

# Prehospital Pediatric Care Course

## Lesson 3 Pediatric Assessment

Initial assessment methods used for adults must be modified when EMTs encounter children. As previously discussed, developmental and physiological considerations effect the EMT's approach to children.

In this lesson, the focus will be three-fold:

- Why and how to perform a rapid "first impression" assessment.
- Why, how and when to perform the physical examination in two parts: Initial assessment and detailed physical exam.
- Why, how and when to conduct the focused history.

### **Rapid First Impression: Why**

- A rapid first impression is accomplished by observations made on first sight of the patient.
- The objective is to determine whether the child's condition is urgent or non-urgent.

### **Rapid First Impression: How**

By observing the child's

- Appearance
- Breathing
- Skin

EMT's are able to recognize if the child's condition is urgent or non-urgent.

## **Rapid First Impression: Appearance**

- Observe Mental Status
  - Is the child alert?
  - Immediate response to parents?

Alert = Non-urgent  
Other than alert = Urgent

- Observe muscle tone and body position

Normal for age= Non-urgent

Examples:

Young infants lying with flexed arms and legs, Older children sitting comfortably

**Anything else (floppy, stiff, unable to sit) = urgent**

## **Rapid First Impression: Breathing**

- Observe and listen

**Is there visible movement of the chest or abdomen?**

**Are there audible sounds associated with breathing?**

**Does the child appear to be making extra effort in order to move air in or out?**

The chest wall is moving without extra effort and without audible sounds=

Non-urgent

Chest wall movement with extra effort or audible sounds = Urgent

No visible chest wall movement = Urgent

## Rapid First Impression: Circulation

- Observe the skin color to evaluate the circulation.

In children with dark skin tones look at the lips, tongue, palms or soles.

Pink tones = Non-urgent

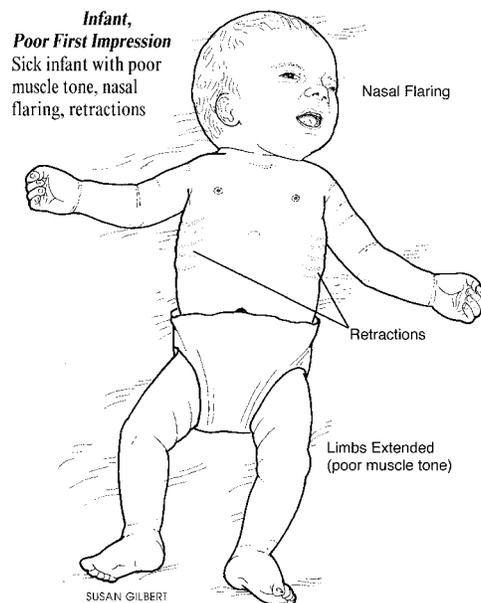
Pale, bluish or mottled color = Urgent

## Rapid First Impression: Urgent

A child with an **urgent** condition requires immediate intervention to support airway, breathing or circulation.

**Immediate intervention  
AND  
Rapid transport are the priority.**

- Additional physical exam and history taking are *delayed* until after transport is begun.
- Briefly explain interventions to parents.
- It is *always more important* to get the child to definitive care than it is to complete the focused history or initial assessment.



## Rapid First Impression: ALWAYS URGENT

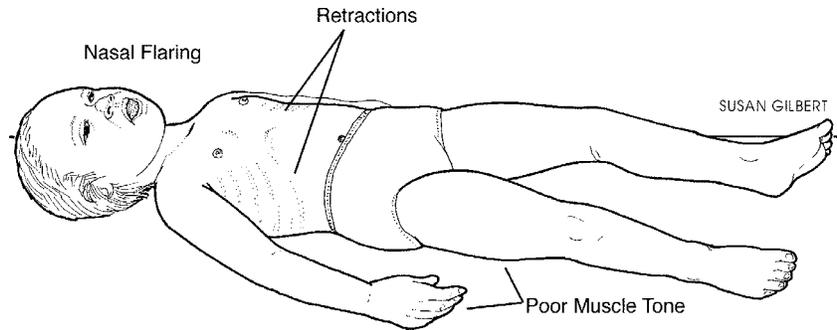
A child, of any age, who is

**unresponsive**

**or**

**has severe trauma**

needs *immediate* intervention and *rapid* transport.

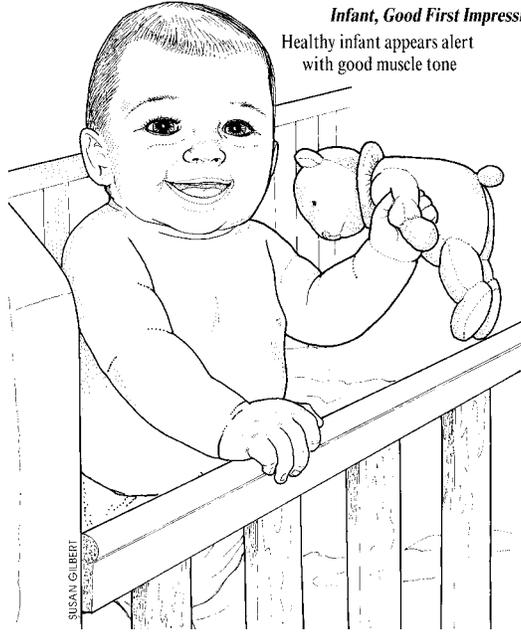


## Rapid First Impression: Non-urgent

A child with a **non-urgent** condition can be approached in a more gradual manner.

The initial assessment and focused history can be done at the scene or during transport.

**Infant, Good First Impression**  
Healthy infant appears alert  
with good muscle tone



SUSAN CHILBERT

# Rapid First Impression Case 1

You are called to a home for a 2 year old with respiratory distress.

As you enter the child's bedroom, you observe a calm toddler with a flushed face comfortably sitting on his mother's lap. You can see that he is breathing easily and hear no abnormal sounds. When he sees you, he tightens his grip on his mother and begins to cry loudly.

**What is your impression: Urgent or Non-urgent? Why?**

The child's condition appears to be \_\_\_\_\_ because:

**Appearance:** \_\_\_\_\_.

**Breathing:** \_\_\_\_\_.

**Circulation:** \_\_\_\_\_.

**How would you approach this child?**

Begin by enlisting the assistance of the mother in examining the child including leaving the child on her lap and asking her to lift his shirt, placing the head of the stethoscope on the chest, etc.

Bring your height down to the child's when examining him. Try distracting him with a toy and examine only what is needed.

Obtain the focused history from the mother.

If the initial assessment reveals a problem, or if the child's appearance, breathing or circulation status deteriorates, the child's condition would be changed to urgent.

## Rapid First Impression Case 2

You are called to a home for a 2 year old with respiratory distress.

As you enter the child's bedroom, you observe an alarmingly pale toddler draped across her mother's chest. You hear no abnormal respiratory sounds. When she sees you approaching, she does not react.

**What is your impression: Urgent or Non-urgent? Why?**

This child's condition is \_\_\_\_\_ because:

**Appearance:** \_\_\_\_\_.

**Breathing:** \_\_\_\_\_.

**Circulation:** \_\_\_\_\_.

**What is the best approach for this child?**

This child requires definitive care, diagnosis and treatment not available in the pre-hospital setting to determine the cause of her altered mental status and pallor.

The best approach for this child is to keep her calm, in her mother's arms, provide high concentration oxygen and rapidly transport.

Further examination and focused history can be done enroute to the hospital.

# Initial Assessment

When the rapid first impression indicates that the child's condition is non-urgent, or during the transport of a child with an urgent condition, EMTs turn their attention to completing the initial assessment.

During the initial assessment, EMTs continue to observe while actively assessing the child's

- airway
- breathing
- circulation
- mental status

**Treatment is given at each step.**

**Continue to think in terms of urgent and non-urgent condition.**

If initial assessment reveals a problem that changes the child's condition to urgent

**Perform immediate interventions  
*and*  
Initiate transport**

The remainder of the exam and the history may then be completed during transport.

# Initial Assessment - Airway

Assessment of the airway is done for two reasons:

- To assure that the airway is open (patent)
- To detect and prevent obstructions that can compromise the airway

Begin by assuring airway patency

## **Is the child effectively moving air?**

- Is the child able to speak or cry vigorously?
- Ask the parent to lift the child's shirt.
- Look for signs of airway obstruction.
- Observe movement of the chest or abdomen.

## **Is there a potential for airway compromise?**

Listen for sounds that indicate airway obstruction or excessive secretions

- *Stridor*: A high or low pitched sound that occurs when the child breathes in, **stridor indicates partial obstruction of the upper airway**
- Foreign body?
- Swelling (from disease, poison, etc)?

**If FBAO is suspected, follow AHA guidelines and transport rapidly.**

**Provide humidified high concentration oxygen by non-rebreather mask or blow- by oxygen tubing.**

If airway swelling is suspected, keep the child in the position most comfortable for breathing.

- Do not separate from parent or agitate the child unnecessarily

**Provide humidified high concentration oxygen by non-rebreather mask or blow by oxygen tubing**

**DO NOT examine or insert anything into the oropharynx.**

Ask parent about the child's activities immediately preceding onset of symptoms

Try to determine the cause of problem

Ingestion can occur in seconds with an unsupervised child.

Illness is suggested by recent or current respiratory symptoms such as cough or presence of fever.

Another sound associated with airway compromise is *gurgling*, a bubbling sound that indicates excessive secretions.

**Provide high concentration oxygen by non-rebreather mask or blow by oxygen tubing.**

- Position the child to maximize drainage from mouth.
- Be prepared to suction and ventilate with a bag-valve-mask if mental status deteriorates.



# Initial Assessment-Breathing

Following the airway assessment and interventions, breathing is assessed.

## **Is the child breathing adequately?**

Look for

Movement of chest

Extra effort used to breathe

Blue skin tones

Listen for lung sounds

Count respirations

## **Is the chest rising equally on both sides?**

- The chest should move smoothly with no noticeable difference from left to right.
- The depth and rhythm of chest movement should be regular.

**If the chest is not rising, begin ventilations with a bag-valve-mask and supplemental oxygen.**

- Reassess the airway
- Position the head
- Unlike the adult, ventilate with just enough pressure to see the chest rise.

Observe the **respiratory effort**

## **Is the child working hard just to breathe?**

The extra effort of moving air in to or out of the lungs indicates respiratory distress and eventually can exhaust the child.

Look for signs of extra effort:

**Retractions** - The skin appears to pull in above the sternum or clavicles and/or between or below the ribs.

**Head bobbing** - The head draws back during inspiration and falls forward during expiration.

**Nasal flaring** is seen in infants and toddlers. As the child breathes out, the nostrils widen.

### **Is air moving freely through the lungs?**

Assess the lung sounds using a stethoscope placed on the lateral chest wall directly under the axilla (armpit).

Normal sounds should be equal, clear

All other sounds indicate that air traveling to the lungs is meeting resistance.

Wheezing is a whistling sound heard in the chest.

Wheezes are caused by air moving through narrowed lower airway passages.

Mucous plugs can cause wheezes.

Spasms of bronchi or bronchioles can cause wheezes.

Wheezes are usually heard on expiration.

Wheezes may be audible without a stethoscope.

When wheezes are present, air movement requires extra work to move the air out of the lungs. Some air is trapped in the narrowed passages so that less oxygen rich air reaches the alveoli and less oxygen is exchanged.

Wheezes may be heard with asthma, bronchiolitis and other diseases.

Wheezes are also associated with smoke inhalation.

Crackles are sounds heard when fluid is present in the alveoli, associated with pneumonia and other lung infections.

When crackles are present, fluid is occupying the air space where oxygen exchange takes place, so that less oxygen is readily available to move into the bloodstream.

Grunting is a sound heard at the end of expiration. Grunting sounds like a rhythmic whining.

A child who is grunting is using the chest, neck and head together in order to breathe. Head bobbing is often seen with grunting. This breathing takes extreme effort that can quickly exhaust the child.

When EMTs encounter a child who is grunting, they should immediately consider the child's condition urgent and begin transport without delay.

Provide high concentration oxygen by non-rebreather mask.

Be prepared to assist ventilations with a bag-valve-mask.

### **Is the rate of breathing adequate?**

Count the respirations for 30 seconds and double that number to determine the respiratory rate.

Remember that respiratory rates that are too fast or too slow for the child's development prevent adequate oxygenation.

<b>Pediatric Respiratory Rates</b>	
<b>Age</b>	<b>Rate (breaths per minute)</b>
Infant (birth–1 year)	30–60
Toddler (1–3 years)	24–40
Preschooler (3–6 years)	22–34
School-age (6–12 years)	18–30
Adolescent (12–18 years)	12–16

Look at the skin, lips and tongue for signs of low blood oxygen.

Well-oxygenated skin has a pink tone.

Poorly oxygenated skin has a blue or mottled tone.

## Initial Assessment: Circulation

Circulation is assessed in order to

Find and stop active bleeding.

Look and feel for bleeding

Determine if perfusion is sufficient.

- Compare peripheral and central pulses

- Skin temperature

- Skin tones

Unlike adults, blood pressure is ***not*** a reliable indicator of poor perfusion in children and should not be the determining factor used to decide if the child has hypoperfusion.

Blood pressure can be measured in children over three, particularly when the condition is non-urgent and there is no need to expedite transport.

Begin circulation assessment by detecting and stopping active bleeding.

- Use direct pressure, elevation and, when necessary, the proximal pressure point.

Remember that seemingly small blood losses can be significant as a child has a much smaller blood volume than an adult.

Determine whether circulation is sufficient:

**Are there any signs of poor perfusion?**

Assess and compare:

Central and peripheral pulses

Palpate both at the same time

Strength of pulse should be nearly equal

Central pulses are carotid, femoral and brachial.

Peripheral pulses are pedal or radial.

Begin chest compressions in infants and children who are receiving assisted ventilation if

- **the patient has a pulse rate slower than sixty beats per minute with signs of hypoperfusion or poor peripheral perfusion or**
- **has no pulse.**

For infants and children, deliver five compressions for each ventilation until the pulse rate exceeds sixty.

Both central and peripheral pulses are normally strong and distinct on palpation.

The peripheral pulse may normally feel slightly less strong than the central pulse, but the pulsations are distinctly felt.

When a peripheral pulse is absent, not distinct or feels much weaker than the central pulse, hypoperfusion may be present.

In either case, check the skin.

—Assess and compare peripheral and central skin:

—Feet, legs and trunk or

—Hands, arms and trunk

Color

Look for mottling, pallor or blue tint, which indicate poor perfusion.

Temperature

Feel for coolness that may indicate poor perfusion if the environment is warm.

Assess pulses for heart rate.

Count for 30 seconds and double to get heart rate.

Use either a peripheral or central pulse.

Is the rate too fast or too slow?

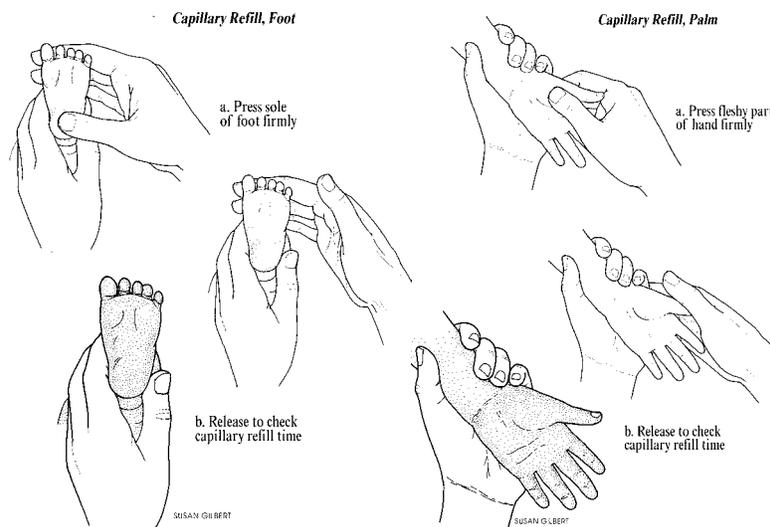
Assess capillary refill time.

Elevate hand or foot slightly above the level of the heart.

Press firmly and release.

Refill time is normal at 2 seconds.

Remember that a cool environmental temperature will increase capillary refill time.



Pediatric Pulse Rates		
Age	Low	High
Infant (birth–1 year)	100	160
Toddler (1–3 years)	90	150
Preschooler (3–6 years)	80	140
School-age (6–12 years)	70	120
Adolescent (12–18 years)	60	100

*Pulse rates for a child who is sleeping may be 10 percent lower than the low rate listed.*

## Pediatric Pulse Rates

**Put these assessment pieces together:**

- Central vs. peripheral pulse quality
- Central vs. peripheral skin color and temperature
- Capillary refill time

**If there is a single deviation from normal, consider hypoperfusion a possibility. More deviations increase the likelihood that hypoperfusion is present.**

If hypoperfusion is suspected, begin treatment.

Provide high concentration oxygen.

Initiate transport.

Conserve body heat.

Children lose body heat more readily than adults do. Even when environmental temperature is warm, cover the child with a light blanket.

Elevate legs unless spinal injury is suspected.

If the pulse is absent or slow:

- Begin chest compressions in infants and children who are receiving assisted ventilation if
  - the patient has a pulse rate slower than sixty beats per minute with signs of hypoperfusion or poor systemic perfusion, or
  - has no pulse.
- For infants and children, deliver five compressions for each ventilation until the pulse rate exceeds sixty.

Pediatric Pulse Rates		
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## Initial Assessment: Mental Status

To complete the initial assessment, assess the child's mental status.

Is the child alert?

Use the AVPU assessment tool.

Normal finding is A for alert. All other findings are not normal and may indicate low blood oxygen or hypoperfusion.

For school age children and older, AVPU can apply as for adults. Children of school age can be expected to know their names, locations and can differentiate between day and night.

A= Alert to person, place and time.

V=Responsive to verbal stimulus

P=Responsive to painful stimulus

U=Unresponsive

In order to accommodate the developmental differences among children younger than school age (about 6 years), use the following:

**Alert:** The child is active, responsive to parents, and interacts appropriately with surroundings.

**Verbal** stimulus: The child is not looking around and responds only when the parents say the child's name.

**Painful** stimulus: The child responds only to a painful stimulus, such as rubbing the chest or squeezing a fingernail.

**Unresponsive** to any type of stimulus.

If the child is alert or verbal, high concentration oxygen is indicated.

If the child responds only to painful stimulus or is unresponsive, ventilations may need to be assisted.

Rapid interventions to support airway, breathing and circulation

**and**

Transport are indicated for any child who is not alert or easily awakened by verbal stimulus.

Delay further examination and history until enroute to the hospital.

## CUPS Assessment

Using the findings of the initial assessment, make a CUPS decision.

**Critical**

**Unstable**

**Potentially unstable**

**Stable**

Pediatric CUPS Assessment			
Category	Assessment	Actions	Example
<b>Critical</b>	Absent airway, breathing, or circulation	Perform rapid initial interventions and transport simultaneously	Severe traumatic injury with respiratory arrest or cardiac arrest
<b>Unstable</b>	Compromised airway, breathing, or circulation with altered mental status	Perform rapid initial interventions and transport simultaneously	Significant injury with respiratory distress, active bleeding, hypoperfusion; near-drowning; unresponsiveness
<b>Potentially unstable</b>	Normal airway, breathing, circulation, and mental status <i>BUT</i> significant mechanism of injury or illness	Perform initial assessment with interventions; transport promptly; do focused history and physical exam during transport if time allows	Minor fractures; pedestrian struck by car but with good appearance and normal initial assessment; infant younger than three months with fever
<b>Stable</b>	Normal airway, breathing, circulation, and mental status; no significant mechanism of injury or illness	Perform initial assessment with interventions; do focused history and detailed physical exam; routine transport	Small lacerations, abrasions, or ecchymoses; infant older than three months with fever

Based on CUPS Assessment Table © 1997 N. D. Sanddal, et al. Critical Trauma Care by the Basic EMT, 4th ed.

# Assessment Scenario

You are called to a home for a 2 year old with respiratory distress.

As you enter the child's bedroom, you observe a calm toddler with a flushed face comfortably sitting on his mother's lap. You can see that he is breathing easily and hear no abnormal sounds. When he sees you, he tightens his grip on his mother and begins to cry loudly.

With the mother's reassurance, the toddler stops crying, but continues to hold on to her.

Using the steps of the initial assessment, and the information that follows, assess this child.

## Is the child effectively moving air?

You've made the observation of \_\_\_\_\_, so you know that the child is \_\_\_\_\_. The airway is open.

What else do you need to ascertain about this child's airway?

You need to know

## Is there a potential for airway compromise?

List the four steps you should take to determine this:

Ask \_\_\_\_\_

Look \_\_\_\_\_

Observe \_\_\_\_\_

Listen \_\_\_\_\_

The chest wall movement is visible. No abnormal sounds are heard nor excessive secretions seen.

**Has any problem arisen that changes this child's condition from non-urgent to urgent?**

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**What assessment should you now perform?**

Assess breathing

What do you need to know?

**Is the child breathing adequately?**

Observe \_\_\_\_\_

Listen \_\_\_\_\_

Count \_\_\_\_\_

**Look for**

Movement of chest

**Is the chest rising equally on both sides?**

Chest rise is even, regular

**Is the child working hard just to breathe?**

Retractions at sternum noted on expiration, indicate extra effort is being used.

Skin tones are pink. This indicates that, despite the extra effort, the child is well oxygenated.

**Is air moving freely through the lungs?****Listen** for lung sounds

Wheezes are heard throughout the lung fields on expiration.

**Is the rate of breathing adequate?**

There are 18 respirations in 30 seconds.

This rate is within the normal range.

**Has any problem arisen during the breathing assessment that changes the child's condition from non-urgent to urgent?**

Yes. The child shows signs of increased respiratory effort and sounds associated with lower airway resistance, therefore, the child's condition is now urgent.

**The action to take now is to:**

Provide high concentration oxygen.

Transport in a position of comfort (probably securing both mother and child together on the ambulance stretcher.

Continue with the assessment.

**What do you want to assess now?**

Assess circulation.

- Observe \_\_\_\_\_
- Feel/Compare \_\_\_\_\_
- Count \_\_\_\_\_

Begin by finding and controlling active bleeding.

There is no active bleeding.

**Are there signs of poor perfusion?**

What do you need to assess and compare?

Assess and compare

- Central and peripheral pulses
- Palpate both at the same time
- Strength of pulses are nearly equal

Assess and compare central and peripheral skin.

Color

No mottling, pallor or blue tint seen in hands, arms and trunk.

Temperature

Hands, arms and trunk are warm.

**What do you want to assess now?**

Assess pulses for heart rate.

In 30 seconds you count 60 beats at the femoral pulse.

**Is this rate too fast or too slow? No**

Assess capillary refill time.

After elevating the hand slightly above the level of the heart, you press firmly and release. The refill time is 2 seconds.

**Are there signs of poor perfusion? No**

What do you want to assess now?

Assess mental status.

Using AVPU, what is this child's mental status?

Consider his response to you and to his mother.

He was fearful of your approach because he cried when you entered his bedroom. In turn, he clung to his mother and seems most comfortable on her lap because she is his security in the presence of strangers.

For a 2 year old, this is an appropriate response and therefore, he is alert.

A on the AVPU scale.

What is his CUPS assessment?

CUPS is P, potentially unstable because he has some respiratory distress and increased work of breathing. However, he shows no signs of low blood oxygen or hypoperfusion and his mental status is alert.

Reassess the ABCs and mental status frequently, throughout the rest of the exam and during transport. These factors provide the earliest and most reliable indicators of change in a child's condition.

## **Focused History**

Another component to pediatric pre-hospital care is the focused history.

Use the SAMPLE format in a similar manner to adults.

### **SAMPLE**

**S**igns and symptoms-assessment findings plus history

**A**llergies-especially to medications

**M**edications that the child is currently taking

**P**ast medical problems

**L**ast food or liquid the child has taken

**E**vents leading to illness or injury

In addition to the SAMPLE, ask questions about the specific problem:

#### **With illness, when were the first signs noticed?**

Did this illness start suddenly or has there been a gradual onset?

Are there others in the home that share these signs and symptoms?

#### **Are there additional complaints?**

Irritability? Loss of appetite? Change in activity?

#### **Is this the first time this problem has occurred?**

## How does this episode compare to previous ones?

If there has been an event such as an injury or seizure that precipitated the problem, finding out the details can be helpful:

### Mechanism of injury

Blood loss? Fall from height? Changes in mental status since trauma occurred?

### Seizure

How did it start? How long did it last? Was the child's behavior prior to the seizure different from usual?

### Fever

Has the temperature been taken? By what method? How long ago? Has any treatment been given for the fever?

### Poisoning

What substance? How much? When? Where is the container?

For ingestions, has the child been given anything to eat or drink since the ingestion occurred?

History taking is primarily a skill of meaningful listening. Parents whose child has become ill or injured to the extent that they are calling for help, may not be able to answer every question you may have.

However, if you listen to the parents, they will often give you much of the information you seek.

Most importantly, **never** delay transport of a child who is urgent or has a CUPS of C or U in order to obtain a history.

## Focused History Scenario

You are enroute to the hospital with a two year old and his mother. During the initial assessment, you found wheezing and sternal retractions on expiration. Based on these findings, you began to transport and now want to obtain a focused history.

### **Where do you start?**

Begin with SAMPLE

**S**igns of respiratory distress

**A**llergies- None, per mother

**M**edications taken - Just cough syrup since yesterday.

**P**ast medical problems - None, per mother

**L**ast food eaten - About two hours ago, ate one cracker and drank juice.

**E**vents leading up to this: No events other than the runny nose and cough.

### **What else do you want to ask mother?**

#### **Ask about the specific problem.**

Q: When did you first notice the breathing trouble?

A: When I tried to lay him down to nap, it seemed like he was having trouble breathing, but it stopped as soon as he sat up. It really scared me and that's when I called you.

### **What else do you want to ask now?**

**Ask more details about the specific problem.**

Q: Did you notice any other changes in your son today?

A: Usually, I have to chase him around because he loves to climb on everything, but today, he has been so quiet. All he wants is for me to hold him.

Q: Anything else?

A: Well, he hasn't eaten much all day.

**What have you learned about this child?**

The SAMPLE revealed that the child has had a cough and runny nose prior to today. He has been given cough syrup for this.

He has had a change in his behavior today.

He has a decreased appetite.

His behavior has changed from very active to very quiet.

He had an event where breathing was difficult for him apparently due to being laid down.

Do any or all of these history findings relate to the current problem?

If so, how do they relate?

Each isolated item may not mean much by itself. Putting the items together, however, and the circumstances surrounding this child's illness become much clearer.

**How would you present this patient's assessment, management and history to the Emergency Department personnel?**

This 2-year-old boy presented to us alert in his mother's lap. Our initial assessment revealed that he had wheezes and sternal retractions on expiration. We administered high concentration oxygen and began transporting. His initial vital signs were RR: 36 and labored on expiration; HR 120, strong and regular, skin pink and warm.

His mother told us that she called the ambulance for help because her son had trouble breathing when she tried to lay him down to nap. The trouble was resolved when he sat up again. She further told us that he has had a runny nose and cough since yesterday. Today, his behavior changed from very active to quiet and he has lost his appetite.