Pediatric Disaster Medicine

2:30 – 3:15 p.m.

Lorin Brown, DO, FAAP
I have no relevant financial relationships to disclose.
Objectives

- Review principles of disaster medicine and mass casualty care
- Explore the anatomic, physiologic, developmental, and social aspects of children that impact disaster care
- Highlight pediatric lessons learned from recent incidents
- Discuss office-based and personal emergency preparedness
What is a Disaster?
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What is a Disaster?

- Not entirely defined by the event
- Defined by the effects of the event on the system
- On-hand resources are insufficient to meet demand
- “Sudden...phenomenon of sufficient magnitude to require external assistance.”

*World Health Organization*
What is a Disaster?

- **Hazard**: physical source of danger that may become an emergency upon interacting with humans

- **Emergency**: threatening situation that requires immediate action to avoid loss or harm
  - if handled successfully, disaster may be averted
What is a Disaster?

Disasters are:
- not defined by number of patients, level of acuity, or extent of damage but defined by the impact of the event on a systems’ abilities to meet its needs.
Disaster Impact

Number of people reported affected by natural disasters 1900 - 2012
Mass Casualty Incident (MCI)

- Emergency medical resources are overwhelmed by the number and severity of casualties
- These can be caused by:
  - natural disasters
  - structural disasters
  - intentional act
The rate of active shooter incidents has tripled in the US
- 2008-2013: 16.4/year

40% of these incidents resulted in at least 3 fatalities.

“A TIMELINE OF U.S. MASS KILLINGS

ALL CASES VERIFIED BY USA TODAY

SHOW CASES THE FBI DID NOT PROVIDE

Cases verified by USA TODAY
Cases verified by USA TODAY which the FBI did not provide

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Disaster Preparedness

- The goal is to minimize disruption of normal system operations by
  - mitigating hazards and emergencies to prevent disasters
  - preparing to augment resources prior to a disaster
  - allocating scarce resources during disaster response
  - restoring normal system operations as quickly as possible
Challenges of Disaster Medicine

• Disasters and MCIs are challenging
  – unique and diverse
  – insufficient resources
  – inappropriate allocation of resources
  – lack of event control
  – delivery of care to specialized and/or vulnerable populations
Unique and Diverse

- Scale
  - Katrina 2005 vs Sihk Temple Shooting 2012
- Causative factor
  - Oklahoma City 1995 vs Fukushima 2011
- Location
  - urban vs rural
- Secondary events
  - Fukushima 2011 and Katrina 2005
Resource Allocation

• The primary challenge in disasters
• Usually hindered by
  – emergent/urgent needs
  – lack of effective and accurate communication
  – disruptions in critical infrastructure
  – continuously evolving events
Resource Allocation

• Disaster mindset requires the “greatest good for the greatest number”

• Goal is to maximize available resources to save as many lives as possible
  – required to rethink the way we prioritize our care

• This is difficult for most practitioners
Standards of Care

• Legal standards of care
  – determined by court precedent
  – determines what is appropriate and what is negligent care

• Ethical standards of care
  – determined by the presence of a patient-doctor relationship
  – practitioners advocate for individual patients
  – do everything possible for the patient
Crisis Standards of Care

• Legal aspect
  – can only be changed by official government declaration

• Ethical aspect
  – requires a more utilitarian approach
  – the needs of the many outweigh the needs of the few
  – heavier scrutinization of relative risks of interventions
Lack of Event Control

• Continuing threat
• Possibility of secondary event
• Lack of scene safety
• Ongoing danger to victims and responders
• Lack of effective coordination of efforts
• Redundant or incomplete response efforts
Vulnerable Populations

- Very young
- Very old
- Very ill
Vulnerable Populations

- Very young
- Very old
- Very ill
Pediatric Disaster Medicine

• The nature and timing of disasters determine the impact on children
  – Oklahoma City 1995 (168 dead, 20 children)
  – Beslan School Shooting 2004 (380 dead, 186 children)
  – Bali Nightclub Bombings 2002 (202 dead, 0 children)
  – Sandy Hook Shooting 2012 (26 dead, 20 children)
Pediatric Disaster Medicine

- In most disasters, children will likely
  - comprise a larger proportion of injured than the general population
  - exhibit significantly higher mortality rates than adults
• Biologic distinctions
  – solid organs are proportionally larger, closer together, and less well-protected
  – higher metabolic rates (HR, RR) increases susceptibility to airborne dispersal agents
  – shorter stature increases vulnerability to both high-vapor-density gases (chlorine, sarin) and explosive pressure waves
  – larger BSA-to-weight ratio increases susceptibility to toxic exposures
  – more tenuous fluid and electrolyte balance
Developmental distinctions

- lack of motor skills to escape harm
- lack of cognitive ability to respond reasonably to a threat
- dependency on concerned adult caregiver
- inability to articulate symptoms or concerns
- immature coping skills and increased risk of anxiety and PTSD
Pediatric Disaster Medicine

• Social distinctions
  – schools represent a vulnerable population
  – $1/5^{th}$ of the US population is in schools on a given weekday
Pediatric Disaster Medicine

• Specialized needs
  – smaller and larger variation in required sizes of medical equipment
  – larger variation in drug dosing
  – increased need for comfort care measures
  – the need for re-unification with families and care givers
Children do not typically receive attention in disaster planning
  – 74% of EMS agencies have a disaster plan
  – 87% assume that children should receive the same care as adults

The majority of emergency response agencies lack:
  – a plan for school response
  – training in pediatric triage
  – pediatric victims in disaster drills
New York City, 2001

- Identified many weaknesses in our disaster response
  - virtually no medical incident command
  - very little communication between agencies
  - hospitals over-run by walking wounded
  - few individuals transported by EMS

- Few pediatric casualties
  - 5 month old presented to VA
  - 10 schools in the blocks that surround ground zero
National Disaster Medical System

• Formed in response to 9/11
• Reviewed and overhauled after Hurricane Katrina
• Incident Command System (ICS) forms the basis of NDMS
  – standardizes structure, communication, and roles in disaster response
  – designed to be scalable and flexible
National Disaster Medical System

• Incident Commander is in charge of entire operation
• Roles are very well-defined
• Clear chain of command
• Supervisors manage small numbers of responders
• Responders
  – maintain their roles
  – only report to one supervisor
Disaster Planning for the Office-based Pediatrician
Disaster Planning

Citing Urgent Need, U.S. Calls on Hospitals to Hone Disaster Plans

By SHERI FINK  MARCH 11, 2014

Federal officials are proposing sweeping new requirements for American health care facilities — from large hospitals to small group homes for the mentally disabled — intended to ensure their readiness to care for patients during disasters.

Describing emergency preparedness as an "urgent public health issue," the proposal by the Department of Health and Human Services offers regulations aimed at preventing the severe disruptions to health care that followed Hurricane Katrina and Hurricane Sandy. More than 68,000 institutions would be affected, including large hospital chains, "mom and pop" nursing homes, home health agencies, rural health clinics, organ transplant procurement organizations, outpatient surgery sites, psychiatric hospitals for youths and kidney dialysis centers.

After high water from Hurricane Katrina inundated their nursing home, residents waited for assistance in New Orleans in 2005. Federal officials are trying to avoid these types of situations with new requirements for health care providers ahead of emergencies.

Mario Tama/Getty Images
Disaster Planning

• Three critical questions:
  – What will our office’s role be during a disaster?
  – How do we minimize disruptions to normal office operations?
  – How do we return to normal operations as quickly as possible?
Disaster Planning

• The role of physician offices
  – continued care of established patients (affected and unaffected by the disaster)

• Possible additional roles
  – medical triage
  – stabilization and management of patients awaiting transport
  – safe location to shelter those displaced by the disaster
Disaster Planning

• Keys to providing disaster care
  – majority of patients who seek care are “worried-well”
  – manage staff and supplies on the anticipated length of disruption to services
  – remember that staff will likely be personally affected by disasters that affect your patients
    • physical effect: may be directly affected by the disaster
    • emotional effect: even present in those not directly affected by a disaster
Disaster Planning

• The goal is to **minimize disruption of normal system operations** by
  – mitigating hazards and emergencies to prevent disasters
  – preparing to augment resources prior to a disaster
  – allocating scarce resources during disaster a response
  – restoring normal system operations as quickly as possible
Disaster Planning

• It is impossible to predict and plan for all possible disasters
  – fire
  – flood
  – tornado
  – earthquake

• Plans should be tailored to individual practice needs and likely disaster scenarios

• Build-in system redundancies
Disaster Planning

• Redundancies
  – system operations that are not necessary to normal function
  – may seem inefficient during normal operation
  – can be life-saving during a disaster
Disaster Planning

• Redundancies
Disaster Planning

• Simple redundancies
  – ensuring that frequently used supplies are stored in multiple locations within the office
  – storing critical medication and equipment in two separate places
  – storing emergency contact information in multiple forms (electronic and printed) in separate places
  – plugging at least one computer into emergency power outlet
Disaster Planning

• Disaster champion
• Disaster plans should be written in advance
  – general disaster policy
  – bomb threat
  – document protection
  – medical emergency
  – office disruption
  – freezing/bursting pipes
  – fire
  – flood
  – tornado
  – evacuation

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Disaster Planning

• Disaster plans should
  – anticipate the worse
  – describe specific actions to
    • protect staff and patients
    • minimize disruptions to practice
  – describe internal command structure
  – detail communications process
  – describe outside partnerships
  – list recovery process for critical vendors

• Staff should be trained on disaster policies
Disaster Planning

• Keep a list of supplies, equipment and assets
• Maintain list of emergency phone numbers
  – fire department
  – ambulance services
  – security
  – phone company
  – major suppliers
  – police department
  – hospital
  – insurance agent
  – utility company
  – health department
Disaster Planning

• Essential emergency equipment
  – flashlight
  – portable first aid kit
  – fire extinguisher
  – basic tool kit
  – current staff emergency contact list
  – battery-operated radio and spare batteries
Disaster Planning

• Consider keeping the following off-site:
  – insurance policies
  – list of assets
  – important phone numbers
  – lease
  – patient records
  – disaster plans and policies
  – mailing list of current patients
Disaster Planning

• Other helpful hints:
  – know your local team
  – promote a culture of preparedness
  – create a practice response team
  – assess your facility annually
  – support the needs of your staff
  – reinforce cabinets and furniture
  – move all essential equipment (e.g. computers) off the floor
Disaster Planning

• Other things to consider
  – portable medical equipment and supplies (“go bag”)
  – back-up electricity
  – essential documents (medical license, hospital ID, DEA license, state controlled substance license, etc)
  – medical records and data security
Summary

- Disasters require re-allocation of scarce medical resources
- Children are a vulnerable population
- Preparing for their disaster needs is essential
- Office-based disaster planning
  - seeks to minimize disruptions and restore normal practice operations
  - requires planning and practice
Disaster Planning

- [http://www.cdc.gov/phpr/healthcare/documents/Medical__Office_Preparedness_Planner.PDF](http://www.cdc.gov/phpr/healthcare/documents/Medical__Office_Preparedness_Planner.PDF)
- [http://www.mgma.com/about/about-mgma-medical-group-management/about-center-for-research/preparing-for-a-medical-office-emergency-or-disaster](http://www.mgma.com/about/about-mgma-medical-group-management/about-center-for-research/preparing-for-a-medical-office-emergency-or-disaster)
Contact Information

Lorin Browne, DO, FAAP
(414) 266-2625

Physician Consultation and Referral: (800) 266-0366