## 35 An Experiential Learning Curriculum to Enhance Emergency Medicine Residents' Situational Awareness of Patient Safety Hazards

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**Learning Objective**: 1. Assess EM residents satisfaction with a patient safety simulation and debriefing 2. Assess EM residents ability to identify hazards and solutions in a simulated patient safety room.

**Background:** Situational awareness (SA) is essential to patient safety in emergency medicine (EM). SA has 3 ascending levels and is impacted by environment and workload.(Fig.1) Little is known about how EM residents' SA evolves during training, limiting development of curricula, though simulation may be a promising approach.

**Objectives:** Our objective was to evaluate EM residents' SA of hazards in a simulation and assess satisfaction with the exercise and debriefing. We hypothesized senior residents would identify more hazards.

**Methods:** A cross-sectional observational study was conducted over 3 months with a convenience sample of residents at 2 university-affiliated 3-year EM programs. A simulation scenario was designed, incorporating common safety hazards.(Fig. 2) After reviewing a mock handoff and chart, participants spent 10 minutes in a simulated room documenting hazards and solutions. An interruption and new task were introduced midway to replicate the ED environment and workload. Hazards, solutions, and core SA concepts were discussed during the debriefing. Descriptive statistics were used for hazards and survey responses. A Spearman-Rho coefficient was calculated to assess the correlation between PGY and hazards identified.

**Results:** 46/91 residents participated in the simulation. Mean hazards identified were 6.12/13(47.1%): Level 1:3.8/6(63.3%), Level 2:1.84/4(46.0%), Level 3:1.13/3(37.7%). There was no correlation between PGY and hazards identified (all hazards: r=0.136,p=0.3655; Level 3: r=-.039,p=0.796). 97.8% and 96.7% reported satisfaction with the exercise and debriefing, respectively. 100% agreed the exercise improved knowledge of ED safety hazards.

**Conclusions:** Residents identified <50% of hazards; higher level hazards were less frequently identified for all PGYs. This suggests a need for longitudinal SA and patient safety education. Educators should consider incorporating elements of workplace complexity for patient safety education.

**Figure 1.** Endsley's levels of SA.

Level 1 SA: Perception of elements in environment
*Perceiving status, attributes, and dynamics of relevant elements in the environment*

Level 2 SA: Comprehension of current situation
*Synthesizing disjointed level 1 elements from multiple sources to understand the significance of those elements in light of pertinent operator goals, to form patterns that contribute to a holistic picture of the environment*

Level 3 SA: Projection of future status
*Projecting future action of environmental elements through knowledge of the status and dynamics of the elements and comprehension of the situation (i.e. Level 1 and 2 SA)*

Endsley MR. Toward a theory of situation awareness in dynamic systems. Human Factors. 1995 Mar;37(1):32-64.

**Figure 2.** List of hazards and potential solutions.

| Hazard | Level of SA |
|---|---|
| Lowered bed rail | 1 |
| Patient not wearing non-skid/non-slip hospital-issue socks | 1 |
| Foley catheter not placed to gravity | 1 |
| Exposed sharps in room | 1 |
| Patient lacking identification band | 1 |
| Unlabeled medication infusion via IV line | 1 |
| Discrepancy between patient's allergy band and recorded allergies (allergy band in place despite none listed in chart) | 2 |
| Cannula is in the nose but not connected to anything (on home oxygen) | 2 |
| Patient is a fall risk and not wearing fall bracelet | 2 |
| Patient is on contact isolation for suspected C. difficile but no PPE present (also no PPE present for providers) | 2 |
| No bag valve mask in patient room (patient at risk for respiratory compromise) | 3 |
| Handoff states "labs normal" but abnormal lab in the chart | 3 |
| Food in room (patient is npo pending a CT a/p) | 3 |

## 36 Assessment of Emergency Medicine Residents' Situational Awareness and Perception of Patient Safety Culture in the Emergency Department

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**Learning Objective**: 1. Assess the baseline comfort for EM residents identifying and rectifying patient safety hazards 2. Assess the EM residents baseline ED safety climate.

**Background:** Situational awareness (SA) is crucial in emergency medicine (EM) and to patient safety. SA refers to perceptions and understanding of the environment. Little is known about EM trainees' SA and perception of Emergency Department (ED) safety climate.

**Objectives:** Our objective was to evaluate EM residents' perception of ED safety climate and their self-reported SA; we hypothesized that both would be low.

**Methods:** A cross-sectional observational study was conducted over 3 months at 2 university-affiliated 3-year EM

programs. A convenience sample of residents completed the validated self-reported Situational Awareness Rating Technique (SART) measure after the resuscitation of an ED or simulated patient. The safety climate portion of the Safety Attitudes Questionnaire and a survey assessing comfort with identifying and rectifying hazards in the ED were completed Descriptive statistics were used for SART, safety climate, and comfort. A Spearman-Rho correlation coefficient was calculated to assess the correlation between PGY and SA, PGY and comfort, and the correlation between comfort and SA.

**Results:** 51/91 residents completed a SART for a total of 62 SARTs; 10 residents completed more than one SART. The mean SART score was 13.4 (max 21). 64/91 residents completed the safety climate scale; 57.8% of participants identified a positive safety climate. 46.0% and 41.3% reported being somewhat or very comfortable identifying and rectifying hazards, respectively. There was no correlation between PGY and SA (r=0.163,p=0.25). There was a correlation between PGY and comfort with identifying (r=0.252,p=0.046) and rectifying hazards (r=0.252,p=0.046).

**Conclusions:** Less than 50% of residents reported comfort with identifying and rectifying hazards and only a slight majority reported a positive ED safety climate. Comfort modestly improved throughout residency, while SA did not. This data suggests a need for longitudinal patient safety curriculum.

Figure 1.

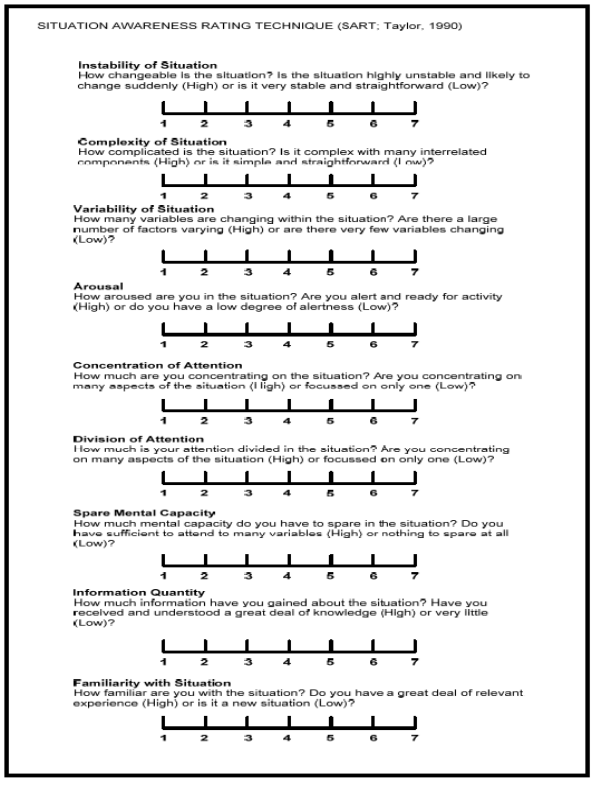


**Figure 2.**

**Safety Culture Subscale of Safety Attitudes Questionnaire (SAQ)**
**Positive Climate: Score of 75% or higher**

| | | | | | |
|---|---|---|---|---|---|
| 1. I would feel safe being treated in the ED as a patient. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |
| 2. Medical errors are handled appropriately in the ED. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |
| 3. I know the proper channels to direct questions regarding patient safety in the ED. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |
| 4. I receive appropriate feedback about my performance. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |
| 5. In the ED, it is difficult to discuss errors. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |
| 6. I am encouraged by my colleagues to report any patient safety concerns I may have. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |
| 7. The culture in the ED makes it easy to learn from the errors of others. | | | | | |
| Disagree Strongly | Disagree Slightly | Neutral | Agree Slightly | Agree Strongly | Not Applicable |

## 37 Virtual Simulation's Application to Assess Emergency Medicine Learners in the Post-COVID Setting: A Literature Review

*Patrick Zeniecki, Xiao Chi Zhang, Jared Kilpatrick*

**Learning Objective**: This review aims to provide a brief history of virtual simulation and how it is currently being applied as a clinical assessment tool in emergency medicine (EM) training.

**Background:** Simulation has played a vital role in training generations of medical professionals. In response to the COVID pandemic, virtual simulation (VS) has provided educational advantages to traditional in-person simulation. However, there is no current literature review on VS's medical education application in the post-COVID pandemic setting.

**Objective:** This review aims to provide a brief history of VS and how it is currently being applied as a clinical assessment tool in emergency medicine (EM) training.

**Method:** We conducted an electronic database search of SCOPUS in November 2021 using the following terms: "virtual simulation," "simulation history," "virtual reality," "online simulation," "augmented reality," "serious game," "computer-based simulation," "simulation," "health care," "emergency medicine," "education," and "assessment." Returned articles were filtered based on the following: English language, their relevance/inclusion of a VS method, and EM learners as the population under investigation.

**Results:** 1,104 articles were identified, of which 19 addressed VS's use in assessing EM education (1 article in