Preparing for the Zombie Apocalypse

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Learning Objective

- Implement effective surge protocol training when an outbreak approaches

The Preparedness Cycle

1. Plan
2. Organize/Equip
3. Train
4. Exercise
5. Evaluate/Improve

Preparedness Cycle
Chain-of-Events Planning

- The PDC developed a fully comprehensive pediatric disaster plan for NYC from the onset of the event and first response through primary and secondary transportation and pediatric hospital and intensive care surge.

Why We May Need to Suuuuuurge

- Acute event (eg, weather, blast/mass shooting, vehicle pile-up)
- Extended event (eg, ID outbreak/pandemic)
- Longer-time course and scope
  - Where do resources come from when everyone is affected?
  - Issues of sustainability
  - Resource allocation
    - Ethics
    - Planning
    - Oversight
  - Planning and learning from previous mistakes is essential
- SPACE & STAFF & STUFF
General Surge Planning Topics

- Triggers
- Notification
- Pre-activation
- Activation
- Mobilization
- Demobilization
- Deactivation

What are the essential goals of surge planning?
Most Important Goals

- Providing additional geographic space (capacity #beds)
- Providing Surge Capabilities (space, staff, stuff)
- Matching resources to needs
- Giving Sufficient Care
- Providing best outcomes for the greatest number of patients

Deep Dive—Surge Capacity

- Not just “certified” beds—this is during disaster/emergency conditions
- What does surge capacity mean at your institution?
- Do you have capability (eg, staff, stuff)?
- How would you increase staff numbers (eg, physicians, nurses, respiratory therapy)?
- Consider—what other units could take PICU patients?
  - Adult ICU
  - Recovery room
- How many beds would that open up, and how would care be managed?
Plan Review

- Key planning “must haves”
  - General considerations
  - Preparedness activities
  - Response activities
  - Recovery activities

Response Actions

- Have the triggers been met to activate the plan?
- How will your institution respond to this incident?
- Does your plan guide you, from beginning to end, through managing this incident?
Emergency Operations Plan

- **Key components include:**
  - Hazard-specific annexes
  - Job action sheets
  - Contact lists for staff and key partners/resources
  - Maps/diagrams

Who Is Involved in Building a Plan?

- **Representatives from:**
  - Emergency management
  - Emergency medicine
  - Safety
  - EMS
  - Exercise planning committee
  - Pediatric Department/NICU/PICU/clinical unit of choice
  - Mental Health/Social Work/Child Life
  - Security
  - Facilities
  - Nursing/Pharmacy/Respiratory Therapy/Laboratory Services
Community Stakeholders

- All levels of government
- Volunteer organizations
- Community groups
- Private entities
- Nonprofit organizations
- Faith-based groups
- Groups working with individuals with disabilities or access and functional needs
- Schools/Daycare

ED and Inpatient Pediatric Surge

- Identify those with pediatric expertise
- Predict the number of children you might need to treat
- Plan for rapid access to equipment, medications, and supplies
- Plan for a family reunification/assistance area and pediatric safe area
- Identify and network with specialty referral centers
- Determine how children will be boarded
  - Cribs? Adult beds?
- Remember to address the mental health needs of children and families
- Conduct a pediatric mass casualty drill
Surge/PICU Planning: Related Plans and Documents to Review

- **General Surge Plan**
  - Incident command EOC
  - Pre-event census, ongoing census
  - Triage, patient distribution (RPD), tracking
  - ED (Acute/nonacute patient care areas)
  - Radiology/imaging
  - OR
  - “Walking well”
  - Psychosocial (ASR, family reunification)
  - Communications (staff, agencies, public, press)
  - Patient transfer to other institutions (rank of severity, subspecialty need)

- **PICU Surge Plan**
  - ED response
  - Rapid patient disposition
  - Space, staff, stuff
  - Adult/surgical ICU interaction

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Checklist for Preparing the Pediatric Critical Care Surge Plan

- Determine levels of surge plan
- Determine involvement of critical care in the ED and elsewhere (eg, transport, HICS)
- Develop a plan to rapidly enlist critical care providers during off-hours
- Develop a plan to ensure intensivists' coverage 24/7
- Develop guidelines for changing standards of care (N/P ratio)
- Develop patient rapid discharge/transfer tool for the PICU
- Develop a plan to increase the number of beds in the PICU
- Develop a plan to add PICU beds in a different hospital location
- Optimize victim management by ensuring expertise availability
- Develop a plan to self-sustain for 72 hours and longer
- Obtain current knowledge about the management of CBRNE victims and ensure that the PICU will have adequate respiratory therapy pharmacy support, equipment, and supplies
- Ensure laboratory support for PICU management
Benefits of an Exercise Program

- Develop, test, and validate
  - Policies, plans, and agreements with local community partners
  - Training and competency
  - Equipment
- Improve individual and team performance
  - Identify gaps in resources
  - Improve planning and response

Discussion-Based vs Operations-Based Exercises

- **Discussion-based exercises** familiarize participants with current plans, policies, agreements, and procedures or may be used to develop new plans, policies, agreements, and procedures
- **Operations-based exercises** validate plans, policies, agreements, and procedures, clarify roles and responsibilities, and identify resource gaps in an operational environment
Impact of Full-Scale Exercises

- A plan is just a piece of paper until it is tested; a physical test of space and staff demonstrates strengths and weaknesses that cannot be measured in a discussion-based exercise.
- Tabletop exercises followed by FSEs allow hospitals to troubleshoot and improve existing plans, while becoming more comfortable with response to pediatric disasters.
- FSEs are crucial to test plans for strengths, weaknesses, and gaps.
Planning Team Members

- Emergency preparedness coordinator – trusted agent
- PICU or NICU (depends on the department being exercised)
- ED (if the event will involve them)
- Respiratory therapy
- Admitting/bed management
- Security
- Hospital administration
- Facilities/engineering
- Social work
- Safety officer

HSEEP’S Progressive Planning Approach
Key Planning Documents

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Evaluation Guide</td>
<td>Helps evaluators assess performance of capabilities, tasks, and objectives during an exercise</td>
</tr>
<tr>
<td>Controller and Evaluator Handbook</td>
<td>Supplements exercise plan with exercise administration information and scenario details</td>
</tr>
<tr>
<td>Exercise Plan</td>
<td>Includes general exercise information but does not contain scenario details; enables players to understand their roles and responsibilities in the exercise</td>
</tr>
<tr>
<td>Master Scenario Events List</td>
<td>A chronological listing of the events and injects that drive exercise play; produced in both short (quick reference) and long (all-encompassing) formats</td>
</tr>
<tr>
<td>After-Action Report</td>
<td>Summarizes key information related to the evaluation of disaster preparedness exercises</td>
</tr>
<tr>
<td>Improvement Plan</td>
<td>Includes key recommendations and corrective actions identified throughout the exercise</td>
</tr>
</tbody>
</table>

Adapted from IAFC. www.iafc.org/files/downloads/MASTF/metAid_HSEEPvolumeII.pdf#page=26&zoom=auto,-22,155.

Pediatric Multi-Hospital/Agency-Coalition Operational Exercise

- The NYC PDC conducted a functional virtual reality real-time exercise with 28 NYC hospitals and agencies to operationalize and evaluate their pediatric surge and secondary transport plans
- The hospitals were tier 1 and 2 pediatric disaster admitting destinations
- All hospitals agreed to participate in the NYC Pediatric Disaster Plan
- Agency participants in the exercise included NY Fire Department/EMS, Emergency Management, Department of Health, Medical Reserve Core, and Pediatric Intensive Care Response Team
Gaps in Pediatric Preparedness: Will It Be Surge or Scramble?

- Children are 25% of the population & over represented in disasters
- Everyday pediatric readiness inadequate
- Everyday mental health system in crisis
- Funds not appropriated for specific pediatric preparedness of hospitals and child health facilities ($0.01 out of every $10)
- Few hospitals or communities have scalable plans for response (eg, surge, isolation) that address the special needs of children
Influenza Pandemics in the 20th Century

1918: “Spanish Flu”
  50 million deaths

1957: “Asian Flu”
  1-4 million deaths

1968: “Hong Kong Flu”
  1-4 million deaths

US ID Mortality:
The Impact of Influenza and AIDS

An Influenza Ward During the 1918 “Spanish Flu”

- Avian strain of influenza virus
- Virus was similar to current “bird flu” virus
- Spread around the globe in 4-6 months
- Infected 25%-30% of the world population
- Killed 40-100 million worldwide
- Majority of deaths occurred in persons 18-40 years old

The New York Times
OP-ED: Wednesday, April 30, 2003
Children and Pandemics

- Influenza/SARS/smallpox/EVD *ad infinitum*
- Unclear resource allocation
  - Ventilators
  - Home care
- Addressing unique pediatric problems
  - Toddlers won’t wear masks, are not great at washing their hands, won’t promise to not touch their noses
- Impact on modern society of large numbers of pediatric mortalities
  - More than we could bear
- Palliative care
Children in Disasters: Biologic Vulnerability

- Prone to infection due to frequent exposure to pathogens in crowded environments
- Age-dependent immune function
- Lack of immunity from previous outbreaks, pandemics
- Lack of pediatric-specific research on vaccines and treatments
- 30% at or below the poverty level
- Dependent on adults

Children and Families

- 73 million people younger than 18 years old
- 25% of the population
- Largest vulnerable population
  - Disabled children
  - Tech-dependent children
  - 30% living at or near poverty level
- Environment and response provided by adults
Why Do Children Need Special Disaster Planning?

Children Are Different!

- Therefore, the pediatric plan and disaster response must be tailored to the special needs of children.
Size Matters
What Is the NYC Pediatric Disaster Coalition?

- Established in 2008 to prepare NYC for a catastrophic pediatric mass casualty event
- Funded by DHS ASPR federal grants
- The PDC includes:
  - NYC pediatric general and specialty hospitals
  - Community healthcare providers
  - NYC Fire Department EMS
  - NYC Office of Emergency Management
  - NYC Department of Health and Mental Hygiene
Goals and What We Do

- Guidelines and planning for surge and evacuation including pediatric hospitals, PICU, NICU, OB/newborn, and long-term care facilities
- Operationalizing pediatric disaster plans through exercises
- Increasing pediatric critical care providers through hosting PFCCS course training
- Providing pediatric SME and training on disaster preparedness
- Citywide planning with DOHMH, Office of Emergency Management, Fire Department, and coalitions for pediatric disasters
- Responding to real-time events and providing lessons learned

PDC Response to Real-Time Disasters

- H1N1
- Haiti earthquake
- Hurricane Sandy
- EVD pediatric preparedness (school health, city, and hospital planning)
PDC Response to Real-Time Disasters

Atrium Flu Center
H1N1 Response to Patient Surge

- Pediatric algorithms (< 18 years old)—NYC DOHMH 311 Nurse Flu Hotline
- CDC H1N1 ED triage algorithm

Coalition Coordination & SME in Response to EVD

- PDC activities with multiple coalitions and organizations
- NY workgroup on pediatrics, obstetrics, and EVD
  - PDC was a primary pediatric SME in this working group lead by NYS DOH, whose goal was to work together in collaboration to achieve adequate capacity to care for confirmed EVD patients who are children, infants, or pregnant women or pediatric PUIs with a low likelihood of EVD
  - Other members included hospitals—Bellevue, Mt. Sinai, NS-LIJ, NYP, Montefiore—and government agencies—NYS DOH, NYC DOHMH, HHC, GNYHA, NYC OEM
- Working group on EVD guidance/risk communication for children, parents, and school staff
  - Partners included NYS and NYC DOH and DOE
  - *Created a fact sheet on EVD for parents and children*, addressing concerns about the disease, travel, disease transmission, and how parents should speak to children about EVD
Background of PFCCS

- A 2-day, comprehensive course addressing fundamental management principles for the first 24 hours of pediatric critical care
- Created by the Society of Critical Care Medicine
- The fundamentals of critical care support have been available since the mid 1990s; PFCCS, covering pediatric critical care, was released in 2008
- Students have included pediatric hospitalists, emergency medicine physicians, nurses, EMTs, physician assistants, nurse practitioners, transport, and pre-deployment military personnel
- NYC DOHMH has supported the training of more than 150 medical personnel to date
Course Purpose

- Better prepare the non-intensivist for the first 24 hours of post-resuscitation management of the critically ill pediatric patient until transfer or appropriate consultation
- Prepare non-intensivists, nurses, and critical care practitioners in dealing with acute deterioration of the critically ill pediatric patient
- Assist the non-intensivist in dealing with sudden deterioration of a previously stable patient
- Prepare house staff for PICU coverage

Future PDC Initiatives

- The PDC is dedicated to preparing NYC for a mass casualty event involving children
  - Continued assistance of hospitals in PICU, NICU, and OB planning
  - Plan operationalization through comprehensive exercise series (seminar, tabletops, and FSEs)
  - Full-scale citywide exercise
  - Interactive Pediatric Disaster Planning and FSE series toolkit
  - Continued education on pediatric disaster preparedness
  - Collaboration with community, hospital, and government coalitions (PCEPN, CHCANYS)
  - Development of Community based and Urgent Care Center Plans
Example: Planning Dilemma: Allocation of Ventilators During Time of Scarce Resources

- Experience in this country is limited
  - Sadly a common third-world problem
- NYS convened groups of experts
  - Adult, pediatric, and neonatal guidelines
  - Draft released in 2015 for informational purposes only
    - Recognition that one size does not fit all
    - Other states have variations

Allocation of Ventilators During Time of Scarce Resources (cont.)

**Ethical Construct**

- Save the most lives without damaging the nature of society
  - We will have to live with ourselves afterwards
  - Duty to care
  - Just system
    - Duty to steward resources
    - Duty to plan
    - Distributive justice
  - Transparency
    - Clear, consistent communication to public and patients
      - Government messaging, hospital messaging, care provider messaging
    - Not based on quality of life
    - Of interest, being a child is a tie breaker
Allocation of Ventilators During Time ofScarce Resources (cont.)

- Who decides?
  - Not the treating physician
    - Decided by triage officer or appointed group
    - No pre-treatment scores exist, much less have been validated
    - Not a competition; patients are not compared

- Process
  - Step 1—Exclusion criteria
    - ??DNR, dialysis are not exclusion criteria
  - Step 2—Assessment of mortality
    - Based on structured process and experience/clinical judgement
  - Step 3—Time trials
    - 48 and 120 hours

Legal Considerations

- Are guidelines binding?
- Is there an appeal process?
- Are facilities and providers shielded from liability if they follow the guidelines?
Future Challenges

- Hazard vulnerability analysis to accurately predict future events (eg, EVD)
- Gap analysis based on past events
- Planning, exercises, and response to severe pandemic with high penetrance and significant morbidity and mortality
- Pre-identification of space, staff, and stuff that adequately responds to the magnitude of the event
- Define standards of care

Future Challenges (cont.)

- Address disaster mental health issues (patients, related family members and friends, non-affected population)
- Address risk communications (eg, coordination with all agencies, ID)
- Moral and ethical standards for prioritization of patient care, resource utilization
- Planning for special population needs
- Matching resources to needs to produce the best outcomes
- Where do coalitions fit in?
Research Priorities for Children: Emerging Infections

- Establish at least one pediatric pandemic model
- Coordinating center
  - Partner with multiple universities and industry with diverse expertise from basic research, therapeutic development, vaccination, translation, health planning, urban planning, mental health, and computer simulation
  - Test and prove best practices for prevention, readiness, and mitigation

Final Thoughts

- Public health for catastrophes
  - We need to prepare as if we were in wartime England
  - Society must be brave
  - As a nation we need to make the correct though difficult choices
  - We must protect assets and our way of life
- Need to over focus on children
NYC PDC Web Site
www.pediatricdisastercoalition.org

- Find tools, templates, and guidelines
- Resources including:
  - NYC Pediatric Resource Directory
  - NYC NICU Resource Directory
  - NYC DOHMH Pediatric Preparedness Guidelines
  - Obstetric Services Evacuation Template Plan
  - PICU Surge Template Plan
  - Template NICU Evacuation Plan
  - Template NICU Surge Plan
  - Obstetric Services Surge Template

Additional References

- National Incident Management System (NIMS) training.fema.gov/nims/
  www.ncbi.nlm.nih.gov/pubmed/19699558
  idsociety.org.app.box.com/s/pjm3gsjyxi3fj/2m3n3v77s0lpe7/1/11858459684/99396282464/1
Thank You for Your Time!

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