

## Enhancing Students' Ability to Recognize Clinical Cues using the "War Games" Medical Simulation

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### Abstract

**Background:** Medical errors are a major problem in health care. A significant component of life-threatening medical errors is the inability of the practitioner to recognize cues that precede obvious clinical deterioration. If the ability to recognize these cues can be enhanced, earlier diagnosis and intervention should improve clinical outcomes. We propose a study using the concept of "pre-mortem" analysis in our "War Games" simulation format to enhance the recognition of clinical cues by third and fourth year medical students.

**Methods:** Third and fourth year medical students will be recruited to participate in the study. After informed consent, subjects will be presented with three simulated cases. All interactions between the controller and the subjects will be audio recorded and transcribed for analysis. The presentations will include mock progress notes and verbal reports similar to a "check-out" done between medical teams. Each case will include cues to impending clinical deterioration. These cues will range from subtle (10% changes from normal lab values or physiologic parameters, minor alterations in physical examination findings), moderate (50% changes in parameters), to obvious (100% elevations in lab values from previous records, markedly abnormal clinical findings). The possible interventions for each cue will be determined prospectively and placed in a grading sheet along with whether the subject verbalized recognition of the significance of the cue. Following presentation the subjects will be asked what actions or orders they wish to give to continue the care of these patients. If no orders are given, this part of the experiment is terminated.

**Experimental group:** Following what has been described above, subjects will be randomized into two groups; half of the subjects will be given a "pre-mortem" of the patients. This is a technique described by decision-making experts where the subject is told to *imagine* that it is the following day, and that the patients have done poorly under their care. For example, the patients with obvious cues will have died, and the ones with subtle or moderate cues will have deteriorated. The subjects will then be asked to go back and identify those cues in the presentations that could have indicated that the poor outcomes were likely. If they fail to identify the proper cues, these will be shown to them.

**Control group:** These subjects will not experience the "pre-mortem" and will be told to make a follow-up appointment in four weeks for further testing. No further discussion of the cases will be performed at the first session.

**Follow-up:** Both groups will be brought back in four weeks, and retested on a different set of mock patients to assess if their ability to recognize and intervene on the cues improved. To insure that the control group is able to benefit from the "pre-mortem" techniques, the control group will be exposed to this analysis following their follow-up examination.

**Outcomes and Results:** As in our previous studies, we will collect basic information concerning the subjects' clinical experience (med school year, ICU rotations completed, etc.) and participation in previous "war game" sessions. At the initial session, the subject will be graded on: identification of cue (number of each class of cue verbally identified divided by the total number of cues in each class), and interventions performed (number of possible interventions or tests ordered divided by the total number possible as prospectively determined). At the follow-up session, the same grading scheme will be used. Initial and follow-up performance in recognizing and intervening on cues, and categorization of recognition based on class of cues (subtle, moderate, obvious) will be presented. These findings will be analyzed by group (experimental vs. control), medical school year, number of ICU weeks, and "War Game" session experience. This study will help us evaluate the capability of medical students to recognize and intervene upon clinical cues, and the ability of the "War Games" format and the pre-mortem analysis to enhance this capability.