Small Victims and Serious Play: Simulations and Video Games for Pediatric Disaster Education

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Objectives
• Understand the scope, importance, and challenges of pediatric disaster education
• Recall the advantages and limitations of 'live' and screen-based simulation modalities
• Consider means for incorporating disaster simulations and video games into initial and continuing education programs
Types of Disasters

Sudden
- Unexpected
- All victims ill or injured simultaneously
- Examples: tornadoes, school shootings, nerve gas attacks

Delayed
- Incubation period
- Range of times to presentation and degrees of illness/injury
- Examples: pandemic influenza, biological weapons

What Disasters Have In Common

- Overwhelm health care resources
  - Scale
  - Duration
  - Preexisting resources

- Children are disproportionally harmed
  - Physically
  - Emotionally
  - Family separation
  - Poverty

Balance of Needs and Resources

- Patients
- Healthcare needs
- Community needs
- Media attention
- Personnel
- EMS Resources
- Medical equipment
- Pharmaceuticals
- ORs
- Hospital rooms
- ICU Space
Scope of EMS Pediatric Disaster Education

- Scene Safety
- Mutual aid
- Triage
- Initial Treatment
- Decontamination
- Family reunification and transport
- Alternate care sites
- Interface with:
  - Public health
  - Receiving facilities
  - Police and other authorities

Challenges To EMS Pediatric Disaster Education

- Time
  - Initial training
  - Continuing Education
- Dys-Synchrony of training and practice
  - Uncommon patient group
  - Rare events
- Decay of knowledge, skill, and self-efficacy
- Unclear what methods effective
Curriculum Development: Kern Method

Step 1: General needs assessment
- Current educational practice
- Ideal Approach

Step 2: Needs assessment of targeted learners
- Previous disaster training and experience
  - Attitudes about need for disaster education (Likert Scale)
  - Self-reported comfort with triage, treatment, preparedness, and disaster mental health

Step 3: Goals and Objectives

Step 4: Educational strategies
- Didactic
- Experiential

Step 5: Implementation

Step 6: Evaluation and Feedback

Modified Kirkpatrick Hierarchy: Program Evaluation

- Higher level outcomes more difficult to:
  - Measure
  - Establish causation of improvement

Barr, 2000
Pediatric Disaster Education: Live Simulations

• Advantages
  • Hands on skill practice
  • Debriefing in real time
  • Closest to reality

• Limitations
  • Costly
  • Schedule constraints

Live Simulations for Improving Triage Accuracy: Study Design

Live Simulations for Improving Triage Accuracy: Results

• Live simulations yielded a sustained 10% improvement in triage accuracy 6 months after the educational intervention
• The greatest improvements in accuracy were for triage RED and YELLOW patients
Rationale For Using Video Game Education

STUDY PROTOCOL
Testing a videogame intervention to recalibrate physician heuristics in trauma triage: study protocol for a randomized controlled trial

Derek Michael*, Matthew R. Rosengart†, Earle Fischhoff†, David C. Anguig*2, Corren Tanis*3, Donald M. Hoss3, David J. Malisac*3, and Amber E. Basnet*4

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Assessing the Validity of Using Serious Game Technology to Analyze Physician Decision Making

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* Decisions about trauma transfers in a video game correlated with physician practice

60 SECONDS TO SURVIVAL DISASTER TRIAGE

School Shooting
Home Fire
Tornado

Score: 23.00
Play
Locked

Start
Instructions
High Score

60 Seconds to Survival Pediatric Disaster Video Game

Patient Characteristics in 60 Seconds to Survival
- Full range of pediatric and adult ages
- Children with special healthcare needs
- Injury types and severity mirror the nodes of the combined START/JumpSTART algorithm (Nadeau, 2017)

Advantages of Video Game Education
- Victims represented in the game
  - Can depict many patients
  - Children can be portrayed without pediatric standardized patients or manikins
- Educational delivery
  - Asynchronous learning
  - Experience is standardized
  - No need for facilitators or instructors
  - Feedback is immediate
- Good match for the learner population
Limitations of Video Game Education

Lacks realism
- Emotional connection
- Distraction

Debriefing
- On-screen feedback can bridge the gap
- Addresses evaluation phase of Kern method

Expenses
- Difficult to modify for different triage system

Participants enrolled for the study (n=62)

- Excluded did not show up to first session (n=6)

Participants allocated to control (n=23)

- Excluded from analysis did not complete second session (n=8)
- Did not play game ≥3 times in intervention group (n=5)

Participants allocated to control (n=39)

- Excluded from analysis did not complete second session (n=2)

Consort Statement: Randomized Controlled Trial of Video Game Disaster Education (Intervention) vs. No training
- Both groups completed live simulations at beginning and end of study period
- Assessed for improvement in triage accuracy

Video Games for Improving Triage Accuracy: Results

- Video game play yielded a 10% improvement in triage accuracy 3 months after study onset
- The improvement was similar to that seen in the live simulation study
- The control group improved similarly
Incorporating Pediatric Disaster Simulations and Video Games Into EMS Education

- Choose the simulation to meet the educational goals
  - Number and kinds of patients
  - Scale: agency, school, community, healthcare system
  - Target change in attitudes, knowledge, practice, or outcomes
  - Evaluation and measurement
- Keep the goal the goal

Incorporating Disasters Into Training

- Needs assessment
  - Hazard vulnerability analysis
  - Reactive
  - Anticipatory (e.g., Ebola)
- Educational intervention
  - Didactic
  - Tabletop
  - Small group
  - Video game
- Evaluation

Incorporating Pediatric Disaster Simulations and Video Games Into EMS Education

- Frequency and duration of intervention
  - Initial learning
  - Re-inoculation
  - Just-in-time training
- Represent children in mass casualty training
  - Triage Tuesdays
  - Incident command system mini-drills
  - Work with schools, daycare centers, religious groups
Conclusion

• Live simulations and video game learning improve EMS pediatric disaster knowledge, skills, and practice
• These methods are useful for maintaining and testing readiness for child disaster victims
• A version of the game is available at: disastertriagegame.org

Take home points:

1. Understanding prehospital educational needs, just-in-time training, and need for periodic re-education likely yield best performance in a disaster.
2. Pediatric disaster preparedness and training are training for daily pediatric emergencies.
3. Matching the educational modality to the educational goals improves uptake and efficiency.