

NORMAL PEDIATRIC VITAL SIGNS

| | HR Beats/ min | RR Breaths /min | BP systolic mm/Hg | BP diastolic 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 |

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 |
| Best 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 |
| Best 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

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EMERGENCY MEDICAL SERVICES AGENCY
LOS ANGELES COUNTY

Pediatric Surge Quick Reference Guide

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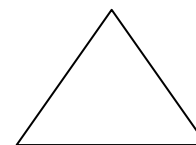
PEDIATRIC RISKS DURING DISASTERS

| System / Area | Risk |
|------------------|---|
| Respiratory | <ul style="list-style-type: none"> Higher breaths/minute increases exposure to inhaled agents Nuclear fallout and heavier gases settle lower to the ground and may affect children more seriously |
| Gastrointestinal | <ul style="list-style-type: none"> May be more at risk for dehydration from vomiting and diarrhea after exposure to contamination |
| Skin | <ul style="list-style-type: none"> Higher body surface area increases risk of skin exposure Skin is thinner and more susceptible to injury from burns, chemicals and absorbable toxins |
| Endocrine | <ul style="list-style-type: none"> Increased risk of thyroid cancer from radiation exposure |
| Thermoregulation | <ul style="list-style-type: none"> Less able to cope with temperature problems with higher risk of hypothermia |
| Development | <ul style="list-style-type: none"> Less capability to escape environmental dangers or anticipate hazards |
| Psychological | <ul style="list-style-type: none"> Prolonged stress from critical incidents Susceptible to separation anxiety |

PEDIATRIC ASSESSMENT TRIANGLE (PAT)

AIRWAY & APPEARANCE

Mental status
Muscle tone
Body position



BREATHING

Visible movement
Work of breathing (normal/increased)

CIRCULATION

Color

AVPU: Alert, Voice, Pain, Unresponsive - Used to assess level of consciousness or alertness in PAT

| Component | Abnormal Signs |
|-------------|---|
| Appearance | Abnormal or absent cry or speech. Decreased response to parents or environmental stimuli. Floppy or rigid muscle tone or not moving |
| Breathing | Increased/excessive (nasal flaring, retractions or accessory muscle use) or decreased/absent respiratory effort or noisy breathing |
| Circulation | Cyanosis, mottling, paleness/pallor or obvious significant bleeding |

PEDIATRIC SIGNS OF RESPIRATORY DISTRESS AND RESPIRATORY FAILURE

Respiratory distress is apparent when a child fails to maintain adequate gas exchange. As the child tires, effort and / or function deteriorate and gas exchange cannot be maintained.

Respiratory failure *requires* intervention to prevent deterioration to cardiac arrest.

Indicators may vary with severity.

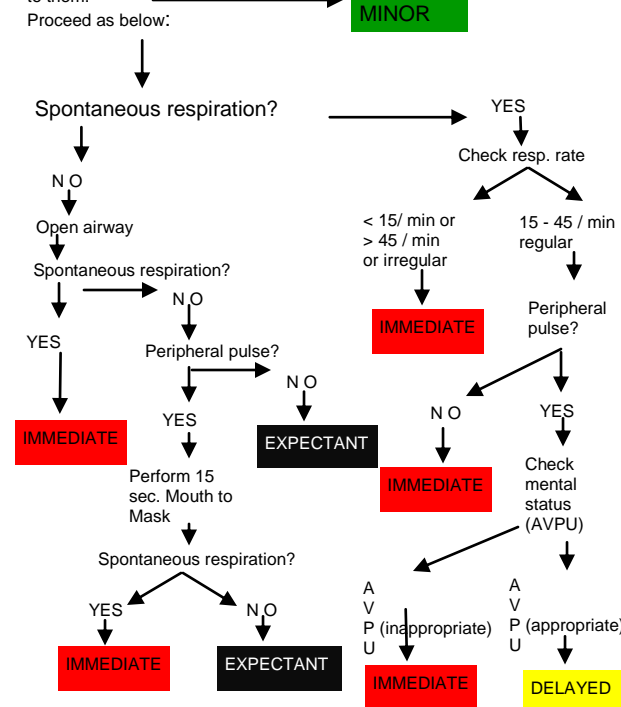
| Respiratory Distress | Respiratory Failure |
|--|---|
| Tachypnea | Marked tachypnea (early) |
| Increased respiratory effort (nasal flaring, retractions) | Increased, decreased or no respiratory effort |
| Inadequate respiratory effort (hypoventilation, bradypnea) | Bradypnea, apnea (late) |
| Abnormal airway sounds (stridor, wheezing, grunting) | Poor to absent distal air movement |
| Tachycardia | Tachycardia (early), Bradycardia (late) |
| Pale, cool skin | Cyanosis |
| Changes in level of consciousness | Stupor, coma (late) |

JUMPSTART FIELD PEDIATRIC MULTICASUALTY TRIAGE SYSTEM

Patients ages 1-8 years

Identify and direct all ambulatory patients to designated Green area for secondary triage and treatment. Begin assessment of non-ambulatory patients as you come to them.

Green = Minor / Ambulatory
Yellow = Delayed
Red = Immediate
Black = Expectant or Dead



TREATMENT PRIORITIZATION

| Triage category | Description |
|--------------------------------|--|
| Green Minor | Patients with mild injuries that are self-limited and can tolerate a delay in care without increasing mortality risk |
| Yellow Delayed | Remaining patients who do not fit in the Red or Green categories |
| Red Immediate | Patients who do not obey commands <u>Or</u> do not have a peripheral pulse, <u>Or</u> are in respiratory distress, <u>Or</u> have uncontrolled major hemorrhage |
| Black Expectant or Dead | Expectant: Patients who have injuries incompatible with life given the current available resources Dead: Patients who are not breathing after life-saving interventions |

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) may be used for weight estimation. |

DAILY MAINTENANCE FLUID AND ELECTROLYTE REQUIREMENTS

| | Calculation |
|---|--|
| Fluids per hour | 4mL/kg/hr. for first 10 kg of weight 2mL/kg/hr. for next 10 kg of weight 1mL/kg/hr. for each kg over 20 kg |
| Fluids per 24 hour period | First 10 kg body wt. give 100mL/kg Next 10kg body wt. give 1000mL (for 1st 10 kg) + 50mL/kg over 10 kgs Each kg of body wt. over 20 kg give 1500mL (for 1st 20 kgs) + 20mL/kg |
| 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 | |
|---------------|--|
| 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 time 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, anuria |
| 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 - 4 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) = [16 + age (y)] / 4

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 | 3.0-3.5 | 3.5-4.0 | 4.0-4.5 | 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 | Mil/Mac 2 | Mil/Mac 2-3 | Mil/Mac 3 | Mil/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) |