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Serious Gaming in Bridging High-Impact, No-Warning Incidents with Catastrophic Pandemics

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Abstract

Gaming has been an effective healthcare teaching method yet is an alien concept for active shooter and pandemic preparedness training. Through gaming, participants can employ comprehensive plans within a simulated environment. Gaming is an inexpensive modality that facilities can employ to train providers and students. It serves as an efficacious precursor to a functional exercise for both an acute mass casualty incident as well as a long-term catastrophe.

Methods: We have created two inexpensive and time-efficient games that increase both the knowledge base and management options in dealing with these events. Game players were asked their knowledge and awareness regarding these events both prior to and following each game in order to determine if increases occurred.

Results: Players reported an increase in both knowledge and awareness of dealing with these types of incidents following game completion. Additionally, gaming opened the dialogue to include issues such as threat assessment, tourniquet application, altered standards of care and mental health concerns.

Conclusions: Gaming is an inexpensive modality to be employed anytime and anywhere to train healthcare providers and students. It allows players to discuss and critique their decisions in an engaging, non-threatening environment. Gaming encourages frequent training, thereby enabling players to react instinctively should an active shooter or pandemic incident occur, potentially saving many lives, including theirs.

Keywords: Gaming; Emergency Medicine; Education; Disaster; Pandemic

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Introduction

The academic oxymoron, serious gaming, may be defined as a technique that employs the concepts, rules, and regulations of traditional, recreational games in order to enhance "….the learning, skill acquisition, and training…." of both student and professionals [1].

Serious gaming or educational gaming has been used in diverse professions, from aviation to social services [2-7].

Within the realm of medicine and public health, serious gaming has also achieved traction [1]. However, as the medical and public health "games" have developed, there have been biostatistical attempts to evaluate whether the concept is worthwhile. Proponents of medical educational gaming cite studies demonstrating that the proper use of gaming techniques improves critical decision-making, long-term retention, and encourage further independent studying [4,8-18]. Skeptics claim that the educational results seen with gaming are no better than those achieved through traditional educational approaches [19]. More specifically, healthcare education has lagged with regard to simulation applications. Reasons include cost [13], evidence-based proof of efficacy [4], and resistance to change [9,10]. Nevertheless, a review of the extant literature emphasizes that:

- No reliable data exist indicating that medical gaming is not as good as traditional education.
- Gaming is a broad term encompassing a broad array of techniques. Research should be specific to each gaming technique.
- Medical gaming research is insufficient [4,8]. More studies are required [9,13].

Meanwhile, the authors, based on over sixty years of collective educational experience in

medicine and public health, have noted perceptible gaps in the education of both students and professionals in these two disciplines which can be specifically addressed by serious gaming:

- Healthcare providers' response to an "active shooter" event in the healthcare environment;
- Public health's preparedness and response to outbreaks, pandemics, and bioterrorism;

Therefore, the objective of this paper is to present an outline of two games that have been created to address these educational gaps using a low-tech, economical, and easily-reproducible gaming model.

Methods

CAVEAT CURANTIS©: "Let the Healthcare Provider Beware!"

There are many governmental, quasi-governmental, and commercial programs that teach preparedness, response, and recovery within the context of an active shooter event. There is, however, little emphasis on healthcare providers' options while caring for a patient. The extant information deals with generalities and avoids, at the most basic, granular level, the conflicting obligations of saving one's own life and that of the patient. At the lowest end of the educational spectrum, didactic courses are too general and are oftentimes not taught by actual hospital-based healthcare providers. At the other end, the gold standard – the functional exercise is expensive, time-consuming, and infrequently executed. Caveat Curantis© serves as a "bridge" between classroom, lecture-based "Run, Hide, and Fight" and drilling "Run, Hide, and Fight."

Goal: To improve the healthcare providers' preparedness and response capabilities during an active shooter event in a healthcare environment.

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

a) Explore the concepts of "Run, Hide, and Fight" in the context of caring for a patient and family during an active shooter event.

b) Discuss the conflicting duties and obligations to self, one's family, the patient, and the patient's family.

c) List three (3) available pieces of equipment in any patient's room that can be used as barricades.

d) List five (5) items in a patient's room that can be weaponized.

e) Apply a commercial tourniquet.

f) Identify three (3) improvised tourniquets.

g) Discuss modifications of a player's response based upon alternative demographics.

h) Identify mental health surge capabilities.

Prerequisites:

Review: *The Planning and Response to an Active Shooter: An Interagency Security Committee Policy and Best Practices Guide from the Department for Homeland Security* [20].

Equipment:

a) Game board: Healthcare venue with twelve (12) patient rooms.

b) Dice

c) Writing tablet

d) Playing cards

Patient scenario cards:

i. Multiple levels of severity

ii. Family optional

Player cards:

I. Self

II. Avatar

Photographs of patient rooms

I. Tokens

II. Patients

III. Family members

IV. Players

V. Perpetrator(s)

Players: 2-12

Faculty

"Dealer" (1) per table

"Pit Boss"

Oversees multiple games in progress

Game Instructions: See Appendix A

Caveat Mundum©: "Let The World Beware!"

A pandemic on the level of the 1918 pandemic will significantly strain communities' societal infrastructure as well as medical resources. Therefore, it is incumbent upon all levels of Public Health to incorporate the myriad strategies and tactics to mitigate the worst impact of a pandemic and to affect a response that is ethically and medically sound [21,22].

Goal: Utilizing an all-hazards approach, teams of players will initiate various preparedness and response strategies to mitigate any infectious disease threat (from outbreak to bioterror to pandemics) to their community;

Objectives: The learners by the end of play will.

Utilize ICS (Incident Command System) to achieve their goals.

Develop preparedness plans for their community based upon the agent, its severity, and its global spread.

Select the most appropriate response tactics as the threat envelops the community.

Design an "Inclusion-Exclusion" policy.

Design a "Withdrawal of Care" policy.

Design a pre-hospital triage policy.

Identify traditional and non-traditional responders.

Design a COO (Concept of Operations) for PODs (Points of Distribution).

Design a COO for ACSs (Alternative Care Sites).

Discuss ethical considerations regarding the allocation of scarce resources.

Apply the SOFA (Sequential Organ Failure Assessment) score into any allocation of scarce resource policies.

Develop a Mass Fatality plan.

Determine specific recovery options as the community confronts a "new normal."

Prerequisites:

FEMA IS 100HCb: Introduction to the Incident Command Structure for Hospitals:

https://emilms.fema.gov/IS100hcb/index.htm

Community Mitigation Guidelines to Prevent Pandemic Influenza — United States, 2017 [23].

New York State Ventilator Allocation Guidelines.

Equipment:

World map

Dice

Chaos Cards: Random problems and dilemmas that must be managed effectively;

Preparedness playing cards: Strategic and tactical items that are selected by team to mitigate the threat;

Response playing cards: Strategic and tactical actions that are selected by team to limit morbidity and mortality in the stricken community;

Community Stress Barometer: Indicators of stress, fear, and panic within the community before, during, and after the infectious disease catastrophe;

i. TokenTeam's community location

ii. Outbreak site

iii. Disease Progression: interurban, multinational, transcontinental;

Success/Debacle Cliff

I. Registers the progress of the team.

II. Etiology cards: Pandemic or bioterrorism

III. Internet access (Team)

IV. Just-in-time information acquisition

Players:

Public Health personnel

MPH candidates

Attended 3-credit course in pandemic preparedness and response

Faculty:

Pit Boss

a) Oversees multiple tables of play

b) Final arbitrator of all games

i. Resolves debates and challenges

ii. Determines team success/failure

iii. Debriefs

Dealer

i. Facilitates action at one table

ii. Debriefs

Gaming instructions: See Appendix B

Discussion

It is difficult to estimate where serious gaming resides within the overall theme of medical simulations. In fact, in one review of the ethics of simulation education, it is not even included as one "tool" or "approach" among low-tech simulators, standardized patients, and realistic patient simulators [18].

Nevertheless, the traditional lecturing used in teaching has the lowest retention rate while a thorough literature review concluded that gaming makes a positive impact on the teaching/learning process [4]. Catalyzed by this opinion, the authors/creators have developed two games using conventional board game concepts to teach a disparate group of healthcare students and professionals specific educational material considered vital to the patient, the professional, and the community at large. Both games have their educational and training purposes and demonstrate that the two extremes of disasters can be efficaciously taught. However, they are not meant to be stand-alone methods nor are they designed to replace existing teaching methodologies. Rather, they are another type of educational platform that can be utilized by anyone or any facility, regardless of their size and available resources, as an adjunct to their current educational techniques. Healthcare facilities, professionals, and students may not have the time or resources, both financial and personnel, to design and implement functional exercises. However, the games described here can be done in a time-efficient, inexpensive, and informal manner.

1. The major limitation of these gaming concepts is how to measure objectively their value? Abdulmajed et al. [4] suggest that any traditional assessment tool may be inappropriate for gaming because of its emphasis on deeper learning. Researchers have attempted to develop a conceptual research model regarding generic gaming [20]. However, how do we test the value of the games outlined above?Caveat Curantis©: The key issue is whether the player has learned to make the most appropriate decision during the most inappropriate time thereby saving lives and optimizing one own's mental health recovery. Therefore, how does one evaluate success when the likelihood of an event is minimal? In addition, other confounders cannot be ignored: the uniqueness of each incident, the changing roles and responsibilities of the player over time, and the needs of the specific patient population.

2. Caveat Mundum©: This game is meant for a specific group of individuals who must be intellectually, mentally, and ethically equipped to manage a crisis that, presumably, no living person has ever managed, i.e. a pandemic of a 1918-like magnitude. In a reasonable period of time, this game enables the players to confront issues related to preparing for and responding to a pandemic (or on a smaller scale, a bioterror event). Whether it is a class, a game, or a functional exercise, there is no yardstick that can be used to

measure whether an individual during a pandemic will display sound understanding of basic concepts linked with flexibility of thought, mental endurance, and crisis leadership.

Conclusion

As we await the final consensus of opinion from educators, biostatisticians and behavioral scientists, we are left with the very essence of these games. They are easy to create, quick to execute (maximum: two hours each), and economical. Therefore, the strength of these games resides in the venerable adage: "Practice Makes Perfect." If institutions recognize, sustain, and mandate that these types of games become an integral and frequent part of their personnel's continuing education, we submit that the goals will be ultimately achieved. In fact, the employment of these games such as these would comport with the concept that the proper and careful development of simulation-based medical education is an ethical imperative (Ziv et al. 2006) and would facilitate an institution's educational obligations to its people [22].

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