A Continuous Improvement Patient Safety Project
No Conflict of Interest
Nemours Children’s Hospital in Orlando, Florida, USA
No Sponsorship or Commercial Support

Objectives:
1- How to increase patient safety in a clinical setting by using standard techniques known as TeamSTEPPS and Simulation
2- Overview of TeamSTEPPS Safety Program
3- Overview of Simulation
4- Was there improvement in teamwork and mutual support
5- Was improvement sustained 3 months after safety initiative was implemented
BACKGROUND AND SIGNIFICANCE OF PROJECT

• **Communication Failure** is the top cause of preventable adverse events.
• Can lead to: Poor patient outcomes including death and permanent loss of function
• Developing a culture of safety- most effective means of prevention of adverse events
• OR is a high risk area- vulnerable to communication missteps and lack of teamwork.
• These skills are particularly essential among the anesthesia group for patients undergoing anesthesia and surgery
TOOLS USED

- TeamSTEPPS 2.0 Program
- Simulation
The Clinical questions were:

(1) Does the implementation of a TeamSTEPPS training program in the OR cause an improvement in simulation scores in both communication and mutual support/teamwork skills post training?

(2) What are the employee’s attitudes about the TeamSTEPPS training?

(3) Was the simulation experience satisfying to the employee undergoing the testing?

(4) Was the intervention sustained 3 months post training?
MEASUREMENTS

TeamSTEPPS Teamwork Attitudes Questionnaire (T-TAQ)
• Assessment of participants attitudes towards TeamsSTEPPS training session

Satisfaction with Simulation Experience Scale (SSES)
• Evaluation of Simulation experience

T-TAQ 2: Sustainability Check
• Was there an improvement that still exists
SIMULATION AS PARTNER

- Allows for practice in a safe setting
- Anesthesiology pioneered using simulation
- Can mimic real life standard of care. Simulation patient can be brought to the environment where the work is done to provide the most realistic training method
- Combining TeamSTEPPS training with simulation practice/observation/testing is a validated, reliable educational method convenient for healthcare personnel

(Fehr, 2011; Liaw et al, 2014; Clapper, 2014)
TEAMSTEPPS INTERVENTION

• National Patient Safety Culture Program
• Used to develop **highly reliable** medical teams in the military, healthcare, radiation industry and other private sectors
• Focus was on key modules of communication and mutual support (teamwork)
• Online user support network
• Master Trainer Certification available
TEAMSTEPPS OVERVIEW
WHAT IS TEAMSTEPPS 2.0?

Evidence-based Curriculum created by AHRQ and the DOD of team strategies and tools to enhance performance and Patient Safety

Consists of 5 main modules:
1. Leadership
2. Team Structure
3. Communication
4. Mutual Support
5. Situation monitoring

Customization is encouraged

Master Trainer course available-provides skill set to teach Teamstepps to groups/organizations

Website is www.teamsteppsporal.org/
TEAMSTEPPS COMMUNICATION
ADVOCACY TOOLS

Advocacy Tools: Speak with a firm but *respectful* manner

**Two Challenge Rule:** Empowers all team members to “stop the line” if they sense or discover an essential safety breach

**CUS:**
- I am **Concerned**!
- I am **Uncomfortable**!
- This is a **Safety Issue**!

Other tools available on website: Handoff, Feedback and more
TEAMSTEPPS EFFECTIVE COMMUNICATION TOOLS

Call out: strategy used to communicate important or critical information during emergent situations for all of the team to hear.

Check-Back: using closed-loop communication to ensure what you said was heard correctly by the person who you said it to.
CUSTOMIZATION

-Sterile Cockpit
METHODS

Setting:
• NCH 127 bed Pediatric facility with 46 + 20 (ICU) beds in use currently in Lake Nona area of Orlando

Sample:
• 30 surgery associates, 8 anesthesiologists, and 14 CRNAs
METHODS : DESIGN

Design:

• Continuous improvement quality project obtaining quantitative data using pre-and post-intervention testing through simulation to compare communication and teamwork skills

Simulation:

Each team of approximately 5-7 members including anesthesiologist, CRNA, RN and surgical technician performed 1 scenario over 15 minutes with time for debrief

Scenario’s used were laryngospasm and accidental extubation
INSTRUMENTS AND DATA COLLECTION:

Simulation Observation tool - scenarios taken from Dr. James Fehr, et al., 2011 study using simulation testing for anesthesia residents

Satisfaction with Simulation Experience Scale (SSES)
18-item, 3 constructs with a 5-point Likert rating scale
Content validity determined by expert simulation panel

TeamSTEPPS Teamwork Attitudes Questionnaire (T-TAQ)
10-item, 2 constructs with a 5-point Likert rating scale
Validated by TeamSTEPPS - customization encouraged

T-TAQ 2 Sustainability Check Tool: 4 item, Likert rating scale
NCH project validation of tool
TEAMSTEPPS TRAINING

- 2 X 1-hour sessions done covering modules of Mutual Support (teamwork) and Communication from online materials
- Sessions done by TeamSTEPPS Master Trainer
- An assessment of the training session done post training (T-TAQ)
COST, RESOURCES, MATERIALS

- State of the Art, High-fidelity pediatric patient simulation model provided by hospital simulation excellence team
- Simulation team observers 2-3 physicians and paramedic for approximately 6 hours both pre and post training
- Validated Simulation scenarios provided from sources at Washington University.
- Online free power-point presentation training from AHRQ and materials printed for participants as packets to take with them.
- Assistant Nurse Manager of OR, lead CRNA and Chief of Anesthesiology to aid in planning, support, team formulation and providing time for training
DATA ANALYSIS: SIMULATION OBSERVATIONS
PRE-EDUCATION, POST-EDUCATION

Table 3: Wilcoxon Signed Rank Test: Difference of Task Performance in Scenario

<table>
<thead>
<tr>
<th>Task Performance</th>
<th>PRE-Simulation</th>
<th>POST-Simulation</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team 1</td>
<td>54%</td>
<td>100%</td>
<td>46%</td>
</tr>
<tr>
<td>Team 2</td>
<td>81%</td>
<td>100%</td>
<td>19%</td>
</tr>
<tr>
<td>Team 3</td>
<td>93%</td>
<td>100%</td>
<td>7%</td>
</tr>
<tr>
<td>Team 4</td>
<td>81%</td>
<td>100%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Wilcoxon statistic 10.0  P=0.100  A=0.05

Post Intervention Simulation Observations

\[ p > \alpha, \text{ indicating not enough statistical evidence to support a claim of improvement due to the intervention} \]
DATA ANALYSIS: T-TAQ LITERATURE COMPARISON ATTITUDES TOWARDS TEAMSTEPPS EDUCATION

Table 6: Literature Comparison of T-TAQ Scores Post TeamSTEPPS Training

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mutual Support</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma Team</td>
<td>33</td>
<td>3.96</td>
<td>3.46</td>
</tr>
<tr>
<td>NCH Anesthesia Team</td>
<td>21</td>
<td>4.51</td>
<td>4.25</td>
</tr>
<tr>
<td>OR Team</td>
<td>17</td>
<td>4.25</td>
<td>4.25</td>
</tr>
</tbody>
</table>

(Capella, et al., 2010)

Highest score possible 5.0 for each item and overall

*Interpretation: The scores for NCH post intervention training are equal to or higher than previous teams in the literature taking the same survey. This indicates that the education sessions were valued similarly to those who previously had the education.*
# DATA ANALYSIS: T-TAQ 2 SUSTAINABILITY CHECK

Table 9: T-TAQ 2 Sustainability Check

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>SE Mean</th>
<th>90% Upper bound</th>
<th>T</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>Q1</td>
<td>17</td>
<td>3.412</td>
<td>0.939</td>
<td>0.228</td>
<td>3.716</td>
<td>-2.58</td>
<td>0.010</td>
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<tr>
<td>Q2</td>
<td>17</td>
<td>3.529</td>
<td>0.624</td>
<td>0.151</td>
<td>3.732</td>
<td>-3.11</td>
<td>0.003</td>
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<tr>
<td>Q3</td>
<td>17</td>
<td>3.588</td>
<td>1.121</td>
<td>0.272</td>
<td>3.952</td>
<td>-1.51</td>
<td>0.075</td>
</tr>
<tr>
<td>Q4</td>
<td>17</td>
<td>3.529</td>
<td>1.068</td>
<td>0.259</td>
<td>3.876</td>
<td>-1.82</td>
<td>0.044</td>
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</tbody>
</table>

With a 90% confidence interval, alpha = 0.10
DISCUSSION: HOW CLINICAL QUESTIONS WERE ANSWERED

1. Was there an improvement in communication and mutual support (teamwork)?
   • Based on a ($p$ of 0.046) for the post score difference of combined constructs there was a difference since the intervention

2. What are the employees attitudes about the TS training?
   • Positive: For both constructs and overall, we had scores from each group that were above 4/5

3. Was the simulation experience satisfying to the employee undergoing the testing?
   It appears positive. Approximately 98%-100% of participants agreed/strongly agreed it was satisfying

4. Was the intervention sustained three months post training?
   54% of the team responded positively that there was some improvement in communication and mutual support and of all participants, CRNAs wanted a refresher course
OTHER SYSTEMIC MEASURES

The three big gains from this project were:

• Employees within the OR and Anesthesia teams experienced simulation to practice skills in a safe environment-most for the first time

• It was an opportunity for the simulation excellence team to validate their testing methods

• The impetus to use TeamSTEPPS training within this organization and our sister organization was sparked and the SPREAD began
LIMITATIONS OF PROJECT

• Lack of baseline data for strong comparison internally
• This study was non-randomized, non-blinded and conducted only at this site
• Not enough demographic data collected to learn about those difference
• No comparison data yet from similar organization with project done in the same way to make stronger
“A year ago, I would have been looking for someone to yell at, but instead, I said, ‘I think we need to debrief this.’”

—UNC TeamSTEPPS facilitator
IGNITE A FIRE... SAFETY CULTURE WILL SPREAD