When the Hospital Goes Down:  
The Importance of Medical Gaming in the Disaster Preparedness and Response Training of all Healthcare Professionals

Paul P. Rega* and Brian N. Fink

1 EM Residency Assistant Professor, Department of Emergency Medicine Assistant Professor, University of Toledo College of Medicine, Ohio, USA  
2 University of Toledo, Ohio, USA

Abstract

Emergency evacuation of an emergency department can be a no-warning, high-impact event that requires comprehensive planning and expeditious execution in order to save lives. Textbook assignments have minimal impact in terms of education and retention of this potentially deadly topic. Exercises and drills are the usual gold standard, but they require time to prepare and a maximal effort to execute. Medical gaming, on the other hand, can serve as a bridge between what is gleaned through articles and books and what is practiced through drills and exercises. The purpose of this paper is to present a medical educational game that uses the principal components of a typical deck of playing cards in order to explore priorities during an emergency evacuation of an Emergency Department. It is simple, economical, expedient, and easily-delivered. Thus, the game can be played on a regular basis to improve both retention and execution.

Keywords: Gaming, Disaster, Preparedness, Response, Healthcare

Introduction

There are three types of hospital evacuations: 1) The planned, staged evacuation, that is, the relocation of services and patients from the old hospital to a new hospital; 2) The unplanned, urgent evacuation that is seen with loss of heating, ventilation, and air conditioning (HVAC) or an approaching tropical cyclone; and 3) The unplanned, emergency evacuation associated with catastrophic structural damage, actual or imminent [1]. The first type takes months, if not years, of planning, preparations, and rehearsal. The threat to limb and life is low. The second type is stressful and taxing to both patients and staff, but here again, the immediate threat of morbidity and mortality is lacking as long as pertinent policies and procedures, Incident Command, and lessons learned from prior exercises have been digested and activated [2]. The third type, however, falls into the category of the “low probability, little-to-no warning, high impact” event. Examples include emergency evacuations after the Joplin, Missouri F-5 tornado (2011) and the 2016 Kumamoto earthquake [3,4]. Because the threat of structural collapse and other imminent dangers are so palpable, the concern over death and disability to both staff and patients cannot be ignored. These concerns are mushrooming as hospitals must also consider themselves as “soft targets” for global terrorism and conventional warfare [5]. Similarly, climate change may alter the traditional guise of disaster management and response as natural disasters and pandemics seem to be looming ominously just over the horizon [6].

To prepare for and respond to low probability, high-impact events, requires institutional commitment and individual dedication for specific training and drilling. This is indeed problematic. Lectures and specific readings have been shown to be inefficient compared to other platforms in terms of retention of information [7]. On the other hand, drills and exercises, the current gold standards, tread the backwaters of education not only because they are expensive to develop, time-consuming to prepare, and expensive to deliver, but also the interval between these exercises can be so long that institutional memory and individual retention withers.

However, there is a bridge between traditional textbook-lecture education and functional exercise: serious medical gaming. Serious medical gaming, an offshoot of
simulation education, is a technique that employs the concepts, rules, and regulations of traditional, recreational games to enhance the education, skill acquisition, and critical decision-making of healthcare professionals [8-18]. However, gaming is just one type of simulation. There are multiple formats that can qualify as "gaming," including but not limited to video gaming and computer gaming. The proper "serious medical game" that can serve as that bridge between textbook-learning and functional exercises should be economical, expedient, and easily delivered. The purpose of this commentary is to present one such game focusing on the emergency evacuation of an emergency department.

Methods

EVAC-TAC ROULETTE

Goal: To develop a very economical, medical education game that uses the principal components of a typical deck of playing cards to explore priorities during an emergency evacuation of an Emergency Department.

Objectives: At the termination of the game, the player will

1. Distinguish an emergency evacuation from all other types of evacuation.
2. Define "reverse triage."
4. Identify key resources that may be useful to patients once evacuated.

The Game:

- Equipment
  - Timer
  - Standard deck of playing cards
  - Master Patient Log
- Each patient case is linked to one playing card
  - Player tokens
- Players
  - Minimum three (3)
- Game Play Instructions
  - High card determines Incident Commander (I.C.) in ED
  - Senior-level emergency physician
  - LC. draws from deck of 4 Aces
    - Four Aces = Threat Cards
      - Ace of Hearts = Bomb blast
      - Ace of Clubs = 8M earthquake
      - Ace of Spades = Tornado-direct hit
      - Ace of Diamonds = Out-of-control internal disaster
  - Dealer separates remaining cards into 2 decks
    - Number cards: 2 - 10
    - Number and suit correlates to a case-scenario
    - Picture cards: Jack - Queen - King
- Each player selects 2 cards from number deck and 1 card from picture deck to represent patients.
  - Number cards
    - 2 - 5: Green patients
    - 6 - 10: Yellow patients
  - Picture cards: Red patients
    - Kings: Males
    - Queens: Females
    - Joker: One additional family member
  - Backstory (sudden impact, no-warning event)
    - Presented by dealer
    - Indicates the credibility of the threat
    - Emphasizes the risk of significant morbidity and mortality unless immediate evacuation is executed
    - Immediate evacuation ordered by hospital LC.
    - Occurs after backstory is read and after any player inquiries are answered satisfactorily
  - Dealer draws again to determine patient-case
  - Meanings of suits
    - Hearts: Cardio-Pulmonary
    - Clubs: Trauma
    - Diamonds: GI-GU
    - Spades: Potpourri
  - Each card is connected to a specific patient on the Master Patient Log.
  - Examples:
    - 22-year old male with a sprained ankle and normal vital signs;
    - 34-year old female with asthma and a respiratory rate of 22 and an oxygen saturation (SaO₂) of 94% (21% FiO₂);
  - Players keep their selected patient cards within the Inner Perimeter of the card-table (represents the ED).
  - LC. blindly selects Threat Card from the deck of 4 Aces.
Each player activity equals one or more cycles (15 seconds)
- Player escape: 1 cycle required
- Player escape with Green patients: 2 cycles required
- Player escape with Yellow patients: 3 cycles required
- Player escape with Green & Yellow patients: 4 cycles required
- Player escape with Red patient (1 only): 5 cycles required
- Player with resources:
  - Resources weigh less than 50 pounds
    - Requires 2 cycles
  - Resources weigh more than 50 pounds
    - Requires 3 cycles
  - Player's placement of multiple resources on one gurney/wheelchair
    - Requires 4 cycles
- Once evacuated, players and patients enter Outer perimeter
- Evacuated players may elect to enter Inner Perimeter (ED)
- Return to vulnerability status
- Game Over
- Ka-Boom card is turned over
- All patients and players are in the Inner Perimeter
- Debrief

Discussion

A recent review of the literature concluded that gaming makes a positive impact on the teaching/learning process. However, the authors also question whether the current assessment tools which are in place are sufficient to judge these games’ efficacy in education [7]. Therefore, how do we judge whether Evac-Tac Roulette is effective in teaching the most important question: Did playing the game help save lives? The ability to evaluate that may be impossible. In the meantime, the adage “Practice makes perfect” may be the most important aspect of games such as Evac-Tac Roulette. The game has been created to be as simple as possible. The rules are simple; the learning curve is brief. The cost to the educator is minimal. The game is designed to be played anytime and anywhere. Therefore, if there is institutional and/or departmental support, this type of game is easily accessible to anyone. In addition, since this type of game may play out in less than thirty minutes, the player-learner can easily be exposed to playing it at frequent intervals. That player, therefore, will increasingly be empowered to become an important part of the interdisciplinary debriefing. It is at that debriefing that each player, in addition to the facilitator, can explore each other’s actions and discuss possible alternatives to improve the likelihood of survival. There is no right answer or wrong answer. However, we hypothesize that the discussions coupled with frequent game-playing will make both staff and professionals function reflexively thereby quickening their decision-making and saving lives in the process.

Conclusion

With a standard deck of playing cards, creativity, and eager participants, the ability to educate and train providers in a cost- and time-effective manner is easy. Often due to the low probability of occurrence, more sophisticated simulations are rarely done at healthcare facilities. This game, at the very least, provides knowledge, awareness, and education on what needs to be done if one of these events does occur. Repetition, another positive attribute, would improve a timely, safe response should an actual threat occur. However, the game is not an end in itself. It bridges traditional education with more comprehensive drills and exercises, thereby keeping these events constantly in everyone’s consciousness. There is no downside to this form of education as it can only help healthcare providers and facilities become more prepared.

References


