Pediatric Considerations
in Disaster Planning

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1

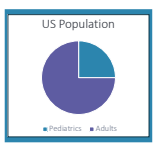
Objectives

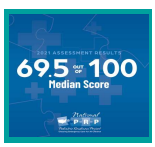
1. Understand why children are disproportionately affected in disasters and public health emergencies.
2. Explain the unique anatomical, physiological, and developmental differences in children that make them a vulnerable population.
3. Review mass casualty trauma triage principles using pediatric mass triage tools (SALT and JumpSTART).
4. Describe essential pediatric-specific resources, supplies, and equipment necessary to provide at least initial clinical care during disasters.
5. Review pediatric decontamination considerations and best practices.

2

2

Pediatric Disaster Planning By the Numbers





25% | **47.5%** | **30 million** | **69.5/100**

Source: Pediatric Issues Informing Current and Future Disaster Planning, ASPR-TRACIE, 2024

3

3

JAMA
The Journal of the American Medical Association

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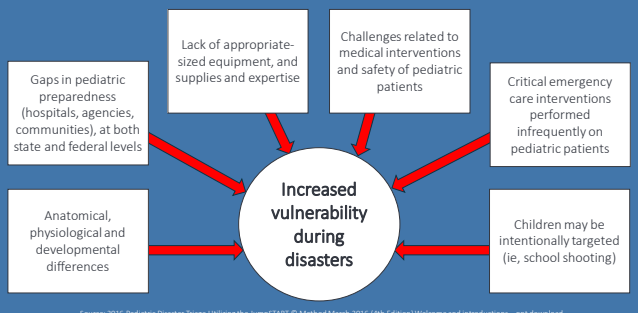
- Only 17.4% of EDs had high pediatric readiness
- Annual US cost for all EDs to reach high pediatric readiness from current levels: ~207 million, ranging from $0-$11.84 per child by state
- Of 7619 deaths, 2143 (over 28%) were preventable through universal high ED pediatric readiness
- High levels of pediatric readiness:
  - 76% ↓ mortality – sick kids
  - 60% ↓ mortality – injured kids
- Pediatric Readiness in the Emergency Department Checklist (EMSC)
  - Administration/Coordination of Pediatric Care
  - Competencies for ED MDs, APPs, RNs
  - QI/PI, Policies, Procedures, Protocols
  - All-Hazards Disaster Preparedness
  - Improving Patient Safety Guidelines
  - Interfacility Transports
  - ED Support Services Guidelines
  - Medication, Equipment/Supplies Guidelines
  - Medications and Administration Supplies
  - Pediatric Equipment List (general, vascular access, fracture management, monitoring, respiratory, specialized pediatric trays/kits
- Additional recommendations for high-volume EDs (>10k pediatric visits/year)

Sources: EMSC National Pediatric Readiness Project, 2024 and Newgard et al, 2024

4

Why are Children More Vulnerable in Disasters?

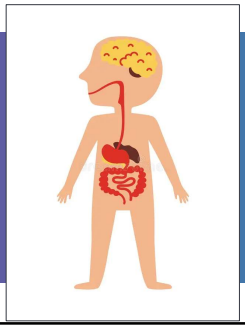


Source: 2016 Pediatric Disaster Triage Utilizing the JumpSTART © Method March 2016 (4th Edition) Welcome and introductions. - ppt download, Illinois Department of Public Health, 2016.

5

Anatomical Differences in Children Increase Vulnerability

- Shorter stature
- Smaller size
- Head Size
- Abdominal organs



- Smaller airways
- Thinner skin
- Smaller blood volume
- Greater Body Surface Area to Mass Ratio

Source: Pediatric Disaster Planning Considerations, Children's Hospital Los Angeles, nd

6

Physiological Differences in Children

- Higher respiratory rates
- Higher heart rates
- Higher metabolic rates

Source: Chiu et al, 2022

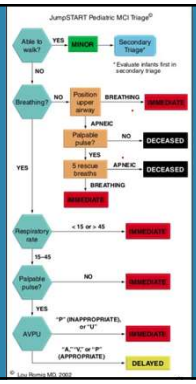
7

Developmental and Psychological Differences

- Motor and cognitive skills
- Communication issues
- Dependence/need for supervision
- Developmental regression

Sources: Pediatric Disaster Planning Considerations, Children's Hospital Los Angeles, nd and Chiu et al, 2022

8



JumpSTART: Simple Triage and Rapid Treatment

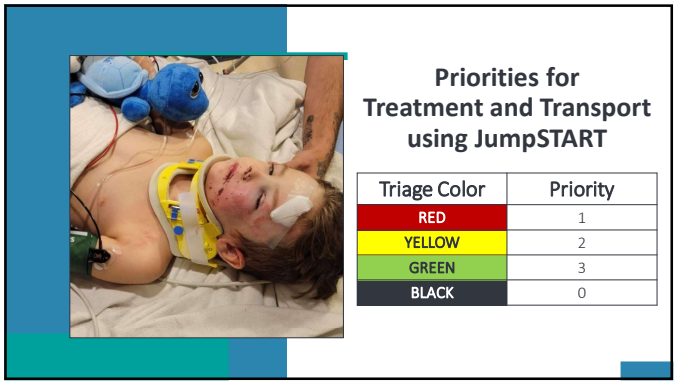
Alert
Patient is fully awake and responsive.

Voice
Patient responds to your voice.

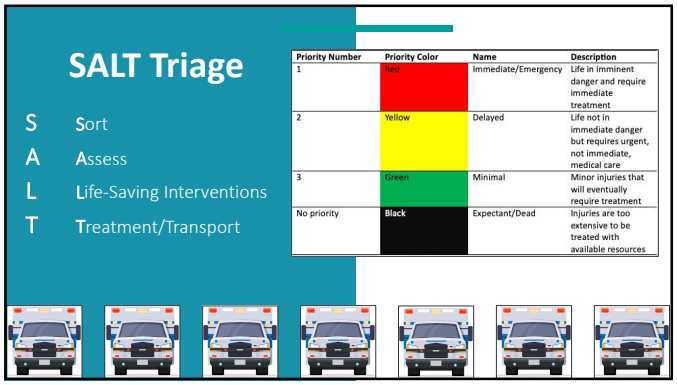
Pain
Patient responds when you cause them pain.

Unresponsive
Patient does not respond no matter what you do.

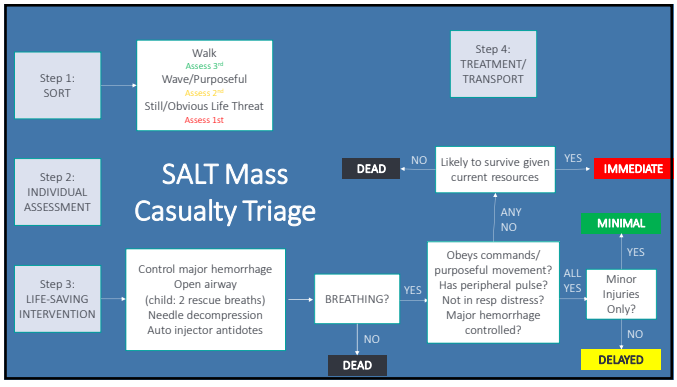
9


Priorities for Treatment and Transport using JumpSTART
Triage Color
Priority
RED
1
YELLOW
2
GREEN
3
BLACK
0

10


SALT Triage
S Sort
A Assess
L Life-Saving Interventions
T Treatment/Transport
Priority Number
Priority Color
Name
Description
1
Red
Immediate/Emergency
Life in imminent danger and require immediate treatment
2
Yellow
Delayed
Life not in immediate danger but requires urgent, not immediate, medical care
3
Green
Minimal
Minor injuries that will eventually require treatment
No priority
Black
Expectant/Dead
Injuries are too extensive to be treated with available resources

11


Step 1: SORT
Walk
Assess 3rd
Wave/Purposeful
Assess 2nd
Still/Obvious Life Threat
Assess 1st
Step 4: TREATMENT/ TRANSPORT
Step 2: INDIVIDUAL ASSESSMENT
SALT Mass Casualty Triage
DEAD
NO
Likely to survive given current resources
YES
IMMEDIATE
ANY
NO
MINIMAL
Step 3: LIFE-SAVING INTERVENTION
Control major hemorrhage
Open airway
(child: 2 rescue breaths)
Needle decompression
Auto injector antidotes
BREATHING?
YES
Obeys commands/ purposeful movement?
Has peripheral pulse?
Not in resp distress?
Major hemorrhage controlled?
ALL YES
Minor Injuries Only?
YES
NO
NO
DEAD
DELAYED

12

Individual Assessment

C – Follows Commands?

R – Respiratory Distress?

A – Arterial Bleeding?

P – Peripheral Pulse?

"Bad" answer to any question:

IMMEDIATE

13

Immediate	Delayed	Minimal
Bad "CRAP" • Doesn't follow commands • No peripheral pulse • Respiratory distress • Uncontrolled major hemorrhage	**No bad "CRAP"** • Follows commands • Has a peripheral pulse • No respiratory distress • Hemorrhage controlled	**No bad "CRAP"** • Follows commands • Has a peripheral pulse • No respiratory distress • Hemorrhage controlled
No purposeful movement	**Purposeful movement**	**Purposeful movement**
Chest/abdominal trauma	**Serious injuries that can be delayed** (tourniquet/wound packing)	**Minor injuries** (scrapes, abrasions, minor lacs)
Explosive injuries (missing limbs, vascular/organ injury)	**Illnesses/injuries that are *not* minor** (chest pain, deformity, wheezing)	**Simple orthopedic injuries**
Airway injury/obstruction or respiratory distress/failure		**"Walking wounded"** (some may be uninjured)

14

14

The 4S's of Preparedness

Staff

Stuff

Space

Systems

15

Staffing Considerations in Pediatric Disaster Planning

Pediatric Training/Competencies
- Triage, assessment & treatment
- Med administration
- Resuscitation & critical procedures
- Device/equipment safety
- Trauma resuscitation & stabilization
- Drills/exercises include peds patients
- Peds equipment and supplies
- "Just in Time" training

Support Staff
- Supervision of unattended minors

Emergency Staffing
- Emergency staffing plans
- Emergency credentialing

16

16

Space Considerations

- Pediatric Surge Plans
- Written peds transfer agreements and guidelines
- Peds resuscitation/trauma room with peds code cart, airway box and equipment
- Storage space for peds equipment/supplies
- Memorandums of Understanding

- Capacity at which alternate care site may be needed
- Identify alternative spaces for pediatric surge
- Ensure spaces are private, child-proof, secure and protected from the public
- Identify Pediatric Safe Area and Family Reunification Area
- Consider space for bereavement notification

17

17

Systems-Level Support in Pediatric Disaster Planning

- Telemedicine/telehealth capabilities
- Mass notification system
- Family Reunification Plan
- Peds evacuation plans
- Crisis standards of care
- Pediatric decontamination
- Intra/Interhospital transport of children
- Extended pediatric care (shelter in place)
- Discharge of minors to alternate caregivers

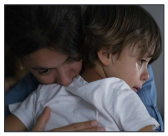
18

18

Family Reunification Plan Essentials

- Plan activation
- Leadership and organization
- Registration, intake and tracking
- Definitive patient identification
- Family Reunification Center
  - Location (away from ED)
  - Supplies/Equipment
- Pediatric Safe Area
  - Location (away from ED, secure)
  - Staffing, Supplies/Equipment, Resources
- Information Sharing (Media, Social Media)
- Security concerns
- Legal considerations
- Family reunification plan drills/exercises





19

Supplies and Equipment Considerations in Pediatric Disaster Planning

Monitoring Equipment
Neo, infant, child BP cuffs
Doppler US
Defib/EKG (peds pads)
Neo/peds pulse oximeter
Continuous ETCO2

Newborn Delivery Kit
Umbilical clamp
Scissors
Bulb syringe
Towel

General Equipment
Infant warmer
Blood/fluid warmer
Restraints
Infant/child scales (kgs)
Braslow tape
Peds pain scales
Peds CPR board/AED pads
Atomizer for intranasal meds

Urine cath kits
Straight/foley cath
Infant/child kits

Vascular Access
Infant/child arm boards
22g/24g IV catheters
Neo/Peds IO needles
IV pumps (peds guardrails)
Infant hot packs/tourniquets
NS, D5 0.45% NS, LR, D10

Fracture Management
Peds extremity splints
Infant/child cervical collars
Peds crutches/slings

Source: EMSC Pediatric Readiness in the Emergency Department


20

Peds Respiratory Supplies and Equipment

Difficult Airway
Supraglottic airways (ie LMA)
Needle cricothyrotomy kit
Surgical cric kit
Video laryngoscopy

Laryngoscope Blades
Straight and curved
Sizes 0, 1, 2

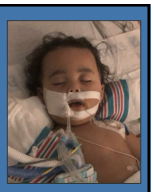
Intubation Supplies
Magill forceps (peds)
ETT stylets (infant, peds)
ETCO2 detector

General Respiratory
OP Airways (0, 1, 2, 3)
NP Airways (3.5-6)
Suction caths (6, 8, 10, 12F)
Rigid suction (peds yankeur)
Ambu bags (infant, peds)
Ambu bag masks (neo, infant, child)
NRBs (infant, peds)
Simple masks (infant, peds)
Nasal cannula (infant, peds)
Bite blocks
ETT securement device

Endotracheal Tubes
Uncuffed 2.5mm
Uncuffed 3.0mm
Cuffed/Uncuffed 3.5mm
Cuffed/Uncuffed 4.0mm
Cuffed/Uncuffed 4.5m
Cuffed/Uncuffed 5.0mm
Cuffed/Uncuffed 5.5mm
Cuffed 6.0mm

Feeding Tubes
5F, 8F, 10F NG tubes
8F, 10F G-tubes

Source: EMSC Pediatric Readiness in the Emergency Department

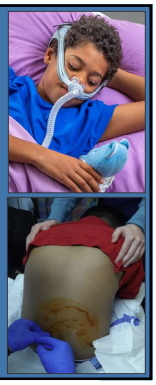



21

>10,000 Peds Visits Annually

Medications	Central Access	Trach Tubes
Alprostadil (prostaglandin)	Central venous catheters size 4.0-7.0F	3.5mm
Inotropes (ie, digoxin, milrinone)	**Chest Tubes**	4.0mm
Non-Invasive Ventilation	Infant (8-12F)	4.5mm
CPAP	Child (14-22F)	5.0mm
HFNC	Adult (24-40F) or pigtail catheter kit (8.5-14F)	**Umbilical Vein Catheters**
Laryngoscope Blades	**Self-inflating**	3.5F
Size 00	Peds bag-mask device	5.0F
Lumbar Punctures	**Peds Specialty Tray**	**Laryngoscopy**
Infant/child spinal needles	Tube thoracostomy tray	Laryngoscope Blades
		Size OO

Source: EMSC Pediatric Readiness in the Emergency Department



22

Pediatric Decon

Increased Susceptibility to Effects of Contaminants

- Higher respiratory rates
- Shorter stature
- Higher risk of hypovolemia/ shock
- Higher metabolic rates
- Fewer pediatric medical countermeasures (MCMs)

23

Peds Decon Considerations

- ↑ risk of hypothermia
- Risk of burns
- Dependency on others
- Psychological trauma
- Slippery when wet!
- Maintain family unit
- Parents assist as able
- Wound irrigation

24

Hygiene Procedure for Infants

THE NITTY GRITTY

Washcloths/Bubbles | Towels | Blankets
Belongings Bag | Baby Soap | Wipes | Sleep Sacks | Hats
Laundry Basket | Non-slip Pads | Mylar Blankets

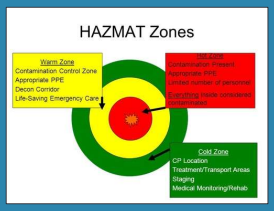
Pre-Hygiene
- Don decon PPE.

Hot Zone
- Receive patient(s) at staging area. Keep families together.
- Non-contaminated caregivers should don PPE for decon process.
- Double bag patient belongings, tie and label outer bag.
- Caregivers receive hygiene instructions.
- Place infant in laundry basket with non-slip pads for wash/rinse process.

Warm Zone
- Progress to wash area. Wash infant using baby soap and hand-held sprayers for length of time determined by technical specialists.
- Progress to rinse area. Rinse patient using hand-held sprayers for length of time determined by technical specialists. Infant is then moved to cold zone.

Cold Zone
- Dry infant and place on clean stretcher. Dress patient and apply warming aids to prevent hypothermia.
- Upon exit, non-decontamination personnel receive infant and transfer patient to Peds ED for.

Decon Process



25

Item	Size	Par
Baby soap	N/A	20
Wash cloths	N/A	40
Towels	N/A	40
Infant blankets	N/A	10
Warmed infant blankets	N/A	10
Blankets	N/A	10
Warmed blankets	N/A	10
Diapers	1, 3, 4, 5, 6	1 pack each size
Briefs	Peach, Blue, White	1 pack each size
Wipes	N/A	20
Sleep sack	S, L	10
Infant hats	N/A	10
Hospital scrubs/gowns	Toddler, School-Age, Adult	5 of each size
Hospital socks	Infant, Pediatric, Adult	5 of each size
Hospital ID/Wristbands	Infant, Adult	N/A
Laundry baskets	Standard	2
Anti-slip surfaces	21" x 21"	10
Infant warming pads	Standard	5
Mylar blankets	Standard	10
Infant foil bunting	Standard	10

Sample Peds Decon Supply List

26

Pediatric Disaster Planning Resources

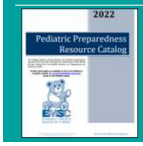
AAP

Emergency Medical Services for Children (EMSC)

ASPR-TRACIE

Lurie Children's Hospital (Chicago)

EMSC Illinois



27

28

Resources

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29

29

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30

30

Peds Decon Resources

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31

31