

# Certified Pediatric Emergency Nurse

Now with  
over  
1200  
questions!



**CPEN**  
Review

Putting It All  
Together

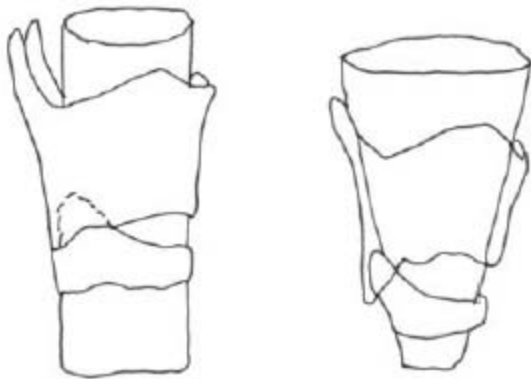
**4th Edition**

**Scott DeBoer**

RN, MSN, CPEN, CEN, CCRN, CFRN

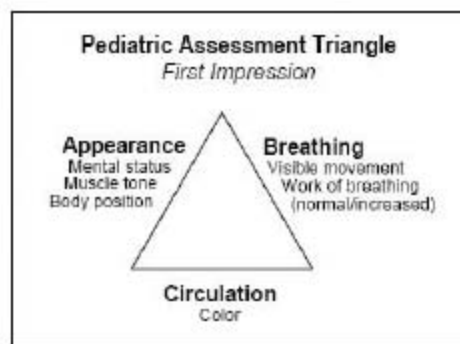
Editors: Bacon • Dawson • Romig • Seaver

[www.PediEd.com](http://www.PediEd.com)



**Adult vs. Pediatric Airways**

**Illustration by Nina DeBoer, then age 9 (my aspiring artist daughter, now aspiring baker daughter)**



Gen. Appearance	Work of Breathing	Circulation to Skin	Pathophysiologic Category	Compensated?	Sick?
Good	Normal	Normal	No active compromise to vital functions	Yes	No
Good	Increased	Normal	Respiratory distress (varying degrees)	Yes	No
Poor	Increased or poor effort	Normal	Respiratory failure	No	YES!
Good	Normal	Abnormal	Peripheral vasoconstriction (medications, fever, hypothermia)	Yes	Probably not
Poor	Normal to mildly increased	Abnormal	Shock	No	YES!
Poor	Normal	Normal	Central nervous system dysfunction (postictal, head injury, intoxication)	No	YES!
Poor	Poor effort	Abnormal	Cardiopulmonary failure	No	YES!
Poor	None	None	Cardiopulmonary arrest	No	YES!

### Pediatric Assessment Triangle (PAT) and Pathophysiology

Courtesy of Lou Romig MD,FAAP,FACEP

[www.jumpstarttriage.com](http://www.jumpstarttriage.com)

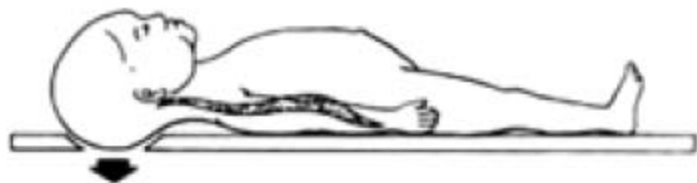


**Range of BP Cuff Sizes**

**Photo courtesy of Welch Allyn**

**[www.welchallyn.com](http://www.welchallyn.com)**





**Pediatric Spinal Positioning**

**Photos courtesy of the**

**Journal of Bone and Joint Surgery**



**“Peanut” Papoose**

**Photo courtesy of Ossur**

**[www.ossur.com](http://www.ossur.com)**



**Pedi-Align Pediatric Spinal Board**

**Photo courtesy of Iron Duck**

**[www.ironduck.com](http://www.ironduck.com)**

<b>Two-level triage</b>	<b>Three-level triage</b>	<b>Four-level triage</b>	<b>Five-level triage</b>
Emergent	Emergent	Critical	Resuscitation
Non-emergent	Urgent	Acute	Emergent
	Non-urgent	Urgent	Urgent
		Non-urgent	Semi-urgent
			Non-urgent

### **Overview of triage classifications**

**Adapted from the Emergency Nursing Pediatric Course, 3<sup>rd</sup> edition, [www.ena.org](http://www.ena.org)**



## Normal Pediatric Vital Signs

Adapted from Crash Cards - [www.CrashCards.com](http://www.CrashCards.com)

Age	Heart Rate/min	Respiratory Rate/min	Systolic Blood Pressure (mm Hg)
Full term newborn	80-160	30-50	60-90
6 months	80-150	30-50	87-105
7 months to 1 ½ years	80-150	30-50	87-105
2 to 3 ½ years	100-110	20-35	90 + (2 x years)
3 ½ to 5 years	70-110	20-35	90 + (2 x years)
5 ½ years to 7 years	70-100	15-25	90 + (2 x years)
7 ½ years to 9 ½ years	60-100	15-25	90 + (2 x years)
10 to 12 years	55-90	12-20	90 + (2 x years)

## Five-Level Triage

Title	Vital Signs and Resource Utilization	Examples
Resuscitation (I)	Unstable vitals and maximum use of resources  "Definite threat to life"	Respiratory or cardiac arrest  Major trauma  Completely unconscious
Emergent (II)	Threatened vitals and high use of resources  "Potential threat to life or limb"	"Not normal" level of consciousness  Moderate-severe respiratory distress  Fever in an infant under one month of age
Urgent (III)	Stable vitals and medium use of resources  "Not likely to lose life or limb"	Belly pain  Moderate pain  Dehydration
Semi-urgent (IV)	Stable vitals and low use of resources  "Really not likely to lose life or limb"	Bumps, bruises, and breaks  Little kids with fevers
Non-urgent (V)	Stable vitals and no use of resources  "They are not going to lose life or limb"	Fast track

Adapted from Hawkins, H. (Editor). 2004. Emergency Nursing Pediatric Course, 3<sup>rd</sup> Edition. Emergency Nurses Association: Des Plaines, IL. 64.

## APPENDIX 1-C

### Triage Practice – What Level are These Patients?

Chief Complaint	Resuscitation (I)	Emergent (II)	Urgent (III)	Semi-Urgent (IV)	Non-Urgent (V)
Conjunctivitis					
Respiratory arrest					
Unresponsiveness					
Moderate respiratory distress					
Active seizure					
Dehydration					
Ear discomfort					
Unstable vital signs					
Simple laceration					
Altered mental status					
Cold or flu					
Intubated patient					
Fever in an infant <1 month of age					

*I highly recommend that those taking the CPEN exam review ENA's Emergency Nursing Pediatric Course (ENPC) textbook, especially the section on triage, prior to taking the examination. ([www.ena.org](http://www.ena.org))*

## TICLS

TICLS	Questions to be answered
Tone	Is the child actively moving with good muscle tone, or is the child limp?
Interactivity	Is the child alert and attentive to what's going on, or is too sick to care?  Will the child reach for a cool toy?  Does the child respond to people, objects, and sounds?
Consolability	Does comforting the child help them chill out and stop crying?
Look/Gaze	Do the child's eyes follow your every move, or is the kid staring out into space?
Speech/Cry	Do they have a strong cry, or is it weak, muffled, or hoarse?

Adapted from Dieckmann, R. Editor. (2006). Pediatric Education for Prehospital Professionals, 2<sup>nd</sup> Edition. Jones and Bartlett: Sudbury, MA. 8.



## CIAMPEDS

<b>C</b>	(C)hief complaint
<b>I</b>	(I)mmunizations and isolation
<b>A</b>	(A)llergies
<b>M</b>	(M)edications
<b>P</b>	(P)ast medical history and (P)arent's or caregiver's impression of the child
<b>E</b>	(E)vents surrounding the illness or injury
<b>D</b>	(D)iet and (D)iapers
<b>S</b>	(S)ymptoms associated with the illness or injury

Adapted from Hawkins, H. (Editor). 2004. Emergency Nursing Pediatric Course, 3<sup>rd</sup> Edition. Emergency Nurses Association: Des Plaines, IL. 51-52. [www.ena.org](http://www.ena.org)

### Common Indications of Non-Accidental Trauma (Child Abuse)

Family Behaviors	Child Behaviors	Historical Findings	Physical Findings	Radiographic Findings
Inappropriate parent-child interactions	Extreme behaviors, i.e. withdrawn or acting out	Story inconsistent with physical findings (doesn't fit)	Multiple injuries in various stages of healing	Multiple fractures
Hostile or unconcerned interactions with hospital staff	Doesn't oppose painful procedures	Story inconsistent with developmental stage (kids can't do that)	Injury and location of injury don't fit developmental stage	Fractures in different stages of healing
Unrealistic expectations of the child	Inappropriate sexual behavior	Delay in seeking medical care	Characteristic patterns (belt or bite marks)	Skull fractures
Parents deny any knowledge as to how injury occurred	Somatic complaints (i.e. chronic headaches, sleep disorders, bedwetting)	Child verbalizes abuse	Signs of poor overall care	Intracranial hemorrhage
Siblings blamed for injury	Suicidal threats or attempts	Multiple visits to the ED	Genital bleeding or discharge in pre-teen age children	
Parents over or under reacting to child's condition	Alcohol or drug abuse			

Adapted from Salassi-Scotter, M., Jardine, J., and Lawson, L. (1994). Child maltreatment. In Henderson, D. and Brownstein, D. Editors. Pediatric Emergency Manual. Springer: New York. 293-322.

**If you remember nothing else about growth and development...**

## **Remember these milestones**

**“Head and shoulders, knees, and toes...”**  
*(Feel free to sing along)*

**2 months:** (Head) Holds head up

**4 months:** (Shoulders) Rolls over

**6 months:** (Knees) sits unsupported

**1 year:** (Toes) walking

Or

**3-6-9-12**

*3 months* – Should be able to lift head

*6 months* – Should be able to sit up alone

*9 months* – Should be crawling and everything they find goes in their mouths

*12-18 months* – Should start walking and says/understands “No!”

Thanks to Kathleen Piotrowski-Walters BSN,RN,CCRN and Lynn Mohr MS,APN,

PCNS-BC,CPN for their help with these short and sweet summaries

Check CAB First! Resp: 24-30/50		Term to - 6 months					- 7 mos to 1.5 yr				
HR: Term (90-170) 1-6 mos (110-180)		ET: 3.0-5.5 (nasal) (8-10 cm)					Et: -3.5-4.0 (nasal) or 3.0-3.5 (oral) (in-hosp only)				
Syst. BP: $\geq$ 60/40 6 mos-87-100		Blade: 0-1 (mouth)					(8-10, 5-12 cm) Blade: 1 (mouth)				
See MD pg 3 "NOTE DELIRIUM"		3 kg	4kg	5kg	6kg	7kg	17.6 lb	18.8 lb	22 lb	24.2 lb	
Fluids: (ML, L/100ml)		80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	
Based on 10-20mL/kg. Tissue perfusion as indicated.											
Colloids, Blood: (mL/kg)		80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	80-180mL	
Based on 10-15mL/kg. Monitor - check perfusion, repeat as indicated.											
Defibrillation: initial 2-4J/kg, 4J/kg		16-32J	16-32J	16-32J	16-32J	16-32J	16-32J	16-32J	16-32J	16-32J	
Cardioversion: 0.5-1 J/kg (initial)		4-6J	4-6J	4-6J	4-6J	4-6J	4-6J	4-6J	4-6J	4-6J	
2 J/kg (if no response)											
Epinephrine: (1:10,000) 0.1mg/mL		0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	
0.2mg/kg, repeat every 3-5 min. For ET use same vol. of 1:1000 and dilute to 2-4 mL for 0.1mg/kg.											
Glucose: (mg/kg) 0.5-1g/kg		16-32 mL	16-32 mL	16-32 mL	16-32 mL	16-32 mL	16-32 mL	16-32 mL	16-32 mL	16-32 mL	
Atropine: (0.1 mg/mL)		1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	
0.02mg/kg, may double and repeat three times.											
Amiodarone: (5mg/mL)		0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	0.8 mL	
Pulseless pg 38: 5mg/kg bolus, dilute to 2-4mL/kg D5W, max 10mg/kg. Tachycardia pg 38: 5mg/kg (20-40) max 200mg.											
Procainamide: (10mg/kg)		1.2 mL	1.2 mL	1.2 mL	1.2 mL	1.2 mL	1.2 mL	1.2 mL	1.2 mL	1.2 mL	
15mg/kg (max 1.2 mL) dilute to 10-20mL D5W over 30-60 min.											
Lidocaine: (2mg/mL)		0.4 mL	0.4 mL	0.4 mL	0.4 mL	0.4 mL	0.4 mL	0.4 mL	0.4 mL	0.4 mL	
Adenosine: (6mg/kg)		0.26 mL	0.3 mL	0.3 mL	0.3 mL	0.3 mL	0.26 mL	0.3 mL	0.3 mL	0.3 mL	
0.1mg/kg 2nd administration followed by 0.2mL NS 0.5mL bolus. Max clinical cardiac dose.											
Code: 500mg/10mL		0.26 mL	0.3 mL	0.3 mL	0.3 mL	0.3 mL	0.26 mL	0.3 mL	0.3 mL	0.3 mL	
Atropine: 1mg/kg		1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	1.6 mL	

## Crash Cards Pediatric Resuscitation Guide

Photo courtesy of Crash Cards







**EZ-IO**

**Photo courtesy of Vidacare**

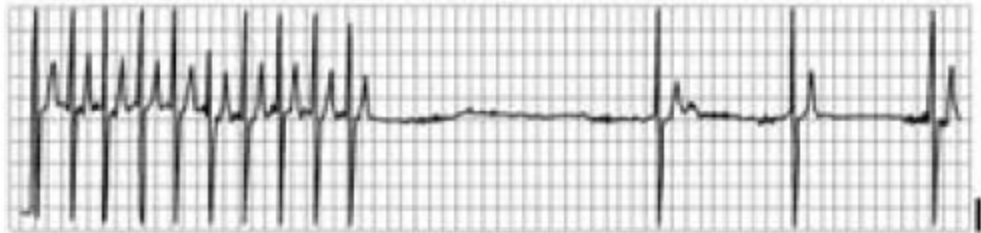
**[www.vidacare.com](http://www.vidacare.com)**



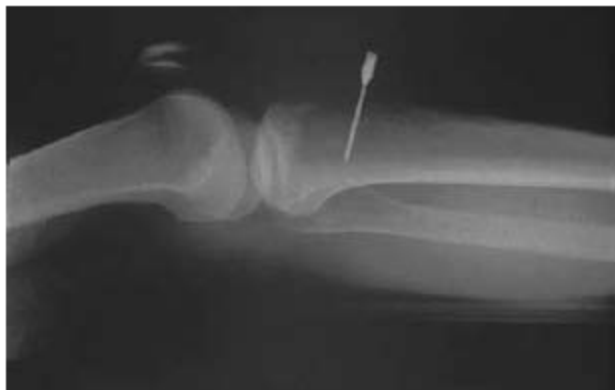
## **Bone Injection Gun**

**Photo courtesy of WaisMed**

**[www.waismed.com](http://www.waismed.com)**



**SVT and Adenosine**



**Radiograph of Tibial IO Placement**

**Photo courtesy of WaisMed**

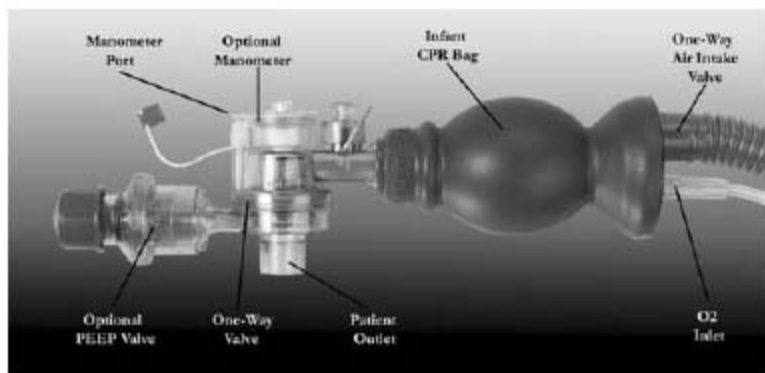
**[www.waismed.com](http://www.waismed.com)**



**Size Range of Ventilation Bags**



**Size Range of Ventilation Masks**



**Infant Ventilation Bag**





**Infant Ventilation Bag with Pop-Off Valve**

**Photos courtesy of Mercury Medical**

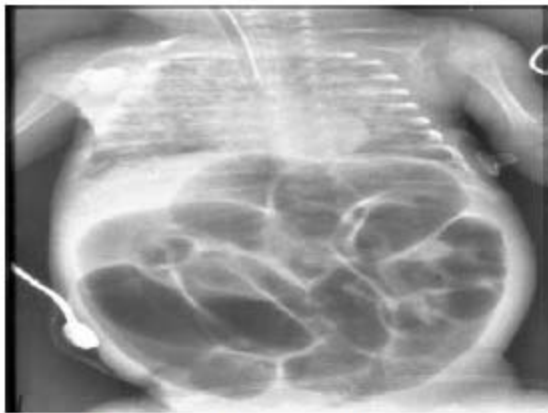
**[www.mercurymedical.com](http://www.mercurymedical.com)**



**Colorimetric End-Tidal CO<sub>2</sub> Detectors**

**Photos courtesy of Mercury Medical**

**[www.mercurymedical.com](http://www.mercurymedical.com)**



**Massive abdominal distension**

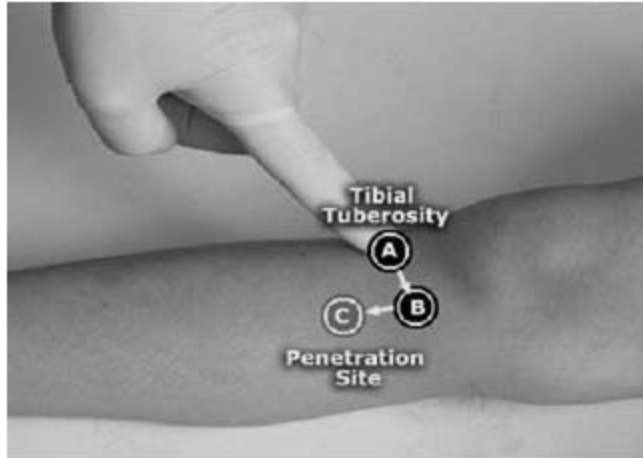
**Courtesy of Christopher Straus MD - University of Chicago Hospitals**



## **Esophageal Intubation Detection Devices**

**Photos courtesy of Wolfe-Tory**

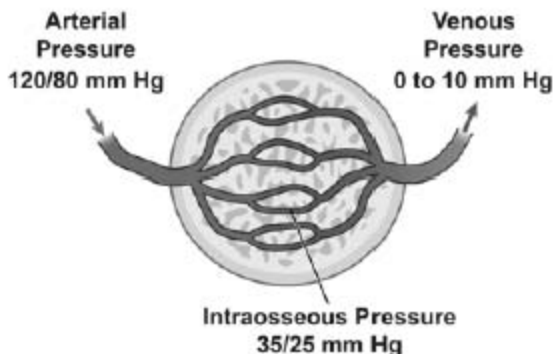
**[www.wolfetory.com](http://www.wolfetory.com)**



**Consult individual intraosseous device manufacturers for their recommendations as to placement guidelines**

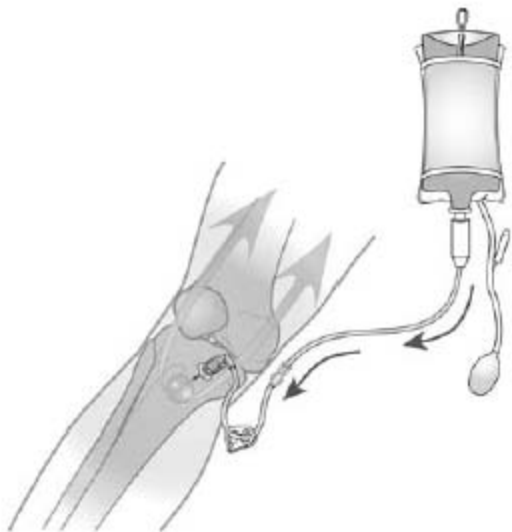
**Bone Injection Gun (BIG) pediatric tibial intraosseous device placement landmarks**

**Courtesy of Waismed - [www.waismed.com](http://www.waismed.com)**



**Arterial, venous, and intraosseous pressures**

**Courtesy of Vidacare – [www.vidacare.com](http://www.vidacare.com)**



**Intraosseous fluid administration with pressure bag**

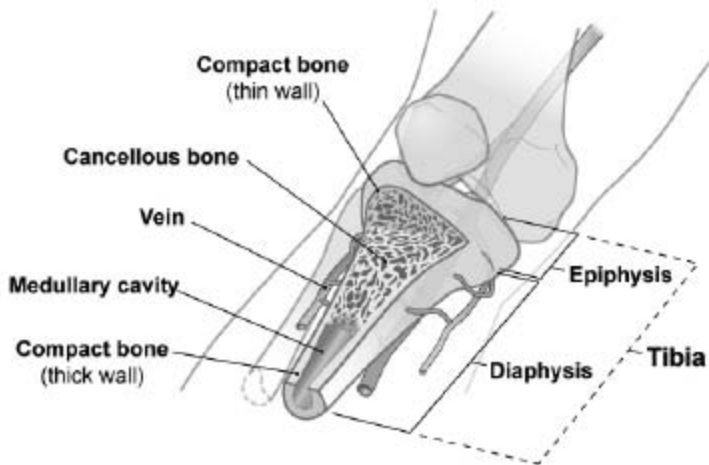
**Courtesy of Vidacare – [www.vidacare.com](http://www.vidacare.com)**





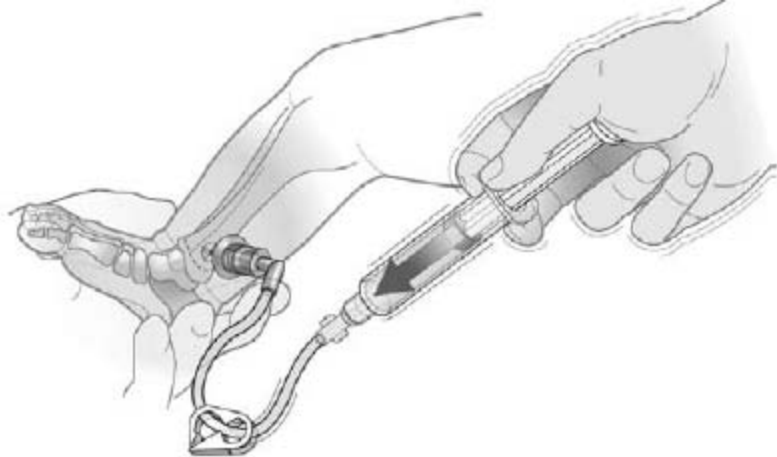
**3-way stopcock review - “OFF” on stopcock means “OFF,” i.e. no fluid will go that way**

**Courtesy of Medtronic - [www.medtronic.com](http://www.medtronic.com)**



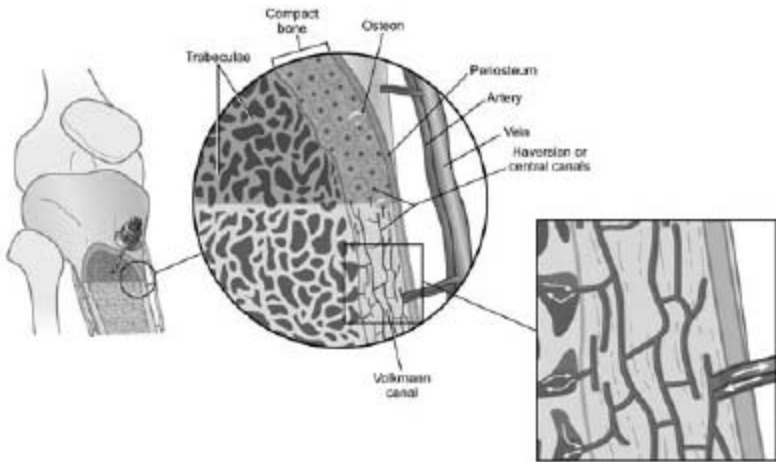
### **Intraosseous anatomy**

Courtesy of Vidacare – [www.vidacare.com](http://www.vidacare.com)



**Syringe flush of intraosseous device**

**Courtesy of Vidacare – [www.vidacare.com](http://www.vidacare.com)**



## **Intraosseous blood flow**

Courtesy of Vidacare – [www.vidacare.com](http://www.vidacare.com)

[3kg](#)
[4kg](#)
[5kg](#)
[6 - 7kg](#)
[8 - 9kg](#)
[10 - 11kg](#)
[12 - 14kg](#)
[15 - 18kg](#)
[19 - 23kg](#)
[24 - 29kg](#)
[30 - 36kg](#)
**Resuscitation**
[Infusions](#)
[Anaphylaxis](#)
[RST](#)
[Seizures](#)
[Respiratory Meds](#)
[Fluid & Blood Therapy](#)
[Rehydration Therapy](#)
[Electrolyte Abnormal](#)
[DKA](#)
[Burns](#)
[Toxicology](#)
[Gastrointestinal Agents](#)
[Steroids](#)
[Intracranial Pressure](#)
[Chemical Weapons](#)
[Prescribing Guide](#)



**Dehydration Therapy / Fluid Bolus IV**

	Fluid Bolus IV		Normal Saline - Lactated Ringers									
						10-11kg						
20 mL per kg Bolus						210 mL						
10 mL per kg Bolus						105 mL						
5 mL per kg Bolus						55 mL						

**Push Directions**

Initial fluid therapy is aimed at restoration of circulating blood volume and renal perfusion. In the presence of shock an isotonic fluid bolus of 20 mL/kg should be given as fast as possible, otherwise many providers prefer a smaller (10 mL/kg) bolus be given over 30-60 minutes.

**Color coded isotonic fluid bolus**

Courtesy of James Broselow MD & Robert Luten MD – [www.ebroselow.com](http://www.ebroselow.com)

[3kg](#)
[4kg](#)
[5kg](#)
[6-7kg](#)
[8-9kg](#)
[10-11kg](#)
[12-14kg](#)
[15-18kg](#)
[19-23kg](#)
[24-29kg](#)
[30-36kg](#)

## Resuscitation

[Infusions](#)
[Anaphylaxis](#)
[RSI](#)
[Seizures](#)
[Respiratory Meds](#)
[Fluid & Blood Therapy](#)
[Rehydration Therapy](#)
[Electrolyte Abnormal](#)
[DKA](#)
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[Prescribing Guide](#)
[\(Quick Reference\)](#)
[\(Antibiotics\)](#)
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## Fluid Therapy & Blood Products

### Maintenance Fluids

#### Maintenance Fluids

#### D5W 1/4 NS

All maintenance fluid calculations are based on the Holliday-Segar Method

						10-11kg					
Hourly Rate						43 mL					

### Remarks

**Note:** D5W 1/4 NS has traditionally been used for pediatric maintenance fluid therapy. We are recommending D5W 1/2 NS because there has been much concern over the use of hypotonic fluids and development of hyponatremia in hospitalized patients. One must always follow the sodium concentration in these patients, especially if they are at risk (see example below) for non-osmotic secretion of Anti-diuretic Hormone (ADH).

**Example:** CNS infections, significant volume loss, drugs, and metabolic and endocrine disorders such as hypoadrenalism, and particularly the postoperative state.

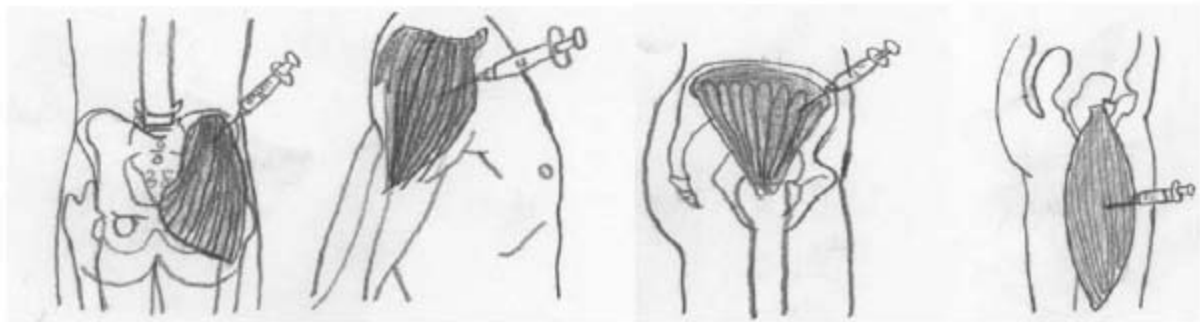
Color coded maintenance IV fluids

Courtesy of James Broselow MD & Robert Luten MD- [www.ebroselow.com](http://www.ebroselow.com)



**“Pull and push” fluid bolus technique**

**Photo courtesy of Joshua DeBoer, my now 14-year old aspiring computer genius son**



**Dorsogluteal**

**Deltoid**

**Ventrogluteal**

**Vastus lateralis**

**Intramuscular injection sites**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**





**Car seat image 1 - Child in forward-facing convertible seat**

- **Child sitting upright**
- **Car seat's harness is flat and snug**
- **Harness retaining clip is at the armpit level (where it should be as this is a pre-crash position)**
- **Top of child's head well below top of car seat shell – (when the top of the child's ears are in line with the top of the car seat, the child will be too tall for the seat)**



**Car seat image 2 - Mother checking internal harness to make sure it is snug**



**Car seat image 3 - Child in rear-facing infant seat with a 5-point harness**

- **Harness is laying flat and snug**
- **Harness retaining clip is at armpit level**
- **Seat appropriate for weight and height of child**
- **Top of head well below top of car seat shell**

**(for infants the top of the head must be one inch and below the top of the car seat shell)**



**Car seat image 4 - Rear-facing**

**Mother is tightening internal harness so that it is snug on the baby**



**Car seat image 5 - Rear-facing convertible seat**

**Probably rated up to 35 pounds (16 kg)**

- This can be used after an infant outgrows the infant seat, but must remain rear-facing until 2 years old (this is the new 2011 guideline from the AAP and NHTSA)**

# Car Seat Recommendations for Children



- Select a car seat based on your child's age and size, and choose a seat that fits in your vehicle and use it every time.
- Always refer to your specific car seat manufacturer's instructions; read the vehicle owner's manual on how to install the car seat using the seat belt or LATCH system; and check height and weight limits.
- To maximize safety, keep your child in the car seat for as long as possible, as long as the child fits within the manufacturer's height and weight requirements.
- Keep your child in the back seat at least through age 12.

AGE



## Birth – 12 months

Your child under age 1 should always ride in a rear-facing car seat.

There are different types of rear-facing car seats: Infant-only seats can only be used rear-facing. Convertible and 3-in-1 car seats typically have higher height and weight limits for the rear-facing position, allowing you to keep your child rear-facing for a longer period of time.



## 1 – 3 years

Keep your child rear-facing as long as possible. It's the best way to keep him or her safe. Your child should remain in a rear-facing car seat until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the rear-facing car seat, your child is ready to travel in a forward-facing car seat with a harness.



## 4 – 7 years

Keep your child in a forward-facing car seat with a harness until he or she reaches the top height or weight limit allowed by your car seat's manufacturer. Once your child outgrows the forward-facing car seat with a harness, it's time to travel in a booster seat, but still in the back seat.



## 8 – 12 years

Keep your child in a booster seat until he or she is big enough to fit in a seat belt properly. For a seat belt to fit properly the lap belt must lie snugly across the upper thighs, not the stomach. The shoulder belt should lie snug across the shoulder and chest and not cross the neck or face. Remember, your child should still ride in the back seat because it's safer there.

## DESCRIPTION (RESTRAINT TYPE)



**A REAR-FACING CAR SEAT** is the best seat for your young child to use. It has a harness and in a crash, cradles and moves with your child to reduce the stress to the child's fragile neck and spinal cord.



**A FORWARD-FACING CAR SEAT** has a harness and tether that limits your child's forward movement during a crash.



**A BOOSTER SEAT** positions the seat belt so that it fits properly over the stronger parts of your child's body.



**A SEAT BELT** should lie across the upper thighs and be snug across the shoulder and chest to restrain the child safely in a crash. It should not rest on the stomach area or across the neck.



[www.facebook.com/childpassengersafety](http://www.facebook.com/childpassengersafety)



<http://twitter.com/childseatsafety>

March 21, 2011

Images courtesy of the National Highway Traffic Safety Administration

[www.nhtsa.gov](http://www.nhtsa.gov)

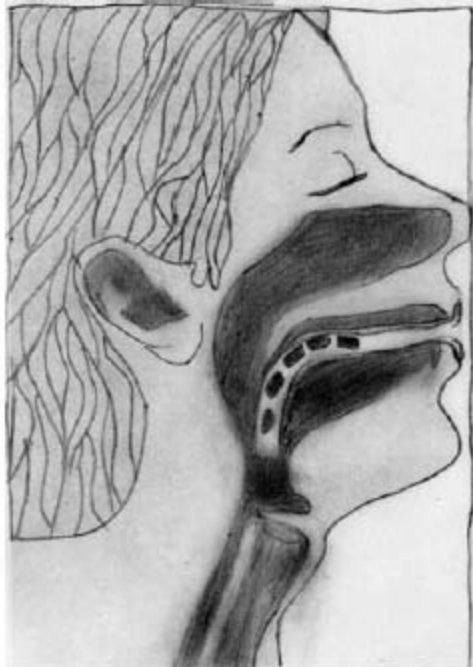
DEVICE	FLOW RATE	OXYGEN CONCENTRATION DELIVERED
Nasal cannula	1-6 LPM	24-44 Percent
Venturi mask	Varied depending on device and desired oxygen percentage	24-60 Percent
Partial rebreather mask	10-12 LPM	40-60 Percent
Non-rebreather mask	12-15 LPM	80-90 Percent



Size range of oral airways

Courtesy of Mercury Medical – [www.mercurymedical.com](http://www.mercurymedical.com)





**Oral airway in proper position**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**



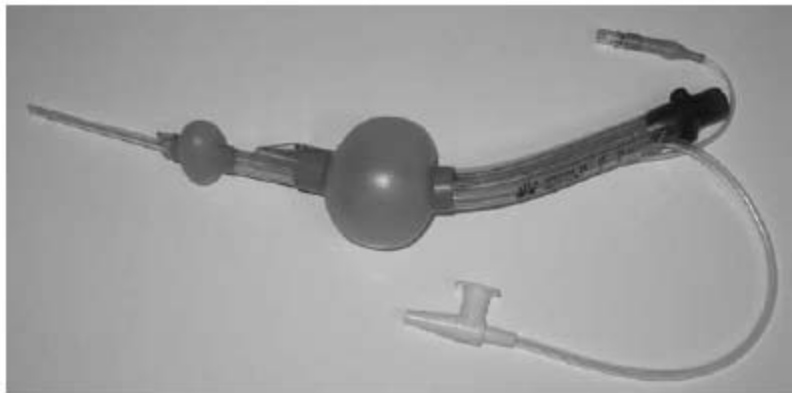
**Oral airway that is “too small”**



**Oral airway that is “too big”**



**Oral airway that is “just right”**



**King Airway with gastric decompression port**

**Courtesy of King Systems - [www.kingsystems.com](http://www.kingsystems.com)**



**Range of King airway sizes**

**Courtesy of King Systems - [www.kingsystems.com](http://www.kingsystems.com)**



**Range of LMA Supreme Laryngeal Mask Airway Sizes**

**Courtesy of LMA North America - [www.lmana.com](http://www.lmana.com)**



**LMA Supreme with gastric decompression port**

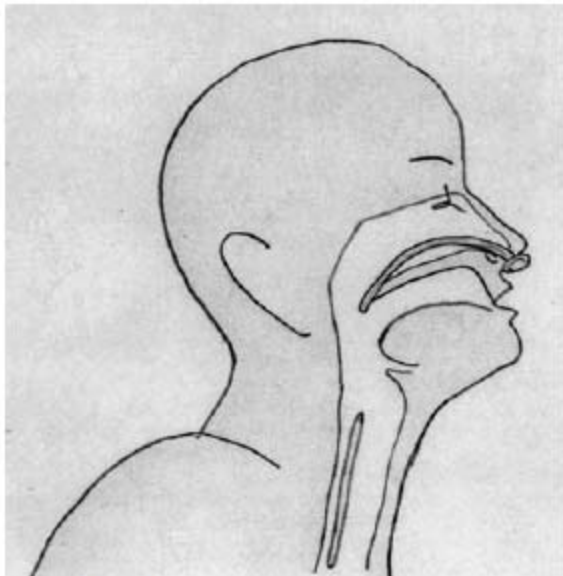
**Courtesy of LMA North America - [www.lmana.com](http://www.lmana.com)**



**Size range of nasal airways**

**Courtesy of Med-Tech Resource - [www.gomed-tech.com](http://www.gomed-tech.com)**





**Nasal airway in proper position**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**



**Nasal airway that is “too small”**

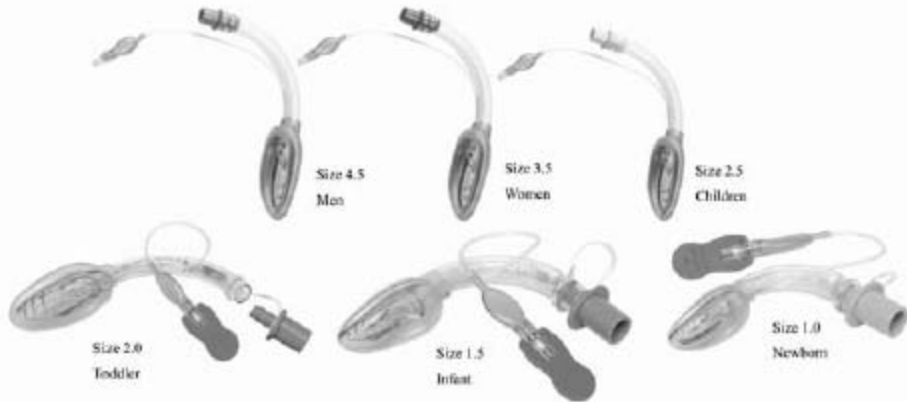


**Nasal airway that is “too big”**



**Nasal airway that is “just right”**

**Photos courtesy of Joshua DeBoer, my now 14-year old aspiring computer genius son**



## **Range of Air-Q Laryngeal Mask Sizes**

**Photo courtesy of Mercury Medical**

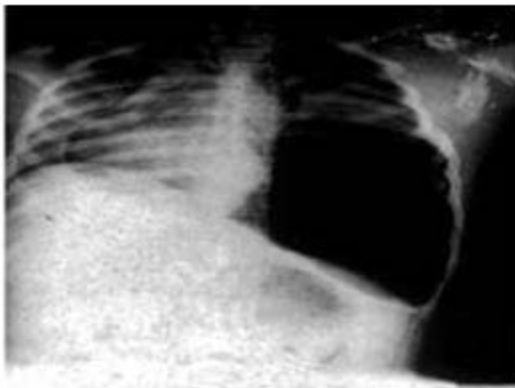
**[www.mercurymed.com](http://www.mercurymed.com)**



## **King Airway**

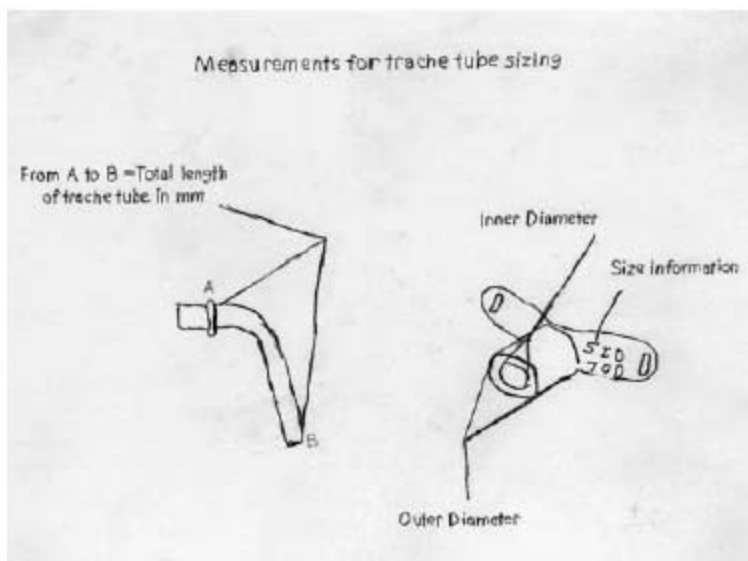
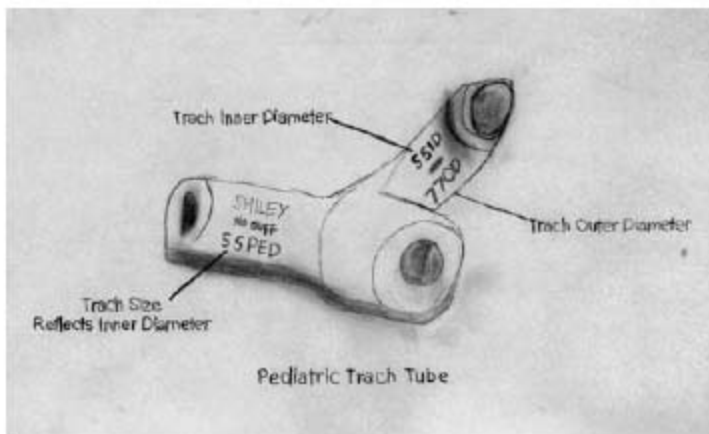
**Photo courtesy of King Systems**

**[www.kingsystems.com](http://www.kingsystems.com)**



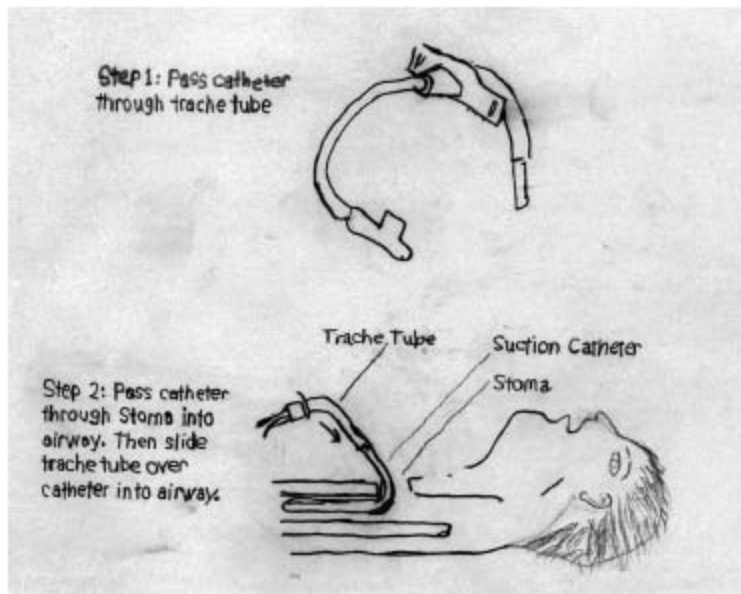
**Tension pneumothorax**

**“Courtesy of Christopher Straus MD - University of Chicago Hospitals”**



## Tracheostomy tubes

Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter



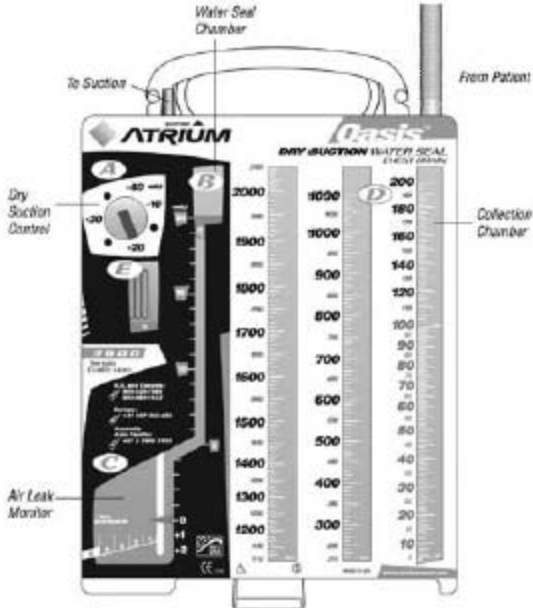
**Replacing trach tubes with a suction catheter “guide wire”**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**

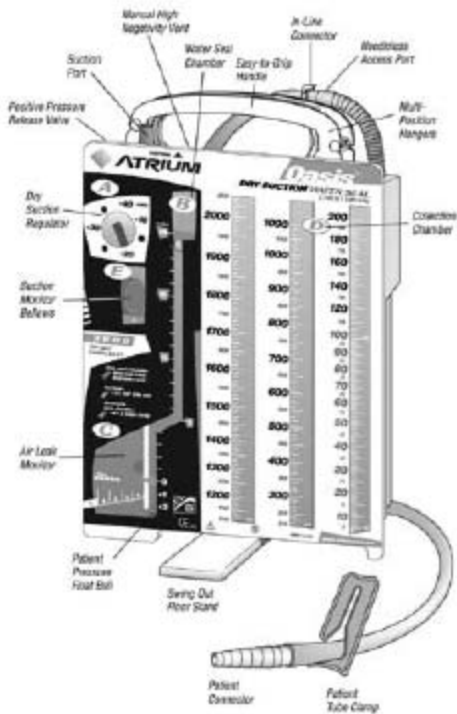




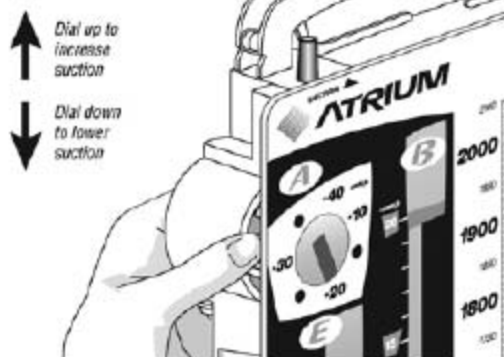
**Endotracheal or tracheostomy tube capnography device**  
**Courtesy of Oridion Medical - [www.oridion.com](http://www.oridion.com)**



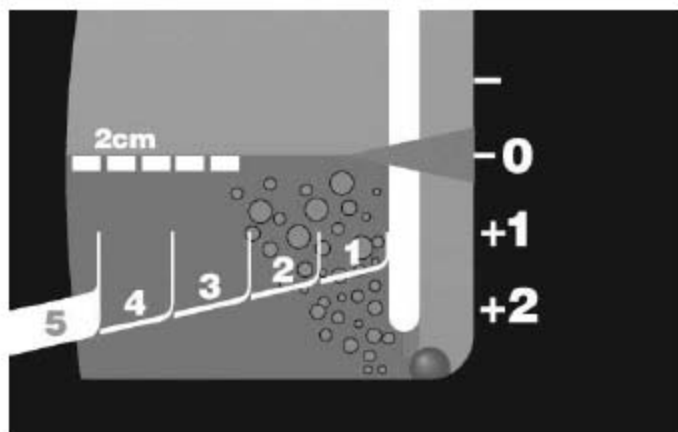
Overview of chest drain components 1



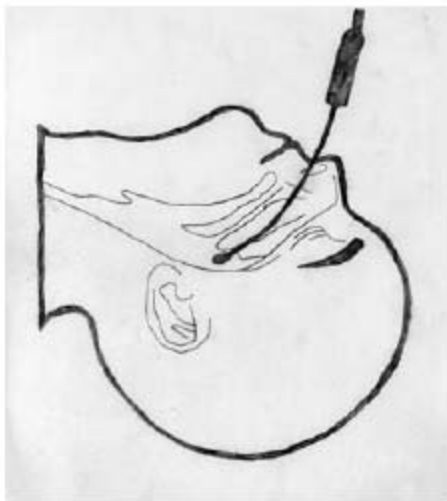
**Overview of chest drain components 2**



**Suction control dial**



**Bubbles in water seal chamber**

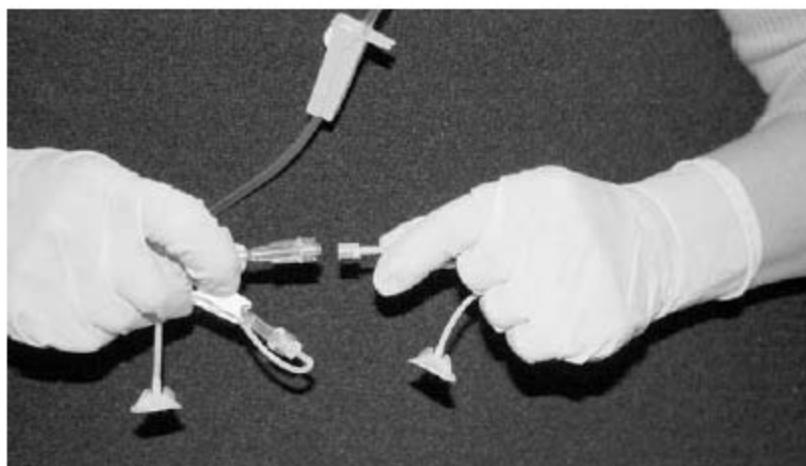


**Nasopharyngeal RSV/pertussis/influenza swab technique**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**



**Morgan Lens® step 1 – Instill topical ocular anesthetic, if available.**



**Morgan Lens® step 2 – Attach Morgan Lens® delivery set, IV set-up, or syringe using solution and rate of choice; Start flow.**



**Morgan Lens® step 3 – Have patient look down, insert Morgan Lens® under upper lid.  
Have patient look up, retract lower lid, drop lens in place.**



**Morgan Lens® step 4 – Release the lower lid over Morgan Lens® and adjust flow. Tape tubing to patient's forehead to prevent accidental lens removal. Absorb outflow with the Medi-Duct®.  
Do not run dry.**



**Morgan Lens® step 5 – Removal: Continue flow, have patient look up, retract lower lid – hold position.**





**Morgan Lens® step 6 – Slide Morgan Lens® out; Terminate flow**

## Morgan Lens Uses

	Solution	Mode with Morgan Lens	Rate	Frequency
Ocular injury due to acid burns or solvents, gasoline, detergents, etc.	Lactated Ringer's** I.V. Solution	Morgan Lens Delivery Set or I.V. set-up	500 ml rapid/free flow. Reassess and continue at slower rate.	Once. Repeat as necessary.
Alkali burns	Lactated Ringer's** I.V. Solution	Morgan Lens Delivery Set or I.V. set-up	2000 ml rapid/free flow. Reassess. Continue at 50 ml/hour or 15 drops/minute.	Continuous until pH of cul-de-sac is returned to neutrality.
Non-embedded foreign bodies	Lactated Ringer's** I.V. Solution	Morgan Lens Delivery Set or I.V. set-up	500 ml rapid/free flow. Reassess and continue at slower rate.	Once. Repeat as necessary.
Foreign body sensation with no visible foreign body	20 cc sterile solution	20 cc syringe	Slowly without force.	Once. Repeat once if necessary
Routine pre-operative	10 cc of preferred ocular antiseptic	10 cc syringe	Slowly without force.	Once.
Eyelid surgery	Lactated Ringer's** I.V. Solution	Morgan Lens Delivery Set or I.V. set-up	4 drops/minute.	During entire procedure.
Severe infection	Lactated Ringer's** I.V. Solution with suitable antibiotic and steroid***	Morgan Lens Delivery Set or I.V. set-up	50 ml/hour or 15 drops/minute.	Continuous for 70 hours, then 10-hour intervals until marked improvement.

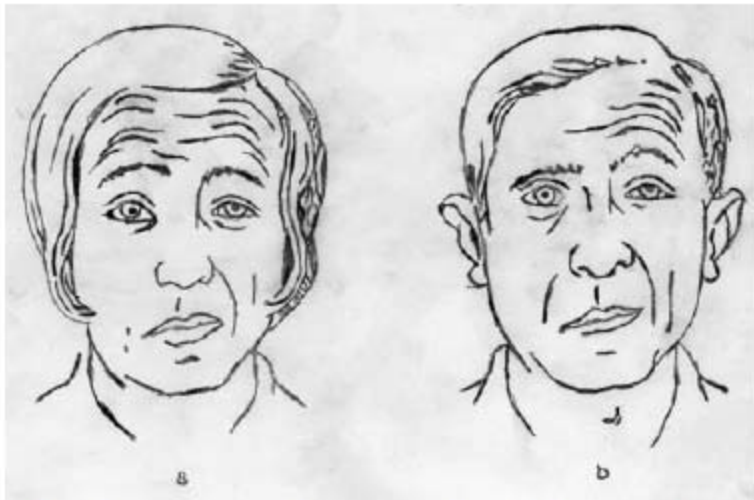
\*Allows Lens to "float" over cornea and sclera.

\*\*Recommendation based on pH: Tears approximately 7.1, Normal Saline 4.5 to 7.0,  
Lactated Ringers 6.0 to 7.5.

\*\*\*Use only when indicated.

Quality Certified  
ISO 9001 & 13485

The Morgan® Lens  
MorTan® Inc.



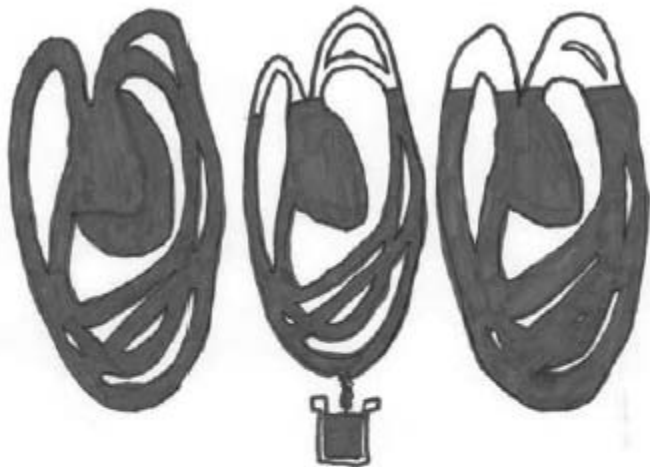
**Peripheral nerves vs. brain issues and resulting facial droops**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**

## **The Modified Westley Clinical Scoring System for Croup**

- **Inspiratory stridor:**
  - Not present - 0 points.
  - When agitated/active - 1 point.
  - At rest - 2 points.
- **Intercostal recession:**
  - Mild - 1 point.
  - Moderate - 2 points.
  - Severe - 3 points.
- **Air entry:**
  - Normal - 0 points.
  - Mildly decreased - 1 point.
  - Severely decreased - 2 points.
- **Cyanosis:**
  - None - 0 points.
  - With agitation/activity - 4 points.
  - At rest - 5 points.
- **Level of consciousness:**
  - Normal - 0 points.
  - Altered - 5 points.

**Possible score 0-17: <4 = mild croup, 4-6 = moderate croup, >6 =severe croup.**



Cardiogenic  
shock

Hypovolemic  
shock

Septic, neurogenic,  
or anaphylactic shock

**Illustration by Nina DeBoer, then age 9 (my aspiring artist daughter, now aspiring baker daughter)**



**Patent Ductus Arteriosus (PDA)**

**Illustration by Nina DeBoer, then age 9 (my aspiring artist daughter, now aspiring baker daughter)**

Fallot's Tetralogy: Four defects make up this congenital heart disorder

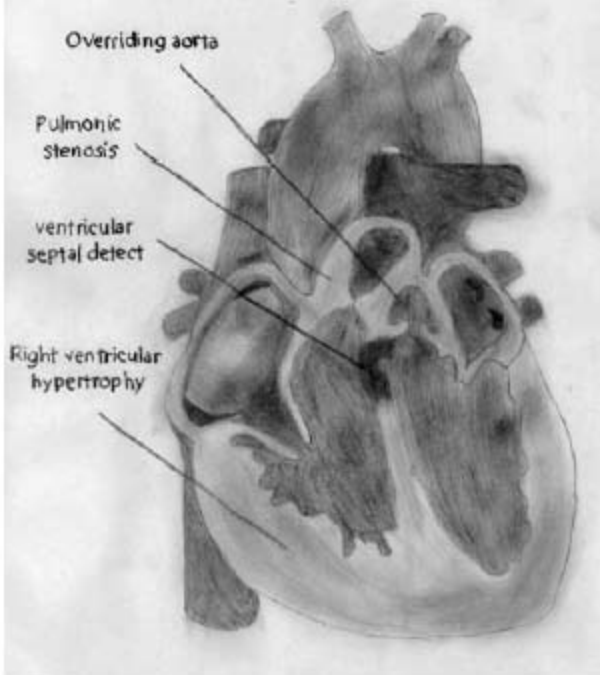


- ① A hole in the wall between the two sides of the heart
- ② Narrowing (stenosis) of the main artery to the lungs
- ③ Abnormal thickening of the right ventricle
- ④ Abnormality in the position of the main artery

### **Tetralogy of Fallot 1**

Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter

## Tetralogy of Fallot



**Tetralogy of Fallot 2**

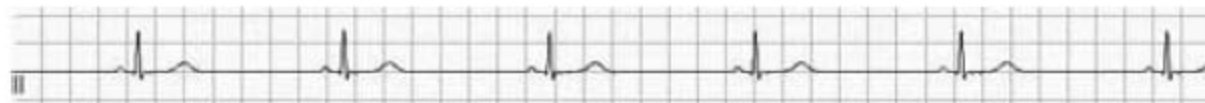
Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter



## Review of Common ECG Rhythms



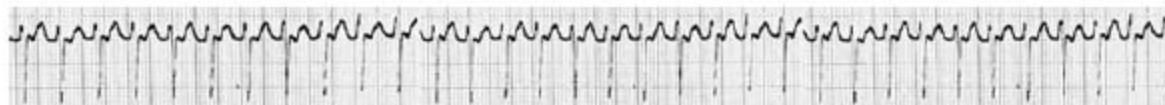
**Normal Sinus Rhythm - Rate 60-100 (age dependent)**



**Sinus Bradycardia - Rate less than 60 (age dependent)**



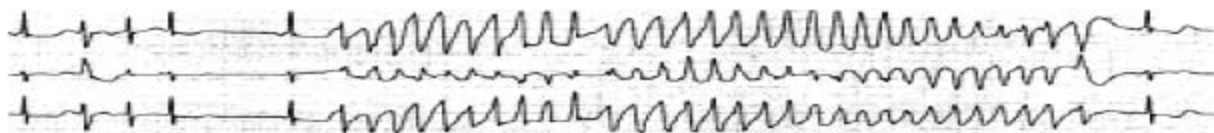
**Sinus Tachycardia - Rate over 100 (age dependent)**



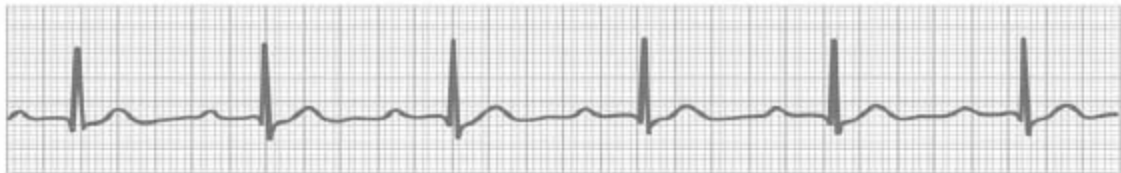
**Supraventricular Tachycardia "SVT" (Fast and skinny (QRS))**



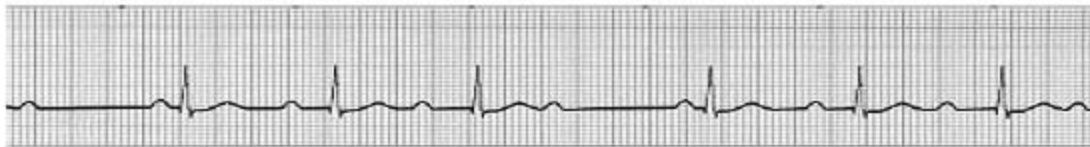
**Ventricular Tachycardia (Fast and fat (QRS))**



**Torsades de Pointes (Fast, fat, funky, and flipping (QRS))**



**1<sup>st</sup> Degree AV block (PR >0.20)**



**2<sup>nd</sup> Degree AV block –Type I (bad)**

**PR intervals getting longer and longer, then drop a QRS**



**2<sup>nd</sup> Degree AV block – Type II (worse)**

**PR intervals OK, but drop a QRS**



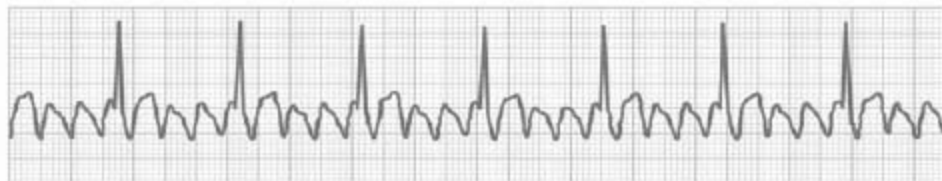
**3<sup>rd</sup> Degree AV block (worst)**

**Atria (Ps) march out and ventricles (QRSs) march out;**

**But they are marching to different drummers and they are independent of each other**



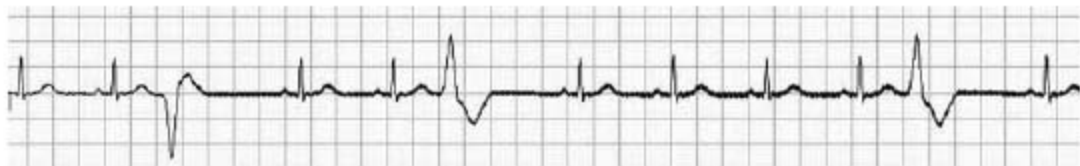
**Junctional Rhythm – Slow and steady, but no P waves**



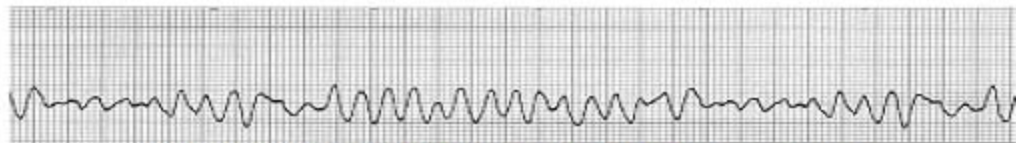
**Atrial Flutter – Look for the saw tooth pattern**



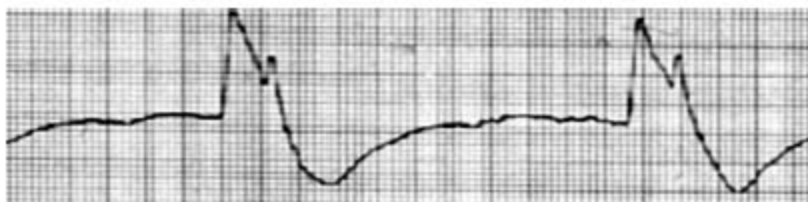
**Atrial Fibrillation – No Ps and irregularly irregular**



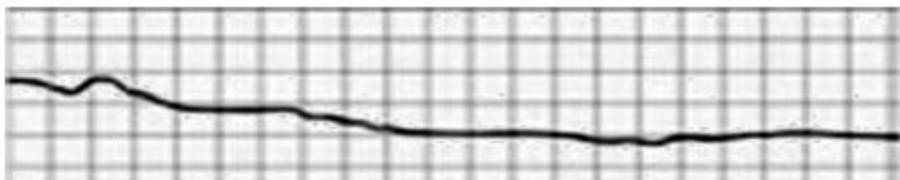
**Multifocal PVC's – Simply PVC's that look different because they are different**



**Ventricular Fibrillation – Imagine ECG leads on Jell-O**



Agonal – About to be asystolic



Asystole – If you can't identify this one, you probably shouldn't be taking the exam



## Summary of Common Congenital Heart Defects

Type of defect	Description	Pink or blue?	Blood flow	Medical or surgical management?
Atrial septal defect (ASD)	Hole between the right and left atriums	Pink	Increased pulmonary	Medical and either cardiac catheterization lab or surgical closure
Ventricular septal defect (VSD)	Hole between the right and left ventricles	Pink	Increased pulmonary	Medical and either cardiac catheterization lab or surgical closure
Patent ductus arteriosus (PDA)	Artery between the aorta and pulmonary artery that didn't close on its own	Pink	Increased pulmonary	Medical and either cardiac catheterization lab or surgical closure
Atrioventricular canal (AV canal)	ASD joined with a VSD	Pink	Increased pulmonary	Medical and surgical repair
Coarctation of the aorta (Coarc)	Narrowing of the aorta	Pink	Obstructed from ventricles	Medical and either cardiac catheterization or surgical repair
Tetralogy of Fallot (Tet)	Four defects: 1) VSD 2) Pulmonary stenosis (narrowing of artery) 3) Overriding aorta (aorta sits on top of both ventricles), and 4) Right ventricular hypertrophy (ventricle gets big trying to pump against the pulmonary stenosis)	Blue	Decreased pulmonary	Medical and surgical repair
Transposition of the great vessels (Transposition)	"Big vessels are switched." The pulmonary artery comes off of the left ventricle and the aorta comes off of the right ventricle	Blue	Decreased pulmonary	Medical, cardiac catheterization lab, and surgical repair
Hypoplastic left heart syndrome (Hypoplast)	Profound badness. Babies born with essentially no left ventricle.	Blue	Mixed	Medical and surgical repair vs. transplant vs. hospice



P1

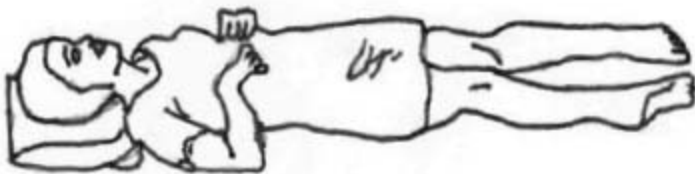
P2

P3

**“Color-Coded” Cervical Collars**

**Photo courtesy of Ossur**

**[www.ossur.com](http://www.ossur.com)**



**Decorticate and Decerebrate Posturing**

**Illustration by Nina DeBoer, then age 9 (my aspiring artist daughter, now aspiring baker daughter)**



Name of child or adult with autism: \_\_\_\_\_

Nickname if any: \_\_\_\_\_ Date of birth: \_\_\_\_\_ Height: \_\_\_\_\_

Weight: \_\_\_\_\_ Eye color: \_\_\_\_\_ Hair color: \_\_\_\_\_

Scars or identifying marks: \_\_\_\_\_

Medical conditions: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Zip: \_\_\_\_\_ Home phone: \_\_\_\_\_ Other phone: \_\_\_\_\_

Method of communication, if non verbal: sign language, picture boards, written word, etc: \_\_\_\_\_

Identification worn: ex: jewelry/Medic Alert®, clothing tags, ID card, tracking monitor, etc: \_\_\_\_\_

Current prescriptions (include dosage): \_\_\_\_\_

Sensory, medical, or dietary issues and requirements, if any: \_\_\_\_\_

Inclination for wandering behaviors or characteristics that may attract attention: \_\_\_\_\_

Favorite attractions and locations where person may be found if missing: \_\_\_\_\_

Likes and dislikes (include approach and de-escalation techniques): \_\_\_\_\_

Attach map and address guide to nearby properties with water sources and dangerous locations highlighted.

Attach blueprint or drawing of home, with bedrooms of individual highlighted.

**Medical Care Providers:**

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Parents/Caregiver name: \_\_\_\_\_ Home phone: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Cell phone: \_\_\_\_\_

Other contact info: \_\_\_\_\_

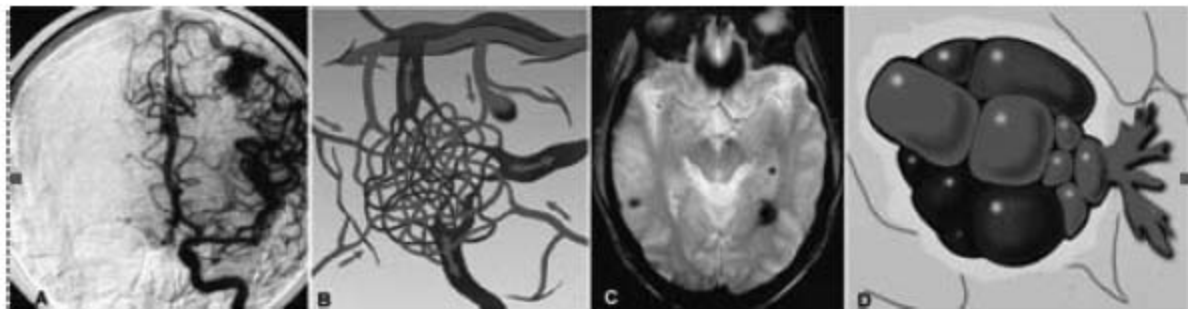
Emergency contact name: \_\_\_\_\_ Home phone: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Cell phone: \_\_\_\_\_

**Please attach any additional information, use extra paper if necessary.**

**Autism Emergency Contact Form**



### **Vascular malformations of the brain**

**A) Cerebral angiogram showing AVM cluster of abnormal blood vessels**

**B) Artist diagram of AVM with shunting between arteries and veins**

**C) Magnetic resonance scan showing dark spots characteristic of cerebral cavernous malformations or cavernous angiomas**

**D) Artist diagram illustrating mulberry-like vascular structure**

**Courtesy of Professor Issam Awad MD, MSc, FACS, MA (hon)**

**Neurovascular Surgery Program, University of Chicago Hospitals, [www.issamawad.com](http://www.issamawad.com)**



**Horseshoe towel / car seat spinal immobilization technique**

**Courtesy of William Justice NREMT-P,TEMS-I & Sara House EMT-P**



**Proper post-removal from car seat spinal immobilization technique**

**Courtesy of William Justice NREMT-P,TEMS-I & Sara House EMT-P**



**Miami-Jr. pediatric cervical collars (that actually fit kids)**

**Courtesy of Ossur - [www.ossur.com](http://www.ossur.com)**

3kg

4kg

5kg

6-7kg

8-9kg

10-11kg

12-14kg

15-18kg

19-23kg

24-29kg

30-35kg

Resuscitation

Infections

Anaphylaxis

ECG

Seizures

Respiratory Needs

Fluid & Blood Therapy

Rehydration Therapy

Electrolyte Abnormal

DKA

Burns

Toxicology

Gastrointestinal Agents

Steroids

Intracranial Pressure

Chemical Weapons

Prescribing Guide

(Quick Reference) ▾

(Antidotes) ▾

(Pain & Sedation) ▾

Intracranial Pressure (ICP)

Mannitol Reference IV

Mannitol Reference IV

1 g/kg/dose Every 4-6 Hours

						10-11kg							
						10							
						5							
0.2 g/mL						50							
						mL							

Preparation and Administration

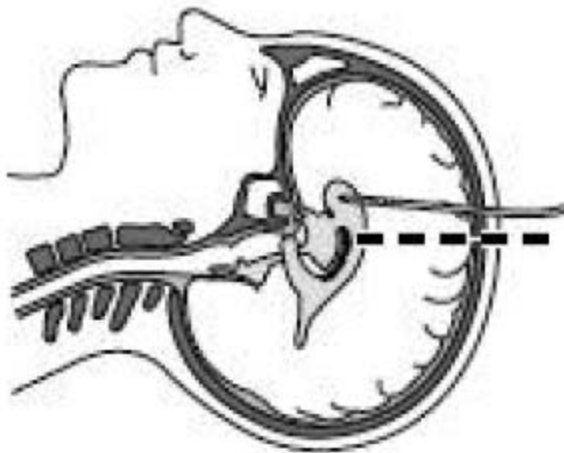
Use an IV set with an inline filter. Infuse over 15-30 minutes. Do not use solution containing "drug crystals". Place in warm water bath to dissolve crystals, then cool to body temperature before administering.

Remarks

Note: Rapid infusions may result in:

Hypotension, hyperosmolality, and elevated ICP. Mannitol should not be used in patients with severe renal dysfunction. Document strict intake and output. Dehydration and hypovolemia may result from rapid diuresis. Monitor patient's electrolytes and serum osmolality.

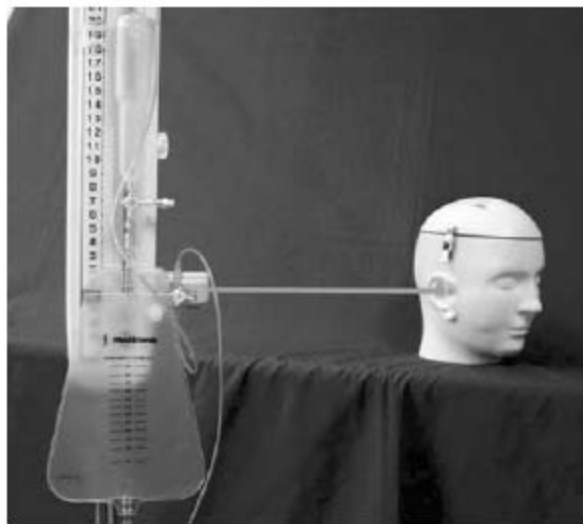
Color coded mannitol administration



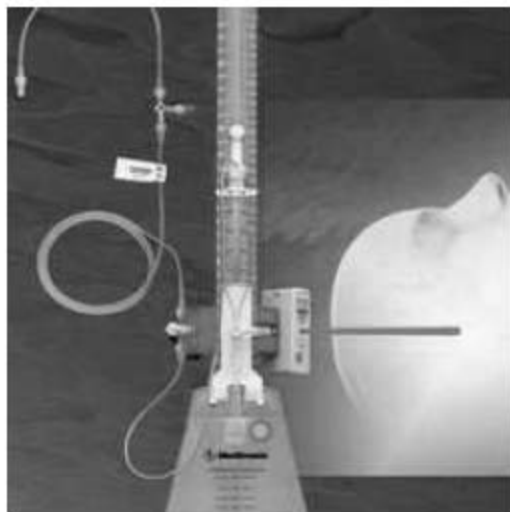
**External ventricular drain (EVD) in ventricular space**



**Duet™ external ventricular drain**

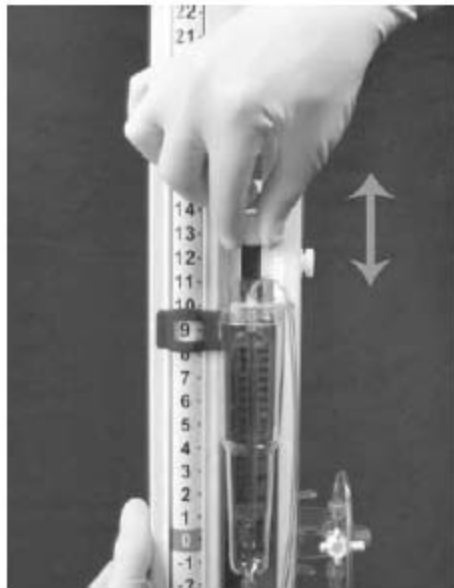


**Correct level of EVD (ear) for drainage and pressure reading (Upright patient)**



**Correct level of EVD (ear) for drainage and pressure reading (Supine patient)**





**Adjusting the desired CSF drainage level**

**External ventricular drain images courtesy of Medtronic – [www.medtronic.com](http://www.medtronic.com)**

## Pediatric Glasgow Coma Scale

### *Eye opening (4)*

	<1 year	>1 year
4	Spontaneous	Spontaneous
3	To shout	To command
2	To pain	To pain
1	None	None

### *Motor (6)*

	<1 year	>1 year
6	Spontaneous	Obeys command
5	Localizes pain	Localizes pain
4	Withdraws pain	Withdraws pain
3	Abnormal flexion	Abnormal flexion
2	Abnormal extension	Abnormal extension
1	None	None

*Voice (5)*

**0-2 years**

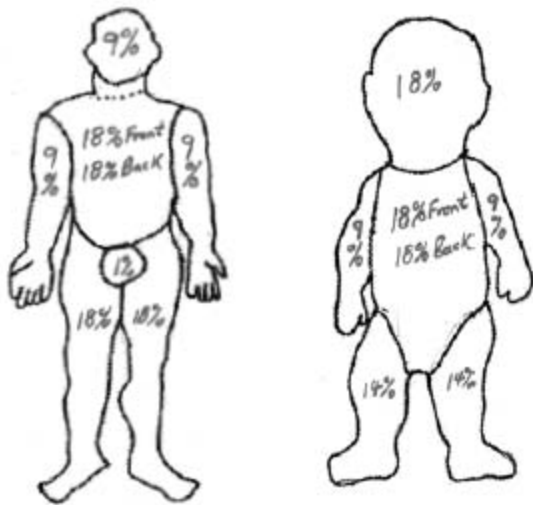
5	Babbles or coos appropriately
4	Cries, but is consolable
3	Persistent crying or screaming
2	Grunts or moans to pain
1	None

**2-5 years**

5	Appropriate words and phrases
4	Inappropriate words
3	Persistent crying or screaming to pain
2	Grunts or moans to pain
1	None

**>5 years**

5	Oriented and converses
4	Confused conversation
3	Inappropriate words
2	Incomprehensible sounds
1	None



**Adult and Pediatric Rule of 9's**

**Illustration by Nina DeBoer, then age 9 (my aspiring artist daughter, now aspiring baker daughter)**



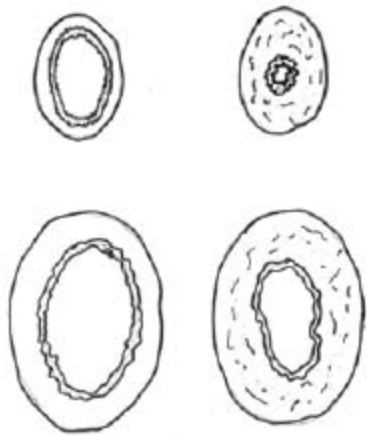
**Handheld BladderScan® Bladder Volume Instrument to**

**Ensure Urine is Present in the Bladder Prior to Catheterization**

**BladderScan BVI 9400 Bladder Volume Instrument, ©2011 Verathon Inc.**

**Photo Courtesy of Verathon**

**[www.Verathon.com](http://www.Verathon.com)**



**Pediatric vs. Adult Airway Edema**

**Illustration by Nina DeBoer, then age 9 (my aspiring artist daughter, now aspiring baker daughter)**

# PEDIATRIC ANTIDOTES FOR CHEMICAL WARFARE DRUG VOLUMES (in

DRUGS	3 kg	4 kg	5 kg	6 kg	RED	PURPLE	ORANGE	YELLOW	BLUE	ORANGE
<b>ATROPINE IV/IM</b>	<b>0.15 mg</b>	<b>0.2 mg</b>	<b>0.25 mg</b>	<b>0.3 mg</b>	<b>0.4 mg</b>	<b>0.5 mg</b>	<b>0.65 mg</b>	<b>0.8 mg</b>	<b>1 mg</b>	<b>1.3 mg</b>
0.05 mg/mL** conc	3	4	5	6	8	10	13	16	20	26
0.1 mg/mL** conc	1.5	2	2.5	3	4	5	6.5	8	10	13
0.4 mg/mL conc	0.4	0.5	0.6	0.8	1	1.3	1.6	2	2.5	3.2
0.5 mg/mL conc	0.3	0.4	0.5	0.6	0.8	1	1.3	1.6	2	2.6
0.8 mg/mL conc	0.2	0.25	0.3	0.4	0.5	0.6	0.8	1	1.2	1.6
1 mg/mL conc	0.15	0.2	0.25	0.3	0.4	0.5	0.65	0.8	1	1.3
<b>2PAM</b>	<b>75 mg</b>	<b>100 mg</b>	<b>125 mg</b>	<b>165 mg</b>	<b>215 mg</b>	<b>265 mg</b>	<b>325 mg</b>	<b>415 mg</b>	<b>525 mg</b>	<b>665 mg</b>
IV 50 mg/mL	1.5	2	2.5	3.3	4.3	5.3	6.5	8.3	10.5	13.3
IM 300 mg/mL	0.25	0.33	0.42	0.55	0.7	0.9	1.1	1.4	1.8	2.2
IV 20 mg/mL DRIP	1.5-3 mL/hr	2-4 mL/hr	2.5-5 mL/hr	3.3-6.5 mL/hr	4.3-8.5 mL/hr	5.3-10.5 mL/hr	6.5-13 mL/hr	8.3-17 mL/hr	11-21 mL/hr	13-27 mL/hr
<b>2PAM</b>	<b>IV</b>			<b>IM</b>			<b>IV DRIP</b>			
<b>MEDICATION PREPARATION</b>	1 gm vial + 20 mL Sterile Water = 50 mg/mL			1 gm vial + 2 mL Sterile Water = 500 mg/mL			Reconstitute the 1 gm vial with 20 mL NS, then dilute w/ 20 mL NS to a total volume of			

\*\*Concentrations are too dilute for IM injection in most patients. All IV medications may be given IO.

Color Coded Chemical Warfare Antidotes

Photo Courtesy of James Broselow MD

[www.ebroselow.com](http://www.ebroselow.com)

3kg

4kg

6kg

6-7kg

8-9kg

10-11kg

12-14kg

16-18kg

19-23kg

24-29kg

30-36kg

**■ Resuscitation**

Infusions

Anaphylaxis

RSI

Seizures

Respiratory Aids

Fluid &amp; Blood Therapy

Rehydration Therapy

Electrolyte Abnormal

DKA

Burns

Toxicology

Gastrointestinal Agents

Steroids

Intracranial Pressure

**Chemical Weapons**

Prescribing Guide

(Quick Reference)

(Antibiotics)

(Pain &amp; Sedation)

**Chemical Weapons**
**2-PAM (10 - 11kg)**

IV: 50 mg/mL

265 mg

5.3 mL

IM: 300 mg/mL

265 mg

0.9 mL

IV DRIP: 20 mg/mL

105-210 mg/hr

5.3-10.5 mL/hr

**IV/IM:**

Doses may need to be repeated in 1-2 hours if muscle weakness persists, then at 10-12 hour intervals if cholinergic symptoms are recurring.

**IV Drip:**

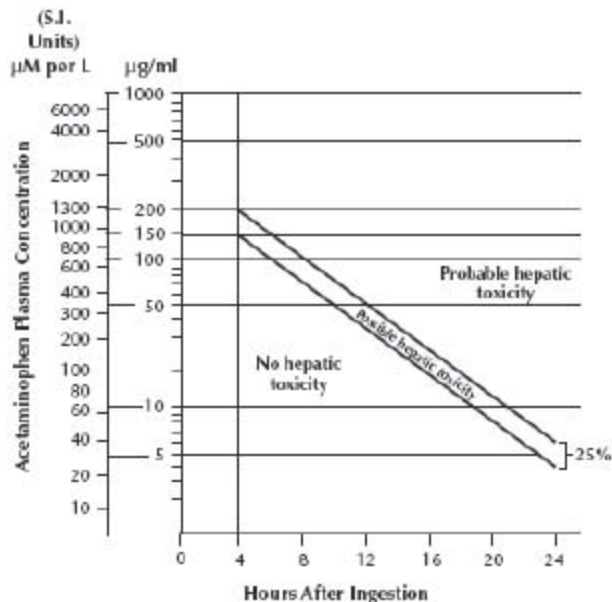
The duration of the infusion is determined by the patient's clinical status and should be continued for 24 hours after the signs and symptoms of nerve agent exposure resolve.

**Color coded 2-PAM administration for chemical weapon exposure**

**Courtesy of James Broselow MD & Robert Luten MD - [www.ebroselow.com](http://www.ebroselow.com)**



**Figure 2A: Rumack-Matthew Nomogram: Plasma or Serum Acetaminophen Concentration Versus Time Post-Acetaminophen Ingestion**



The nomogram has been developed to estimate the probability that acute acetaminophen overdose will result in hepatotoxicity based on plasma acetaminophen levels in relation to hours after ingestion.

Adapted from ACETADOTE® Package Insert, 2008

**Rumack-Matthew nomogram for acetaminophen overdose**

Courtesy of Cumberland Pharmaceuticals - [www.cumberlandpharma.com](http://www.cumberlandpharma.com)

[3kg](#)
[4kg](#)
[6kg](#)
[6-7kg](#)
[6-9kg](#)
[10-11kg](#)
[12-14kg](#)
[15-18kg](#)
[19-23kg](#)
[24-28kg](#)
[30-36kg](#)
**Resuscitation**
[Drugs](#)
[Anaphylaxis](#)
[RSI](#)
[Seizures](#)
[Respiratory Medic](#)
[Fluid & Blood Therapy](#)
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[Intraosseous Pressure](#)
[Chemical Weapons](#)
[Prescribing Guide](#)
[\(Quick Reference\) >](#)
[\(Antibiotics\) >](#)
[\(Pain & Sedation\) >](#)
**Toxicology / Acetylcysteine Loading IV**

Acetylcysteine Loading IV	150 mg/kg/dose (DMSO)	(ACETADOTE)
	10-11kg	
	1000 mg	
	40 mL	
40 mg/mL		

**Preparation Instructions**

Add 25 mL Acetadote 200 mg/mL (20%) to 100 mL bag Dextrose 5% in Water (DSW) = 5000 mg per 125 mL total volume = 40 mg/mL (4%)

**Preparation and Administration**

Administer via syringe or infusion pump over 15-30 minutes.

**Remarks**

Serious anaphylactic reactions have been reported with patients receiving IV Acetylcysteine. Use with caution in patients with history of asthma or bronchospasm.

Other adverse reactions include:

**STOP THE INFUSION** if patient develops a rash, tachycardia, hypotension, respiratory distress or allergic symptoms.

[3kg](#)
[4kg](#)
[6kg](#)
[6-7kg](#)
[6-9kg](#)
[10-11kg](#)
[12-14kg](#)
[15-18kg](#)
[19-23kg](#)
[24-28kg](#)
[30-36kg](#)
**Resuscitation**
[Drugs](#)
[Anaphylaxis](#)
[RSI](#)
[Seizures](#)
[Respiratory Medic](#)
[Fluid & Blood Therapy](#)
[Rehydration Therapy](#)
[Electrolyte Abnormal](#)
[DKA](#)
[Burns](#)
[Toxicology](#)
[Gastrointestinal Agents](#)
[Steroids](#)
[Intraosseous Pressure](#)
[Chemical Weapons](#)
[Prescribing Guide](#)
[\(Quick Reference\) >](#)
[\(Antibiotics\) >](#)
**Toxicology / Acetylcysteine 1st Maintenance IV**

Acetylcysteine 1st Maintenance IV	50 mg/kg/dose over next 4 hours	(ACETADOTE)
	10-11kg	
	525 mg	
	5.3 mL/hr	
40 mg/mL		

**Preparation Instructions**

Add 25 mL Acetadote 200 mg/mL (20%) to 100 mL bag Dextrose 5% in Water (DSW) = 5000 mg per 125 mL total volume = 40 mg/mL (4%)

**Preparation and Administration**

Following loading dose administer this 1st Maintenance dose via syringe or infusion pump over the next 4 hours. This solution is compatible with 5% Dextrose in Normal Saline (D5 1/2 NS) and for those zones with low infusion rates should be piggy-backed into patient's maintenance infusion.

**Remarks**

Serious anaphylactic reactions have been reported with patients receiving IV Acetylcysteine. Use with caution in patients with history of asthma or bronchospasm.

**Color coded intravenous Acetadote® administration**

3kg

4kg

5kg

6-7kg

8-9kg

10-11kg

12-14kg

15-18kg

19-23kg

24-28kg

29-35kg

## Resuscitation

Antidotes

Anaphylaxis

ASA

Seizures

Respiratory Meds

Fluid & Blood Therapy

Rehydration Therapy

Electrolyte Abnormal

DKA

Burns

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Pain & Sedation

## Newborn Resuscitation

Dosing Key

Trade/Generic Index

## Chemical Weapons

### ATROPINE IVIM (10 - 11kg)

0.05 mg/mL <sup>**</sup> conc	10 mL	0.5 mg
0.1 mg/mL <sup>**</sup> conc	5 mL	0.5 mg
0.2 mg/mL conc	2.5 mL	0.5 mg
0.5 mg/mL conc	1 mL	0.5 mg
1 mg/mL conc	0.5 mL	0.5 mg

Atropine IM  
Auto-Injector  
(Atro-Pen)

0.5 mg  
(may repeat up to 3 times)

<sup>\*\*</sup> Concentrations are to be diluted for IM injection in most patients. All IV medications may be given 10 (intravenous)

Color coded atropine administration for chemical weapon exposure

Courtesy of James Broselow MD & Robert Luten MD – [www.ebroselow.com](http://www.ebroselow.com)

## Radical Rashes and Bad Bugs

Type	Caused by:	Signs and Symptoms (systemic)	Signs and Symptoms (rash)	Management	Contagious Period	Route of Transmission
Chicken Pox	Virus	Flu	Chicken Pox rash	Benadryl (diphenhydramine) PO or lotion, Calamine lotion, time – Varicella-zoster immunoglobulin (VZIG) in high- risk kids	1 day before visible lesions until ALL lesions are crusted over	Primarily respiratory, but also direct contact with open lesions - Scabs are not infectious
Mumps	Virus	Fever/malaise x 24 hours, followed by “earache” that is aggravated by chewing – Then parotid gland swelling	None	Tylenol or Motrin  Fluids	Most communicable immediately before and after swelling begins	Respiratory and saliva
Roseola	Virus	3-4 days of high fever in a cute kid – Fever goes away with rash	Discreet rose-pink rash – First on trunk, then to face and extremities – not itchy	Tylenol or Motrin	During the actively febrile period	Respiratory and saliva
Rubella  (German measles)	Virus	None in most children	Pinkish red rash starts in the face and rapidly moves down – Disappears in same order it began and is usually gone by 3rd day	Tylenol or Motrin	7 days before rash to about 5 days after rash appears	Respiratory and saliva  Isolate child from pregnant women (teratogenic)

Type	Caused by:	Signs and Symptoms (systemic)	Signs and Symptoms (rash)	Management	Contagious Period	Route of Transmission
Rubeola (measles)	Virus	Fever, malaise, and Koplik spots (red spot with a blue-white center found in the mouth)	Red rash – starts in face and becomes less red as it moves down the body	Rest, Tylenol or Motrin; antibiotics to prevent secondary infection in high-risk kids	4 days before rash until 5 days after rash appears	Respiratory and saliva
Fifth's Disease	Virus	“Flu” symptoms  Usually afebrile	“Slapped face” appearance which disappears by 1-4 days, red, symmetrical, itchy rash moving proximal to distal	Tylenol or Motrin  Antihistamines for itching	1-2 days before the rash starts until the rash appears	Respiratory and saliva
Scarlet Fever	Strep.	Malaise, high fever, and high pulse out of proportion to fever	Sandpaper-like red rash starting on the neck within 12 hours of fever	Penicillin or cephalosporins  Tylenol or Motrin	First 10 days of symptoms	Respiratory and saliva

## Laboratory Detection of Drugs

Alcohol	12-24 hours
Amphetamines	2-4 days
Benzodiazepines	1-14 days
Rohypnol	36 hours
Cannabinoids	Occasional use: 1-7 days
Cannabinoids	Chronic use: 1-4 weeks
Cocaine	12-48 hours
GHB	4 hours (blood) - 12 hours (urine)
Opiates	1-3 days
PCP	Occasional use: 1-8 days
PCP	Chronic use: Up to 30 days

(Actual figures will vary due to metabolism, user laboratory, and excretion)

*If someone asks how long a certain drug is detectable in their urine, what do you tell them???*

Tell them whatever drug they asked about is detected in urine for 2 years!



## One Pill or One Swallow Killers

Agent or Class	Examples
Camphor	Camphor mothballs and camphor oil
Salicylates	Oil of wintergreen and methylsalicylate
Podophyllin	Podofilox (podophyllin) Also occasionally in herbal medications
Local anesthetics	Nupercainal (Dibucaine) ointment
Anti-arrhythmics	Quinaglute (quininide), Norpace (disopryamide), Enkaid (encainide), and Rhythmol (propafenone)
Anti-malarials	Quinine and chloroquine
Anti-hypertensives	Catapres (clonidine)
Tricyclic antidepressants	Elavil (amitriptyline), Tofranil (imipramine), and Pamelor (nortriptyline) - Depending on dose and size of child
Calcium channel blockers	Calan or Ioptin (verapamil), Cardizem (diltiazem), and Procardia (nifedipine)
Oral hypoglycemics (sulfonylureas)	Amaryl (glimepiride), Glucotrol (glypizide), and Glyburide (glibenclamide)
Opioids	Vicodin (hydrocodone with acetaminophen), Lomotil (diphenoxylate and atropine), and Duragesic (fentanyl) patch
Toxic alcohols	Windshield washer fluid (methanol) and antifreeze (ethylene glycol)
Theophylline	Theo-Dur, Theostat, and Theo-Dur Sprinkle

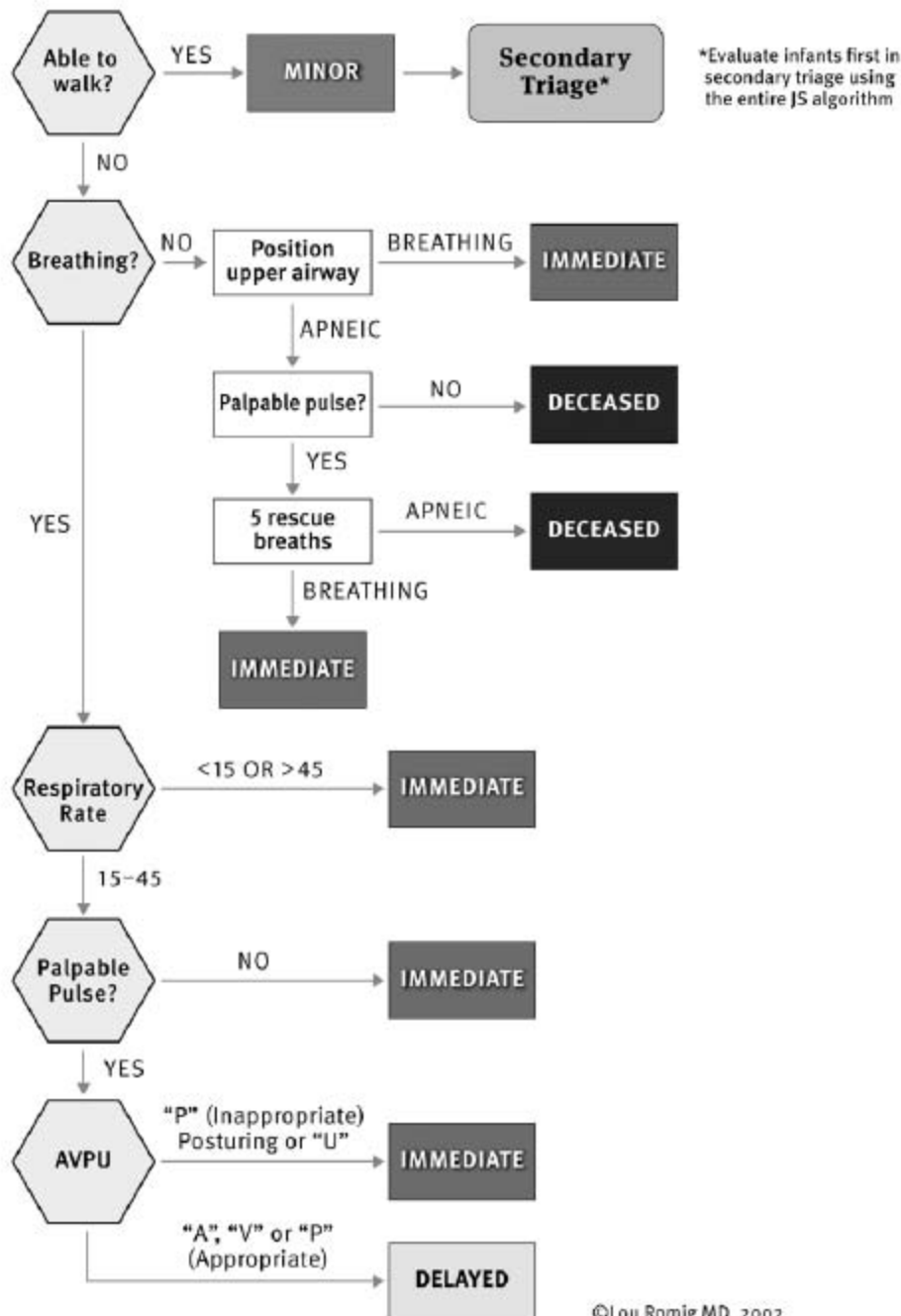
*Thanks to James Rhee MD and Anthony Scalzo MD for their help with the creation of this chart*

## **Snakebite Tidbits from the Texas Panhandle Poison Center [www.poisoncontrol.org](http://www.poisoncontrol.org)**

- The annual incidence of snake bite in the United States is 3-4 bites per 100,000 population; with only about 20 deaths reported each year. Rattlesnake bites are the most common envenomation, and the victim is often a young, intoxicated male who was teasing or trying to capture the snake.
- The potency of the venom and the amount of venom injected vary considerably. About 25% of all snake strikes are dry bites in which there is no envenomation.
- Fang marks from the Crotalidae (rattlesnake, copperhead, and the cottonmouth) may look like puncture wounds or lacerations.
- Coral snake envenomation is rare because of the snake's small mouth and fangs. The snake must hold on and chew for several seconds or more to work its rear fangs into the skin.
- **Red on yellow... Kill a fellow    Red on black...Venom lack**
- A child gets the same amount of antivenin as an adult.
- If platelets are low, give more antivenin... not more platelets.
- Do not pack the wound in ice or use a tourniquet.
- Never perform a fasciotomy unless compartment syndrome is documented with tissue compartment pressure monitoring.
- Electric shock treatment for snakebite is ineffective and is potentially dangerous!



# JumpSTART Pediatric Multicasualty Incident Triage



©Lou Romig MD, 2002

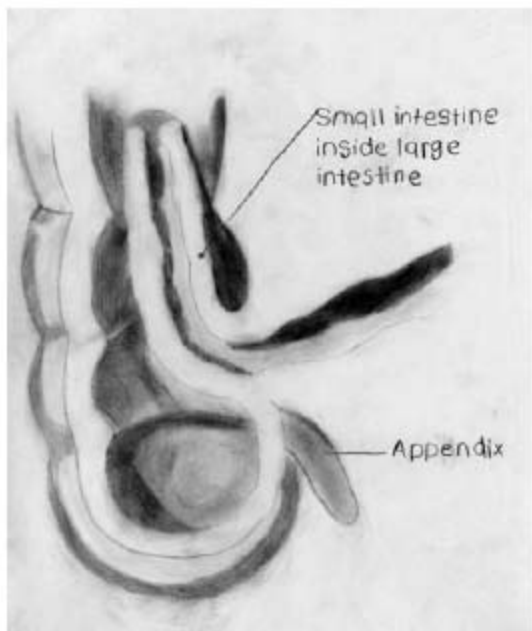
Photo Courtesy of Lou Romig MD,FAAP,FACEP



**BabyPod II Infant Warmer**

**Photo courtesy of BabyPod**

**[www.babypod.com](http://www.babypod.com)**



### **Intussusception**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**



**Double bubble & double trouble abdominal x-ray**

**Courtesy of Gerald A. Mandell MD - Phoenix Children's Hospital**

## Appendix 7-A

### APGAR Scores

Element	0	1	2	Score
<b>Appearance</b> (skin color)	Body and extremities blue, pale	Body pink, extremities blue	Completely pink	
<b>Pulse rate</b>	Absent	Below 100/min	100/min or above	
<b>Grimace</b> (Irritability)	No response	Grimace	Cough, sneeze, cry	
<b>Activity</b> (Muscle tone)	Limp	Some flexion of extremities	Active motion	
<b>Respiratory effort</b>	Absent	Slow and irregular	Strong cry	
			<b>TOTAL SCORE =</b>	

[3kg](#)
[4kg](#)
[5kg](#)
[6-7kg](#)
[8-9kg](#)
[10-11kg](#)
[12-14kg](#)
[15-18kg](#)
[19-23kg](#)
[24-28kg](#)
[30-36kg](#)
**■ Resuscitation**
[Intusions](#)
[Anaphylaxis](#)
[RGI](#)
[Seizures](#)
[Respiratory Problems](#)
[Fluid & Blood Therapy](#)
[Rehydration Therapy](#)
[Electrolyte Abnormal](#)
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[Prescribing Guide](#)
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[\(Pain & Sedation\)](#)
**(DKA) Fluid Therapy**
**Insulin / Normal Saline Infusion**
[Click here for Clinical Interpretation:](#)

	Insulin/Normal Saline (NS) Infusion				0.1 units/kg/hr				(Regular INSULIN)			
1 unit Insulin/mL NS												

**Preparation and Administration**

\*Add 1 mL (100 units) Regular Insulin to 100 mL Normal Saline (NS) = 1 unit Insulin/mL Normal Saline (NS).

**Remarks**

**Note:** Insulin is known to bind to both glass and plastic IV bottles, as well as tubing and syringes. Because of this many sources recommend a 30 minute waiting time (after the drip has been run through the tubing) before the drip is started to allow for this binding to occur. In the situation where the insulin drip is needed to be started quickly, we recommend that the first 50 mL be run thru into a sink. This is done to bind most of the sites in the tubing and eliminating the need for the 30 minute waiting period. If using a syringe pump with a low volume, low absorbing tubing for administration the 50 mL tubing flush is not needed.

[3kg](#)
[4kg](#)
[5kg](#)
[6-7kg](#)
[8-9kg](#)
[10-11kg](#)
[12-14kg](#)
[15-18kg](#)
[19-23kg](#)
[24-28kg](#)
[30-36kg](#)
**■ Resuscitation**
[Intusions](#)
[Anaphylaxis](#)
[RGI](#)
[Seizures](#)
[Respiratory Problems](#)
[Fluid & Blood Therapy](#)
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[Chemical Weapons](#)
[Prescribing Guide](#)
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[\(Antibiotics\)](#)
[\(Pain & Sedation\)](#)
**(DKA) Fluid Therapy**
**Glucose Greater than 360**
[Click here for Fluid Therapy Overview:](#)

	Glucose greater than 360											
Fluid #1 rate/hour												
Fluid #2 rate/hour												

**Suggested Guidelines**

**Note:** Serum glucose every hour in addition to bedside glucose monitoring. Serum electrolytes and calcium. Arterial Blood Gas (ABG) or Venous Blood Gas (VBG) every two hours times x 3. Follow Two Bag Protocol Sliding Scale.

**Fluid Guidelines**

**IV Fluid #1:** Normal Saline(NS)+20 mEq/L potassium phosphate +20 mEq/L potassium acetate IV  
**IV Fluid #2:** 10% Dextrose in Normal Saline (D 10 NS) + 20mEq/L potassium phosphate + 20 mEq/L potassium acetate IV

**Color coded DKA intravenous insulin and fluid management**

Courtesy of James Broselow MD & Robert Luten MD – [www.ebroselow.com](http://www.ebroselow.com)

# Insulin Preparations

Since 1982, most of the newly approved insulin preparations have been produced by inserting portions of DNA ("recombinant DNA") into special lab-cultivated bacteria or yeast. This process allows the bacteria or yeast cells to produce complete human insulin. Recombinant human insulin has, for the most part, replaced animal-derived insulin, such as pork and beef insulin. More recently, insulin products called "insulin analogs" have been produced so that the structure differs slightly from human insulin (by one or two amino acids) to change onset and peak of action. The following table lists some of the more common insulin preparations available today. Onset, peak, and duration of action are approximate for each insulin product, as there may be variability depending on each individual, the injection site, and the individual's exercise program.

Type of Insulin	Examples	Onset of Action	Peak of Action	Duration of Action
Rapid-acting	Humalog (lispro) Eli Lilly	15 minutes	30-90 minutes	3-5 hours
	NovoLog (aspart) Novo Nordisk	15 minutes	40-50 minutes	3-5 hours
Short-acting (Regular)	Humulin R Eli Lilly  Novolin R Novo Nordisk	30-60 minutes	50-120 minutes	5-8 hours
Intermediate-acting (NPH)	Humulin N Eli Lilly	1-3 hours	8 hours	20 hours
	Novolin N Novo Nordisk			
	Humulin L Eli Lilly  Novolin L Novo Nordisk	1-2.5 hours	7-15 hours	18-24 hours
Intermediate- and short-acting mixtures	Humulin 50/50 Humulin 70/30 Humalog Mix 75/25 Humalog Mix 50/50 Eli Lilly  Novolin 70/30 Novolog Mix 70/30 Novo Nordisk	The onset, peak, and duration of action of these mixtures would reflect a composite of the intermediate and short- or rapid-acting components, with one peak of action.		
Long-acting	Ultralente Eli Lilly	4-8 hours	8-12 hours	36 hours
	Lantus (glargine) Aventis	1 hour	none	24 hours



## **Nasal Medication Delivery Devices**

**Photos courtesy of Wolfe-Tory**

**[www.wolfetory.com](http://www.wolfetory.com)**





**Mask that is “too small”**



**Mask that is “too big”**



**Mask that is “just right”**

**Photos courtesy of Joshua DeBoer, my now 14-year old aspiring computer genius son –**

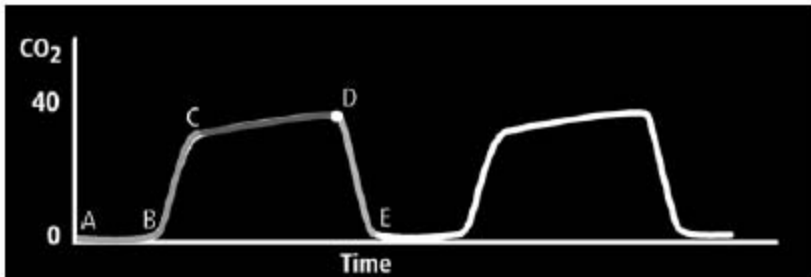


**Pediatric nasal cannula capnography device**

**Note the ability to administer supplemental oxygen and monitor end-tidal CO<sub>2</sub> for both “nose & mouth breathers”**



**Nasal cannula capnography in use**



**Normal ventilation capnograph**

**Capnography images courtesy of Oridion Medical - [www.oridion.com](http://www.oridion.com)**

## Translations of Wong-Baker FACES Pain Rating Scale



### Original Instructions:

Explain to the person that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain. Face 0 is very happy because he doesn't hurt at all. Face 1 hurts just a little bit. Face 2 hurts a little more. Face 3 hurts even more. Face 4 hurts a whole lot. Face 5 hurts as much as you can imagine, although you don't have to be crying to feel this bad. Ask the person to choose the face that best describes how he is feeling.

Rating scale is recommended for persons age 3 years and older.

**Brief word instructions:** Point to each face using the words to describe the pain intensity. Ask the child to choose the face that best describes their own pain and record the appropriate number.

**Wong-Baker FACES Pain Rating Scale, from Hockenberry, M. & Wilson, D. (2009).  
Wong's essentials of pediatric nursing, 8<sup>th</sup> edition. Mosby: St Louis.  
Used with permission. Copyright Mosby.**

# OUCHER!™

100 —



90 —



80 —



70 —

60 —



50 —

40 —



30 —

20 —



10 —

0 —

<http://www.oucher.org>

# OUCHER!™

100 —



90 —

80 —



70 —

60 —



50 —

40 —



30 —

20 —



10 —

0 —



<http://www.oucher.org>

African-American boy OUCHER™ scale was developed and copyrighted in 1990 by Mary J. Denyes, PhD,RN (Wayne State University) and Antonia M. Villarruel PhD,RN (University of Michigan) USA. Cornelia P. Porter PhD,RN and Charlotta Marshall RN,MSN contributed to the development of this scale.

# OUCHER!™



<http://www.oucher.org>



# OUCHER!

10 —



9 —

8 —



7 —

6 —



5 —

4 —



3 —

2 —



1 —

0 —



<http://www.oucher.org>

First nations girl OUCHER™ scale was developed and copyrighted by Carla Shapiro RN,MN,  
Canada, 1997.

# OUCHER!™

100 —



90 —

80 —



70 —

60 —



50 —

40 —



30 —

20 —



10 —

0 —



<http://www.oucher.org>

Hispanic boy OUCHER™ scale was developed and copyrighted in 1990 by Antonia M. Villarruel PhD,RN (University of Michigan) and Mary J. Denyes PhD,RN (Wayne State University), USA.

OUCHER™ scale images courtesy of Judith Beyer RN,PhD - [www.OUCHER.org](http://www.OUCHER.org)

## Common Pediatric Orthopedic Emergencies

Name	What is it?	Signs and Symptoms	Diagnostics	Management
Septic arthritis	Infection of the joint space – Bacteria spread from somewhere else, such as otitis, URI, cellulitis, etc.	Fever and/or chills  Decreased ROM of joint  Limping  Palpable effusion	CBC, ESR, blood cultures, arthrocentesis (test of choice), vaginal, rectal, oral cultures to rule out N. gonorrhea infection, X-rays to rule out osteomyelitis	IV antibiotics  Oral analgesics
Osteomyelitis	Bone infection – Bacteria spread from somewhere else, such as trauma, puncture wound, open fractures, etc.	Fever  Focal bone pain  Unwilling to bear weight or move limb	CBC, ESR, blood cultures, bone and chest X-rays (rule out TB), wound culture, bone scan	IV antibiotics  IV analgesics  Immobilize the extremity  Possible surgery
Transient Synovitis	Inflammation of the membrane of the hip joint – Not sure why it occurs	Acute groin pain  Non-traumatic knee/thigh pain  Usually afebrile	CBC, ESR, X-rays, ultrasound, or MRI of hip	NSAIDS  Bed rest with no weight bearing until pain free

Name	What is it?	Signs and Symptoms	Diagnostics	Management
Slipped femoral capital epiphysis (SCFE)	Spontaneous displacement of the proximal femoral epiphysis which causes displacement of the femoral head relative to the femoral neck – Not sure why it occurs – Most common adolescent hip disorder	Severe hip pain (acute)  External rotation with shortening (acute)  Several months of pain, limping, and out-toed gait (chronic is most common type)	Pelvic X-rays	Oral analgesics  No weight bearing  Traction  Surgical repair
Osgood-Schlatter Disease	Microfracture of the tibial tubercle – Running and jumping	Anterior knee pain  Point tenderness at the tibial tubercle	Knee X-rays	NSAIDS  Decreased activity x 2-3 weeks
Osteogenesis Imperfecta (OI)	"Brittle bone disease" - Most common osteoporosis syndrome in childhood – Genetic cause	Variable fractures, blue sclera, less fractures post-puberty (with most common type of OI)	Genetic testing (not in ED)  X-rays and history  Rule out abuse	Oral or IV analgesics  Fracture care  Gentle handling
Juvenile Rheumatoid Arthritis (JRA) – Now called Juvenile Idiopathic Arthritis (JIA)	Chronic inflammation of joints with eventual erosion, destruction, and fibrosis of the cartilage – Rarely "rheumatoid" type in children	Arthritis symptoms	ESR, rheumatoid factor (only + in 10% of cases), X-rays	NSAIDS  Methotrexate  Steroids
Childhood Accidental Spiral Tibial (CAST) fracture – aka Toddler's fracture	Spiral fracture of the lower 1/3 of the tibia caused by twisting/rotating the leg with the foot fixed in place (i.e. foot caught in something)	Limping or unwilling to bear weight  No history of trauma (if unwitnessed) and no fever	Radiographs Bone scan  Rule out abuse (most commonly midshaft or upper tibia)	Oral analgesics  Long leg cast for several weeks

**CBC** – Complete blood count **ESR** – Erythrocyte sedimentation rate

**MRI** – Magnetic resonance imaging

**NSAIDS** - Non-steroidal anti-inflammatory drugs

**TB** – tuberculosis **URI** – Upper respiratory infection

## Wong-Baker FACES Pain Rating Scale



0

No hurt



1

Hurts  
little bit



2

Hurts  
little more



3

Hurts  
even more



4

Hurts  
whole lot



5

Hurts  
worst

Brief word instructions: Point to each face using the words to describe the pain intensity. Ask the child to choose the face that best describes his/her own pain and record the appropriate number.

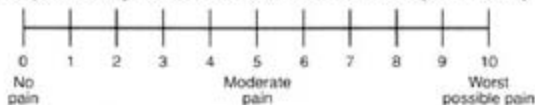
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Rating scale is recommended for person's age 3 years and older.

From: Hockenberry, M. and Wilson, D. (2009). Wong's Essentials of Pediatric Nursing, 8th Ed. Mosby: St. Louis. Used with permission: Copyright Mosby.

# UNIVERSAL PAIN ASSESSMENT TOOL

This pain assessment tool is intended to help patient care providers assess pain according to individual patient needs. Explain and use 0-10 Scale for patient self-assessment. Use the faces or behavioral observations to interpret expressed pain when patient cannot communicate his/her pain intensity.



WONG-BAKER  
FACIAL  
GRIMACE SCALE

MILD

MODERATE

SEVERE

ACTIVITY TOLERANCE SCALE	NO PAIN	CAN BE IGNORED	INTERFERES WITH TASKS	INTERFERES WITH CONCENTRATION	INTERFERES WITH BASIC NEEDS	BEDREST REQUIRED
SPANISH	NADA DE DOLOR	UN POQUITO DE DOLOR	UN DOLOR LEVE	DOLOR FUERTE	DOLOR DEMASIADO FUERTE	UN DOLOR INSOPORTABLE
FRENCH	AUCUNE DOULEUR	LÉGÈRE DOULEUR	DOULEUR MODÉRÉE	FORTE DOULEUR	TRÈS FORTE DOULEUR	DOULEUR EXTRÊME
GERMAN	KEINE SCHMERZEN	LEICHTE SCHMERZEN	MÄSSIGE SCHMERZEN	STARKE SCHMERZEN	SEHR STARKE SCHMERZEN	EXTREME SCHMERZEN
JAPANESE	痛みなし	軽い痛み	中程度の痛み	ひどい痛み	非常にひどい痛み	最悪の痛み
TAGALOG	HINDI MASAKIT	KAUNTIG SAKIT	MEDYO MASAKIT	TALAGANG MASAKIT	MASAKIT NA MASAKIT	PINAKAMASAKIT
HINDI	DARD NAHI HAI	BAHUT KAM	HIL NE SE TAKLEF HOTI HAI	SOCH NAHIN SAK TE	KUCH NAHIN KAR SAKTE	DARD BAHUT HAI

# FLACC SCALE

CATEGORIES	SCORING		
	0	1	2
FACE	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested.	Frequent to constant quivering chin, clenched jaw.
LEGS	Normal position or relaxed.	Uneasy, restless, tense.	Kicking, or legs drawn up.
ACTIVITY	Lying quietly, normal position moves easily.	Squirming, shifting back and forth, tense.	Arched, rigid or jerking.
CRY	No cry, (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints.
CONSOLABILITY	Content, relaxed.	Reassured by occasional touching hugging or being talked to, distractable.	Difficulty to console or comfort

# Neonatal/Infant Pain Scale (NIPS)

## Pain Assessment Tools

### Neonatal/Infant Pain Scale (NIPS)

(Recommended for children less than 1 year old) - A score greater than 3 indicates pain

Pain Assessment		Score
<b>Facial Expression</b>		
0 - Relaxed muscles	Restful face, neutral expression	
1 - Grimace	Tight facial muscles, furrowed brow, chin, jaw, (negative facial expression - nose, mouth and brow)	
<b>Cry</b>		
0 - No Cry	Quiet, not crying	
1 - Whimper	Mild moaning, intermittent	
2 - Vigorous Cry	Loud scream, rising, shrill, continuous (Note: Silent cry may be scored if baby is intubated as evidenced by obvious mouth and facial movement).	
<b>Breathing Patterns</b>		
0 - Relaxed	Usual pattern for this infant	
1 - Change in Breathing	Intersting, irregular, faster than usual; gagging, breath holding	
<b>Arms</b>		
0 - Relaxed/Restrained	No muscular rigidity, occasional random movements of arms	
1 - Flexed/Extended	Tense, straight legs; rigid and/or rapid extension, flexion	
<b>Legs</b>		
0 - Relaxed/Restrained	No muscular rigidity, occasional random leg movement	
1 - Flexed/Extended	Tense, straight legs; rigid and/or rapid extension, flexion	
<b>State of Arousal</b>		
0 - Sleeping/Awake	Quiet, peaceful sleeping or alert random leg movement	
1 - Fussy	Alert, restless, and thrashing	



## Probable Causes and Examples of Adverse Sedation Events

Probable Causes	Examples of Actual Reported Events
Drug-drug interaction - an event that was likely drug-related and for which a combination of drugs had been administered	"The six-week old infant received Demerol, Phenergan, and Thorazine for a circumcision and was found dead six hours later"
Drug overdose - at least 1 drug was administered in a dose > 1.25 times the maximum recommended dose	"The child received 6000 mg of chloral hydrate"
Inadequate monitoring - this could have occurred during or after the procedure	"The child was not on any monitors"
Inadequate resuscitation - the records indicated that the individuals involved did not have the basic life support or advanced life support skills or did not appropriately manage the emergency	"The heart rate decreased from 98 to 80, the nurse anesthetist gave oxygen and atropine, the pulse decreased further into the 60's, the nurse anesthetist gave epinephrine, 4 minutes later the nurse gave Narcan, 3 minutes later the nurse gave Antirilium, 12 minutes later the ambulance was summoned, 10 minutes later the patient was intubated, the ambulance drivers found the child on no monitors, EKG revealed electromechanical dissociation, the patient was transported from the dental office to a hospital"
Inadequate medical evaluation - lack of evaluation or appreciation of how underlying medical conditions would alter the patient's response to sedative drugs	"A child was transferred from Mexico and received 60mg/kg of chloral hydrate for a cardiology procedure; respiratory depression and bradycardia were followed by cardiac arrest. Autopsy revealed a ventricular septal defect, pulmonary hypertension, and elevated digoxin levels"
Premature discharge - the patient developed the problem after leaving a medical facility before meeting recommended discharge criteria	"The child became stridorous and cyanotic on the way back to his hometown"
Inadequate personnel - either the medication was administered at the direction of a physician who then left the facility, or there were inadequate numbers of individuals to monitor the patient and carry out the procedure at the same time	"The physician administered the medication and left the facility leaving the care to a technician"
Prescription/transcription error - if patient received incorrect dose either because of a transcription or prescription error (nursing or pharmacy)	"The patient received tablespoons instead of teaspoons"

Inadequate equipment - if an emergency arose and the equipment to handle it was not age - or size - appropriate or not available	"An oxygen outlet was available, but flow meter was not - only room air for the first 10 minutes"
Inadequate recovery procedures - this category included cases where there was not a proper recovery period, where no one was observing the patient after the procedure, or if an emergency occurred and the necessary equipment was not available	"If they made nurses stay after 5PM, they would all quit" ( <i>my personal favorite - SLD</i> )
Inadequate understanding of a drug or its pharmacodynamics	"The patient was given 175mcg of Fentanyl by IV push; chest wall/glottic rigidity was followed by full cardiac arrest" - Narcan or muscle relaxant never administered
Prescription given by parent in an unsupervised medical environment	"The mother gave two prescriptions of chloral hydrate at home"
Local anesthetic overdose - if child received more than the recommended upper limits or if an intravascular injection occurred	"A 22.7kg child received 432 mg of mepivacaine for a dental procedure. Seizures were followed by respiratory and cardiac arrests"
Inadequate fasting for elective procedure	"The child received a bottle of milk prior to a CT scan"
Unsupervised administration of a drug by a technician	"The drug was administered by a technician; there was no physician or nurse in attendance"

Edited from Cote, C. et al. (2000). Adverse sedation events in pediatrics: A critical incident analysis of contributing factors. Pediatrics. 105(4). 805-814.

### **Analgesia and Sedation Continuum**

	<b>Minimal Sedation (Anxiolysis)</b>	<b>Moderate Sedation/Analgesia "Conscious Sedation"</b>	<b>Deep Sedation/Analgesia</b>	<b>General Anesthesia</b>
<b>Responsiveness</b>	Normal response to verbal stimulation	Purposeful response to verbal or light tactile stimulation	Purposeful response following repeated or painful stimulation	Unarousable even with painful stimulation
<b>Airway</b>	Unaffected	No intervention required	Intervention may be required	Intervention often required
<b>Spontaneous Ventilation</b>	Unaffected	Adequate	May be inadequate	Frequently inadequate
<b>Cardiovascular Function</b>	Unaffected	Usually maintained	Usually maintained	May be impaired

Adapted from: American Society of Anesthesiologists House of Delegates. (October 27, 2004). Continuum of depth of sedation definition of general anesthesia and levels of sedation/analgesia.

<http://www.asahq.org/publicationsAndServices/standards/20.pdf>

## Sedatives and Analgesics Commonly Utilized in Pediatric Emergency Care

Drug	Route	Dose	Onset	Duration
<b>TAC</b> (tetracaine, adrenaline, and cocaine)  NOTE: Never near mucous membranes	TD	-	15-30 minutes	45-60 minutes
<b>LET</b> (lidocaine, epinephrine, and tetracaine)	TD	-	15-30 minutes	45-60 minutes
<b>EMLA</b> (lidocaine and prilocaine)	TD	-	60 minutes	1-2 hours
<b>L-M-X</b> (lidocaine)	TD	-	30-60 minutes	2-4 hours
<b>Synera</b> (lidocaine and tetracaine)	TD	-	20-30 minutes	2 hours
<b>Lidocaine</b> (xylocaine, lignocaine)	SQ	5mg/kg max (plain)  7mg/kg max (with epinephrine)	1 minute	1-3 hours
<b>Marcaine</b> (bupivacaine)	SQ	2.5mg/kg max (plain)  3.0mg/kg max (with epinephrine)	1 minute	4-12 hours

Drug	Route	Dose	Onset	Duration
<b>Tylenol</b> (acetaminophen, Panadol)	PO, PR	10-15mg/kg PO or PR	30-60 minutes PO  60-180 minutes PR	4-6 hours PO or PR
<b>Motrin</b> (ibuprophen, Brufen)	PO	10mg/kg PO	30 minutes PO	6 hours PO
<b>Toradol</b> (ketorolac)	IM, IV	0.5mg/kg IM (max 60mg)  0.5mg/kg IV (max 30mg)	10-20 minutes IM  5-10 minutes IV	6-8 hours IM/IV
<b>Narcan</b> (naloxone)	IM, IN, IV	0.1mg/kg IM/IN/IV peds  0.4-2.0mg IM/IN/IV adults	5-10 minutes IM  3-10 minutes IN  1-4 minutes IV	60-90 minutes IM  20-40 minutes IN  20-40 minutes IV
<b>Romazicon</b> (flumazenil, Anexate)	IM, IN, IV	0.02mg/kg IM/IV peds  0.04mg/kg IN peds (0.2mg max single dose)  0.2mg IM/IN/IV adults (up to 1mg in 5 divided doses)	5-10 minutes IM  2-4 minutes IN  1-2 minutes IV	60-90 minutes IM  90-120 minutes IN  20-40 minutes IV

Drug	Route	Dose	Onset	Duration
<b>Zofran</b> (ondansetron)	IV	0.1mg/kg IV (max 4mg)	10 minutes IV	3-4 hours IV
<b>Morphine</b>	IM, IV	0.1mg/kg IM/IV	10-15 minutes IM 5 minutes IV	3-4 hours IM/IV
<b>Demerol</b> (meperidine)	IM, IV	1-2mg/kg IM/IV	10 minutes IM 5 minutes IV	2-3 hours IM/IV
Sublimaze ( <b>fentanyl</b> )	IN, IV, TM	2mcg/kg IN 1-5mcg/kg IV 5-15mcg/kg "lollipop"	5-10 minutes IN 2-3 minutes IV 20-30 minutes TM	45-60 minutes IN/IV 60 minutes TM
Succinylcholine ( <b>"Sux"</b> , Anectine, Quelicin) For reversal of fentanyl-induced "rigid chest"	IM, IV	4mg/kg IM 2mg/kg IV	1 minute IV and "Be ready to bag"!	10 minutes IV
Ketalar ( <b>ketamine</b> ) + with atropine or Robinul (glycopyrrolate) and Versed (midazolam) (adjunctive therapy)	IM, IN, IV, PO, PR	4mg/kg IM 10mg/kg IN 0.5-1.0mg/kg IV 5-10mg/kg PO 5-10mg/kg PR	2-10 minutes IM 10-20 minutes IN 1 minute IV 10-30 minutes PO 10-30 minutes PR	60-90 minutes IM 1-2 hours IN 5-10 minutes IV 1-2 hours PO 1-2 hours PR

Drug	Route	Dose	Onset	Duration
Nitronox (Nitrous oxide, Entonox)	INHL	50% N2O/50% O2	3-5 minutes INHL	3-5 minutes INHL
Versed (midazolam)	IM, IN, IV, PO, PR	<u>For seizures:</u> 0.2-0.3mg/kg IN  0.1mg/kg IV 0.5mg/kg PR  <u>For sedation:</u> 0.1mg/kg IM 0.4-0.5mg/kg IN 0.1mg/kg IV 0.5mg/kg PO 0.5mg/kg PR	10-20 minutes IM  5 minutes IN  2-3 minutes IV  10-30 minutes PO  10-30 minutes PR	1-2 hours IM  30-60 minutes IN/IV  60-90 minutes PO  60-90 minutes PR
Chloral hydrate (Nembutal)	PO/PR	50-100mg/kg PO/PR	15-60 min PO/PR	1-2+ hours PO/PR
Diprivan (Propofol)	IV	100mcg/kg bolus IV (loading dose)  then 50- 100mcg/kg/min (maintenance infusion)	<1 min IV	10-15 min IV



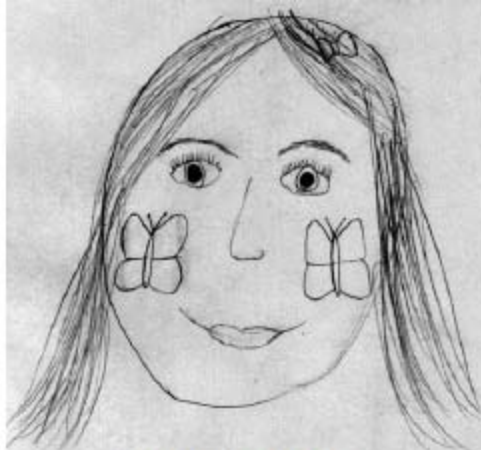
<b>Drug</b>	<b>Route</b>	<b>Dose</b>	<b>Onset</b>	<b>Duration</b>
<b>DPT</b>  Demerol, Phenergan, and Thorazine – meperidine, promethazine, and chlorpromazine)	IM	Just say no!	Just say no!	Up to 19+ hours (This is just one of the many reasons you that you should just say no)!
Seconal  ( <b>Pentobarbital</b> )	IM, IV, PR	5mg/kg IM  1-6mg/kg IV  3mg/kg PR	10-20 min IM  1 min IV  15-60 min PR	1-4 hours IM  15 min IV  1-4 hours PR
(Amidate)  <b>Etomidate</b>	IV	0.2mg/kg IV	30 seconds IV	10 minutes IV
<b>Precedex</b>  ("Dex", dexmedetomidine)	IN, IV	1-1.5mcg/kg IN  1mcg/kg/IV over 10 min (loading dose)  0.2-1.0mcg/kg/HOUR (maintenance infusion)	45 min IN  6-10 min IV	3 hours IN  2 hours IV

### **Legend**

IM – intramuscular, IN – intranasal, INHL – inhalation, IV – intravenous, PO – oral, PR – rectal  
SQ - subcutaneous, TD – transdermal, TM - transmucosal

*(Thanks to Madelyn Kahana MD, Tim Wolfe MD, and Michelle Webb RN,MS,CRNA for their invaluable assistance with the creation of this chart)*



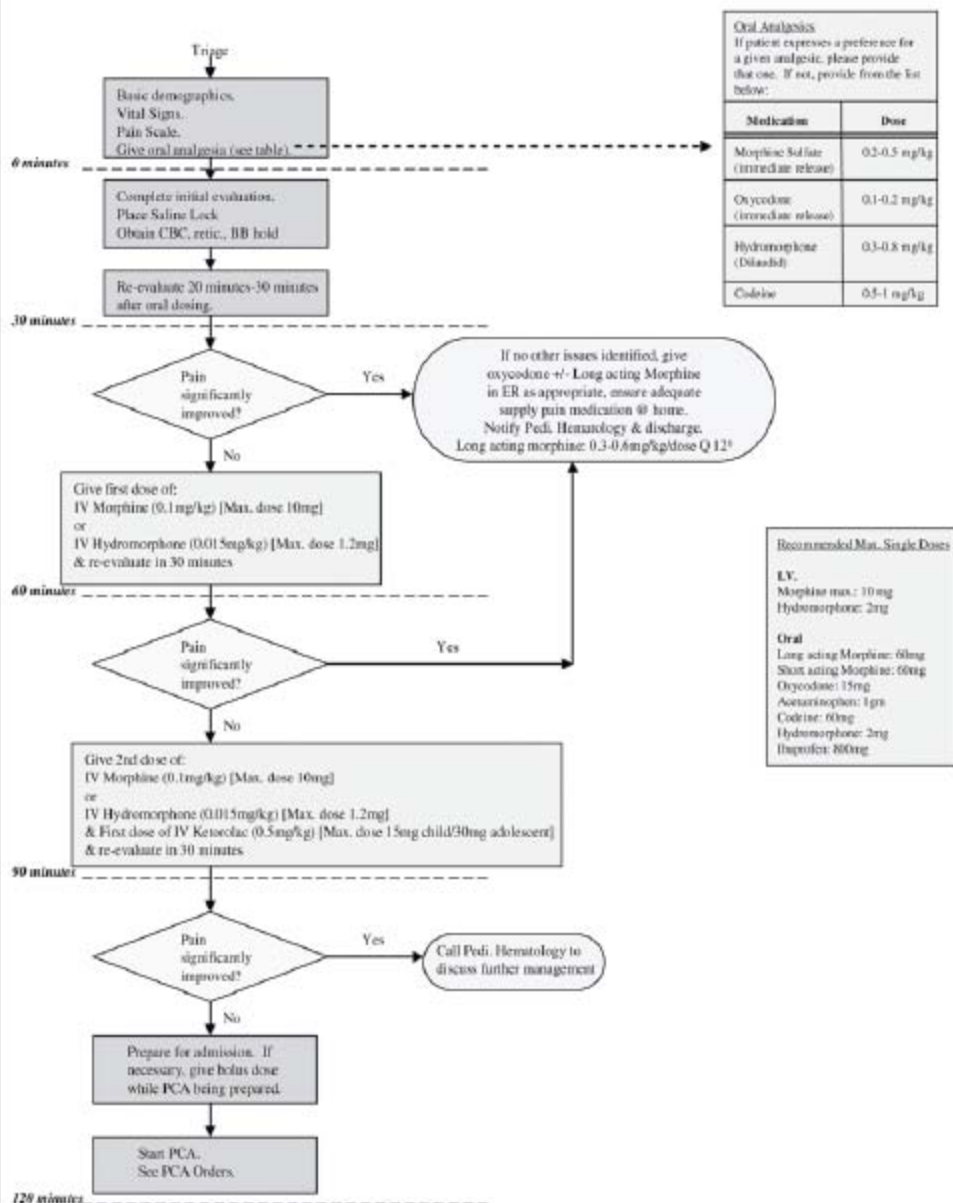


**SLE “Butterfly Rash”**

**Courtesy of Nina DeBoer, my now 12-year old aspiring artist/baker daughter**

# Guidelines for the Management of Uncomplicated Vaso-Occlusive Pain in Children with Sickle Cell Disease in the E.D.

The purpose of these guidelines is to provide an educational resource for clinicians at BMC. Clinicians are encouraged to follow these guidelines. It is recognized however, that at times there will be exceptions to the guidelines that make different medical management appropriate.



## Sickle cell disease pain crisis pathway

Courtesy of William Zempsky MD & the New England Pediatric Sickle Cell Consortium

## PURPOSE

This procedure describes a process for nursing and/or pharmacy personnel\* to administer lidocaine through an intra-osseous catheter to decrease infusion related pain in a conscious patient. IO insertion may cause mild pain in conscious patients but IO infusions may cause severe discomfort. Lidocaine is meant to be used as an anesthetic and not as analgesia.

<u>Broselow</u> <u>Color</u>	<u>Weight</u> <u>(KG)</u>	<u>0.5 mg/kg</u> <u>Lidocaine</u> <u>(mg)</u>	<u>20mg/ml</u> <u>Lidocaine</u> <u>(ml)</u>	<u>Normal</u> <u>Saline</u> <u>(ml)</u>
Grey	3	1.5	0.08	0.92
Grey	4	2	0.1	0.9
Grey	5	2.5	0.13	0.87
Pink	6-7	3.4	0.17	0.83
Red	8-9	4.25	0.21	0.79
Purple	10-11	5.25	0.26	0.74
Yellow	12-14	6.5	0.33	0.67
White	15-18	8.25	0.41	0.59
Blue	19-22	10.37	0.52	0.48
Orange	24-28	13	0.65	0.35
Green	30-36	16.5	0.83	0.17

For **PEDIATRIC** patients who may or are able to perceive pain after the IO device is placed and position has been confirmed and secured, **CONTRAINDICATED** in pediatric patients with acute seizures or history of non-febrile seizures.

1. May give 0.5 mg/kg (Max 20mg) of 2% lidocaine (without preservatives or epinephrine) IO as a slow bolus
2. Diluted with Normal Saline to a total volume of 1 ml. (See table below)
3. Wait at least 30 seconds then flush with 5mls of normal saline.
4. If necessary, step 1 may be repeated as needed to maintain anesthetic effect. (Do NOT exceed 3mg/kg/24hr)

This table represents approximate dosing based Broselow's weight breakpoints.

The volume of lidocaine recommended in pediatric patients is not enough to prime the tubing. A small amount of normal saline is used to ensure the volume is the correct amount to prime the tubing and complete the lidocaine flush. Because of the familiarity and ease-of-use of the Broselow system, we based our lidocaine chart (see chart below) on the weight-based tape recommendations.

**ADULT** patients- For patients who may or are able to perceive pain after the IO device is placed and position has been confirmed and secured.

1. May give 20-40 mg (1-2 mL) of 2% lidocaine (without preservatives or epinephrine) IO as a bolus over 1 minute.
2. Wait at least 30 seconds then flush with 10 ml of normal saline.
3. If necessary, step 1 may be repeated as needed to maintain anesthetic effect. (Do NOT exceed 3 mg/kg/24 hr)

\*Medication must be ordered by physician or LIP.

## Color-Coded Intraosseous Lidocaine

	DATE/TIME						
<b>Face</b>							
0 - No particular expression or smile							
1 - Occasional grimace or frown, withdrawn, disinterested							
2 - Frequent to constant quivering chin, clenched jaw							
<b>Legs</b>							
0 - Normal position or relaxed							
1 - Uneasy, restless, tense							
2 - Kicking, or legs drawn up							
<b>Activity</b>							
0 - Lying quietly, normal position, moves easily							
1 - Squirming, shifting back and forth, tense							
2 - Arched, rigid or jerking							
<b>Cry</b>							
0 - No cry (awake or asleep)							
1 - Moans or whimpers; occasional complaint							
2 - Crying steadily, screams or sobs, frequent complaints							
<b>Consolability</b>							
0 - Content, relaxed							
1 - Reassured by occasional touching, hugging or being talked to, distractible							
2 - Difficult to console or comfort							
<b>TOTAL SCORE</b>							



- 0: Hi. I am not experiencing any pain at all. I don't even know why I'm here.
- 1: I am completely unsure whether I am experiencing pain or itching, or maybe I just have a bad taste in my mouth.
- 2: I probably just need a Band Aid.
- 3: This is distressing. I don't want this to be happening to me at all.
- 4: My pain is not f\_cking around.
- 5: Why is this happening to me??
- 6: Ow. Okay, my pain is super legit now.
- 7: I see Jesus coming for me and I'm scared.
- 8: I am experiencing a disturbing amount of pain. I might actually be dying. Please help.
- 9: I am almost definitely dying.
- 10: I am actively being mauled by a bear.
- 11: Blood is going to explode out of my face at any moment.

## A Better Pain Chart

Courtesy of Allie Brosh, [www.hyperboleandahalf.blogspot.com](http://www.hyperboleandahalf.blogspot.com)



Midrange



Pinpoint





























Anisocoria



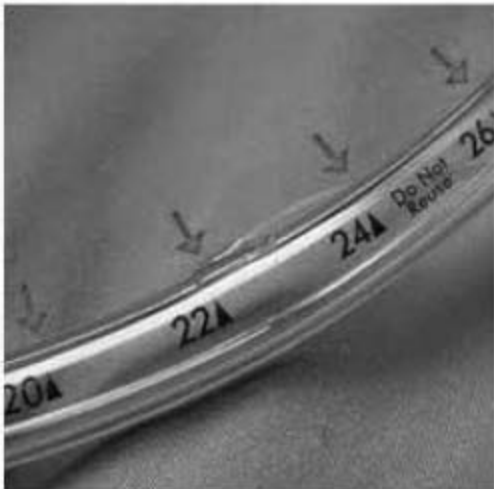
Dilated



### Variations of Pupil Sizes

in	.223	.21	.197	.184	.17	.158	.144	.131	.118	.105	.092	.079	.066	.053	.039
mm	5.7	5.3	5.0	4.7	4.3	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.67	1.35	1
Fr	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
															
															
Fr	18	19	20	22	24	26	28	30	32	34					
mm	6.0	6.3	6.7	7.3	8.0	8.7	9.3	10.0	10.7	11.3					
in	.236	.249	.263	.288	.315	.341	.367	.393	.419	.445					

**Foley Urinary Catheter Sizes**  
 Courtesy of [UrethraGauge.com](http://UrethraGauge.com)



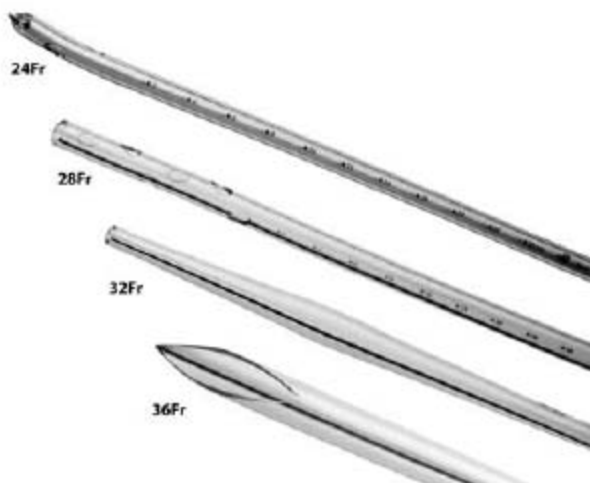
**Centimeter Markings on an Endotracheal Tube**





**8f-16f Chest Tubes**

Courtesy of Atrium Medical, [www.atriummed.com](http://www.atriummed.com)



**24f-36f Chest Tubes**

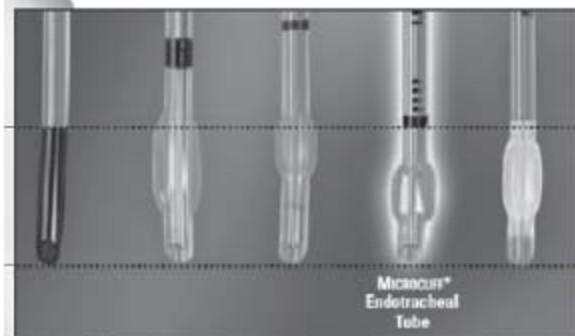
Courtesy of Atrium Medical, [www.atriummed.com](http://www.atriummed.com)



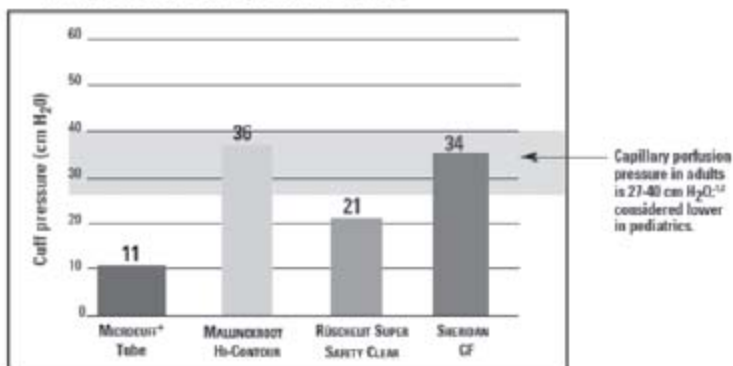
## **2.5-5.5 Uncuffed Endotracheal Tubes**

**Photo courtesy of Julie Bacon RN,BA,CPEN**

**MICROCUFF® tube is designed for pediatric airway**



**MICROCUFF® tube seals at a lower pressure than conventional pediatric tubes<sup>4</sup>**



*Median cuff pressure to seal the trachea in children aged 2-4 (n=4x20 patients, ID 4.0mm). Sealing pressure assessed by auscultation within 5 minutes after intubation.*

**Microcuff Cuffed Pediatric Endotracheal Tubes**

**Images courtesy of Kimberly-Clark Healthcare, [www.kchealthcare.com](http://www.kchealthcare.com)**



**Radiograph Revealing Battery in the Esophagus**



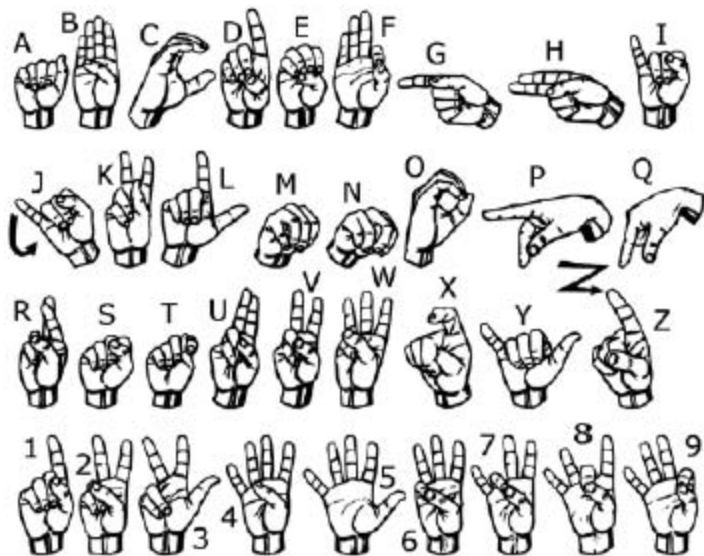
**Radiograph Revealing Battery in the Stomach**

**Images Courtesy of Christopher Straus MD, University of Chicago Medicine**



**Radiographs Revealing Coin in Right Mainstem Bronchus**

**Images Courtesy of Christopher Straus MD, University of Chicago Medicine**



**American Sign Language Alphabet**

Image Courtesy of Dr. William Vicars, [www.lifeprint.com](http://www.lifeprint.com)



**I Love You in American Sign Language**

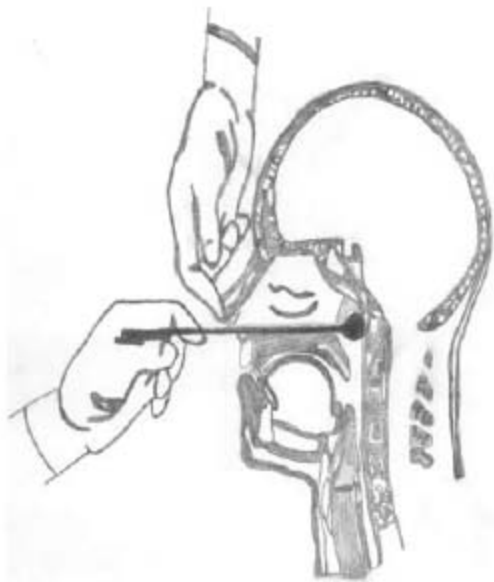
**Image Courtesy of Dr. William Vicars, [www.lifeprint.com](http://www.lifeprint.com)**





## WaterBalz

Photo courtesy of DuneCraft, [www.dunecraft.com](http://www.dunecraft.com)



**Obtaining a Nasopharyngeal Specimen for Pertussis Testing**

**Illustration courtesy of my now 14-year old aspiring baker daughter,**



**Radiograph Demonstrating Gastrostomy Tube in the Stomach**

**Image Courtesy of Christopher Speaker RN,MSN,APN, University of Chicago Medicine**



**Radiograph Demonstrating Intraperitoneal (not stomach) Gastrostomy Tube**

**Image Courtesy of Christopher Straus MD, University of Chicago Medicine**

50 mL

NDC 0409-7517-16

**50%  
DEXTROSE**  
Injection, USP

**25 grams (0.5 g/mL)**

*Ansy<sup>®</sup> II*

Unit of Use Syringe

**LifeShield<sup>®</sup>**  
with male luer lock adapter

**Rx only**

LOT 15-420-EU  
EXP. 1MAR2014

  
Hospira

◀ PRESS AND PULL TO OPEN ▶

**50% Dextrose, 0.5g/ml**

Photo courtesy of Hospira, [www.Hospira.com](http://www.Hospira.com)



**25% Mannitol Bottle, 12.5g/50ml**

Photo courtesy of Pharmaceutical Partners of Canada, [www.ppcdrugs.com](http://www.ppcdrugs.com)





**Mannitol Bottles with Visible Crystals**

**Image courtesy of Springer Images, [www.springerimages.com](http://www.springerimages.com)**



Change Weight 5.0kg

To

Volume 0.5ml

To

Dose to chart 0.05mg



$$5kg * \frac{0.01mg}{kg} \approx 0.05mg$$

$$0.05mg * \frac{10ml}{1mg} \approx 0.5ml$$

10 mL

NDC 0409-4921-34

**EPINEPHRINE**  
**Injection, USP**

**1:10,000**

**1 mg (0.1 mg/mL)**

***PROTECT FROM LIGHT***

**LifeShield®**

**Glass**  
**ABBOJECT®**  
**Unit of Use Syringe**

**with male luer lock  
adapter and 20-Gauge  
protected needle**

**Rx only**



**1:10,000 Epinephrine Injection, 0.1mg/ml**

**Photo courtesy of Hospira, [www.Hospira.com](http://www.Hospira.com)**



**Colormetric End-Tidal CO<sub>2</sub> Detectors Demonstrating Gold and Purple Colors**

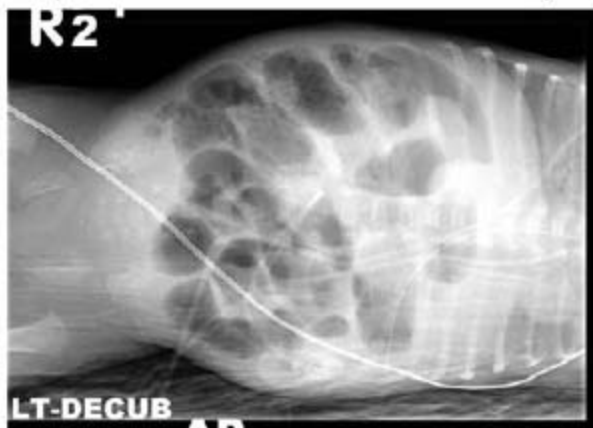
**Images courtesy of Mercury Medical, [www.mercurymed.com](http://www.mercurymed.com)**



**Endotracheal Tube Cuff Pressure Monitor**

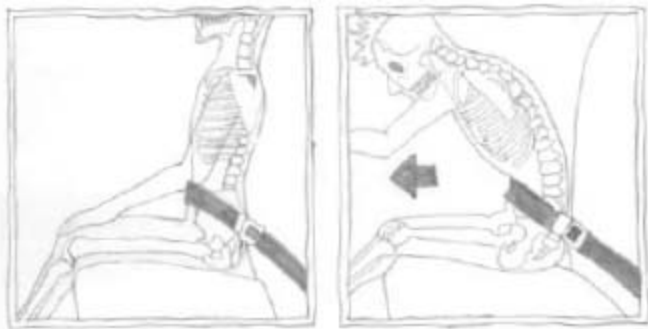
**Image courtesy of Posey, [www.posey.com](http://www.posey.com)**

# Pneumatosis (Gas in the bowel wall)



**Abdominal Radiograph Demonstrating Pneumatosis Intestinalis**

**Image courtesy of Terri Russell RN,DNP,NNP**



### **Lap Belt Injuries**

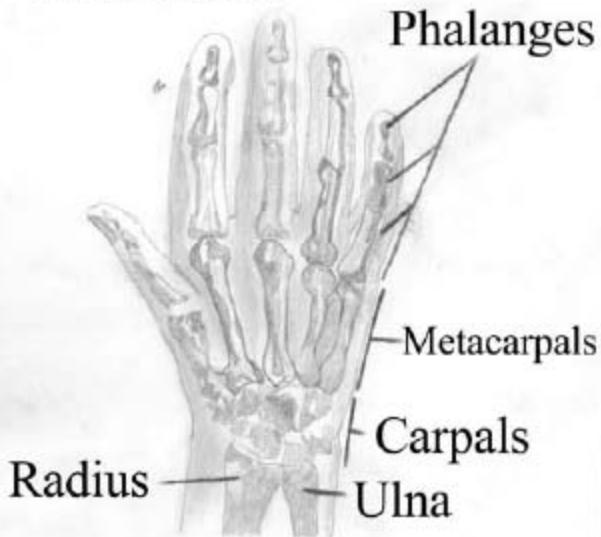
**Illustrations Courtesy of My Now 14-year Old Aspiring Baker Daughter,**



**Buzzy**

**Image courtesy of Amy Baxter MD,FACEP, [www.buzzyforshots.com](http://www.buzzyforshots.com)**

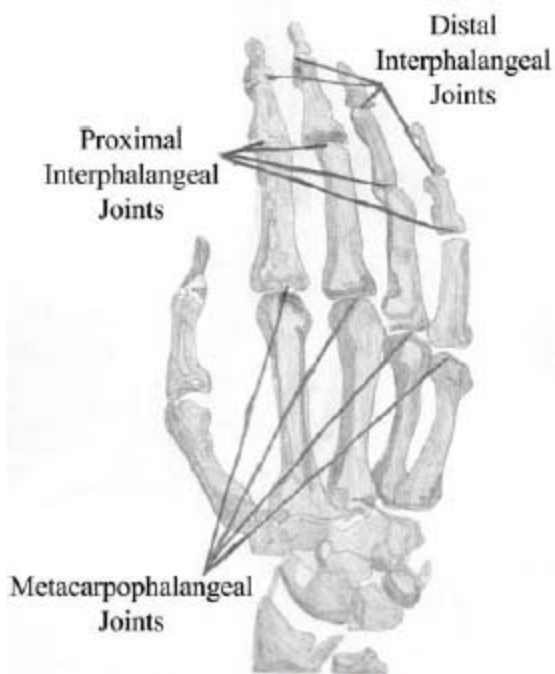
# Hand Bones



**Bones of the Hand**

**Illustration Courtesy of My Now 14-year Old Aspiring Baker Daughter,**

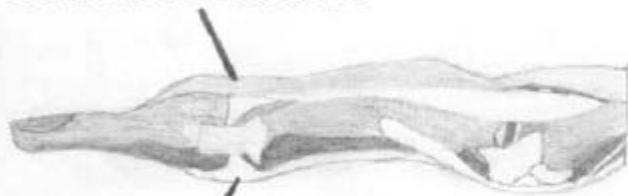




**Joints of the Hand**

**Illustration Courtesy of My Now 14-year Old Aspiring Baker Daughter,**

Extensor Tendon



Flexor Tendon

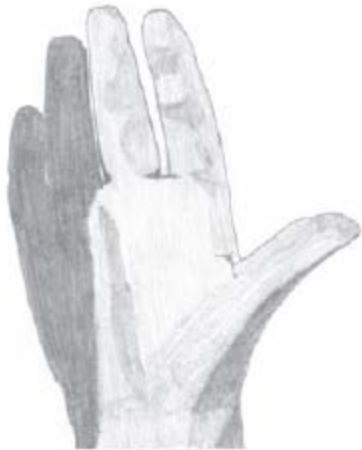
**Hand Flexor and Extensor Tendons**

**Illustration Courtesy of My Now 14-year Old Aspiring Baker Daughter,**



**Areas of Sensation: Radial Nerve**

**Illustration Courtesy of My Now 14-year Old Aspiring Baker Daughter,**

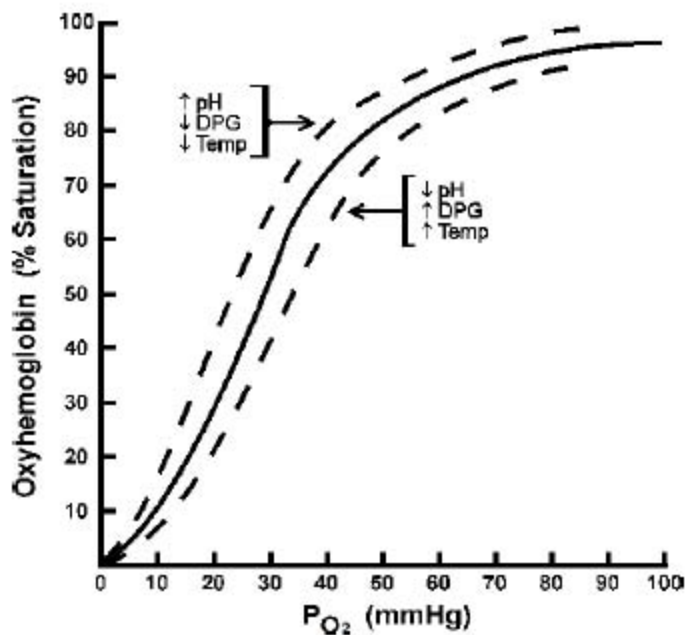


**Areas of Sensation: Ulnar Nerve**

**Illustration Courtesy of My Now 14-year Old Aspiring Baker Daughter,**

ABG Normal Ranges	
sPO <sub>2</sub>	~95-99%
pO <sub>2</sub>	80-100
pH	7.35-7.45
pCO <sub>2</sub>	35-45 mmHg
HCO <sub>3</sub>	22-26

**Normal Arterial Blood Gas Values**

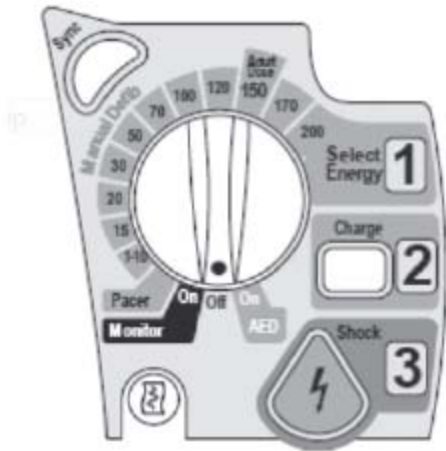


**Oxygen-Hemoglobin Dissociation Curve**



## **Vapotherm High-Flow Nasal Cannula Therapy**

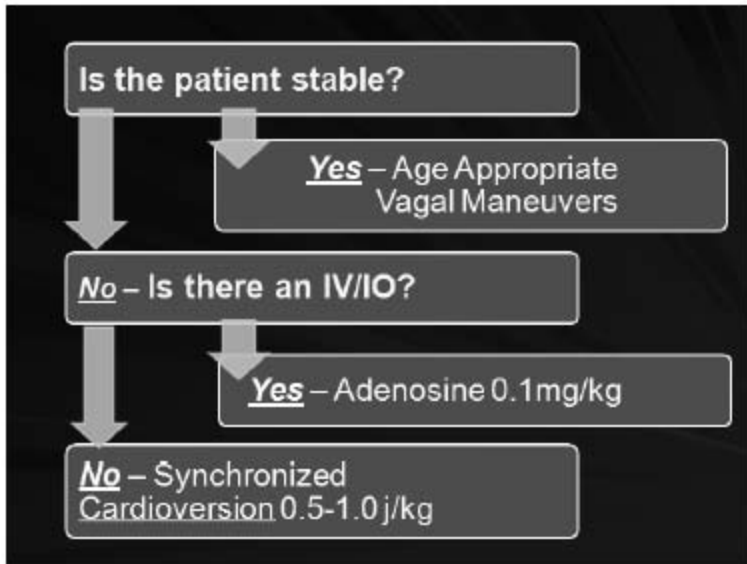
**Images courtesy of Vapotherm, [www.Vapotherm.com](http://www.Vapotherm.com)**



**Options for Defibrillation or Cardioversion Energy in Joules**

**Image courtesy of Phillips Medical, [www.medical.phillips.com](http://www.medical.phillips.com)**





### Pediatric SVT Algorithm

Image courtesy of Julie Bacon RN,BA,CPEN



**Adenosine 6mg/2ml**

Photo courtesy of Pharmaceutical Partners of Canada, [www.ppcdrugs.com](http://www.ppcdrugs.com)

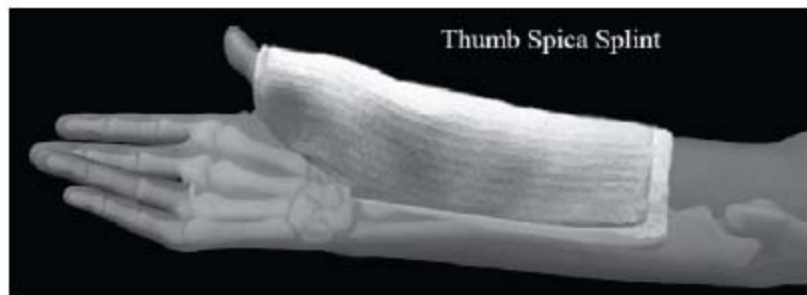
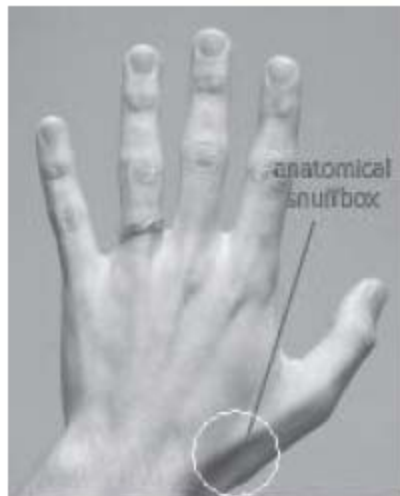
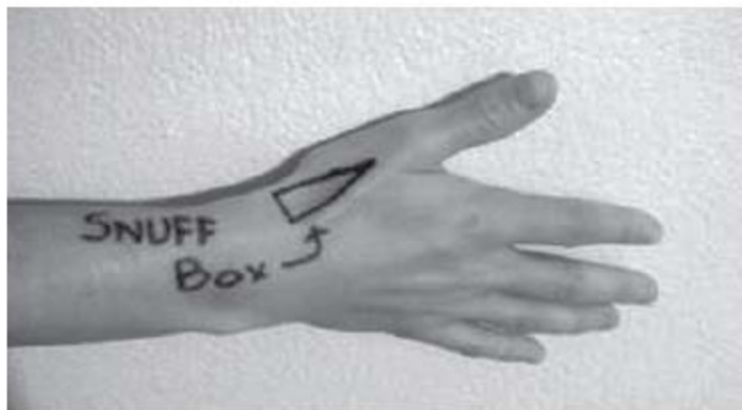


**Fentanyl 50mcg/ml**

**Photo courtesy of Emergency Medical Products, [www.buyemp.com](http://www.buyemp.com)**

Type	Usual age of onset	Characteristics
I - Infantile	0-6 months	<p>The severe form manifests in the first months of life, usually with a quick and unexpected onset ("floppy baby syndrome.") Rapid motor neuron death causes inefficiency of the major bodily organs - especially of the respiratory system - and pneumonia-induced respiratory failure is the most frequent cause of death. Babies diagnosed with SMA type I do not generally live past two years of age, with death occurring as early within weeks in the most severe cases (sometimes termed SMA type 0.) With proper respiratory support, those with milder SMA type I phenotypes, which account for around 10% of cases, are known to live into adolescence and adulthood.</p>

II - Intermediate	6-18 months	<p>The intermediate form affects children who are never able to stand and walk, but who are able to maintain a sitting position at least some time in their life. The onset of weakness is usually noticed some time between 6 and 18 months.</p> <p>The progress is known to vary greatly; some patients gradually grow weaker over time while others, through careful maintenance, avoid any progression. Body muscles are weakened, and the respiratory system is a major concern. Life expectancy is somewhat reduced, but most SMA II patients live well into adulthood.</p>
III - Juvenile	>18 months	<p>The juvenile form usually manifests after 18-months of age and describes patients who are able to walk without support at some time, although many later lose this ability. Respiratory involvement is less noticeable, and life expectancy is normal or near normal.</p>
IV - Adult Onset	Adulthood	<p>The adult-onset form (sometimes classified as a late-onset SMA type III) usually manifests after the third decade of life with gradual weakening of muscles – mainly affects proximal muscles of the extremities – frequently rendering the patient wheelchair-bound. Other complications are rare, and life expectancy is unaffected.</p>



**Scaphoid Bone Fractures and Spica Splint**



## Auvi-Q Talking Epi-Pens

Photo courtesy of Sanofi-Aventis, [www.auvi-q.com](http://www.auvi-q.com)



**Broselow Pediatric Emergency Tape**

**Photo courtesy of Armstrong Medical, [www.armstrongmedical.com](http://www.armstrongmedical.com)**



## EZ-IO and Laboratory Testing

### Background

Improved vascular access devices, which enable providers to deliver critically needed drugs as quickly as central lines, have ignited a resurgence in the intraosseous (IO) route to vascular access. This, in turn, has led to other uses of the IO vasculature, including drawing IO blood for laboratory analysis.

It has been a number of years since the last published study examining IO blood for laboratory analysis.<sup>1</sup> For this reason, Vidacare conducted and completed this new study to both validate earlier research and address concerns regarding the use of IO-derived blood for laboratory analysis.

### Study Methodology & Design<sup>ii</sup>

Ten healthy adult volunteers consented to participate in an IRB-approved study involving the following:

- Blood samples were obtained from peripheral veins in the forearm. Within 5 minutes, an IO catheter was placed in the proximal humerus.
- Two sets of IO blood samples were obtained from each participant, one set following 2 ml of marrow/blood waste and one set following 6 ml of waste.
- All sample sets were analyzed at a reference laboratory for complete blood count and chemistry profile.
- Means were compared for each blood test from the drawn samples (Intravenous, IO-1, and IO-2), with intravenous blood values serving as controls for IO blood values.



Insertion at  
proximal humerus



Drawing of blood at  
proximal humerus



EZ-IO G3  
Power Driver

### RESULTS & CONCLUSIONS

Intraosseous (IO) and intravenous (IV) laboratory values had statistically significant correlation for many commonly ordered lab studies, with some exceptions as noted. (See Table and Graphs, Page 2.)

The intraosseous space proved to be a reliable source for blood laboratory analysis for several commonly ordered tests, such as hemoglobin and hematocrit, as well as several chemistry values.

**NOTE:** Results may not be reliable for CO<sub>2</sub> and platelets, and are unreliable for WBCs.

### REFERENCES

- <sup>i</sup> Grisham J, Hastings C. Bone marrow aspirate as an accessible and reliable source for critical laboratory studies. *Ann Emerg Med.* 1991;20:1121-1124.
- <sup>ii</sup> Huren JS. Can blood taken from intraosseous cannulations be used for blood analysis? *Burns.* 2000;26:727-730.
- <sup>iii</sup> Miller LJ, Philbeck TE, Montez DF, Spadaccini CJ. A new study of intraosseous blood for laboratory analysis. *Arch Pathol Lab Med* 2009;133:1628.

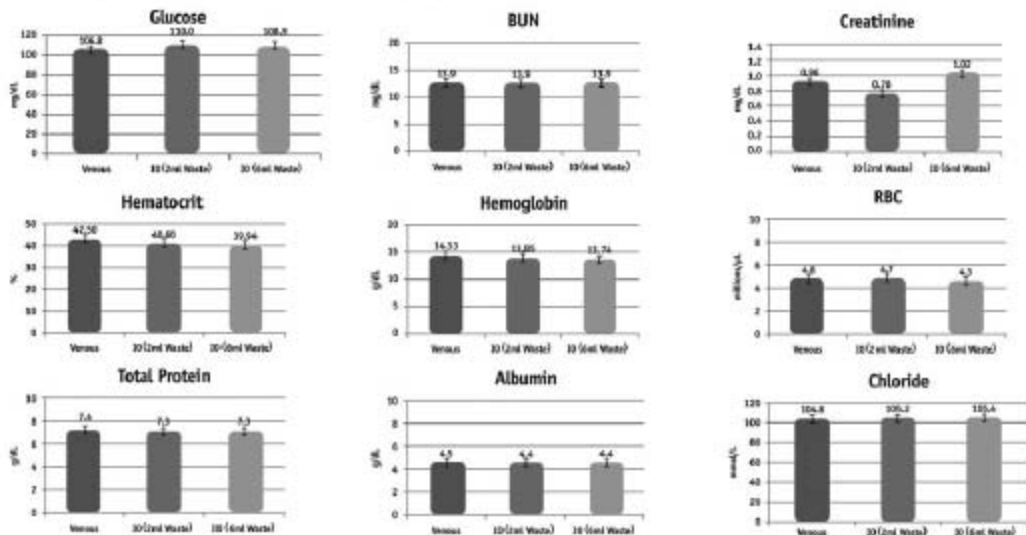
## EZ-IO and Laboratory Testing (Continued)

### IO vs. IV Comparisons

The graphs and table shown are comparisons of mean laboratory values by sampling method.

IV indicates the typical intravenous phlebotomy sampling. IO-1 indicates first intraosseous sampling following 2 ml of marrow/blood waste. IO-2 indicates second intraosseous sampling following 6 ml of waste.

The following lab studies produced a statistically significant correlation between IO and IV values:



Certain laboratory values did not produce a statistically significant correlation.  $CO_2$  and platelet count were lower for IO blood than for IV blood, and WBCs were elevated in the IO samples. Potassium, sodium and calcium did not produce statistically significant correlation.

VALUE	IV	IV/IO-1 <i>r</i> (p VALUE)	IO-1	IV/IO-2 <i>r</i> (p VALUE)	IO-2	IO-1/IO-2 <i>r</i> (p VALUE)
WBC <sup>1</sup> ..... (1000/ $\mu$ L)	7.6 $\pm$ 1.6	.193 (ns)	15.0 $\pm$ 7.1	.53 (ns)	10.4 $\pm$ 4.0	.76 (ns)
RBC <sup>2</sup> ..... (millions/ $\mu$ L)	4.8 $\pm$ 0.4	.88 (.004)	4.7 $\pm$ 0.4	.99 (<.001)	4.3 $\pm$ 0.2	.99 (<.001)
Hemoglobin ..... (g/dL)	14.3 $\pm$ 0.9	.91 (.002)	13.9 $\pm$ 1.6	.98 (.004)	13.7 $\pm$ 0.8	.95 (.013)
Hematocrit ..... (%)	42.5 $\pm$ 2.8	.85 (.008)	40.6 $\pm$ 2.9	.91 (.031)	39.9 $\pm$ 1.7	.95 (.013)
Platelets ..... (1000/ $\mu$ L)	301.9 $\pm$ 76.0	.47 (ns)	201.7 $\pm$ 77.0	.91 (ns)	238.3 $\pm$ 34.3	.55 (ns)
Glucose ..... (mg/dL)	106.8 $\pm$ 14.4	.90 (.001)	110.0 $\pm$ 16.3	.85 (.003)	108.9 $\pm$ 15.9	.95 (<.001)
BUN <sup>3</sup> ..... (mg/dL)	13.9 $\pm$ 2.5	.98 (<.001)	13.9 $\pm$ 2.4	.98 (<.001)	13.9 $\pm$ 2.4	.98 (<.001)
Creatinine ..... (mg/dL)	1.0 $\pm$ 0.2	.97 (<.001)	0.8 $\pm$ 0.2	.96 (<.001)	1.0 $\pm$ 0.2	.96 (<.001)
Sodium ..... (mmol/L)	140.3 $\pm$ 3.7	.22 (ns)	136.4 $\pm$ 1.7	.13 (ns)	136.4 $\pm$ 1.5	.23 (ns)
Potassium ..... (mmol/L)	4.6 $\pm$ 0.5	.38 (ns)	5.4 $\pm$ 1.0	.13 (ns)	5.0 $\pm$ 1.0	.21 (ns)
Chloride ..... (mmol/L)	104.8 $\pm$ 1.7	.81 (.009)	105.2 $\pm$ 1.4	.76 (.018)	105.4 $\pm$ 2.0	.76 (.016)
$CO_2$ ..... (mmol/L)	22.7 $\pm$ 3.2	.45 (ns)	17.4 $\pm$ 2.5	.64 (ns)	17.3 $\pm$ 2.1	.71 (.033)
Calcium ..... (mg/dL)	9.9 $\pm$ 0.5	.08 (ns)	9.2 $\pm$ 0.3	.57 (ns)	9.2 $\pm$ 0.3	.48 (ns)
Total Protein ... (g/dL)	7.4 $\pm$ 0.3	.77 (.016)	7.3 $\pm$ 0.4	.90 (.001)	7.3 $\pm$ 0.4	.89 (.001)
Albumin ..... (g/dL)	4.5 $\pm$ 0.2	.74 (.022)	4.4 $\pm$ 0.2	.89 (.001)	4.4 $\pm$ 0.3	.79 (.012)

1 - White blood cells 2 - Red blood cells 3 - Blood urea nitrogen 4 - Carbon dioxide ns = non-significant

## Alternative Methods for Pediatric Pain Management

Pain Relief Option	Onset (minutes)	Duration (minutes)	Approved Ages	Notes
<b>1% buffered lidocaine &amp; 25-30g needle</b> (1ml 8.4% bicarb & 9ml 1% lidocaine to "buffer")	2-5	30-60	All	Remember max dose of lidocaine 4.5mg/kg without epi (max 300mg) & 7mg/kg with epi (max 500mg) <i>1% lido is 10mg/ml</i>
<b>EMLA® cream</b> (lidocaine/prilocaine)	60-90	60-120	37+ weeks	Can cause methemoglobinemia Avoid ingestion (as with all topical creams) Dosage & application times differ dependent upon weight
<b>LMX4® cream</b> (lidocaine)	30	60	2+ years	Avoid ingestion (as with all topical creams)
<b>Synera® patch</b> (lidocaine/tetracaine)	20-30	60	3+ years	Don't cut or cover the patch
<b>J-tip®</b> (buffered lidocaine)	1-3	1-3	6+ months	Don't point near the face
<b>"Freeze spray"</b> (ethyl chloride)	Immediate	1	All	Possible frostbite with excess spray

Adapted from: Moisman, W. & Pile, D. (2013). Emerging therapies in pediatric pain management. *Journal of Infusion Nursing*. 102.

How to use BUZZY®...  
in healthcare settings



# How Does Buzzy® work?



- Uses natural pain relief by confusing your body's own nerves and distracting away from the poke
  - This dulls or eliminates the pain
- Works in the same way as:
  - Rubbing a bumped elbow stops the hurt
  - Running water soothes a burn
  - Putting a hand in ice water lowers pain everywhere else

## What procedures can I use Buzzy® for?



- Insertion of IV's
- Venipunctures for lab draws
- Finger sticks for obtaining blood samples
- IM injections to the upper arm
- SQ or Intradermal injection
- On shoulders, sternum, or distant body part for distraction from any procedure

Buzzy needs to go  
"between the brain and the pain"  
to be effective.

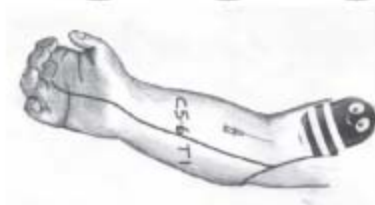
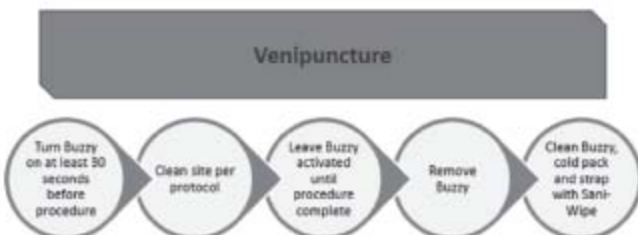


# IV placement and Venipuncture procedure

- Apply tourniquet if applicable
  - Through Buzzy slot or
  - Prior to placing Buzzy
- Place BUZZY® 2-5 cm proximal to site
- Place wider end of BUZZY® closest to pain.  
(Head of BUZZY® closer to patient's head during procedures)



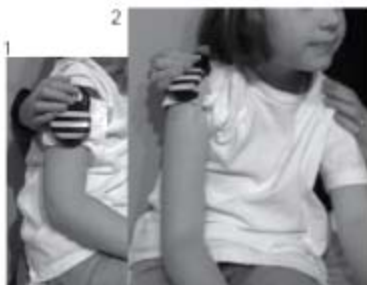
Best numbing is directly distal from the center of the Buzzy where the motor is.



Courtesy of Shriners Childrens Hospital  
Louanne Lunny, MLS(ASCP)cm

## Intramuscular Injections in Upper Arm

- 1) Locate site
- 1) Press BUZZY® directly on site and activate vibration. Leave in place at least 30 seconds; for stinging shots or deeper IM, leave on up to 2 minutes for deepest numbing.
- 2) For injection, slide BUZZY® 2-5 cm proximal to site (pressing on bony area if available) for deltoid injections



Parent pressing Buzzy using position of comfort.  
Shot goes where red dot is located. Nurse can reposition so Buzzy's motor is directly above shot.

## Capillary Collection



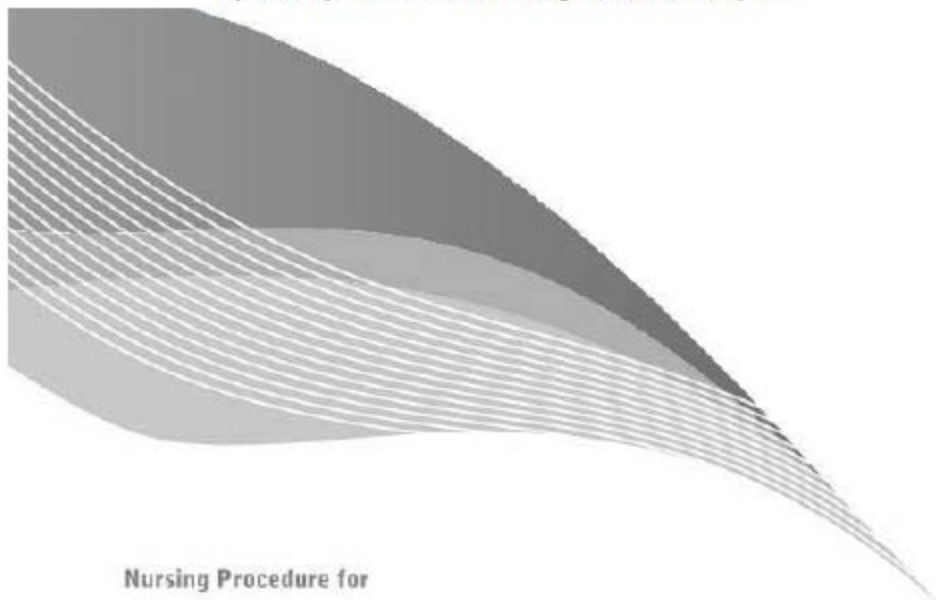
Courtesy of Shriners' Childrens Hospital  
Louanne Lunny, MLS(ASCP)cm



## Who can use Buzzy®?

- Who can use Buzzy®?
  - Buzzy is an FDA registered Class I device (over the counter)
  - Since Buzzy is over the counter, anyone can use Buzzy.
    - A phlebotomist
    - Child Life
    - A radiology tech
    - A nurse
    - A resident

"If you want your children to be intelligent, read them fairy tales."



**Nursing Procedure for**

**Initiating Subcutaneous Fluid Administration  
with *Hylanex*® recombinant  
(hyaluronidase human injection)**

Please see back cover for Indication  
and Important Safety Information and  
accompanying full Prescribing Information.

  
**Hylanex**®  
recombinant  
(hyaluronidase human injection)



These draft policies and procedures have been adapted from the Infusion Nurses Society (INS), the Oncology Nursing Society (ONS), and the Hylenex<sup>®</sup> recombinant hyaluronidase human injection prescribing information. It is the responsibility of the healthcare organization considering the use of this procedure to conduct an independent review and assessment to determine applicability and appropriateness of this document to their institution and to any particular clinical setting. Infusion therapies present risks; it is the responsibility of the healthcare organization to manage these risks, including the skills and competency validation of personnel.

The healthcare organization that uses these guidelines should be aware that an annual review of organizational policies and procedures should continue to occur in accordance and compliance with regulatory and nonregulatory agencies.

## The Purpose of This Guide

To outline nursing responsibilities in providing symptom control and/or fluid and electrolyte replacement by administering fluids subcutaneously.

## Policy

Subcutaneous access is utilized to administer fluids via single injection or continuous infusion into the subcutaneous tissue. The fluid is absorbed through both adipose and connective tissue.<sup>1</sup> Hylenex recombinant is used for subcutaneous fluid administration, enabling enzymatically augmented subcutaneous infusion.

In subcutaneous fluid administration, a catheter is placed in the subcutaneous tissue.<sup>1</sup> Skilled and competent nurses knowledgeable in subcutaneous administration and the operation of electronic infusion devices may initiate and manage subcutaneous infusions.<sup>1</sup> Some state and facility regulations allow this procedure to be performed by LVNs/LPNs. Please check your state guidelines in regard to administration regulations. The nurse who is administering subcutaneous isotonic fluids and electrolytes should be knowledgeable about the indications for use, appropriate rates of administration, monitoring parameters, adverse effects, stability of infusate, storage requirements, and potential complications.

Fluids given subcutaneously should be isotonic.<sup>2</sup>

## Recommended Equipment<sup>2</sup>

Gloves	Tape
Appropriate antiseptic	Subcutaneous access device (see "Device Selection and Insertion" for options)
Sharps container	Subcutaneous infusion set
Syringe	Extension tubing (optional)
Gauze	Fluid
Transparent semipermeable membrane (TSM)	Electronic infusion device (optional)

## Medication

*Hylanex* recombinant (hyaluronidase human injection)  
(1 vial contains 1 mL of 350 USP units/mL)

## Procedure

### Assessing and Educating Patient<sup>3</sup>

1. Verify patient's identity with them or parent/legally authorized guardian.
2. Obtain and review physician's order for type of fluid, amount, rate, route of administration, frequency, duration, and titration parameters if applicable.
3. Plan patient's care.
4. Per institutional protocol, obtain consent of patient or his/her parent or legally authorized guardian before administering therapy.
5. Educate patient (or his/her parent or legally authorized guardian) as to purpose and anticipated outcome of therapy, site placement, type of fluid, route of administration, adverse effects, and recognition of signs and symptoms of complications. Also educate concerned parties on possible alternatives to this method of fluid administration and possible complications of the alternatives. Include device operation instructions, if applicable.
6. Assess patient according to facility guidelines.
7. Place patient in a reclining, comfortable position based on site selected.

### Prior to Beginning Procedure<sup>1</sup>

1. Assemble equipment.
2. Wash hands and dry thoroughly.
3. Put on gloves.
4. Use aseptic technique and observe standard precautions.



PREP

## Procedure (Cont'd)



### Insertion Site Selection

1. Site selection should be based on patient's anticipated mobility and comfort.<sup>1</sup>
2. Assess sites for device placement in pediatric and adult patients<sup>1</sup>:
  - a. Scapula region
  - b. Anterior or lateral aspects of thighs
  - c. Dorsal aspect of upper arm
3. Select insertion site with adequate subcutaneous tissue (a fat fold of at least 1 inch or 2.5 cm when forefinger and thumb are gently pinched together).<sup>1</sup>
4. Avoid areas with compromised integrity, such as, but not limited to:
  - a. Edema
  - b. Pain
  - c. Excoriation
  - d. Infection
  - e. Bruise or hematoma
  - f. Scar tissue

### Insertion Site Preparation<sup>1</sup>

1. (Optional Step) Remove excess hair from intended insertion site with clippers or scissors.
2. Wash insertion site with antiseptic soap and water, if necessary.
3. Disinfect insertion site.
4. Cleanse site and allow site to dry. (Do not blow or blot dry.)

## Device Selection and Insertion

1. The recommended catheter is a standard 25-gauge butterfly needle. However, 20- to 24-gauge angiocatheters have also been used. Inspect access set for defects.
2. Prepare equipment and prime infusion set.
3. Lift skin into small mound.<sup>1</sup>
4. Insert infusion set/catheter bevel up into prepared site.<sup>1</sup>
5. Secure device and follow facility protocol for dressing.
6. Observe for negative blood return. If blood return is observed:
  - a. Remove device and select new insertion site.
  - b. Prepare new site.
  - c. Use new sterile infusion set.
7. Secure administration-set tubing to skin to prevent accidental dislodgment.<sup>1</sup>
8. Label dressing per facility guidelines.

## ***Hylanex* recombinant Administration**

### Injection before fluid administration:

After obtaining Sub-Q access, inject *Hylanex* recombinant via Sub-Q access device before initiation of fluid administration. Once *Hylanex* recombinant is injected, follow with a 3-5 cc injection of hydration fluid (ie, normal saline or Lactated Ringer's) into the Sub-Q access device to ensure *Hylanex* recombinant is fully administered into the Sub-Q tissue. 150 USP units of *Hylanex* recombinant will facilitate absorption of 1000 mL or more of solution.

Please see back cover for Indication and Important Safety Information and accompanying Full Prescribing Information.



INFUSE

*Hylanex*<sup>®</sup>  
hyaluronan  
recombinant human hyaluronan

## Procedure (Cont'd)

### Subcutaneous Fluid Administration

The rate and volume of subcutaneous fluid administration should not exceed those employed for intravenous infusion. During subcutaneous fluid administration, special care must be taken in pediatric patients to avoid overhydration by controlling the rate and total volume of the infusion.<sup>4</sup>

1. Deliver isotonic solutions subcutaneously.<sup>2</sup>
2. Inspect fluid container for leaks, cracks, or particulate matter.<sup>3</sup>
3. Initiate fluid administration per physician's orders and monitor patient response.
4. Monitor patient's response and observe for complications at insertion site at regular intervals per facility guidelines.
5. Rotate site per facility policy.
6. Document subcutaneous administration of fluids per facility guidelines.

### For Premature Infants/Neonates

For premature infants or during the neonatal period, the daily dosage should not exceed 25 mL/kg of body weight, and the rate of administration should not be greater than 2 mL per minute.

### Site Maintenance<sup>2</sup>

1. Observe site per facility policy.
2. Follow facility policy for catheter/needle replacement.
3. Replace catheter/needle if bruising, erythema, or other signs of local irritation or infection appear or if the site is painful to the patient.
4. Change transparent dressing according to facility protocol.
5. Clients, families, significant others, and assistive personnel should be instructed to report any leakage, erythema, edema, or pain at the injection site as soon as possible. Consult the facility's processes and procedures for specific directions.

## Device Removal<sup>1</sup>

1. Obtain and review the physician's order for infusion discontinuance.
2. Wash hands.
3. Assemble equipment.
4. Put on gloves.
5. Use aseptic technique and observe standard precautions.
6. Place patient in comfortable position.
7. Clamp administration and stop infusion device.
8. Remove transparent dressing and securement tapes.
9. Remove administration set, activating safety mechanism (if applicable); discard in Sharps container.
10. Apply manual pressure with sterile gauze to prevent bleeding and fluid leakage.
11. Cover site with dry dressing.
12. Discard expended equipment in appropriate receptacle(s).

## Documentation

Document the following in the patient's permanent medical record:

- a. Date and time of administration
- b. Skin integrity and location of access device
- c. Number of insertion attempts and location of infusion set

## Indication

*Hylenex*® recombinant is indicated as an adjuvant in subcutaneous fluid administration, and to increase the dispersion and absorption of other injected drugs.

## Important Safety Information

- Hypersensitivity to hyaluronidase or any other ingredient in the formulation is a contraindication to the use of this product.
- Discontinue *Hylenex* recombinant (hyaluronidase human injection) if sensitization occurs.
- Hyaluronidase should not be used to enhance the absorption and dispersion of dopamine and/or alpha agonist drugs.
- Hyaluronidase should not be injected into or around an infected or acutely inflamed area because of the danger of spreading a localized infection.
- Hyaluronidase should not be used to reduce the swelling of bites or stings.
- Hyaluronidase should not be used for intravenous injections because the enzyme is rapidly inactivated.
- Furosemide, the benzodiazepines and pheryltol have been found to be incompatible with hyaluronidase.
- Anaphylactic-like reactions following retrobulbar block or intravenous injections have occurred, rarely.

- Hyaluronidase should not be applied directly to the cornea.

The most frequently reported adverse experiences have been local injection site reactions, such as erythema and pain. Hyaluronidase has been reported to enhance the adverse events associated with co-administered drug products.

Patients receiving large doses of salicylates, cortisone, ACTH, estrogen or antihistamines may require larger amounts of hyaluronidase for equivalent dispersing effect, since these drugs apparently render tissues partly resistant to the action of hyaluronidase.

Edema has been reported most frequently in association with subcutaneous fluid administration. The rate and volume of subcutaneous fluid administration should not exceed those employed for intravenous infusion. As with all parenteral fluid therapy, use the same precautions for restoring fluid and electrolyte balance. Special care must be taken in pediatric patients to avoid overhydration by controlling the rate and total volume of infusion. When solutions devoid of inorganic electrolytes are given subcutaneously, hyponatremia may occur.

Please see accompanying package insert for Full Prescribing Information.

For product inquiry, please call **855-HYLENEX (855-495-3639)** or visit **[www.hylenex.com](http://www.hylenex.com)**.

**References** 1. Infusion Nurses Society. Policies and Procedures for Infusion Nursing, 2nd ed. Norwood, MA: Infusion Nurses Society; 2006. 2. Thomas JR, Yaconi RE, Baker MF, van Gurem CT. Assessing the role of human recombinant hyaluronidase in gravity-driven subcutaneous hydration: the INFUSE-LR Study. *J Palliat Med*. 2007;16(1):112-120. 3. *Hylenex* recombinant [Package Insert]. Halozyme Therapeutics; San Diego, CA; 2011.

# Requests from the Mother of a Catastrophically Injured Child

- My child had a full active life prior to this injury - Please ask them about it.
- Keep our family informed
- Answer questions to the best of your ability
- Whenever possible, provide information about possible outcomes
- Be ready for my child when he arrives on your unit / at your hospital
- I need some attention too - I am frightened and feel so alone
- Let me know how to get in touch with you if I need you
- Allow me to stay with my child whenever possible
- Help my child to not be in pain, please!
- Arrange it so he/she can get some sleep - Even in the ICU
- Try not to ask repeated questions for which there are answers in my child's chart
- Respect my child's need for privacy and modesty - Remember he's only a child
- Introduce yourself, write down your role - Better yet, give me your business card
- Document carefully so I don't have to clarify things
- Speak directly to my child
- Don't stand at the foot of his/her bed - Go the side, bend down he/she can see you
- My child is a bright child - Please don't talk down to him/her
- Notice non-clinical things (a new postcard, a photo of pet, etc)
- Help me to construct letters to my insurance company
- Allow my child to maintain a sense of self-esteem and some control over what is happening by giving my child some choices
- This may be the 100th child you have cared for with this type of injury - It's our first!

*Good care is important - True caring is a gift!*



# The Miracle Toddler Diet

Over the years you may have noticed that most two year olds are trim. Now the formula to their success is available to all in this new diet... The Miracle Toddler Diet! You may want to consult your doctor before trying this diet. If not, you may be seeing him afterwards. Good luck!

## Day One:

Breakfast: One scrambled egg, one piece of toast with grape jelly. Eat 2 bites of egg, using your fingers; dump the rest on the floor. Take 1 bite of toast, then smear the jelly over your face and clothes.

Lunch: Four crayons, any color, a handful of potato chips, and a glass of milk, 3 sips only, then spill the rest.

Dinner: A dry stick, two pennies and a nickel, 4 sips of flat Sprite

Bedtime snack: Throw a piece of toast on the kitchen floor.

## Day Two:

Breakfast: Pick up stale toast from kitchen floor and eat it. Drink half bottle of vanilla extract or one vial of vegetable dye.

Lunch: Half tube of "pulsating pink" lipstick and a handful of Purina dog chow, any flavor. One ice cube, if desired.

Afternoon snack: Lick an all-day sucker until sticky, take outside, drop in dirt. Retrieve and continue slurping until it is clean again. Then bring inside and drop on rug.

Dinner: A rock or an uncooked bean, which should be thrust up your left nostril. Pour grape Kool-Aid over mashed potatoes; eat with spoon.

## Day Three:

Breakfast: Two pancakes with plenty of syrup, eat one with fingers, rub in hair. Glass of milk; drink half, stuff other pancake in glass. After breakfast, pick up yesterdays sucker from rug, lick off fuzz, put it on the cushion of best chair.

Lunch: Three matches, peanut butter and jelly sandwich. Spit several bites onto the floor. Pour glass of milk on table and slurp up.

Dinner: Dish of ice cream, handful of potato chips, some red punch. Try to laugh some punch through your nose, if possible.

## Final day:

Breakfast: A quarter tube of toothpaste, any flavor, bit of soap, an olive. Pour a glass of milk over bowl of cornflakes, add half a cup of sugar. Once cereal is soggy, drink milk and feed cereal to dog.

Lunch: Eat bread crumbs off kitchen floor and dining room carpet. Find that sucker and finish eating it.

Dinner: A glass of spaghetti and chocolate milk. Leave meatball on plate. Stick of mascara for desert.

# How to Raise Mom and Dad (by Josh Lerman)

## Instructions from an older sibling to a younger one

- 1) Always ask Daddy for candy, cookies, or lemonade. He'll give it to you; Mommy won't.
- 2) If Mommy says you can't have candy, cookies, or lemonade, do that thing where you change your voice so you're almost crying but not quite (Mommy calls it "whining.") Sometimes she'll give in.
- 3) If you ask Daddy to be a horse or to carry you or dance with you, and he says maybe later, that means he will really soon. If he says anything about his back hurting, that means he won't. Don't worry - His back doesn't really hurt, I looked once.
- 4) A lot of the time they're not listening, so always say things over and over.
- 5) The whole green-vegetable thing is pretty out of hand. So never admit you like them, keep changing the ones you'll agree to eat, and every once in a while claim that one of them makes you feel like throwing up.
- 6) If Daddy says, "Did Mommy say you could do that?" it means he doesn't want you to do it. Always answer "Yes."
- 7) If you wake up and you're lonely, call Mommy. She'll come in and might fall asleep next to you. Daddy will just kiss you and leave.
- 8) If there's a monster by the window, call Daddy - He can totally kill monsters. I don't think Mommy knows much about them because she doesn't even think there are any.
- 9) If you don't like your mittens, you can "lose" one and they'll buy you new ones.
- 10) When you get a toy with very, very small parts (like Barbie's shoes, Legos, Playmobil cuffs, collars, and hair thingies), put some in every room of the house. Mommy and Daddy will like finding this stuff because it reminds them of you.
- 11) Mommy and Daddy aren't so smart. If you just scribble all over a page, they'll tell you it's good. This has probably already happened to you.
- 12) This is what a minute is: It's the 200 or so hours between when Mommy says she'll do something (like come play dolls with you) and when she does it.
- 13) Mommy and Daddy are very rich - I think they earn like \$40 or \$100 a year - So if they don't buy you the toys you ask for, it's because they're mean.
- 14) Whenever Mommy and Daddy hug each other, always go and get in the middle because it's the best kind when it's everybody hugging.

# God Created Children...

To those of us who have children in our lives, whether they are our own, grandchildren, nieces, nephews, or students... here is something to make you chuckle. Whenever your children are out of control, you can take comfort from the thought that even God's omnipotence did not extend to His own children. After creating Heaven and Earth, God created Adam and Eve... And the first thing he said was "DON'T!"

"Don't what?" Adam replied.

"Don't eat the forbidden fruit." God said.

"Forbidden fruit? We have forbidden fruit? Hey Eve... we have forbidden fruit!!!"

"No Way!"

"Yes way!"

"Do NOT eat the fruit!" said God.

"Why?"

"Because I am your Father and I said so!" God replied, wondering why He hadn't stopped creation after making the elephants. A few minutes later, God saw his children having an apple break and He was ticked!

"Didn't I tell you not to eat the fruit?" God asked.

"Uh huh," Adam replied.

"Then why did you?" said the Father.

"I don't know," said Eve.

"She started it!" Adam said.

"Did not!"

"Did too!"

"DID NOT!"

Having had it with the two of them, God's punishment was that Adam and Eve should have children of their own. Thus the pattern was set and it has never changed!

But there is reassurance in the story! If you have persistently and lovingly tried to give children wisdom and they haven't taken it, don't be hard on yourself. If God had trouble raising children, what makes you think it would be a piece of cake for you?



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## 2013 Certified Pediatric Emergency Nurse Detailed Content Outline

Exams based upon the 2013 CPEN Content Outline will be available on February 6, 2013. Exams based on the 2009 CPEN Content Outline will be available through February 1, 2013.

**# of  
Items**

### **Domains and Tasks**

<b>1. Triage Process</b>	<b>23</b>
A. <i>Emergency Intake</i>	
1 Perform visual assessment	
a. Sick vs. not sick	
b. Pediatric Assessment Triangle (PAT)	
2 Emergency Intake	
a. Intervene for life or limb threatening illnesses or injuries	
b. Identify triage priority	
c. Identify the need for isolation	
d. Identify the need for decontamination (e.g., chemical or biological agents)	
e. Prioritize resource utilization based on volume (e.g., surge, mass casualty)	
B. <i>Perform Triage Interventions</i>	
1 Perform initial interventions (e.g., first aid, splint, ice, eyewash)	
2 Select and administer medications	
<b>2. Assessment</b>	<b>34</b>
A. <i>History and Physical</i>	
1 Perform a primary survey	
2 Perform secondary survey	
3 Assess behavioral status and risk for harm (e.g., risk-taking behaviors, self-harm, violence)	
4 Evaluate assessment findings related to developmental milestones	
5 Customize the assessment for children with special needs (i.e., developmental diversity)	
6 Identify caregivers' perception of child's baseline and current status	
7 Identify suspected maltreatment	
B. <i>Pain</i>	
1 Perform age appropriate assessment of pain	
C. <i>Family</i>	
1 Assess family functioning and dynamics (e.g. coping strategies, support systems, parenting skills, learning style)	
<b>3. Technical Skills</b>	<b>20</b>
A. <i>Perform or Assist with Technical Skills</i>	

- 1 Airway management
- 2 Capnography
- 3 Cardioversion
- 4 12-lead ECG
- 5 Defibrillation
- 6 Cardiac pacing
- 7 Peripheral IV access
- 8 Rapid fluid infusers/warmers
- 9 Intraosseous access
- 10 Central IV access (including PICC, venous access ports)
- 11 Incision and drainage
- 12 Dressings
- 13 Wound closure
- 14 Chest tubes
- 15 Specimen collection (e.g., sputum, urine, blood, nasopharyngeal)
- 16 Splinting
- 17 Enteral tubes (e.g., nasogastric, orogastric, PEG)
- 18 Chemical or biological decontamination
- 19 Spinal stabilization (including safety seat removal)
- 20 Positioning for procedures (e.g., lumbar puncture, bladder catheterization, IV)
- 21 Infant warmer
- 22 Medication administration

#### **4. Medical Conditions**

**27**

##### **A. Manage Airway Conditions**

- 1 Mechanical (e.g., foreign body)
- 2 Pathophysiologic (e.g., anaphylaxis, distributive shock, infections)
- 3 Congenital (e.g., stenosis, malacia)

##### **B. Manage Respiratory (Upper and Lower) Conditions**

- 1 Mechanical (e.g., pneumothorax, foreign body, embolism)
- 2 Pathophysiologic (e.g., bronchiolitis, reactive airway disease, pneumonia)
- 3 Congenital (e.g., chronic lung disease)

##### **C. Manage Cardiovascular Conditions**

- 1 Mechanical (e.g., tamponade, tension pneumothorax)
- 2 Pathophysiologic (e.g., cardiogenic and hypovolemic shock, rhythm disturbances, congestive heart failure, infections)
- 3 Congenital (e.g., aortic stenosis)

##### **D. Manage Neurological Conditions**

- 1 Mechanical (e.g., shunt malfunction, tumors)
- 2 Pathophysiologic (e.g., seizures, infections, stroke, headache)
- 3 Congenital (e.g., hydrocephalus, arteriovenous malformation)

##### **E. Manage Gastrointestinal Conditions**

- 1 Mechanical (e.g., obstructions, intussusception)
- 2 Pathophysiologic (e.g., infections, necrotizing enterocolitis, fluid-electrolyte)

- imbalance)
- 3 Congenital (e.g., tracheoesophageal fistula.)
- 4 Nutrition (e.g., failure to thrive, formula intolerance, obesity)
- F. Manage Genitourinary and Reproductive Conditions**
- 1 Mechanical (e.g., stricture, ovarian cyst)
- 2 Pathophysiologic (e.g., urinary tract infections, renal failure, sexually transmitted infections)
- G. Manage Emergent Neonatal Conditions**
- Pathophysiologic (e.g., infections, necrotizing enterocolitis, fluid-electrolyte imbalance, jaundice, thermoregulation)
- 1 Congenital (e.g., ductal dependent lesions, tracheoesophageal fistula, obstructive uropathy)
- 2 Care of the newly born (e.g., resuscitation following delivery)
- H. Manage Environmental and Toxicology Conditions**
- 1 Heat and cold
- 2 Bites and stings
- 3 Substance exposures (e.g., nuclear, chemical, radiologic, biologic, organophosphates)
- 4 Poisoning (e.g., medications, alcohol)
- I. Manage Other Medical Conditions**
- 1 Hematology (e.g., sickle cell, bleeding or clotting disorders)
- 2 Oncology (e.g., fever and neutropenia, tumor lysis syndrome)
- 3 Endocrine (e.g., congenital adrenal disorders, glucose disturbance)
- 4 Musculoskeletal (e.g., osteogenesis imperfecta, septic arthritis)
- 5 Eyes, ears, nose, and throat (e.g., strep throat, cleft palate)
- 6 Dermatology (e.g., rashes, infections)
- 7 Infectious diseases
- 8 Sepsis
- 5. Surgical and Trauma Emergencies, and Procedural Sedation 26**
- A. Manage Surgical Emergencies**
- 1 Gastrointestinal (e.g., acute abdomen, appendicitis, malrotation/volvulus, strangulated hernia, pyloric stenosis, intussusception)
- 2 Genitourinary and reproductive (e.g., testicular torsion, ectopic pregnancy, phimosis, priapism)
- 3 Musculoskeletal (e.g., compartment syndrome, slipped capital femoral epiphysis (SCFE))
- 4 Postoperative hemorrhage (e.g., tonsillectomy)
- 5 Neurological (e.g., shunt failure, herniation syndrome)
- B. Manage Trauma Emergencies**
- 1 Burns (e.g., heat, electrical, inhalation)
- 2 Submersion injuries (e.g., near drowning, positional asphyxia)
- 3 Neurological trauma (e.g., neurogenic shock, head trauma)
- 4 Musculoskeletal trauma (e.g., fractures, lacerations, joint dislocations, sprains and strains)
- 5 Cardiothoracic trauma (e.g., pneumothorax, hemothorax, cardiac tamponade)

6	Abdominal trauma	
7	Maxillofacial and dental trauma	
8	Multi-system trauma	
C. <i>Manage Procedural Sedation</i>		
1	Patient monitoring	
2	Essential equipment	
3	Medications and reversal agents	
6.	<b>Special Considerations</b>	<b>20</b>
A. <i>Behavioral and Maltreatment Emergencies</i>		
1	Manage behavioral emergencies	
	a. Suicidal ideations/attempts	
	b. Homicidal ideations/attempts	
	c. Acute psychosis	
	d. Aggressive behavior	
	e. Substance abuse	
	f. Post-traumatic stress disorder	
2	Manage maltreatment emergencies	
	a. Sexual assault (including rape and drug-facilitated rape)	
3	Manage abuse emergencies	
	a. Emotional abuse	
	b. Physical abuse	
	c. Sexual abuse	
	d. Neglect	
B. <i>Legal and Professional Issues</i>		
1	Legal Issues	
	a. Ensure that informed consent has been obtained	
	b. Ensure preservation of forensic evidence and chain of custody	
2	Comply with government regulation	
	a. EMTALA	
	b. HIPAA	
	c. Mandatory reportable situations (e.g., gunshot wounds, infectious diseases)	
3	Professional Issues	
	a. Resolve conflicts with family members	
	b. Promote safety and health/wellness in the community	
	c. Participate in emergency preparedness activities	
	d. Facilitate critical incident stress management (debriefing)	
<b>Total Scored Items</b>		<b>150</b>





# CPEN® Recertification

Every four years, the Certified Pediatric Emergency Nurse (CPEN) will need to renew or recertify to keep his or her certification active. The PNCB and BCEN believe that your continued growth in the field of pediatric emergency nursing is critical to providing high-quality health care to your patients.

## What's required?

There are three options for recertification. CPENs will need to document professional development activities equivalent to 100 contact hours earned over a period of four years or chose a CE plus nursing practice option or re-take the certification exam.

Of the 100 contact hours submitted, 75 (clinical) must show clear and direct application to emergency, pediatric, or pediatric emergency nursing, and up to 25 (other) can be general nursing. One contact hour is equivalent to 60 minutes of instruction.

## About Contact Hours

A minimum of 50 contact hours must be from accredited agencies. The remainder may be from non-accredited activities such as those listed in the following chart. All national accrediting agencies are accepted for your recertification. These include but are not limited to American Association of Critical Care Nurses (AACN), American Nurses Credentialing Center (ANCC), Emergency Nurses Association (ENA) and State Nurses Associations/State Boards of Nursing (SNA/SBN). All contact hours for CPEN recertification must have been earned during the past 48 months prior to recertification enrollment.

Recertification Options	How it can apply to your CPEN recertification
<b>1. Continuing Education Option</b>  The following may be used to fulfill the CE option:	<p>Of the 100 contact hours submitted: Minimum of 50 hours from accredited sources. The remaining 50 hours can be from non-accredited sources, and Minimum of 75 clinical and up to 25 other</p>
<b>Accredited Contact Hours</b>	<p>The contact hours have been awarded by a third party accreditor Examples include but are not limited to:</p> <ul style="list-style-type: none"><li>• Conference or seminar attendance</li><li>• Lectures or presentations</li><li>• Online education completion</li><li>• Journal CE</li><li>• Successful completion of PNCB's Pediatric Updates (formerly Standards Assessment Exams - SAEs)</li></ul> <p>Type: Accredited CE</p>

Academic Credit	<p>Must have earned a "C" or higher and content must apply to emergency, pediatric or pediatric emergency nursing from an accredited institution. General nursing academic credit is allowable for 25 out of 100 hours.</p> <p>1 Academic Credit Semester = 15 Contact Hours  1 Academic Quarter = 10 Contact Hours  1 Academic Trimester = 12 Contact Hours</p> <p>Type: Accredited CE</p>
Preceptorship	<p>80 hours of precepting are equivalent to 5 contact hours. A maximum of 5 contact hours will be accepted in a 4 year renewal cycle.</p> <p>Type: Non-accredited CE</p>
Poster Presentations	<p>5 Contact Hours per poster developed. An individual will be allowed to submit a poster only once during the renewal period.</p> <p>Posters for which contact hours were awarded count as accredited CE.</p> <p>Type: Accredited or Non-accredited CE</p>
Item Writing	<p>This option can be used up to a maximum of 5 non-accredited contact hours per year. This option is for BCEN, CPEN and PNCB item writing. Items writers will count 0.5 contact hours per item written and accepted for review up to a maximum of 10 items.</p> <p>Type: Non-accredited CE</p>

<p><b>Authoring</b></p>	<p>Publication must be peer-reviewed and content must be specific to pediatric, emergency or pediatric emergency nursing. *Co-authorship credit is distributed evenly among all authors.</p> <p>Article = 5 Contact Hours  Chapter/module = 10 Contact Hours  Textbook regardless of page number = 50 Contact Hours</p> <p>Type: Accredited CE</p>
<p><b>Committee Participation</b></p>	<p>This option is for nursing committee membership in local, regional, state or national level committees and BCEN, CPEN and PNCB committee participation and can be used for a maximum of 5 non-accredited contact hours per year regardless of the number of committees served on.</p> <p>Type: Non-accredited CE</p>
<p><b>2. Clinical Practice Hours plus CE option</b></p>	<p>40 Hours of accredited CE with a clear and direct application to pediatric emergency nursing plus 1000 hours of hands-on care with pediatric patients in emergency settings.</p> <p>Nursing practice includes providing direct care, health care facilitation, education and advocacy for patients and families with urgent- care or emergent-care needs.</p> <p>Type: Accredited CE</p>
<p><b>3. Exam as a renewal option</b></p>	<p>You may elect to re-take the exam again. You will not be required to submit contact hours when choosing this option.</p>

# **“Baby Talk”**

## **Communicating Effectively With Your Pediatric Patients (*and other kids*)**

**Lou E. Romig MD, FAAP, FACEP**  
**Miami Children’s Hospital**

## **Developmental Stages**



### Birth to 6 months

- Infant is learning to regard the environment, especially faces.
- No stranger anxiety until late in this phase.
- Nonverbal communication is key
  - Facial expressions
  - Tone of voice
- Parents warm to medical personnel who treat their children as babies, not patients. Make faces and talk baby talk!

### 6 – 18 months

- Stranger anxiety! Try to keep the child with a caregiver.
- Communication is still mostly nonverbal, but talk to the child anyway.
- Development in motor skills is often faster than communication skills.
- Use stimulating objects to catch attention for distraction or assessment.
- Use toe to head approach.

### 18 months – 3 years

- More explorative, but still seek shelter with parents.
- Will understand more words than they can say.
- Constantly moving.
- Play and curiosity are big motivators.
- Use your tools and toys.
- Toe to head approach.
- Try not to hold them down, but don't wait forever for cooperation with exam.
- Toilet training often includes lessons about modesty and improper touching. Respect these lessons; uncover child selectively for exam.

### 3 to 6 years

- Usually a great age to work with.
- Learning to explore and be independent. Very curious!
- Can be very talkative and verbally enthusiastic.
- Are starting to understand about being hurt or sick and that people will try to help them.
- Are starting to understand the concept of “the future”.
- May misinterpret words they hear.
- Have “magical thinking.”
- Worry about being in trouble.
- Like to have choices.

### 3 to 6 years

- “This flashlight’s DEAD.”
- “I’m going to TAKE your pulse.”
- “Don’t CUT OFF the circulation with that strap.”
- “We’re going to have to TIE YOU DOWN on this board.”
- “I didn’t put my seatbelt on, so we got in a crash.”
- “Put a bandaid on it!” (and the boo-boo goes away...)
- “I was bad in school so now I have to get a shot.”

“Would you like your IV in this arm or that arm?”

NOT

“Where would you like your IV?”

### 6 – 12 years

- Fear failure & inferiority. Want to be treated as “big kids,” but may feel “baby” insecurities.
- Want to be accepted and blend in.
- Body-conscious and modest.
- May feel pain intensely.
- Feel comfort with touching.
- Question the child directly and in simple, but not babyish terms.
- Use common interests to build trust.
  - Sports
  - TV and movie characters
- Treat them with respect.
- Offer limited choices.
- Don't embarrass them in front of peers.
- Don't tell them not to cry!
- OK to touch in comfort.
- Respect their modesty.

### 12 years and up

- Identity and peer relationships are the key issues at this age.
- Body image and future deformities and dysfunctions are very important.
- Reactions can be under- or over-exaggerated.
- Regressive behavior is common.
- Respect modesty and privacy.
- Avoid embarrassing the child.
- Direct yourself to the child as you might to an adult, with an adjustment in language.
- Make eye contact, but don't force it unless you need to make a point.
- Touch cautiously until you're sure touch is welcome.
- Don't lie & don't be condescending.



- Don't try to "be one of the group" unless you are. These guys can spot fakes a mile away.
- If drugs, pregnancy or other sensitive issues are involved, assure the child that your job is not to judge or enforce the law (unless it is.)
- Whenever possible, allow close friends to maintain support roles as socially-acceptable parent surrogates.

## Cautions

- Don't ever intentionally lie to a child patient. If you're caught, it blows the credibility of all medical personnel.
- Always tell a child if something is going to hurt!
- Explain procedures in simple terms, but not until it's time to do it. Anticipation is often worse than the procedure.



## What parents like

The hardest part of taking care of kids is usually dealing with their parents and guardians.

## What parents like and want

- Treat children as people.
  - Learn and use their preferred name.
  - At least get the sex right!
- Keep children as physically and emotionally comfortable as possible.



- Basic and advanced pain management is important.
- Try to relieve fear and anxiety as early and as much as possible.
- Treat every child as if they were the most special, beautiful, smartest child in the world. A compliment to a child is a compliment to their parents.
  - Listen to what the child has to say, even if it sounds like nonsense.
  - Every child has something you should honestly be able to compliment them on, even if it's just that they have such good lungs for them to be able to scream so loudly...



*What your face and body  
say are every bit as  
important as what your  
mouth says.*



## Nonverbal communication

- Get to the child's eye level.
- Try not to make the child look at you at an awkward angle.
- Make eye contact, but don't hold it in a challenging manner.
- Use your eyebrows to exaggerate your expressions, especially for babies through elementary-age kids.
- Use a soft voice with a moderate pace and interrupt only when necessary.
- Use noises like "um-hmm" and "I see" to encourage children to talk.
- For preverbal children, use a happy voice and bring the tone up at the ends of sentences (inviting a response from the patient.)

- Infants less than about 6 months can be touched anywhere first, but go to the most painful place last.
- For children with stranger anxiety, offer your hand or a tool for them to touch and explore first. Go for their heads and trunks and any painful parts last.
- Touch school-agers in a playful fashion. “High five” is often a good way to start.
- Tickling is good in young school-agers but don’t do it until you’ve gotten your assessment done.
- Once a school-ager trusts your touch, try to maintain some contact while getting info from the parent.
- Touch teens only as needed for your exam, unless further touch is clearly welcome.
- Try to always have a witness when with a teen, especially a teen of the opposite sex, just in case one of your gestures is misinterpreted.
- Watch your facial expressions with teens! If you look like you don’t believe them, you lose them.

## Tools, Toys and Tricks



Flashlight

- Test range of motion of joints, mobility, and grip strength.
- Check pulmonary function (“blow out the candle!”)
- Look in mom’s throat or show the child your own.
- Look for Mickey Mouse, SpongeBob, etc. under clothes.
- Make an “ET finger.”



Stethoscope

- Check range of motion, etc...
- Let the child listen to somebody's heart and stomach.
- Make a "phone call" to the child.



Pager/Cell Phone

- Check range of motion, etc...
- Get a page or call from Mickey, SpongeBob, etc.
- Play with the tones and/or vibration feature.
- Try to keep it from being thrown across the room...

Stuffed Animals

- Check range of motion, etc...
- Check cognition
  - Who/what is this?
  - What color is this?
  - What sound does he make?
- Check gait
  - Will you pick that up for me please?



## **Dr. Lou's Bag of Tricks**

- Any toy or interesting tool can be used to check the motor exam and mental status of a child.
- If you don't have a toy and want to check neck flexion (nontraumatic,) ask the child to show you his/her belly button. They almost always look down as they pull up their shirt.
- If they don't look down, ask dubiously if they're sure that's their belly button.
- Demo what you want to do on mom or dad.
- If you want a young school-ager to do something, bet them that they can't do it as well as you can.
- To improve deep breathing for auscultation, ask the child to act like she's blowing up a balloon or blowing out a candle, but quietly.
- To check pulmonary function on a school-age or older child, have them see how far they can slowly count out loud on a single breath. Normally, they should get at least into the teens. Repeat to assess effectiveness of treatment.
- Tell a preschool child that you're going to give their arm a hug when you take their blood pressure.
- Have a child tilt their head back if checking their throat. You get a better view.
- To help palpate a ticklish abdomen, put the child's hand under yours and palpate with their hand.
- To get your tool or toy back, distract the child with something else while you or the parent retrieves it. Get it out of sight immediately!

## **Dr. Lou's Sure-Fire Laugh Lines**

When a child's done a good job at deep breathing for you...

"Wow, you're a really good breather!

I'll bet you do it all the time, don't you?"

*"Does your ... hurt?"*

Mention normal painful body parts and then start throwing in others...

Hair, eyelashes, fingernails, toenails, freckles?



To a school-aged child:

"My goodness, you're so cute! How many girl(boy) friends do you have?"

OR

"Are you married? Have any kids?"

If no girlfriend, whisper loudly,

"You're supposed to say your mother's your girlfriend!"

OR

If horrified by the thought of a girlfriend,

"That's OK. Girls are yucky anyway."

## Summary

- Getting along well with your pediatric patients often enhances your communication with their parents.
- Developmental stages influence your communication approach, but you should always talk to your pediatric patients, regardless of age.
- Tell the parents what they want to hear about their child. Then tell them about the medical stuff.
- Smiles are powerful communication tools.
- Sometimes it's not what you say, but how you say it; With your body as well as your words!
- Never lie.
- Shamelessly use any tools and tricks you have to enhance communications and build trust. This can only make your job easier.
- Make 'em laugh!



**Thanks!**

**Lou Romig MD**

# Summary of Pediatric Developmental Milestones

Adapted from

Pediatric Nursing Certification

Review Course: Unlocking the Door to Success

Copyright 2011

Louise Jakubic PhD, CRNPRN-BC

President and Chief Educational Officer - Nurse Builders

[www.NurseBuilders.net](http://www.NurseBuilders.net)

## 3 Months

### *Physical/Motor*

- Starts coordinating movement of hands and eyes (notices own hands)
- Raises head and chest when lying on stomach
- Stretches legs out and kicks
- Posterior fontanel closes by 2 months

### *Language/Cognition*

- Notices own hands
- Begins to babble
- Turns head toward sound

### *Social*

- Beginnings of instinctual smile at six to eight weeks
- Social smile appears around three months
- More expressive with face

### *Vision*

- Vision is poor at birth; black and white colors are seen best
- Watches faces
- By 3 months, follows objects with eyes 180 degrees

#### 4-6 Months

##### *Physical/Motor*

- Reaches for objects
- Transfers objects from hand to hand
- Uses hands to rake objects
- Rolls both directions (front to back first, then back to front)
- When prone, the infant pushes up on knees and hands rocking back and forth and may begin to crawl
- Sits with support and may develop the ability to sit up without support
- Teething begins

##### *Language/Cognition*

- Finds partially hidden objects
- Explores hands and mouth
- Responds to own name
- Continuous babbling; babbles in response to sounds

##### *Social*

- Enjoys social play (smiles, laughs)
- Responsive to expressions of others
- Stranger anxiety appears
- Comforting habits begin such as thumb sucking or holding a favorite blanket

##### *Vision*

- Develops full color vision
- Distance vision improves
- Increased ability to track objects

##### *Weight*

- Birth weight doubles at 5 months technically; we teach that it doubles at 6 months because that is when the assessment of weight occurs (at the 6 month primary care visit)

##### *Sleep*

- Sleeps through the night with one or two naps per day

## 7-9 Months

### *Physical/Motor*

- Pincer grasp develops
- Everything is placed in the mouth
- Feeds self bottle or cheerios/cracker
- Sits alone without assistance
- Crawls
- Stands up while holding onto an object for support (table, parent's hand)

### *Language/Cognition*

- Develops object permanence and searches for objects out of view
- Understands "No" at 9 months
- The infant develops object permanence (a principle from Piaget's theory) where the infant searches for objects outside the visual field, knowing that even though the object cannot be seen it is still present. Therefore, if an object is hidden while the infant watches, the infant will look for it as the infant understands that the object is not gone just because it is out of site.

### *Social*

- Imitates expressions of others
- Claps hands
- Enjoys games and play
- Weaning to a cup for fluid intake can begin

## 10-12 Months (1 Year)

### *Physical/Motor*

- Puts objects into and takes objects out of a container
- Claps hands, waves bye-bye and enjoys rhythm games
- Gets into sitting position unassisted
- Crawls
- Pulls self up to stand
- Cruises (side steps while holding onto furniture) at 10 months
- Walks with support at 11 months
- Takes first steps (walks) beginning at 12 months with variability up until 15-16 months



### *Language/Cognition*

- Finds hidden objects easily
- Looks at correct image when named
- Explores objects in a variety of ways (shaking, hitting, throwing)
- Responds to simple verbal requests
- Uses simple gestures (i.e. shakes head for “no” – shakes head when does not like/want food)
- Says about 5 words, but understands many more words
- Says “da-da” and “ma-ma”
- Tries to imitate words

### *Social*

- Shy/anxious with strangers
- Cries when caregiver leaves
- Prefers certain people and toys (prefers mother over other caregivers)
- Tests parental responses to behavior (i.e. throws bottle or toy when in high chair)
- Repeats sounds and gestures

## **12-18 Months**

### *Physical/Motor*

- Anterior fontanel closes by 18 months
- Walks unassisted
- Climbs steps
- Stacks blocks

### *Language/Cognition*

- Obeys simple commands
- Asserts independence
- Says “No”
- By 12 months, the toddler uses 5 words.
- By 18 months, the toddler use up to 50 words
- Points to objects when asked

### *Social*

- Stranger anxiety decreases
- Extremely curious of environment
- Point to familiar objects when asked
- Demonstrates frustration

### **18-24 Months**

#### *Physical/Motor*

- Feeds self with spoon/fork and cup without difficulty
- Turns pages in a book
- Climb stairs by 21 months
- Runs and jumps by 24 months
- Enjoys push and pull toys
- Beginning readiness for toilet training (shows interest)

#### *Language/Cognition*

- Puts 2 to 3 words together in a sentence
- Repeats words said by others
- Says own name
- Has understanding of routine and time

### *Social*

- Exhibits temper tantrums
- Defiant behavior begins
- Has difficulty sharing
- Says “mine”
- Exhibits parallel play with other children

### **24-36 Months**

#### *Physical/Motor*

- Walks up and down stairs
- Dresses self with assistance
- May begin to use cup without lid

—Rides a tricycle by 3 years

#### *Language/Cognition*

—Develops a full vocabulary

—Words are increasingly recognizable to adults other than parents/caregivers

—Speaks three to five word sentences

—By age 2, the toddler uses two-to-three-word sentences and comprehends many more words.

—At age 3, the toddler is a chatterbox, using about 11,000 words a day and three to four word sentences

—Knows first and last name

—Aware of gender and age

—Symbolic thought appears; exhibits pretend play

—Begins magical thinking where wishing, or thinking something will happen, make it happen

#### *Social*

—Transitions from parallel play to interactive play

—Imitates behavior of others

—May complete toilet training

—Does not like to share toys but is able to take turns

—Frustration decreases

—Decreased level of asserting independence in favor of more social conformity

### **3 Years**

#### *Physical/Motor*

—Dresses and undresses self

—Walks backward up and down stairs

—Uses toilet

—Washes hands

—Draws

—Uses scissors

—Builds a tower of more than six blocks

#### *Language/Cognition*

—Develops a sense of body image

- Beginning understanding of causality, but still uses magical thinking
- Develops sexual curiosity
- Understands “mine” and “his/hers”
- Uses three to four-word sentences, but has trouble with pronouns

#### *Social*

- Exhibits fears of things such as the dark, etc.
- Has a full use of cooperative play; takes turns; plays in a group
- Develops self identity and family identity
- Plays make-believe with dolls, animals, and toys

#### **4 Years**

##### *Physical/Motor*

- Hops and stands on one foot for up to 5 seconds
- Throws overhand and catches ball
- Is increasingly agile in body movements
- Begins to copy letters
- Copies shapes
- Draws a person with 2 to 4 body parts

##### *Language/Cognition*

- Speaks in 4-5 word sentences
- Counts
- Names colors

#### *Social*

- Cooperates with others
- Increase in pretend play with dolls or other toys
- Negotiates solutions to problems

#### **5 years**

##### *Physical/Motor*

- Dresses and undresses self well; cannot tie shoes
- Runs, jumps, skips

—Hops, somersaults

#### *Language/Cognition*

—Speaks sentences of more than 5 words

—The 5 year-old uses sentences of more than five words and tells long stories.

—Preschoolers are concrete thinkers. Communication and explanations should provide concrete ideas and examples; preschoolers are often scared by health care lingo.

—Tells long stories

—Can distinguish fantasy from reality

#### *Social*

—Wants to please people, particularly friends

—Likes to play with and be like friends

—Enjoys singing and dancing

### **6 to 12 Years**

#### *Physical/Motor*

—Permanent teeth begin at 6 years and are completed by age 12 years

—Vision is matured by age 6 years

#### *Language/Cognition*

—Language Development is completed

—The following develop:

—Concept of time and space

—Understanding of cause and effect

—Reversibility

—Conservation (permanence of mass and volume)

—Learns to read and spell

—Learns to do math and understand ratios

—Begins to enjoy games with strategy (cards, board games) and make-believe (video games, toys)

—Child understands rules (cheating in games is common).

—Engages in team play

### *Social*

- School is the focal point of the child's activities shaping his/her cognitive and social development
- Teacher becomes a major non-parental influence
- Develops first true friend
- Morality develops (6-9 years: right or wrong; 10-12 years: sense of "shades of gray")
- Becomes aware of social roles
- Fantasy play and daydreaming emerge

### **13 to 18 Years**

#### *Physical/Motor*

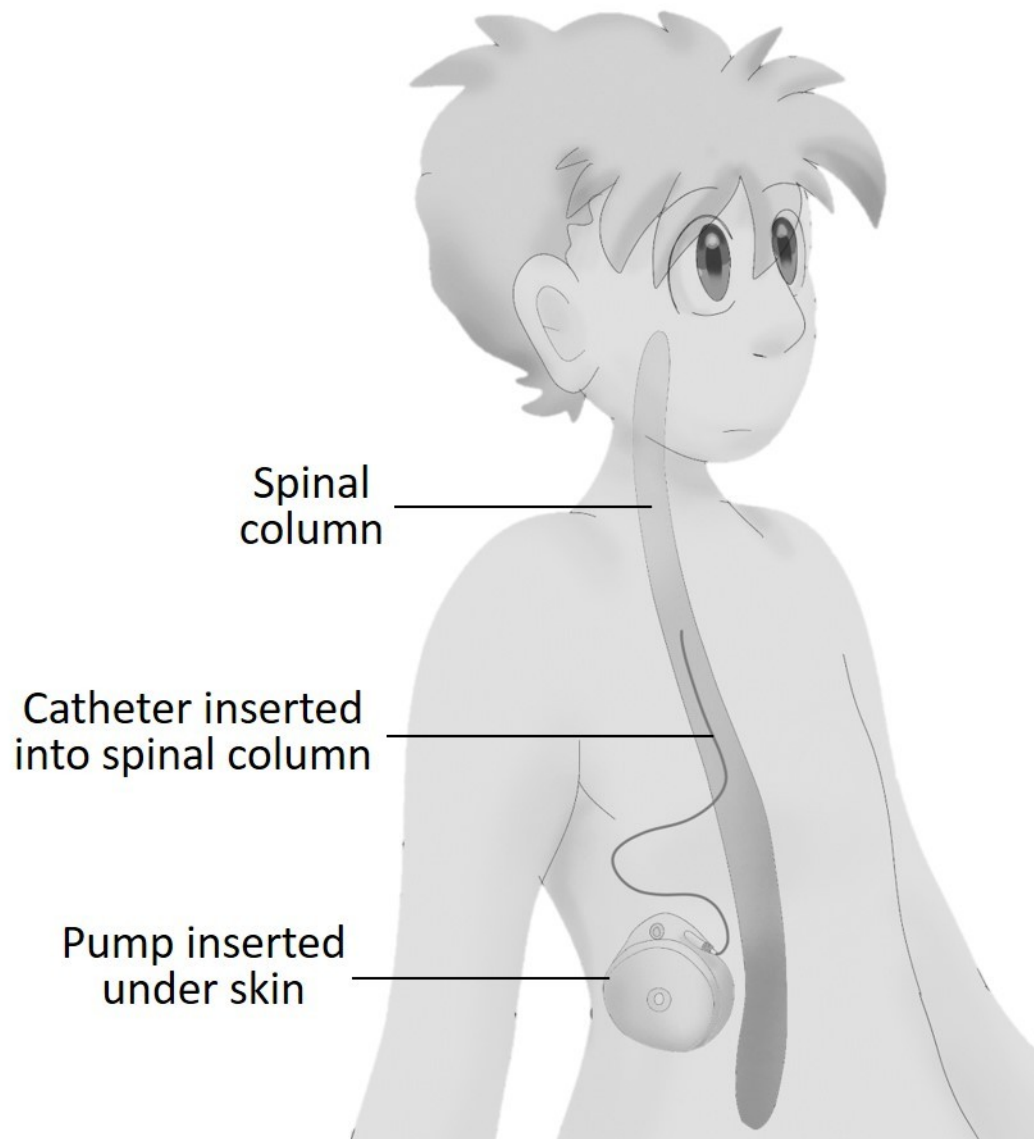
- Rapid increase in height and weight
- First pubescence changes are development of testicles in boys and breast in girls

#### *Language/Cognition*

- Changing body requires adaptation of self-image/concept
- Egocentric
- Can think hypothetically
- Uses past experiences when making decisions

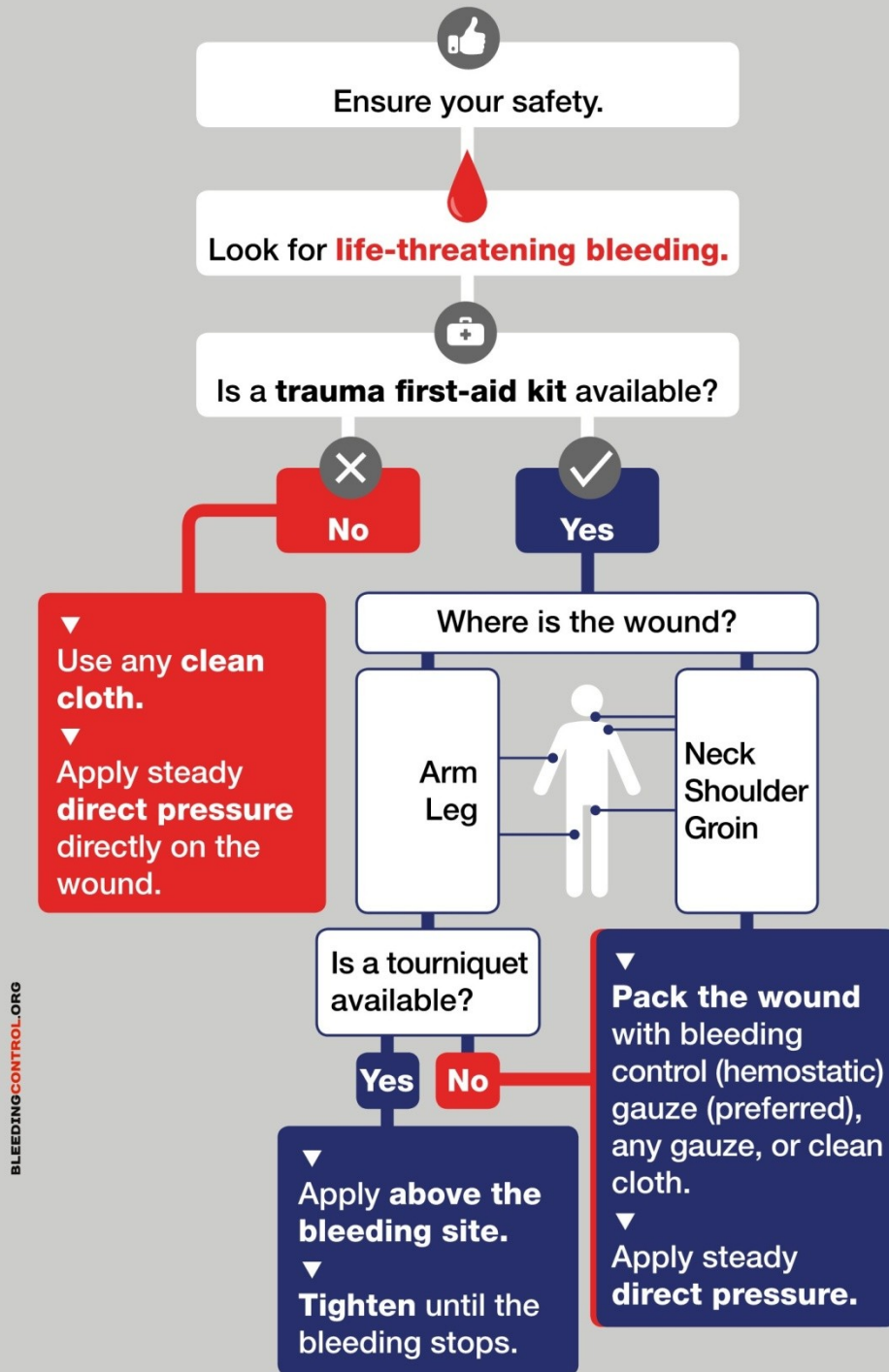
### *Social*

- Intense interest in peer group and perception of others
- Peer contact and involvement becomes increasingly important
- Sexuality emerges and dating begins



# Save a life

What everyone should know  
to stop bleeding after an injury







SAVE A LIFE



AMERICAN COLLEGE OF SURGEONS  
Inspiring Quality,  
Highest Standards, Better Outcomes

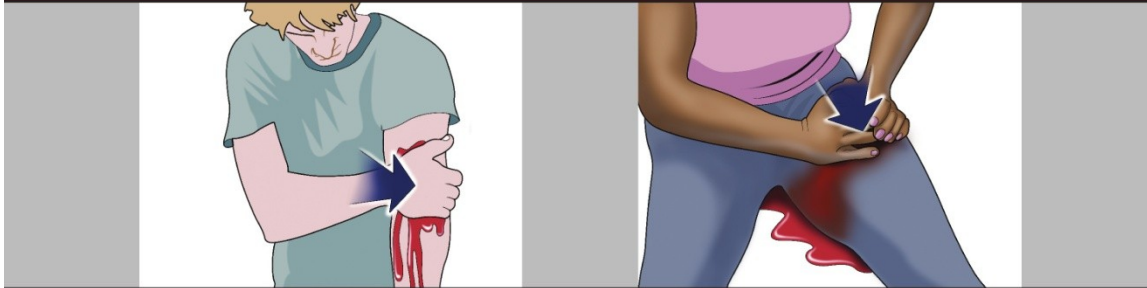


THE  
COMMITTEE  
ON TRAUMA

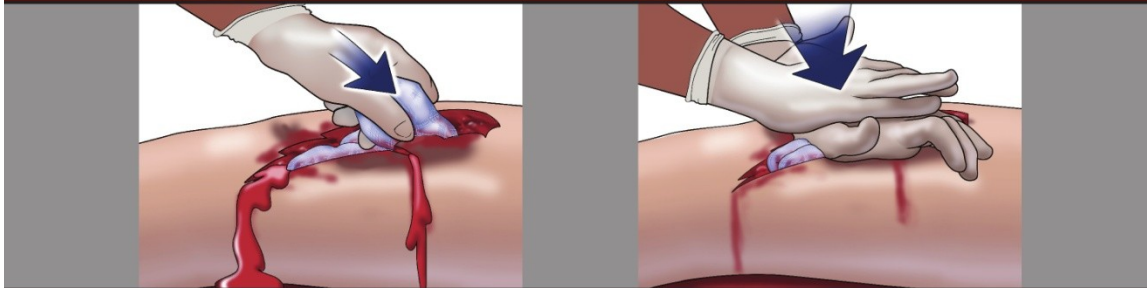


**BLEEDINGCONTROL.ORG**

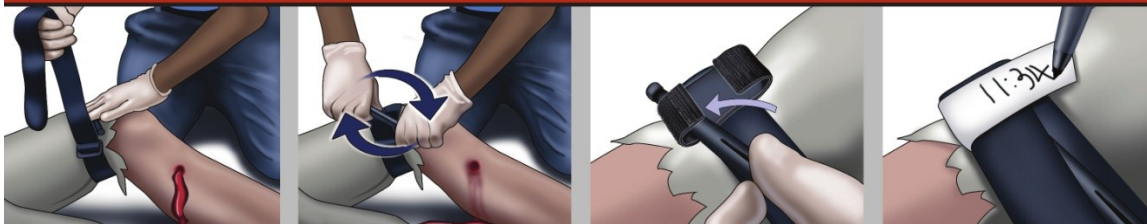
## 1 APPLY PRESSURE WITH HANDS



## 2 APPLY DRESSING AND PRESS



## 3 APPLY TOURNIQUET



WRAP

WIND

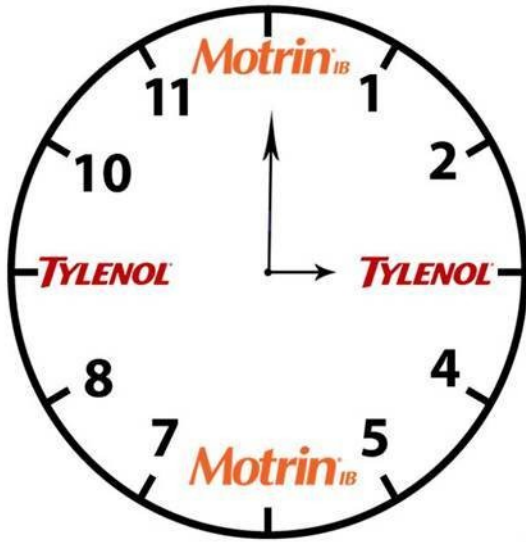
SECURE

TIME

**CALL 911**

The "Stop the Bleed" campaign was initiated by a federal interagency working group convened by the National Security Council Staff, The White House. The purpose of the campaign is to build national resilience by better preparing the public to save lives by raising awareness of basic actions to stop life-threatening bleeding following everyday emergencies and man-made and natural disasters. Advances made by military medicine and research in hemorrhage control during the wars in Afghanistan and Iraq have informed the work of this initiative which exemplifies translation of knowledge back to the homeland to the benefit of the general public. "Stop the Bleed" is a registered service mark of the Department of the Defense. Use of the equipment and the training does not guarantee that all bleeding will be stopped or that all lives will be saved.

© 2017 American College of Surgeons

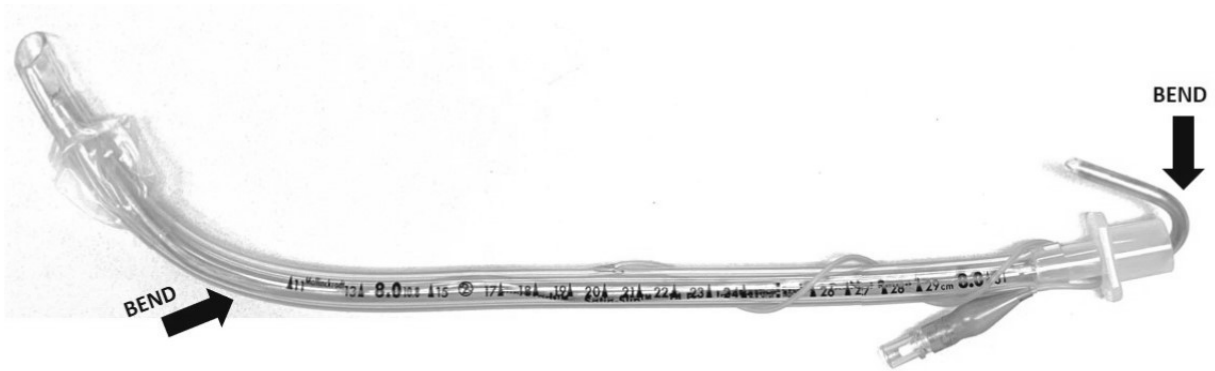
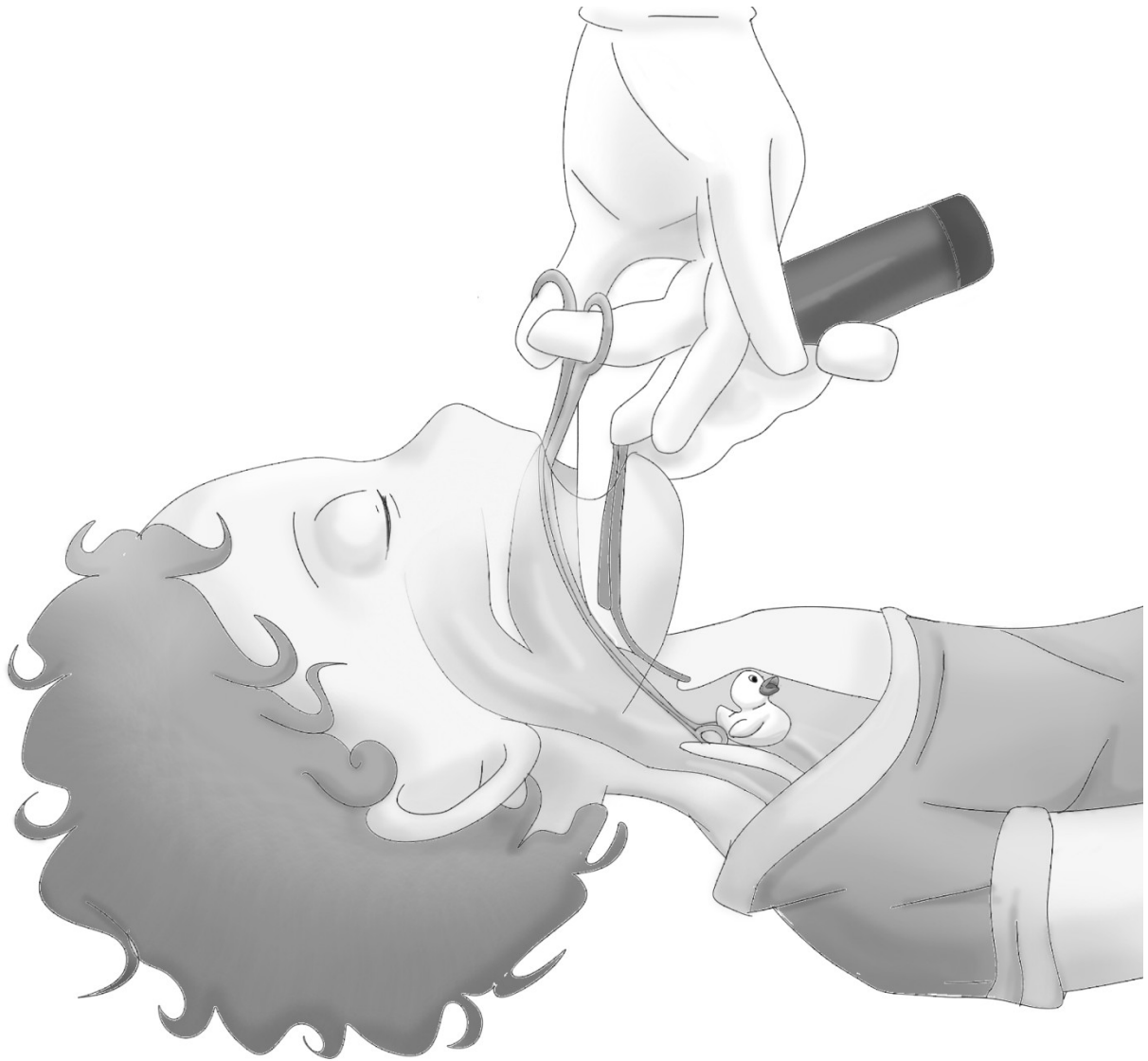


## Inconsolable Infant IT CRIES

- I** = Infections (Meningitis, UTI, Sepsis)
- T** = Trauma (Fractures, Subdural Hematoma, Non-Accidental Trauma)
- C** = Cardiac Disease (SVT)
- R** = Reflux, Rectal/Anal Fissure, Reaction to Meds
- I** = Intussusception
- E** = Eyes (Foreign Body, Corneal Abrasion, Glaucoma)
- S** = Surgical Processes and Strangulation (Ovarian/Testicular Torsion, Hernia, Hair Tourniquet)

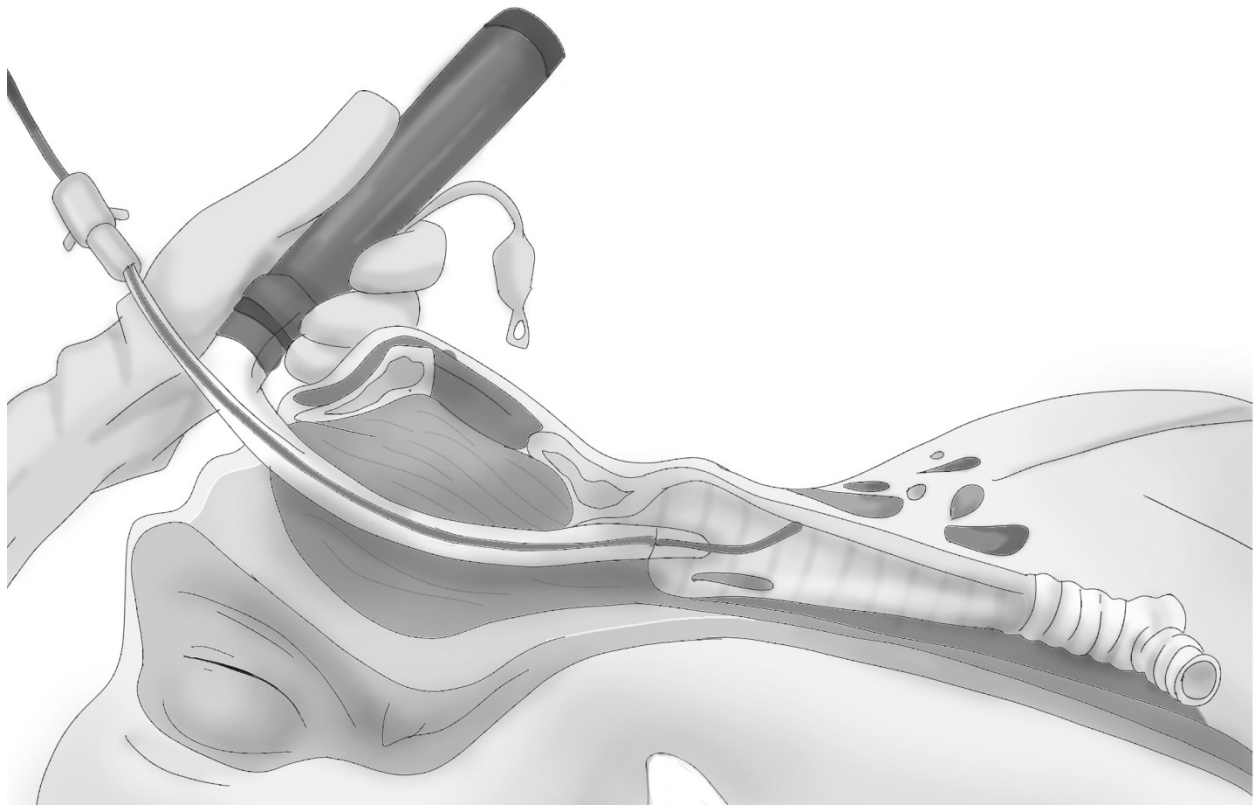










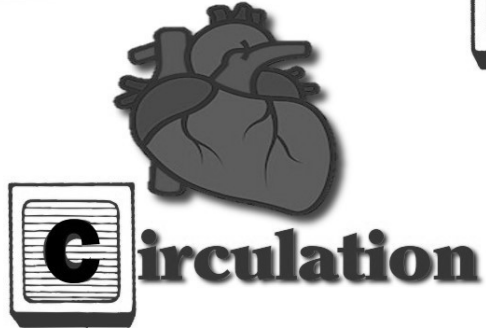




**irway**



**reathing**



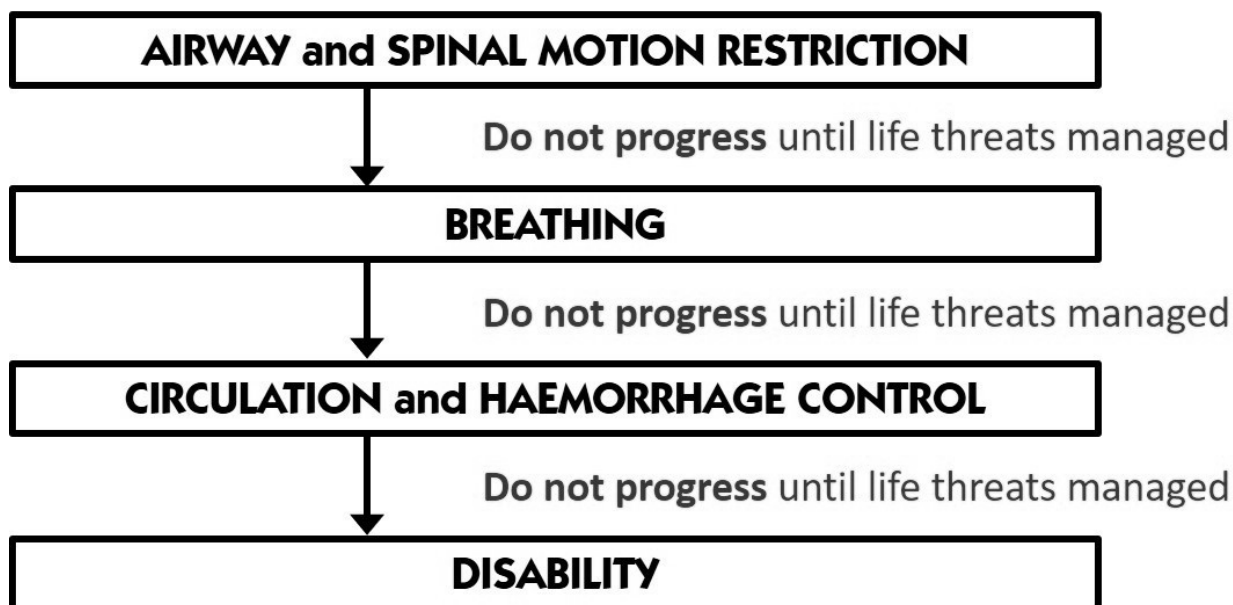
**irculation**



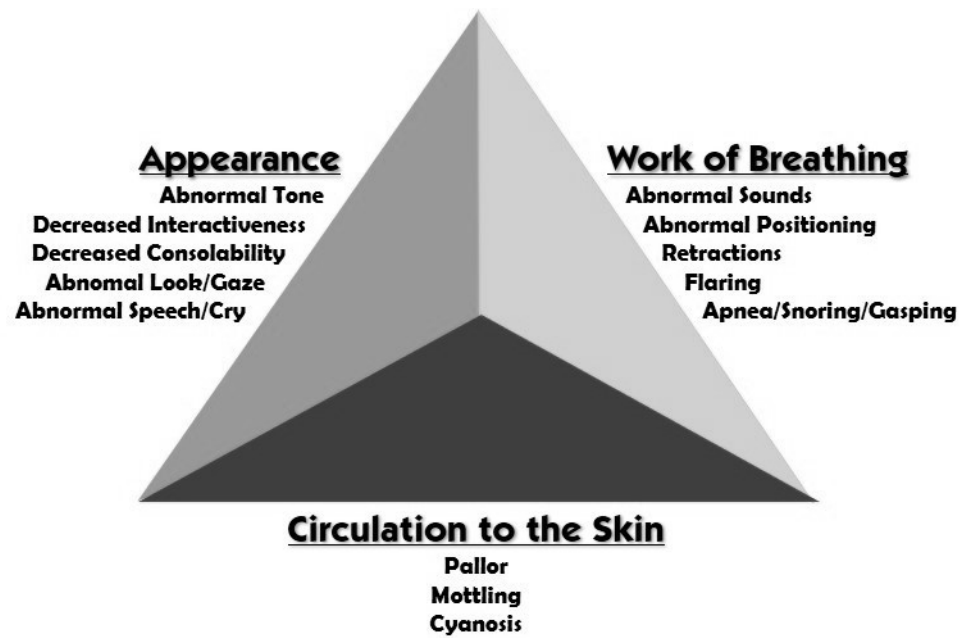
**isability**

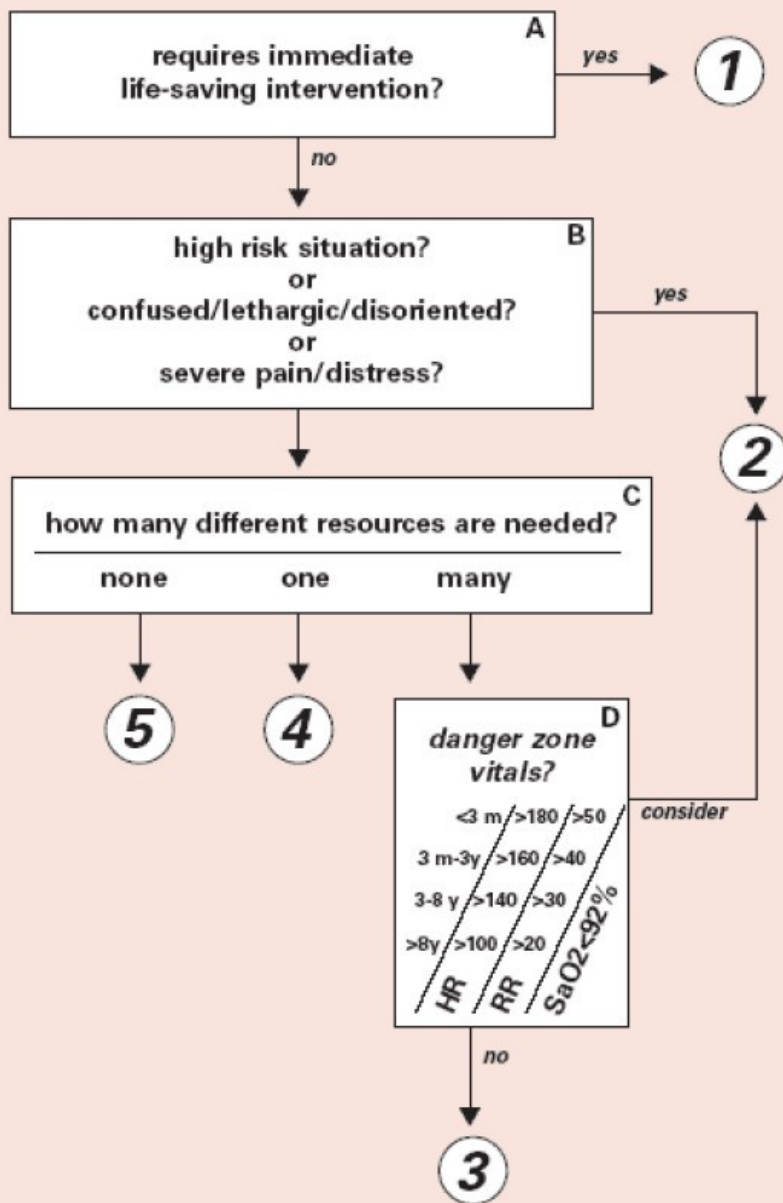


**xposure**









NOTES:

- A. Immediate life-saving intervention required: airway, emergency medications, or other hemodynamic interventions (IV, supplemental O2, ECG or labs, DO NOT count); and/or any of the following clinical conditions: intubated, apneic, pulseless, severe respiratory distress, SPO2 < 90, acute mental status changes, or unresponsive.

Unresponsiveness is defined as a patient that is either:

- (1) nonverbal and not following commands (acutely) or
- (2) requires noxious stimulus (P or U on AVPU scale)

- B. High risk situation is a patient you would put in your last open bed.

Severe pain/distress is determined by clinical observation and/or patient rating of greater than or equal to 7 on 0-10 pain scale.

- C. Resources: Count the number of *different types* of resources, not the individual tests or x-rays (examples: CBC, electrolytes and coags equals one resource; CBC plus chest x-ray equals two resources).

<b><i>Resources</i></b>	<b><i>Not Resources</i></b>
<ul style="list-style-type: none"><li>• Labs (blood, urine)</li><li>• ECG, X-rays</li><li>• CT-MRI-Ultrasound-Angiography</li></ul>	<ul style="list-style-type: none"><li>• History and Physical (including pelvic)</li><li>• Point-of-Care Testing</li></ul>
<ul style="list-style-type: none"><li>• IV Fluids (Hydration)</li></ul>	<ul style="list-style-type: none"><li>• Saline or Heplock</li></ul>
<ul style="list-style-type: none"><li>• IV or IM or Nebulized Treatments</li></ul>	<ul style="list-style-type: none"><li>• PO Medications</li><li>• Tetanus Immunization</li><li>• Prescription Refills</li></ul>
<ul style="list-style-type: none"><li>• Specialty Consultation</li></ul>	<ul style="list-style-type: none"><li>• Phone Call to PCP</li></ul>
<ul style="list-style-type: none"><li>• Simple Procedure=1 (lac repair, foley cath)</li><li>• Complex procedure=2 (conscious sedation)</li></ul>	<ul style="list-style-type: none"><li>• Simple wound care (dressings, recheck)</li><li>• Crutches, splints, slings</li></ul>

- D. Danger Zone Vital Signs

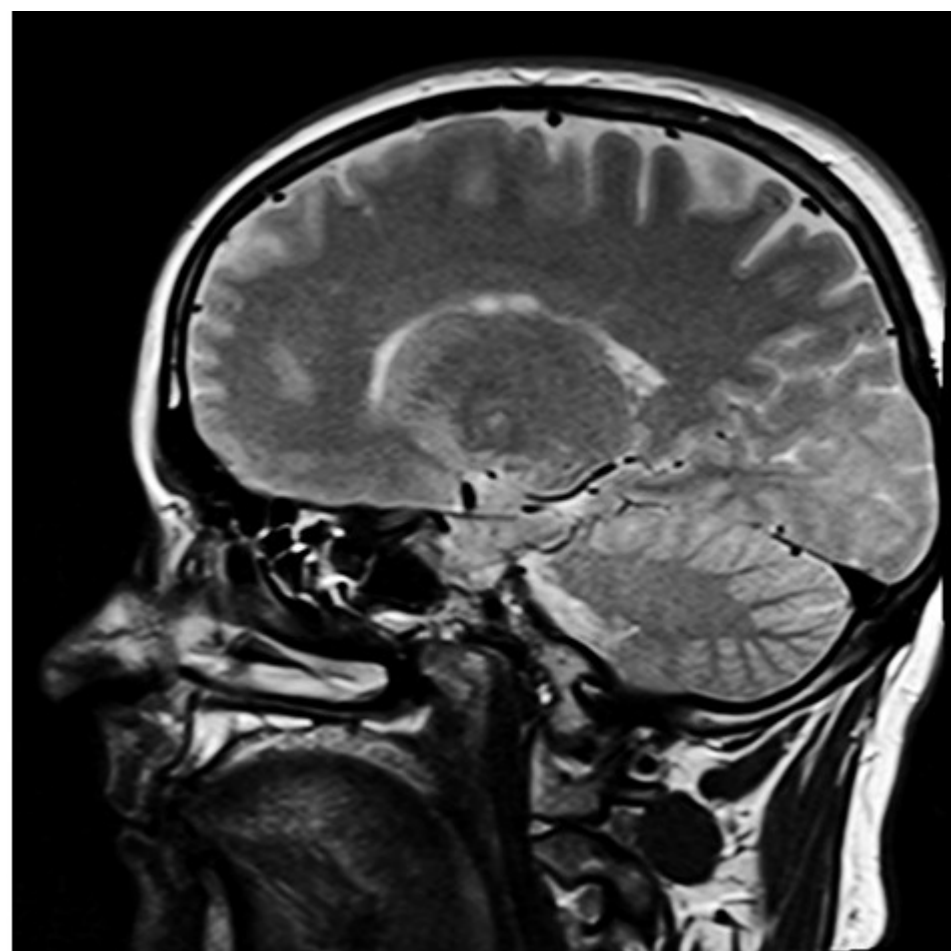
Consider uptriage to ESI 2 if any vital sign criterion is exceptional

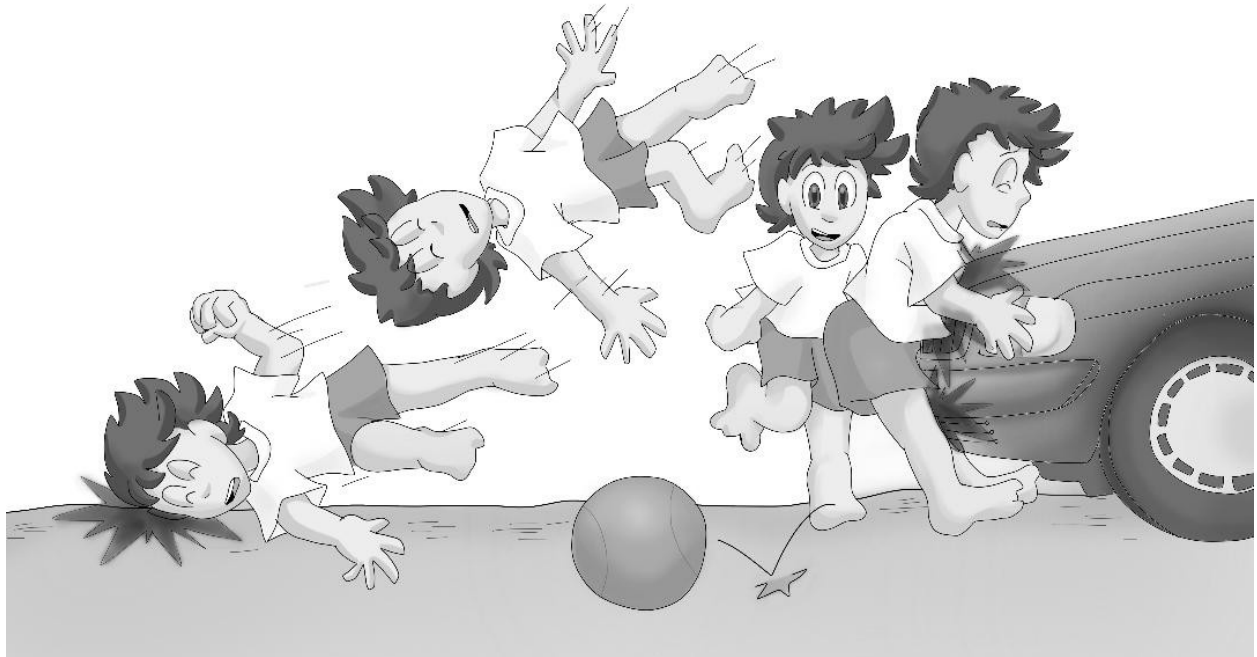
Pediatric Fever Considerations

- 1 to 28 days of age: assign at least ESI 2 if temp >38.0 C (100.4 F)
- 1-3 months of age: consider assigning ESI 2 if temp > 38.0 C (100.4 F)
- 3 months to 3 years of age: consider ESI 3 if temp >39.0 c (102.2 F), or incomplete immunizations, or no obvious source of fever



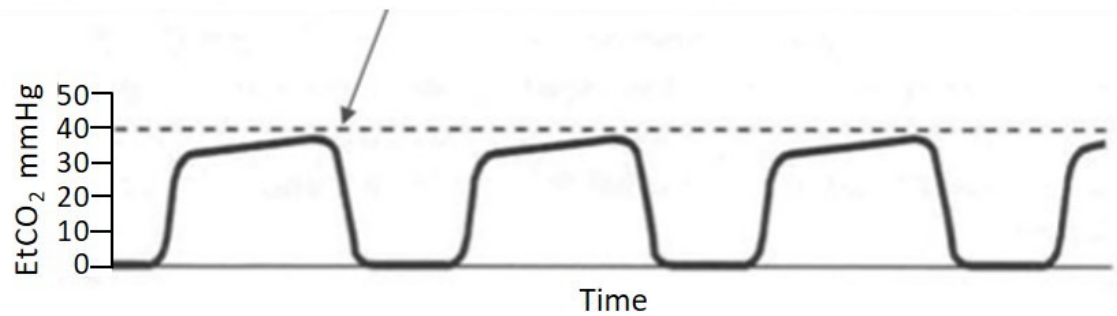
GCS	FOUR score
<ul style="list-style-type: none"> <li>• Three major components               <ul style="list-style-type: none"> <li>• Eye—4 points</li> <li>• Motor—6 points</li> <li>• Verbal—5 points</li> </ul> </li> <li>• Limited utility in intubated patients and children with limited language development</li> <li>• Key component of other ICU severity of illness scales such as acute physiology and chronic health evaluation II score (APACHE-2)</li> <li>• Widely used and validated for more than 30 years</li> </ul>	<ul style="list-style-type: none"> <li>• Four components (<math>E_4</math>, <math>M_4</math>, <math>B_4</math>, <math>R_4</math>) with maximum score of 4 points each               <ul style="list-style-type: none"> <li>• Eye response</li> <li>• Motor response</li> <li>• Brainstem reflexes</li> <li>• Respiratory pattern</li> </ul> </li> <li>• Includes testing for intubated patients and brainstem reflexes</li> <li>• Useful in detecting patients with locked-in syndrome and VSs</li> <li>• Multicenter trials and validation are pending</li> </ul>





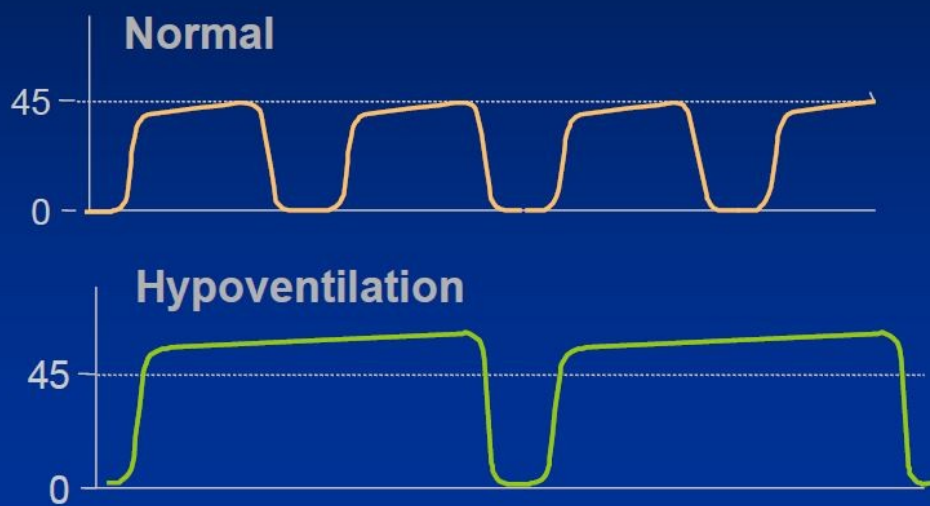


The arrow is pointed to the end of the tidal wave.  
This point represents the number displayed on the monitor.



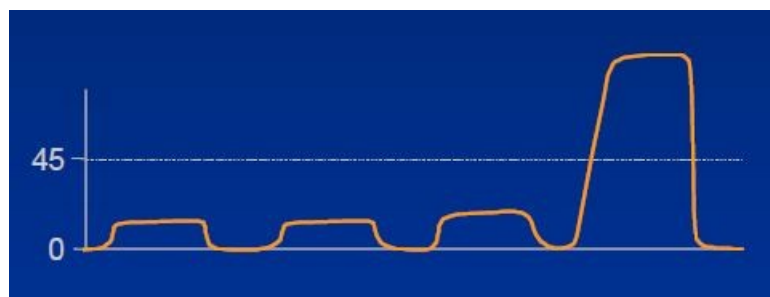
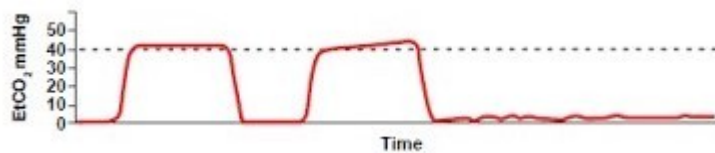
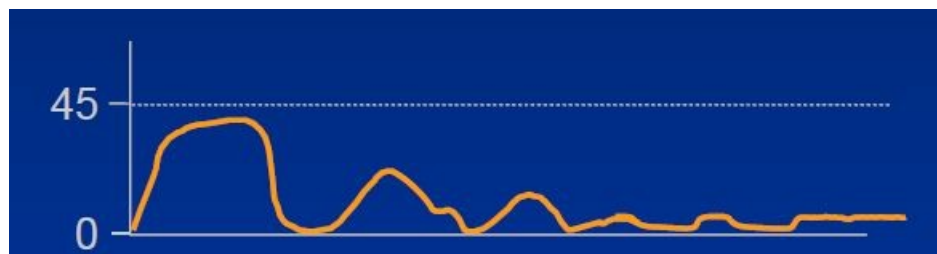
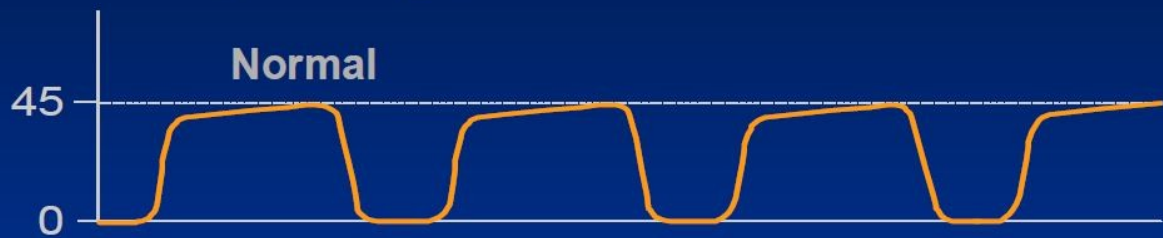
## Hypoventilation

RR ↓ : EtCO<sub>2</sub> ↑



# Hyperventilation

RR  $\uparrow$  EtCO<sub>2</sub>  $\downarrow$











Unscented Size 5



Fresh Scent



Strawberry



Cherry



Bubble Gum

LIVING MADE EASY



PRESCRIPTION FOR SCOLDING WIVES.

*London, Pub<sup>d</sup> by T. M<sup>o</sup> Lane, 25, Haymarket, Jan 1. 1830.*

*Printed by J. Sturges.*

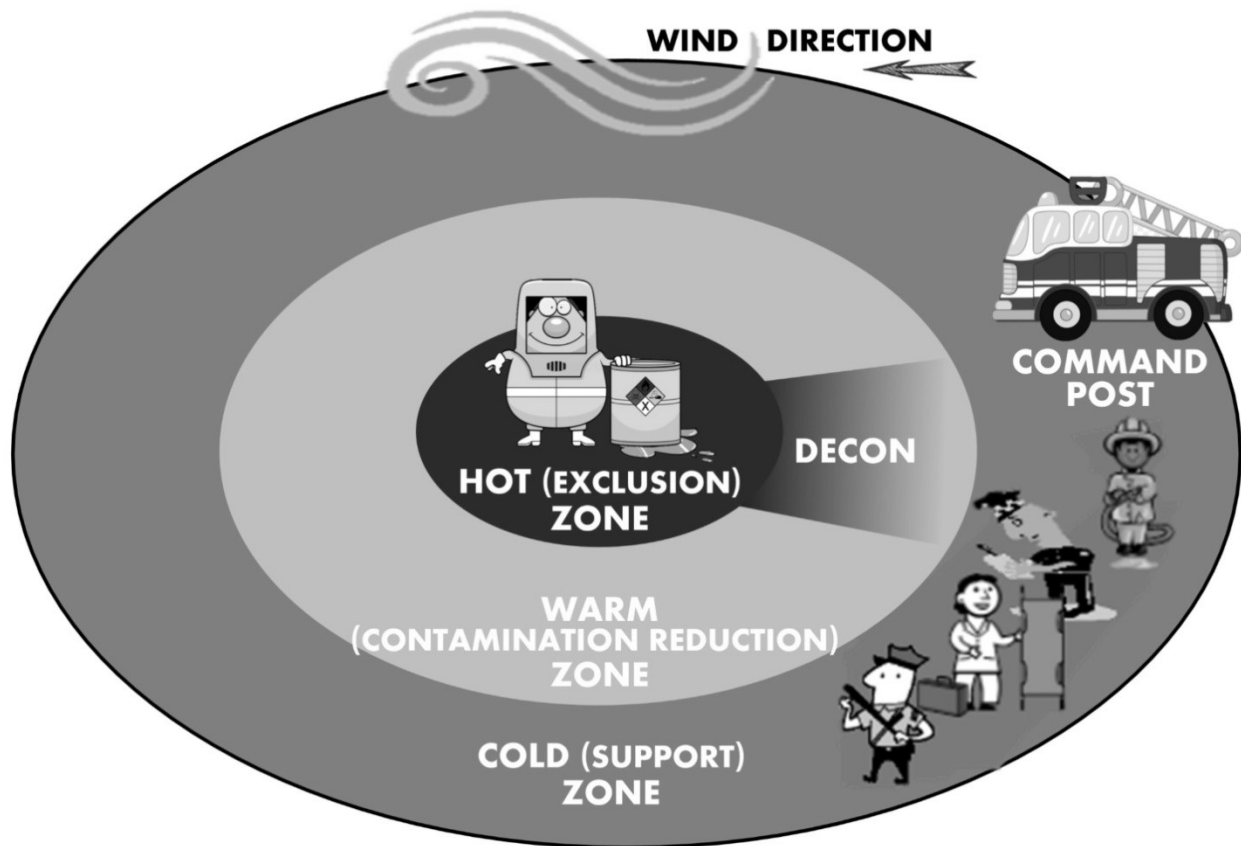
Detail from a satirical print from 1830  
depicting Humphry Davy administering a dose of Laughing Gas  
to a woman while Count Rumford looks on.

TMFA. . .

Too  
Many  
Freakin'  
Acronyms!



# HAZARD CONTROL ZONES







## Fitting guide for Wisp pediatric patients

Achieving the right fit with Wisp pediatric is easy. Simply follow the instructions below.



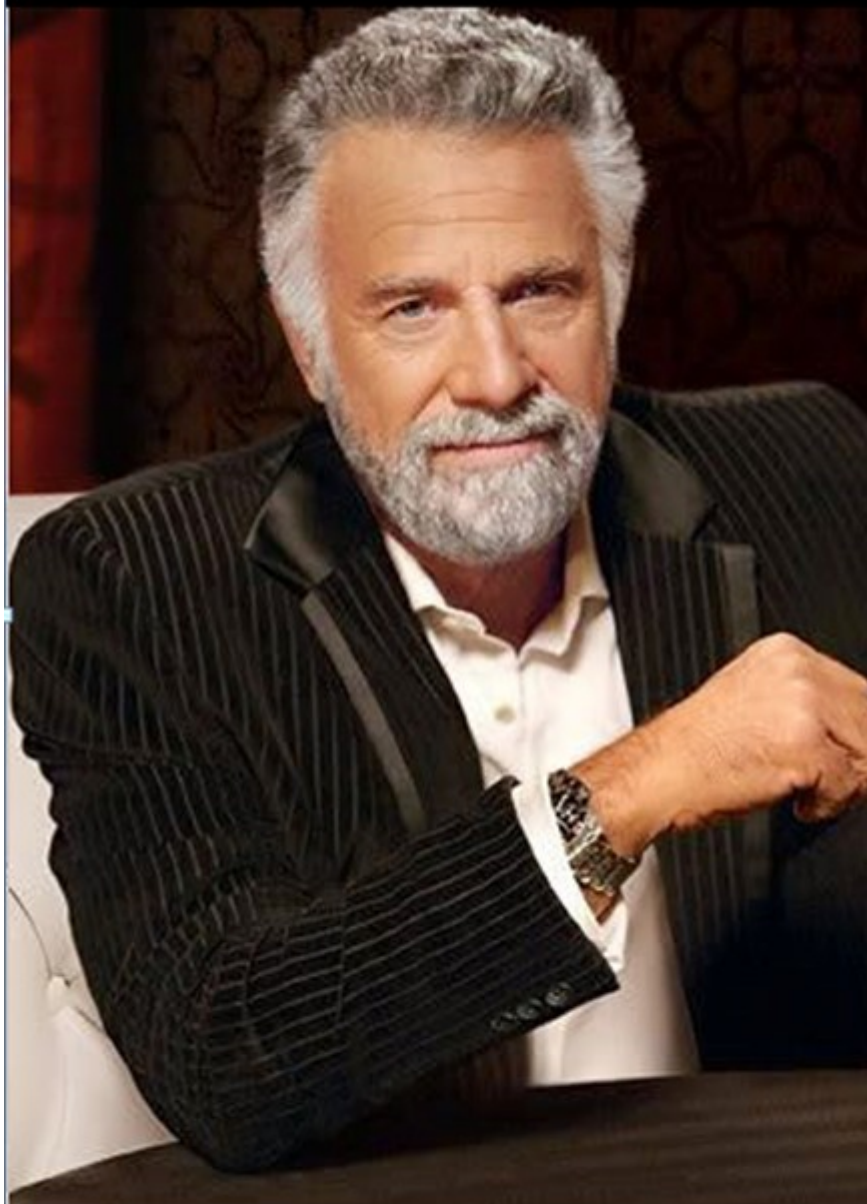
1. The mask cushion should fit the width of the nose without blocking the nostrils.
2. Pulling the headgear over the child's head, gently hold the cushion over the nose.
3. Reconnect the clips by pushing them into the mask frame.
4. Connect the Wisp pediatric tubing and elbow swivel to the front of the mask.

Three cushion sizes (SCS, SCM, SCL) are available. Please read the Instructions for Use for additional fitting information.





I don't always transfuse  
platelets...



But when I do,  
I do it at room temperature

# IS IT MEASLES?

Look out for:

- \* fever
- \* tiredness
- \* runny nose
- \* moist cough
- \* sore, red eyes
- \* blotchy red rash
- \* spots inside the mouth (Koplik spots)



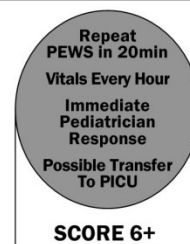
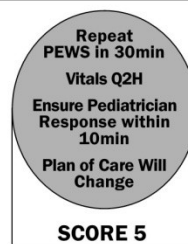
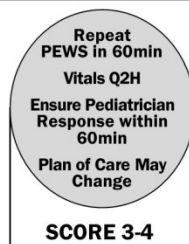
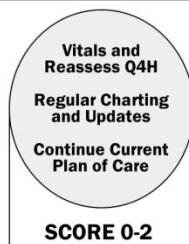


# PEWS SCORING SYSTEM

Score Parameter	0	1	2	3
Behavior	Playing/Appropriate	Sleeping	Irritable/ Parent Concern	Lethargic/confused Reduced response to pain
Cardiovascular (Nail Bed Color, Capillary Refill, Heart Rate)	Pink or Capillary Refill 1-2 seconds	Pale or Capillary Refill 3 seconds	Grey or Capillary Refill 4 seconds or HR 20 beats/min above normal rate	Gray and mottled Capillary Refill $\geq 5$ or HR of 30 beats/min above normal rate or bradycardia 10 beats/min below normal rate
Respiratory (Respiratory Rate, Respiratory Description, $FI_{O_2}$ , Oxygen Flow Rate)	Within normal parameters, no recession or tracheal tug	RR>10 above normal parameters, using accessory muscles, 30+% $FI_{O_2}$ or >4 liters/min	RR>20 above normal parameters, recessions, tracheal tug, >40% $FI_{O_2}$ or >6 Liters/min	RR>30 or 5 below normal parameters with sternal recessions, tracheal tug or grunting, 50% $FI_{O_2}$ or >8 liters/min
Use of Nebulizer/ Inhaler*	Nil/less frequent than every 15 minutes		Every 15 minutes	
Post-Surgical Vomiting*	Nil/Minimal vomiting		Persistent vomiting	

	0	1	2	3	SCORE
Behavior "Cute vs Coma"	Playing/ Appropriate	Sleeping	Irritable	Lethargic/Confused or Reduced response to pain	
Cardiovascular "Cute vs Crashing"	Pink OR Capillary Refill 1-2 seconds	Pale OR Capillary Refill 3 seconds	Grey OR Capillary Refill 4 seconds OR tachycardia of 20 above normal	Gray or mottled OR Capillary Refill $\geq 5$ OR tachycardia of 30 bpm above normal rate OR bradycardia	
Respiratory "Cute vs Crummy"	Within normal parameters, no retractions	>10 above normal parameters, using accessory muscles, OR 30% FiO2 OR 3+ liters/min	>20 above normal parameters, retractions, OR 40% FiO2 OR 6+ liters/min	5 <u>below</u> normal parameters with retractions and/or grunting, OR 50% FiO2 OR 8+ liters/min	
Add 2 additional points for interventions or conditions, i.e. continuous nebs, O2 changes, persistent post-op vomiting, multiple IV attempts, frequent suctioning, or positioning				TOTAL SCORE	

**STABLE**



**CRITICAL**

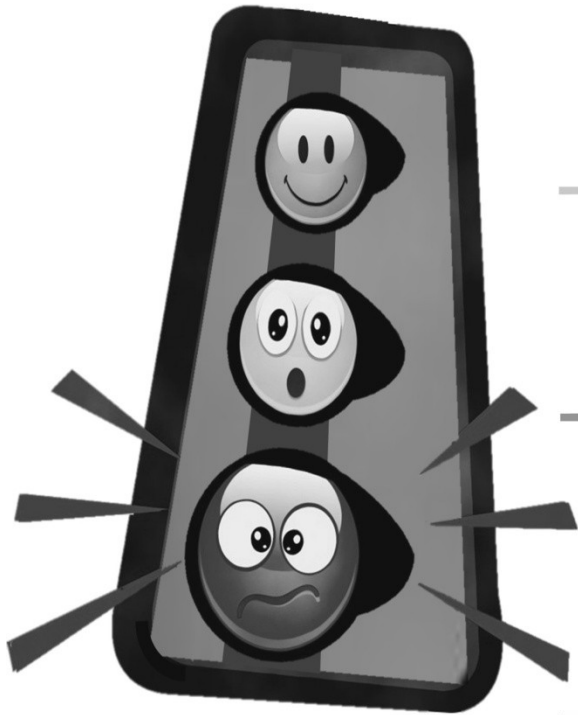
*Normal Heart Rate Ranges By Age Group*

Infant (<1 year)	Toddler (1-3 years)	Preschool (3-4 years)	School Age (5-12 years)	Adolescent (13-16 years)
100-160	85-150	75-140	60-115	60-100

*Normal Respiratory Rate Ranges By Age Group*

Infant (<1 year)	Toddler (1-3 years)	Preschool (3-4 years)	School Age (5-12 years)	Adolescent (13-16 years)
24-60	22-30	22-30	16-24	16-22

# Pediatric Early Warning Score



## Green

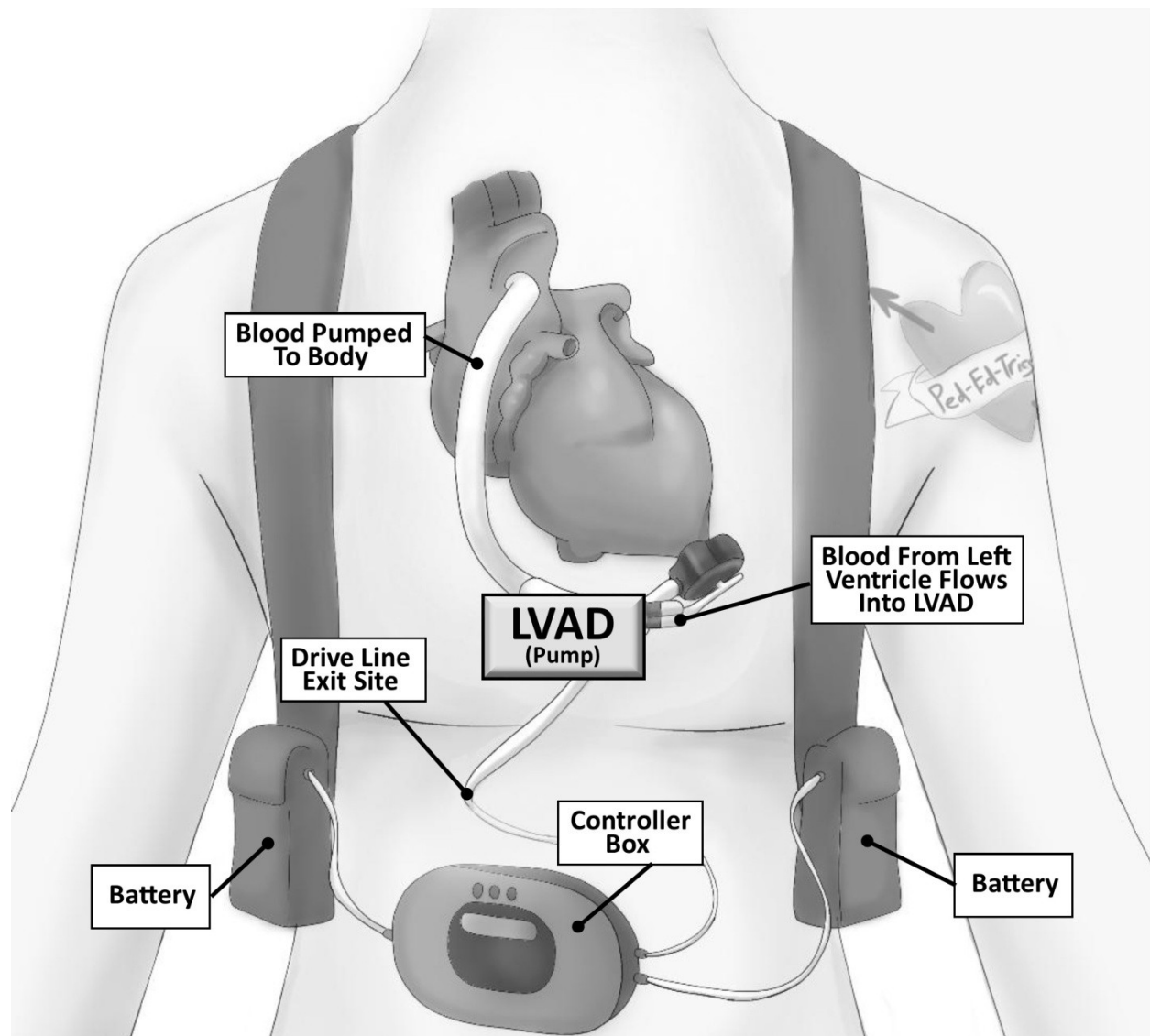
- There has been no change in your child's status
  - Your child's vital signs will be checked every 4 hours
  - Your child's status will be reassessed every 4 hours
  - Your child is stable and we will continue with their current plan of care
- 

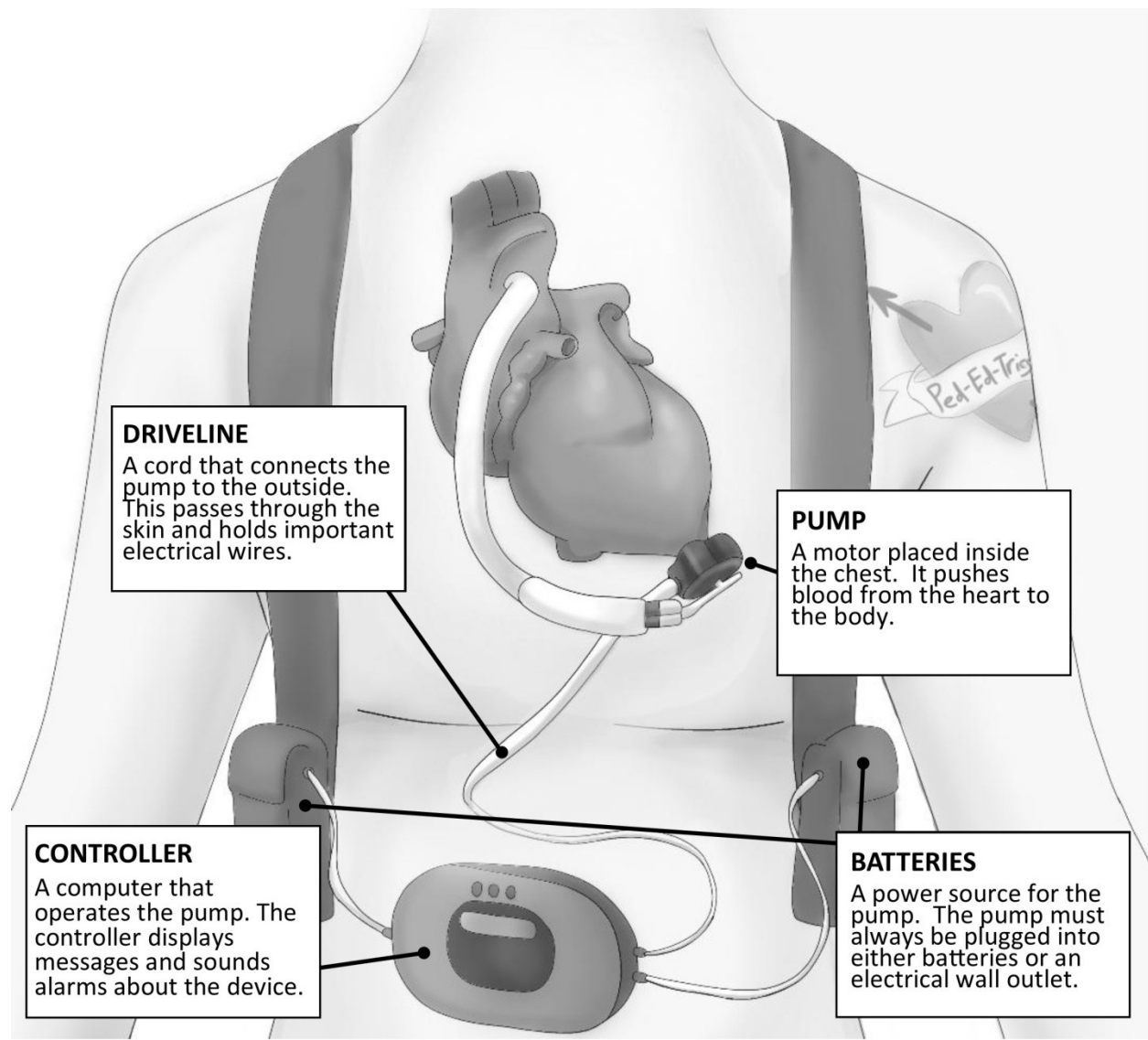
## Yellow

- There has been a change in your child's status; your nurse will give you more information. The charge nurse and resident have been notified
  - Your child will be reassessed in 2 hours, or sooner, if needed
  - Your child's plan of care may change
- 

## Red

- There has been a significant change in your child's status; your nurse will give you more information. The charge nurse has been notified and will come assess your child
  - The resident will be notified and will assess your child; the attending doctor will be notified
  - Your child will be reassessed within 1 hour, or sooner, if needed
  - We may ask other experts to come assess your child
  - Your child's plan of care may change
-





$$\text{MAP} = \frac{\text{SBP} + (2 \times \text{DBP})}{3}$$

3

MAP = mean arterial pressure

SBP = systolic blood pressure

DBP = diastolic blood pressure

Alarm Type	Alarm Display	Meaning	Potential Causes	Actions Required
Hazard / Critical	Pump Off VAD stopped	Pump has stopped. Pump is not operating correctly Pump flow < 2.5 L/min Percutaneous lead is disconnected	- Driveline disconnected - Driveline fracture - Connector malfunction/breakage - VAD electrical failure	Check connections from driveline, controller and power source  Change controller.
	Critical battery Low voltage	<5 minutes of battery power remaining. Controller receiving inadequate power.	- Limited battery time - Battery malfunction	Replace battery. Connect to alternate power source. ** Do not remove both batteries simultaneously - VAD will stop **
	Controller failed	Controller component failed	- Controller component failed	Change controller.
Advisory / Medium	Controller fault	Controller fault. Alarms disabled.	- Controller component malfunction - Electrostatic discharge	Change controller. Review alarm thresholds.
	High watts	High power condition in running VAD pump	- VAD thrombus - High RPM - High flow - VAD electrical fault	Assess & optimise preload/afterload  Assess for thrombus
	Low flow Suction	Pump flow < 2.5 L/min Average flow dropped below threshold	- Suction event - Poor VAD filling - Elevated BP/afterload - Outflow graft kink - RPM too high or low	* Ensure adequate preload/filling. * Treat dysrhythmias. * Investigate for VAD occlusion (inflow and outflow tracts). * Consider afterload reduction or decreasing pump speed
Advisory / Low	Low battery Low Voltage	<15 minutes of battery power remaining.		Replace battery. Connect to alternate power source.
	Power cable disconnected	Power cable disconnected		Ensure all connections intact.
	Replace system controller	System controller is operating in backup mode		Replace system controller.



Look



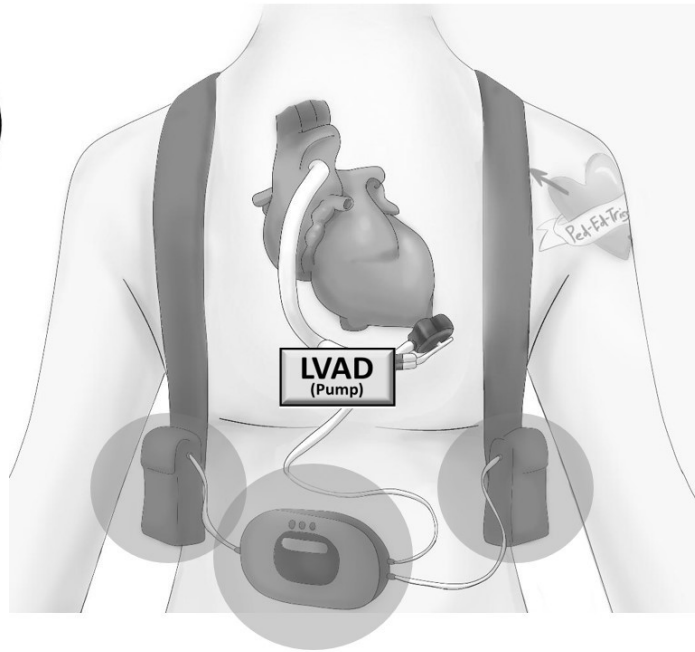
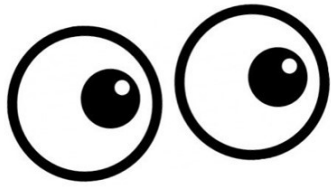
Listen

Feel



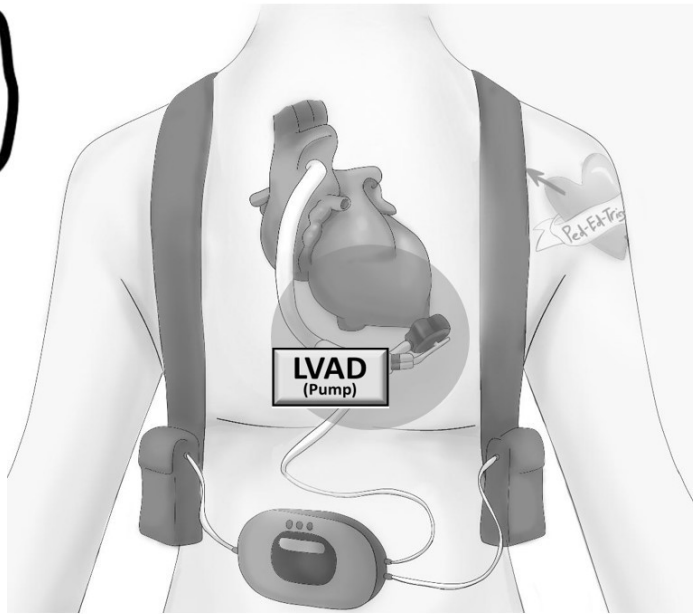
# Approach to the LVAD patient...

**LOOK: At ALL the connections & controller  
Battery life & hopefully green lights**



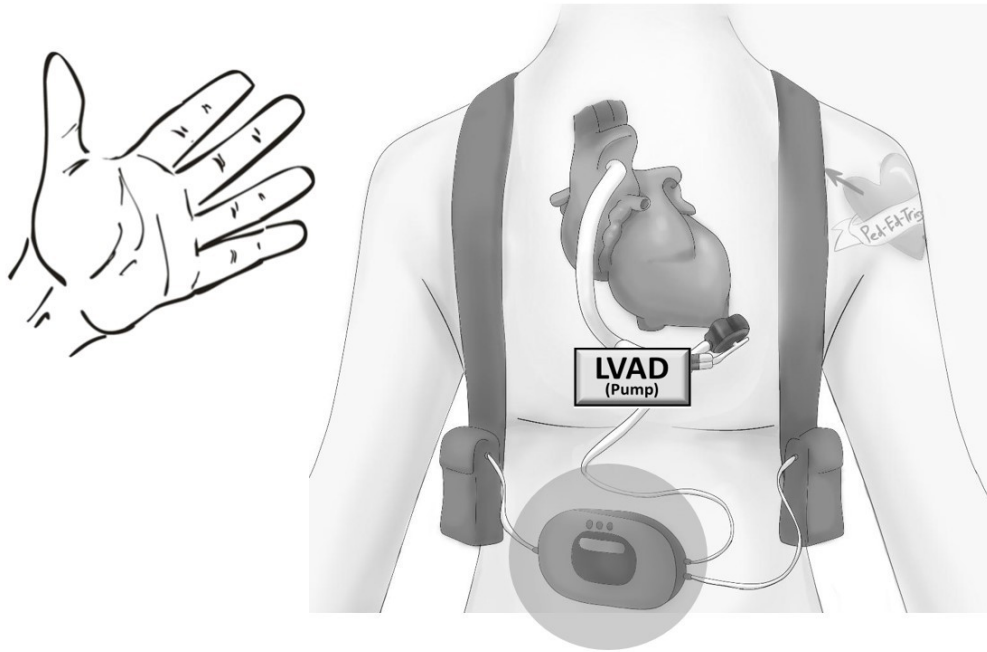
# Approach to the LVAD patient...

**LISTEN: Hum versus no hum**

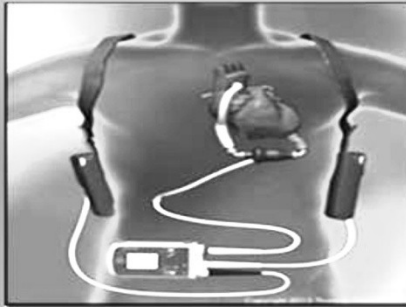


# Approach to the LVAD patient...

**FEEL: The controller box**  
**Hot = Big clot**



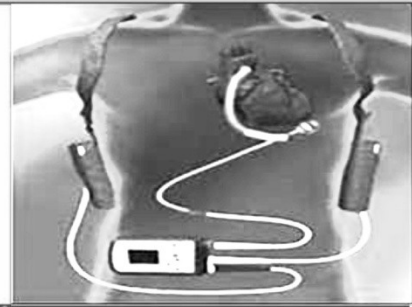
## Types of Continuous Flow Left Ventricular Assist Devices



**HeartMate II**



**HVAD**



**HeartMate 3**

Axial Flow Pump

Flow: 4-6 lpm

MAP: 70-90

Warfarin/Aspirin

Pair Batteries=10-12 hrs

Backup Emergency 15 min.  
Battery in Controller

Centrifugal Flow Pump

Flow: 4-6 lpm

MAP: 70-90

Warfarin/Aspirin

Pair Batteries=8-12 hrs

**No** Emergency Battery in  
Controller

Centrifugal Flow Pump

Flow: 4-6 lpm

MAP 70-90

Warfarin/Aspirin

Pair Batteries=15 hrs

Backup Emergency 15 min  
Battery in Controller

## Color By Age



**Newborn Gray**

**1 Purple**

**5-6 Blue**

**4 months Pink**

**2 Yellow**

**7-8 Orange**

**6 months Red**

**3-4 White**

**9-13 Green**

# 1 YEAR

## EQUIPMENT

<b>BVM</b>	Child or Adult
<b>Blade</b>	1 - 1.5 Straight
<b>ETT Size</b>	4.0 Uncuffed or 3.5 Cuffed
<b>Stylet</b>	10 French
<b>Suction Catheter</b>	10 French
<b>ETCO2 (Colorimeter)</b>	Pediatric
<b>ETT @ Gum or Teeth</b>	11 - 12 cm
<b>OPA (Teeth to Angle Jaw)</b>	60 mm (Size 1)
<b>NPA (Nostril to Earlobe)</b>	18 French
<b>i-gel Supraglottic Airway</b>	Size 1.5
<b>King Laryngeal Tube Airway</b>	Size 1
<b>IV Catheter</b>	20 - 24 Ga
<b>EZ-IO</b> Place needle on bone → 5 mm line should be visible before drilling	25 mm
<b>NG Tube</b>	8 - 10 French

EMS Integration



P-9:17

6MO 8 KG Ideal Wt.



Medications

Drug	Conc.	Vol.	Rt.
Adenosine <i>1st dose</i>	3 mg/mL	0.3 mL	IV IO
Adenosine <i>2nd dose</i>	3 mg/mL	0.5 mL	IV IO
Albuterol	2.5 mg/3mL	3 mL	NEB
Amiodarone	50 mg/mL	0.8 mL	IV IO
Atropine <i>Bradycardia</i>	0.1 mg/mL	1.6 mL	IV IO
Bicarb 8.4%	1 mEq/mL	8 mL	IV IO



Meds



Drips



Equipment

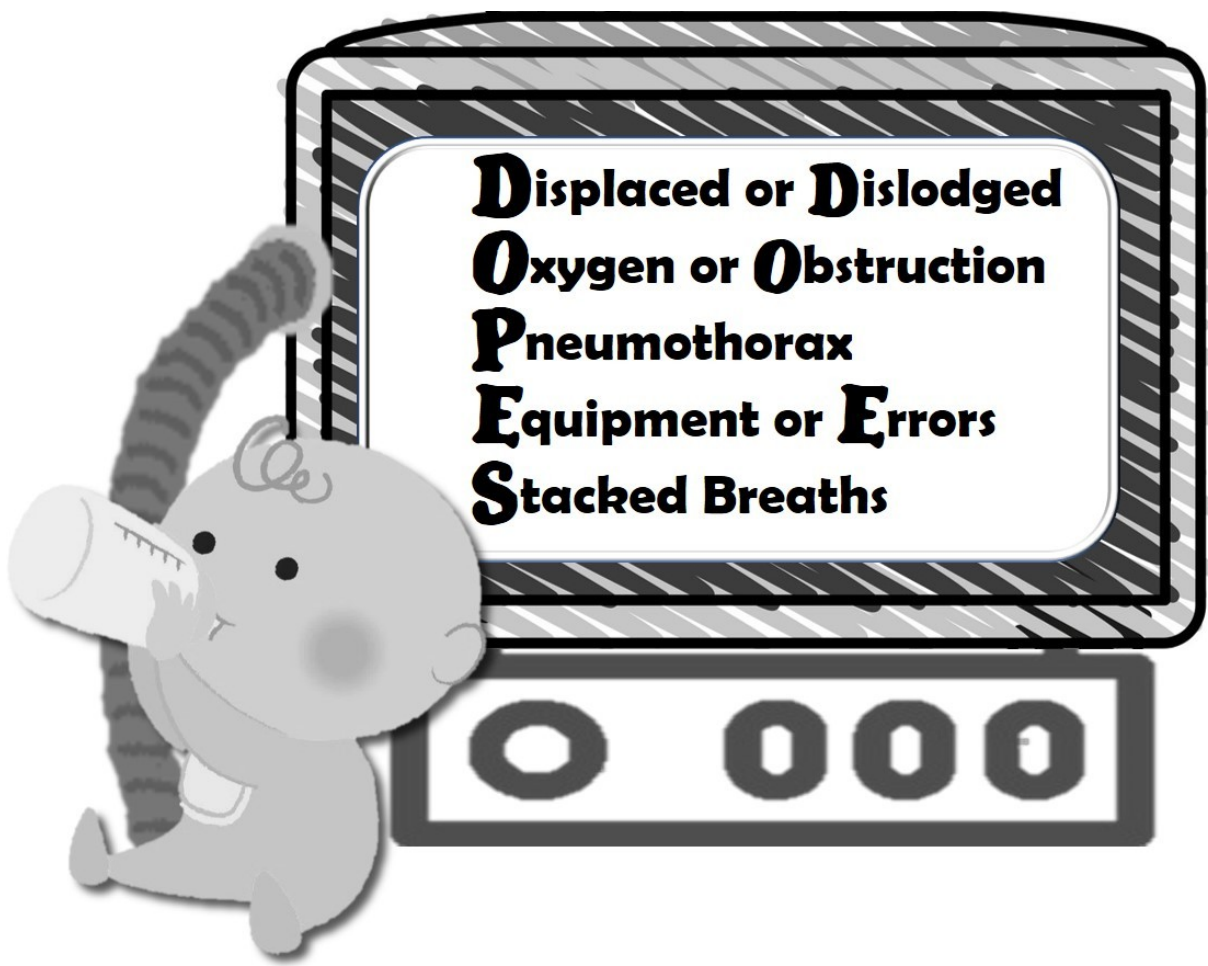


Electrical



Vitals





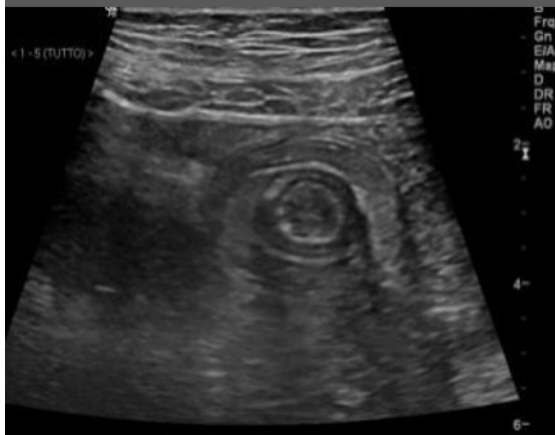


BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1

Obeys commands	+2
Localizes pain	+1
Withdrawals to pain or worse	0



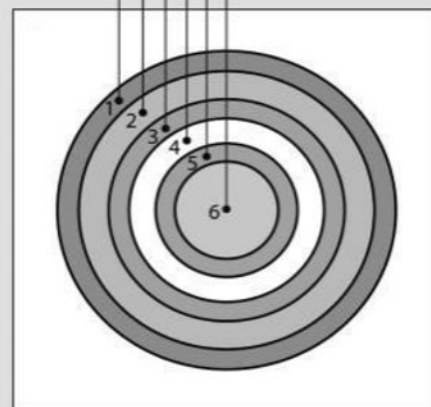
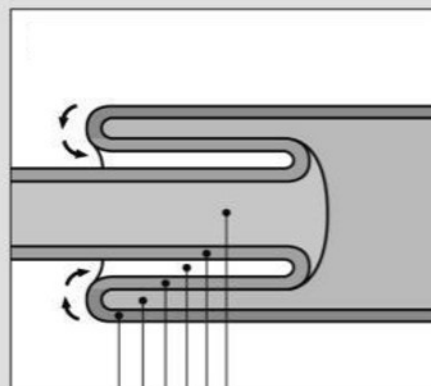
## DONUT SIGN



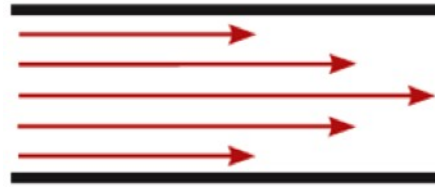
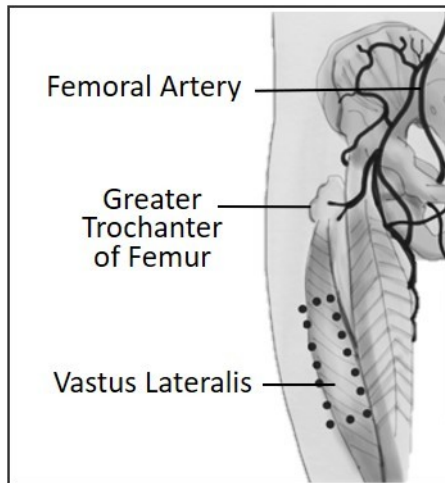
Intussusception



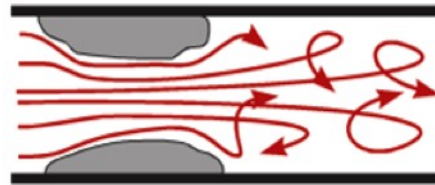
## TARGET SIGN



## Vastus Lateralis Site



Laminar Flow



Turbulent Flow

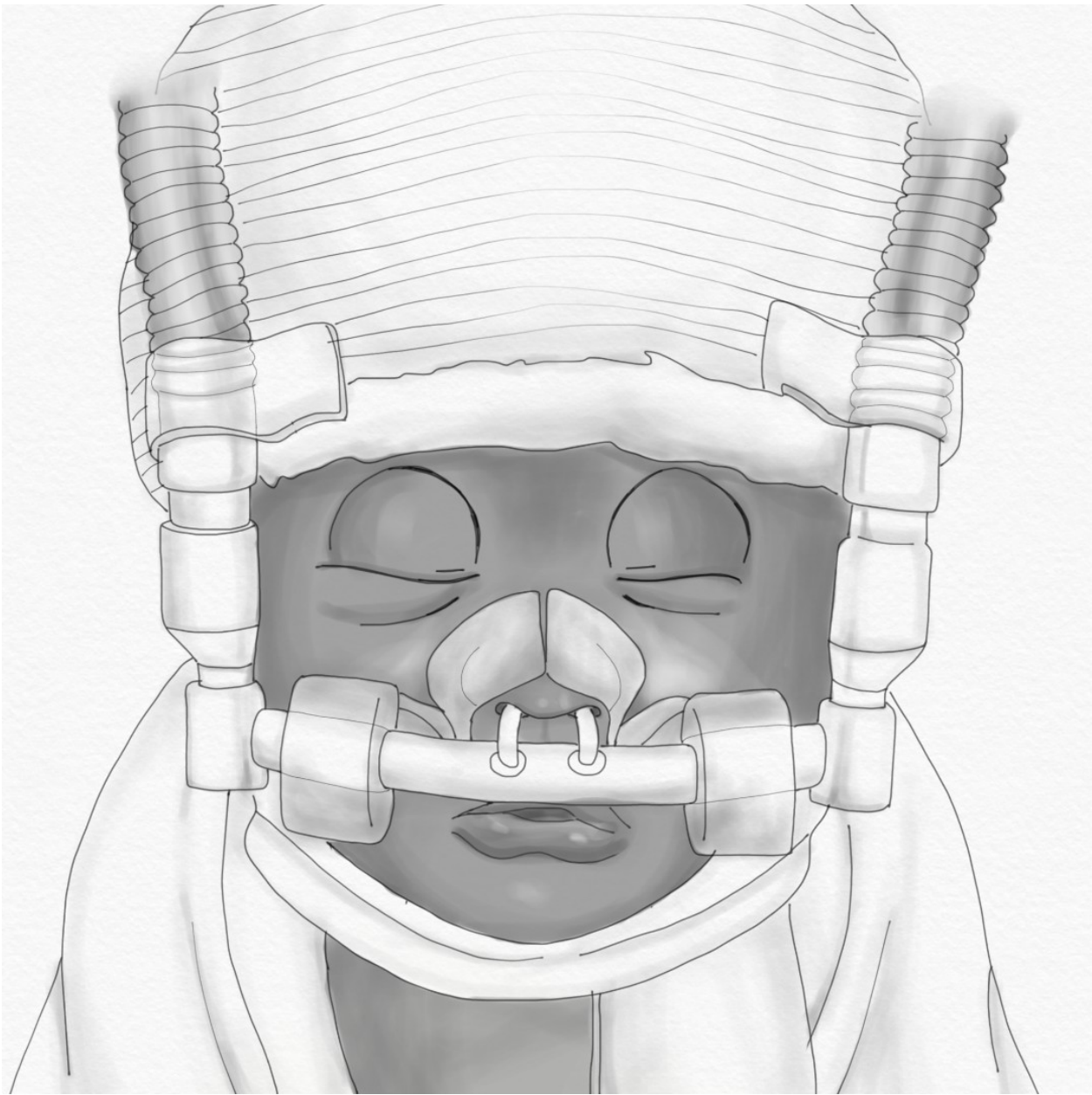
**CLOSER** is  
**BETTER**

If it ain't

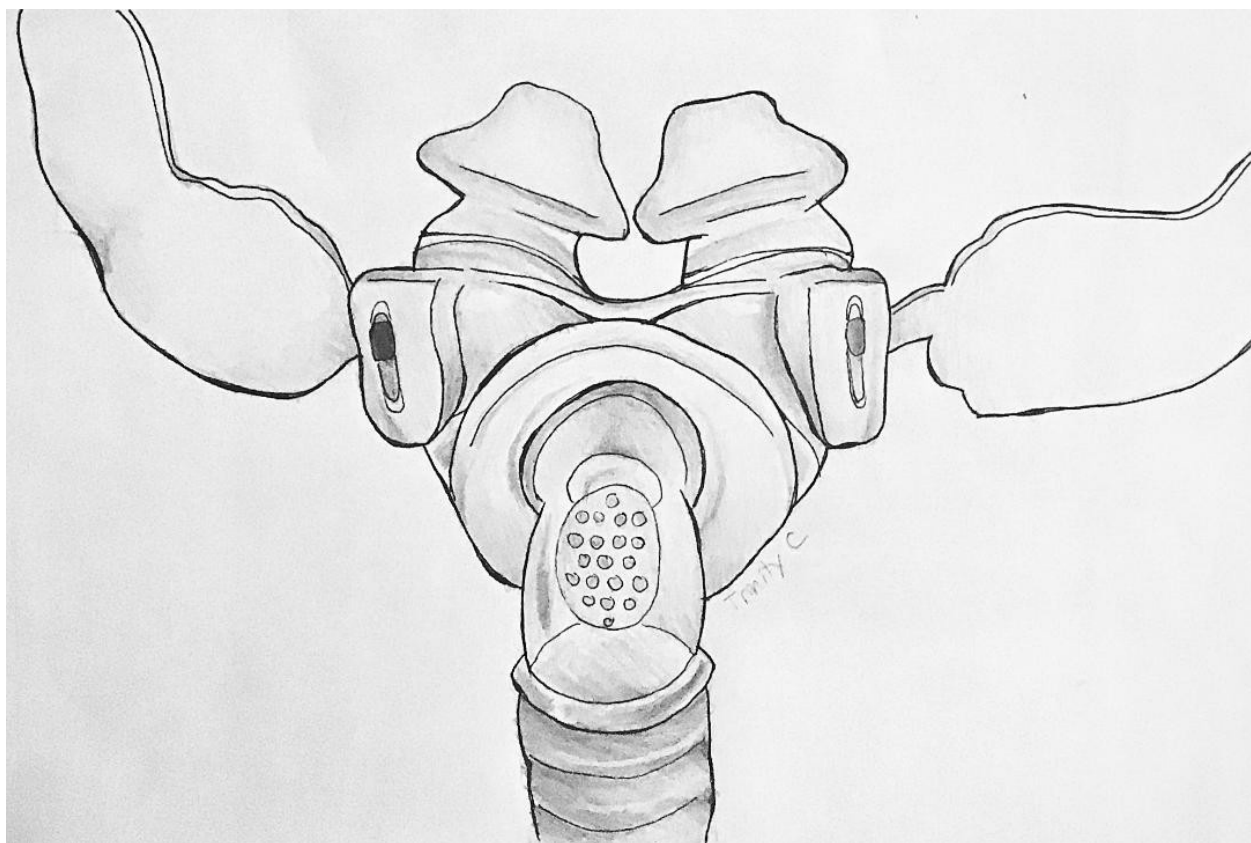
**BROKE**,

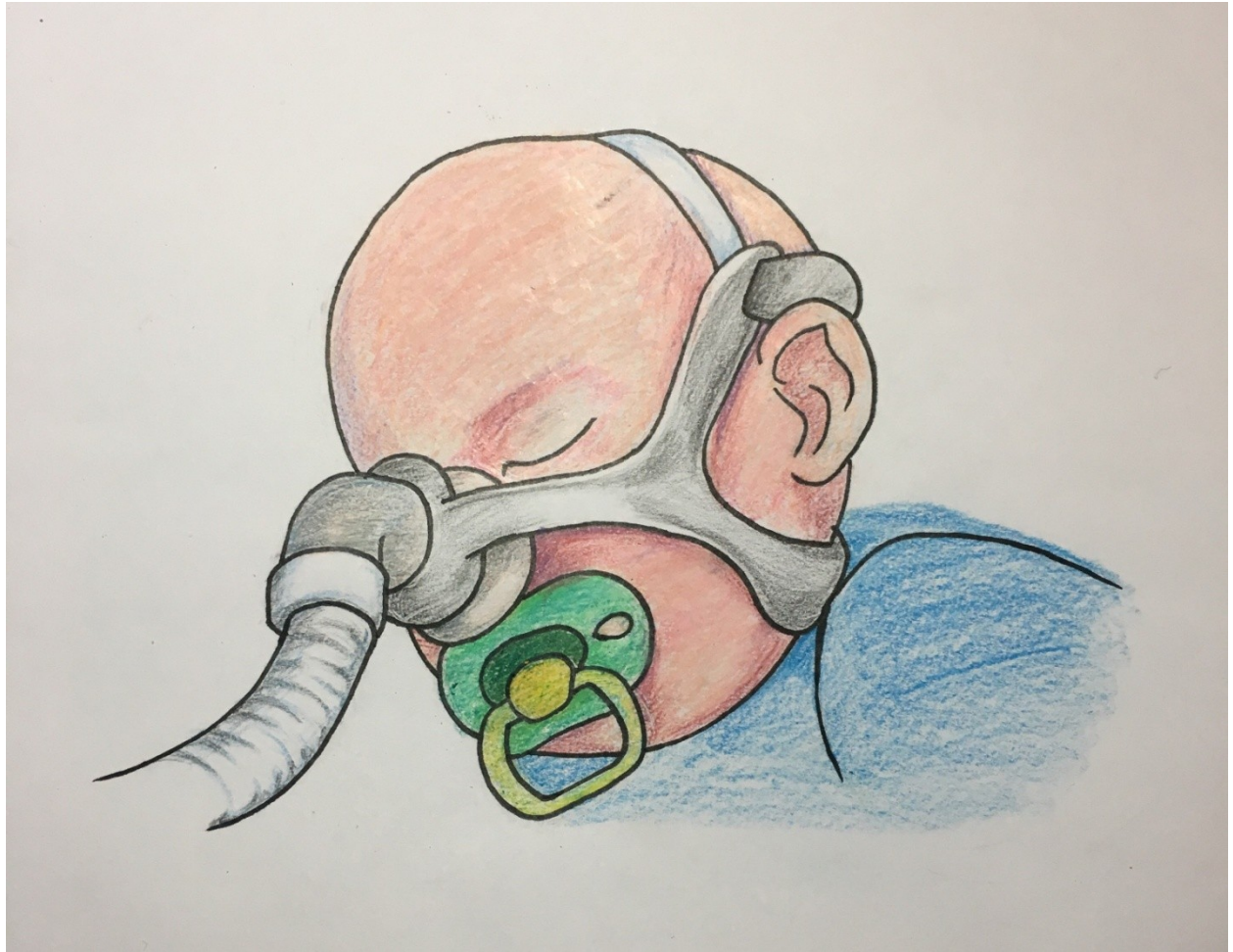
~~don't fix it~~

*USE IT!*

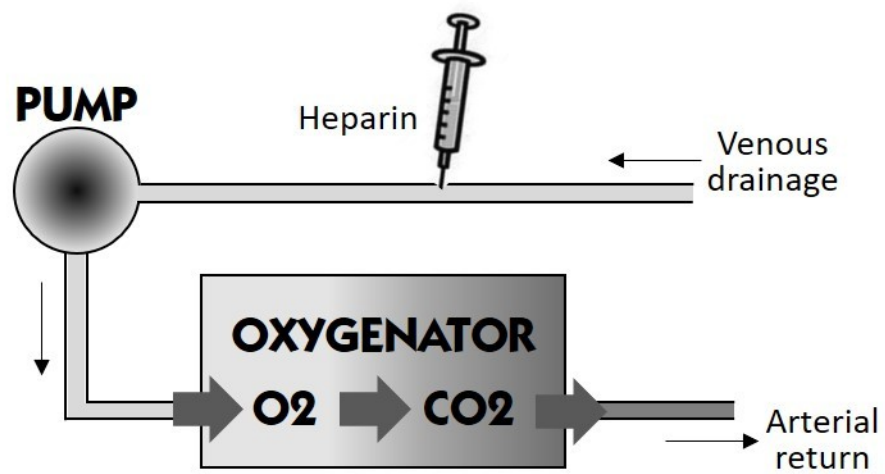


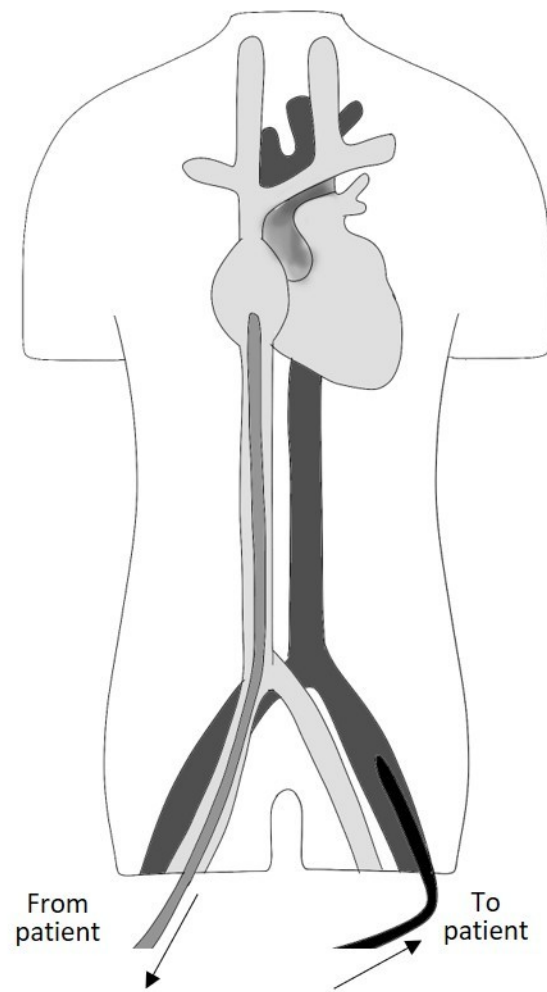


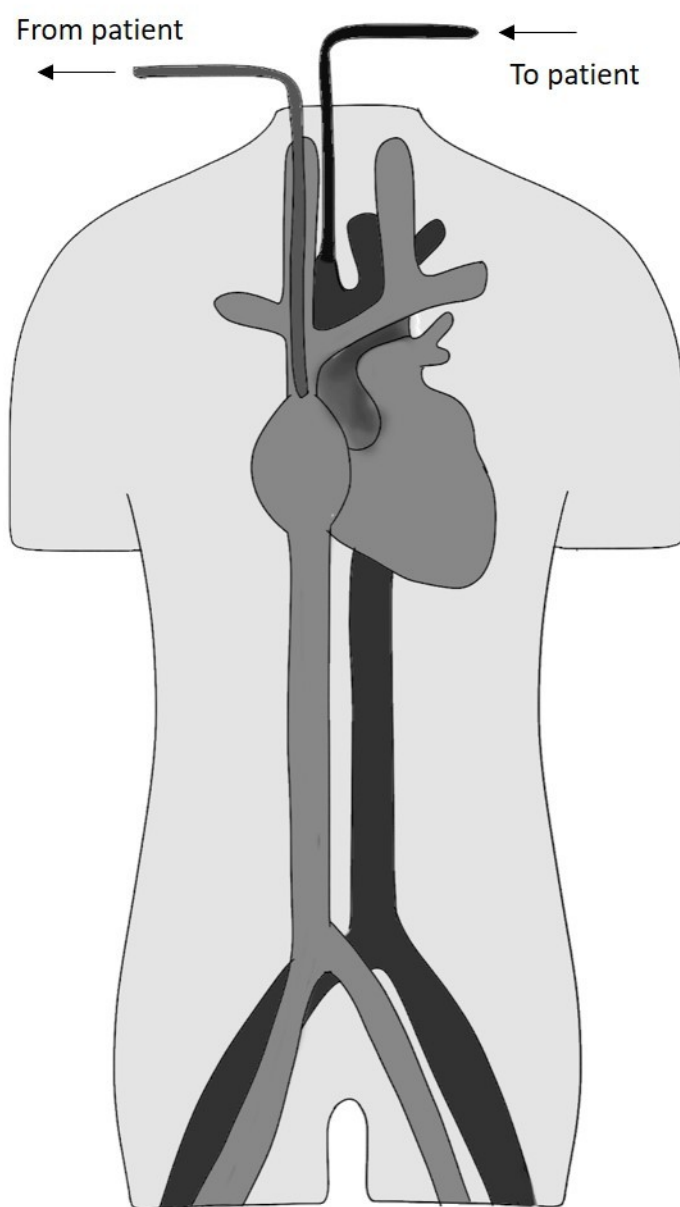


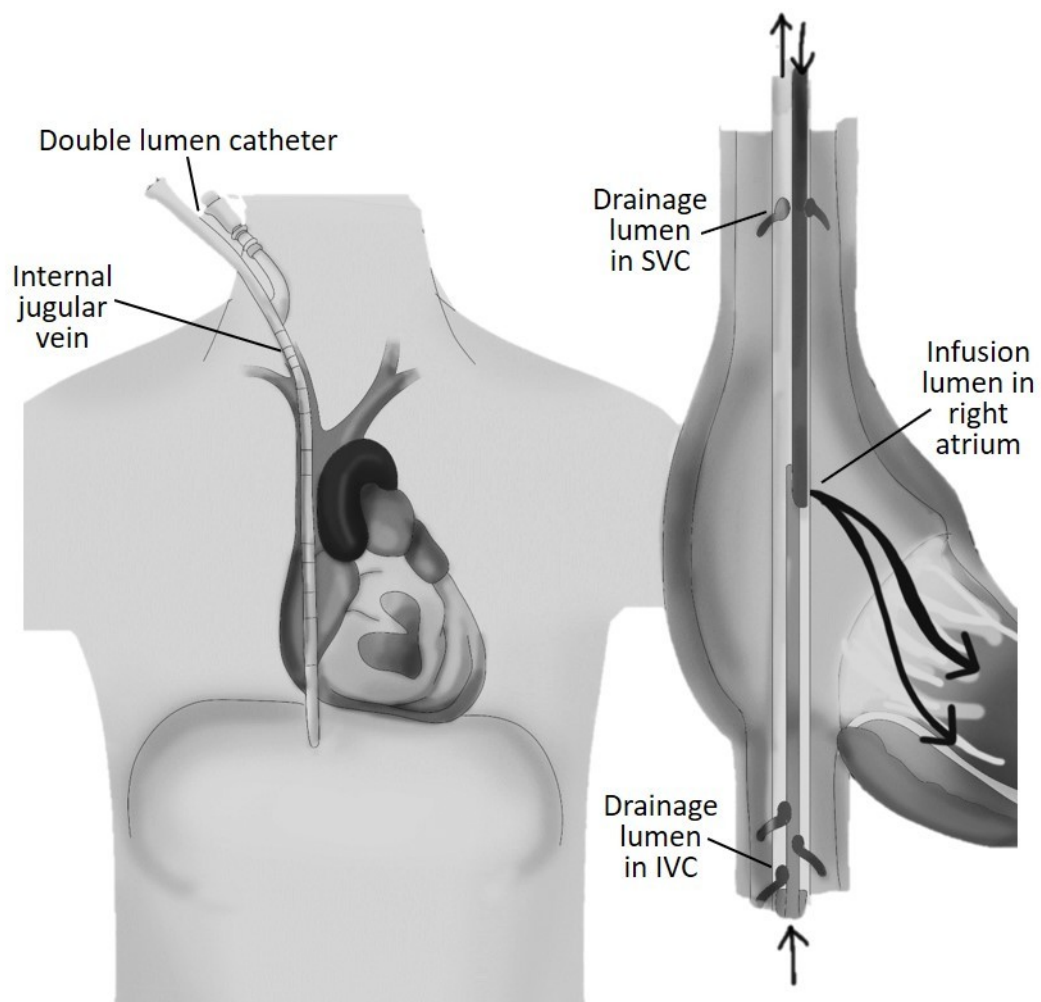


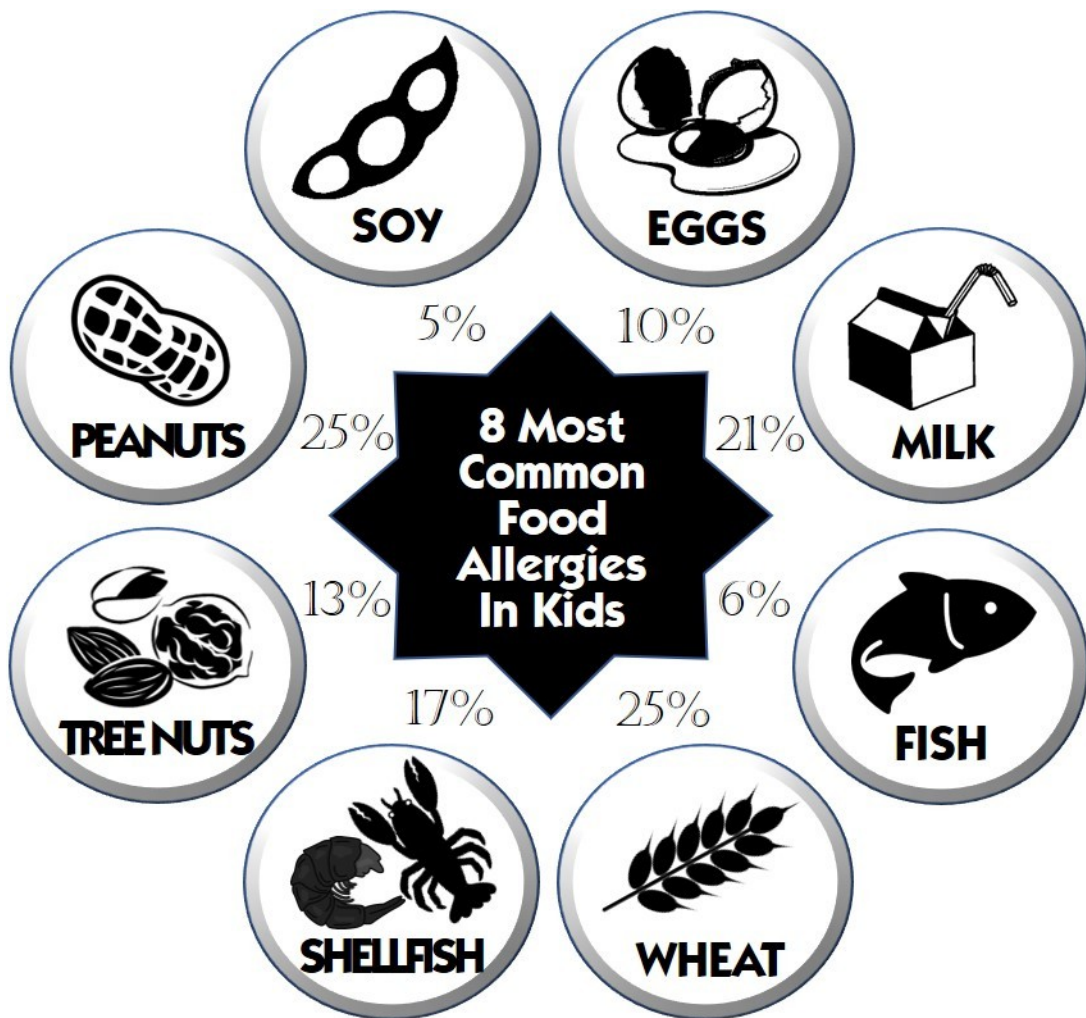










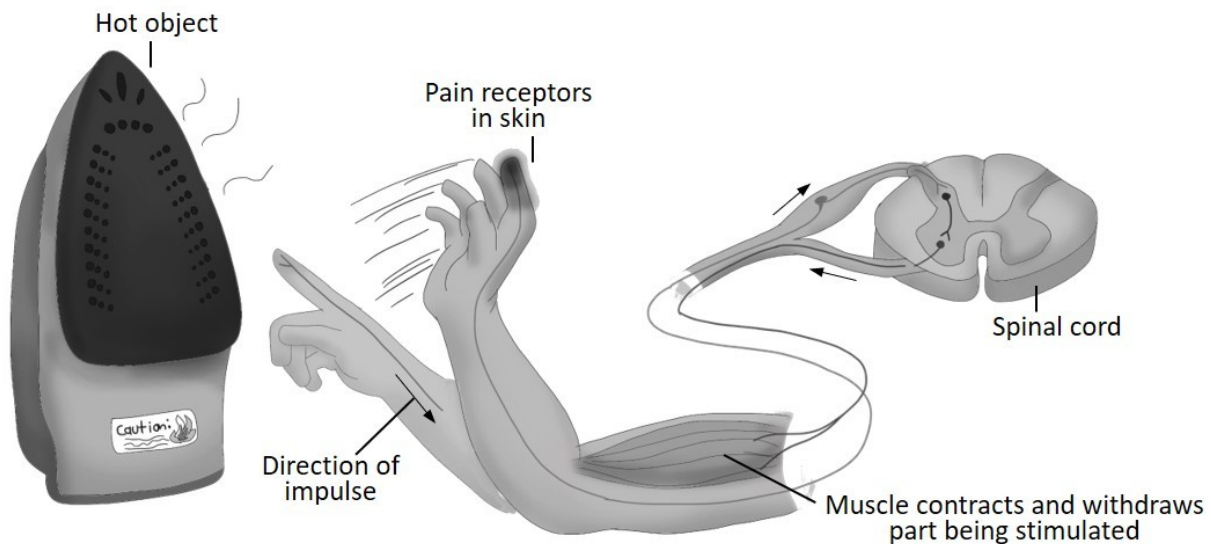


**Best eye movement, NONE = 1**  
**Best motor response, NONE = 1**  
**Best verbal response, NONE = 1**

**Total = 3... Your'e DEAD.**  
**Yes a corpse gets a 3...**



**GCS is the**  
***"Ultimate***  
***Participation Award"***









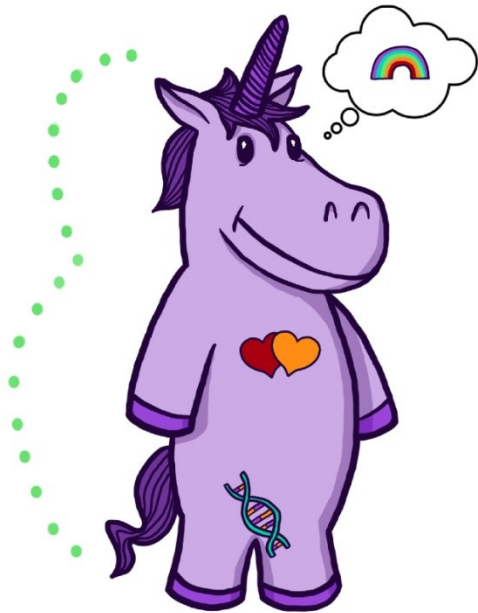




Do Not Use	Appropriate Terminology
Sex change	<b>Transition</b> Gender confirming (Affirming) <b>Surgery</b> Gender Reassignment Surgery
Hermaphrodite	Intersex
Transvestite	Cross-dresser
Transsexualism / Transgenderism	None – using those terms is always offensive
Sexual Preference	Sexual orientation
Gay Lifestyle Transgender Lifestyle	None – there is no such thing as a gay or transgender lifestyle. The word lifestyle implies that one's sexual orientation or gay identity is a choice.

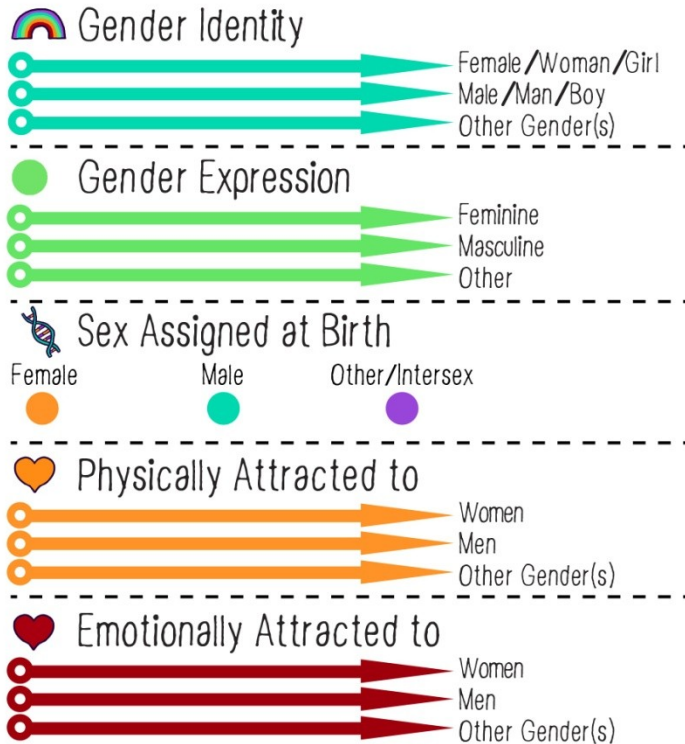
# The Gender Unicorn

Graphic by:  
**TSER**  
Trans Student Educational Resources

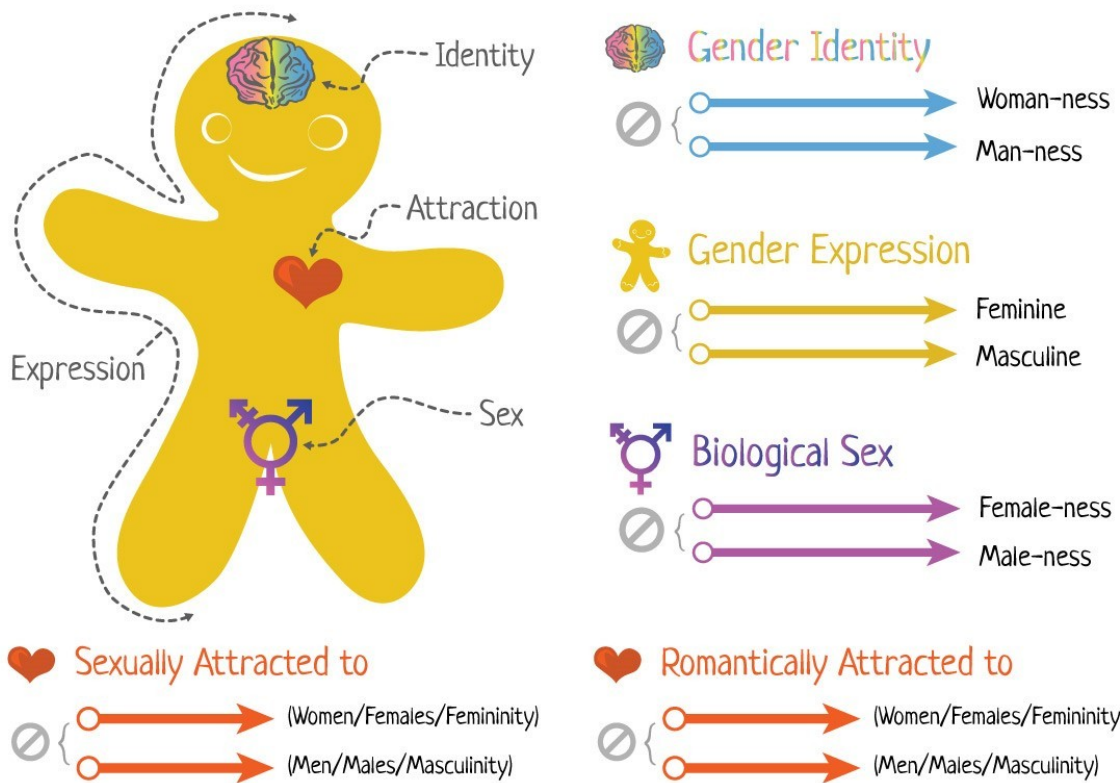


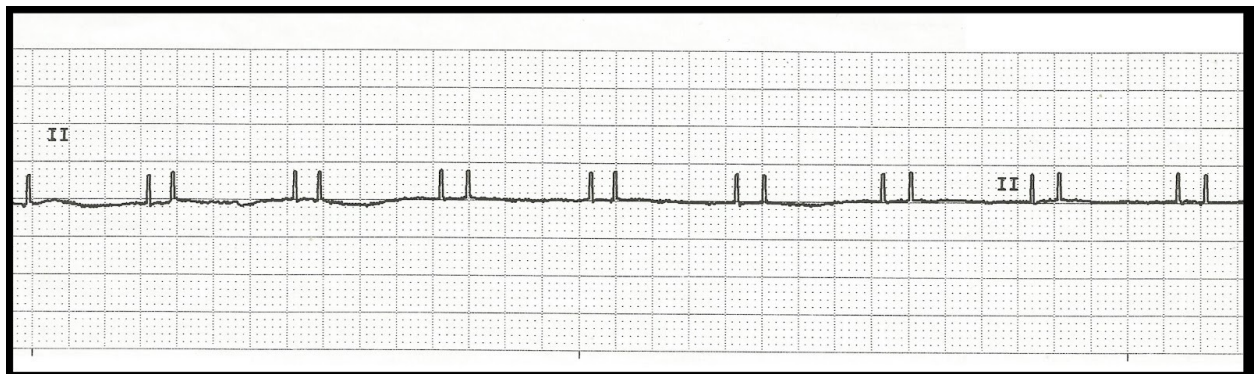
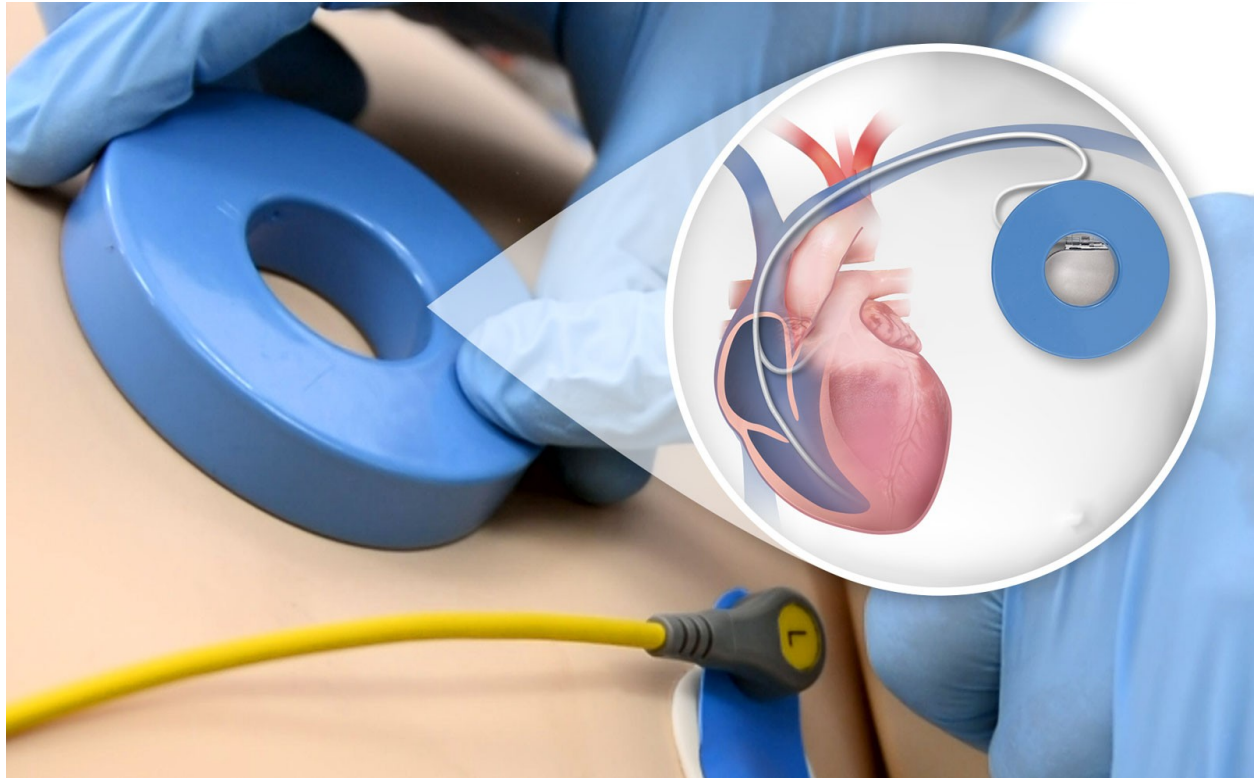
To learn more, go to:  
[www.transstudent.org/gender](http://www.transstudent.org/gender)

Design by Landyn Pan and Anna Moore



# The Genderbread Person v3.3 by its pronounced METROsexual.com

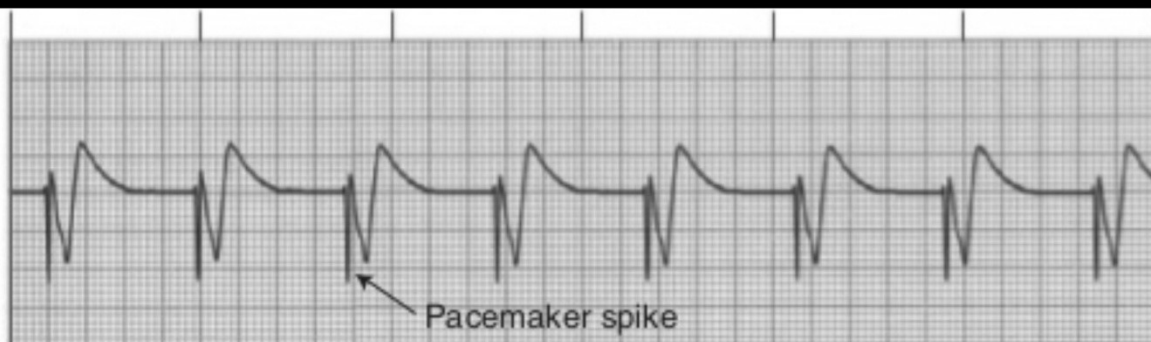




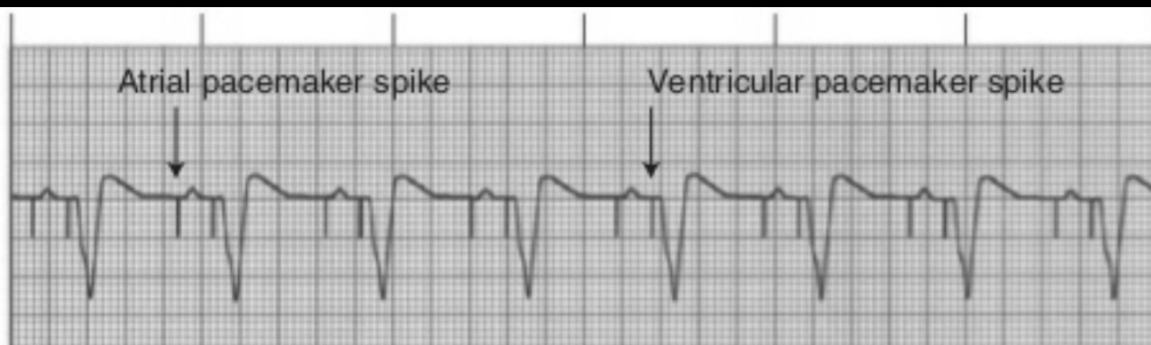


POSITION 1: CHAMBER(S) PACED	POSITION 2: CHAMBER(S) SENSED	POSITION 3: RESPONSE TO SENSING	POSITION 4: PROGRAMMABILITY	POSITION 5: MULTISITE PACING
<b>O</b> = none	<b>O</b> = none	<b>O</b> = none	<b>O</b> = none	<b>O</b> = none
<b>A</b> = atrium	<b>A</b> = atrium	<b>I</b> = inhibited	<b>R</b> = rate modulation	<b>A</b> = atrium
<b>V</b> = ventricle	<b>V</b> = ventricle	<b>T</b> = triggered		<b>V</b> = ventricle
<b>D</b> = dual (A + V)	<b>D</b> = dual (A + V)	<b>D</b> = dual (I + T)		<b>D</b> = dual (A + V)

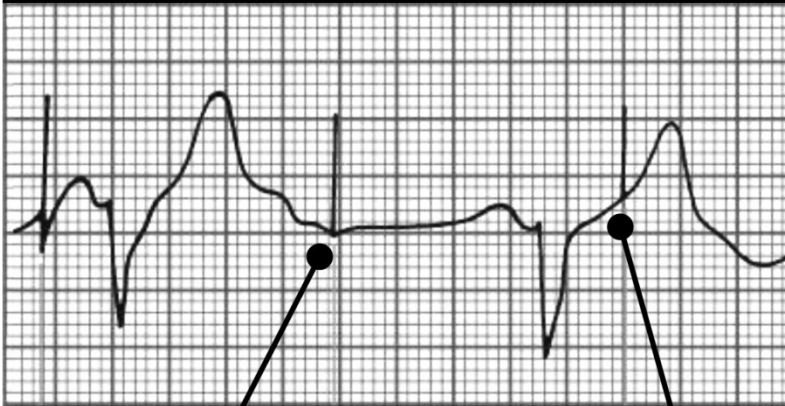
### Single-Chamber Pacemaker Rhythm — Ventricular



### Dual-Chamber Pacemaker Rhythm — Atrial and Ventricular



## Failure to Sense



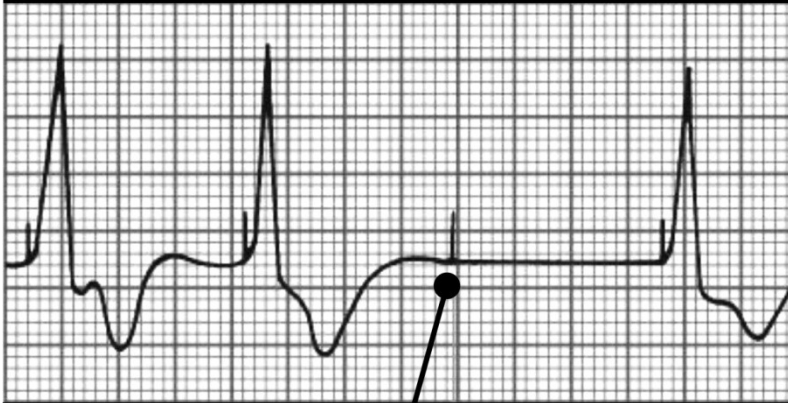
The pacemaker fires anywhere in the cycle

## Failure to Fire



A pacemaker spike should appear here, but does not

# Failure to Capture



There is a pacemaker spike, but no response from the heart



Implantable Defibrillator  
Patient Identification Card

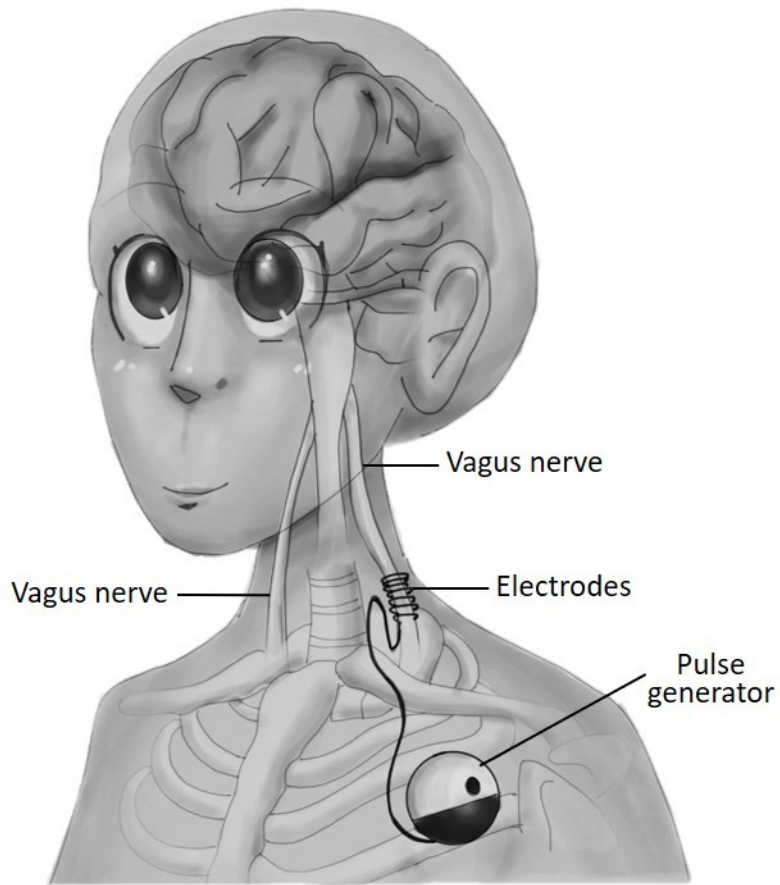
PATIENT: **ROMEO MONTAGUE**

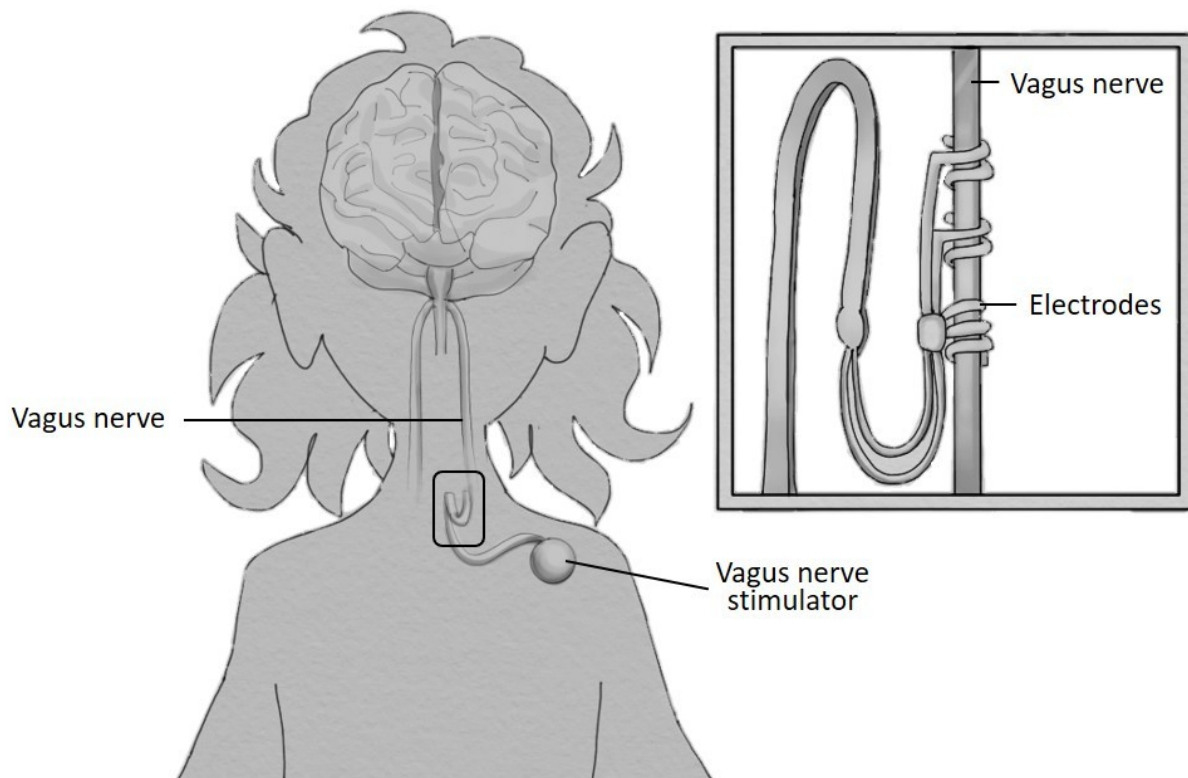
	MODEL NUMBER	SERIAL NUMBER	IMPLANT DATE
ICD	<b>CD3201-36</b>	<b>123456</b>	<b>29/JUL/1976</b>
LCV	<b>11581/86</b>	<b>ABC12345</b>	<b>29/JUL/1976</b>
RVA	<b>7122/65</b>	<b>XYZ54321</b>	<b>29/JUL/1976</b>

PHYSICIAN:  
**MARCUS WELBY**  
**VERONA, CA 94566**

PHONE: **888-280-PEDS**









## Autism Support Checklist

Patient Name: \_\_\_\_\_

Patient Date of Birth: \_\_\_\_\_

Date Completed: \_\_\_\_\_

### Communication

1. Does the patient communicate using spoken language?

- ☐ Yes  
☐ No

Please explain: \_\_\_\_\_

2. What other ways does the patient communicate?

- ☐ Pictures  
☐ Written Words  
☐ Electronic Communication  
☐ Gestures  
☐ Other: \_\_\_\_\_

3. What would help the patient understand information?

- ☐ Spoken language  
☐ Pictures  
☐ Written Words  
☐ Electronic Communication  
☐ Other: \_\_\_\_\_

4. How does the patient communicate pain?

- ☐ Spoken language  
☐ Crying/Screaming  
☐ Self Injury  
☐ Aggression  
☐ Other: \_\_\_\_\_

### Sensory Needs

5. Does the patient have sensory triggers/needs?

- ☐ Avoid bright lights  
☐ Avoid loud noises  
☐ Avoids touch  
☐ Seeks pressure  
☐ Other: \_\_\_\_\_

6. What items/actions would be helpful?

- ☐ Sunglasses  
☐ Headphones  
☐ Stress Ball  
☐ Other: \_\_\_\_\_

### Interacting with the Patient

7. What would help the patient understand the procedure/exam?

- ☐ Talk the patient through the exam  
☐ Demonstrate on another person  
☐ Show a picture schedule  
☐ Other: \_\_\_\_\_

8. Are there particular actions or phrases that are likely to trigger the patient?  
(e.g. people speaking loudly)

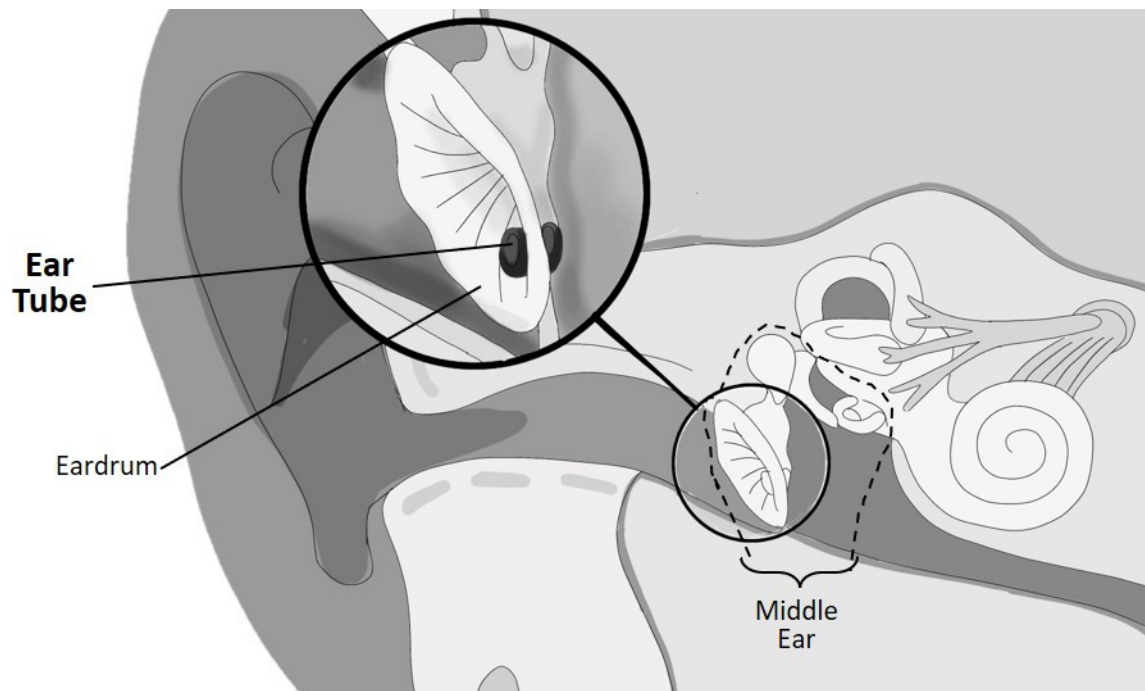
- ☐ Yes? Please explain:  
☐ No

9. Does the patient engage in behaviors that could be a safety concern?

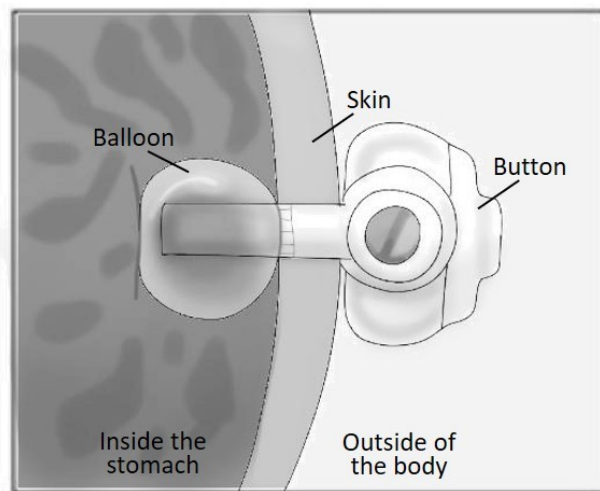
- ☐ Bolting  
☐ Self-injurious behaviors  
☐ Hitting, kicking etc.  
☐ Other: \_\_\_\_\_

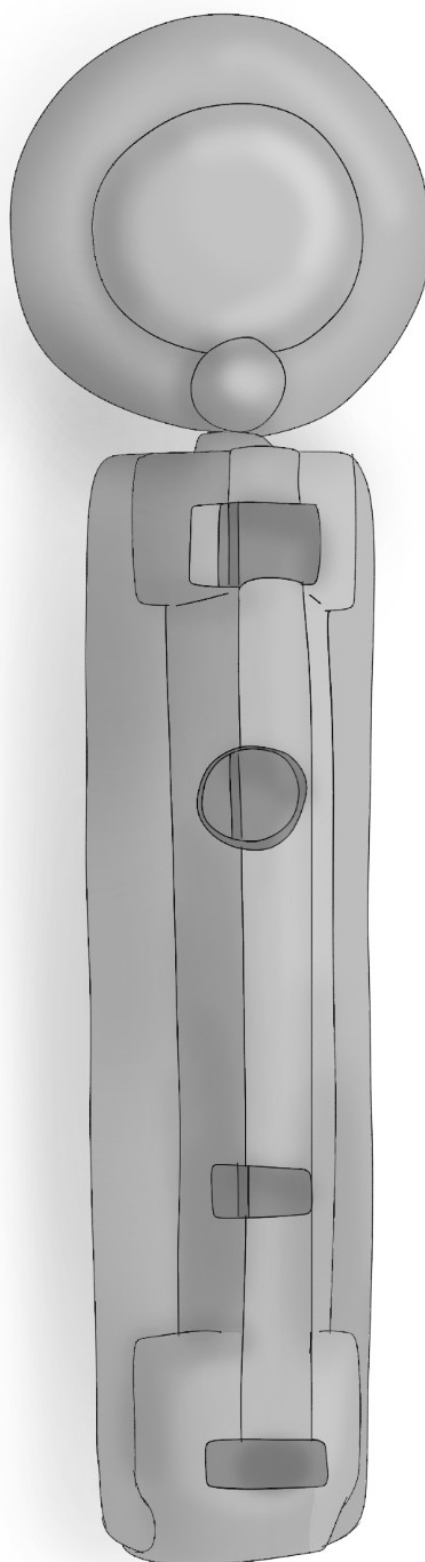
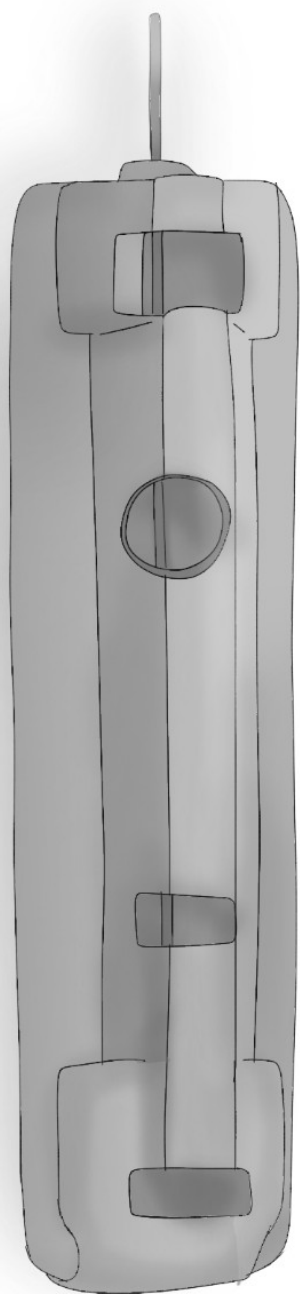
10. What other information should we know to help make the patient more comfortable?

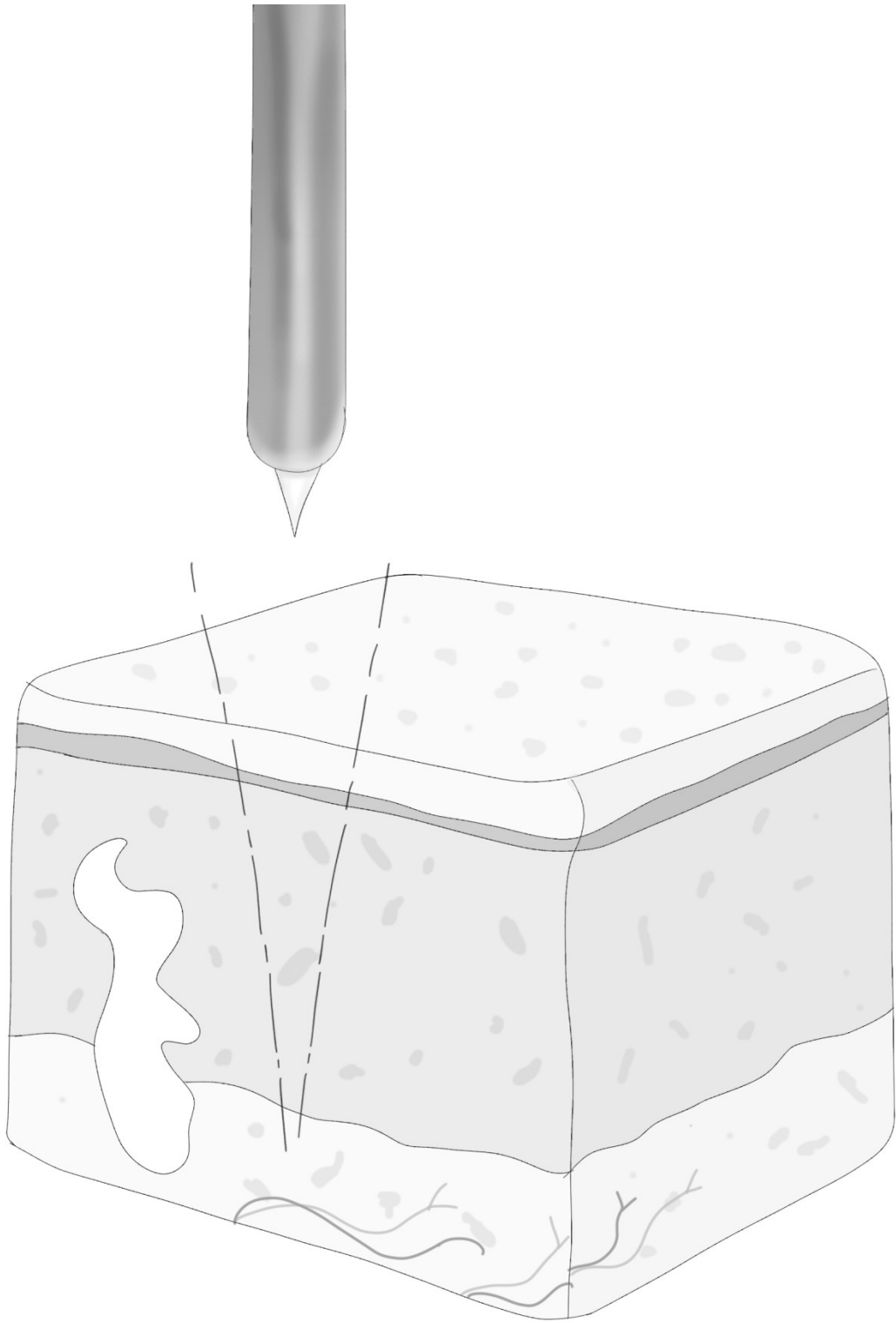
Please mail completed forms for BMC patients with autism to The Autism Program 72 E. Concord St. Vose, Boston MA 02118, or fax it to us at 617-414-3693. For questions, contact us at [autismfriendlyinitiative@bmc.org](mailto:autismfriendlyinitiative@bmc.org).



**Button Positioned Properly**  
(view from the side)

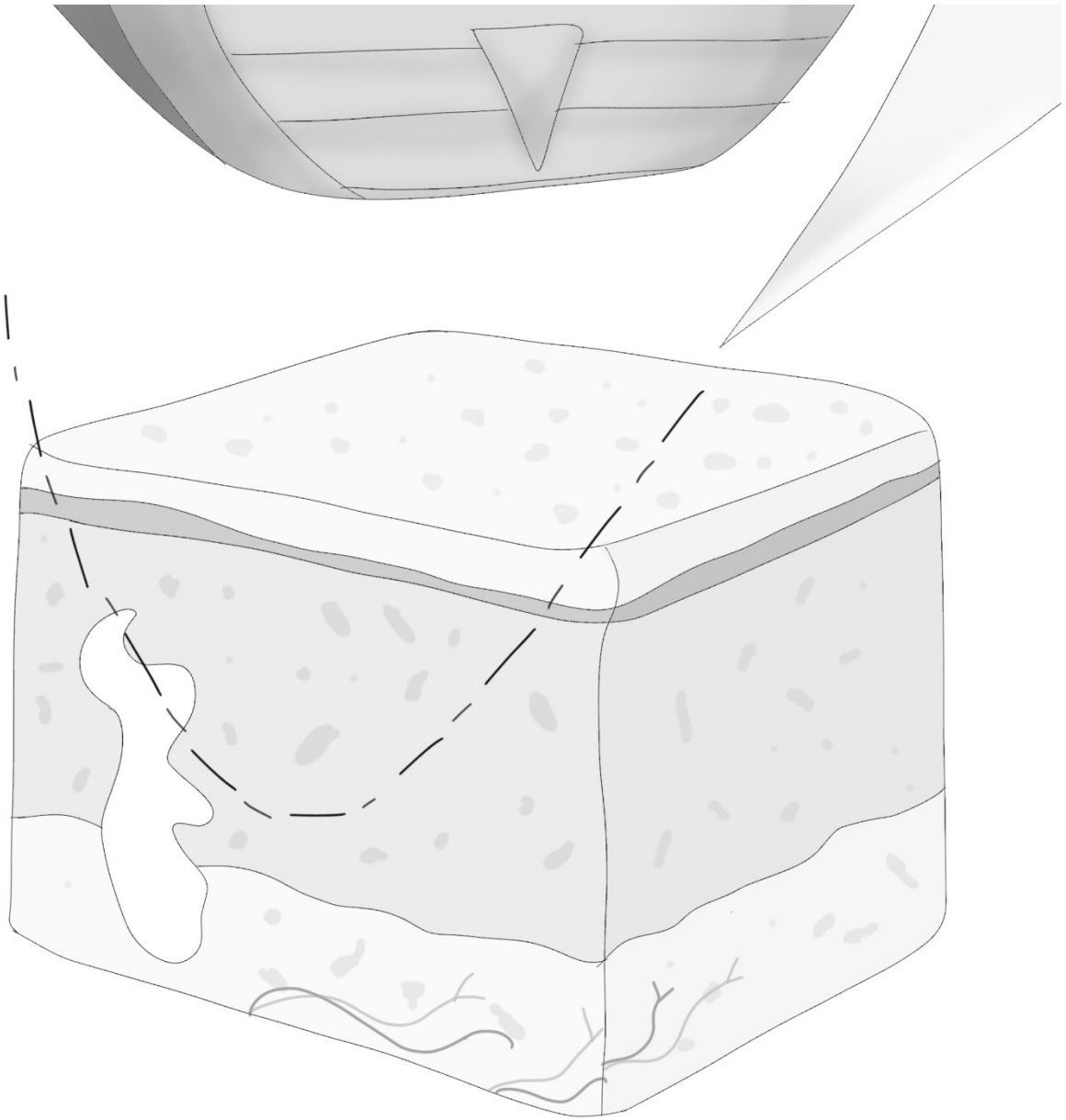


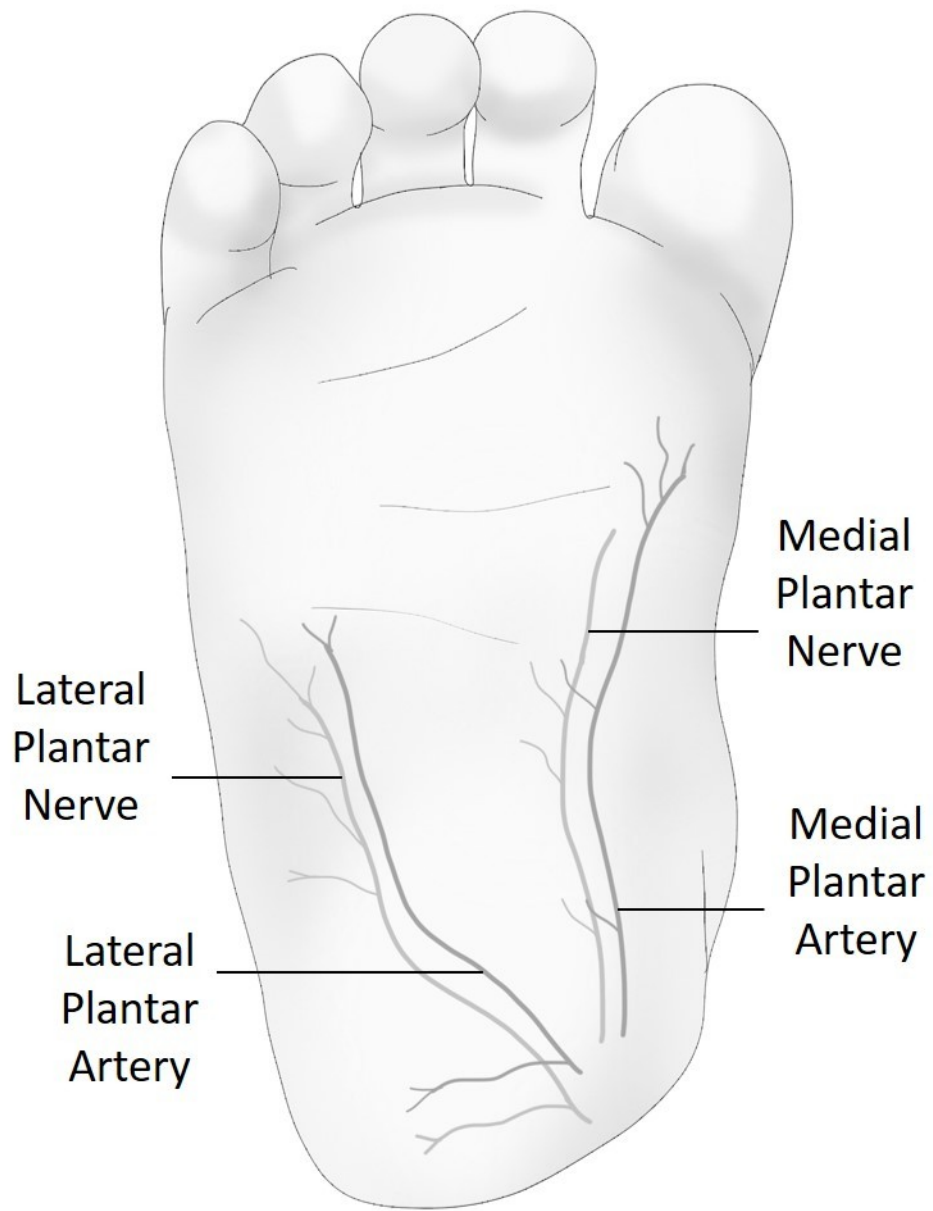


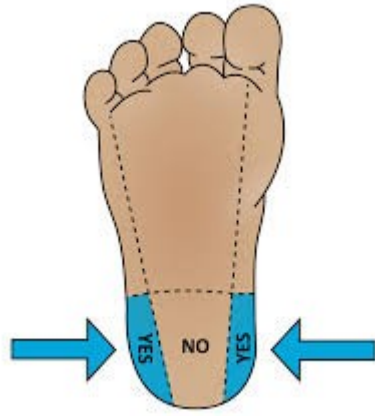












## ISMP's List of *Error-Prone Abbreviations, Symbols, and Dose Designations*

The abbreviations, symbols, and dose designations found in this table have been reported to ISMP through the ISMP National Medication Errors Reporting Program (ISMP MERP) as being frequently misinterpreted and involved in harmful medication errors. They should **NEVER** be used when commu-

nicating medical information. This includes internal communications, telephone/verbal prescriptions, computer-generated labels, labels for drug storage bins, medication administration records, as well as pharmacy and prescriber computer order entry screens.

Abbreviations	Intended Meaning	Misinterpretation	Correction
µg	Microgram	Mistaken as "mg"	Use "mcg"
AD, AS, AU	Right ear, left ear, each ear	Mistaken as OD, OS, OU (right eye, left eye, each eye)	Use "right ear," "left ear," or "each ear"
OD, OS, OU	Right eye, left eye, each eye	Mistaken as AD, AS, AU (right ear, left ear, each ear)	Use "right eye," "left eye," or "each eye"
BT	Bedtime	Mistaken as "BID" (twice daily)	Use "bedtime"
cc	Cubic centimeters	Mistaken as "u" (units)	Use "mL"
D/C	Discharge or discontinue	Premature discontinuation of medications if D/C (intended to mean "discharge") has been misinterpreted as "discontinued" when followed by a list of discharge medications	Use "discharge" and "discontinue"
IJ	Injection	Mistaken as "IV" or "intraocular"	Use "injection"
IN	Intranasal	Mistaken as "IM" or "IV"	Use "intranasal" or "NAS"
HS	Half-strength	Mistaken as bedtime	Use "half-strength" or "bedtime"
hs	At bedtime, hours of sleep	Mistaken as half-strength	
IU**	International unit	Mistaken as IV (intravenous) or 10 (ten)	Use "units"
o.d. or OD	Once daily	Mistaken as "right eye" (OD-oculus dexter), leading to oral liquid medications administered in the eye	Use "daily"
OJ	Orange juice	Mistaken as OD or OS (right or left eye); drugs meant to be diluted in orange juice may be given in the eye	Use "orange juice"
Per os	By mouth, orally	The "os" can be mistaken as "left eye" (OS-oculus sinister)	Use "PO," "by mouth," or "orally"
q.d. or QD**	Every day	Mistaken as q.i.d., especially if the period after the "q" or the tail of the "q" is misunderstood as an "i"	Use "daily"
qhs	Nightly at bedtime	Mistaken as "qhr" or every hour	Use "nightly"
qn	Nightly or at bedtime	Mistaken as "qh" (every hour)	Use "nightly" or "at bedtime"
q.o.d. or QOD**	Every other day	Mistaken as "q.d." (daily) or "q.i.d." (four times daily) if the "o" is poorly written	Use "every other day"
q1d	Daily	Mistaken as q.i.d. (four times daily)	Use "daily"
q6PM, etc.	Every evening at 6 PM	Mistaken as every 6 hours	Use "daily at 6 PM" or "6 PM daily"
SC, SQ, sub q	Subcutaneous	SC mistaken as SL (sublingual); SQ mistaken as "5 every;" the "q" in "sub q" has been mistaken as "every" (e.g., a heparin dose ordered "sub q 2 hours before surgery" misunderstood as every 2 hours before surgery)	Use "subcut" or "subcutaneously"
ss	Sliding scale (insulin) or ½ (apothecary)	Mistaken as "55"	Spell out "sliding scale;" use "one-half" or "½"
SSRI	Sliding scale regular insulin	Mistaken as selective-serotonin reuptake inhibitor	Spell out "sliding scale (insulin)"
SSI	Sliding scale insulin	Mistaken as Strong Solution of Iodine (Lugol's)	
i/d	One daily	Mistaken as "tid"	Use "1 daily"
TIW or tiw	3 times a week	Mistaken as "3 times a day" or "twice in a week"	Use "3 times weekly"
U or u**	Unit	Mistaken as the number 0 or 4, causing a 10-fold overdose or greater (e.g., 4U seen as "40" or 4u seen as "44"); mistaken as "cc" so dose given in volume instead of units (e.g., 4u seen as 4cc)	Use "unit"
UD	As directed ("ut dictum")	Mistaken as unit dose (e.g., diltiazem 125 mg IV infusion "UD" misinterpreted as meaning to give the entire infusion as a unit [bolus] dose)	Use "as directed"
Dose Designations and Other Information	Intended Meaning	Misinterpretation	Correction
Trailing zero after decimal point (e.g., 1.0 mg)**	1 mg	Mistaken as 10 mg if the decimal point is not seen	Do not use trailing zeros for doses expressed in whole numbers
"Naked" decimal point (e.g., .5 mg)**	0.5 mg	Mistaken as 5 mg if the decimal point is not seen	Use zero before a decimal point when the dose is less than a whole unit
Abbreviations such as mg. or mL. with a period following the abbreviation	mg mL	The period is unnecessary and could be mistaken as the number 1 if written poorly	Use mg, mL, etc. without a terminal period

**ISMP's List of Error-Prone Abbreviations, Symbols, and Dose Designations** (continued)

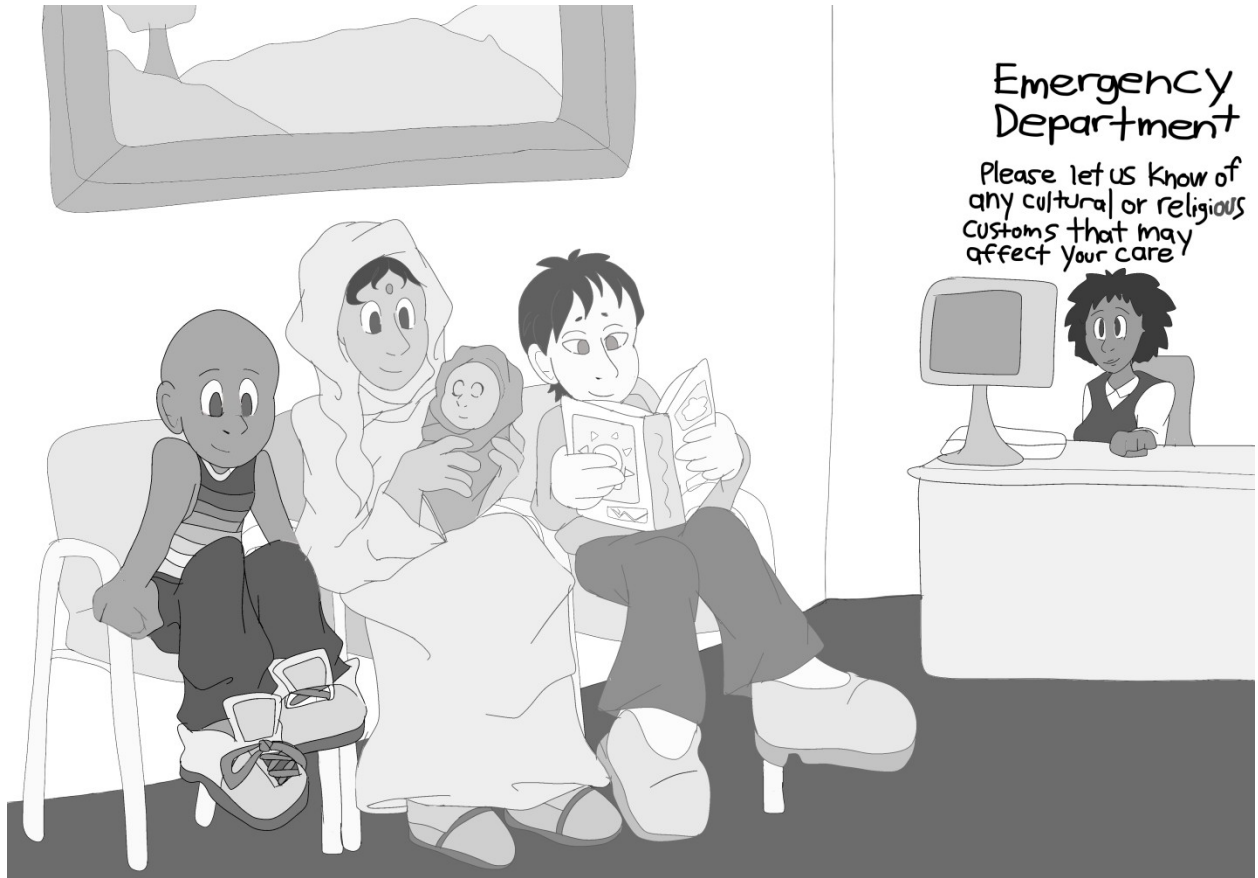
Dose Designations and Other Information	Intended Meaning	Misinterpretation	Correction
Drug name and dose run together (especially problematic for drug names that end in "I" such as Inderal 40 mg; Tegretol 300 mg)	Inderal 40 mg	Mistaken as Inderal 140 mg	Place adequate space between the drug name, dose, and unit of measure
	Tegretol 300 mg	Mistaken as Tegretol 1300 mg	
Numerical dose and unit of measure run together (e.g., 10mg, 100mL)	10 mg 100 mL	The "m" is sometimes mistaken as a zero or two zeros, risking a 10- to 100-fold overdose	Place adequate space between the dose and unit of measure
Large doses without properly placed commas (e.g., 100000 units; 1000000 units)	100,000 units 1,000,000 units	100000 has been mistaken as 10,000 or 1,000,000; 1000000 has been mistaken as 100,000	Use commas for dosing units at or above 1,000, or use words such as 100 "thousand" or 1 "million" to improve readability
Drug Name Abbreviations	Intended Meaning	Misinterpretation	Correction
To avoid confusion, do not abbreviate drug names when communicating medical information. Examples of drug name abbreviations involved in medication errors include:			
APAP	acetaminophen	Not recognized as acetaminophen	Use complete drug name
ARA A	vidarabine	Mistaken as cytarabine (ARA C)	Use complete drug name
AZT	zidovudine (Retrovir)	Mistaken as azathioprine or aztreonam	Use complete drug name
CPZ	Compazine (prochlorperazine)	Mistaken as chlorpromazine	Use complete drug name
DPT	Demerol-Phenergan-Thorazine	Mistaken as diphtheria-pertussis-tetanus (vaccine)	Use complete drug name
DTO	Diluted tincture of opium, or deodorized tincture of opium (Paregoric)	Mistaken as tincture of opium	Use complete drug name
HCl	hydrochloric acid or hydrochloride	Mistaken as potassium chloride (The "H" is misinterpreted as "K")	Use complete drug name unless expressed as a salt of a drug
HCT	hydrocortisone	Mistaken as hydrochlorothiazide	Use complete drug name
HCTZ	hydrochlorothiazide	Mistaken as hydrocortisone (seen as HCT250 mg)	Use complete drug name
MgSO4**	magnesium sulfate	Mistaken as morphine sulfate	Use complete drug name
MS, MS04**	morphine sulfate	Mistaken as magnesium sulfate	Use complete drug name
MTX	methotrexate	Mistaken as mitoxantrone	Use complete drug name
NoAC	novel/new oral anticoagulant	No anticoagulant	Use complete drug name
PCA	procainamide	Mistaken as patient controlled analgesia	Use complete drug name
PTU	propylthiouracil	Mistaken as mercaptopurine	Use complete drug name
T3	Tylenol with codeine No. 3	Mistaken as liothyronine	Use complete drug name
TAC	triamcinolone	Mistaken as tetracaine, Adrenalin, cocaine	Use complete drug name
TNK	TNKase	Mistaken as "TPA"	Use complete drug name
TPA or tPA	tissue plasminogen activator, Activase (alteplase)	Mistaken as TNKase (tenecteplase), or less often as another tissue plasminogen activator, Retavase (reteplase)	Use complete drug names
ZnSO4	zinc sulfate	Mistaken as morphine sulfate	Use complete drug name
Stemmed Drug Names	Intended Meaning	Misinterpretation	Correction
"Nitro" drip	nitroglycerin infusion	Mistaken as sodium nitroprusside infusion	Use complete drug name
"Norflex"	norfloxacin	Mistaken as Norflex	Use complete drug name
"IV Vanc"	intravenous vancomycin	Mistaken as Invanz	Use complete drug name
Symbols	Intended Meaning	Misinterpretation	Correction
℥	Dram	Symbol for dram mistaken as "3"	Use the metric system
℥	Minim	Symbol for minim mistaken as "mL"	
x3d	For three days	Mistaken as "3 doses"	Use "for three days"
> and <	More than and less than	Mistaken as opposite of intended; mistakenly use incorrect symbol; "< 10" mistaken as "40"	Use "more than" or "less than"
/ (slash mark)	Separates two doses or indicates "per"	Mistaken as the number 1 (e.g., "25 units/10 units" misread as "25 units and 110" units)	Use "per" rather than a slash mark to separate doses
@	At	Mistaken as "2"	Use "at"
&	And	Mistaken as "2"	Use "and"
+	Plus or and	Mistaken as "4"	Use "and"
°	Hour	Mistaken as a zero (e.g., q2° seen as q 20)	Use "hr," "h," or "hour"
∅ or ∅	zero, null sign	Mistaken as numerals 4, 6, 8, and 9	Use 0 or zero, or describe intent using whole words

\*\*These abbreviations are included on The Joint Commission's "minimum list" of dangerous abbreviations, acronyms, and symbols that must be included on an organization's "Do Not Use" list, effective January 1, 2004. Visit [www.jointcommission.org](http://www.jointcommission.org) for more information about this Joint Commission requirement.

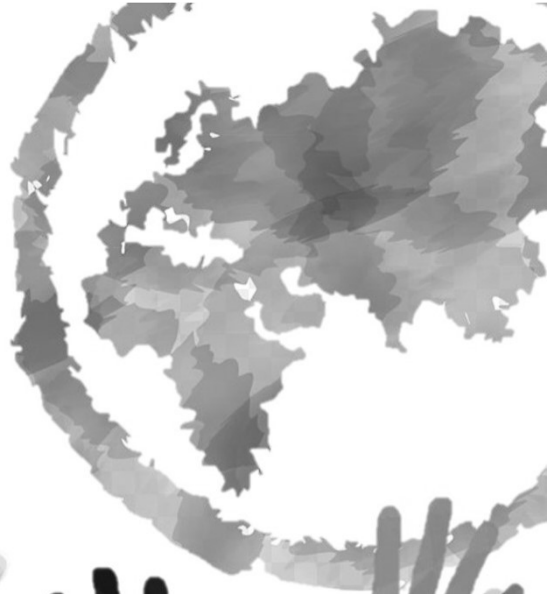
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**Different  
Individuals  
Valuing  
Each other  
Regardless of  
Skin,  
Intellect,  
Talents or  
Years**



**CULTURAL COMPETENCE**



## **Risk Factors for Child Maltreatment**

### **CAREGIVER OR FAMILY CHARACTERISTICS**

- Domestic Violence
- Family history of abuse, neglect, and/or violence
- Inappropriate expectations of the child/development
- Low self-esteem
- Mental health problems (eg, anxiety, depression)
- Negative attitudes toward parenting
- Poor Impulse Control
- Poverty (especially for serious neglect and physical abuse)
- Social Isolation
- Substance abuse

### **CHILD CHARACTERISTICS**

- Age younger than 4-5 years (especially for fatalities)
- Female gender (sexual abuse)
- Handicaps
- Irritable temperament, colicky infant
- Prematurity

## Mimics of Child Abuse / Non-Accidental Trauma

Accidental fractures
Alopecia areata
Benign external hydrocephaly
Confusing cutaneous lesions (eg, hemangiomas, Mongolian spots, molluscum contagiosum)
Congenital coagulation disorder
Conjunctival hemorrhages*
Connective tissue disorders
Hair tourniquet syndrome*
Hematologic diseases
Intracranial bleeding*
Irregular hymenal anatomy
Metabolic disorders (eg, homocystinuria, methylmalonic aciduria)
Metastatic bone tumors
Osteogenesis imperfecta
Perinately transmitted infection with <i>Chlamydia trachomatis</i> , bacterial vaginosis, etc
Periostitis
Thrombocytopenia
Tinea infections

\* These conditions may be accidental or nonaccidental in etiology



## DESCRIPTION

### Symptoms

*Patient's chief complaints*

### Allergies

*Seeking to know what type of allergic reaction they experience*

### Medications

*Prescribed, OTC drugs, herbal meds, etc.*

### Past Medical Hx

*Seeking to know the previous state of health, and previous illnesses*

### Last Oral Intake

*Seeking what are the last oral intakes of the patient*

### Events

*Events leading up to the illness or injury*

## QUESTIONS TO ASK

*"What's wrong?"*

*"What brought you to the hospital?"*

*"Are you allergic to anything?"*

*"What happens to you when you use something that you're allergic to?"*

*"Are you taking any medications?"*

*"What are you taking the meds for?"*

*"When did you last take your meds?"*

*"Have you had this problem before?"*

*"Do you have other medical problems?"*

*"When did you last eat/drink anything?"*

*"What is it that you last ate?"*

*Injury: "How did you get hurt?"*

*Illness: "What led to this problem?"*

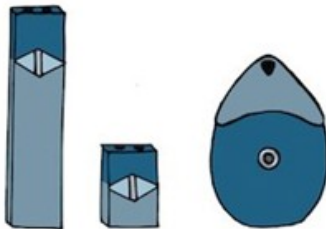
Lord,  
Give Me Coffee  
To change the Things I Can,  
Wine,  
to Forget the Things I Can't  
and 30 mils of E-juice  
so I can Sit Back and Vape  
until I Can Figure Out The  
Difference

~ VL

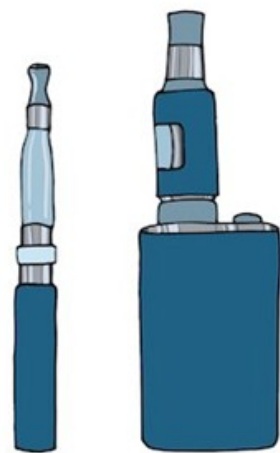
### Types of E-cigarettes



Disposable  
e-cigarettes



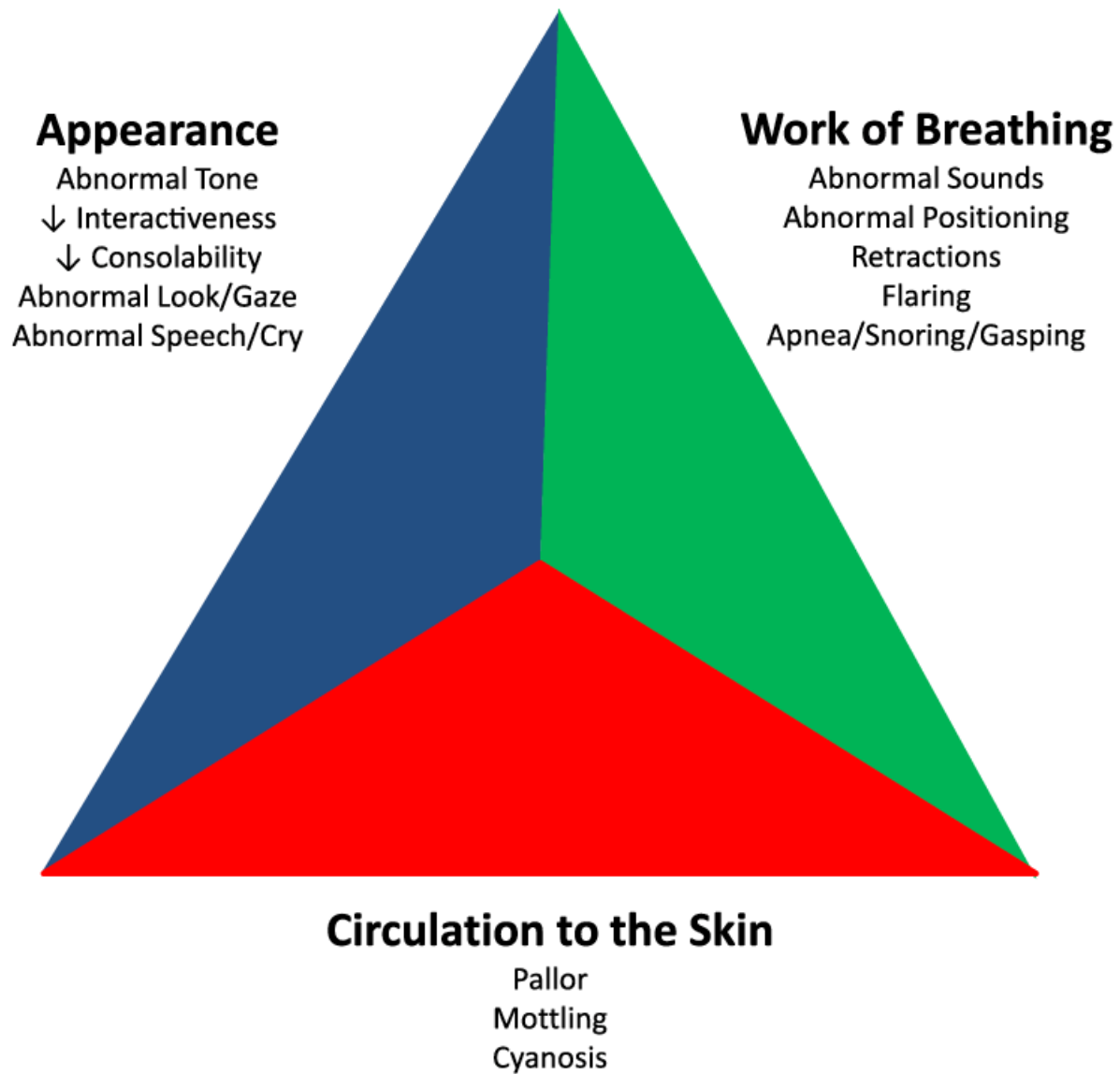
Rechargeable  
e-cigarettes



Tanks and Mods

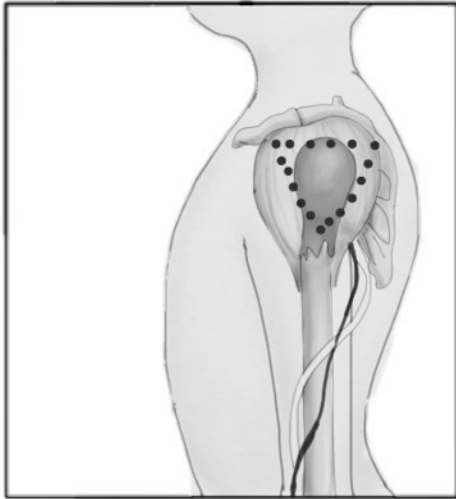
Sittin' in the classroom.  
thinkin' it's a drag.  
Listening to the teacher  
rap just ain't my bag.  
Gonna meet the boys on  
floor number two.  
Smokin' in the boys  
room. Smokin' in the  
boys room. Teacher  
don't you fill me up  
with your rules.  
Everybody knows that  
smokin' ain't allowed in  
school.

UP IN  
SMOKE

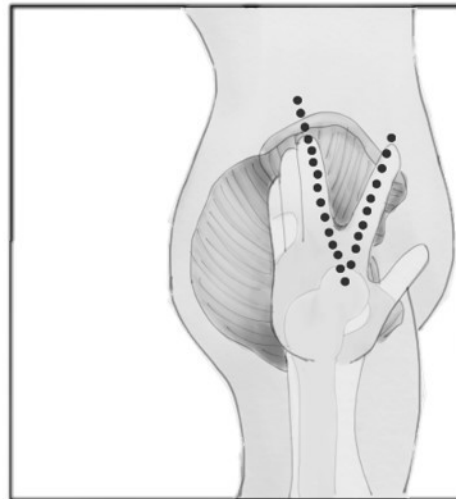




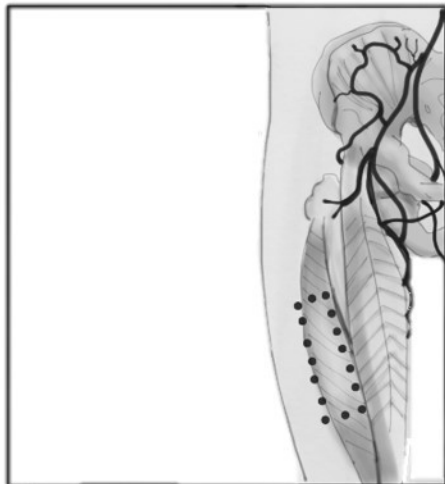
**Deltoid Muscle**



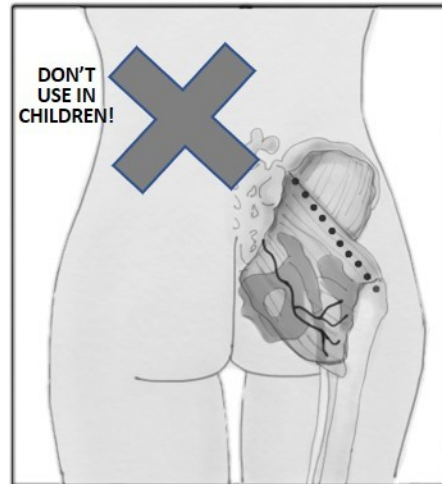
**Ventrogluteal Muscle**



**Vastus Lateralis Muscle**





**Dorsogluteal Muscle**









<div><div>BOARD OF CERTIFICATION FOR EMERGENCY NURSING <i>Excellence. Achievement. Impact.</i></div></div> <div><b>Certified Pediatric Emergency Nurse (CPEN) Examination Content Outline</b></div>		Total Items
<b>1. Triage Process</b>	<b>20</b>	
A. Emergency Intake		
1. Visual assessment / Pediatric Assessment Triangle (PAT)		
2. Triage priority based on acuity and resources		
3. Immunization status		
4. Isolation concerns		
5. Behavioral status and risk for harm		
6. Sexual orientation and gender identity		
7. Cultural and language considerations		
B. Emergency preparedness		
1. Decontamination		
2. Mass casualty		
<b>2. Assessment</b>	<b>25</b>	
A. History and physical		
1. Primary and secondary survey		
2. Developmental milestones		
3. Children with special needs		
4. Caregivers' perception of child's baseline and current status		
5. Family functioning and dynamics (e.g., coping strategies, support systems)		
B. Pain		
1. Developmentally appropriate pain assessment and reassessment		
2. Non-pharmacological and pharmacological interventions		
<b>3. System-Focused Emergencies</b>	<b>56</b>	
A. Respiratory		
1. Foreign body		
2. Congenital conditions (e.g., stenosis, malacia, cystic fibrosis)		
3. Upper Airway		
a. Infections (e.g., croup, epiglottitis)		
b. Trauma (e.g., inhalation injuries, tracheal disruption)		
4. Lower Airway		
a. Infections (e.g., bronchiolitis, pneumonia)		
b. Reactive airway disease/asthma		
c. Trauma (e.g., pneumothorax, hemothorax, pulmonary contusion)		
5. Respiratory failure and/or arrest		
6. Oxygen administration (e.g., low-flow, high-flow)		
7. Airway adjuncts (e.g., tracheostomy, endotracheal tube, supraglottic)		

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<b>B. Cardiovascular</b>		
1. Infections		
2. Congenital heart defects		
3. Rhythm disturbances		
4. Shock		
5. Cardiac arrest		
6. Circulatory support (e.g., vascular access, ECMO, LVAD)		
7. Trauma (e.g., tamponade, blunt cardiac injury)		
<b>C. Neurological</b>		
1. Infections		
2. Congenital conditions (e.g., hydrocephalus, arteriovenous malformation)		
3. Headache, migraine, and tumor		
4. Shunt dysfunction		
5. Seizure		
6. Stroke		
7. Trauma (e.g., traumatic brain injury, spinal cord injury)		
<b>D. Gastrointestinal</b>		
1. Foreign body (e.g., button battery, magnets)		
2. Infections (e.g., gastroenteritis, appendicitis, pancreatitis)		
3. Obstructions (e.g., pyloric stenosis, intussusception, volvulus, constipation)		
4. Nutrition (e.g., failure to thrive, formula intolerance, obesity, TPN)		
5. Chronic conditions (e.g., IBD, GERD, congenital)		
6. Trauma (e.g., liver injury, spleen injury, bowel injury)		
<b>E. Genitourinary and Obstetrical (OB)</b>		
1. Infections (e.g., UTI, STI, PID, epididymitis, pyelonephritis)		
2. Genitourinary emergencies (e.g., testicular torsion, priapism, phimosis, ovarian torsion)		
3. OB emergencies (e.g., ectopic pregnancy, emergent delivery)		
4. Trauma (e.g., abrasion, straddle injury, renal contusion)		
<b>F. Maxillofacial, Ocular, and Ear/Nose/Throat (ENT)</b>		
1. Foreign body		
2. Infections (e.g., peritonsillar abscess, mastoiditis, periorbital cellulitis)		
3. Hemorrhage		
4. Trauma (e.g., dental injury, facial fracture, globe rupture)		

<div><div>BOARD OF CERTIFICATION FOR EMERGENCY NURSING <i>Excellence. Achievement. Impact.</i></div></div> <div><b>Certified Pediatric Emergency Nurse (CPEN)</b> <b>Examination Content Outline</b></div>		Total Items
G. Musculoskeletal		
1. Infections (e.g., osteomyelitis, septic arthritis)		
2. Congenital conditions (e.g., osteogenesis imperfecta, muscular dystrophy, spina bifida)		
3. Trauma (e.g., fractures, amputations, compartment syndrome)		
H. Integumentary		
1. Infections (e.g., cellulitis, abscess)		
2. Rash (e.g., hives, petechiae, infestations)		
3. Trauma (e.g., foreign body, avulsions, lacerations, degloving)		
I. Hematology/Oncology		
1. Hematology (e.g., sickle cell disease, bleeding or clotting disorders)		
2. Oncology (e.g., fever and neutropenia, tumor lysis syndrome)		
J. Endocrine/Metabolic		
1. Congenital disorders (e.g., CAH, inborn errors of metabolism)		
2. Acquired disorders (e.g., diabetes)		
<b>4. Special Considerations</b>	<b>25</b>	
A. Neonatal Emergencies		
1. Infections		
2. Jaundice (e.g., hyperbilirubinemia)		
3. Thermoregulation		
4. Fluid-electrolyte imbalance		
5. Newborn resuscitation		
B. Behavioral Health Emergencies		
1. Mood disorders (e.g., depression, anxiety)		
2. Self-injury (e.g., cutting, eating disorders)		
3. Suicidal and homicidal ideations		
4. Aggressive behavior		
C. Maltreatment Emergencies		
1. Emotional neglect/abuse		
2. Physical neglect/abuse		
3. Sexual abuse or assault		
4. Human trafficking		
D. Environmental		
1. Temperature-related emergencies		
2. Chemical exposures (e.g., cleaning agents, organophosphates)		
3. Vector borne illnesses/Envenomation (e.g., rabies, ticks, bites)		
4. Trauma (e.g., burns, electrical injuries)		

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E. Toxicology		
1. Ingestion and poisoning (intentional and unintentional)		
2. Carbon monoxide poisoning		
3. Drug interactions/withdrawal		
F. Communicable diseases		
1. Childhood diseases (e.g., measles, mumps, pertussis, chicken pox)		
2. Multi-drug resistant organisms (e.g., MRSA, VRE)		
3. Emerging infectious diseases		
<b>5. Multi-System Considerations</b>		<b>12</b>
A. Submersion injuries		
B. Sepsis		
C. Anaphylaxis		
D. Post-resuscitative care		
E. Procedural sedation		
<b>6. Professional Issues</b>		<b>12</b>
A. Legal Issues		
1. Consent for treatment		
2. Preservation of forensic evidence		
3. Government regulations (e.g., EMTALA, HIPAA, mandatory reportable situations)		
4. Risk management (e.g., impaired nurse, drug diversion, resource allocation)		
B. Nursing Practice		
1. Workplace violence (e.g., interprofessional, patient/family)		
2. Stress management (e.g., burnout, compassion fatigue, PTSD)		
3. Culture of safety (e.g., collaboration, blame-free environment)		
4. Delegation of tasks to assistive personnel		
5. Performance and process improvement		
C. Patient and Family Considerations		
1. Discharge planning		
2. End-of-life and palliative care		
3. Patient safety and injury prevention		
4. Patient satisfaction		
5. Transfer and transitions of care		
<b>Total</b>		<b>150</b>