The Pediatric Black Swan Event

*What is it and How to Prepare* ...

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EMS Director, Contra Costa Health Services
Vice Chair, National Pediatric Disaster Coalition
Objectives

1. Describe the lessons learned in real world disasters and their impact on children and families.

2. Identify key preparedness activities to improve resiliency in Black Swan events.

3. Discuss why California may be particularly at high risk for pediatric black swan events.
What is a Black Swan Event?
Three Main Types of Black Swan Events

Nobody knew and the event was not predicted

You don’t know but someone else knew and didn’t tell you

Yeah, we know but events are unlikely to EVER occur… so just ignore it
What is a Pediatric “Black Swan” Event?
The Perfect Storm: Compounding Events

- Any man-made or natural event leading to …
- Pediatric Regional System Exhaustion and Collapse
Black Swan No Notice & Catastrophic Japan 2011 Earthquake/Tsunami/Reactor Melt Down
59 Major Disaster Declarations

2017 FEMA Major Disaster Declarations

- 1 Declaration
- 2-3 Declarations
- 4+ Declarations
Over 1.7 Million Children Affected

Harvey
San Antonio
Port Lavaca
Rockport
Port Mansfield

Irma
Naples
Miami
Key West

Maria
San Juan
Ponce
The Nation’s Children’s Hospitals & US Risk of Natural Disaster

Vulnerable Regional Infrastructure

Every US Hospital Pediatric Ready
Pediatric Centers Are “Regional” with Dedicated Transport Privately Contracted Assets
## Day to Day Conditions
### Children, Hospitals & EMS

<table>
<thead>
<tr>
<th>US Hospitals &amp; EMS</th>
<th>Pediatric Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-children’s hospitals ED</td>
<td>See 89% of all children in ED’s</td>
</tr>
<tr>
<td>75% Hospital see</td>
<td>&lt; 20 children/day</td>
</tr>
<tr>
<td>50% Hospitals see</td>
<td>&lt; 10 children/day</td>
</tr>
<tr>
<td>Remote Hospitals see</td>
<td>&lt; 2 children/day</td>
</tr>
<tr>
<td>Percent of total ED volume</td>
<td>18-27%</td>
</tr>
<tr>
<td>Pedi ED volume admitted</td>
<td>&lt;10% (90% treat and release)</td>
</tr>
<tr>
<td>Average Length of Stay</td>
<td>3.5 days (children’s hospital)</td>
</tr>
<tr>
<td>911 Calls and Transports</td>
<td>&lt; 5-10% of all calls</td>
</tr>
<tr>
<td>EMS Pediatric MCI Plan</td>
<td>13% report plan</td>
</tr>
</tbody>
</table>

Low volume, high risk…Really “sick” kids are rare
Pediatric Disaster Capability: Living in a World of Narrow Margins

Daily Triage
- When abundant resources are available relative to patient demand
- Do the best for each individual
- Normal Standards of Care

Disaster Triage
- When the patient needs outstrip resources
- Greatest good for greatest number of people
- Altered Care Standards
- Recognizes resuscitation attempts may be futile
How Long Can Your Staff Hold Out?  … With Children, Pets and Families???

<table>
<thead>
<tr>
<th>Industry</th>
<th>Recommendations till Re-supply</th>
<th>Real World</th>
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</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>96 hours Joint Commission</td>
<td>Weeks</td>
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<tr>
<td>EMS</td>
<td>72-96 hours (Ambulance Strike Team) FEMA</td>
<td>Months</td>
</tr>
<tr>
<td>Families</td>
<td>3 days (ideal 2 weeks) FEMA</td>
<td>Years</td>
</tr>
</tbody>
</table>
Black Swan Events: Requires Non-Traditional Measures and Tools
Pediatric Black Swan Scenario #1
Novel Virus Pandemic
NOVEL Highly Infectious Disease … AND Human to Human Transmission
A Black Swan Near Miss … H1N1 2009

Less than one additional admission per ten inpatient beds would have caused ALL Children’s hospitals to reach 100% capacity.

M. Sills et.al., Emerging Infections Diseases, Sept 2011
CDC MMWR Sept 16, 2011
Pediatric Black Swan Scenario #2
Multi-Pediatric Mass Casualty Events
When Lee Malvo asked why he planned to attack children in schools and on buses, convicted sniper John Mohammed allegedly replied:

“For the sheer terror of it – the worst thing you can do to people is aim at their children.”

(From AP story 5/30/06)
Only 57% of Children in US Live Within 30 Miles of a Pediatric Trauma Center

How do we get them there?

Pediatric Mass Casualty

- Responders seldom know child’s age
- Family separation common
- No time to designate children to specialty centers
- Triage tag may be only identifier
Mass Casualty Pediatric Surge Identification and Reunification

• Whose child is this?
  o Separated family members
    - Transport/Injured
• No history
• No one to help care for the child
• No one to consent
• No home to send them to
Hartford Consensus: Integrated Response
Fire/Rescue/EMS and Law Enforcement

T = Threat suppression
H = Hemorrhage control
RE = Rapid Extrication to safety
A = Assessment by medical providers
T = Transport to definitive care

How many?
How far away?
Who to send
Where?

Won't someone please think of the CHILDREN?!?
50-90% of Acute Casualties Go to Closest Facility
Less Than 20% Transported by EMS

- **1st wave (0-30 minutes):** Less injured, may arrive before the most seriously injured, self or bystander transport
- **2nd wave (30-60 minutes):** Most severely injured
- **10-20% Pediatrics**
Pediatric Mass Casualty Bottlenecks

- Surgery/Anesthesia
  - Bring patient to the specialist
  - Bring specialist to the patient
- Radiology
  - Not all imaging is “kid friendly”
- Labs
  - Micro-sampling
- Respiratory Therapists (NICU)
  - Specialized Staff
- Medical Transportation
Real World Experience: Many Children Die

Sandy Hook

[Image: Photographs of children, with names Josephine, Olivia, Dawn, Jesse, Catherine, Mary, Ana, Dylan, Anne Marie, Charlotte, Nancy, Rachel, Emilie, Chase, Grace, Jack, Victoria, Sam, Andy, and Grayson.]

Shooting tolls since 2000, by type of school

- Elementary: KILLED, WOUNDED
- Middle: KILLED, WOUNDED
- High: KILLED, WOUNDED
- College/university: KILLED, WOUNDED
Black Swan Lessons
Look to Wartime Pediatric Care

• **Highest risk: < 8 years old**
  - Injuries more severe and higher mortality
    - 20% mortality rate due to burns and penetrating head injury
    - 10-20% require surgical or critical care support

• **Conditions**
  - 76% traumatic (gunshot/explosive)
  - 25% of all conditions non traumatic
  - Longer hospital and ICU stays

• **Poor transfer options**
Real World Black Swan Lesson

Plan for Pediatric Fatality Management

- Increase morgue space
- Separate family space away from treatment area
- **Process:** identification of the unknown
- **Comfort:** clothes, food, chargers
- Mental health support
- **Staff assigned:** high risk PTSD

Oklahoma City Bombing
Black Swan Mass Casualty
Every Community Hospital Needed

• Treat what you can and shelter patients in place
• Triage and delay non-life threats until the next day
• Stabilize and transfer patients you cannot treat
• STOP BLEEDING
• CONTROL CONTAMINATION
• Restock and resupply in real time
• Create new capacity in the event of multiple surges
Real World Black Swan Staffing – All Hands on Deck

Respiratory therapists
Pharmacists
Volunteers
Parents
Anesthesiologists
EMT/Paramedics
Students/Residents
Pediatric Black Swan Scenario #3
No Notice Pediatric Regional Center Evacuation
California’s Pediatric Regional Centers and Earthquake Risk

California’s Black Swan Event

[Map of California showing pediatric regional centers and earthquake risk areas.]
Black Swan Real World Challenge: Premature Infants
Regional and Multi-State Already Required To Meet Day-to-Day Need
<table>
<thead>
<tr>
<th>Hospital</th>
<th>City</th>
<th>Neonatal</th>
<th>ECMO</th>
<th>High Risk Maternity</th>
<th>Last Update</th>
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<tr>
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<td>San Francisco</td>
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<td>Children’s Hospital</td>
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<tr>
<td>UCSF Benioff Oakland</td>
<td>NorCal</td>
<td>44</td>
<td>NorCal 203 NICU beds</td>
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<td>UCSF Mission Bay</td>
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<td>UC Davis</td>
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<td>Valley Children’s</td>
<td>Central</td>
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<td>Central: 88 NICU beds</td>
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<td>Rady’s Children’s</td>
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<td>SoCal 274 NICU beds</td>
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<td>Children’s Orange County (CHOC)</td>
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<td>Children’s LA</td>
<td>SoCal</td>
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<td>Loma Linda Children’s</td>
<td>SoCal</td>
<td>84</td>
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The **MOST** Problem Prone Scenarios …

Sudden Shifts from Normal to Austere
Crisis Standards of Care: The Pediatric Black Swan Must Have Conversation

Risk of disruption, limited staff, space, stuff and system: HIGH PROBABILITY
ECMO and Jet Ventilation Infants
Limited Options Other Than Shelter in Place
Neonatal Black Swan Bed Expansion
Doubling and Tripling Up … Who, When and How
Low Birth Weight Premature Infants
And Austere Conditions
Premature Infants Black Swan Challenge
Day-to-Day and Disaster: #1 Hypothermia

Maintain “Warm Chain”

- WHO: one million preventable neonatal deaths per year
- Mortality rate twice in hypothermic babies
- Anticipate risk in transport

Four ways a newborn may lose heat to the environment:

- Convection
- Evaporation
- Conduction
- Radiation
Black Swan Warm Chain Options: Kangaroo Care (Skin-to-Skin) When Technology Runs Out
Black Swan Warm Chain
Limited Incubator Options

Baby Pod
EMBRACE: Low Resource Setting Solution
India, Africa, Latin America, UNICEF
Black Swan Low Tech Option: Up to Eight Hour Thermoregulation

How the warmer works
It is a simple device that provides a constant temperature and does not require continuous power supply

Baby wrap
The warm pack is kept inside a pocket at the back of the sleeping bag. The infant is then wrapped with it

Warm pack
It is made of a phase-changing material that can keep the baby wrap warm for six hours

Heater
The device takes around half an hour to heat the warm pack to 37°C
Black Swan Option: Portable Inflatable Incubators
Premature Infant Black Swan Challenge
Day-to-Day and Disaster: #2 Hypoglycemia

- Consequences
  - Seizures
  - Permanent Brain Injury

American Academy of Pediatrics Committee on Fetus and Newborn Pediatric 2011;127: 575-579
Growers … Formula, Breast Milk, Feeding Frequency, Suck and Swallow Intact?
Black Swan: Austere Feeding a Spoon, a Syringe, a Med Cup at a Time ...
Pediatric Black Swan #4
Pediatric Large Scale Patient Movement
Pediatric Disaster and Mass Casualty Medical Transportation To and From the Hospital

• Both events
  o Involve triage and resource allocation
  o Situational and dynamic
  o Involve patient distribution decisions
    Protocols, judgement, experience, situational awareness and practice

• Disaster … NOT normal standards of care
  o Maximum of maximums
  o Greatest good for greatest number of people

• Mass casualty part of the EMS system normal workflow
  o All the rules apply
  o Saving as many patients as possible
  o May expand but typically does not
“There are more safety standards for moving cattle than for moving (pediatric) patients”
Transportation Infrastructure and Earthquake Evacuation Routes and Resources
Black Swan Real World Patient Movement Challenge

Who to move? How many? How to do it? Where to go?
California Ambulance Industry
Private Ambulance Providers Serve Both EMS and Hospitals

- 715 public & private ambulance services
- 170 private sector ambulance services
- 3,600 licensed ambulances
- 74% ambulances private operators
- 60,000 EMTs & 20,000 paramedics
- 20,000 people are employed by private ambulance services
- 220 out of the 337 emergency ambulance services areas (zones) are served by private contractors

KATRINA RECOMMENDATION

ESTABLISH A DATABASE OF COALITION PEDIATRIC CAPABILITIES

Source: California Ambulance Association Website www.the-caa.org
2016 California “Private” Air Medical Assets

- Services:
  - 22 in State
  - 1 Out of state
  - 302 in US

- Rotor:
  - 71 bases
  - 98 aircraft
  - 879 in US

- Fixed Wing:
  - 13 bases
  - 121 aircraft
  - 360 in US

AASM: Association of Air Medical Services www.airmed.org
California’s Regional Air Medical Capabilities

219 Air Assets Statewide

10 minute Fly Circle Reasonable Day-to-Day Coverage
Ambulance Mutual Aid

May take from 24 to 75 hours to get to you if the roads are clear.

“Be prepared to use non-traditional transport”
Black Swan Immediate Need …
The ONLY Cavalry Are the Locals YOU Exercised With
California Patient Movement Plan

A framework for patient movement, when a disaster creates the need for patient movement **BEYOND** the capabilities of California’s local EMS systems.
Federal Patient Movement Capabilities Extremely Limited for Pediatrics

Federal Support of Patient Movement

1. National EMS Contract*

2. National Disaster Medical System (NDMS)

3. Defense Support of Civil Authorities (DSCA)

* Most likely available
### Department of Defense Contraindications

#### Air Medical Evacuation

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>Contraindication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any medical condition not stabilized</td>
<td>Untreated pneumothorax</td>
</tr>
<tr>
<td>Pregnancy &gt; 34 weeks</td>
<td>Seizure within last 2 weeks</td>
</tr>
<tr>
<td>Hemorrhaging (Hgb &lt; 8.5)</td>
<td>New onset cardiac dysrhythmia</td>
</tr>
<tr>
<td>Post-op &lt; 72 hours</td>
<td>Unbivalved orthopedic cast</td>
</tr>
<tr>
<td>Acute Coronary Syndrome</td>
<td>Communicable disease</td>
</tr>
<tr>
<td>&lt; 7 Days: Open Heart Surgery</td>
<td>Respiratory isolation inc. possible TB</td>
</tr>
<tr>
<td>&lt; 7 Days: Craniotomy</td>
<td>Psychologically unstable</td>
</tr>
<tr>
<td>&lt; 7 Days: Spinal Surgery</td>
<td>Decompression sickness</td>
</tr>
<tr>
<td>Pneumocephalus</td>
<td>Agitation or other distracting behavior</td>
</tr>
<tr>
<td>Neonates/young pediatric patients</td>
<td></td>
</tr>
</tbody>
</table>
What We Know About Large Scale Pediatric Patient Movement?

- Planned Moves
- Notice Events
- No Notice Events
Moved 111 children 8.5 miles in < 12 hours.

64 patients (32 infants). 24 vents, 3 inhaled nitric oxide, 30 continuous infusions, 4 external ventricular drain

5 ALS ambulance crews, 4 SUVs, 1 Hospital Van

13 critical care teams
1 pediatric and 8 neonatal and 2 general care critical care transport team

1 ventilator failure and 1 cyanotic event requiring suctioning and bagging

“Mass Transfer of Pediatric Tertiary Care Hospital Inpatients to a New Location in Under 12 hours: Lessons Learned and Implications” Fuzak, J.K. et al., Journal of Pediatrics, July 2010
How to move a hospital

Children's Memorial will move to a new 23-story hospital in the Streeterville neighborhood on June 9. The new building will allow for expansion of hospital resources and a better connection with the hospital's academic partner, Northwestern University's Feinberg School of Medicine.

MOVING DAY: JUNE 9
Starting at 6 a.m., 160 to 200 critically ill or injured children will be moved via ambulance. One family member or guardian is allowed to ride along.

ROAD CLOSURES
Fullerton Avenue will be closed from Lincoln Avenue to Lake Shore Drive. Public traffic is allowed north and south on Clark Street, and Stockton and Cannon drives, but will be controlled by traffic aides and police. Chicago Avenue will remain open, but no parking will be allowed from the new hospital to Lake Shore Drive.

In between transporting patients, each ambulance will return to a staging ground on Orchard Street, between Lincoln and Fullerton, to be cleaned and refreshed with supplies.

While in transport, vehicles will have lights on, and Chicago police officers and traffic control aides will be set up at posts along the 3.5-mile stretch of city streets to manage traffic.

10-18 hours
The amount of time officials estimate it will take to move all patients. A 48-hour contingency plan has been created in case of emergency. Some patients will take no longer than 60 minutes to transport. Others could take more than four hours from door to door.

SOURCES: Children’s Memorial Hospital, ESRI
UCSF Benioff Mission Bay
2014 Maternal Child Hospital Move

• Move of 131 Pediatric patients from UCSF Parnassus and UCSF Zion Campuses to new UCSF Mission Bay Campus.
• 41 Ambulances, 100 Ambulance personnel and 300 hospital staff
• Several critical ECMO patients
• Total Time - 8 ½ hours, 7.8 miles round trip 45 minutes
Over a Year in Pre-Planning: Assets Staged Planned, Exercised and Executed
HURRICANE KATRINA
AUGUST 23–31 2005

Costliest hurricane in the U.S.
Nearly 106 billion U.S. dollars.
Damage caused by Superstorm Sandy, which struck in 2012, was approximately 71 billion U.S. dollars.

62 tornadoes in 8 states spawned from the storm.

Maximum storm surge in Mississippi: 26 ft (8 m).

Lives lost: 1,200.
Large Disaster Event: Katrina 2005
“Widespread Chaos, Desperation & Inefficiency”

- Transport across 7 states within 3 days coordinated by ad hoc and private networks
- Few pediatric air and ground assets available. Critical PICU/NICU patients transported by paddle boat, cars and flat bed trucks
- 5 pediatric transport teams mobilized from 5 different children’s centers moved 40 med/surgical patients and 12 PICU during the hurricane
- 170 cancer treatment interrupted. Chronic & specialty care disrupted
Katrina Hospital Patient Evacuation
Battlefield Conditions …

<table>
<thead>
<tr>
<th>Priority</th>
<th>Criteria (Evac Decision Making)</th>
</tr>
</thead>
</table>
| 1        | Fairly good health  
Can sit up or walk  
NICU babies and pregnant mothers |
| 2        | Sicker  
Need more assistance |
| 3        | Very ill  
With DNR orders  
Last to go… |

- Nearby violence
- No fresh water
- 200 people trapped
- Five days without power before everyone rescued
- Helipads: passing patients thru 3x3 hatch
- Hundreds sent to International Airport for evacuation staging handed off to understaffed FEMA teams
HHC and Hurricane Sandy By the Numbers

9 Hospitals in full operation through the hurricane and post hurricane period

4 Nursing homes in full operation

7000 Patients in HHC hospitals and nursing homes during the storm

3 HHC mobile medical vans serving hard hit communities

900 Patients safely evacuated

8 Special Medical Needs Shelters staffed by HHC clinicians

2 Data Centers where electronic medical records are backed up

$300 Million Emergency Repair Funds for public hospitals made available by Mayor and City Council
Large Disaster: Hurricane Sandy 2012
NICU Evacuation 21 neonates 4.5 hours

The timeline of the NYULMC NICU power outage and evacuation.

7:00PM First Signs of Power Loss

9:45PM First Infant Leaves the NICU

1:00AM Last Infant Leaves the NICU

8:30PM Complete Power Loss

©2014 by American Academy of Pediatrics
Black Swan and Disaster
The Fallback Plan Movement in the Arms

- New York Superstorm Sandy: 6 staff for each infant to navigate 9 flights of stairs with cell phone lighting
- Transported 6 different facilities
- Hand Carried Bassinets
- Hospital Staff went with patient nurses/RT/MD
- Warm Chain: Infant Carrier Worn By Staff
- Receiving hospitals were all no more than 3 miles away

Sources: Dr. Romansky Unique Vulnerabilities Pediatric Resiliency Presentation May 2016
How Many People and Will They Be There?
Black Swan Evacuation Immediate Need Plan on Moving Bins of Preemies

Photo: Newborns arriving in bassinets
Spedale, S. B. Pediatrics 2006;117:S389-S395
Copyright ©2006 American Academy of Pediatrics
Transporting Fragile Infants With Limited Resources in Austere Conditions

On the way to the health facility:

- If the baby is able to breastfeed, feed the baby at least every two hours. Give only breast milk.
- Keep the baby warm. Keeping the baby skin-to-skin is best. Ensure the baby is:
  - Naked except for a nappy, hat and socks
  - Placed between the mother’s breasts with the baby’s legs along her ribs and the head turned to the side
  - Secured with a cloth
- If skin-to-skin care is not possible, wrap the baby well and keep her or him close to the mother.
- Where feasible, the health worker accompanying the caregiver and baby can provide counseling on care during transport, such as thermal care and breastfeeding.
How Can We Make A Difference?

• Whole Community Preparedness
  o Preserves workforce
  o Reduces risk of unintended separation
  o Protects the Med/Health System at every level

• Integrating Children in Disaster Planning at EVERY Level
  o Improves reunification
  o Improves recovery
  o Mitigates long term child mental and physical health consequences resiliency
A Personal Preparedness Plan

Are You Prepared?

• Family, pets
• Plan, supplies, food, H2O, medications
• Meeting place
• How long?
“Change Begins with Champions”
Identify Your Pediatric Med/Health Champions
The future of Emergency Medical Services for Children
Priorities to Move Patients are Situational
Assumes Transportation is at the Ready AND Regional Models to Scale are in Place

- **Acuity 1**
  - Minimal Care
  - Feeders growers

- **Acuity 2**
  - Moderate Care
  - Nasal cannula, BCPAP

- **Acuity 3**
  - Intensive Care
  - Ventilators, drips and chest tubes

**Immediate Evacuation Order Given**
- Acuity 1 then 2
- Acuity 3
- Evacuate to area of refuge or receiving facility

**Planned Controlled Evacuation Order Given**
- Acuity 3
- Acuity 2 then 1
- Evacuate to receiving facility

Requires Consensus

Source: Evelyn Lyons Illinois EMSC DPH June 2016 Integrated Healthcare System Preparedness Summit
## Situations for Transporting Children in Emergency Ground Ambulance (EGA)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Description</th>
<th>Option(s)</th>
</tr>
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<tbody>
<tr>
<td><strong>1</strong></td>
<td>For a child who is uninjured/not ill</td>
<td>Use vehicle other than EGA</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>For ill and/or injured child whose condition does not require continuous and/or intensive medical monitoring and/or interventions</td>
<td>Use BLS transport</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>For child whose condition requires continuous and/or intensive medical monitoring and/or interventions</td>
<td>Use ALS or CCT transport or BLS with Hospital RN</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>For a child or children who require transport as part of a multiple patient transport (newborn with mother, multiple children, family)</td>
<td>BLS or ALS transport per patient condition</td>
</tr>
</tbody>
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Adapted from NHTSA Recommendations for Ground Ambulance Safety 2010
Consider Low Tech and No Tech Solutions
Infant/Mother Transport Systems
Dialogue with Vendors to Create Flexible Solutions
### Triage by Resource Allocation for IN-patients [TRAIN]

<table>
<thead>
<tr>
<th>Transport</th>
<th>Car</th>
<th>BLS</th>
<th>ALS</th>
<th>CCT</th>
<th>Specialized</th>
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<tbody>
<tr>
<td>Life Support</td>
<td>Stable</td>
<td>Stable</td>
<td>Minimal</td>
<td>Moderate</td>
<td>Severe</td>
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<tr>
<td>Mobility</td>
<td>Car/Carseat</td>
<td>Wheelchair or Stretcher</td>
<td>Wheelchair or Stretcher</td>
<td>Transport Rig</td>
<td>Immobilized</td>
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<tr>
<td>Nutrition</td>
<td>All PO</td>
<td>Intermittent Enteral</td>
<td>Continuous Enteral or Partial Parenteral</td>
<td>TPN Dependent</td>
<td>TPN Dependent</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>PO Meds</td>
<td>IV Lock</td>
<td>IV Fluids</td>
<td>IV Drip x1</td>
<td></td>
</tr>
</tbody>
</table>

| Life Support | Minimal = Hood or Low Flow Cannula O2, chest tube, etc. | Moderate = CPAP/BiPAP/Hi-Flow, Conventional Ventilator, Peritoneal Dialysis, Extracorporeal, continuous nebulizer treatments, etc. | Maximal = Highly specialized equip., e.g., HFOV, ECMO, INO, CVVH, Berlin Heart, wt ≤ 1.5 kg, etc. |
| Mobility | Car/Carseat = Able to ride in automobile with age-appropriate restraints | Transport rig = Age-appropriate rig with equipment for connecting to ambulance | Immobilized = Unsafe to move without special equipment e.g., neurosurgical/bariatric |

Adopt Innovations
Children’s Stanford NICU, Peds
PICU, Perinatal
and coming soon
Adult
Evidence shows the **best outcomes** for critically ill children are achieved when treated at facilities **most prepared** to address their needs and are on the **same page**.

Interfacility Transfer and Regional agreements are the keys to success.

https://emscimprovement.center/resources/toolboxes/interfacility-transfer-toolbox/
Use Toolkits

CPQCC NICU Disaster Preparedness Tool Kit

Douglas Carbine, MD
Vice President, California Association of Neonatologists
CAN Disaster Preparedness Task Force

Emergency Preparedness in the NICU

Children’s Hospitals and Preparedness Webinar
Friday, May 12, 2017, at 1:30pm ET/12:30pm CT

Best Practice: “Bedside Go-Kits”

- Paper charting
- Medication administration record
- Blankets/formula/diapers/hat
- Bar-code stickers (patient specific)
- Patient evacuation tracking form
- Consents
- Flashlight
- Headlamp

Additional bedside supplies are added prior to evacuation.

Source: National Working Model
Best Practice Use Designated Teams

Medical Technical Specialists for Command Center Decision Support

Source: Loma Linda Children’s Hospital
Best Practice Lesson Learned
“Evacuation Equipment Hands-On”

Aprons

Med-Sleds

NICU Portable Transport Bed

Source: Loma Linda
More EMS Systems Pediatric Ready
Learn How that Happens in Your Operational Area Participate in Patient Movement Exercises

A Multi-Sectoral Rescue Chain

- Search
- Rescue
- First Aid

Traffic Control
Regulation of Evacuation

Hospital Disaster Response Plan
Accident & Emergency Department

PRE-HOSPITAL ORGANIZATION

HOSPITAL ORGANIZATION
Pediatric Disaster National Curriculum
A Pediatric Surge Plan is on the Way …
CDPH State Emergency Operating Manual
Impacts of Disaster on Children are Lifelong

Impact of disaster to children

- Physic impact
  - death
  - injured
  - disable

- Economic impact
  - reconstruction
  - rehabilitation
  - Livelihood impact to children’s parents

- Psychosocial impact
  - Descent in study
  - Spirit descent

- Education impact
  - Document lost
  - Drop out from school
  - Quality descent

- Child right
  - Education for all

Plan

© Plan
Pediatric Black Swans are Predictable
So Mitigate Your Exposure …

- Avoid complacency
- Expect to handle unknown-unknowns
- Assess the likelihood of rare events
- Plan for the marathon
- Plan for austere conditions
- Prepare for Crisis Standards of Care
- Learn from Humanitarian Disaster Aid
A MacGyver Approach to Pediatric Preparedness Is NOT Enough
Raise the Bar for All Children in Our Community and Under Our Care
Questions
Thank You

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