



Chemical Agents of Opportunity for Terrorism: TICs & TIMs

Module Eight
Observed Behaviors during
Mass Chemical Exposures

Training Support Package

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Chemical Agents of Opportunity for Terrorism:
TICs & TIMs

Learning Objectives

By the end of this module participants will be able to:

- Understand the psych impact of mass chemical exposures
- Provide appropriate response to the mental health needs of victims of real & perceived events
- Describe expected behaviors of large groups of people after a perceived toxic chemical exposure
- Recognize signs & symptoms of acute psychological / emotional response to a traumatic event
- Develop a strategy to aid victims with fear/strong emotions following a real or perceived toxic chemical exposure

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Chemical Agents of Opportunity for Terrorism:
TICs & TIMs

Some Key Messages

- Physiologic responses to a perceived threat can lead to a range of symptoms
- There are characteristic features of crowd response
- Sorting out physical responses to a toxic exposure from physiological and psychological responses to a stimulus can take time and may not be “100% provable”

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Chemical Agents of Opportunity for Terrorism:
TICs & TIMs

Case 1: “The Toxic Lady”

- A 31 year-old cancer patient is rushed by EMS to the nearest LA suburb ED on March 19th, 1994.
 - An “oily sheen” is noted on her chest.
- During the resuscitation, a nurse drawing her blood notices a peculiar acrid smell that seems to be coming from the patient and passes out.
- The senior EM resident picks up the syringe used to draw the blood and notices yellow crystals, smells it, collapses.
 - Within minutes, 4 more care providers are “overcome.”
- During the ensuing evacuation the patient dies

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TICs & TIMs

Case 1: Leading Theories

- Patient drank pesticide in suicide attempt or used a solvent (DMSO) as a home cancer remedy
- Hospital plumbing emitted a toxic gas
- A secret methamphetamine lab operated in the hospital basement.
- “Mass hysteria”

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Chemical Agents of Opportunity for Terrorism:
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Case 1: “The Toxic Lady”

- 37 exposed
 - 11 noticed unusual smell
 - Description varied: garlicky, ammonia like, gas-like, or chemical-like
 - 26 did not notice odor
- Paramedics who transported patients and drew blood in the ambulance noticed no odor and developed no symptoms
- 23/37 developed at least one symptom

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Case 1: Mass Psychogenic Illness or Toxic Exposure?

- 5 health care staff hospitalized
 - ED nurse hospitalized for 9 days developed chronic severe headaches, fatigue, dyspnea
 - A psychiatrist insisted it was an organic cause
 - ED physician hospitalized in ICU for 2 weeks requiring mechanical ventilation
 - 3 months in a wheelchair
 - Avascular necrosis of knees requiring 20 operations

Case 1: Three Investigations

- Coroner
 - Patient died from cervical cancer
 - Fumes that sickened hospital workers were just the “smell of death”
- Cal-OSHA
 - No safety violations
 - Three employees had “involuntary psychological reaction to some agents” while the rest suffered from mass hysteria
- California Dept of Health Services (CDC)
 - “An outbreak of mass sociogenic illness perhaps triggered by an odor”
 - Also possible that a few staff members were exposed to unknown toxic chemical

What is the correct terminology to identify “mass psychogenic illness”?

More Common Terms

- Mass Sociogenic Illness
- Epidemic Hysteria
- Mass Hysteria
- Traumatic stress response

Less Common Terms

- Epidemic transient situational disturbance
- Psychosocial casualties
- Environmental somatization syndrome
- Psychological sequelae
- Psychic possession
- Crowd poison

Definitions

- Diagnostic and Statistical Manual of Mental Disorders-IV-TR
 - Epidemic Hysteria
 - Shared symptoms develop in a circumscribed group of people following “exposure” to a common precipitant.
- Medical literature
 - Multiple Unexplained Symptoms
 - Typically chronic and not triggered by a specific event

Be Careful What You Call It!

- Condescending terms
 - Negative connotations
 - Hysteria implies individual is to blame for illness
- Of course, physicians cannot have mass psychogenic illness
 - 1955 hospital epidemic with 300 affected
 - Once medical staff became affected, condition labeled as “epidemic benign myalgic encephalomyelitis”

Case 2: Cyanide

- 06:00 am
 - A pail caught fire at a plating company containing:
 - Sodium meta-nitrobenzene (85%)
 - Potassium cyanide (15%)
- 15 workers of a downwind warehouse smelled smoke and noticed brief upper respiratory irritation
- Evacuated to nearby (5 miles) airport facility but not informed of potential cyanide exposure



Case 2: Cyanide (Continued)

- The original 15 evacuees and 85 contacts learned of cyanide exposure and several began complaining of chest tightness, nausea and dizziness
- “Several are feeling ill and we’ve got about 50 people that were exposed over there, they’re awake and oriented, they just wanted to be checked out.”



Case 2: Cyanide (Continued)

- 9:30 am Incident Command decides
 - No decontamination at scene necessary
 - Transport to area hospitals
 - Hospital 1: 36 patients
 - Hospital 2: 52 patients
 - Hospital 3: 12 patients
- 9:50 am Treatment and Disposition
 - Hospital 1:
 - Gross decontamination in parking lot
 - Lilly Cyanide Antidote Kit (N=2)
 - Media interviews with cameras rolling
 - Hospitals 2 & 3: Quick check and release



Medical Personnel Responses

- “Cyanide is deadly. Cyanide is bad stuff!
If it were me, I’d go get checked out. ”
- EMTs wearing surgical masks to drive.
 - Upset that patients were not decontaminated.
 - Medics c/o lightheadedness and smelled ‘bitter almonds’



Case 2: Cyanide (Continued)

- 12:30 pm media coverage
 - Footage and interviews from Hospital 1
- Calls to Poison Center from:
 - Previously treated and released employees concerned they had not received “appropriate treatment”
 - Hospitals 2 and 3 because several patients returned for “appropriate treatment”



Lessons Learned

- Patients remote to exposure may exhibit symptoms
 - May develop symptoms on learning of the exposure
- Medical personnel can be affected
 - They can become victims
 - They may react inappropriately
 - e.g., use therapies with potential for adverse reactions
- Treatment for presumed poisoning can be harmful
 - Decontamination in extremely cold weather
 - Adverse effects of antidotes



Expect Large Numbers of Patients after Mass Chemical Exposure



http://www.uli-atl.com/alerts_2007/alert_070118b.htm

- Types of Patients
- Obvious Medical Needs
 - Poisoned
 - Contaminated
- Nonspecific symptoms
 - With no apparent exposure
- Asymptomatic
 - “Just want to get checked out”



Magnitude of Problem

- Tokyo Sarin Incident 1995
 - 12 died
 - 1,200 required some care
 - 5,500 sought medical care but had no exposure
- Bhopal Disaster 1984
 - >10,000 severe and 5000 died
 - 200,000 sought medical care



Magnitude of Problem

- Operation Desert Storm 1991
 - 39 Scud missiles reached ground
 - 1000 casualties/ 2 deaths
 - 544 “anxiety attacks” and 230 “atropine overdoses”



What is Panic?

- Panic is:
 - A sudden fear which dominates or replaces thinking [wikipedia.org]
 - A sudden unreasoning terror often accompanied by mass flight [www.merriam-webster.com]
- Often used incorrectly to describe any type of fear, flight, evacuation, or lack of coordination
 - Flight is often appropriate
- Panic flight is
 - Irrational, hysterical or groundless flight
 - Reckless disregard for others



Can People Panic during a Disaster?

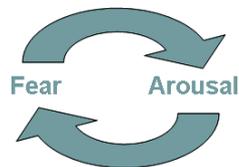


<http://scifipedia.scifi.com/>



Cycle of Fear and Perceived Poisoning

- Perceived high risk of uncontrolled release of dreaded toxin
- Input
 - Mucous membrane irritation
 - Lightheadedness
 - Noticing a bad odor
 - Observing friends become ill
- Natural response is fear
- Fear leads to autonomic arousal
 - Palpitation
 - Sweating
- Autonomic arousal misinterpreted as a symptom of poisoning



Panic is Rare During a Disaster

- Observed groups of patients in period of impact
 - “Cool and Collected” (75%)
 - Stunned and bewildered (>20%)
 - Confused, anxious, hysterical crying (<5%)
- Not terribly different than what occurred on 9/11/2001



Case 3: A Gas Smell

- A gas odor is noted in a school classroom
- The teacher complains of headache, nausea, shortness of breath and dizziness
- 80 students, 19 staff, 1 family member go to the ED
 - 38 hospitalized for unclear reasons
- Scene investigation: no environmental cause
 - 5 days later school reopened
 - 71 people return to the ED for similar symptoms
- Exhaustive investigation: no environmental cause



Features Suggestive of “Mass Psychogenic Illness”

- Rapid onset and recovery
- Contagious, spreads via:
 - Sight (particularly “line of sight”)
 - Smell
- Diversity of symptoms w/o physical signs or abnormal labs
- Benign morbidity with no sequelae
 - Though remember the “Toxic Lady”
- Often recurs when returning to environment
- No reasonable organic basis
 - Environmental investigation is negative



Symptoms Suggestive of “Mass Psychogenic Illness”

From Jones, et al. (in order)

- Headache
- Dizziness/lightheadedness
- Nausea
- Drowsiness
- Chest tightness
- Breathing difficulty
- Sore throat
- Burning eyes
- Cough
- Abdominal pain/cramps
- Nervousness
- Watery eyes

Other typical symptoms:

- Diaphoresis (sweating)
- Dry mouth
- Involuntary Urination
- Numbness and tingling
- Palpitation/tachycardia
- Syncope
- Tremor
- Weakness



Evidence for Mass Psychogenic Illness

IN FAVOR

- No source identified
 - Exposures are below occupational exposure standards
- No correlation between attack rate and presumed level of exposure to toxic agent
 - Lack of dose-response

AGAINST

- Adequacy of patient evaluations:
 - Can everything be ruled out?
- Can you ever have a comprehensive environmental investigation?
 - Delayed environmental sampling
 - Passing plume



Is it Psychological or Is it Poisoning?

Psychological

- Chest Tightness
- Breathing difficulty
- Tachycardia
- Nausea/Vomiting
- Involuntary Urination
- Headache
- Tremor
- Sweating
- Syncope

Nerve Agent Poisoning

- Chest Tightness
- Breathing difficulty
- Bradycardia or Tachycardia
- Nausea/Vomiting
- Involuntary Urination
- Headache
- Fasciculations
- Diaphoresis
- Paralysis
- Coma



Is it Psychological or Is it Poisoning?

Psychological

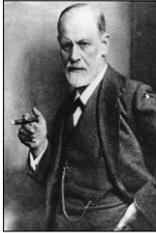
- Breathing difficulty
- Tachycardia
- Nausea/Vomiting
- Headache
- Dizziness
- Syncope

Cyanide Poisoning

- Breathing difficulty
- Tachycardia
- Nausea/Vomiting
- Headache
- Dizziness
- Coma
- Seizures
- Dysrhythmias



Is there a solution?



www.bu.edu



commons.wikimedia.org



Is it Real?

- Emergency Response
 - Don't get caught up on figuring out if it exists or not
 - “Psychogenic illness” is a diagnosis of exclusion
 - Create a “holding environment”
 - Location away from high-tempo triage activities
 - Symptoms monitored and re-evaluated
- Research
 - Need for good epidemiological data that clarifies characteristics of each group (defines needs)



Planning Suggestions

- Expect the problem – Plan for it
- “Base disaster plans on what people are likely to do rather than what they should do”
 - Auf der Heide: Disaster Response: Principles of Preparation and Response
- Don't ignore these patients
 - And take them seriously
- Early diagnostic & management decisions are critical to the success of the emergency response
 - EDs have little surge capacity
 - Decontamination and PPE burden the health care system



Training Suggestions

- Teach emergency responders basic toxicology principles
 - e.g. Dose-Response (“dose makes the poison”)
- Look for objective signs of toxicity
 - Toxidrome recognition
 - Irritant Gas Syndrome
 - “Knock-down” or metabolic poisoning
 - Opioid intoxication
 - Cholinergic/Cholinesterase inhibitor



Improve Communications

- Information is the ANTIDOTE for fear
- Make substance identification a priority and report to health care providers as soon as possible
- Make inter-agency coordination a priority in planning
 - Strive for “single voice” communications with the media and the public. When you speak, you speak for all of us!
- Teach risk communication skills to ALL responders



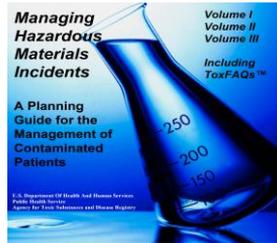
Unconventional Partnerships

- Behavioral care experts
- Epidemiologists
 - Develop tools to evaluate behaviors during catastrophic events
 - Evidence based planning based on Social-behavioral observations
- Medical Toxicologists
 - Medical Toxicologists are clinical experts in the human health effects of poisoning
 - Accessed through ACMT, poison centers, or direct contact



Information Resources

- Poison information recognized as an essential component in chemical emergencies
- Many excellent sources
 - ATSDR Planning Guide
 - CDC website



Summary

- Expect large numbers of patients after mass chemical exposure
 - Often difficult to identify those needing immediate medical care
- Avoid labels without objective diagnostic criteria
 - “Worried well”, “Mass hysteria” less helpful than “I know you are worried; things check out OK now. I will check on you again...”
- Use historic lessons, expected behaviors to guide planning
- Communication is Key
 - Interagency coordination may avoid needless fear
- Know your resources and partner with them
 - Including ACMT/Medical Toxicologists



Questions