

Reference 7 Pediatric Assessment Tools

INTRODUCTION:

Pediatric emergencies may present a daunting challenge to prehospital care providers for a variety of reasons including:

1. The historical scarceness of primary training materials about the care of pediatric patients
2. The relative infrequency of pediatric emergency calls, and the even more limited occurrence of life-threatening emergencies
3. The variability in size, development, and physiologic responses to illness and injury of pediatric patients, making assessment more challenging than for adults
4. The nature and variety of causes of pediatric emergencies, many differing substantially from those for adult emergencies

ASSESSMENT:

Care of the pediatric patient begins with **assessment**. This is **the most important**, and often the most challenging step. In the pre-hospital setting the key issues are:

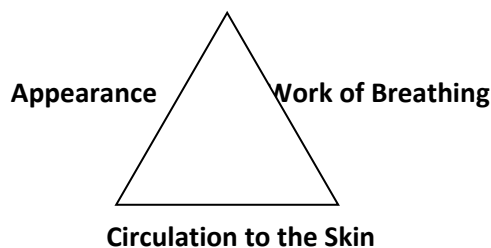
1. What vital physiologic functions are affected?
2. How severe is the physiologic abnormality - stable, unstable, or critical?

Assessment and management should always begin with the Initial Assessment Protocol. The initial assessment can be accomplished by rapidly employing the following:

1. Pediatric Assessment Triangle
2. Primary Survey (ABCDEs)
3. Vital Signs

THE PEDIATRIC ASSESSMENT TRIANGLE (PAT)

The Pediatric Assessment Triangle is a rapid, accurate, easily learned tool for initial assessment (see figure below). It establishes a level of severity and urgency for life support, and identifies a general category of physiologic problem. Based primarily on visual observation without stethoscope, blood pressure cuff, or any equipment or test, it integrates three key features of the overall pediatric cardiopulmonary and neurologic assessment: **appearance, work of breathing, and circulation to the skin.**



The Pediatric Assessment Triangle

HEALTHEAST MEDICAL TRANSPORTATION MEDICAL OPERATIONS MANUAL

APPEARANCE: The general appearance is the **single most useful indicator** of serious illness or injury. It can usually be judged from across the room. Assess by:

Indicator	Normal	Abnormal
Tone	Normal	Limp, listless, or flaccid
Interactiveness - the most important characteristic to note. Regardless of cause, if the appearance is abnormal, perform the pediatric primary survey and begin life support to optimize oxygenation, ventilation, and perfusion	Alert (for newborns, responds to voice or touch)	Agitated / lethargic
Consolability	Can be comforted	Inconsolable
Look / Gaze	Can fix and follow (newborns will not fix or follow, but will blink to light)	Glassy-eyed stare
Speech / Cry	Strong	Weak, muffled, or hoarse

WORK OF BREATHING:

Assess by: Examining the respiratory effort, chest wall, and lung sounds

Indicator	Normal	Abnormal
Abnormal breath sounds	None	Stridor, grunting, or wheezing
Abnormal positioning	None	Tripoding, refusing to lie down
Retractions	None	Present
Nasal flaring	None	Present

CIRCULATION TO THE SKIN: Indicates perfusion of vital organs.

Assess visually by noting skin or mucous membrane color:

Indicator	Normal	Abnormal
Pallor, mottling, cyanosis	None	Present

*****The three elements of the triangle are interdependent, and together provide a rapid assessment of SEVERITY, PHYSIOLOGIC ABNORMALITY (Table 1 on following page) and CATEGORY OF ABNORMALITY (Table 2 on following page)*****

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MEDICAL OPERATIONS MANUAL

**TABLE 1 - SEVERITY OF PHYSIOLOGIC ABNORMALITY
DETERMINED USING THE PEDIATRIC ASSESSMENT TRIANGLE**

SEVERITY OF ABNORMALITY			
OBSERVATION	STABLE	UNSTABLE	CRITICAL
Tone	Normal	↑↑	↓↓
Interactiveness	Appropriate	Agitated	Depressed
Consolability	Comforts	Won't Comfort	Unresponsive
Look / Gaze	Regards	Won't Regard	Glassy-eyed Stare
Speech / Cry	Normal	Weak	None
Work of Breathing	↑	↑↑	↑↑↑ or ↓↓↓
Skin Color	Normal	Dusky	Cyanotic on O2

**TABLE 2 - CATEGORY OF PHYSIOLOGIC ABNORMALITY
DETERMINED USING THE PEDIATRIC ASSESSMENT TRIANGLE**

APPEARANCE	WORK OF BREATHING	CIRCULATION TO THE SKIN	ILLNESS/ INJURY CATEGORY
Normal	Normal	Normal	Normal
Normal	Abnormal	Normal	Respiratory Distress
Abnormal	Abnormal	Normal	Respiratory Failure
Abnormal	Normal	Normal	Systemic Failure or CNS Injury
Abnormal	Normal	Abnormal	Shock
Abnormal	Abnormal	Abnormal	Multiple Organ Failure

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TYPICAL NORMAL VITAL SIGNS FOR INFANTS AND CHILDREN				
Age	Normal Heart Rate	Minimal Systolic Blood Pressure (mmHg)	Respiratory Rate (Breaths/min)	Typical Weight (kg/lb)
Infant (< 1yr)	100-160	>60	30-60	3-10 / 6.6-22
Toddler (1-3 yr)	90-120	>70	20-40	10-14 / 22-30
Preschooler (4-5 yr)	80-120	>75	22-34	15 / 33
School Age (6-12 yr)	70-100	>80	18-30	20-40 / 44-90
Adolescent (>13 yr)	60-90	>90	12-16	40-70 / 90-155

PEDIATRIC AIRWAY MANAGEMENT INFORMATION									
PARAMETER	AGE								
	<1yr	1mo	6mo	1yr	2yr	3yr	6yr	10yr	Teen
Spontaneous Tidal Volume	20	30	50	70	85	100	150	250	300-500
ET tube size (mm)	3-3.5	3.5	3.5-4	4	4.5	4.5	5-5.5	6-6.5	7-8
ETT length: teeth/gum to mid trachea (cm)	10	11	12	13	14	15	15	17	19-22

PEDIATRIC FLUID MANAGEMENT INFORMATION									
PARAMETER	AGE								
	<1yr	1mo	6mo	1yr	2yr	3yr	6yr	10yr	Teen
Blood Volume (ml)	240	320	560	800	1000	1100	1600	2800	3200-5600
Usual maintenance fluid rate (ml/hr)	12	15	30	40	45	50	60	75	80-100

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MEDICAL OPERATIONS MANUAL

PEDIATRIC BURN SURFACE AREA PERCENTAGES				
AREA OF BODY	AGE			
	INFANT	1-4YR	5-9YR	10-14YR
Head + Neck (front + back)	21	19	15	13
Anterior Trunk	16	16	17	17
Posterior Trunk	16	16	17	17
Each Arm (front + back)	9	9	9	9
Each Leg (front + back)	14	15	16	17
Genitalia	1	1	1	1

APGAR SCORE			
SIGN	0	1	2
Appearance (Skin color)	Blue, pale	Body pink, extremities blue	Completely pink
Pulse Rate (Heart Rate)	Absent	Below 100	Above 100
Grimace (Irritability)	No response	Grimaces	Cries
Activity (Muscle Tone)	Limp	Some flexion of extremities	Active motion
Respiratory (Effort)	Absent	Slow and Irregular	Strong cry
Total Score			