



# Enhancing Systems Integration in Healthcare Using Simulation: The Mortality and the Deteriorating Patient Simulation Project

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## Background

Simulation can improve the quality of care through re-engineering systems effectiveness and care delivery processes. System failures such as delays in care and preventable harm may be optimally addressed via simulation-based education.

Time dependent situations, such as the acutely deteriorating patient, exemplify the greatest need to optimize organizational performance. Multiple system resources must interact with synergy to provide the right treatment to the right patient at the right time. In shock, a 60 minute reduction in time to definitive therapy equates with a 6-10% improvement in survival<sup>1</sup>, and early goal directed therapy is the cornerstone of mortality reduction from sepsis.<sup>2</sup>

While provider experience is typically obtained during real-time hospital care and "on-the-job" learning, deliberate training in a safe environment for integration of multiple systems (e.g. nursing and physician services, support teams, pharmacy, bed management) is rare. When training does occur, technical knowledge and skills (e.g. code algorithms) are often emphasized more than behavioral and cultural ones (coordinating teams for optimal care, effectively managing clinical discord between providers).

Focusing on cultural competency in Mayo Clinic's commitment to patient safety, we developed simulation-based programs to assess, teach, and improve our systems functioning in the care of the deteriorating patient. This was done in a simulation environment.

## Methods

The Mortality and the Deteriorating Patient Simulation (MDPS) project created objective, structured, simulation exercises (OSSE) to improve the prompt, bedside response to deteriorating patients.

Each OSSE consisted of a scenario with a core clinical context relevant to the group participating in the exercise (e.g. post-operative carotid surgery). More importantly, each OSSE had a component of clinical deterioration that necessitated optimized cross-disciplinary communication, assessment skills, and policy-based actions (e.g. urosepsis).

Finally, some OSSE scripts deliberately forced interpersonal tension (discord) between providers, typically induced through instructions provided to a single confederate participating in the OSSE (e.g. "I can see the patient in 20 minutes"). In some cases discord was introduced prior to reaching "rapid response" criteria. Every OSSE was digitally recorded to facilitate reflection and to help identify future areas of focus for the respective groups.

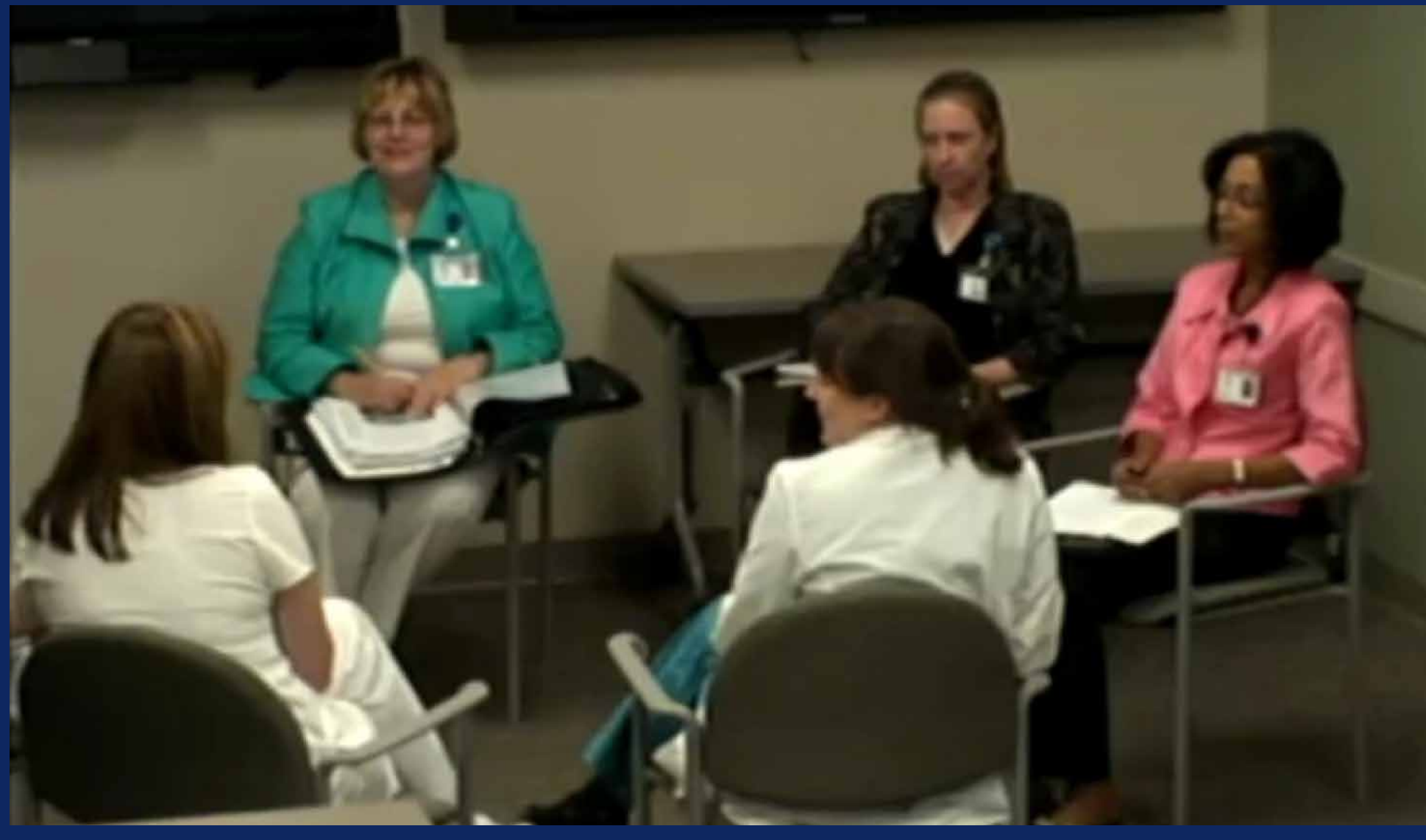
A structured debriefing to emphasize and teach the cultural and behavioral skills necessary for effective systems integration followed each OSSE. The scope of this project were Med-Surg pilot units and did not include ICUs.

## Key Objectives

To help all providers understand how to be an effective team under duress, such as a deteriorating patient or clinical discord, (via behaviors) and have a positive experience through simulation.

## Focus of Debriefing

- Pay attention to detail
- Communicate clearly
- Have a questioning and receptive attitude
- Handoff effectively
- Support each other



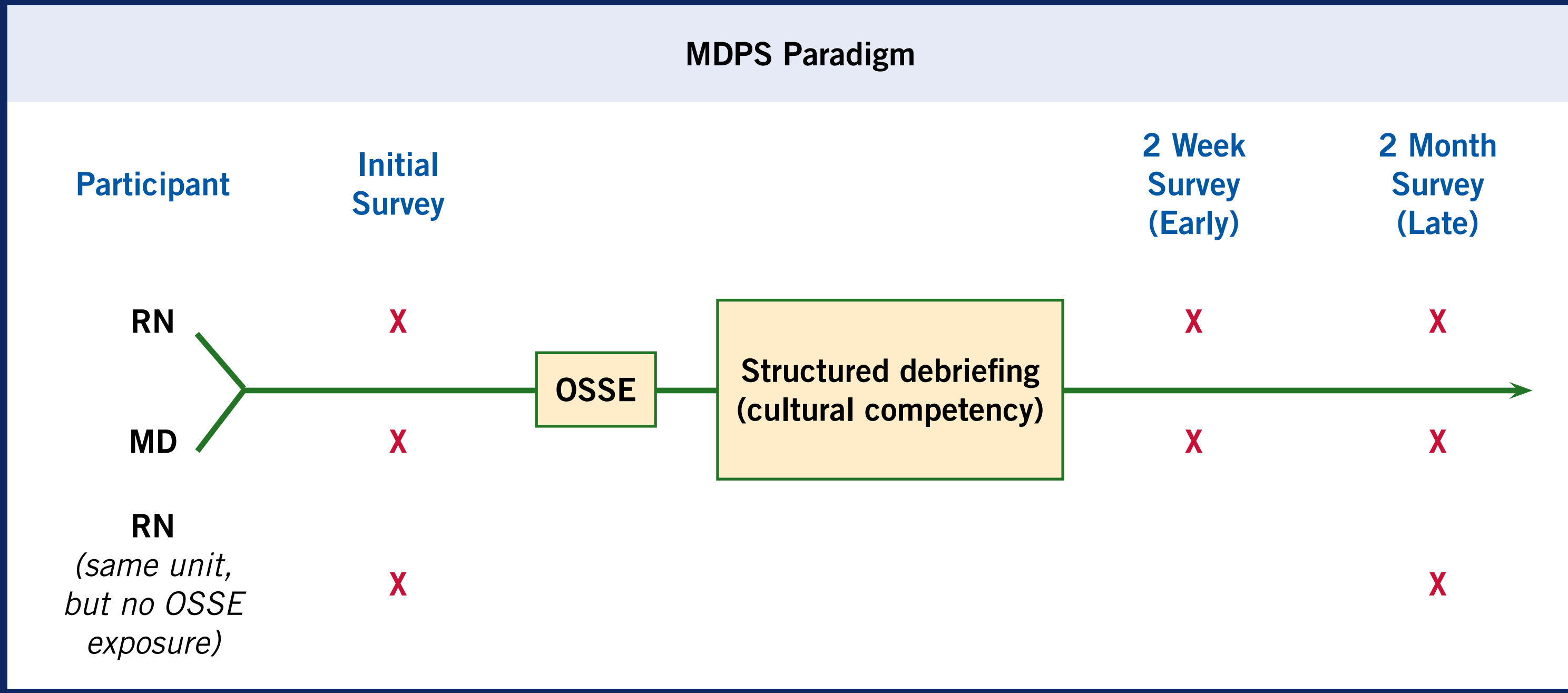
## Overview

- **Hypothesis:** Simulation education can improve a culture of safety
- **Impact:** Reduce the mortality of deteriorating patients via timely and effective teamwork
- **Method:** A library of OSSEs with debriefings focused on a culture of safety
- **Measurement:**
  - Pre, post, and late training evaluations
  - Evaluate impact on non-participating colleagues in the patient care unit

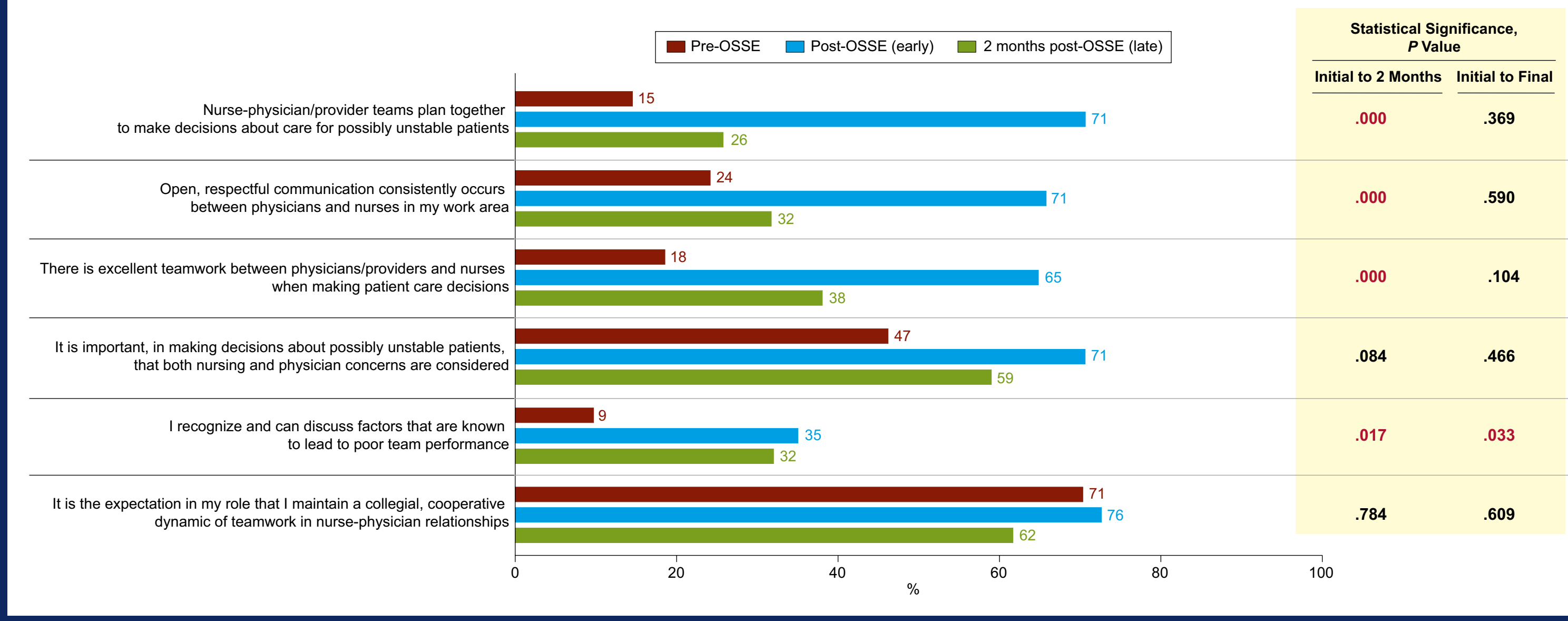


## Measurement

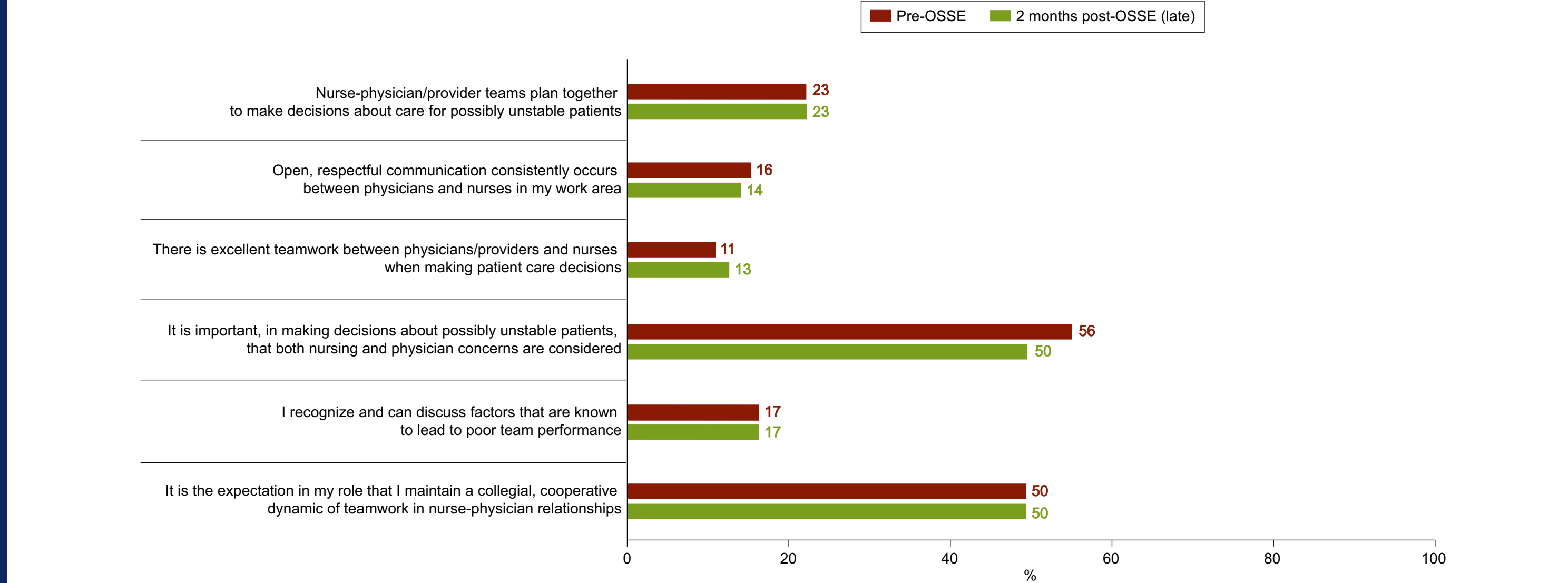
- Effectiveness of the exercises was assessed using participant surveys related to a culture of safety.
- Baseline values for clinical metrics were also obtained for future use as long-term metrics.
- The acute impact and effectiveness of the OSSE simulation training effort was the primary goal of the project.
  - A Likert scale was used to compare pre-OSSE, post-OSSE (early), and 2 month (late) perspectives.
- Assessments were also performed on nurses that did not participate.
  - This was to test the hypothesis that there might be an impact on colleagues in the same units who did not participate in an OSSE.



## Enterprise MDPS Survey Results Indicating Percentage of Participants that Strongly Agree (N=34)



## Enterprise MDPS Survey Results Indicating Percentage of Non-Participants that Strongly Agree (N=13)



## Conclusions

- MDPS successfully demonstrated that interprofessional simulation education acutely improves the culture of safety as measured by a survey methodology
  - Survey score improvements representing a "culture of safety" were highly statistically significant, and present in physician and nursing/allied health participants.
  - Over time (2 months) scores regressed to baseline.
  - An exception was the "excellent teamwork" question which while declining at 2 months, still remained significantly improved.
- OSSE is a useful technique to promote effective teamwork and learning. Clinical content provides a starting point, with each evolving OSSE structured to present "cultural content challenges." The OSSE induced challenges and the participants' responses were reviewed during debriefing, and allowed emphasizing clearly defined behaviors as solutions.
- No impact was seen by those not participating in the simulation exercise.



## Observations

- Training effective and skilled debriefer/facilitators is believed to be a significant factor in the success of the project.
- Logistical issues such as allowing/finding time for physicians, nurses, and allied health staff to participate and coordinate their schedules pose the greatest threat to successful broad deployment.

## References

1. Kumar A, Roberts D, Wood KE, et al: Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. Crit Care Med 2006;34(6):1589-1596.
2. Dellinger RP, Levy MM, Carlet, JM, et al: Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2008 [published correction appears in Crit Care Med 2008; 36:1394-1396]. Crit Care Med 2008; 36:296-327.