Resolved:
Crew Resource Management in Medicine is a Fad
(Part I)

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Definitions of CRM

• From aviation:

"CRM...is the effective utilization of all available resources - information, equipment, and people - to achieve safe and efficient flight operation"

Definitions of CRM

"the goal is to maximize safe and healthy outcomes for families through the effective utilization of all available resources"

-Miller LA. J Perinat Neonat Nurs, 19:46-51, 2005
**Crew Resource Management** - Crew resource management (CRM), also called crisis resource management in some contexts (eg, anesthesia), encompasses a range of approaches to training groups to function as teams, rather than as collections of individuals. Originally developed in aviation, CRM emphasizes the role of "human factors" - the effects of fatigue, expected or predictable perceptual errors (such as misreading monitors or mishearing instructions), as well as the impact of different management styles and organizational cultures in high-stress, high-risk environments.

CRM training develops communication skills, fosters a more cohesive environment among team members, and creates an atmosphere in which junior personnel will feel free to speak up when they think the something is amiss. Some CRM programs emphasize education on the settings in which errors occur and the aspects of team decision making conducive to "trapping" errors before they cause harm. Other programs may provide more hands-on training involving simulated crisis scenarios followed by debriefing sessions in which participants assess their own and others’ behavior.

From: Agency for Healthcare Research and Quality; Glossary, 2007
Definitions of CRM

"Specific training of healthcare personnel in team techniques, with an emphasis on enhanced communication, to improve patient safety."

-R. Wissler, SOAP 2007
Definitions of "Fad"

- "a pet project...to which exaggerated importance is attributed"
  - Oxford English Dictionary

- "a practice or interest followed for a time with exaggerated zeal"
  - Merriam-Webster Online Dictionary
Definition of CRM as a fad

Specific training of healthcare personnel in team techniques, with an emphasis on enhanced communication, to improve patient safety................. followed for a time with exaggerated zeal.
Recent Literature Proving that Team Training Improves Patient Outcomes
Recent Literature Proving that Team Training Improves Patient Outcomes
Recent Literature Suggesting that Team Training Improves Patient Outcomes
CREW RESOURCE MANAGEMENT:
The Flight Plan for Lasting Change in Patient Safety
According to the 2005 book on "Crew Resource Management" by Gaffney, Harden and Seddon:

"Hospital executives with profit and loss responsibility want to know whether CRM works."

The book gives five examples that "CRM programs do work in healthcare and produce results...appearing in peer-reviewed journals and other publications"

Today, let's take a look at this "evidence".
Example #1

- Observational study
- 164 "surgical services staff members" participated in 12 hours of team training (4 hours X 3 sessions), conducted by an aviation training company.
- Trainees developed a checklist for "surgical counts"
- "Surgical count errors" measured in the six months before and after the training (pro- and retro-spective)
- 50 % decrease in "surgical count errors" after training.
Example #2

- "MedTeams" team training in emergency depts
- Hospitals assigned to two groups in 1998-9:
  - no: 1 military and 2 civilian
  - yes: 3 military and 3 civilian
  (684 ED personnel trained)
- Baseline data prior to training
- Post-implementation data acquired at four and eight months after training
Example #2

• Outcomes included clinical errors noted by a study observer, defined as "any clinical task that actually or potentially put a patient at risk".

• Examples of observed clinical errors:
  – no treatment or communication about high BP
  – no communication about contact precautions
  – no medication in nebulizer
  – trauma patient with disconnected oxygen mask
  – chest pain patient has EKG, but lack of communication leads to delayed interpretation
Example #2

- Control group had no significant change in the observed clinical error rate (17% to 12%)

- Team training group had a significant improvement in the observed clinical error rate (31% to 4%, p<0.03), that was sustained at eight months after training
Example #3

• May 3, 2004 ACOG press release:
  Quotes Dr. Benjamin Sachs from Beth Israel Deaconess, Boston as follows:

  "...in my own hospital, where we adapted these (CRM) techniques for obstetrics, the rate of adverse outcomes has declined 53% in the last four years".

No data were presented.
Example #4


  Describes the information from the Morey study on EDs (example #2), and the ACOG press release quoting Dr. Sachs (example #3).

  No other data were presented.
Example #5

• Business school study of 16 hospitals that adopted minimally invasive cardiac surgery in 1996-8.
• Individual hospital "learning rates" determined by the decrease in procedure length with additional experience.
• Anecdotal information presented that cooperative team behavior by the attending cardiac surgeon was associated with an improved learning rate.
• No formal team training.
• No patient outcome data.
According to the 2005 book on "Crew Resource Management" by Gaffney, Harden and Seddon:

"Hospital executives with profit and loss responsibility want to know whether CRM works."

The book gives five examples that "CRM programs do work in healthcare and produce results...appearing in peer-reviewed journals and other publications"

I'm sure that you agree that only one of these five examples is truly supportive.
Crew Resource Management
CRM and Patient Safety

- All of us know that errors in healthcare are expensive; from both fiscal and ethical perspectives.

- All of us want to improve patient safety.

- Q. Is CRM the correct approach to improve patient safety?

- A study of "MedTeams" team training in OB.
- Hospitals assigned to two groups in 2003-2004:
  - no: 3 military and 5 civilian
  - yes: 3 military and 4 civilian
  (1,307 L&D personnel trained)
- Baseline data: two months before training
- Post-implementation data: five months after training
## Adverse Outcome Index

<table>
<thead>
<tr>
<th>Index Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal death</td>
</tr>
<tr>
<td>Intrapartum or neonatal death (more than 2,500 g)</td>
</tr>
<tr>
<td>Uterine rupture</td>
</tr>
<tr>
<td>Maternal admission to ICU</td>
</tr>
<tr>
<td>Birth trauma (Erb’s palsy, vacuum or forceps injury)</td>
</tr>
<tr>
<td>Return to operating room or labor and delivery unit</td>
</tr>
<tr>
<td>Admission to NICU (more than 2,500 g for more than 24 h)</td>
</tr>
<tr>
<td>Apgar score less than 7 at 5 min</td>
</tr>
<tr>
<td>Blood transfusion</td>
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<tr>
<td>Third- or fourth-degree perineal tear</td>
</tr>
</tbody>
</table>

# Weighted Adverse Outcome Index

<table>
<thead>
<tr>
<th>Index Measures</th>
<th>Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal death</td>
<td>750</td>
</tr>
<tr>
<td>Intrapartum or neonatal death (more than 2,500 g)</td>
<td>400</td>
</tr>
<tr>
<td>Uterine rupture</td>
<td>100</td>
</tr>
<tr>
<td>Maternal admission to ICU</td>
<td>65</td>
</tr>
<tr>
<td>Birth trauma (Erb’s palsy, vacuum or forceps injury)</td>
<td>60</td>
</tr>
<tr>
<td>Return to operating room or labor and delivery unit</td>
<td>40</td>
</tr>
<tr>
<td>Admission to NICU (more than 2,500 g for more than 24 h)</td>
<td>35</td>
</tr>
<tr>
<td>Apgar score less than 7 at 5 min</td>
<td>25</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>20</td>
</tr>
<tr>
<td>Third- or fourth-degree perineal tear</td>
<td>5</td>
</tr>
</tbody>
</table>

ICU, intensive care unit; NICU, neonatal intensive care unit.

Results from Nielsen, et al., 2007

• No significant differences in baseline data or demographics.

• No significant differences in OB patient outcomes, with team training.

• No significant differences in ten of eleven OB clinical process measurements, with team training.
## Results

<table>
<thead>
<tr>
<th>Measure</th>
<th>Control Group</th>
<th>Intervention Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Outcome Index (%)</td>
<td>7.2</td>
<td>8.3</td>
</tr>
<tr>
<td>Weighted Adverse Outcome Score</td>
<td>2.3</td>
<td>2.7</td>
</tr>
<tr>
<td>Severity Index</td>
<td>30.6</td>
<td>31.9</td>
</tr>
<tr>
<td><strong>Process measures (time elapsed)</strong>‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registration to provider assessment</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Registration to maternal-fetal assessment (min)</td>
<td>14.9</td>
<td>17.8</td>
</tr>
<tr>
<td>Scheduled registration to induction</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>GBS antibiotic order to first dose (min)</td>
<td>42.5</td>
<td>42.9</td>
</tr>
<tr>
<td>Epidural request to initiation (min)</td>
<td>33.1</td>
<td>32.5</td>
</tr>
<tr>
<td>Scheduled cesarean delivery start time to incision</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Immediate cesarean delivery decision to incision (min)</strong></td>
<td><strong>33.3§</strong></td>
<td><strong>21.2§</strong></td>
</tr>
<tr>
<td>Urgent cesarean section decision to incision (min)</td>
<td>65.8</td>
<td>77.0</td>
</tr>
<tr>
<td>Registration to delivery – nullipara</td>
<td>14.4</td>
<td>13.8</td>
</tr>
<tr>
<td>Registration to delivery – multipara</td>
<td>8.1</td>
<td>8.3</td>
</tr>
<tr>
<td>Delivery to end of care in labor and delivery</td>
<td>3.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>


- study of the impact of a local hospital training program on neonatal outcomes
- one day training program, offered bimonthly, with all obstetricians and midwives required to attend annually
- course structure:
  - morning - FHR monitoring interpretation
  - afternoon - six OB emergency drill stations: shoulder dystocia, postpartum hemorrhage, eclampsia, twins, breech, adult and neonatal resuscitations
Draycott T, et al. 2006

• Training program started in 2000
• Data collection:
  1. pre-implementation: 1998-1999
  2. post-implementation: 2001-2003
• Major endpoints:
  1. 5 minute Apgar score ≤ 6
  2. neonatal hypoxic-ischemic encephalopathy

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>5-minute Apgar ≤ 6, n (rate per 10,000)</td>
<td>73 (86.6)</td>
<td>49 (44.4)</td>
<td>0.51 (0.35–0.74)</td>
</tr>
<tr>
<td>HIE, n (rate per 10,000)</td>
<td>23 (27.3)</td>
<td>15 (13.6)</td>
<td>0.50 (0.26–0.95)</td>
</tr>
<tr>
<td>Moderate/severe HIE, n (rate per 10,000)</td>
<td>16 (19.0)</td>
<td>11 (10.0)</td>
<td>0.53 (0.24–1.13)</td>
</tr>
</tbody>
</table>

- study of the impact of a local hospital training program on neonatal outcomes
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- recent comprehensive review of CRM in non-aviation settings.
- In medicine, "there is only partial support for training's effectiveness. Whereas reactions to training were positive, transfer of the learned behaviors to the job were somewhat less concrete." "We can not ascertain whether CRM has had an impact on the organization's bottom line (i.e. safety)."
"WHERE'S THE BEER?"
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Resolved:
Crew Resource Management in Medicine is a Fad
(Part II)

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CRM is a fad,
because the continued pursuit of patient outcome data distracts from other team training accomplishments
CRM is a fad,
because the continued pursuit of patient outcome data, distracts from other team training accomplishments such as:

1. improved trainee self-esteem

2. improved job satisfaction

3. improved workplace environment
   a. health implications
   b. substance abuse impact?
CRM improves the workplace environment

- "Nurses often are quick to embrace crew resource management because it flattens hierarchies of authority, resulting in greater respect and improved quality of work life"

- Powell SM and Hill RK. AORN J, 83:179-202, 2006
CRM improves the workplace environment

• This should be an inducement to all of us

• Younger physicians, as a group, may have a heightened interest in overall lifestyle. They may be more interested in investing time in team training, to reap the improved workplace rewards.
Any industry should see these effects of team training as a positive outcome, and worth considerable investment.
Patients and their families appreciate cooperation and respect among their healthcare providers
Accreditation Organizations (i.e. Joint Commission and ACGME), already are actively encouraging hospitals to engage in team training.
One reason that CRM is well-accepted in aviation is that poor crew performance can lead to crew death.

We need to visualize good team behavior in healthcare as an important factor in provider well-being.
In my opinion, we should not lose the benefits of CRM by insisting on a link to patient outcome data. If we do, CRM may lose local institutional support and evolve into a fad.
Patient Outcomes

CRM
"The enemy of good is better"

- modified from Voltaire, 1764
Resources for Team Training

• Free curriculum and support materials:
  - Team STEPPS program
    (dodpatientsafety.usuhs.mil)
    or
    (www.ahrq.gov)

• Join the Society for Simulation in Healthcare
  (www.ssiih.org)