The Problem

- Failure to detect and treat S/S of hospital complications early leads to poor outcomes

- The ability to detect and treat early S/S of hospital complications is dependent on several interactive factors

Improving Teamwork

- Amplifies real-world experiences to improve KSAs and teamwork performance
- Improves:
  - Teamwork performance
  - Clinical knowledge
  - Clinical competencies
  - Safety culture

In Situ Simulation Training

- Allows clinicians to train:
  - with their real-world team
  - in their real work environment
  - Opportunity to discover latent safety threats in the workplace

Improving Clinical Outcomes

- Clinical Microsystems:
  - Subcultures of clinicians with varying processes and approaches to care for specific patient populations in different hospital units
  - “The frontline where clinical teams interact with patients”
  - Unit leaders accountable for practice change

Microsystem Approach

- Critical level at which to make local quality and safety improvements
- Team training should be designed for the context in which clinicians function
- Approach leads to improved and clinical outcomes

Study Hypothesis

A patient safety program that is:
- microsystem-based
- simulation-driven
- aimed at improving early detection and treatment of hospital-acquired complications through evidence-based guidelines

will:
- Decrease rate of hospital-acquired complications:
  - Severe sepsis and septic shock
  - Acute respiratory failure
- Decrease rate of unplanned transfers to higher level of care
- Decrease risk-adjusted hospital mortality
- Improve culture of safety
**Sustainability Phase**

**Acute Respiratory Insufficiency**

- **Weighted Risk-Adjusted Mortality:**
  - Observed & expected mortality weighted in proportion to LOS on study
  - Expected mortality calculated using Elixhauser co-morbidity scores and internal data
  - Unplanned transfers validated by RN based on predetermined definitions

- **Unplanned Transfers to HLOC (i.e., ICU, OR):**
  - Participants: Nurses and residents
  - Unplanned transfer to higher level of care (HLOC)

- **Weighted Risk-Adjusted Mortality:**
  - Expected mortality calculated using Elixhauser co-morbidity scores and Charlson Comorbidity Index
  - Observed & expected mortality weighted in proportion to LOS on study units
  - Statistical significance set at p < 0.05

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**Study Design**

- **Design:** 1 prospective intervention study with a case-crossover design
  - conducted at 450-bed academic medical center
  - 6-month sustainability period

- **Approved by IRB**
- **Study Units:** 3 intermediate ICUs and 1 surgical unit
- **Participants:** Nurses and residents
- **Selected Outcomes**:
  - Hospital-acquired complications: Severe sepsis/septic shock
  - Acute respiratory failure
  - Unplanned transfer to higher level of care (HLOC)
  - Risk-adjusted 0-E mortality ratio
  - Culture of safety

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**Data Methods**

- **Hospital Complications:** Administrative data, RN chart review MD Validation
- **Severe Sepsis/Septic Shock:** Surviving Sepsis Campaign definitions
- **Acute Respiratory Failure:** Intubation or emergent use of BIPAP
- **Unplanned Transfers to HLOC (i.e., ICU, OR):**
  - Internal data, unplanned transfers validated by RN based on predetermined definitions

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**Project Interventions**

<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Team Training</td>
<td>To foster an environment for nurses &amp; residents to learn and observe teamwork principles in action</td>
</tr>
<tr>
<td>Monthly Patient Safety Team Meetings</td>
<td>Review, analyze, and discuss patient and unit-level care and identify potential solutions to improve problematic outcomes</td>
</tr>
<tr>
<td>Patient Safety Champion Role</td>
<td>Establish a safety champion for the unit</td>
</tr>
<tr>
<td>Quarterly Patient Safety Conference</td>
<td>Facilitate interdisciplinary discussion to develop action plan to improve patient outcomes</td>
</tr>
<tr>
<td>Debriefing of Medical Emergencies</td>
<td>Review and analyze patient safety events and unit-level care and identify potential solutions to improve problematic outcomes</td>
</tr>
<tr>
<td>Monthly Recognition Program</td>
<td>Recognize nurses who demonstrate exemplary teamwork &amp; collaborative practice</td>
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**Evidence-Based Guidelines**

- **Sepsis Continuum**
- **Acute Respiratory Insufficiency**

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**Teamwork Principles for Everyday Practice**

- **Designate Leadership**
- **Call for Help Early**
- **Distribute the Workload Effectively**
- **Supportive Environment**
- **Allocate Attention Wisely**
- **Utilize All Available Information**
- **Know the Environment**
- **Create a Positive Culture**
- **Provide Sustained Support**
- **Use All Available Resources**
- **Assess and Address Workload**
- **All-Hands Approach**
- **Stress Communication**
- **Manage Stress**
- **Support Positive Change**
- **Build Resilience**

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**10/25/2012**
B. Physicians value nurses' diagnostic thinking even more than we might think.

**OBSERVATION:**
- Debriefing revealed:
  - how much one resident can learn to appreciate during one exercise
  - how important and valuable nurses' knowledge and experience are in helping diagnostic thinking

**TAKEAWAY:**
A. Thinking out loud is essential for all teams to hear each other's thoughts whether they be right or wrong
B. Physicians value nurses' diagnostic thinking even more than we may think.
**Operational Challenges**

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
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<tbody>
<tr>
<td>Pre-scheduling simulation exercises with UBMD &amp; CNS</td>
<td>• Complex schedule coordination allowed for UBMD &amp; CNS preferences (steep learning curve)</td>
</tr>
<tr>
<td>Bed availability</td>
<td>• Administrative approval to hold beds for training</td>
</tr>
<tr>
<td>Training on night shift</td>
<td>• Re-affirmed that charge nurse would cover nurse’s patient assignment during training</td>
</tr>
<tr>
<td>• Busy time due to influx of ED admits &amp; procedural patients</td>
<td>• Accommodated each unit’s workflow by scheduled training later in shift</td>
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<tr>
<td>High patient acuity at time of scheduled simulation training</td>
<td>• Avoided conducting training within 1-hour of a RRT/CB call</td>
</tr>
<tr>
<td>• Charge nurse judged whether patient acuity was too high to conduct simulation training</td>
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</tbody>
</table>

**Feasibility of Simulation Program**

- 185 simulation exercises conducted in one year
- Total of 201 nurses involved training during 7 yr determination
- 247 nurses, 55 medicine and surgery residents

**Clinical Outcomes**

**Acceptability of Simulation Training**

**Outcomes – Culture of Safety**

- AHRQ Hospital Survey on Safety Culture
  - Total % Positive Responses for Nurses and Residents
  - Survey Range 0-100%

**Summary**

- A patient safety program that was:
  - microsystem-based
  - simulation-driven
  - aimed at improving early detection and treatment of complications
  - improved selected clinical outcomes

- Study Limitations:
  - Lack of a control group
  - Nonrandom selection of participating units
  - No direct observation to validate improved team performance

- Success attributed to buy-in from CMO and CNO

- Examining potential to spread program to all inpatient units and major procedural areas

*Agency for Healthcare Research & Quality (AHRQ) Hospital Survey consists of 12 dimensions with Cronbach’s alpha reliability scores ranging from 0.63 to 0.84.*