



Small Victims, Big Challenges:
**Pediatric Triage, Treatment and
Recovery in Disasters**

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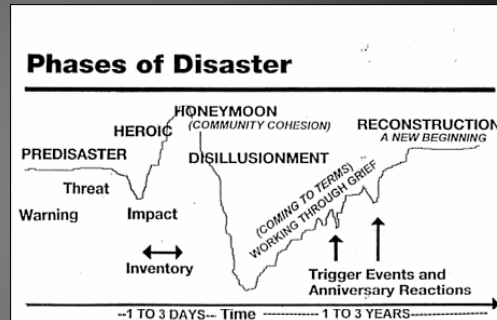
OBJECTIVES

- Identify personnel, equipment and infrastructure for pediatric disaster preparedness
- Demonstrate the ability to triage children who are victims of multiple casualty incidents (MCIs) using internationally accepted criteria (JumpSTART)
- Identify clinical manifestations and appropriate treatment for child victims of natural and human-caused disasters
- Apply lessons learned into new and updated plans, treatments, preparedness, procedures, response and recovery

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PHASES OF DISASTERS

- Disaster planning
 - Continuous, based on HVAs and focusing on resources and education
- Disaster Response
 - Immediate care, including implementation, triage, stabilization and transport via incident command system
- Disaster Recovery
 - Return to status quo
 - Debriefing and learning



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COMMUNITY RESOURCES

- Pediatric emergency and trauma centers
- Pre-hospital care providers, including EMS, fire departments and police
- Social services
- Schools
- Local health clinics
- Departments of Health
- Government (city, state and federal)
- Local and national media



Photo Courtesy of FEMA

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EMERGENCY MEDICAL SERVICES FOR CHILDREN (EMS-C) IN A DISASTER

- A program of Health Resources and Services Administration (HRSA)
 - Education and grant funding for development pre-hospital pediatric care
- Provides designations for pediatric disaster centers
 - Emergency Department Approved for Pediatrics (EDAP)
 - Pediatric Critical Care Center (PCCC)
 - Stand-by Emergency Department Approved for Pediatrics (SEDP)



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PREPARATION AND ACCREDITATION

- Ensure local hospitals and pediatrician's offices are stocked with basic pediatric supplies
- EDAP or SEDP designations exist as resource centers for healthcare providers and institutions



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PLANS FOR SURGE CAPACITY FACILITIES

- Hospitals without formal pediatrics services
- Community health centers
- Rehabilitation hospitals
- Urgent care centers
- Physicians' offices
- Nursing homes
- School-based health centers
- Field hospitals in gymnasiums, warehouses, and convention centers
- Religious or faith-based facilities



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PHARMACEUTICAL/MEDICAL SUPPLY STOCKPILES

- The Centers for Disease Control and Prevention (CDC) provide a Strategic National Stockpile (SNS)
 - Developed in 1999 for anthrax
 - Point of delivery (POD) system for local distribution, with supplementation by state and national sources within 48 hours
- States should plan on being self-sufficient for 72 hours before SNS arrives
- Instructions for accessing PODS
 - Use of United States Postal Service for distribution
 - Security considerations
 - Available media used to disseminate distribution point locations



EQUIPMENT NECESSARY FOR PEDIATRIC DISASTER PREPAREDNESS

- Airway equipment
- IV access devices (intravenous lines, intraosseous needles)
- Warming blankets
- Radiant warmers
- Normal saline
- Pediatric nutrition supplies
 - Formula,
 - G-tube feeds,
 - Child-friendly non-perishable items



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CONSIDER THE NEEDS OF CHILDREN IN FAMILY PREPAREDNESS PLANNING

- Pre-designated meeting locations
- Listing of key phone numbers
- Create an emergency kit
 - Prescription medications
 - Common medications
 - Formula/Food
 - Diapers
 - Clothes
- Create a list of trusted adults and a safety "password"
- Comfort objects and foods



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STRATEGIES FOR INCREASING COMMUNITY PEDIATRIC DISASTER AWARENESS

- Media reports about family preparedness
- Add a disaster section to website
 - disasters likely in your area
 - based on local HVA
- Educate daycare and school centers on disaster preparedness
- Lobby state and local governments for stronger pediatric disaster planning



www.aap.org/

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EDUCATIONAL PROGRAMS

- Programs for rescue workers, EMS and other pre-hospital care triage
- Didactic courses about potential biological, chemical and radiological weapons
- Working with pediatric resource centers that integrate pediatric and adult care



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HOMELAND SECURITY EXERCISE EVALUATION PROGRAM (HSEEP)

- Step 1:** Plan and organize the evaluation
- Step 2:** Observe the exercise and collect data
- Step 3:** Analyze data
- Step 4:** Develop a draft After Action Report
- Step 5:** Conduct an After Action Conference
- Step 6:** Identify improvements to be implemented
- Step 7:** Finalize the After Action Report
- Step 8:** Track Implementation



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KEY PLANNING ELEMENTS FOR DESIGNING AN EXERCISE

- Identify venue for exercise and organization type
 - Hospital
 - Community health center/clinic
 - School
 - Daycare center
 - After-school facilities
- Develop scenario



Photo Credit: FEMA

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DISASTER RESPONSE: PEDIATRIC TRIAGE

GUIDING PRINCIPLE IN DISASTER:

Do the most good for the most patients, a utilitarian ethic due to overwhelmed resources.

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Pediatric Triage – JumpStart Algorithm

- Guiding principles in triaging children
 - Variations in normal vital signs with age
 - Children less than 9 years old triaged with JumpSTART
 - Apneic children more likely to have primary respiratory issue than adults
 - Developmental considerations
 - Pre-existing conditions/syndromes
 - Inability to walk/talk or obey commands, as used in adult triage
- Goal is triaging patient in less than 30 seconds

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PRIMARY TRIAGE PERFORMED AT DISASTER SITE

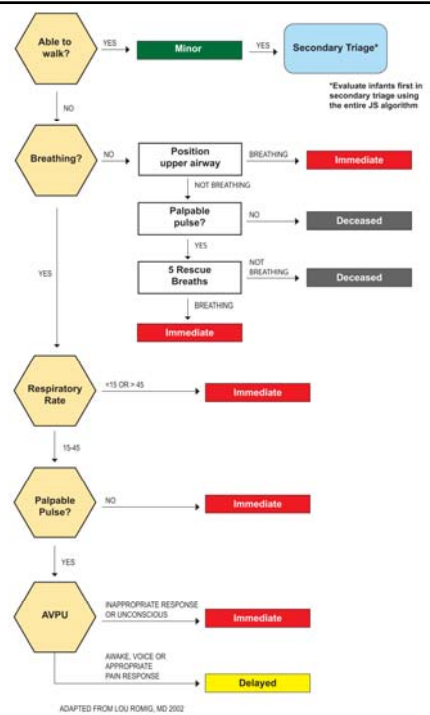
- Patients assigned to color triage groups
 - Immediate (Red)
 - Delayed (Yellow)
 - Ambulatory (Green)
 - Deceased/Non-recoverable (Black)
- No back flow to primary triage once sorted
 - Allows orderly progression through triage system
 - Each triage area has a team leader

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JUMPSTART PEDIATRIC MCI TRIAGE

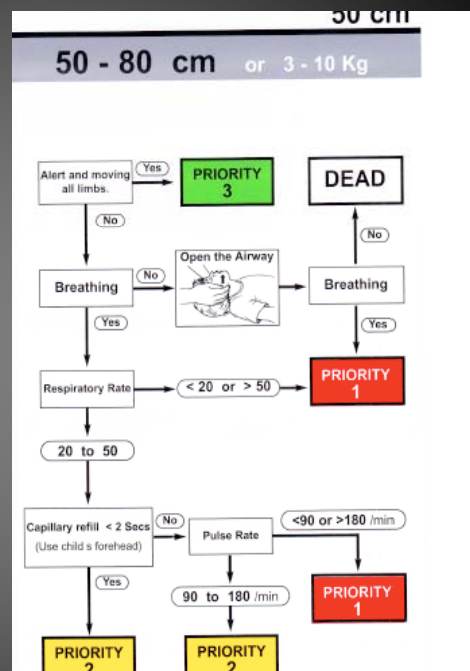
Adapted from Lou Romig, MD

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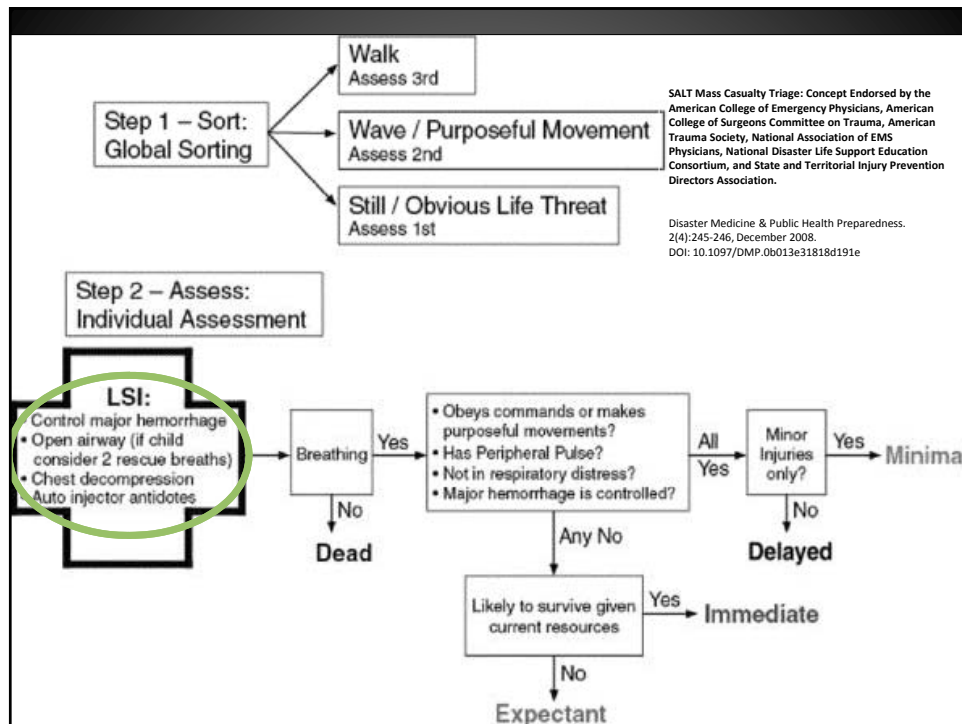
SMART TRIAGE

- Proprietary triage tool
- Potential Strengths
 - Integrated with a mass casualty event management system
 - Considers pediatric physiology (length-based tape)
- Potential weaknesses
 - Limited evidence base



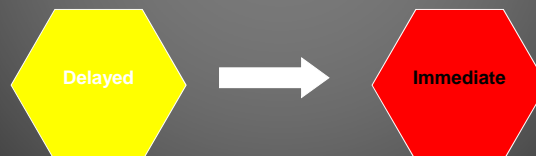
SALT TRIAGE

- Sort- Assess – Life-saving interventions- Transport
 - Developed by a CDC expert panel
 - Endorsed by several professional organizations
- Strengths include:
 - Consideration of whole population of victims
 - Same tool for adults and children
- Potential weakness
 - Little consideration of pediatric physiology



SECONDARY TRIAGE

- Performed at the scene of the MCI or healthcare delivery venues when patients are delivered by ambulance
- In disasters 75% of patients may come in with a parent or caregiver
- Flow within triage categories
 - Based on clinical changes
 - Requires communication between triage area leaders
- Reassess venue of treatment
- Transportation to hospitals or surge capacity care centers



TRIAGE OF CHILDREN WITH HEAD INJURIES

- Head injuries carry a high risk
 - Intracranial hemorrhage
 - Cerebral edema
- The **AVPU** mnemonic allows rapid detection of significant head injury
 - **A**lert
 - Responds to **V**oice commands
 - Responds to **P**ainful stimuli
 - **U**nconscious
- **A**lert and “**V**oice” patients are in the delayed (**yellow**) triage category
- “**P**ain” and **U**nconscious patients are in the immediate (**red**) triage category



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DISASTER TRIAGE FOR CHILDREN WITH SPECIAL HEALTHCARE NEEDS

- The JumpSTART mnemonic still applies
- If chronically non-ambulatory and have no ABCD problems, may still be triaged to **green** area
- Technology dependent children with technological failure may need **red** or **yellow** triage
- Verbal instruction to children



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WHY ARE CHILDREN MORE PRONE TO INJURY AND EXPOSURE IN MCIS?

- Lack cognitive skills to avoid exposure and attack
- Lack motor skills
- High surface area to mass ratio increases risk for:
 - Hypothermia
 - Dehydration due to vomiting and diarrhea
 - Exposure to radiation, chemical, biological dangers



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WHY ARE CHILDREN MORE PRONE TO INJURY AND EXPOSURE IN MCIS?

- Faster respiratory rate speeds exposure to aerosolized agents
- Thinner skin increases the danger of chemical exposure
- Smaller circulating blood volume increases the risk of shock and death



BIOLOGICAL AND CHEMICAL MULTIPLE CASUALTY INCIDENTS

- Divided temporally into immediate and delayed symptoms
- Divided by predominant body system involved
 - Neuromuscular
 - Respiratory
 - Dermatological
- Chemical, Biological, Radiological and Nuclear (CBRN)



Photo Credit: FEMA

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MENTAL HEALTH NEEDS OF CHILDREN

- Children's reactions to disaster will vary based on demographics, age and development stage
- Reactions by gender:
 - Girls generally more cognitively, emotionally and socially mature than boys from school age through adolescence
 - Children identify gender in preschool and may react with perceived/ learned social norms to disaster
 - Much variability and many exceptions to these rules should be expected
 - Boys tend to have more external, aggressive, behavioral symptoms; girls tend to internalize, with depression, anxiety and sleep disturbances



Photo Credit: FEMA

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ELAPSED TIME SINCE DISASTER

- Reactions influenced by:

- P **Personality**
- P **Psychological illnesses**
- P **Previous exposure to disaster and trauma**
- P **Proximity to disaster**
- P **Personal loss from the disaster**

- Most children are resilient and will recover from acute symptoms in days or weeks

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Caring for Children's Mental Health as They Respond to A Disaster

Adapted mental health first aid:
Strategy for identifying children in need of help

- Introduce yourself in a developmentally appropriate way
- Explain that you are trying to help
- Remain non-threatening but be honest and direct
 - Preserve credibility
 - Avoid unrealistic promises or false statements



Photo Credit: FEMA

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PRESERVING THE FAMILY UNIT: PROMOTING RECOVERY

- Triaging children and their families together important for mental health
 - Send family unit to triage color area appropriate for most ill family member
 - Preservation may not be possible if children and adult are all immediate (red) category
 - Tracking system necessary in triage to ensure family reunification
 - Separation from parents and siblings greatly increases children's anxiety



SEVERITY OF DISASTERS

- Level I disaster: Local resources effectively deal with consequences
- Level II disaster: Regional efforts required
- Level III disaster: Highest magnitude, with overwhelmed regional resources. State and Federal intervention required



SUMMARY



- Children will be victims in most foreseeable disasters
- Children's size, development, and level of emotional maturity influence their physical and mental health in disasters
- Disaster preparedness includes planning, training, and acquisition of appropriate medications and equipment
- Treatment of CBRN victims depends on child's age, size, and the severity of disease
- Practitioners must be vigilant for the first child victim of a disaster

PEDIATRIC DISASTER RESOURCES

Preparation

- Pediatric Disaster Assistance Toolkits (PDAT), CDC PDAT and Greater New York Hospital Association (GNYHA) PDAT
- Markenson D., Reynolds S. (2006, February). American Academy of Pediatrics Committee on Pediatric Emergency Medicine; Task Force on Terrorism. *The Pediatrician and Disaster Preparedness*, 117(2):e340-62.

Triage

- Dr. Lou Romig's pediatric triage strategy. <http://www.jumpstarttriage.com>

PEDIATRIC DISASTER RESOURCES

➤ Decontamination

- - Liudvikas Jagminas,
MD<http://www.emedicine.com/emerg/topic893.htm>
- - New York Centers for Terrorism Preparedness and Planning PROTOCOL FOR THE DECONTAMINATION OF THE PEDIATRIC PATIENT ADMINISTRATIVE POLICY AND PROCEDURES
- - Brennan RJ, Waeckerle JF, Sharp TW, Lillibridge SR: Chemical warfare agents: emergency medical and emergency public health issues. Ann Emerg Med 1999 Aug; 34(2): 191-204
- - Timm N, Reeves S. A Mass Casualty Incident Involving Children and Chemical Decontamination. Disaster Manag Response. 2007 April - June;5(2):49-55

PEDIATRIC DISASTER RESOURCES

Mental Health

- Pediatrics Vol. 116 No. 3 September 2005, pp. 787-795
 - An article about children's responses to and mental illness resulting from disaster
- Psychosocial issues for children and families in disasters.
<http://www.mentalhealth.samhsa.gov/publications/allpubs/SMA95-3022/default.asp>
 - A health and human series guide for primary care physicians for children's mental health preparation and responses to disasters
- The impact on brain and behavior.
www.acnp.org/Docs/TaskForceReports/impact_of_terrorism.pdf,
 - American College of Pharmacology Consensus Statement on Disaster and Behavior

PEDIATRIC DISASTER RESOURCES

Mental Health

- Vaiva G, Ducrocq F, Jezequel K, Averland B, Lestavel P, Brunet A, Marmar CR.
- Immediate treatment with propranolol decreases posttraumatic stress disorder two months after trauma. Biol Psychiatry. 2003 Nov 1;54(9):947-9. Erratum in: Biol Psychiatry. 2003 Dec 15;54(12):1471.
 - A study in adults. More work needed before B-blockers may be recommended for disaster workers, and especially children
- <http://www.mhfa.com.au/firstaid.htm>,
 - A site explaining mental health first aid.
- <http://www.nimh.nih.gov/publicat/NIMHviolence.pdf>
 - A federal site about helping children and adolescents cope with violence and disasters

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PEDIATRIC DISASTER RESOURCES

Treatment

- The Redbook (AAP resource on biological agents)
- The Harriet Lane Handbook (For pediatric drug dosing)
- Behrman, Kliegman, Jenson. Nelson Textbook of Pediatrics. 17th ed. 2005.
- Local poison control centers (1-800-222-1222)
- Olson, KR. Poisoning and Drug Overdose
 - A handbook of clinical toxicology

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PEDIATRIC DISASTER RESOURCES

Drills and Training

- Hodgetts, T.J. and Mackway-Jones, K, *Major Incident Medical Management and Support, The Practical Approach*", BMJ Publishing Group, London (1995).

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