Appendix 1: PowerPoint Training Intervention

Overall Training Goal
Provide knowledge and strategies to support effective teamwork behaviors during patient resuscitation events

Training Method
1. Narrated PowerPoint training
2. Total Length = 25 minutes
3. Number of Slides = 27

Training Objectives
1. Improve declarative knowledge of the nature of code teams and critical teamwork behaviors
2. Develop an understanding of how teamwork behaviors are implemented during code team events
3. Develop an understanding of how teamwork behaviors impact team performance and patient care

Curriculum Overview
Table 1: Training Outline

<table>
<thead>
<tr>
<th>Training Component</th>
<th>Content</th>
<th>Number ofSlides</th>
<th>Targeted Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Overview of PowerPoint training to orient learners toward content and relevance to patient safety</td>
<td>1</td>
<td>Orient learners toward goals and objectives of training</td>
</tr>
<tr>
<td>Provision of Information about Code Teams and Teamwork Dimensions</td>
<td>Teamwork dimension definitions</td>
<td>8</td>
<td>Improve declarative knowledge of the nature of code teams and critical teamwork behaviors</td>
</tr>
<tr>
<td>Provision of Teamwork Behavioral Examples</td>
<td>Examples of teamwork behaviors in a code team clinical context</td>
<td>8</td>
<td>Develop an understanding of how teamwork behaviors are enacted during code team events</td>
</tr>
<tr>
<td>Relevance of Teamwork to Patient Care</td>
<td>Clinical vignette demonstrating the importance of teamwork dimensions as well as the episodic nature of teamwork*</td>
<td>7</td>
<td>Develop an understanding of how teamwork behaviors impact team performance and patient care</td>
</tr>
</tbody>
</table>

* clinical event involved pediatric resuscitation to ensure training did not include clinical content relevant to the assessment simulations

Rationale for Selection of Teamwork Competencies

1. Guiding Principles
   1. Curricula focusing on improving teamwork behaviors should focus on competencies and skills that have been empirically linked with improvement in team effectiveness.(1)
   2. Programs should focus on core competencies as they apply to the specific nature of the team and taskwork targeted by the training.(2, 3)

2. Supporting Literature

It is unlikely that a single taxonomy can generalize across all types of medical teams.(4) Rather it is the nature of the taskwork and characteristics of team composition within different specialties and team types that dictate which processes are appropriate for training.(5, 6) The taskwork and teamwork performed by code teams are interdependent and rapidly changing.(7, 8) In their framework, Marks, et al, describe a temporal model of team processes and performance in which different team processes are critical, depending upon the task work required.(9) Episodes where the demand for task work is high are characterized by action processes that facilitate accomplishing team goals. These episodes of high activity are separated by periods where teams execute transition processes that facilitate planning and reflection. Underlying both action and transition processes are interpersonal factors that influence all team activities.

Considerable evidence supports this temporally-based process model. A recent meta-analysis demonstrates that the teamwork processes described by Marks have a positive relationship with team performance and member
These processes generate observable behaviors that can be practiced and measured, thus making them most pertinent to simulation-based training and assessment. At the 2008 Society for Academic Emergency Medicine Consensus Conference, “The Science of Simulation in Healthcare,” experts in team performance and resuscitation reviewed and modified the taxonomy by Marks, et al. Care was taken when adopting this taxonomy to ensure applicability to both emergency medical teams and current large-scale team training programs. This process provides a code teamwork heuristic (Figure 1) and a comprehensive, evidence-based taxonomy for code teams (Table 1) that captures their unique team characteristics and taskwork.

The content of the team training intervention was driven by the teamwork taxonomy and was presented in a clinical context consistent with the episodic, rapidly shifting nature of code team tasks.

Table 2: Teamwork Domains and Definitions

<table>
<thead>
<tr>
<th>Team Processes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning or Preparation</td>
<td></td>
</tr>
<tr>
<td>Mission analysis</td>
<td>Identification and interpretation of the team’s tasks as well as environmental conditions, available resources, and potential challenges</td>
</tr>
<tr>
<td>Goal specification</td>
<td>Identification and prioritization of team goals</td>
</tr>
<tr>
<td>Strategy formulation</td>
<td>Developing a course of action as well as contingency plans. Involves adjusting strategies in response to environmental and task changes</td>
</tr>
<tr>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>Systems monitoring and adaptation</td>
<td>Tracking team resources and environmental conditions to ensure the team can accomplish its goals; monitoring environmental changes and adapting strategies as necessary</td>
</tr>
<tr>
<td>Team monitoring / Back-up behavior</td>
<td>Team members’ assist other team members with their tasks, help to balance workloads, and compensate for areas of deficiencies. Also called cooperation, workload sharing, and group level citizenship behavior</td>
</tr>
<tr>
<td>Coordination</td>
<td>Organizing the sequencing and timing of team activities</td>
</tr>
<tr>
<td>Mechanisms</td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>Directs and coordinates activities, assesses overall team performance, assigns roles, monitors and develops team attitudes and behaviors, facilitates problem solving and error recognition, facilitates feedback</td>
</tr>
<tr>
<td>Communication</td>
<td>Following-up with a team member to verify that a message was correctly received and clarifying with the sender of a message that the message was received as intended</td>
</tr>
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</table>
Critical Incident Example

**Clinical Event**

**Initial Patient Presentation**
- Team is working in a community hospital where they are called to a pediatric code in the emergency department (ED).
- EMS brings in a seizing 9-month-old baby still seizing, no IV could be established, and no medications given.

**Patient Update #1**
- Patient continues to seize and is becoming hypoxic.
- Respiratory therapist has not arrived.
- Family is now present in the waiting room.
- Requested medications are available.
- Patient is still without IV access despite multiple placement attempts.

**Planning Teamwork Behaviors**

**Mission Analysis**
- Presence of continued seizure activity and absence of IV communicated to team.
- EMS questioned regarding field vital signs and any known past medical history.
- Team assesses personnel present and notes absence of respiratory therapist (RT).

**Goal Specification**
- Team member hears that there is no RT present and places patient on oxygen.
- You ask the pharmacist to draw up medications for intubation and seizure control.
- Team member places patient on cardiac monitor.

**Strategy Formulation**
- Establishing IV access noted as first priority to team.
- Intravenous line kit requested from charge nurse.
- Choice of seizure medications discussed with team.

**Action Teamwork Behaviors**

**Coordination**
- Junior team member currently addressing airway is asked to turn his role over to respiratory therapist.
- Team member is asked to help stabilize patient’s leg for IV placement.
- Nurse is asked to hand you materials while you are sterile for IV placement.

**Team Monitoring and Backup Behavior**
- Junior resident reminds the team that paralyzing patient for intubation may necessitate EEG monitoring.
- Pharmacist questions the diazepam dose and reminds you of weight-based dosing.
- Team member rechecks patient weight and calculated dose.

**Patient Update #2**
- Patient continues to seize.
- Respiratory therapist is now present.
- An intravenous line is being placed, however technically difficult due to ongoing seizures.
- Once line is placed, valium is given with good response and diltiazem is ordered.

**Patient Update #3**
- The patient has stopped seizing after administration of valium.
- Respiratory therapist notes that saturations are now 90%.
- More complete physical exam is performed now that patient has stopped seizing.
- Diltiazem is given after dosing confirmed.

**Systems Monitoring**
- Team member notes that seizure activity stopped with IO placement and oxygen saturations have improved.
- A full fontanella is noted on physical exam so you inform team of need for stat CT scan and probable need for intubation despite improvement of saturations.

**Patient Update #3**
- After discussion with the admitting team, the decision is made to intubate the patient prior to CT scan.
- Nursing alerts you that the family reports a sibling with recent illness and fever in the patient earlier today.

**Teamwork Mechanisms**

**Communication**
- Need for head CT communicated with team and need for monitoring during imaging discussed with nursing staff.
- You order 3 medications for meningitis treatment and the nurse repeats them back to confirm the order in which you want them given.

**Leadership**
- Junior resident prepares to do a lumbar puncture but you remind him that CT is first priority and why.
- You make sure team is aware that evidence of trauma on CT will require additional workup and monitoring.

**Results**

**Clinical Event**

**Patient given oxygen**
- Medications ready when access obtained.
- Patient vitals can now be monitored automatically by all team members.

**Action Teamwork Behaviors**

**Results**

**Coordination**
- IO is quickly established and medication given.
- Team member is freed up for other tasks.

**Team Monitoring and Backup Behavior**
- Possible dosing error avoided.
- Team creates plan for appropriate monitoring if patient paralyzed during intubation.

**Patient Update #3**
- Team is aware patient is no longer seizing.
- Team is aware of probable need for intubation.
- Treatment plan for patient can be expanded based on physical findings.

**Teamwork Mechanisms**

**Results**

**Communication**
- Patient is able to quickly get CT scan.
- Patient medications are appropriately ordered and administered.

**Leadership**
- Possible procedural error avoided.
- Team is able to proactively plan for potential further management issues.
References


