

Disaster Preparedness *Are We Ready for Kids?*

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Disclosures

- I have no relevant financial relationships with the manufacturers of any commercial products and/or providers of commercial services discussed in this CME activity
- I do not intend to discuss an unapproved or investigative use of a commercial product or device in my presentation

Objectives

- Acknowledge disaster readiness as a significant pediatric and public health care concern
- Recognize the enhanced vulnerability of children
- Acknowledge evidence gaps in the readiness literature
- Describe lessons learned from recent disasters and the current status of pediatric preparedness
- Describe the fundamental link between day-to-day pediatric emergency preparedness and disaster readiness
- Identify opportunities to improve pediatric emergency and disaster preparedness
- Discuss activities of the American Academy of Pediatrics

What's a Disaster

Cicero M, Baum C. Pediatr Emerg Care 2008; 24:478

- **An event of sufficient scale, asset depletion, or numbers of victims to overwhelm health care (& other) resources**
 - **Whether natural or man-made, may occur with little or no warning**
 - **Create apprehension and uncertainty, with long-standing impact**

Disaster Medicine 101:

One Plan for All Hazards & All Victims

- **Can we manage ill or injured children like small adults?**
 - **No!**
- **Why not....**
 - **Unique vulnerabilities**
 - **Assessment/triage**
 - **Specialized care resource needs**
 - **Development/mental health**
 - **Family issues**
- **Where's the evidence?**

Enhanced Vulnerability of Children:

Anatomic, Physiologic & Developmental Issues

- **Thinner and less keratinized dermis**
- **Increased body surface area/mass ratio**
- **Higher minute ventilation rates**
- **Higher BMR and growth rates**
- **Live closer to the ground**
- **↑'d susceptibility to infection**
- **↑'d MH and behavioral impact**
- **Unable to recognize danger**

How's the PHEP Evidence Base

Yeager VA, et al. *J Public Health Manage Pract* 2010; 16:441.

- Systematic review of public health emergency preparedness literature: 2000 – 2008
- Results - 823 articles
 - 31% natural disasters, 40% man-made/terrorism
 - 61% focused on preparedness phase of life cycle
 - 68% were 'non-empirical'
 - Editorials or commentaries (66%), case reports (25%)
 - Empirical research
 - Survey methodology (33%), secondary data analysis (17%), interviews (14%), primary data collection (11%)
 - No data on pediatric preparedness

Pediatric Readiness Evidence Gaps

- Triage/assessment
- Surge capacity & capability
- Crisis care standards
- Regionalization
- Personnel training
- Countermeasures
- Mental health
- Resiliency

Disasters: *What Have We Learned?*

- ***“Disasters don't happen to places, they happen to people.” L. Romig, MD***

Avianca Flt 52: *What Did We Learn?*

Van Amerongen RH, et al. *Pediatrics* 1993; 92:105

- Long Island, NY
 - 158 passengers [25 kids]
 - 73 deaths
- County disaster plan in place
- Only 2 of 7 critically injured children were transported to a pediatric tertiary center
 - Remaining 5 were treated at a level III trauma center with limited pediatric capabilities
 - The closest pediatric Level I trauma center, which had a helipad, received no patients

Improving All-Hazard Disaster Readiness for Children

- FEMA survey (1997) of state disaster plans
 - Not one state plan had pediatric considerations
- Pandemic & All Hazards Preparedness Act - 2006
 - All state plans must now contain considerations for “at risk populations” (this group includes children)
 - Few pediatric patient-specific requirements
 - No pediatric-specific performance measures or targets
 - Scope and efficacy of pediatric elements vary greatly by state
 - Empowered HHS Secretary as responsible party for public health and federal disaster planning & response
 - Created ASPR (Asst Secretary for Preparedness & Response)
 - Created an office for 'at-risk populations' within ASPR

Andrew: *What Did We Learn?*

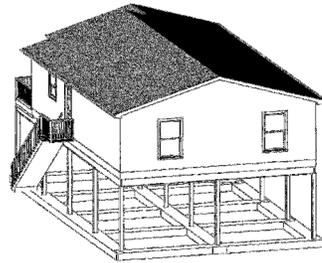
Quinn B, Baker R, Pratt J. *Ann Emerg Med* 1994; 23(4):737

- Second most destructive hurricane in US history
 - Category 5 storm → 65 deaths
 - Cost - 26.5 billion dollars
- Delay in federal relief response
 - Shortages of staff and supplies
- 41% increase in ED visits to Miami Children's Hospital the weeks that followed
 - Gastroenteritis
 - Cellulitis
 - Minor trauma
 - Mental health

September 11th: *What Did We Learn?*

- Occurrence of terrorism on US soil is a reality
- Focused the attention of the federal government on the threat of terrorism and the response to weapons of mass destruction
 - Under-resourced and poorly coordinated emergency and disaster response systems
 - Public health systems outdated
- Massive federal funding targeted to bioterrorism
 - EMS and trauma systems have received only 4-6% of these \$\$

'Blueprint' for Disaster Readiness



"The Elevated Hurricane Zone Housing Solution"

So, How's The Foundation of Our Nation's Emergency Care System?

- Existing public safety systems (EMS, fire, etc) are frequently over-taxed by demand
- EMS and trauma systems are woefully under-funded
- Hospital-based emergency departments are increasingly and dangerously overcrowded
- Pediatric capabilities of our emergency (and disaster) care systems is uncertain

Pediatric Readiness: "Growing Pains"

- Although children constitute about 1/4 of all ED visits (~25-30 M) nationwide
 - Most general EDs and EMS agencies do not require specialized pediatric training for their clinical staff
 - Only 6% have the full scope of pediatric equipment, medications, supplies per AAP/ACEP/ENA guidelines
 - 50% of EDs care for < 10 kids/day
 - Paucity of research on best practices, clinical outcomes, & patient safety in pediatric emergency care

*"If there is one word to describe the current state of pediatric emergency care in 2006, it is **UNEVEN**"*
--- IOM Panel, 2006

Katrina: Impact on Children/Families

- Nearly 165,000 kids from Louisiana and Mississippi were displaced
- 5200 children were reported missing
 - 6 months before all reunited with family
- 50,000 children did not attend school during 2005-06
- 37% of children experienced clinically-diagnosed mental health disorders
 - Depression, anxiety, behavior disorders

Report available at: <http://www.savethechildren.org>

Pediatric Preparedness in Katrina's Wake: *Lessons Learned*

Dolan M, Krug S. Clinical Pediatric Emergency Medicine 2006; 7(1):59

- Support for intact hospitals and other care facilities with power, water, food, supplies and security
- Planning for the care and evacuation of hospitalized children, infants and premature newborns
- Strategies for the evacuation of children with their parents, families and caretakers
- Strategies for reunification of children with parents or families – especially infants and pre-verbal toddlers
- Appropriate sheltering for children and families
- Preparations for culturally and developmentally appropriate mental health interventions for children
- Disruption of the medical home, impeded care access, increased risks for CSHCN, impacted local recovery

H1N1 Pandemic: *Lessons Learned*

- Demand for clinical services by ill and 'worried well' patients exceeded capacity
- Disconnect between federal and local pandemic planning and management recommendations
- Availability of key medications and supplies limited service delivery and placed patients & staff at risk
- Variable screening and treatment practices across facilities/practices within local communities
- Impact on healthcare providers further reduced service capacity
- Impact on safety net services threatened care quality & safety

Medical Countermeasures & Devices: *Pediatric Needs in the National Stockpile*

- The SNS cannot contain MCMs for which there is not an FDA-approved indication or "EUA"
 - The MCM could be there for a different indication (e.g. Midazolam)
- For 'formal' use in children, the MCM should have pediatric labeling
- For 'ad hoc' use, the MCM must be available in a feasibly used version
 - Liquid formulations for oral meds
 - Means for conversion of tab/cap formulations to liquid/suspension
 - Divisible tablets
- Means for effective/efficient delivery
 - Auto-injector (e.g. Pralidoxime)

EUA – Emergency Use Authorization

Haiti: *Acute Needs*

- Insufficient search & rescue resources
- Inadequate acute care capability with massive destruction to hospitals
 - Hospitals in Dominican Republic filled by 1/15
- Timely arrival of international disaster relief impacted by damage to infrastructure
 - Quickly ran out of medical supplies
- Mismatched resources & victim needs
- Means for patient transit disrupted
- Morgue capacity immediately overrun

Wish I Had More Of.....

- Local & topical anesthetics
- NSAIDs, antipyretics
- Narcotics
- IV, PO & topical antibiotics
- IV fluids
- Oral rehydration
- Wound supplies
- Splints & casting materials

Note: The above were indicated by $\geq 40\%$ of respondents as needed for many (> 50) children.

Opportunities to Improve

- Access to general and pediatric-specific supplies
 - Management/coordination of supply chain logistics
 - Communication, distribution, inventory
- Networking and communication between NGO and federal responders – & with local gov't
- Protocols for definitive care, evacuation & coordination of follow-up care for children
- Disaster relief training for volunteers
 - Disaster 101 (care in austere conditions)
 - Disaster-related conditions (fx, wounds)
 - Tropical medicine, malnutrition
 - Pediatric 1^o care (for non-pediatricians)

Japan: *What Are We Learning?*

- Even one of the best prepared nations can suffer great loss
- Natural disasters can cause secondary man-made events
- Current planning for evacuation and countermeasure distribution for reactor/radiation disasters warrants reconsideration
- Mental health issues may prove to be the greatest long-term impact

Tornados 2011-12: *Lessons Learned*

- Storm locations and “seasons” not always predictable
 - Little or no warning
 - Seemingly random path
 - May ‘target’ schools, key infrastructure elements
- Not all communities and states have been equally prepared for children
- Advance preparedness is vital to disaster response & recovery, and ultimately, for community resiliency

Sobering Lesson From the Reality of Terrorism: *Children As Targets*

Terrorism: Violence, the threat of violence, or other harmful acts committed for political or ideological goals with a primary purpose of inducing fear

The Ultimate Preparedness Challenge

- Most US health care systems are primarily designed, staffed & equipped for adults
- Can we create sufficient surge capacity and surge capability to care for a large number of ill or injured children?
 - Emergency care
 - Ambulatory care – *primary & specialty*
 - Hospital care - *tertiary & critical care*
 - Alternate care facilities
 - Mental health

Hospital Disaster Preparedness

Niska RW, Shimizu IM. National Health Statistics Report #37, 2011

- National Hospital Ambulatory Medical Care Survey, 2008
 - Tracking system for children (43%)
 - Reunification of children and families (34%)
 - Increasing pediatric surge capacity (32%)
 - Plan for supplies/sheltering of children (29%)
 - Countermeasures
 - Plan for distribution of KI (33%)
 - Disaster drills (89%)
 - Pediatric victims included (45%) - median # victims: 1 of 16
 - School system included (31%)

Available at: <http://www.cdc.gov/nchs/data/nhsr/nhsr037.pdf>

Hospital Emergency Surge Capacity

Kanter R, Moran J. Ann Emerg Med 2007; 50:314

- Federal (HHS) policy calls for surge capacity of 500 beds per 1M population
- Study of bed capacity in NY State (1996-2002)
 - 242 hospitals -- peak inpatient bed capacity to care for 2700 children [≤ 14 yr] and 46,600 adults
 - Average bed occupancy for children: 60% of peak
 - Average bed occupancy for adults: 82% of peak
- Average statewide surge capacity
 - 268 children and 555 adults per 1M population
- Not enough available pediatric beds
 - Must consider modified care standards to ↑ capacity

National Commission on Children and Disasters: *Final Report*

- Disaster management and recovery
- Mental health
- Child physical health and trauma
- Emergency medical services and pediatric transport
- Disaster case management
- Child care
- Elementary and secondary education
- Child welfare and juvenile justice
- Sheltering standards, services and supplies
- Housing
- Evacuation

Oct 2010

Available at: <http://www.childrenanddisasters.acf.hhs.gov/>

Ten Years After 9/11: National Scorecard

- Plan for evacuating children in licensed child care
 - 30 of 51 states (plus DC) require this of LCCF's
- Plan for reunifying families after a disaster
 - 29 of 51 require LCCF's to have a plan
- Plan for children with special needs in licensed child care settings
 - 22 of 51 presently require this of LCCF's
- Plan for evacuation of children in schools
 - 42 of 51 require schools to have an all-hazard plan

☞ Only 17 states met all 4 criteria, 10 met 3 of 4 criteria

☞ 6 states failed to meet any criteria

Report available at: <http://www.savethechildren.org>

Another Major Concern:

A Child Advocate's Perspective

- Children are classified in most federal/state planning as
 - "At risk populations"
 - "Vulnerable populations"
 - "Underserved populations"
- "The wastebasket of benign neglect"
- This admittedly vulnerable group constitutes 25% of the population – and our future

Should We Prioritize Children?

- If resources become severely limited during a disaster, children should be given a higher priority than adults for life-saving treatment – 76% Strongly Agree or Agree
- If I had to make the decision during a disaster, I would choose to provide life-saving treatment to a child over that of an adult with the same medical condition – 75% Strongly Agree or Agree
- Our country should have readily available the same medical treatments for children as are available for adults for possible chemical, biological and nuclear agents that may be used in a terrorist attack - 92% Strongly Agree or Agree
- The federal government should be better prepared to meet the physical and psychological needs of children in the aftermath of a disaster than it is for adults – 70% Strongly Agree or Agree

How Will We Know We're Ready?

Markenson D, Krug S. Clin Pediatr Emerg Med 2009; 10:229

We need performance measures as it is difficult to plan, let alone improve, what one does not measure and for which there are no specific goals or targets to be achieved

Gaps and Opportunities

Adirim T. Clinical Pediatric Emergency Medicine 2009; 10:164

- Ensure that stockpiled MCMs, equipment and supplies are appropriate for children
- Improve and ensure pediatric education and training for first responders and others
- Ensure that EMS agencies and hospitals are prepared for ill and injured children
- Ensure that state and local planning, and disaster drills, include child and family needs
- Increase linkage between preparedness agencies and private sector pediatric care providers
- Improve individual preparedness, including that of families and children with special care needs
- Involve pediatric experts at all levels of planning

American Academy of Pediatrics Disaster Preparedness Advisory Council (DPAC)

- "Advisory Council" appointed by AAP Board
- To ensure an enduring AAP disaster initiative with close ties to key federal agencies
- Current members
 - Sarita Chung, MD, FAAP
 - MAJ Daniel Fagbuyi, MD, FAAP
 - Margaret Fisher, MD, FAAP
 - Steven Krug, MD, FAAP
 - Scott Needle, MD, FAAP
 - David Schonfeld, MD, FAAP
 - Staff: Laura Aird, Tamar Haro & Betsy Dunford

American Academy of Pediatrics Disaster Preparedness Advisory Council (DPAC)

- DPAC Liaisons
 - Georgina Peacock, MD, FAAP – CDC
 - Lisa Mathis, MD, FAAP – FDA
 - Sally Phillips, RN, PhD – DHS
 - David Siegel, MD, FAAP – NICHD
 - Andrew Garrett, MD, MPH, FAAP and Daniel Dodgen, PhD – HHS/ASPR

'Pearl' – The presence of an advocate/partner is a key success factor !

Progress at the Federal Level

- Numerous provisions for children in S. 1855, the *Pandemic and All-Hazards Preparedness Reauthorization Act*, passed by the Senate
 - Creation of National Advisory Committee on Children and Disasters
 - Increased development and labeling of pediatric medical countermeasures
- Pediatrician appointments to the NBSB
- Expert pediatrician testimony before Congress on disaster preparedness and children
- AAP recognized as a “go-to” for pediatric expertise by Federal agencies and Capitol Hill

Disaster Readiness: *Local & State*

- Local and state authorities and planners have the largest role and primary responsibility for planning and response at the state and local level
 - Each state is responsible for disaster planning
 - State establishes emergency operations center
 - + Over 3000 local Departments of Health
 - State may request federal support
 - Stafford Act – enables federal support
 - Federal government funds many activities
 - Public health readiness grants (CDC)
 - Hospital preparedness grants (HHS)
 - Homeland security grant program (DHS)

Regional planning may be needed to address pediatric care needs

Enhancing Pediatric Partnerships To Promote Pandemic Preparedness

- 2009 H1N1 after-action activities revealed need for enhanced pediatric, public health partnerships
- Meeting Convened in April 2011
 - 10 teams of pediatric/public health leaders
 - Strategic communication, messaging
 - Including pediatricians in decision-making
 - How to prioritize within priority (high-risk) groups
- Pediatric Preparedness Resource Kit for Chapters and Departments of Public Health being developed
 - ☞ **Key take home point:** Having pediatricians and public health leaders working together is key, perhaps via an ongoing pediatric advisory council

State Pandemic Readiness Strategies

- Create a chapter committee on pandemic/disaster readiness
- Learn about and link with key stakeholders and existing state and local emergency preparedness efforts
- Develop relationships with state and local public health and emergency response planners
 - Participate in local public health and disaster planning meetings
 - Form a pediatric advisory committee in partnership with PH leaders
 - Advocate for effective use of statewide vaccine registries
- Partner with local children's hospitals and community hospitals to improve emergency and disaster readiness
- Connect with the state volunteer agencies such as the MRC
- Collaborate with the state department of education and local schools to ensure they have a functional, coordinated disaster plan
- Develop an information dissemination network with a single contact
 - Maintain proactive relationships with media

How Can You Improve Readiness? *Pediatric Preparedness 101*

- Preparation for any type of disaster, begins with basic preparation for pediatric emergencies
 - Should occur at all levels
 - Home/Community/Schools
 - Office/Primary Care/Public Health
 - EMS/EDs/Hospitals
 - Planning should anticipate the unique features/risks of the community and its children
 - Hazard vulnerability analysis
 - Children with special needs

Family Preparedness and PCP Role

Olympia RP, et al. Clin Pediatr 2010; 49:686

- Survey study of family compliance with readiness guidelines (eg. ARC, AAP, HHS)
 - Community evacuation plan awareness, family emergency response plan, emergency/disaster supply kit, maintenance of family emergency plan
- Bronx (NY) & Dauphin (PA) Counties, 2008 [N=1024]
 - 35% familiar with community evacuation plan
 - 43% had a family emergency response plan
 - + Only 42% of those with a plan had practiced
 - 22% had a disaster supply kit
 - 17% had discussed preparedness with PCP
- Those that discussed preparedness with PCP were twice more likely to be prepared

Disaster Preparedness:

What Should We Tell Families?

- Establish a family disaster plan
 - Include escape plans and meeting locations
 - Out of state contact person
- Become familiar with EMS system
 - Know how and when to use 911
- Take first aid/CPR classes
- Stock emergency supplies
- Special considerations for CSHCN
 - Emergency power, medications, supplies
- Family readiness kit

Kit available at: <http://www.aap.org/family/frk/frkit.htm>

Emergency/Disaster Readiness

The School System

- Are your school systems prepared
 - External review of their disaster plan
 - Coordinated with EMS and public safety
 - Shared with community physicians, parents
 - Performance of regular drills
- Important considerations
 - Parents unable to pick up kids
 - Children with special needs
 - Mental health resources
 - Children in route
 - Day care facilities
 - Places of worship

Primary care providers can play a key role in school readiness

Disaster Evacuation and Shelters

- Whenever possible, children should be evacuated/sheltered with family
- Shelters must be resourced to meet the needs of children/families
 - Basic necessities – food, diapers, toys, etc
 - Medical care – including mental health
 - Social services and child identification
 - Safety
 - Physical, infection control, violence
- Are there existing facilities in your community that are designed and staffed with children in mind
 - Yes – schools, places of worship

Helping Children and Families Cope

Strategies to Promote Resiliency

- Maintain normalcy in family unit and the environment
 - Keep family/community together
 - Consider use of familiar shelter locales
 - + School, daycare, worship settings
 - Maintain 'normal' activities if possible
- Avoidance of painful reminders
 - The media – limit exposure to graphic details
- Reassurance of safety
- Encourage children to express feelings
 - Answer their questions – explain!
- Encourage families to seek help
 - Focus will be towards medical concerns
 - Many will fail to seek help for mental health issues
 - Role for primary and mental health care providers
 - Anticipate delayed and anniversary reactions

Children and Disasters

- Disaster planning resources for pediatricians
 - Disaster Preparedness Plan for Pediatricians
- Information on CBRNE agents - & - Influenza!
 - Psychosocial and mental health considerations
- Resources for clinicians
 - Practice guidance, management recommendations
- Resources for patients and families
- Link to the Disaster Preparedness Advisory Council
 - DPAC newsletter, 'friends of DPAC'
- Numerous external links
 - CDC, FEMA, HHS, DHS, FDA, NCCD, EMSC, others

Available at: <http://www.aap.org/disasters>

The Pediatrician and Disaster Preparedness

Committee on Pediatric Emergency Medicine and the Task Force on Terrorism

POLICY STATEMENT
Pediatrics 2006; 117(2): 560-65

- Advocate for children and families in disaster planning at all levels
- Become knowledgeable about issues related to pediatric disaster management
- Participate in disaster planning:
 - Office emergency readiness and an office disaster plan – develop & practice
 - Take part in local community and hospital disaster planning, exercises, drills
 - Work with local schools and child care facilities in developing their plans
 - Provide anticipatory guidance to families on preparedness – esp. CSHCN
 - Participate in disease surveillance and reporting activities
 - Participate/provide guidance to local volunteer disaster response groups