



Preparing Adult Health Care Facilities for Pediatric Disaster Victims

CHA Disaster Planning Conference

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Presenter



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Children's Hospital Los Angeles

Ms. Cheung is a pediatric nurse who works as the emergency preparedness manager at Children's Hospital Los Angeles (CHLA). While initially working bedside at CHLA, Ms. Cheung took on additional duties as the nurse champion for special pathogens preparedness. Her enthusiasm for conducting meaningful trainings and developing sustainable processes has bolstered CHLA's preparedness and response for children infected with high-consequence infectious diseases. Now, she leverages her expertise to keep not only CHLA prepared but also increase the overall pediatric disaster readiness across LA County and the Southern California region.



Presenter



Vicky Olson, MPS, RN

**Program Manager, Emergency Training and Exercises
Children's Hospital Los Angeles**

Ms. Olson is the Emergency Training and Exercises Program Manager for Children's Hospital Los Angeles (CHLA). She started in the Emergency Management field as a wildland firefighter before becoming a nurse. She is passionate about increasing health care and community emergency preparedness and response capabilities.

Disclosure of Relevant Financial Relationships

Erika Cheung, MSN, RN, CPN reports no relevant financial relationships or relationships she has with ineligible companies of any amount during the past 24 months.

Vicky Olson, MPS, BSN, RN reports no relevant financial relationships or relationships she has with ineligible companies of any amount during the past 24 months.

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Learning Objectives

- At the end of this session, participants will be able to:
 - Name at least one difference between a pediatric and adult disaster victim
 - Define a pediatric planning/response consideration for specific incidents (mass casualty incident, reunification, decontamination, or evacuation)
 - Identify a strategy for pediatric disaster response to implement at their health care facility

Interactive Polling

- Scan this QR code, or
- Go to www.pollev.com on your phone (code: **chlaquality**), or
- Text chlaquality to 22333 to join session (then text to answer)

You are **not required to enter a username (you can skip it)*





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Pediatric Care Considerations

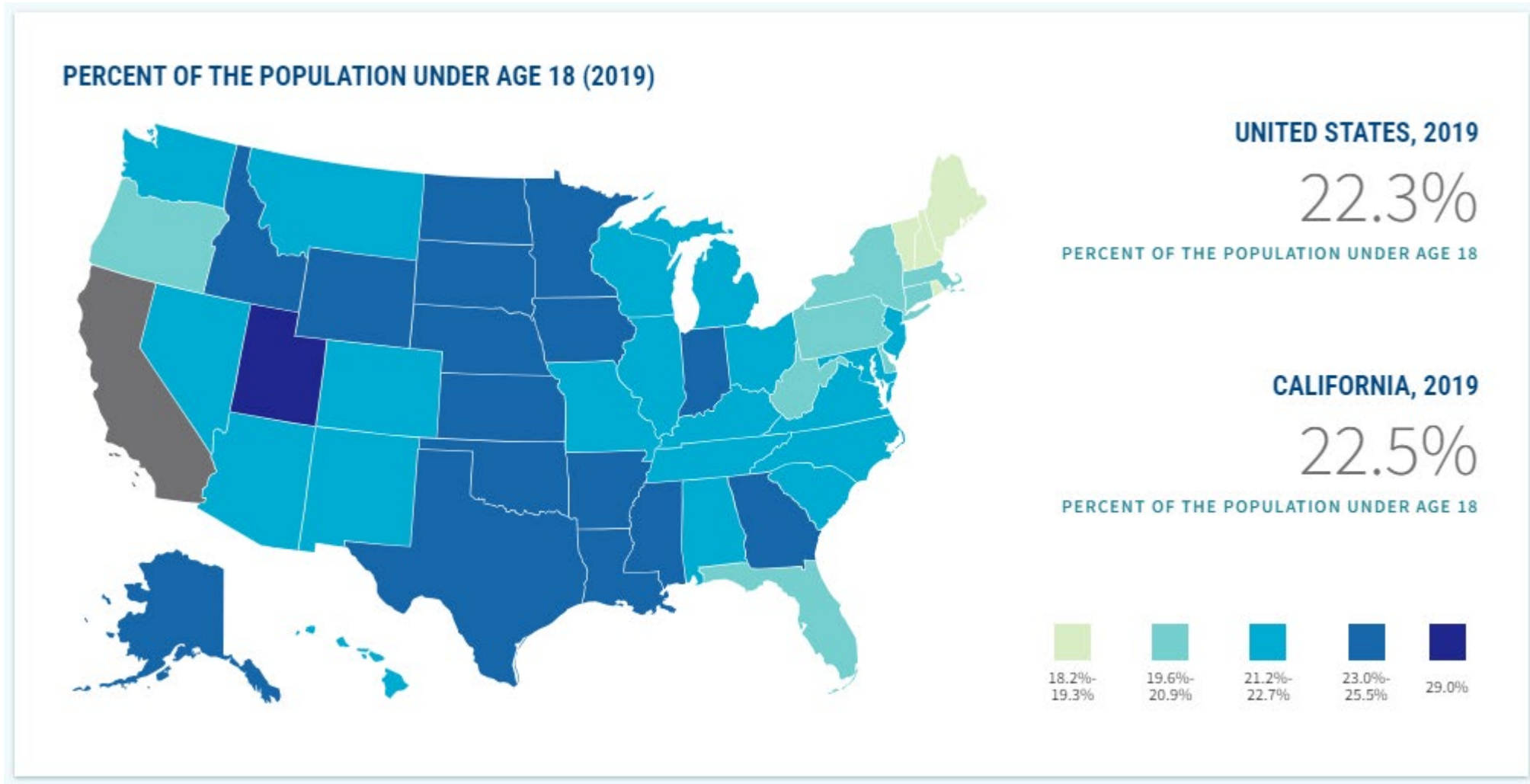
Trivia Question

- In 2019, what percentage of the U.S. population was under age 18?

##.##%

Raise your hand/shout it out... closest guess wins a prize 😊

By the Numbers



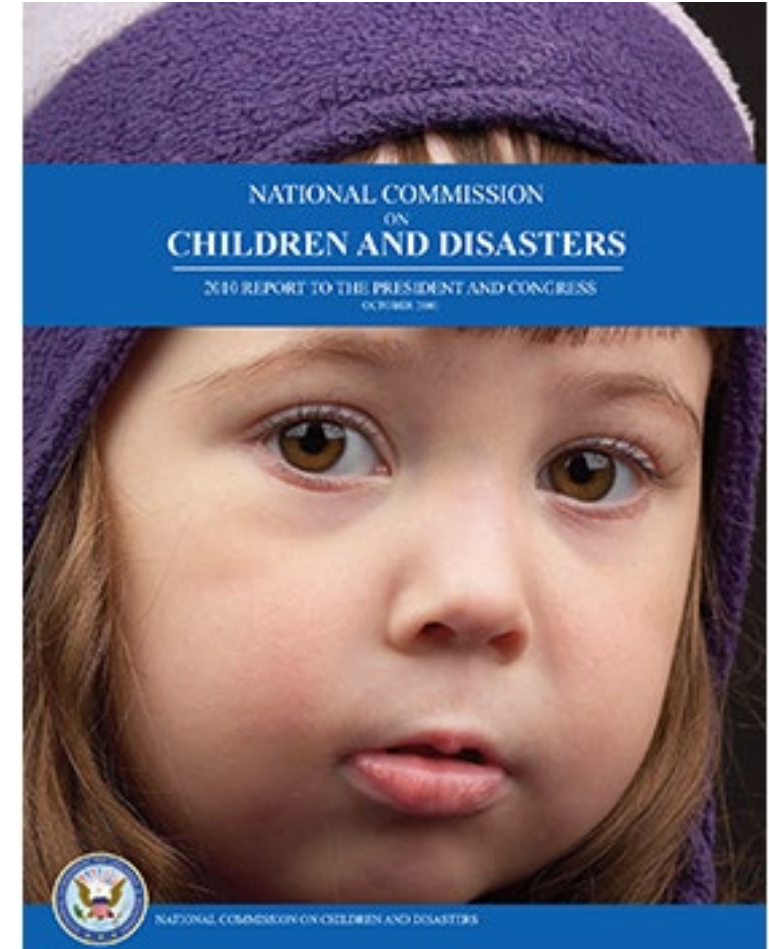
Why Pediatric Disaster Planning?



160,000 children

81 recommendations

*Evacuation-relocation
Family-child reunification
Children with special needs
K-12 multiple disaster plan*



Importance of Pediatric Disaster Planning

- 17/81 met and 44/81 in progress (Save the Children, 2015)
 - 20/81 not addressed
- Competing priorities – time and funding
- False assumptions (implicit bias)
 - *We don't have any pediatric services*
 - *We can just adapt our regular protocols and equipment*



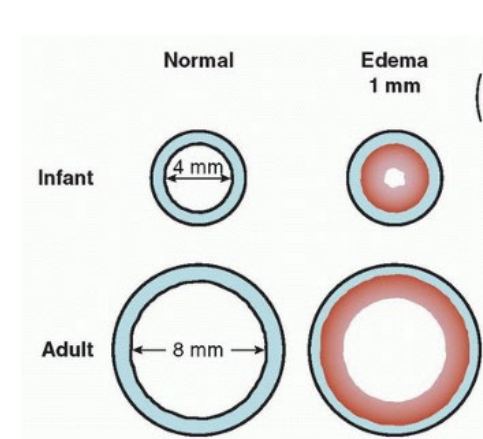
Challenges in Pediatric Disaster Response

- Risk factors
 - Easier to scoop and run
 - Tend to gather in large groups
 - May be intentionally targeted
- Pediatric expertise and equipment
 - *Limited experience/familiarity*
 - *Lack of pediatric-sized equipment*
 - *Resource-intensive for basic procedures*

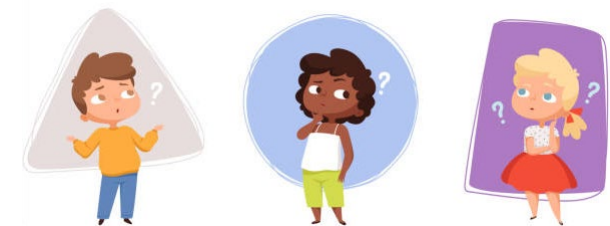


Kids are NOT “tiny adults”

- Physical differences
 - Smaller airways, faster respiratory rate, lower to the ground
 - Smaller blood/fluid volume, greater surface area, thinner skin
 - Head and abdomen injuries
- Developmental differences
 - Infants/toddlers – head and limb control, put things in their mouth
 - Cognitive understanding
 - Communication skills
 - Stranger danger!



Mommy!
Daddy!





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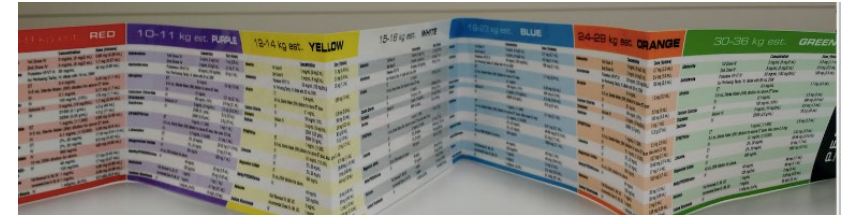
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Kids and Medication

- Challenges

- Weight-based dosing
- Limitations to the Broselow tape (Pukar et al., 2020)
- Non-liquid formulations (or meds not approved for pediatrics)
- Lack of cooperation



- Tips for pediatric medication administration

- Oral syringes
- Food delivery systems



Psychological Needs

- Risk factors
 - Risk for PTSD increases when children remain frightened, anxious, or confused for an extended period
 - Avoid exposure to TV, video clips, social media (*implicit bias – kids absorb more than you think*)
- Recommendations
 - Explain things in simple terms
 - Answer truthfully (even if they may not understand your words)
 - Reassure child that family is safe (but only if you know they are)
 - Allow children to validate their feelings
 - Keep kids away from loud/busy areas

Help Your Infant or Toddler Cope with Stressful Events

How stress impacts young children and babies

Infants and toddlers face stressful events in their everyday lives, just as adults do. Many people think that children younger than three years won't be as impacted by stress because they "won't remember" or don't understand what is happening. However, we now know from research on brain development and toxic stress that even tiny babies are impacted by stress. **Even if they can't put words to their distress, they are impacted by feeling their heart racing, the sight of their mother's tears, or scary sounds of community violence.**

The good news is that while you may not always be able to shield your child from stressful events, your relationship with your child is the buffer that protects from their effects.

Do tell your child when you are leaving, and when you are coming back. Make sure they have a familiar person to stay with them when you have to leave. **It might be tempting to "sneak out" to avoid upsetting your child,** but this makes children more anxious about separations. Instead, even very young children need to hear, "Mommy's going to work now. You can play with Nana while I'm gone. I'll be back for dinner." If a child cries at separating, narrate their feelings and help them transition: "You're sad because Mommy's going. I'll be back soon." A goodbye ritual can help your child learn to say goodbye; you might have a special goodbye song or hug that you do each time you leave. You can also try giving your child something of yours to hold onto while you are gone.

CHLA Resources

<https://www.schoolcrisiscenter.org/>

The screenshot displays the website for the National Center for School Crisis and Bereavement, part of Children's Hospital Los Angeles. The header includes the organization's name and logo, a navigation menu with links for ABOUT, RESOURCES, PROJECTS, NEWS, EVENTS, and SUPPORT, and social media icons for Facebook, Instagram, Twitter, and LinkedIn. The main content area features two prominent white boxes with blue and red accents. The left box, titled 'I Need Help Now', offers materials and guidance for schools currently experiencing crises or helping grieving students, with a red 'GET HELP NOW' button. The right box, titled 'Help Me Prepare', provides resources and guidelines to support children during times of crisis and loss, with a blue 'GET PREPARED' button.

Incident-Specific Considerations and Resources

Mass Casualty Incidents (MCIs)

- Challenges

- Age of an unaccompanied pediatric victim
- Physiological and developmental differences
- Discomfort with tagging a child as “black/expectant”

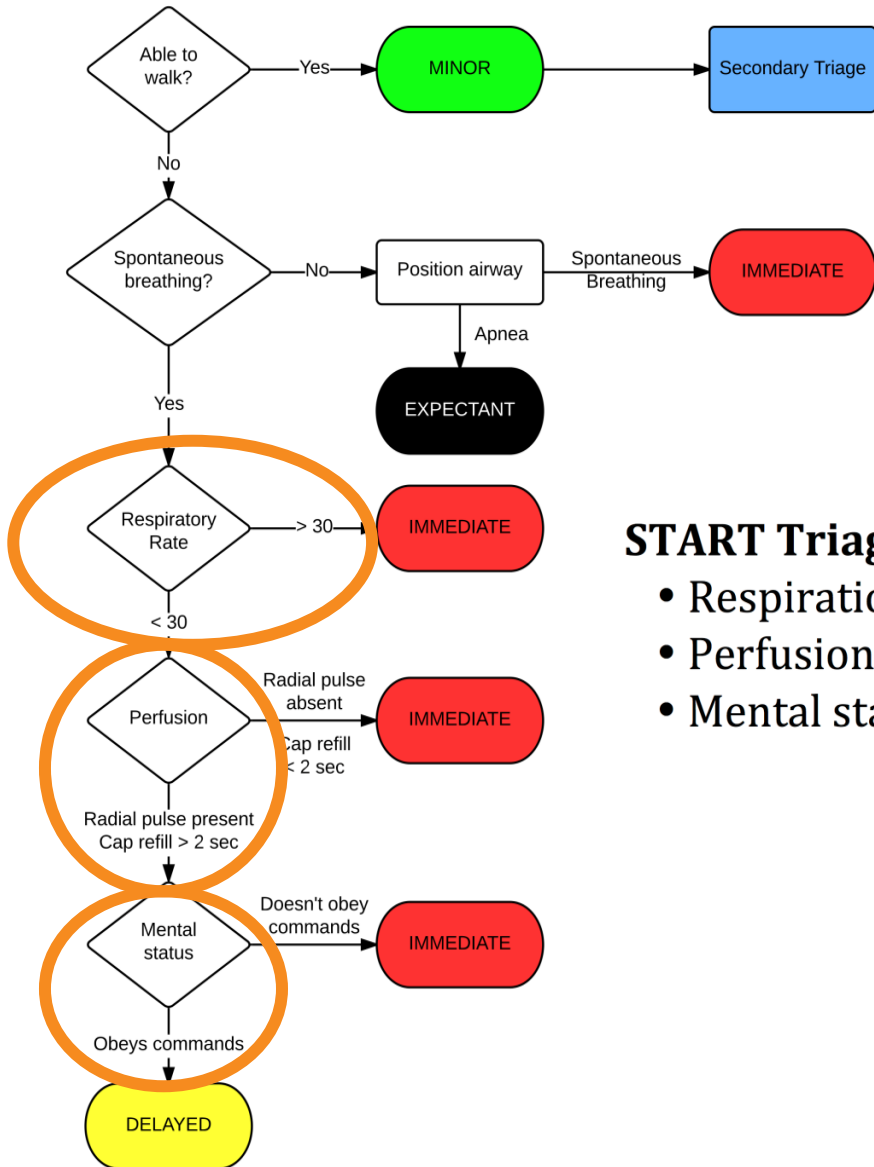
If the victim *appears* to be a child – use **pediatric triage algorithm**
If the victim *appears* to be an adult – use adult triage algorithm

Minor – Green	Not injured or “walking wounded”	Immediate – Red	Life-threatening <u>but treatable</u> injuries requiring immediate and rapid medical attention
Delayed – Yellow	Potentially serious injuries but are stable enough to wait for a short time before medical treatment	Expectant – Black	Deceased <u>or</u> severe injuries that are incompatible with survival in ideal conditions

Mass Casualty Incidents (MCIs)

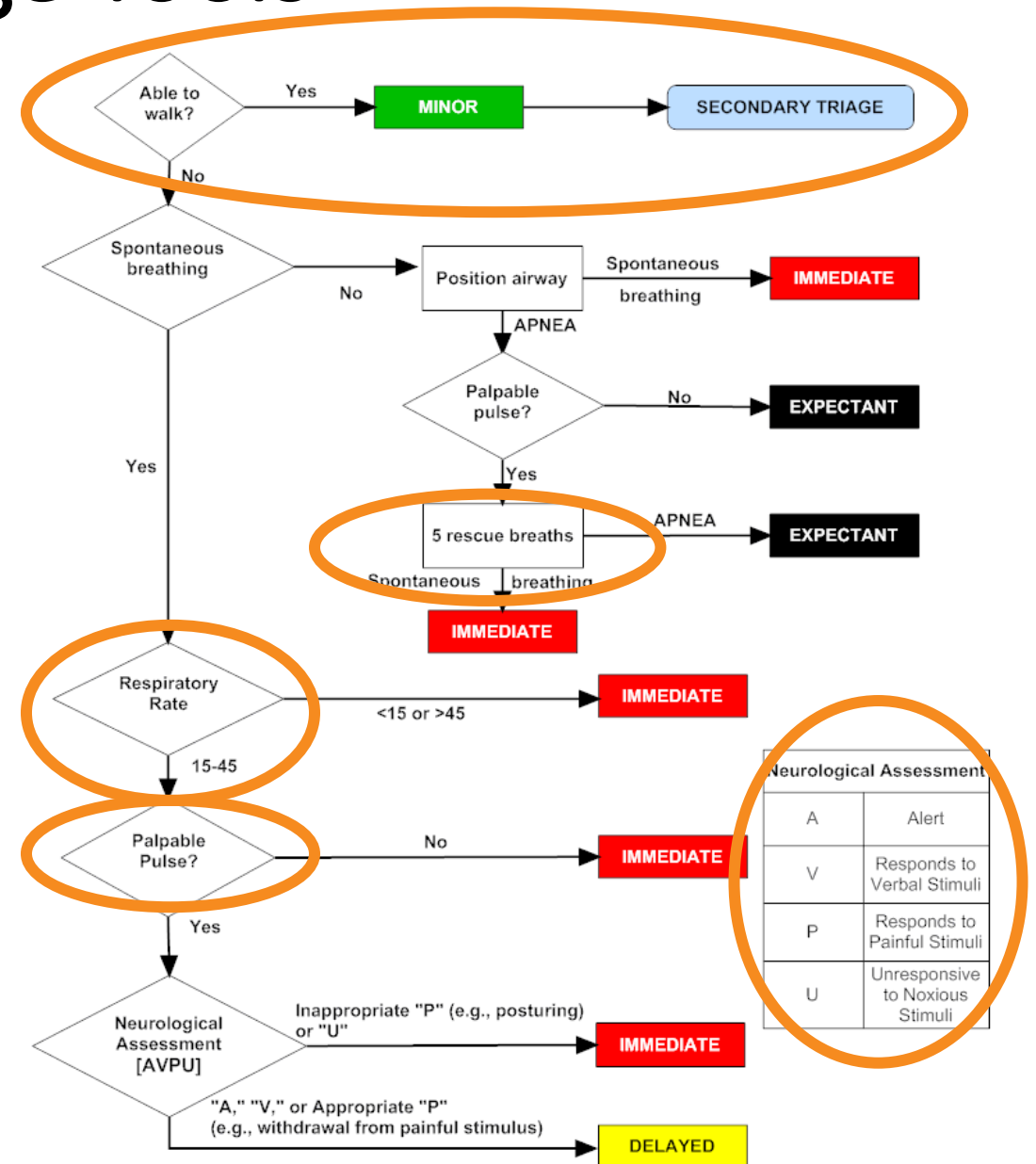
- Recommendations
 - Identify and practice with a pediatric-specific triage tool
 - Obtain/maintain pediatric-sized equipment
 - Identify staff who are trained in pediatric care
 - Develop/collate just-in-time resources

START and JumpSTART Triage Tools



START Triage

- Respirations
- Perfusion
- Mental status



A	Alert
V	Responds to Verbal Stimuli
P	Responds to Painful Stimuli
U	Unresponsive to Noxious Stimuli

NORMAL PEDIATRIC VITAL SIGNS

	HR Beats/ min	RR Breaths/ min	BP (sys) mm/Hg	BP (dias) mm/Hg
Newborn 0-1 month	100-180	30-60	73-92	52-65
Infant 1-12 months	80-150	30-60	90-109	53-67
Toddler 1-3 years	75-130	25-35	95-105	56-68
Pre-School 3-5 years	75-120	22-32	99-110	55-70
School Age 5-12 years	70-110	20-30	97-118	60-76
Adolescent 13-18 years	65-105	16-22	110-133	63-83



Pediatric Surge Quick Reference Guide

© November 2016

GLASGOW COMA SCALE (GCS)

Category	For Patients <2 Years Old	For Patients >2 Years Old
Eye Opening (E)	(4) Spontaneous (3) To speech (2) To pain (1) None	(4) Spontaneous (3) To speech (2) To pain (1) None
Verbal Response (V)	(5) Coos, babbles (4) Irritable, cries (3) Cries to pain (2) Moans to pain (1) None	(5) Oriented (4) Confused (3) Inappropriate words (2) Incomprehensible (1) None
Motor Response (M)	(6) Normal spontaneous movements (5) Withdraws from touch (4) Withdraws from pain (3) Abnormal flexion (2) Abnormal extension (1) None	(6) Obeys commands (5) Localizes to pain (4) Withdrawal to pain (3) Flexion to pain (2) Extension to pain (1) None

Sources for the Pediatric Surge Quick Reference Guide can be found online at:
<http://ems.dhs.lacounty.gov>
www.CHLA.org/DisasterCenter
 Guide last updated 11.15.16

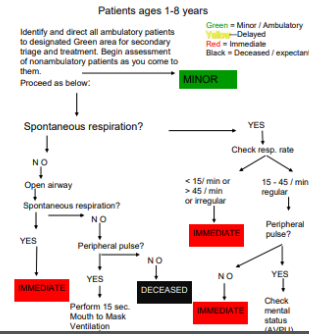
PEDIATRIC ASSESSMENT TRIANGLE (PAT)



AVPU: Alert, Voice, Pain, Unresponsive - Used to assess level of consciousness or appearance in PAT tone or rigid or not moving.

Component	Abnormal Signs
Appearance	T—tone abnormal floppy or rigid muscle tone or not moving; I—interactiveness, C—consolability, L—look/gaze decreased responsiveness to parents or environmental stimuli; S—speech/cry abnormal or absent.
Work of Breathing	Increased/excessive (nasal flaring, retractions or accessory muscle use) or decreased/absent respiratory effort or noisy breathing.
Circulation to the Skin	Cyanosis, mottling, paleness/pallor or obvious significant bleeding.

JUMPSTART FIELD PEDIATRIC MULTICASUALTY TRIAGE SYSTEM



PEDIATRIC SIGNS OF RESPIRATORY DISTRESS

Respiratory distress is apparent when adequate gas exchange. As the condition deteriorates and gas exchange becomes inadequate, respiratory failure requires intervention to cardiac arrest.

Respiratory failure requires intervention to cardiac arrest.

Indicators may vary

Respiratory Distress	Respiratory
Tachypnea	Mal
Increased respiratory effort (nasal flaring, retractions)	Incr
Inadequate respiratory effort (hypoverventilation, bradypnea)	Br
Abnormal airway sounds (stridor, wheezing, grunting)	Pe
Tachycardia	Te
Pale, cool skin	Cy
Changes in level of consciousness	St

USING KILOGRAMS

Weigh all children in kilograms. 1 kg = 2.2 lbs

Method to estimate weight:
 Newborn (term): usually 3 kg
 1-10 yrs: age multiplied by 2 + 10 (kg)
 >10 yrs: age multiplied by 2 + 20 (kg)

If available, a length-based tape, (e.g., Broselow Tape) should be used for weight estimation.

DAILY MAINTENANCE FLUID AND ELECTROLYTE REQUIREMENTS

	Calculation
Fluids per hour	4mL/kg/hr for first 10kg of weight 2mL/kg/hr for next 10 kg of weight 1mL/kg/hr for each kg over 20kg
Fluids per 24 hour period	100mL/kg for the first 10kg body weight 1000mL + 50mL/kg for the next 10kg body wt 1500mL + 20mL for each kg of body weight over 20kg
Maintenance electrolyte calculations for IV fluid	Sodium: 3-4 mEq/kg/day or 30-50 mEq/m ² /day Potassium: 2-3 mEq/kg/day or 20-40 mEq/m ² /day

APPROPRIATE INFANT NUTRITION

Age	Feeding
Birth - 1 mo	2-3 ounces (60-90 mL) per feeding, breast or bottle every 2-3 hours
2-4 mos	3-4 ounces (90-120 mL) per feeding every 3-4 hours
4-6 mos	4-5 ounces (120-150 mL) per feeding, four or more times daily Begins baby food, usually rice cereal
6-8 mos	6-8 ounces (180-240 mL) per feeding, four times daily Eats baby food such as rice cereal, fruits and vegetables
8-12 mos	6 ounces (180 mL) per feeding, four times a day, Soft finger foods

Breastfeeding is best—support mothers with safe locations to breastfeed and remain hydrated

NORMAL BLOOD VOLUME

Total blood volume varies by weight. Approximate volume is 80mL/kg.
 PRBC/Platelet/Albumin 5%/FFP = 10mL/kg

CLINICAL FEATURES OF DEHYDRATION

Feature	Mild (<5%)	Moderate (5% to 10%)	Severe (>10%)
Heart rate	Normal	Slightly increased	Rapid, weak
Systolic BP	Normal	Normal to orthostatic, >10 mmHg change	Hypotension
Urine output	Decreased	Moderately decreased	Markedly decreased,
Mucous membranes	Slightly dry	Very dry	Parched
Anterior fontanel	Normal	Normal to sunken	Sunken
Tears	Present	Decreased, eyes sunken	Absent, eyes sunken
Skin	Normal turgor	Decreased turgor	Tenting
Skin perfusion	Normal capillary refill (<2 seconds)	Capillary refill slowed (2-4 seconds); skin cool to touch	Capillary refill markedly delayed (>4 seconds); skin cool, mottled, gray

NORMAL DEVELOPMENT

Age (years)	Growth & Development	Common Fears	Methods to Minimize Adverse Effects
0-1	Learn through senses; Seek to build trust	Needs not being met; Stranger anxiety	Speak in quiet calm voice; Involve parents in care; Be aware of stranger anxiety
1-3	Imitates others; Understands objects exist even when not seen; Attempt to control environment	Separation; Loss of Control; Altered Rituals	Minimize separation from family; Provide continuity of familiar routines
4-6	Vivid imagination; More independent; Shares with others	Bodily injury; Loss of control; Being left alone; Dark	Be honest; Let child make choices when able; Reinforce child not responsible for injury or illness
7-12	Understands cause and effect; Greater sense of self	Loss of control; Bodily injury; Death	Allow child to make some care decisions; Prepare before major event or surgery; Emphasize things they can do
13-18	Abstract thinking; Develops own identity	Loss of control; Altered body image; Separation from peers	Explain treatment & procedures; Encourage self-participation in care

FLUID RESUSCITATION

- Administer 20 mL/kg of isotonic or crystalloid (NS or LR)
- Monitor: Peripheral perfusion, Urine output, Vital signs, LOC
- Repeat bolus if no improvement
- Reassess status

Consider blood products in traumatic injuries requiring >40-60 mL/kg of fluid

HYPVOLEMIC SHOCK

- Hypovolemic shock is the most common type of shock in children.
- Children increase their cardiac output by tachycardia; therefore bradycardia is an ominous sign.

Look for:
 Slow irregular breathing, grunting, bradycardia, cyanosis, hypotension, decreased LOC

BURN TREATMENT: FLUID RESUSCITATION

Fluid Resuscitation Formula (0 - 12 yrs):
 3 mL x kg x %TBSA burn
 (one half over 1st 8h, second 1/2 over next 16h)

For ages 0 - 2 years: Add maintenance fluid of D₅ Lactated Ringer's (in addition to resuscitation fluid above) - see fluids per hour calculation

- Pediatric Considerations**
- Increased fluid requirements relative to adults
 - Increased surface area : mass ratio
 - Hypoglycemia may occur in infants (<30 kg) due to limited glycogen reserves
 - Hourly urine output to assess effective fluid resuscitation

EQUIPMENT ESTIMATIONS

Method to estimate Endotracheal Tube (ETT) size:
 Tube diameter (mm) = [(AGE (yrs)/4)+4] uncuffed tube size up to size 5.5 mm; for cuffed tubes use 1/2 /2 size smaller (e.g., 2 year old 4.5 mm uncuffed or 4.0 cuffed)
 ETT 6.0 mm or greater are all cuffed; Cuffed tubes preferred if available for all ages

ETT Depth in cm at lip = 3x ETT size

EQUIPMENT SIZES: NEWBORN - 6 YEARS

Equipment	Newborn	3-6 mos	1 year	2-3 yrs	4-6 yrs
Weight	3 kg	5 kg	10 kg	15 kg	20 kg
ETT	3-3.5	3.5-4.0	4-4.5	4.5-5.0	5.0-5.5
L Blade	Miller 0-1	Miller 0-1	Miller 0-1	Miller 1-2	Miller 2
Suction	6-8 Fr	8-10 Fr	10 Fr	10 Fr	10 Fr
NG Tube	5-8 Fr	5-8 Fr	8-10 Fr	10-12 Fr	12-14 Fr
Foley	6-8 Fr	6-8 Fr	8-10 Fr	10-12 Fr	10-12 Fr
Chest Tube	10-12 Fr	12-16 Fr	16-20 Fr	20-24 Fr	24-32 Fr
LMA (cuff)	1 (4 mL)	1.5 (7 mL)	2 (10 mL)	2 (10 mL)	2-2.5 (14 mL)

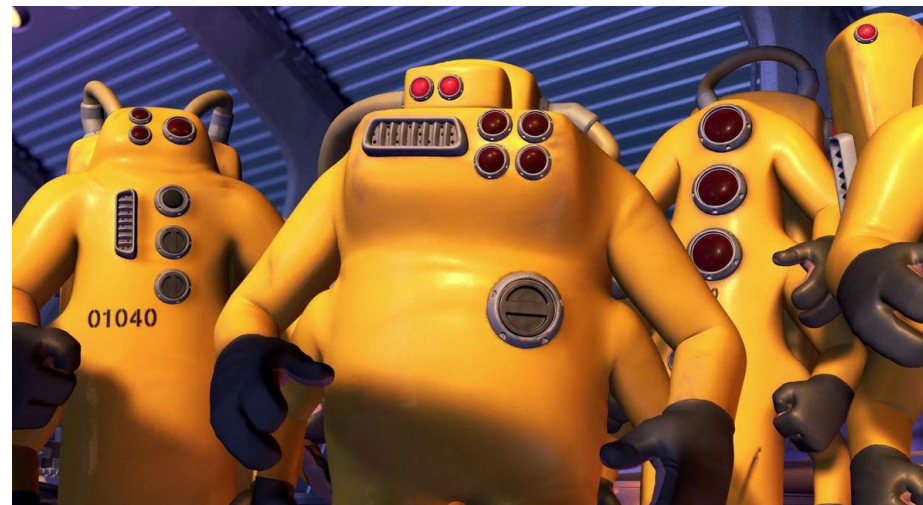
EQUIPMENT SIZES: 7 YEARS and OLDER

Equipment	7-9 yrs	10-12 yrs	13-15 yrs	>15 yrs
Weight	25 kg	30 kg	40 kg	> 50 kg
ETT	5.5-6.0 cuff	6.0-6.5 cuff	7.0-7.5 cuff	7.5-8.0 cuff
L Blade	Mill/Mac 2	Mill/Mac 2-3	Mill/Mac 3	Mill/Mac 3
Suction	10 Fr	10 Fr	12 Fr	12-14 Fr
NG Tube	12-14 Fr	14-26 Fr	14-16 Fr	16-18 Fr
Foley	12 Fr	12 Fr	12-14 Fr	12-14 Fr
Chest Tube	28-32 Fr	28-32 Fr	32-40 Fr	32-40 Fr
LMA (cuff)	2.5	3 (20 mL)	3 (20 mL)	4-6 (30-50 mL)



Decontamination

- Challenges
 - Unable to protect airway and maintain body temperature
 - Non-verbal/limited understanding
 - Being separated from belongings and/or caregivers
 - Resistant to disrobing



Decontamination

- Recommendations
 - Anticipate longer timeframes
 - Keep families together whenever possible
 - Remember that wet babies are slippery!
 - Keep babies and kids warm
 - Include kids in your drills



Pediatric Emergency Preparedness

The Pediatric Disaster Resource and Training Center (PDRTC) at Children's Hospital Los Angeles was first established with grant funding from the U.S. Department of Health and Human Services through the **Hospital Preparedness Program**. Children's Hospital Los Angeles serves as the sole pediatric disaster resource and training center in Los Angeles County and helps to support pediatric preparedness for over 180 other health care facilities, through a partnership with the Los Angeles County Emergency Medical Services Agency.

The goal of the PDRTC is to identify gaps in pediatric disaster preparedness, response and training so that health care providers are prepared to handle the needs of children during a major disaster.

Our Goals

- Expand the hospital's pediatric resources and expertise to a network of geographically dispersed

Pediatric Emergency Preparedness

[How Families Can Prepare for Disasters](#)

[Resources for Health Care Providers](#)

[Children With Special Needs](#)



Pediatric Emergency Preparedness

Pediatric Emergency Preparedness > Resources for Health Care Providers

Resources for Health Care Providers

The Pediatric Disaster Resource and Training Center has focused extensively on preparing hospitals, clinicians and EMS providers for children's needs in a disaster. Below are some resources to help you plan, train and respond.

Pediatric Decontamination

This guide illustrates the steps required for decontamination after a chemical, radiological, or nuclear incident. The guide contains pictures and simple instructions in 6 different languages which will help health care workers communicate with children and non-verbal individuals.

- [Pediatric Decontamination Picture Book](#)

Pediatric Surge Planning

The pediatric surge plan was designed to create a county-wide plan for how each hospital in L.A. County will contribute to caring for children in the event of a surge that largely impacts children.

- [L.A. County Pediatric Surge Plan](#)
- [Pediatric Surge Quick Reference Guide](#)
- [Los Angeles County Emergency Medical Services \(LAC EMS\) Agency](#)

Pediatric Emergency Preparedness

How Families Can Prepare for Disasters

Resources for Health Care Providers

Children With Special Needs

Connected Care

Learn more about virtual visits, our MyChildren'sLA portal to stay connected with your child's care team, and more.

[Learn more about Connected Care](#)

[Learn About Virtual Visits](#)

[Join the My Children's LA Patient Portal](#)

3 | Wash hair

Lavarse el cabello

رعش لاس غا

洗头

머리를 감으세요

ԼԱՆՏԻՔ ՄԱԶԵՐԸ





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Evacuation

- Challenges
 - Kids and infants who cannot walk on their own



Evacuation

- Recommendations
 - Evacuate ambulatory kids all together
 - Ensure staff are trained on how to use equipment
 - Consider design and weight capacity of vests
 - Educate on reverse triage tool



Acuity	Blue/Level 5	Green/Level 4	Yellow/Level 3	Orange/Level 2	Red/Level 1
Life Support*	Stable	Stable+	Minimal	Moderate	Maximal
Mobility*	Car/Car Seat	Wheelchair or Stretcher	Wheelchair or Stretcher	Stretcher	Incubator or Immobile
Nutrition	All PO	Intermittent Enteral	Continuous Enteral or Partial Parenteral	TPN Dependent	
Pharmacy	PO Meds	Intermit IV Meds	IV Fluids	IV Drip x 1	IV Drip ≥ 2
Clinical Support	1 Other***	1 RN or Other***	1 RN, 1 Other***	1 MD, 1 RN, 1 RCP, 1 Other***	1 MD, 2 RNs, 1 RCP (+1 perfusionist, if ECMO)
*Life Support	Stable+	Low flow oxygen			
	Minimal	Oxygen hood, chest tube, etc.			
	Moderate	CPAP/BIPAP/Hi-Flow, Conventional Ventilator, Peritoneal Dialysis, External Pacemaker, Continuous Nebulized Treatments, etc.			
	Maximal	Highly specialized equipment (e.g., Neonatal Ventilator, HFOV, ECMO, iNO, CVVH, Berlin Heart, weight ≤ 1.5 kg, etc.			
**Mobility	Car/Car Seat	Able to ride in automobile with age-appropriate restraints, or Able to be held/carried in adult's arms (internal facility transport only)			
	Incubator	Transport incubator with equipment for connecting to ambulance			
	Immobile	Unsafe to move without special equipment (e.g., neurosurgical, bariatric)			
***Other	Anyone available, unlicensed (e.g., CP, transport) <u>or</u> licensed (e.g., RN, RCP, MD)				

Reunification

- Challenges

- Names of unaccompanied minors (kids don't carry IDs)
- Potential for child abduction

- Recommendations

- Process for identification/matching

1. Take photos of child (before significant medical interventions if able)
2. Ask seeker for recent photo of child
3. Reunification staff match photo to child
 - *If seekers don't have a picture, then a photo of the seeker may be shown to child*



Unaccompanied Minors

- Challenges
 - No legal guardians present (or they are all deceased)
 - Need constant supervision
- Recommendations
 - Work with your legal and social work teams
 - Keep families together whenever possible
 - Designate holding locations with minimal safety concerns
 - Identify trained personnel/security for supervision
 - Put together a box with toys/games



BONUS: Family Preparedness Activity

Activity #1: Pack a "Go Bag"

Game #1: Scavenger Hunt

Game #2: Cut and Paste

Instructions:

1. Cut or fold along the dotted line so that you have the written-out list, and your child has the list of images.
2. Before starting this activity, discuss what your family needs in a go bag, selecting items that your family may need. Extra supplies can be added in the blank space provided or written in. Use the following questions to guide your discussion:
 - Do you think [item #1] should go in our go bag? What about [item #2]?
 - What do you think you should pack?
3. Have your child identify which supplies go into a go bag by cutting out the images, drawing a line from the images to the bag, or pointing to the items. This activity can be played in any way that works for your child.
4. Now it's time to assemble a real go bag!



Activity #2: I Spy an Exit Route

Create an exit route for each emergency. Then lead your family through your plan! See examples on next page.



EARTHQUAKE

What Can You Do?

- Identify pediatric-trained staff at your organization
- Train staff in PALS and JumpSTART
- Maintain pediatric equipment and supplies
- Include pediatric victims and/or family units in your internal exercises and drills
- Think about places nearby where children congregate
- Develop plans for unaccompanied minors

Questions?

Thank you

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