friday: Avoid going to the hospital July-Sept


• Mortality increases and efficiency decreases in hospitals because of year-end changeovers……e.g. new house officers
Tragedies

- A medical gas company picked up 4 empty $O_2$ cylinders at a hospital in Bayshore NY.
- The accompanying paper work said the hospital wanted some $CO_2$ cylinders.
- The cylinders were subsequently filled with carbon dioxide and returned to the hospital. Paper work said they were filled with carbon dioxide. Tanks were green with “oxygen” etched on the tank.
- One patient was killed
Tragedies

- A respiratory therapist jury-rigged a heated humidified nasal cannula system on a neonate
- Used inspiratory limb from a ventilator circuit instead of the one supplied by humidifier manufacturer.
- Increased resistance of the heated wire caused a steam burn.
- The infant eventually lost the nose and most of the upper airway.

Tragedies

- Countless wrong site and wrong patient surgeries-----more on this later

- Preventable injury and deaths from:
  - Gas mix-ups
  - Ventilator mishaps
  - Medication errors
  - “Rigging” equipment
    - Heliox
    - Sub-ambient oxygen
    - Nitrous Oxide
Examples

- Read by the pharmacist as **Coumadin**, a blood thinner.
- The physician wanted the diabetes drug **Avandia**.

Scope of the Issue

- Motor vehicle deaths/yr \( \approx 44,000 \)
- Breast cancer deaths/yr \( \approx 43,000 \)
- AIDS deaths/yr \( \approx 17,000 \)
- Murders/yr \( \approx 13,000 \)
- Adverse drug deaths/yr \( \approx 7,000 \)
- Total Iraq & Pakistan Wars \( \approx 7,800 \)
- Preventable deaths from errors in hospitals
  - \( 100,000-250,000 \) per year
BLOOD GASES
Yes, we need more blood. No, we can't get it from that line. And yes, it will hurt more if I don't like you.

Corey Raising Funds
Can Today’s Medicine be Humanly Mastered? --- NO

• 3,000 Diseases Classified
• Over 6,000 Drugs
• Over 4,000 Medical Procedures
• 250 Parameters at the ICU Bedside
• 178 Interactions with Patients per Day

Persistent-Pernicious

• Study of all self reported adverse events in an insurance company database = 6,000 doctors in Colorado in the age of the universal protocol 2002-2008
• 23,370 events were reported;
  – 25 were wrong pt surgeries
  – 107 were wrong site procedures
  – 43 pts were significantly harmed
  – Pt died from a chest tube insertion on the wrong side
Respiratory Examples

- Accidental extubations, esophageal intubations
- Preventable ventilator deaths
- Oxygen therapy misconnections
  - No no, not the yellow
  - No no, not the black
  - No no, I wanted 100%
- Manual bagging mishaps
- Equipment problems

Comparison Data

Medication Errors Categories “C” through “I” per 1000 doses dispensed (errors that actually reached patient)
Human factors in pediatric anesthesia incidents.

- Pediatric anesthesia group
- 28,600 cases during study
- 16-18 full time anesthesiologists
- 2 year study
- Analyzed all self reported errors
- 688 incidents reported (2.4%) of all cases
- Of these 42% (284) involved human factors

Error Classification Scheme
Number of Incidents Reported by Each Anesthetist During Study Period

Root Causes of Sentinel Events

Communication  
Training  
Patient Assessment  
Staffing Levels  
Availability of Info  
Competency  
Procedural Compliance  
Physical Environment  
Continuum of Care  
Organizational Culture  
Alarm Systems

Study of 2500 Sentinel Events Published by JCAHO
Root Causes of Errors in a Simulated Prehospital Pediatric Emergency
Academic Emergency Medicine, 2012

- Overall crew scores average 63%
- Most common errors:
  - delayed oxygen delivery,
  - equipment organization and use,
  - glucose measurement,
  - drug administration,
  - and inappropriate cardiopulmonary resuscitation.

Number of “Respiratory” Incidents

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<th>Quarters</th>
<th>2004</th>
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<th>2006</th>
<th>2007</th>
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Legend:
- Other Disciplines
- RT’s
Incident Reports Related to RT

Number of Reports

Airway Communication Compliment Education Equipment Medication Transport Ventilation

“Respiratory” Incident Rates and Staffing Levels

Numbers of eFeedback's Involving RT


Staffing Index for Each Quarter = \left( \frac{\sum (\text{Actual # RT's per shift} - \text{Needed # RT's per shift})}{\sum \text{shifts}} \right) \times (-1)
Safety Metrics - Accidental Extubations

Unplanned Extubations

- Children’s NICU
- Children’s PICU
- PICU Benchmark Mean
- NICU Benchmark Mean

Maybe It’s Not the People That’s the Problem!?!?!? Maybe It’s the System
What are Respiratory Systems?

- Training-Competency
- Policy
- Staffing
- Environment of care-
  - Equipment standardization
  - Alarm management
- Documentation/Information Technology
- Models of communication-collaboration
Consequences of Error

- Never fired for reporting and error
- Invitation to be part of solution

The Nitrogen Example

<table>
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<th>SYSTEM</th>
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| Sub-ambient oxygen therapy | Standardization  
|  | Training-Competency  
|  | Environment of Care-Equipment  
|  | Alarm Management |
| Taken from the NICU to O.R. by RN-MD | Policy  
|  | Training-Competency  
|  | Models of Collaboration-Communication  
|  | Staffing |
| Manually ventilated with flow inflating bag | Environment of Care-Equipment |

What was Active-What was Latent?
The Resuscitation Example

**ISSUE**
- Set-up of the equipment for resuscitation
- Repeated checks of equipment

**SYSTEM**
- Standardization Environment of Care-Equipment
- Policy Training-Competency

What was Active-What was Latent?

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Decision Tree for Determining Culpability of Unsafe Acts

- Actions intended?
  - yes
  - no
- Consequences intended?
  - yes
  - no
- Unauthorized substance?
  - yes
  - no
- Medical condition?
  - yes
  - no
- Knowingly violate safety rule?
  - yes
  - no
- Procedures available, workable, correct?
  - yes
  - no
- Deficiency in training, equipment?
  - yes
  - no
- Pass substitution test?
  - yes
  - no
- History of unsafe acts?
  - yes
  - no
- Sub. Abuse w/ mit.
  - yes
  - no
- Sub. abuse, no mit.
  - yes
  - no
- System induced violation
  - yes
  - no
- Possible negligent error
  - yes
  - no
- Possible reckless violation
  - yes
  - no
- System induced error
  - yes
  - no
- Blameless error
  - yes
  - no
- Blameless error/needs f/u
  - yes
  - no

Diminishing Culpability
RESPIRATORY THERAPY
Because somebody has to be the hospital's bitch.

What Can You Do??

"Really, I'm fine. It was just a fleeting sense of purpose—I'm sure it will pass."
What Can You Do

• The Hunt for Latent Errors
• Stamp Out Unwarranted Variation and Unnecessary Complexity
• Avoid Relying on Human Memory
• Standardization
  – Policies
  – Equipment
  – Processes-Measures
  – Training -Training -Training
  – Drills
  – Double Checks

What Can You Do

• Culture of Reporting
• Transparency
• Useful Paranoia
• Stop the Line (authority gradients)
Other Interventions

• Intriguing ideas (continued)
  – Checklist methods for high risk activities such as surgery, anesthesia, catheterizations
  – Time outs
  – Stop the Line
  – Anonymous events reporting system
  – No use of error rates in performance appraisal of units and individuals
  – Rethink job actions against staff who make mistakes

Sacred Cows Make the Best Hamburger

Great Truths
• Good clinicians don’t make mistakes

NOT
• Good clinicians help their patients, themselves and their colleagues learn from their mistakes
Learning disabilities are tragic in children, but they are fatal in organizations.  

-- Peter Senge