Hospital Mass Decontamination and Simulation:
10 Steps to Success

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April 25th, 2017

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Background

- All hazard approach:
  - *C*hemical, *B*acteriologic, *R*adiologic, *N*uclear, *E*xplosive
- Pediatric vulnerabilities:
  - Anatomical, Physiological, Psychological, Developmental

Role of Simulation in Disaster Preparedness

- Challenge: training and maintaining competence
- Provides long term self perceived ability and confidence
  - Bank & Khalil, Prehospital Disaster Medicine 2016; 31(5): 1-6
- Advantage of in-situ simulations: inter-professional training in a high fidelity environment

MCH Experience

- Robust simulation-based disaster training

| Table tops | | Moderate size trauma disaster 2011 | | Large size Orangina trauma disaster 2012 | | Ethics session 2013 | | Moderate size CBRNe disaster 2014 | | Large size Code Orange Decon Sept 2015 |

Hospital Move
May 2015

10 Steps

1. Goals and Objectives
2. Partners/ stakeholders
3. What type of simulation is needed to achieve these objectives?
4. Budget/Top administration support+ hospital community buy-in
5. Timeline
6. Scenario
7. Patient bank
8. Evaluation
9. Evaluators
10. Debriefing

1.Goals and Objectives

Overarching Goal

- Improving population outcome by improving medical response to a high impact event… Ultimately improving population resilience

  - Educational
  - Continuous QI: clinical/ logistic
  - Research

2.Partners/ Stakeholders

Creation of a team

- CO executive
- Psychosocial
- Nursing
- Radiology
- Housekeeping
- Respiratory Therapy
- Volunteers
- Adult team
- PR team
- Emergency Measures
- Others

3.Type of Simulation

Type of Simulation required to fulfill the objectives:

- Type
- Scope (big/moderate/small)
- Level of fidelity
- Announced vs. Unannounced

Types of Simulation

- Table top
- With mannequins
- With standardized patients
- Computer based
- Virtual Reality

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Scope: How big or small?

- Small group
- Workshop
- Larger group
- Whole hospital

Fidelity

Patients

- Low fidelity mannequins
- Task trainers
- Standardized patients
- Virtual reality

Environment

- In situ (high fidelity)
- External centre (mid fidelity)
- Table top (low fidelity)

Orangina

Patients

- 43 simulated patients
- 32 actors
- 11 mannequins

Environment

- In situ

Decon sim

Patients

- 64 simulated patients
- 59 actors
- 5 mannequins

Environment

- In situ

4.Budget+ top admin support and hospital community buy-in

Administration

- Solid commitment required
- All communications supported and validated by the administration
- All departments directed to participate
- Significant risk management issues to be addressed

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Nursing

- Significant budget constraints
- Need to continue clinical activity
- Certain departments prioritised for participation
- Simulation effect and innovation observed

5.Timeline

- Many months required as multiple departments are implicated
- Working on finer details improved chances of success and engagement
- People need time to prepare
- Preparation time ensures a positive learning experience

6.Scenario

Scenario

- Based on Goals/ Objectives of Simulation
  - What are you trying to test? i.e. Trauma vs Decon vs other

- Must be realistic
  - Utilize resources (Public Health Department, Toxicology) to assess your potential vulnerabilities

- Develop a step-wise plan
  - Establish what information to be released at what time

Examples

- Earthquake at amusement park
- Subway explosion
- Bus vs train with hazardous material spill

7.Patient bank

Patient Bank

- Creation of cases based on goals
  - 5-10% RED cases
  - 5-10% YELLOW cases
  - Remainder GREEN

- Create cases from start to finish

- Remember that category can change pending resources and natural progression of cases
  - Yellow ➜ Red
  - Red ➜ Black

- Patient bank can be reused!

Triage

- Assess multiple cases in a short period of time

- Basic information provided

- Various tools
  - START & Jump START
  - Emergency Severity Index, etc

PATIENT DESCRIPTION	TRIAGE CAT
4 yr old resp distress, known history of asthma	Yellow
16 yr old male, unconscious following head injury	Red
6 mo old girl, covered in gasoline , apneic	Red
32 yr old woman, worried, looking for her child	Green

Sample Red Case

Vignette

14 year old female, got ejected from bus and a metal piece of the train, covered in toxic fluid landed on top of her. She is found unconscious but breathing.

Script

On arrival to ED, HR- 120, RR-35, O_2 sat 97% BP 100/60. She is nauseated, and complaining of abdominal pain as well as her eyes burning. Her abdomen is very tender to palpation. Upon transfer to the Red zone, she has a decreased level of consciousness and her BP drops to 72/40.

Expected Disposition

Intubation in ED, IV hydration (NS, blood)

CT- reveals splenic rupture

OR- splenectomy

ICU

Sample Yellow Case

Vignette

22 month old baby boy, was at a park in the vicinity of the accident with his mother. Past medical history of asthma. He has developed respiratory distress and has an injury to his left leg.

Script

On arrival to ED, HR- 110, RR-45, O_2sat 93% BP 98/68. He responds well to ventolin. He has a closed left femur fracture- his leg is splinted.

Expected Disposition

 Admission to medical ward & Orthopedics consultation

Constraints of Pediatric Simulations

- In some jurisdictions unable to use child actors for simulation
- Mannequins for children/ infants, drama students for teenaged "victims"
- Issues of consent
- Concern about exposure of young actors to HIFI simulation provoking an emotional response
- Psychosocial support in place to debrief actors

8.Evaluation

Clinical

- Medical management
- Correct disposition
- Closed loop communication
- Using a disaster mindset
- Identifying team members
- Communication between departments

Administrative

- Identifying team
- Tracking disposition of patients
- Quantifying and distributing resources
- Communication with media
- Communication with external partners

9.Evaluators

Be thoughtful about choosing your evaluators

- Disaster med knowledge
- Simulation knowledge
- Educational background
- Debriefing abilities

- Don't forget to prepare your evaluators!

10. Debriefing (Hot & Cold)
… Leading to knowledge translation & Policy change

The importance of debriefing

The act of reviewing a real or simulated event in which participants explain, analyze and synthesize information and emotional states to improve performance in similar situations.

Outcomes: mortality benefit

## Interdisciplinary ICU Cardiac Arrest Debriefing Improves Survival Outcomes*

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Three main types of Debriefing

- Learner Self-Assessment (Plus-Delta)

- Focused Facilitation (Advocacy-Inquiry)

- Provide Information (Directive Feedback)
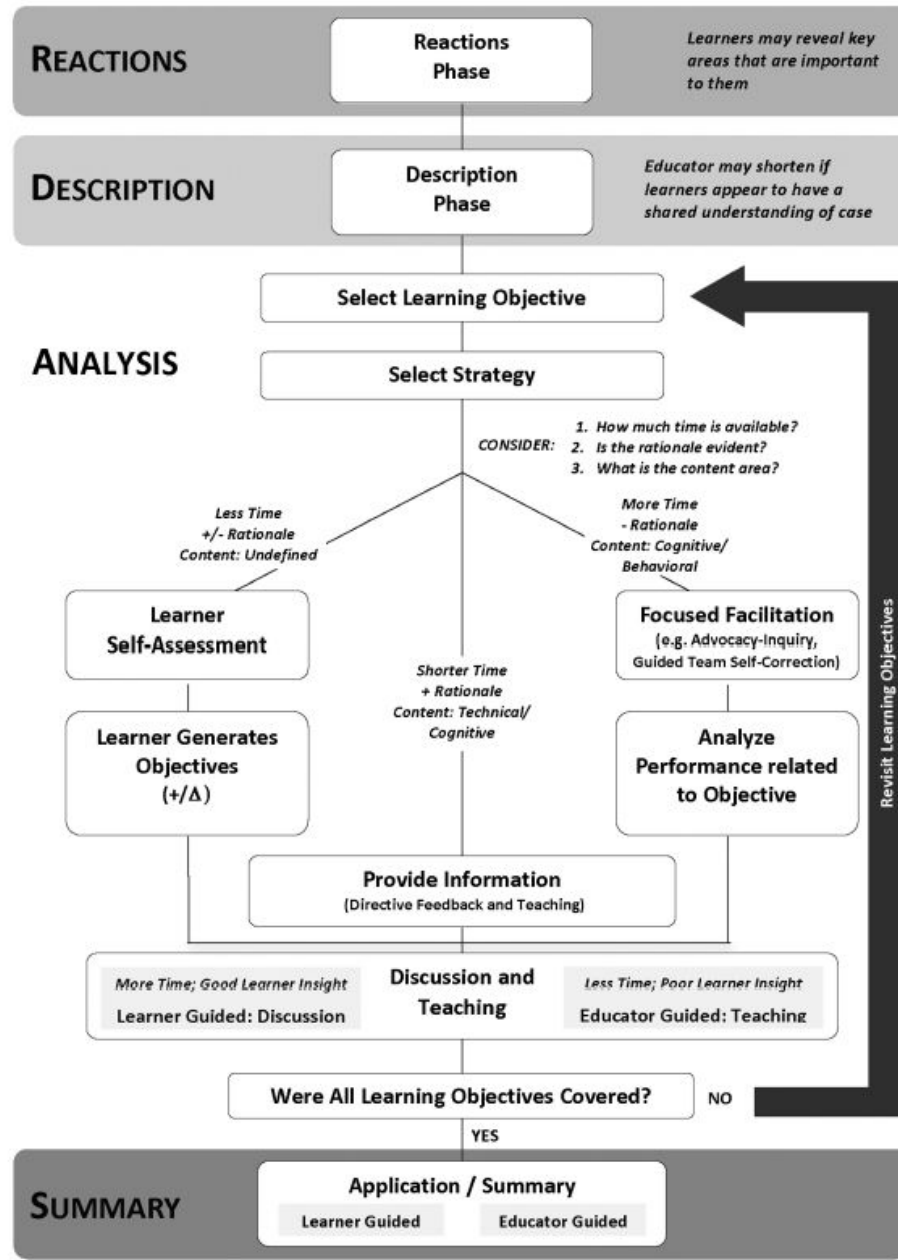
PEARLS Debriefing Script

TABLE 1. PEARLS Debriefing Script

Setting the scene (may also occur before the first scenario debriefing, may abbreviate or omit for subsequent debriefings):

"I'll spend about XX minutes debriefing the case with you. First, I'll be interested to hear how you are feeling now that that case is over; second, I'd like someone to describe what the case was about to make sure we are all on the same page. Then, we'll explore the aspects of the case that worked well for you and those you would manage differently and why. I'll be keen to hear what was going through your mind at various points in time. We'll end by summarizing some take-home points and how to apply them in your clinical practice."

Reaction

• "How are you feeling?"

Potential follow-up question:

• "Other reactions?" or "How are the rest of you feeling?"

Description

• "Can someone summarize the case from a medical point of view so that we are all on the same page?"; "From your perspective, what were the main issues you had to deal with?"

Potential follow up questions:

• "What happened next?"; "What things did you do for the patient?"

Analysis

Signal the transition to the analysis of the case and frame the discussion:

• "Now that we are clear about what happened, let's talk more about that case. I think there were aspects you managed effectively and others that seemed more challenging. I would like to explore each of these with you."

Learner self-assessment (eg, plus-delta)	*Directive feedback and teaching*	*Focused facilitation*
"What aspects of the case do you think you managed well and why?"	Provide the relevant knowledge or tips to perform the action correctly.	(eg, alternatives—pros and cons; self-guided team correction; advocacy-inquiry)
"What aspects of the case would you want to change and why?"	• "I noticed you [behavior]. Next time, you may want to … [suggested behavior]… because [provide rationale]."	• Specifically state what you would like to talk about ("I would like to spend a few minutes talking about XXX.")
Close performance gaps selectively using directive feedback and teaching or focused facilitation		Elicit underlying rationale for actions: see SDC 2, http://links.lww.com/SIH/A175 for advocacy-inquiry approach

Are there any outstanding issues before we start to close?

Application/summary

• *Learner guided*: "I like to close the debriefing by having each you state one two take-aways that will help you in the future."

• *Educator guided*: "In summary, the key learning points from this case were …"

Wrap up:

QUESTIONS?