Crash

Certified Pediatric Emergency Nurse (CPEN) Review

Scott DeBoer RN, MSN, CEN, CPEN, CCRN, CFRN, EMT-P

Flight Nurse: University of Chicago Hospitals

Founder: Peds-R-U's Medical Education

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Crash Certified Pediatric Emergency Nurse (CPEN) Review

0800-0900 Respiratory/EENT emergencies – Working and wheezing
0900-0910 Break
0910-1010 Cardiovascular emergencies – Congenital hearts to CPR
1010-1020 Break
1020-1120 Neuro/Psychiatric emergencies – Neuro nightmares and dysfunctional dilemmas
1120-1130 Break
1130-1230 Environmental emergencies – Drowning, drugs, bugs, and bites
1230-1330 Lunch
1330-1430 Abdominal and OB/neonatal emergencies - Bellies, births, and babies
1430-1440 Break
1440-1515 Endocrine emergencies – Hormones and Haagen-Dazs
1515-1525 Break
1525-1625 Orthopedics and pain management – Bumps, breaks, morphine, and monitoring
1625-1635 Break
1635-1705 Miscellaneous medical emergencies – Remaining reminders
1705-1800 Pediatric pearls and Jeopardy jewels

Suggested review books:
2) ENA Core Curriculum for Pediatric Emergency Nursing – www.ena.org
3) Emergency Nursing Pediatric Course (ENPC) Provider – www.ena.org
4) Mosby’s Comprehensive Pediatric Emergency Care – www.elsevier.com
Biography

Of

Scott DeBoer RN, MSN, CPEN, CEN, CCRN, CFRN, EMT-P

Scott DeBoer is a seminar leader and nurse consultant with over twenty years of nursing experience. Scott received his associate’s degree in 1988, his baccalaureate in 1991 and his master’s degree in critical care nursing from Purdue University in 1996. He presently works as a flight nurse for the University of Chicago Hospitals & is the primary seminar leader for Peds-R-Us Medical Education, a seminar company dedicated to teaching better ways to care for kids. Scott has also authored a newborn emergencies handbook, Emergency Newborn Care: The First Moments of Life, for paramedics, respiratory therapists, & emergency nurses and the first Certified Pediatric Emergency Nurse Review book. Lastly, Scott’s most unique role is being a non-pierced/non-tattooed medical consultant for the Association of Professional Piercers, an international group of body piercers dedicated to safe piercing & body modification practices.

His past experiences include over twenty years of neonatal/pediatric/adult flight nursing, as well as staff nurse positions in intensive care, emergency/trauma nursing. He has also taught as a clinical nursing instructor at Purdue University and is a member of AACN, ENA, and ASTNA. Lastly, Scott is a legal nurse consultant with various national law firms, and as such, is an expert witness for nursing & EMS malpractice issues.

Scott has appeared on the series Trauma Center and in 1995 made his acting debut when he was used on several episodes of the hit television show E.R. as the flight nurse opposite Anthony Edwards and George Clooney.

Scott has written extensively on pediatric and critical care topics in multiple journals such as Neonatal Network, Critical Care Nurse, Journal of Emergency Nursing, American Journal of Nursing, Emergency Medical Services, Air-Medical Journal and the Australasian Emergency Nursing Journal. In recognition of his excellence and significant contributions in medical transport journalism, Scott was honored by ASTNA to be the recipient of the 2000 Jordan Award.

Scott is married and has two young children, but still manages to hold certifications in emergency, critical care, trauma and flight nursing. He also regularly lectures to regional and national audiences on neonatal, pediatric, & “big-people” emergency topics.

Scott’s audiences consistently give him high marks in the areas of “keeping our attention” and “taking complex information and making it both fun and easy to understand.” His humorous, interactive and relaxed style combined with his love of teaching leaves his audiences with a wealth of medical knowledge and a new confidence in their abilities to care for critically ill or injured patients.
### Domains and Tasks

1. **Triage Process**
   - **Emergency Intake**
     - **Perform visual assessment**
       - a. Sick vs. not sick
       - b. Pediatric Assessment Triangle (PAT)
     - **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. Perform Triage interventions**
     - 1. Perform initial interventions (e.g., first aid, splint, ice, eyewash)
     - 2. Select and administer medications

2. **Assessment**
   - **A. History and Physical**
     - 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. Pain**
     - 1. Perform age appropriate assessment of pain
   - **C. Family**
     - 1. Assess family functioning and dynamics (e.g. coping strategies, support systems, parenting skills, learning style)
   - **3. Technical Skills**
     - **A. Perform or Assist with Technical Skills**

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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. Intravenous 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**

   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)
2 Congenital (e.g., ductal dependent lesions, tracheoesophageal fistula, obstructive uropathy)
3 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

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., tonsilleectomy)
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. Special Considerations

#### A. Behavioral and Maltreatment Emergencies

1. Manage behavioral emergencies
   - a. Suicidal ideations/attempt
   - b. Homicidal ideations/attempt
   - 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. Legal and Professional Issues

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)

| Total Scored Items | 150 |
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 choose 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.

<table>
<thead>
<tr>
<th>Recertification Options</th>
<th>How it can apply to your CPEN recertification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Continuing Education Option</td>
<td>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</td>
</tr>
</tbody>
</table>

Accredited Contact Hours

<table>
<thead>
<tr>
<th>Accredited Contact Hours</th>
<th>The contact hours have been awarded by a third party accreditor Examples include but are not limited to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conference or seminar attendance</td>
<td>• Conference or seminar attendance.</td>
</tr>
<tr>
<td>Lectures or presentations</td>
<td>• Lectures or presentations.</td>
</tr>
<tr>
<td>Online education completion</td>
<td>• Online education completion.</td>
</tr>
<tr>
<td>Journal CE</td>
<td>• Journal CE.</td>
</tr>
<tr>
<td>Successful completion of PNCB’s Pediatric Updates (formerly Standards Assessment Exams - SAEs)</td>
<td></td>
</tr>
</tbody>
</table>

Type: Accredited CE
<table>
<thead>
<tr>
<th>Provider Courses</th>
<th>These courses may be counted as accredited CE when taken initially. Renewals will not count regardless of when completed. Type: Accredited CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPC, TNCC, PALS, PEPP, ACLS etc.</td>
<td>Non-accredited Contact Hours This option is for contact hours earned from an educational activity that does not award accredited contact hours. One contact hour is equivalent to 60 minutes of instruction. Type: Non-accredited CE</td>
</tr>
<tr>
<td>Presentations and Lectures Given</td>
<td>Presentation or lectures given may count as a one-time accredited CE submission if the course provides accredited CE. The presentation cannot be counted if part of an educator’s or faculty member’s expected job performance. Presentations or lectures given that do not award contact hours to your audience can be counted as non-accredited CE. One contact hour is equivalent to 60 minutes of instruction. Type: Accredited or Non-accredited CE</td>
</tr>
<tr>
<td>Academic Credit</td>
<td>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. 1 Academic Credit Semester = 15 Contact Hours 1 Academic Quarter = 10 Contact Hours 1 Academic Trimester = 12 Contact Hours Type: Accredited CE</td>
</tr>
<tr>
<td>Preceptorship</td>
<td>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. Type: Non-accredited CE</td>
</tr>
<tr>
<td>Poster Presentations</td>
<td>5 Contact Hours per poster developed. An individual will be allowed to submit a poster only once during the renewal period. Posters for which contact hours were awarded count as accredited CE. Type: Accredited or Non-accredited CE</td>
</tr>
<tr>
<td>Item Writing</td>
<td>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. Type: Non-accredited CE</td>
</tr>
<tr>
<td>Authoring</td>
<td>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.</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Article = 5 Contact Hours</td>
</tr>
<tr>
<td></td>
<td>Chapter/module = 10 Contact Hours</td>
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<td></td>
<td>Textbook regardless of page number = 50 Contact Hours</td>
</tr>
<tr>
<td></td>
<td><strong>Type:</strong> Accredited CE</td>
</tr>
<tr>
<td>Committee Participation</td>
<td>This option is for nursing committee membership in local, regional, state or national level committees and BCEN, CPEN and PNCP 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.</td>
</tr>
<tr>
<td></td>
<td><strong>Type:</strong> Non-accredited CE</td>
</tr>
<tr>
<td>2. Clinical Practice Hours plus CE option</td>
<td>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. Nursing practice includes providing direct care, health care facilitation, education and advocacy for patients and families with urgent-care or emergent-care needs.</td>
</tr>
<tr>
<td></td>
<td><strong>Type:</strong> Accredited CE</td>
</tr>
<tr>
<td>3. Exam as a renewal option</td>
<td>You may elect to re-take the exam again. You will not be required to submit contact hours when choosing this option.</td>
</tr>
</tbody>
</table>
ENA/ENPC reminders

CIAMPEDS, ESI Triage, “Which child would you see first,” PAT, TICLS, child abuse signs, basic growth and development, etc.

You must know these!

CIAMPEDS

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

## Five-Level Triage

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


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))
### Summary of the Pediatric Assessment Triangle

<table>
<thead>
<tr>
<th>General Appearance</th>
<th>Work of Breathing</th>
<th>Circulation to the Skin</th>
<th>Physiologic Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Increased</td>
<td>Normal</td>
<td>Respiratory Distress</td>
</tr>
<tr>
<td>Bad</td>
<td>Much increased or inadequate</td>
<td>Normal</td>
<td>Respiratory Failure</td>
</tr>
<tr>
<td>Good</td>
<td>Normal</td>
<td>Altered</td>
<td>Nonspecific vasoconstriction</td>
</tr>
<tr>
<td>Bad</td>
<td>Normal</td>
<td>Altered</td>
<td>Shock</td>
</tr>
<tr>
<td>Bad</td>
<td>Normal</td>
<td>Normal</td>
<td>Central Nervous System abnormality</td>
</tr>
<tr>
<td>Bad</td>
<td>Inadequate</td>
<td>Altered</td>
<td>Cardiopulmonary Failure</td>
</tr>
<tr>
<td>Bad</td>
<td>Apneic</td>
<td>Pulseless</td>
<td>Cardiopulmonary Arrest</td>
</tr>
</tbody>
</table>

Pediatric Assessment Triangle charts courtesy of Dr. Lou Romig MD, FACEP – www.jumpstarttriage.com
If you remember nothing else about growth and development…

Remember these milestones (The ER version)

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!
Respiratory and EENT Emergencies

I. Eyes

- Chemical burns
  - Alkali (worse) vs. acid
  - Irrigate the eyes either way

- Corneal abrasions
  - Fluorescein stain and Woods lamp exam
  - Pain and patch (don’t patch both eyes)

- Hyphemas
  - Bleeding in front of eye
  - Patch, patch, and positioning

- Conjunctivitis
  - Viral vs. bacterial
  - Contagious (Everybody wash their hands – Should do that anyway!)

II. Ears

- Otitis media
  - Middle ear infection
  - Pain, antibiotics vs. watch and wait

- Otitis externa
  - Ear canal infection
  - Pain and topical antibiotics

- Bugs
  - Yuck!!!
  - Lidocaine and saline (not water) flush
  - Put nothing smaller than your elbow your ear! (Remember what your mother taught you!)
III. Nose

- Nosebleeds
  - Anterior vs. posterior
  - Pinching vs. packing
- Foreign bodies - In through the nose, out through the nose
- Foreign body aspirations
  - They put everything in their mouths and ± came back out
  - Acute respiratory distress, ± object seen on CXR, unilateral wheezing
  - Heimlich maneuver vs. ENT bronch removal

IV. Face and mouth

- LeFort fractures (I-III)
  - Nasty facial fractures
  - III is worse than I or II
- Sore throat
  - Send culture even if negative rapid strep
  - ± antibiotics if rapid strep negative
- Peritonsillar abscess
  - Look for deviation of the uvula
  - Needle vs. scalpel incision/drainage by ENT
- Tonsillectomy bleeding
  - 5-10 days post-surgery when the scab falls off
- Bell’s palsy
  - Viral with paralysis of one side of the face
  - Time and ± steroids

V. Neck

- Cricothyroidotomy or Cric
  - You need an airway right now!
  - Needle cric in kids vs. surgical cric in teens and adults
- Tracheostomy
- You need an artificial airway for a long time
- DOPE - (D)isplacement, (O)xgen or obstruction, (P)neumothorax, (E)quipment

V. Chest (medical)

- Asthma
  - Bronchospasm, edema, and mucous
  - Lots and lots of nebs, IV or PO steroids (either are fine), Heliox? Mag sulfate?

- Croup
  - Viral infection of bottom of funnel shaped airway
  - Croupy cough and ± fever
  - Steeple sign on lateral neck X-ray
  - Racemic epi, PO steroids ± blow by cool mist, and no antibiotics (it’s viral)

- Epiglottitis
  - Bacterial infection involving the epiglottis (top of the airway)
  - Sitting up, drooling, rapid/high fever, looks sick
  - Thumb sign on lateral neck X-ray
  - Do everything in the OR (i.e. IV, meds, intubation) – If you make them cry, they might die!

- Respiratory syncytial virus (RSV)
  - Very contagious viral pneumonia
  - Fall to spring scourge of ped’s ER’s everywhere
  - Ex-preemies, cancer, HIV kids
  - ± nebs (albuterol vs. racemic epi), oxygen, no ribavirin
  - Damage control – Treat the symptoms and prevent it (Synagis)

- Bronchopulmonary dysplasia (BPD) – Chronic lung disease (CLD)
  - Baby COPD
  - Ex-preemies with bad and beat up lungs
  - Home O2, nebs, and rule out RSV

- Pertussis
  - Whooping cough and coughing till they turn blue and barf
  - Making a comeback
- Erythromycin for patients, parents, and exposed staff

- Cystic fibrosis (CF)
  - Just a truly crummy disease
  - Unbelievable amounts of mucous in the lungs and GI tract
  - Chest PT, pneumonia, and bowel obstructions – Send a sputum culture on every CF patient in the ER
  - Now living into adulthood

- Sickle cell disease and acute chest
  - Occlusion of small pulmonary blood vessels
  - Infiltrate on chest X-ray – Acute chest vs. pneumonia?
  - Respiratory distress, hypoxia, and chest pain
  - Pain, antibiotics, oxygen, and possible exchange transfusion (in peds ICU)

VI. Chest (trauma)

- Rib fractures
  - Fracture of a rib (imagine that)
  - Lower rib fractures, think about liver and spleen injury as well
  - Pain management and time

- Flail chest
  - 2+2 = Flail – 2 or more ribs broken in 2 or more places
  - Mush on chest X-ray, paradoxical motion, respiratory distress,
    pulmonary contusions under the broken ribs
  - Pain management (epidural vs. IV morphine), intubation prn (not always), and time

- Pneumothorax
  - Collapsed lung (with air)
  - Small pneumo – Admit and watch them for a few days
  - Big pneumo – Put a chest tube in and watch them for a few days
  - Worry about little pneumos becoming big pneumos with:
    - Altitude, aka. flying somewhere over the top of the mountains or on an airplane
- General anesthesia with positive pressure ventilation

- Hemothorax
  - Collapsed lung (with blood)
  - Put in a chest tube and watch them for a few days
  - Auto-transfuse the chest blood if really shocky

- Chest tube management
  - 20cm of suction (fill to the line)
  - The chest tube is completely pulled out of the chest
    - Cover it up with Vaseline gauze
    - Put it back in another hole
  - The chest tube is still in the chest, but the tubing is disconnected
    - Place the tubing in a bottle of saline (create a water seal) or…
    - Wipe the edges off with an alcohol pad
    - Put them back together while you set up a new chest drain system

VII. Carbon monoxide (CO) poisoning

- Remember most pulse ox’s measure hemoglobin with something on them, but can’t differentiate between oxygen and carbon monoxide – www.masimo.com - New pulse ox that can measure both

- O2 sat of 100% with a CO level of 30, means your real O2 sat is only 70%!

- 100% oxygen and possibly hyperbaric oxygen therapy as well

VIII. ABG interpretation – 3 easy steps

- What’s the pH? - <7.35= something acidosis vs. >7.35=something alkalosis – 50/50 chance!
- Look at the question and history – something respiratory vs. something body/metabolic
- What’s way out of whack? (CO2 vs. bicarb)
- Reminder of normal values: pH 7.35-7.45, PCO2 35-45, Bicarbonate 22-26
- Everything else is fluff and not needed to get the correct answer on the test
  - Respiratory acidosis – Low pH (<7.35) and high CO2 (>35)
    - Asthma, etc.
  - Respiratory alkalosis – High pH (>7.45) and low CO2 (<35)
    - Hyperventilating teenager
- Metabolic acidosis – Low pH (<7.35) and low bicarb (<22)
  - DKA, shock, or profound diarrhea (lose base from below)
- Metabolic alkalosis – High pH (>7.45) and high bicarb (>26)
  - Kid post-cardiac arrest who got way too much bicarb or profound vomiting (lose acid from above)
<table>
<thead>
<tr>
<th>TICLS</th>
<th>Questions to be answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone</td>
<td>Is the child actively moving with good muscle tone, or is the child limp?</td>
</tr>
</tbody>
</table>
| 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?    |

Jones and Bartlett: Sudbury, MA. 8.
## Common Indications of Non-Accidental Trauma

(Child Abuse)

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

I. CPR then and now

- 30 compressions and 2 ventilations for 1 rescuer CPR for children and adults – 15:2 for 2 rescuer CPR for peds
- 100 compressions per minute
- Basic CPR and the Heimlich maneuver are fair game for questions on the test

II. Better living through electricity

- Defibrillation vs. cardioversion
  - **Defibrillation** begins with **D**
    - Push the buttons and energy immediately released
    - **Defibrillation** for patients who are **Dead**
  - **Cardioversion** begins with **C**
    - Push and hold the buttons until the monitor determines a good time for the energy to be released
    - **Cardioversion** for patients who are **Crashing** (but not dead)

- External pacing
  - Try oxygen first and CPR prn until the pacer is set up and working
  - Adult pads are OK as long as one fits on the front and one on the back
  - Increase the energy (ma) until capture (feel a pulse), not just chest muscle movement
  - I suggest only remembering one number: 100 (100 rate and 100ma)

- Automated implantable cardioverter-defibrillators (AICDs) and long QT syndrome
  - The electrical system of the heart takes a bit too long to recharge and restart
  - Frequent first symptom is unexplained fainting during sports or sudden death
  - Drug therapy and AICDs

**Automatic external defibrillators (AEDs) and Commotio cordis**

- Hit on the chest and just the wrong time
- Baseball and football players, martial artists
- V-fib arrest immediately post-impact
III. Arrhythmias

- Too slow (Something bradycardia)
  - Oxygen and CPR/pacing prn
  - Epi preferred over atropine in children (Most kids are not brady due to vaso-vagal)
  - Atropine doesn’t work in heart transplant kids (They cut and don’t routinely reattach the vagus nerve)

- Fast and skinny (Something tachycardia – Top half of heart)
  - Sinus tach vs. SVT – Rate over 220 vs. change in rate?
  - Supraventricular tachycardia (SVT)
    - Stable
      - Vagal maneuvers (Breathe through a straw, bear down, ice bag to face, but no carotid massage anymore)
      - Adenosine and then more adenosine, but no Verapamil
    - Unstable – Sedate and cardiovert

- Fast and fat (Something tachycardia – Bottom half of heart)
  - Stable
    - Amiodarone or lidocaine
  - Unstable – Sedate and cardiovert

- Fast, fat, funky, and flipping (Torsades de Pointes)
  - Twisting of the points
  - Magnesium sulfate
  - Unstable – Sedate and cardiovert

- Not there
  - Ventricular fibrillation (V-fib)
    - Watched them drop dead – Shock, then 2 minutes of CPR
    - Didn’t watch them drop dead – 2 minutes of CPR, then shock, then 2 minutes of CPR
    - Epi
    - Therapeutic hypothermia?

- Asystole (flat line)
  - Verify it’s really flat line
- Call the code reasonably early

- Pulseless electrical activity (PEA) and the 5 Hs and Ts
  - Just about any rhythm you want, but no pulse!
  - **H**ypothermia, **H**ypovolemia, **H**ypoxia, **H**ydrogen ion (acidosis), and **H**yper/**H**ypo electrolytes (calcium, potassium, magnesium)
  - **T**ension pneumothorax, pericardial **T**amponade, **T**oxins, **T**rauma, and **T**hromboembolism
  - Find it, fix it, or reasonably quickly… call it!

- Bicarbonate?
  - Yes with hyperkalemia (dialysis patients) and tricyclic antidepressant overdose
  - No with cardiac arrest

- **C**onsider termination of resuscitation
  - 2 rounds of epi
  - 15 minutes of advanced life support (Air going in/out and meds/blood going round and round)
  - Except with near-drowning and hypothermia

**IV. Other problems with the heart**

- Kawasaki’s disease – **K**awasaki’s **K**ills your **K**oronaries
  - Inflammation of the blood vessels, most importantly the coronary arteries = coronary aneurysms
  - First phase: High fever that is unresponsive to antibiotics.
    - The child must also develop **four or more** of the following:
      - 1) Conjunctivitis without thick discharge
      - 2) Rash on trunk of body and genital area
      - 3) **Red/dry cracked lips with a strawberry like tongue**
        (that’s a big clue they are looking for Kawasaki’s)
      - 4) Edematous hands/feet
      - 5) Sore throat
      - 6) Swollen lymph nodes.
    - Second phase: **Skin on the hands and feet may begin peeling**, and joint pain, nausea, vomiting, and diarrhea may occur
    - Third phase: Signs and symptoms slowly go away unless complications develop
- Inflammation treated with high dose aspirin (hospital & home) and IV immunoglobulin (ER)

- Cardiac contusion
  - Aka blunt cardiac injury, aka bruised heart
  - Diagnosed by ECG and echocardiogram
  - Telemetry monitoring x 24 hours, PVCs rarely require treatment

- Cardiac tamponade
  - Aka squished heart
  - Most commonly post-chest trauma, but also with some cancers
  - Beck’s triad
    - Jugular vein distention (JVD)
    - Muffled heart sounds
    - Narrowed pulse pressure
  - Pericardiocentesis (put a needle into the pericardial sac to drain the fluid) or pericardial window (put a hole in the sac to drain the fluid)
  - Does the blood clot?

- Cardiomyopathy, CHF, and transplants
  - Big, floppy heart that doesn’t pump well
  - Commonly viral or idiopathic (we don’t why) in children
  - Left heart failure backs up to the Lungs
  - Right heart failure backs up the Rest of the body
  - Managed like CHF
    - Diuretics
    - Digoxin (vomiting if level is too high)
    - Inotropes (dobutamine)
  - Heart transplant
    - If they don’t take their anti-rejection meds, they will be dead within 24 hours!

V. Congenital heart disease
- Pink vs. purple?
- Patent ductus arteriosus (PDA)
- The PDA is the tube between the aorta and the pulmonary artery
- Allows mixing of blood while the baby is still inside of mom
- Starts to close in most children a few hours after birth, but may take days to weeks to close (that’s important as some heart defects don’t appear until it closes)
- IV prostaglandins (PGE1) to reopen or keep the PDA open (allows mixing of blood until the heart defect can get fixed)
  - Watch for hypotension
  - Watch for apnea
- Coarctation of the aorta
  - A portion of the aorta is crimped
  - Big difference in blood pressures between the arms and the legs (take BPs x 4 extremities if suspecting it’s a heart kid)
- Tetralogy of Fallot
  - 4 defects (see chart at the end of this section)
  - Tet spells are caused by spasms of the pulmonary artery
  - When the kid gets unhappy (i.e. lab draws) and cries, they turn blue
  - Squat or knee-chest position (increases systemic vascular resistance), oxygen (they are blue), and morphine (don’t worry, be happy!)

VI. Shock
- Pump (heart) vs. pipes (blood vessels)
- Cardiogenic shock
  - Pump is pooped out
  - Pipes are way too full
  - Help the pump and empty the tank (CHF management)
- Septic shock
  - Pump is ± fine (may need help)
  - Pipes are way too big and leaky
  - Shrink and fill up the pipes and fix the leaks (antibiotics, fluids, and pressors)
- Neurogenic or spinal shock
  - Pump is ± fine (may be too slow)
  - Pipes are way too big
- Shrink and fill up the pipes (fluids and pressors)

- Anaphylactic shock
  - Pump is usually fine
  - Pipes are way too big
  - Shrink and fill up the pipes (fluids, pressors, epi, glucagon, and antihistamines)

- Hypovolemic shock
  - Gastroenteritis triad (nausea, vomiting, and diarrhea – aka puking and pooping)
  - Trauma (self explanatory)
  - Pump is usually fine
  - Pipes are empty
  - Fill up the pipes and plug the holes (surgery, Zofran, IV fluids)

**Other cardiac issues:**

- Infective endocarditis
  - Infection of the inner heart lining which messes up the heart valves
  - IV drug abusers and recent body art + with history of heart disease
  - IV antibiotics for a long time and possibly valve replacement surgery

Marfan’s syndrome

- Tall, skinny kids with long fingers

- When you see any question regarding Marfan’s, think things that pop (i.e. aortic aneurysm or pneumos)
<table>
<thead>
<tr>
<th>Type of defect</th>
<th>Description</th>
<th>Pink or blue?</th>
<th>Blood flow</th>
<th>Medical or surgical management?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial septal defect (ASD)</td>
<td>Hole between the right and left atriums</td>
<td>Pink</td>
<td>Increased pulmonary</td>
<td>Medical and either cardiac catheterization lab or surgical closure</td>
</tr>
<tr>
<td>Ventricular septal defect (VSD)</td>
<td>Hole between the right and left ventricles</td>
<td>Pink</td>
<td>Increased pulmonary</td>
<td>Medical and either cardiac catheterization lab or surgical closure</td>
</tr>
<tr>
<td>Patent ductus arteriosus (PDA)</td>
<td>Artery between the aorta and pulmonary artery that didn’t close on its own</td>
<td>Pink</td>
<td>Increased pulmonary</td>
<td>Medical and either cardiac catheterization lab or surgical closure</td>
</tr>
<tr>
<td>Atrioventricular canal (AV canal)</td>
<td>ASD joined with a VSD</td>
<td>Pink</td>
<td>Increased pulmonary</td>
<td>Medical and surgical repair</td>
</tr>
<tr>
<td>Coarctation of the aorta (Coarc)</td>
<td>Narrowing of the aorta</td>
<td>Pink</td>
<td>Obstructed from ventricles</td>
<td>Medical and surgical repair</td>
</tr>
<tr>
<td>Tetralogy of Fallot (Tet)</td>
<td>Four defects: 1) VSD 2) Pulmonary stenosis (narrowing of artery) 3)</td>
<td>Blue</td>
<td>Decreased pulmonary</td>
<td>Medical and surgical repair</td>
</tr>
<tr>
<td>Transposition of the great vessels (Transposition)</td>
<td>Big vessels are switched. The pulmonary artery comes off of the left ventricle</td>
<td>Blue</td>
<td>Decreased pulmonary</td>
<td>Medical, cardiac catheterization lab, and surgical repair</td>
</tr>
<tr>
<td>Hypoplastic left heart syndrome (Hypoplast)</td>
<td>Profound badness. Babies born with essentially no left ventricle.</td>
<td>Blue</td>
<td>Mixed</td>
<td>Medical and surgical repair vs. transplant vs. hospice</td>
</tr>
</tbody>
</table>
Highlights of 2010 American Heart Association
New Advanced Cardiac Life Support (ACLS) Guidelines
(That potentially impact CPEN)

http://circ.ahajournals.org/content/vol122/18_suppl_3/

Adult BLS Changes

**ADULT BLS:** BLS algorithm has been simplified and there is no more “look, listen and feel.” These steps are inconsistent and time consuming. Want immediate EMS activation and compressions.

**ADULT BLS:** Encourage HANDS ONLY compressions (at least 100 per minute) for lay people.

**ADULT BLS:** ABC’s are no longer ABC’s. Now it’s CAB! COMPRESSIONS before airway and breathing; START with 30 compressions, rather than 2 ventilations.

**ADULT BLS:** Depth of compressions is made deeper to at least 2 inches.

**ADULT BLS:** Resuscitation tasks should be preformed simultaneously by healthcare providers.

**ADULT BLS:** Early recognition: assess responsiveness and absence of normal breathing. Guppy breathing does not count. Lay people are confused by this. If not normal breathing/unresponsive, start compressions.

**ADULT BLS:** Minimize interruptions of compressions: Healthcare professionals should take no more than 10-seconds to check a pulse. Even if the patient has a pulse, compressions rarely lead to significant injury. Lay people should NOT check for a pulse.
**ACLS: EMS:** CPR emphasis on adequate rate (at least 100 per minute) and depth of compressions. Adequate recoil, minimal interruptions and no excessive ventilations.

**ACLS: Lay Rescuers:** Simplify. Compressions only CPR vs. traditional CPR with ventilations shows approximately the same patient outcomes. However, pediatric patients do better with traditional CPR (with ventilations.)

**ACLS: Post Cardiac Care:** Therapeutic hypothermia improves outcomes for patients with VF and two other studies show benefits from all other collapse rhythms also. Cooling improves outcomes in neonates with hypoxic encephalopathy. Awaiting pediatric studies (Note: Pediatric studies have since been published showing promising results.)

**ACLS: **

**Change from ABC to CAB (COMPRESSIONS, airway and breathing) for adult and pediatric patients (not for neonates)**

**ACLS:** In ABC: Compressions are delayed while rescuer opens airway and gives mouth to mouth or find equipment to bag-mask ventilate. In CAB, compressions are initiated immediately and 30 compressions should be completed within 18-seconds.

**ACLS:** Only 50% of bystanders will begin CPR with ABC because of concerns with opening the airway and breathing for the patient. With CAB, the hope is more bystanders will begin compressions.

**ACLS:** Healthcare providers can tailor rescue actions if the etiology is known. For example, if a patient collapses and cardiac etiology is suspected, then get an AED and start compressions. If a respiratory or asphyxia etiology is suspected, such as with a drowning victim, then 5 cycles of traditional CPR would be performed before activating EMS. Neonates are always treated with ABC first, as arrests are most likely to be respiratory in etiology.

**ACLS: Ethical issues:** Termination of resuscitation or not starting resuscitation should be guided by a validated termination of resuscitation rules.
ACLS: Allow families to be present if a designated staff member can be with them.

ACLS: Withdrawing life support for patients with poor prognostic indicators may not be as reliable if therapeutic hypothermia protocols were used. “Occasionally” some of these patients with poor prognosis have good outcomes.

ACLS: Tissue and organ donation plans should be timely and supportive for patients with confirmed brain death.

**ACLS Electrical Therapy Changes**

ACLS: 1 shock for VF and minimize interruptions with compressions. If the first shock didn’t fix VF, it’s unlikely the 2\textsuperscript{nd} or 3\textsuperscript{rd} will be successful. Two minutes of CPR and then try defibrillation again.

ACLS: Biphasic waveforms appear to be more effective than monophasic. However there is no clinical data comparing one biphasic waveform to another. (Escalating vs. fixed dose of energy?) However, consider escalating doses if available and initial shock is unsuccessful.

ACLS: PACING:
- Not recommended for asystole
- Considered for brady-arrhythmias that do not respond to Atropine or other medications.

**ACLS Airway Changes**

ACLS: Continuous capnography is recommended to confirm ETT placement and to monitor for return of spontaneous circulation.

ACLS: Supraglottic advanced airways (King, LMA’s) are supported.

ACLS: Cricoid pressure during airway management is no longer recommended.
ACLS Medication Changes

**ACLS:** Vascular access, drug delivery and advanced airway placement, while still recommended, should not cause significant interruptions in chest compressions or delay shocks.
Highlights of 2010 American Heart Association
New Pediatric Advanced Life Support (PALS) Guidelines

http://circ.ahajournals.org/content/vol122/18_suppl_3/

**PALS:** The majority of pediatric cardiac arrests are asphyxial in origin, with only 5-15% attributed to ventricular fibrillation. Best outcomes are with a combination of compressions and ventilations.

**PALS:** If a suspected cardiac etiology, then the emphasis is on chest compressions and early defibrillations.

**PALS:** Compression only CPR is for bystanders (lay people.)

**PALS:** ** Despite the importance of ventilation in pediatric arrests, a switch to CAB (compressions, airway, breathing) sequence is recommended for ease of teaching (so it matches BLS and ACLS.) This should only delay ventilations by about 18-seconds for one-person rescuers.

**PALS:** Chest compressions: Push hard, push fast (at least 100 per minute), minimize interruptions, allow for chest recoil, avoid excessive ventilations.

**PALS:** COMPRESS: 1/3 of A-P diameter (1 ½ inches/4cm in infants and 2 inches/5cm in most children.)

**PALS:** De-emphasis on pulse check for pediatrics. It is often hard to assess and healthcare professionals should not check for more than 10 seconds.

**PALS:** Supraglottic advanced airways (King, LMA’s) are supported.

**PALS:** More data supporting cuffed ETTs in children.
**PALS:** Cricoid pressure during emergency intubation has been questioned.

**PALS:** Continuous capnography is recommended to confirm ETT placement and to monitor for return of spontaneous circulation.

**PALS:** OPTIMAL DEFIBRILLATION ENERGY DOSE IS UNKNOWN IN PEDIATRICS: VF or pulseless VT: 2-4 J/kg of monophasic or biphasic waveform is “reasonable.” Doses higher than 4 J/kg (especially if delivered by a biphasic defibrillator) may also be safe and effective. Now may defibrillate with up to 10 J/kg or maximum adult energy level.

**PALS:** “Adult” automatic external defibrillators (AEDs) may be used in infants and children. Ideally, a pediatric adapter should be used to administer a “kid friendly” energy dose. However, if all that is available is an adult AED, it may be used across the lifespan.

**PALS:** O₂: After return of spontaneous circulation, O₂ should be titrated to limit the risk of hyperoxemia (increasing support of potential harm from high O₂ exposure after cardiac arrest.)
NRP: The etiology of neonatal arrests is nearly always asphyxia, therefore ABC’s are still recommended unless there is a known cardiac etiology.

NRP: Once positive-pressure ventilation or supplemental oxygen administration is begun, assessment should consist of simultaneous evaluation of heart rate, respiratory rate, and pulse oximetry.

NRP: Best indicators to cardio-respiratory transition “life outside of mom” and need for resuscitation are increasing HR, effective respirations and good muscle tone.

NRP: If pulse oximetry is used, apply to right upper extremity (pre-ductal sats.) Healthy babies at term start with a SPO$_2$ (pulse ox) of less than 60%, and many will take over 10-minutes to reach a saturation of over 90%.

NRP: Hyperoxemia can be toxic, particularity to pre-term infants.

NRP: Babies born at term: Best to begin resuscitation with room air rather than 100% O$_2$. Any O$_2$ used should be blended with air and titrated as needed.

NRP: No data to support oral (bulb syringe) or tracheal suctioning of active babies, even if meconium is present.

NRP: Available data does not support or refute tracheal suctioning of non-vigorous babies with meconium.
NRP: Chest compressions:
- Compression to ventilation ratio is still 3:1.
- If cardiac etiology is known, should consider 15:2 compression ratio.

NRP: Epinephrine: 0.1-0.3 mg/kg should be administered IV ASAP (does mention ETT dosing, but not IO dosing.)

NRP: Laryngeal mask airways (LMAs) are discussed.

NRP: Post resuscitation care
Therapeutic hypothermia is recommended for babies born near term with evolving moderate to severe hypoxic ischemic encephalopathy. Need defined protocols.

NRP: Ethics
Duration of resuscitation for newborns with prolonged cardiac arrest: If there is no detectable HR for 10-minutes, it is appropriate to stop resuscitation. If early gestation, low birth weight and congenital anomalies are associated with almost certain death or high morbidity if there is survival, then resuscitation is NOT indicated.
Consistent with recent published concerns about the accuracy of the Brosewol Tape to predict actual weight in an increasingly obese pediatric population, this newest edition incorporates both updated zones and a simple weight prediction adjustment method that retains its simple and practical approach.

The Brosewol tape is based on the relationship between weight and length across all ages; each color zone estimates the 50th percentile weight for length, which for practical purposes estimates the ideal body weight (IBW) for emergency dosing. The 2011 version of the Brosewol Tape incorporates revised length weight zones based on the most recent National Health and Nutrition Examination Survey (NHANES) data set.

Utilizing this data set to examine Brosewol tape predictions of actual body weight with the revised zones reveals that approximately 65% of the time the patient's measured length places them in the correct zone for actual weight. Of the remaining 35%, ~20% fall into the heavier Brosewol-Luten zone above and 13% fall into the lighter zone below, with < 1% outliers falling greater than 1 zone from predicted. If the healthcare provider incorporates a visual estimate of body habitus into the prediction, the accuracy of the estimate of actual patient weight is improved as confirmed in multiple studies. Specifically, for drug dosing the patient's length-based dosing zone can be adjusted up one color zone if the child appears overweight. Thus, incorporating a visual estimate of whether the child is over-weight provides a simple method to predict actual patient weight that appears to be clinically relevant given the rise in obesity in the United States.

Although some medications are best dosed by actual body weight (e.g., sucrose/lycoline), most resuscitation medications are distributed in lean body mass (e.g., epinephrine, sodium bicarbonate, calcium, magnesium, etc.) so that IBW, not the actual body weight, would appear preferable for dosing. For most resuscitation medications, the optimal dose is not known and doses based on IBW or actual weight are likely equally effective.

The recent PALS guidelines comment on this issue: "there are no data regarding the safety or efficacy of adjusting the doses of resuscitation medications in obese patients. Therefore, regardless of the patient's habitus, use the actual body weight for calculating initial resuscitation drug doses or use a body length tape with precalculated doses (Class IIb, LOE C)."

Studies on the accuracy of predicting endotracheal tube sizes consistently demonstrate the superiority of length predictions over other methods. Unlike medication dosing, body habitus does not affect the accuracy of the prediction.

The following is the recommended use of the Brosewol tape. Utilizing clinical judgment applied to each situation:

1) Measure child to identify weight/color zone.

2) If a child appears overweight consider utilizing one zone higher for dosing only.

3) Always use the tape measured length zone for equipment selection regardless of body habitus.

For a more in depth discussion of this issue, including the theoretical dangers of dosing by actual body weight in the obese patient, the reader is referred to the following reference:


References
**Calculation Basis**

<table>
<thead>
<tr>
<th>Paralyzing agents</th>
<th>Removed recommendation to give Atropine prior to Succinylcholine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diazepam RECTAL</td>
<td>Color specific dosing information removed</td>
</tr>
<tr>
<td>Seizure</td>
<td>Fosphenytoin loading dose: 20 mg/kg/dose</td>
</tr>
<tr>
<td></td>
<td>Phenytoin loading dose: 20 mg/kg/dose</td>
</tr>
<tr>
<td>Resuscitation</td>
<td>Atropine ET: 0.05 mg/kg/dose</td>
</tr>
<tr>
<td></td>
<td>Defibrillation dosing updated</td>
</tr>
</tbody>
</table>

**Legend for Initial Ventilator Settings**

- Tidal Volume updated to 6-10 ml/kg
- Added Inspiratory Time and Tidal Volume chart
- Recommendation for 100% FiO2

**Color Zones**

<table>
<thead>
<tr>
<th>Color</th>
<th>Diazepam RECTAL: 3.2 mg</th>
<th>BP cuff: neonatal #4</th>
<th>Stylet size to 10 Fr.</th>
<th>Amiodarone: 50 mg</th>
<th>Stylet size: 10 Fr.</th>
<th>Succinylcholine: 33 mg</th>
<th>Rocuronium: 17 mg</th>
<th>Stylet size: 10 Fr.</th>
<th>Pan/Vec: 0.2 mg</th>
<th>Diazepam RECTAL to 10 mg</th>
<th>Nasopharyngeal airway: 26 Fr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pink</td>
<td></td>
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- Phenytoin loading dose updated
- Fosphenytoin loading dose updated
- Atropine ET dosing updated
- Defibrillation dosing updated
- Removal of recommendation to give Atropine prior to Succinylcholine
- Resized using latest NHANES data
I. Overview of neuro trauma

- Outside (skull), inside (brain) & 3 parts (cerebrum, cerebellum, brain stem)
- Meninges – pia/arachnoid/dura (PAD)
  - Only two kinds of brains
    - Happy brains & unhappy brains
  - Blood, oxygen, & glucose
- Mechanisms of injury
  - Something will keep moving until something tells it to stop
  - 3 collisions in every car accident
    - Car vs. tree
    - Head and/or chest vs. dash or windshield
    - Internal organs vs. the rest of the body
- Waddell’s triad (little pedestrians vs. moving cars)
  - Femur fracture
  - Belly or chest injuries
  - Head injuries

II. Head trauma

- Bonks
  - Concussions
    - “Rapid onset of short-lived impairment of neurologic function that resolves spontaneously”, but more commonly defined by loss of consciousness (only 10% of cases)
    - Headache & dizziness most common symptoms
    - CT fine and most patients do fine
    - Post-concussive syndrome (slow return to normal mental state)
    - Second-impact syndrome
      - Football players get a concussion; look great and go back to play
- Get a second concussion, immediate massive cerebral edema, and death!

- Contusions
  - Aka brain bruise
  - They look bad now, but worse tomorrow

- Shaken baby syndrome
  - **Shaking causes linear and angular forces up to 9.3G**
    - Roller casters produce 3-4G
    - Fighter pilots experience 6G
  - **If a child's head is struck against a solid object, forces increase 50-fold to 428G!**
    - Subdural hematomas on CT scan + retinal hemorrhages = shaken baby syndrome

- **Breaks**
  - Basilar skull fracture
    - Raccoon eyes
    - Battle sign (bruising behind the ear)
    - CSF leaks from ears, nose, or mouth
    - Halo test?
    - Test for glucose
    - No blindly inserted nasogastric or nasotracheal tubes
  - Depressed skull fracture – self explanatory

- **Bleeds**
  - Epidural
    - Epi means above – Dura means dura - arterial
    - Smile and die bleeds
  - Subdural
    - Sub means below – Dura means dura – venous
    - Acute: Head vs. windshield, head vs. baseball bat, or parent vs. child
    - Chronic: Alcoholics or those on anticoagulants
  - Subarachnoid
- Sub means below – Arachnoid means arachnoid – arterial
- Oh my God Oprah headaches or “worst headache of their lives”
- Intracerebral
  - Intra means inside – Cerebral means cerebral – both arterial and venous
  - Just bad

- **Neuro assessment tools and techniques**
  - AVPU (Awake/Verbal/Pain/Unresponsive)
  - Glasgow coma scale (see chart)
    - 15 is good – 3 is bad
    - Anything between means something’s not right
    - Motor, aka. engine (6)
    - Eyes (4)
    - Voice (5)
  - Other things making you act “not right” – check a glucose & a pulse ox
    - Posturing
      - Decorticate (deCORDicate) – Abnormal flexion (bad)
      - Decerebrate – Abnormal extension (worse)

- **Cushing’s triad**
  - BP goes up
  - HR and RR go down
  - Reflex and compensation for squished brain and brain stem

- **Management of increased intracranial pressure**
  - If the brain pressure is high, the blood pressure must be higher
  - If you don’t get blood to your head, you’re soon to be dead!
  - Hyperventilation only for:
    - Blown pupil (not pupils)
    - Stop moving one side of their body
    - GCS drops by 3 points
    - Keep them alive long enough for a CT and neurosurgery
- Diuretics
  - Lasix or Mannitol
  - More fluid in the Foley bag than in the brain
- 30% head of the bed elevation
  - Only after C-spine cleared
  - Let gravity be your friend
- Head midline position
  - >90% of the blood drains from the head via the jugulars
  - Turning the head can kink off the drain
- Decadron, pentobarbital coma, and neuromuscular blockade (paralytics) not routinely recommended
- Decompressive craniectomy – “Take the top of the head off…”
- Pediatric brain death
  - Formally declared in the pediatric ICU
  - Body alive, but the brain is dead

III. Spinal cord issues
- If you break your neck…
- Do you have to break…
- What’s messed up = What you can or can’t do
  - C3-C5
  - C7-T1
  - T12-L1
  - S2-S4
- Types of spinal cord injuries
  - Spinal cord concussion
    - Symptoms were there, then symptoms got better
  - Spinal cord contusion
    - Bruised spinal cord and associated edema
  - SCIWORA (Spinal Cord Injury With Out Radiographic Abnormality)
- Normal X-ray, but paralyzed kid
- Bones pop out and then back in like a rubber band, but trash the spinal cord in the process
- Diagnosis by physical exam and MRI

- Spinal cord syndromes
  - Complete injury
    - Can’t move and can’t feel below the injury level
  - Central cord syndrome
    - Exactly the opposite of what you’d imagine with spinal cords
    - Can’t move or feel arms, but the legs are intact
  - Brown-Sequard syndrome
    - Spinal cord is vertically cut in half
    - Can’t move one side and lose pain/temperature on the other
    - This is the only spinal cord syndrome which has a name cut in half with a hyphen (Brown-Sequard) so it’s when the cord is cut in half

- Treatment of spinal cord injuries – Above all else, do no harm!

- Air bag injuries and children – Put kids in the back seat

IV. Other bad brain and CNS issues

- Munchausen’s syndrome by proxy
  - Mom (or dad) causing the injury or illness in the child
  - Kids who get better when mom or dad are not around
  - Rule out with failure to thrive kids

- Tumors
  - Waking up with headaches + vomiting with no nausea = Brain tumor!

- Shunts
  - If you see any question about a kid with a shunt, it’s either infected or malfunctioning

- Meningitis
  - Kernig’s sign
  - Begins with K
- The patient screams when you straighten their knees.

- Brudzinski’s sign
  - Begins with B
  - The patient Bends their knees after you Bend their neck.

- Viral
  - Diagnosed by lumbar puncture
  - Home vs. admission with pain meds either way

- Bacterial
  - Diagnosed by lumbar puncture (LP) – Give antibiotics BEFORE the LP
  - Admitted for IV antibiotics, IV antivirals, and Decadron
  - Isolation for 24 hours post-first dose of IV antibiotics
  - Chances are on a test, the question will involve the most feared type – Meningococcal
    - Flu symptoms
    - Rapidly spreading, purple, non-blanching rash

- Seizures
  - Absence (petit mal) seizures - Space-out seizures
  - Focal seizures – focal & Todd’s paralysis
  - Febrile seizures - 5, 5, and 5
    - Last less than 5 minutes
    - Most are in kids under the age of 5
    - Occur with a temperature of 102-105F (39-40.6C)
    - Most times, just treat the temperature and not the seizure, but make sure parents know febrile seizures can (and very well might) happen again

Generalized tonic-clonic (grand mal) seizures
  - Loss of consciousness and + loss of bowel/bladder control
  - Status epilepticus
    - One seizure lasting more than 30 minutes or
    - The patient doesn’t wake up between seizures
  - Short acting meds: Ativan, Versed, Valium
- IV/IM/Rectal/Nasal – www.boundtree.com
- Longer acting meds: Phenobarbital, Dilantin (0.9NS only), or Fosphenytoin

V. Psych emergencies

- Psych SAFEty
  - Safety
  - Airway
  - FEelings

- Safety first
  - Safety for you and your fellow staff
  - Safety for the patient
  - Restraints
    - Least amount of restraints or alternatives to restraints is always the correct answer
    - Frequently assess the patient and the need for continued restraints
  - Are they suicidal? (You have to ask, even with kids)

- Autism
  - Spectrum ranges from non-verbal and rocking in a corner to highly-functioning Asperger’s (kids who act a little different)
  - Ask mom, dad, or caregiver!

- Schizophrenia
  - Auditory vs. visual hallucinations
  - Truly challenging patients
### Pediatric Glasgow Coma Scale

**Eye opening (4)**  

<table>
<thead>
<tr>
<th>Score</th>
<th>&gt;1 year</th>
<th>&lt;1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Spontaneous</td>
<td>Spontaneous</td>
</tr>
<tr>
<td>3</td>
<td>To command</td>
<td>To shout</td>
</tr>
<tr>
<td>2</td>
<td>To pain</td>
<td>To pain</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

**Motor (6)**  

<table>
<thead>
<tr>
<th>Score</th>
<th>&gt;1 year</th>
<th>&lt;1 year</th>
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<tbody>
<tr>
<td>6</td>
<td>Obeys command</td>
<td>Spontaneous</td>
</tr>
<tr>
<td>5</td>
<td>Localizes pain</td>
<td>Localizes pain</td>
</tr>
<tr>
<td>4</td>
<td>Withdraws pain</td>
<td>Withdraws pain</td>
</tr>
<tr>
<td>3</td>
<td>Abnormal flexion</td>
<td>Abnormal flexion</td>
</tr>
<tr>
<td>2</td>
<td>Abnormal extension</td>
<td>Abnormal extension</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
<td>None</td>
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</table>

**Voice (5)**  

0-2 years  

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>5</td>
<td>Babbles or coos appropriately</td>
</tr>
<tr>
<td>4</td>
<td>Cries, but is consolable</td>
</tr>
<tr>
<td>3</td>
<td>Persistent crying or screaming</td>
</tr>
<tr>
<td>2</td>
<td>Grunts or moans to pain</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
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<table>
<thead>
<tr>
<th>Age Range</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5 years</td>
<td>Appropriate words and phrases</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Inappropriate words</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Persistent crying or screaming to pain</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Grunts or moans to pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>Oriented and converses</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Confused conversation</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Inappropriate words</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Incomprehensible sounds</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
</tbody>
</table>
Other neuro/psych issues:

Spinal shock and fight or flight
- Sympathetic nervous system (brain) vs. the parasympathetic nervous system (body)
- Brain = Fight or flight reflex
- Body = The opposite
- They keep each other in check, until a spinal cord injury and then one takes over

Spinal bifida
- Aka myelomeningocele
- *When you see any question about spinal bifida, think latex allergy*

- Reye’s syndrome
- If you see any question involving Reye’s syndrome, the answer is aspirin

- Guillain-Barre
  - Viral infection with flu symptoms
  - Weakness starts in the legs and moves quickly up
  - May require intubation and ventilator support
  - Does get better in most cases with time

- Myasthenia gravis
  - Problem with the neuromuscular junction
  - Weakness all over, but worse as the day progresses
  - Diagnosed in ER with the Tensilon test – Push the IV Tensilon and they briefly feel great

- Ecstasy (MDMA)
  - Hyperthermia (from dancing non-stop for 3 days straight with 3,000 of their closest friends)
  - Hyponatremia (from dancing non-stop for 3 days straight with 3,000 of their closest friends and drinking lots and lots of water) – Also, Ecstasy can induce SIADH (see endocrine)

- Botulism
  - If you see a question involving botulism, chances are the answer involves *honey* (or Eskimo’s and the hazards of Tupperware, but probably honey)

- ADHD
  - Ritalin for the patient and also their friends?
- Bipolar
  - Bi means two – Polar means poles
  - Formerly called manic-depressive (easier to remember)
Environmental Emergencies

I. Drowning

- 90% of drownings involve aspiration of liquid into the lungs
- 10% are dry drownings – Laryngospasm and little to no fluid aspiration
- Hypothermic 30X faster if wet, than dry – Check a core temperature before calling the code
- Damage control for most symptoms – i.e. albuterol for wheezing, PEEP for pulmonary edema, Ativan for seizures, etc.
- Heimlich maneuver, steroids, and prophylactic antibiotics not recommended
- Amazing and miraculous outcomes still occur, especially with really young kids and really cold water

II. Burns

- Rule of 9’s (you have to know this)
  - Big parts and little parts
    - Adult:
      - Head and arms are little parts 9%
      - Chest/belly, back, and each leg are big parts 18%
    - Children:
      - Arms are little parts 9%
      - Big head, little body syndrome – 18% for their head
      - Chest/belly and back are big parts 18%
      - Short and stubby leg syndrome – 14% for legs
- Parkland/Consensus Formula for fluid resuscitation *(you have to know this too)*

2- 4cc x kg x BSA burn

Parkland formula divides the amount of fluid to be given in 24 hours into the first 8 hours and the next 16 hours. The actual formula is 2-4ml x kg x % BSA (body surface area) burned. It is important to remember that the timer starts at the time of the burn, not from when the patient arrives in the ED. Once you have figured out the total amount, then ½ is given over the next 8 hours. The remaining amount is then given over the next 16 hours. The way that I’ve always remembered the 4ml x kg x BSA burn formula is:

4ml

Look at your arms and legs and count them? How many are there? Four. They hopefully aren’t burned, so you are doing better than the patient is.

Kg – Big kid vs. little kid

How much do they weigh? Big kids get more fluids than little kids.

BSA burn – Bad burn vs. not bad burn

How much are they burned? Bad burns (more BSA) get more fluids than not bad burns.

Multiply all three numbers together and that’s how much fluid they get in the first 24 hours, but ½ in the first 8 hours, because that’s when they do the most fluid shifting and subsequent swelling.

- Dead, dead, and dead
  - If the child doesn’t have an airway, they are… Dead!
  - If the child is wrapped in wet sheets (horrible hypothermia) and/or doesn’t get enough fluids, they quickly are going to be… Dead!
  - If the child doesn’t get enough IV morphine or fentanyl, they wish they were… Dead!

III. Toxicology

- When in doubt, assume they took the whole bottle

- Decontamination options
  - No more syrup of ipecac
    - 57% effective in preventing poison absorption if given within 5 minutes of ingestion
    - 30% effective in preventing poison absorption if given 30-60 minutes after ingestion
    - No advantage over charcoal alone
  - No more gastric lavage (unless intubated and less than 1 hour since ingestion)
    - 69% effective in preventing poison absorption if performed within 5 minutes of ingestion
    - 31% effective in preventing poison absorption if performed within 30 minutes of ingestion
ingestion
- 11% effective in preventing poison absorption if performed within 60 minutes of ingestion
- In one study, complications of gastric lavage were thought to have contributed to death in over 1/3 of lavaged patients
- Go-LYTELY for iron, sustained release meds, and body packers (heroin, cocaine, etc)

- Charcoal only if able to drink it and give Compazine or Zofran first to prevent vomiting

- Charcoal ineffective or PHAILS with
  a. P Pesticides
  b. H Hydrocarbons
  c. A Alcohols, acids, alkali
  d. I Iron
  e. L Lithium
  f. S Solvents

- Tylenol
  - Think liver failure
  - PO Mucomyst or IV Acetadote

- Iron
  - Think GI bleed
  - Severe abdominal pain very worrisome sign

- Tricyclic antidepressants
  - Think of every arrhythmia you’ve ever seen and then a few more just for fun
  - Treat with sodium bicarbonate, more sodium bicarbonate, or 3% saline

- Hydrocarbons (lamp oil, gasoline)
  - Think horrible aspiration pneumonia and respiratory distress

- Organophosphates (fertilizers) (& nerve gases – same symptoms)
  - Think lots and lots and lots of Atropine and then some more Atropine

- SLUDGE/BBB
  (S)alivation - drooling
  (L)acrimation - tearing
  (U)rition - peeing
  (D)efecation - pooping
  (G)I symptoms – lots of them
  (E)mesis - barfing
(B)ronchorrhea – lots of airway secretions
(B)ronchospasm - wheezing
(B)radycardia – self explanatory

- Raves – Ketamine and Ecstasy

IV. Bites

- Rabies
  - Raccoons and bats
  - Rabies immune globulin (RIG) into the bite
  - Rabies vaccine on days 1, 3, 7, & 14
  - Can’t give vaccine and immune globulin in the same syringe or same muscle

- Snakes
  - Red on yellow, Kill a fellow
  - Red on black, Venom lack
  - Antivenin – Kids get same amount as an adult
  - Don’t elevate the extremity, do fasciotomies, apply tourniquets, or suck out the poison!

- Spiders
  - Black widow
  - Brown recluse
  - Poison control guidance, pain control, and skin grafts

- Jellyfish
  - Vinegar
  - Don’t pee on the sting

V. Bugs

- Fevers in children
  - Under 1 month of age, everyone is septic unless proven otherwise
  - Septic work up:
    - CXR if respiratory symptoms
    - Urine culture, especially with females
    - Blood culture x 1
- LP if worried about meningitis
- Stool culture only if vacationing in a third world country or really sick kids already on antibiotics
- You have to ask about immunizations – Can’t take it for granted they have had all their shots
- Tylenol 15mg/kg q 4-6 hours and Motrin 10mg/kg q 6 hours

- Impetigo
  - Nasty looking face infection (Staph or MRSA)
  - Very contagious

- Lice
  - Yuck!
  - Nix or RID as directed (Make sure parent’s understand exactly how and how often to use it!)
  - No need to shave their heads
  - Very contagious

- Anaphylaxis
  - Peanuts, bee stings, penicillin, and aspirin
  - Airway edema - #1 reason people die from anaphylaxis
  - Bronchospasm - #2 reason people die from anaphylaxis
  - SQ or IV epi, IV fluids, histamine blockers (Benadryl (H1) and Tagament/Pepcid/Zantac (H2), and Glucagon (helps with anaphylactic bronchospasm)

- Lyme disease
  - Bitten by a tick carrying Lyme disease and the tick stays attached for 48 hours
  - Bull’s eye rash, meningitis, and arthritis
  - IV and/or PO antibiotics

VI. Too hot
- Heat cramps
  - Hot and sweaty = Cramps (low sodium)
  - Cool down and drink Gatorade or Pedialyte
- Heat stroke
  - Hot and no longer sweating
  - Altered level of consciousness
  - Body is hot, but the internal organs are hotter
  - Misting with fans, room temperature IV fluids, cool packs to the neck, pits, and groin

VII. Too cold

- Hypothermia
  - Not dead until warm and dead! (core at least 90F)
  - Warm them up
    Outside-in:
    - Wet clothes off
    - Warm blankets on
    Inside-out:
    - Warmed oxygen
    - Warmed IV fluids
    - NG/pleural cavity/peritoneal/bladder/rectal irrigation with warm saline
    - ER cardiopulmonary bypass

- Frostbite
  - Frozen tissue
  - Warm water baths for rapid rewarming and lots of IV pain meds

VIII. Bad people and bad things

- Nuclear exposure
  - Rinse it off before they come to the ED
  - 95% of radiation can be removed with soap, water, and removing clothes
  - Die of acute radiation syndrome (days to weeks after exposure)

- Biological agent exposure
  - Anthrax – Cipro for everyone
  - Plague – Streptomycin and tetracycline for everyone
- Chemical agent exposure
  - Think SLUDGE/BBB (like organophosphates)
# Radical Rashes and Bad Bugs

<table>
<thead>
<tr>
<th>Type</th>
<th>Caused by:</th>
<th>Signs and Symptoms (systemic)</th>
<th>Signs and Symptoms (rash)</th>
<th>Management</th>
<th>Contagious Period</th>
<th>Route of Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chicken Pox</strong></td>
<td>Virus</td>
<td>Flu</td>
<td>Chicken pox rash</td>
<td>Benadryl (diphenhydramine) PO or lotion, Calamine lotion, time – Varicella-zoster immunoglobulin (VZIG) in high-risk kids</td>
<td>1 day before visible lesions until first round of lesions are crusted over</td>
<td>Primarily respiratory, but also direct contact with open lesions - Scabs are not infectious</td>
</tr>
<tr>
<td><strong>Mumps</strong></td>
<td>Virus</td>
<td>Fever/malaise x 24 hours, followed by earache that is aggravated by chewing – Then parotid gland swelling</td>
<td>None</td>
<td>Tylenol or Motrin Fluids</td>
<td>Most communicable immediately before and after swelling begins</td>
<td>Respiratory and saliva</td>
</tr>
<tr>
<td><strong>Roseola</strong></td>
<td>Virus</td>
<td>3-4 days of high fever in a cute kid – Fever goes away with rash</td>
<td>Discreet rose-pink rash – first on trunk, then to face and extremities – not itchy</td>
<td>Tylenol or Motrin</td>
<td>Unknown</td>
<td>Unknown, but usually only in kids between 6 months and 3 years of age</td>
</tr>
<tr>
<td>Type</td>
<td>Caused by</td>
<td>Signs and Symptoms (systemic)</td>
<td>Signs and Symptoms (rash)</td>
<td>Management</td>
<td>Contagious Period</td>
<td>Route of Transmission</td>
</tr>
<tr>
<td>----------------------</td>
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<td>------------------------------</td>
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<td>------------------------------------------------</td>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Rubella</td>
<td>Virus</td>
<td>None in most children</td>
<td>Pinkish red rash starts in the face and rapidly moves down – Disappears in same order it began and is usually gone by 3rd day</td>
<td>Tylenol or Motrin</td>
<td>7 days before rash to about 5 days after rash appears</td>
<td>Nasopharyngeal, but also present in blood, stool, and urine Isolate child from pregnant women (teratogenic)</td>
</tr>
<tr>
<td>Rubeola (measles)</td>
<td>Virus</td>
<td>Fever, malaise, and Koplik spots (red spot with a blue-white center found in the mouth)</td>
<td>Red rash – starts in face and becomes less red as it moves down the body</td>
<td>Rest, Tylenol or Motrin, antibiotics to prevent secondary infection in high-risk kids</td>
<td>4 days before rash until 5 days after rash appears</td>
<td>Respiratory, but also blood and urine</td>
</tr>
<tr>
<td>Fifth’s Disease</td>
<td>Virus</td>
<td>Flu symptoms</td>
<td>Slapped face appearance which disappears by 1-4 days, red symmetrical rash moving proximal to distal</td>
<td>Tylenol or Motrin</td>
<td>Uncertain, but before onset of symptoms in children with aplastic crisis</td>
<td>Unknown, possibly respiratory and blood – No need for isolation</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>Strep.</td>
<td>Malaise, high fever, and high pulse out of proportion to fever</td>
<td>Red rash within 12 hours of fever, but absent on face</td>
<td>Penicillin or Erythromycin, Tylenol or Motrin</td>
<td>10 days during first two weeks of symptoms, but can be carrier for months</td>
<td>Respiratory, but also indirectly from contaminated food, milk, or other articles</td>
</tr>
</tbody>
</table>
Abdominal and OB/Neonatal Emergencies

I. Surgical bellies
   - Belly trauma
     - Impaled object – Don’t pull it out
     - Spleen
       - Left side of abdomen
       - Kehr’s sign
         - Spleen begins with S – Shoulder begins with S
         - Shoulder pain with no shoulder trauma, think Spleen!
       - Fluids, blood, and probably no trip to the OR
     - Liver
       - Right side of abdomen
       - Fluids, blood, and probably no trip to the OR
     - Retroperitoneal bleeds (behind the peritoneum)
       - Cullen’s sign
         - If you C bruising around the Umbilicus, that’s Cullen’s sign
       - Grey-Turner’s sign
         - Turn on your flank – If you Turn and see bruising on the flank, that’s Grey-Turner’s sign
   - Diagnostics: CT vs. DPL vs. US
   - Does every belly need to go to the OR?
     - Open bellies, aka. bowel in the bed?
     - Surgical bellies & pain meds?

Pelvic fractures
   - Rare in kids, but can happen
   - Unbelievable amounts of blood loss
   - Fluids, blood, and angiography for embolization
   - No more MAST pants
- Intussusception
  - Telescoping of the bowel
  - The infamous Currant jelly stool
  - Diagnosed and hopefully treated by air or barium enema

- Pyloric stenosis
  - Stenosis at the bottom of the stomach
  - The infamous Exorcist revisited projectile vomiting

- Volvulus
  - Most commonly from malrotation (twisting) of the bowel on itself
  - True surgical emergency to prevent bowel necrosis

II. Medical bellies

- Liver failure
  - Liver begins with L
  - Lactulose begins with L (for hepatic encephalopathy and high ammonia levels)

- Renal failure
  - Kidneys begin with K
  - K is the symbol for Potassium
  - When you think Kidneys, think K (or Pee)
  - Kayexalate begins with K (for hyperKalemia)
    - Also give dextrose, insulin, and bicarbonate for hyperKalemia
    - Look for Peaked T waves

- Every patient with continuous peritoneal dialysis and belly pain has peritonitis until proven otherwise

- Gastroenteritis
  - Oral rehydration therapy (ORT) after anti-emetics is where it’s at
  - IV fluids only if failed ORT or NG rehydration
  - Subcutaneous fluids? – www.hylenex.com
  - Viral – No need for antibiotics
III. Male and female downstream issues

- Zippers
  - Local anesthesia and it may unzip on its own or cut the bottom zipper tracks
  - No need for circumcision
- Infections vs. torsion
  - Testicles, Trauma, and Torsion all begin with T
    - Praying for death pain and vomiting
    - Ultrasound or nuclear medicine study and hopefully no orchiectomy
  - Epididymitis – febrile, infection, swollen

IV. OB/gyn emergencies

- Every female between 9 and 90 in the ED is pregnant until proven otherwise
- Positive HCG and non-labor belly pain = Ectopic pregnancy until proven otherwise
- Lateral position – either left or right side is fine
- Placenta previa
  - Placenta is partially or completely covering the cervix
  - Bleeding post-trauma or with labor is (P)ainless
- Abruptio placenta
  - Placenta is in the right spot, but now post-trauma/drug use/etc. is “hanging on by a thread”
  - Little to no blood loss through cervix, but also little to no blood flow to baby
  - The patient “abruptly” has pain

V. Neonatal resuscitation

- Catch, clamp, and don’t drop them – All that is required for >90% of deliveries!
- The Mantra
  - Are they breathing? Yes or no?
    Yes – Celebrate
    No – Do something – Bag with oxygen
  - How’s the heart rate? Good or bad?
    Good – Over 100 – Celebrate
    Bad – Below 100 – Do something – Bag with oxygen and CPR if HR less than 60
- How’s the color? Pink or purple?
  
  Pink – Celebrate
  
  Purple – Do something – Blow by O2 if breathing OK or bag with oxygen if not OK
Other abdominal/neo issues:

- Bowel obstruction
  - Think of this in kids with previous belly surgeries
  - Pain, barfing, NG tube, and hopefully no trip to the OR

- Hernias
  - Surgery can push them back in – Great
  - Surgery can’t push them back in - Bad

- Appendicitis
  - Pain in the right lower quadrant (McBurney’s point)
  - CT or ultrasound diagnosis
  - Can give the child pain meds and still tell they have appendicitis

- Toxic shock syndrome
  - The American Academy of Pediatrics defines toxic shock syndrome as when four of the following five criteria are met:
    - 1) Sudden onset of fever of 102F (39C) or higher
    - 2) Diffuse red rash
    - 3) Desquamation (peeling) of skin, especially palms and soles, 1-2 weeks post-onset of illness
    - 4) Hypotension
    - 5) Multisystem organ issues
  - In addition, cultures of blood/CSF must be negative for anything except for Staph. Aureus
  - If the test question involves tampons and peeling skin, think toxic shock

- UTIs and STDs
  - Cath urine in little kids – Urine bag too contaminated
  - STDs in little kids – Abuse, plain and simple
  - Pyelonephritis vs. UTI – Check for flank tenderness
  - Sexual assault – SANE nurses rule! Everything is evidence
- Pre-eclampsia very common in teen pregnancies
  - It’s all about the P
  - Proteinuria
  - Puffy
  - Profoundly hypertensive
  - Mag sulfate to prevent seizures – Calcium is the antidote
Endocrine Emergencies

I. Hypoglycemia
- Way too low blood sugar
- PO sugar if conscious
- IV bolus sugar if unable to take PO – D10, D25, or D50
- IM glucagon if unable to rapidly obtain IV access
- Watch and even better admit the kid for several hours if they accidentally took mom’s oral hypoglycemics

II. Hyperglycemia (DKA)
- Way too high blood sugar
- Acidosis from breakdown of fats (fatty acids = ketones)
- Kussmaul’s respirations – Fast and deep (blow off CO2)
- 3 P’s – Polyuria (pee all the time), Polyphagia (eat all the time), and Polydipsia (drink all the time)
- They didn’t go into DKA in an hour so don’t fix them in an hour!
  - IV insulin drip – No insulin bolus and no bicarbonate
  - Cautious fluid administration
    - Concern with too much fluid or too rapid correction is cerebral edema
    - Treat with hypertonic saline or mannitol
    - Change to D5.something when the sugar is around 250, but keep the insulin drip going until the pH normalizes and ketones clear
    - Hyperkalemia is common initially – Will resolve as the pH comes back to normal and then they will need extra potassium

III. Hyperglycemia (HHNS) – Hyperglycemic Hyperosmolar Non-Ketotic Syndrome or Coma (HHNC)
- Way to high blood sugar
- They are making some insulin, just not enough to prevent the blood sugar from being sky high
  - No acidosis = No Kussmaul’s respirations
  - Hyperosmolar due to the body peeing away all the extra sugar
  - Lots more fluids and much less insulin than with DKA kids

V. Calcium crises
- Hypercalcemia – Think parathyroid issues or cancer somewhere (bone)
- You need calcium to allow your muscles to move
- Too much calcium = Hyperreflexia (they are jumpy)
- Hypocalcemia – Think liver failure or the kid got a whole lot of blood products (banked blood preservatives can induce hypocalcemia)
- You need calcium to allow your muscles to move
- Too little calcium – Hyporeflexia (they are floppy) and they can’t breathe
- Trousseau’s sign begins with T – Take a blood pressure for a little Too long and the hand will look like a claw until the cuff is released
- Chvostek’s sign begins with C – Calcium and Cheek both begin with C – Tap their Cheek and their Cheek muscles Contract

VI. Diabetes insipidus (DI) - DI is very different than DM (diabetes mellitus)
- Think brain tumor, brain trauma, or bad brain infections
- The problem is lack of antidiuretic hormone (ADH) so they pee, and pee, and pee (water)
- Urine looks like water
- Pee is the problem so Pitressin (IV/IM/Nasal spray) is the answer

VII. Syndrome of inappropriate antidiuretic hormone (SIADH) - SIADH is the opposite of DI
- SIADH has ADH in the title cluing you in that the problem probably involves ADH
- Think bad brain tumors, bad brain trauma, or bad brain infections
- They have way too much ADH, so they don’t pee (water)
- Urine is concentrated and serum sodium is very low (diluted by all the water the body isn’t peeing)
- Sodium is the problem (they don’t have enough) so 3% saline and water restriction is the answer

VIII. Cushing’s syndrome - Cortisol (steroid) begins with C and so does Cushing’s
- They have way too much steroids
- Symptoms are like those on chronic steroids (puffy, weight gain, and the infamous buffalo hump)

IX. Addison’s disease - Addison’s is the opposite of Cushing’s
- Addison’s begins with A and these patients Aint got any steroids (or at least not enough)
- Symptoms are the opposite of Cushing’s – Also have “terminal tans” – i.e. child with a tan who’s not trying to get a tan – early sign of Addison’s
- True emergency if children on long-term steroids abruptly stop taking their steroids – Can very easily/quickly die!
Other endocrine issues:

IV. Thyroid emergencies

- Hypothyroid – Everything slows way down
- Hyperthyroid – Picture a manic patient and everything jazzed way up
Orthopedics and Pain Management

I. Peds pain

- Kids don’t feel pain – Scary, but some people still believe this

Monitoring

- Pulse ox for everyone
  - ± ECG, non-invasive BP, and nasal cannula ETCO2

- Pain assessment and scales (see charts at the end of this section & review which scales ENPC discusses)
  - Faces
  - FLACC
  - NIPS
  - Don’t memorize them, but do know how and for whom they are used

- Reversal agents
  - Narcan (naloxone) for the opiates, aka. really good pain killing meds
  - Romazicon (flumazenil) for the benzodiazepines, aka. go to sleep meds

- Medications (analgesia)

  - Remember that analgesics are for pain and possibly may sedate as well

  - Morphine
    - Lasts a few hours
    - Effect on blood pressure

  - Demerol
    - No one outside of anesthesia gives enough Demerol
    - Barfing, seizures, & sicklers

  - Fentanyl
    - Fentanyl begins with F…
    - Only lasts about ½ hour
    - Wonderfully hemodynamically stable
    - SLOW IV push (over 2 minutes) to minimize risk of rigid chest syndrome
    - IV/nasal/lollipop
- Ketamine
  - All 3 things, 1 shot!
  - Animal tranquilizer, PCP, good trips, and bad trips
  - IM or IV drops them like a rock
  - Minimal respiratory depression
  - Goobers, saliva, etc. – Atropine or Robinul
  - Emergence reactions, aka. waking up nutty – Versed chaser
  vs. quiet environment pre-during-post medication

- Nitrous oxide
  o All 3 things – No shot!
  o Colorless, odorless, tasteless
  o 50% nitrous/50% oxygen
  o Don’t mix Versed, Fentanyl, etc. with it – much higher risk of respiratory depression if you do
  o “Aromatherapy masks” for nitrous – www.kingsystems.com

- Vastus lateralis per ENPC is the site of choice for IM injections in little ones (know this)
- See charts at the end of this section for doses, durations, etc.

- Medications (sedation)
  - Remember that sedatives are for sedation, and most do nothing for pain
  - Versed
    - Only lasts about 20-30 minutes
    - 90% asleep with amnesia vs. 10% demonically possessed
    - Routes – Baptism to blowfish – www.boundtree.com
  - Propofol
    - Only last about 10 minutes
    - Watch their breathing & blood pressure – especially with initial bolus
    - Great for short procedures in kids
  - Demerol, Phenergan, & Thorazine (DPT) – Just say no!!!
  - Chloral hydrate
    - Onset in about an hour – way too long for most ER procedures
- 90% asleep – 10% no effect
- 5% chance of serious desaturations or apnea – treat with time and bag-mask ventilation
  as Narcan or Romazicon don’t work to reverse chloral hydrate
- Asleep till you do something mean to them as chloral does nothing for pain
  - See charts at the end of this section for doses, durations, etc.

Safe discharge criteria

II. Orthopedics (neuromuscular)

- Cerebral palsy
  - Contrary to popular belief, the causes of 80% of CP cases are unknown (not from birth injuries)
  - Most importantly, though all of these kids have messed up motor development, 40-50% of them have normal intelligence!

- Muscular dystrophy
  - Duchenne’s is the most common and worst type
  - Starts at 3-5 years old with difficulty walking or biking and progresses with more and more muscle atrophy from there
  - Usually unable to walk by 12-years-old and they die when it finally affects the respiratory muscles
  - If intubation is required, no succinylcholine – High risk of malignant hyperthermia – Getting a diagnosis of MD “sux” and therefore, “NO SUX!”
  - Most importantly remember, the muscles are messed up, but the brain is intact!

III. Orthopedics (musculoskeletal)

- Wound care
  - Saline irrigation is where it’s at – www.wolfetory.com
  - No Hibicleans, Betadine, Mercurochrome, or hydrogen peroxide

- Pain management options
  - Ethyl chloride, aka. freeze spray – www.gebauerco.com
  - Tetracaine/Adrenalin/Cocaine (TAC)
  - Lidocaine/Epinephrine/Tetracaine (LET)
  - EMLA (Lidocaine & prilocaine)
  - LMX – (Lidocaine)
  - Synera (Lidocaine & tetracaine)
- J-tips (Buffered lidocaine)

Injectable anesthetics (1% vs 2% & with vs. without epi?)

Where should you not use Lido with epi? Ears, nose, toes, & hose

- Ways to make the “shot” not hurt
  - Site – inject into the wound itself – hurts less
  - Smaller needles (25-30g) – hurts less
  - Slow – hurts less
  - Hot pack around the bottle of lidocaine 10 minute prior – hurts less
  - Buffer it with bicarb – hurts less
    - Buffering 10:1 ratio with Bicarbonate
    - 10 cc 1% Lidocaine mixed with 1 cc 8.4% Bicarbonate
    - “Good” for 14-28 days after mixing

- Can you numb them up before you scrub them up? Yes!
  - No more infections
  - Kids won’t let you clean them up till they’re numb, so don’t even try

  - Sugar?
  - Dermabond?
  - Osteomyelitis
    - Nasty bone infection
    - IV and PO antibiotics for a long time

Dislocations
  - Shoulder
  - Hip
  - Nursemaid’s elbow
    - Ketamine/versed, fentanyl/versed, etomidate, propofol, or ketophol (ketamine/propofol)

- Fractures
  - Bumps, bruises, & breaks – Does the history/exam fit?
  - Pain, molds, and casts

- Compartment syndrome
- 6 P’s

- Pain
- Paralysis
- Parasthesia (diminished sensation)
- Pallor
- Pressures (increased in the compartment)
- Pulselessness

- Vascular surgery is happy if you can remember 2 – Pain (catch it here) and pulselessness (don’t wait for them to get this bad)

- Amputations

- Patient

- Cover it up – It’s really gross

- Part

- Cover it up – It’s really gross
- Rinse in saline – That’s enough saline
- Wrap in gauze (prevent freezing)
- Gauze wrapped part in a bag, and then the bag placed on ice
<table>
<thead>
<tr>
<th>Name</th>
<th>What is it?</th>
<th>Signs and Symptoms</th>
<th>Diagnostics</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic arthritis</td>
<td>Infection of the joint space – Bacteria spread from somewhere else, i.e. otitis, URI, cellulitis…</td>
<td>Fever and/or chills</td>
<td>CBC, ESR, blood cultures, arthrocentesis (test of choice), vaginal, rectal, oral cultures to rule out N. gonorrhea infection, X-rays to rule out osteomyelitis</td>
<td>IV antibiotics</td>
</tr>
<tr>
<td></td>
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<td>Decreased ROM of joint</td>
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<td></td>
<td></td>
<td>Limping</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Palpable effusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>Bone infection – Bacteria spread from somewhere else, i.e. trauma, puncture wound, or open fractures…</td>
<td>Fever</td>
<td>CBC, ESR, blood cultures, bone and chest X-ray (rule out TB), wound culture, bone scan</td>
<td>IV antibiotics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Focal bone pain</td>
<td></td>
<td>IV analgesics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unwilling to bear weight or move limb</td>
<td></td>
<td>Immobilize the extremity</td>
</tr>
<tr>
<td>Transient Synovitis</td>
<td>Inflammation of the membrane of the hip joint – Not sure why it occurs</td>
<td>Acute groin pain</td>
<td>CBC, ESR, X-rays, ultrasound, or MRI of hip</td>
<td>NSAIDS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-traumatic knee/thigh pain</td>
<td></td>
<td>Bed rest with no weight bearing until pain free</td>
</tr>
<tr>
<td>Name</td>
<td>What is it?</td>
<td>Signs and Symptoms</td>
<td>Diagnostics</td>
<td>Management</td>
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<tr>
<td>-------------------------------------------</td>
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</tr>
<tr>
<td>Legg-Calve-Perthes Disease (LCPD)</td>
<td>Avascular necrosis of the femoral head – Not sure why it occurs</td>
<td>Intermittent limp or hip pain especially upon waking up and at the end of the day</td>
<td>Hip X-rays or MRI</td>
<td>Rest, Casting or braces, Surgical reconstruction</td>
</tr>
<tr>
<td>Slipped femoral capital epiphysis (SCFE)</td>
<td>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</td>
<td>Severe hip pain (acute) External rotation with shortening (acute) Several months of pain, limping, and out-toed gait (chronic is most common type)</td>
<td>Pelvic X-rays</td>
<td>Analgesics, No weight bearing, Traction, Surgical repair</td>
</tr>
<tr>
<td>Osgood-Schlatter Disease</td>
<td>Microfracture of the tibial tubercle – Running and jumping</td>
<td>Anterior knee pain Point tenderness at the tibial tubercle</td>
<td>Knee X-rays</td>
<td>NSAIDS, Decreased activity x 2-3 weeks</td>
</tr>
<tr>
<td>Osteogenesis Imperfecta (OI)</td>
<td>Brittle bone disease - Most common osteoporosis syndrome in childhood – Genetic cause</td>
<td>Variable fractures, blue sclera, less fractures post-puberty (with most common type of OI)</td>
<td>Genetic testing (not in ED) X-rays and history Rule out abuse</td>
<td>Analgesics, Fracture care, Gentle handling</td>
</tr>
<tr>
<td>Name</td>
<td>What is it?</td>
<td>Signs and Symptoms</td>
<td>Diagnostics</td>
<td>Management</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
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<td>---------------------------------</td>
</tr>
<tr>
<td>Juvenile Rheumatoid Arthritis (JRA) – Now called Juvenile Idiopathic Arthritis (JIA)</td>
<td>Chronic inflammation of joints with eventual erosion, destruction, and fibrosis of the cartilage – Rarely rheumatoid type in children</td>
<td>Arthritis symptoms</td>
<td>ESR, rheumatoid factor (only + in 10% of cases), X-rays</td>
<td>NSAIDS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methotrexate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Steroids</td>
</tr>
<tr>
<td>Childhood Accidental Spiral Tibial (CAST) fracture – aka Toddler’s fracture</td>
<td>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)</td>
<td>Limping or unwilling to bear weight</td>
<td>Radiographs Bone scan Rule out abuse (most commonly midshaft or upper tibia)</td>
<td>Long leg cast for several weeks</td>
</tr>
</tbody>
</table>

CBC – Complete blood count  ESR – Erythrocyte sedimentation rate  TB - tuberculosis

URI – Upper respiratory infection  MRI – Magnetic resonance imaging

NSAIDS - Nonsteroidal anti-inflammatory drugs
Wong-Baker FACES Pain Rating Scale

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

International Use of FACES Scale

http://www.anes.ucla.edu/pain/FacesScale.jpg
### FLACC SCALE

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

### 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

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

http://www.anes.ucla.edu/pain/assessment_tool-nips.htm
<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Dose</th>
<th>Onset</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAC (tetracaine, adrenaline, and cocaine)</td>
<td>TD</td>
<td>-</td>
<td>15-30 min</td>
<td>45-60 min</td>
</tr>
<tr>
<td>NOTE: Never near mucous membranes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LET (lidocaine, epinephrine, and tetracaine)</td>
<td>TD</td>
<td>-</td>
<td>15-30 min</td>
<td>45-60 min</td>
</tr>
<tr>
<td>EMLA (lidocaine and prilocaine)</td>
<td>TD</td>
<td>-</td>
<td>60 min</td>
<td>1-2 hours</td>
</tr>
<tr>
<td>L-M-X (lidocaine)</td>
<td>TD</td>
<td>-</td>
<td>45-60+ min</td>
<td>2-4 hours</td>
</tr>
<tr>
<td>Synera (lidocaine and tetracaine)</td>
<td>TD</td>
<td>-</td>
<td>20 minutes</td>
<td>2 hours</td>
</tr>
<tr>
<td>Lidocaine (xylocaine, lignocaine)</td>
<td>SQ</td>
<td>5mg/kg max (plain)</td>
<td>1 minute</td>
<td>1-3 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7mg/kg max (with epinephrine)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marcaine (bupivacaine)</td>
<td>SQ</td>
<td>2.5mg/kg max (plain)</td>
<td>1 minute</td>
<td>4-12 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.0mg/kg max (with epinephrine)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug</td>
<td>Route</td>
<td>Dose Information</td>
<td>Onset Time</td>
<td>Duration</td>
</tr>
<tr>
<td>--------------</td>
<td>-------</td>
<td>------------------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>Tylenol (acetaminophen, Panadol)</td>
<td>PO, PR</td>
<td>10-15mg/kg</td>
<td>30-60 min</td>
<td>4-6 hours PO or PR</td>
</tr>
<tr>
<td>Motrin (ibuprofen, Brufen)</td>
<td>PO</td>
<td>10mg/kg</td>
<td>30 min PO</td>
<td>6 hours PO</td>
</tr>
<tr>
<td>Toradol (ketoralac)</td>
<td>IM, IV</td>
<td>0.5mg/kg IM (max 60mg) 0.5mg/kg IV (max 30mg)</td>
<td>10-20 min IM 5-10 min IV</td>
<td>6-8 hours IM/IV</td>
</tr>
<tr>
<td>Narcan (naloxone)</td>
<td>IM, IV, IN</td>
<td>0.1mg/kg IM/IN/IV peds 0.4-2.0mg IM/IV adults</td>
<td>5-10 min IM 3-10 min IN 1-4 min IV</td>
<td>60-90 min IM 20-40 min IN 20-40 min IV</td>
</tr>
<tr>
<td>Romazicon (flumazenil, Anexate)</td>
<td>IM, IN, IV</td>
<td>0.02mg/kg IM/IV peds 0.04mg/kg IN peds (0.2mg max single dose) 0.2mg IM/IV adults (up to 1mg in 5 divided doses)</td>
<td>5-10 min IM 2-4 min IN 1-2 min IV</td>
<td>60-90 min IM 90-120 min IN 20-40 min IV</td>
</tr>
<tr>
<td>Medicine</td>
<td>Route(s)</td>
<td>Dose (mg/kg)</td>
<td>Onset (min)</td>
<td>Duration</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------</td>
<td>--------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Zofran</strong> (ondansetron)</td>
<td>IV</td>
<td>0.1 (max 4mg)</td>
<td>10</td>
<td>3-4 hours</td>
</tr>
<tr>
<td><strong>Morphine</strong></td>
<td>IM, IV</td>
<td>0.1</td>
<td>10</td>
<td>3-4 hours</td>
</tr>
<tr>
<td><strong>Demerol</strong> (meperidine)</td>
<td>IM, IV</td>
<td>1-2</td>
<td>10</td>
<td>2-3 hours</td>
</tr>
<tr>
<td><strong>Sublimaze</strong> (fentanyl)</td>
<td>IV, TM, IN</td>
<td>2-5</td>
<td>5-15</td>
<td>45-60 min</td>
</tr>
<tr>
<td><strong>Succinylcholine</strong> (Sux, Anectine, Quelicin)</td>
<td>IV</td>
<td>2</td>
<td>1 minute</td>
<td>10 min IV and Be ready to bag!</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug</td>
<td>Route</td>
<td>Dose Information</td>
<td>Onset</td>
<td>Duration</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------</td>
<td>------------------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>Ketalar (ketamine)</td>
<td>PO, IM, IV, PR, IN</td>
<td>5-10mg/kg PO 4mg/kg IM 10mg/kg IN 0.5-1.0mg/kg IV 5-10mg/kg PR</td>
<td>5-10 min PO 2-10 min IM 10-20 min IN 1 min IV 10-30 min PR</td>
<td>1-2 hours PO 60-90 min IM 1-2 hours IN 5-10 min IV 1-2 hours PR</td>
</tr>
<tr>
<td>+ with atropine or Robinul (glycopyrrolate) and Versed (midazolam) chasers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitronox (Nitrous oxide, Entonox)</td>
<td>INHL</td>
<td>50% N2O/50% O₂</td>
<td>3-5 min INHL</td>
<td>3-5 min INHL</td>
</tr>
<tr>
<td>Versed (midazolam)</td>
<td>PO, IM, IV, IN, PR</td>
<td>0.5mg/kg PO 0.1mg/kg IM 0.1mg/kg IV 0.2-0.3mg/kg IN (seizures) 0.4-0.5mg/kg IN (sedation) 0.5mg/kg PR</td>
<td>10-30 min PO 10-20 min IM 5 min IN 2-3 min IV 10-30 min PR</td>
<td>60-90 min PO 1-2 hours IM 30-60 min IN/IV 60-90 min PR</td>
</tr>
<tr>
<td>Chloral hydrate (Nembutal)</td>
<td>PO/PR</td>
<td>50-100mg/kg PO/PR</td>
<td>15-60 min PO/PR</td>
<td>1-2+ hours PO/PR</td>
</tr>
<tr>
<td>Drug</td>
<td>Route</td>
<td>Dose</td>
<td>Duration</td>
<td>Duration</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------</td>
<td>-------------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Diprivan (Propofol)</td>
<td>IV</td>
<td>100mcg/kg bolus IV (loading dose) then 50-100mcg/kg/min (maintenance infusion)</td>
<td>&lt;1 min IV</td>
<td>10-15 min IV</td>
</tr>
<tr>
<td>DPT (Demerol, Phenergan, and Thorazine – meperidine, promethazine, and chlorpromazine)</td>
<td>IM</td>
<td>Just say no!</td>
<td>Just say no!</td>
<td>Up to 19+ hours (This is just one of the many reasons you that you should just say no)!</td>
</tr>
<tr>
<td>Seconal (Pentobarbital)</td>
<td>IM, IV, PR</td>
<td>5mg/kg IM 1-6mg/kg IV 3mg/kg PR</td>
<td>10-20 min IM 1 min IV 15-60 min PR</td>
<td>1-4 hours IM 15 min IV 1-4 hours PR</td>
</tr>
<tr>
<td>(Amidate) Etomidate</td>
<td>IV</td>
<td>0.2mg/kg IV</td>
<td>30 seconds IV</td>
<td>10 minutes IV</td>
</tr>
<tr>
<td>Precedex (Dex, dexmedetomidine)</td>
<td>IN, IV</td>
<td>1-1.5mcg/kg IN 1mcg/kg/IV over 10 min (loading dose) 0.2-1.0mcg/kg/HOUR (maintenance infusion)</td>
<td>45 min IN 6-10 min IV</td>
<td>3 hours IN 2 hours IV</td>
</tr>
</tbody>
</table>

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

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

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

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. [Link](http://www.asahq.org/publicationsAndServices/standards/20.pdf)
## Probable Causes and Examples of Adverse Sedation Events

<table>
<thead>
<tr>
<th>Probable Causes</th>
<th>Examples of Actual Reported Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug-drug interaction - an event that was likely drug-related and for which a combination of drugs had been administered</td>
<td>The six-week old infant received Demerol, Phenergan, and Thorazine for a circumcision and was found dead six hours later</td>
</tr>
<tr>
<td>Drug overdose - at least 1 drug was administered in a dose &gt; 1.25 times the maximum recommended dose</td>
<td>The child received 6000 mg of chloral hydrate</td>
</tr>
<tr>
<td>Inadequate monitoring - this could have occurred during or after the procedure</td>
<td>The child was not on any monitors</td>
</tr>
<tr>
<td>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</td>
<td>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</td>
</tr>
<tr>
<td>Inadequate medical evaluation - lack of evaluation or appreciation of how underlying medical conditions would alter the patient's response to sedative drugs</td>
<td>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</td>
</tr>
</tbody>
</table>
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 (my personal favorite)

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

I. **Bloody emergencies**

- Sickle cell disease
  - Oxygen only if hypoxic
  - Think pain and protocols (IV Morphine or Dilaudid) – No more Demerol
  - Think fluids (PO or IV)
  - Think worst case scenario – Acute chest or stroke

- Hemophilia
  - Think where are they obviously bleeding from now and where else could they potentially be bleeding from?
  - Think worst case scenario – Bleeding into the brain
  - Factor replacement is the treatment of choice at home or in the ED and always give **factor first** (before x-ray, procedures, etc.)

- Human immunodeficiency virus (HIV)
  - 91% of HIV kids got HIV from their mothers during delivery
  - Increasing again in teens with unsafe sex and drug abuse
  - Check the CD4 count and suspect PCP pneumonia
  - Bactrim and antiviral therapies

- Idiopathic thrombocytopenia purpura (ITP)
  - Idiopathic (we don’t know why it’s happening) thrombocytopenia (low platelets) purpura (bruising)
  - Low platelets = bruising – makes sense to me
  - Important as only the platelets are low – Leukemia doesn’t only have low platelets
  - Treat with prednisone and time – Only give platelets if bleeding into their brain

Hodgkin’s disease

- Cancer of the lymph system
- Think teens with a lump in the neck
II. Heme-onc emergencies

- Leukemias
  - Cancer of the blood forming tissues
  - Post-chemo or radiation with a fever = Medical emergency
  - They are neutropenic until proven otherwise and they get isolated, pan cultured, and get boatloads of IV antibiotics

- Omas and enias
  - Omas – Never good – Cancer somewhere
    - Hepatoblastoma (liver cancer)
    - Glioblastoma (brain cancer)
  - Enias – Not so good either – Not enough of something
    - Neutropenia (not enough white blood cells)
    - Thrombocytopenia (not enough platelets)

- Superior vena cava syndrome
  - Think non-Hodgkin’s lymphoma and/or clotted central line
  - Respiratory distress and facial edema – Skinny cancer kid with a big/puffy face and signs of increasing ICP (headaches, visual changes, etc.)
  - Blood backing up from a squished vena cava

- Tumor lysis syndrome
  - Chemo and/or radiation kill the bad cells
  - Bad cells are unhappy at being killed and release lots of other bad things
  - All these bad things hit the kidneys and can result in renal failure
  - Fluids, diuretics, and bicarbonate hoping to avoid dialysis

- Spinal cord compression
  - Another true medical emergency
  - Lymphoma or myeloma squish the spinal cord
  - Emergent chemo, radiation, or surgery in addition to Decadron to shrink the tumor
  - 75-100% of patients coming in walking are discharged walking
  - Only 15-30% of those partially or fully paralyzed will be discharged walking

III. Legal implications
- EMTALA (formerly COBRA)

  - Six criteria must be met:

    - 1) The patient must be stabilized within the skill and capability of the referring hospital. You have to treat the patient as best you can before transfer.

    - 2) The patient or a legally responsible person acting on the individual's behalf requests the transfer – This prevents people from being transferred without telling the patient or their family that they are going on a road trip.

    - 3) The physician must sign saying that the medical benefits of transfer outweigh the risks of the transfer itself – Not transferring the patient is going to mess them up more than keeping them at the original hospital.

    - 4) The accepting facility must have an accepting physician, space, and personnel to care for the patient.

    - 5) Applicable medical records must accompany the patient – This means chart copies and copies of X-rays/CT’s/etc., not just the reports.

    - 6) The transfer must utilize qualified personnel and equipment as determined by the referring physician.

    - All six criteria must be met, not only for a safe patient transport, but for a non-EMTALA violation transport as well.

    - The transferring staff is legally responsible for determining how the patient gets transferred.

- Consents

  - Informed consent

  - Witnessing informed consent

  - Non-emergency treatment for minors (call the parents)

  - Emancipation (call med-legal)

  - Religious objections to treatment (call med-legal)
Other medical & legal issues:

- Disseminated intravascular coagulation (DIC)
  - Think sepsis, trauma, or incomplete miscarriage
  - Lots and lots and lots of blood products and possibly heparin (in the peds ICU)
- Mononucleosis
  - The infamous kissing disease
  - Viral, so no antibiotics needed
- Anticoagulants
  - Check the PTT with Heparin
  - Check the PT with Coumadin
- Blood transfusions - 0.9NS only (no LR or D5)
  - Whole blood – Whole blood
  - Packed RBCs – RBC’s only
  - Fresh frozen plasma – Clotting factors
  - Platelets – Platelets
- Any IV is a good IV – Doesn’t have to be an 18g
  - AB positive is the universal recipient (in an emergency, you can give them any type of blood)
  - O negative is the universal donor (in an emergency, you can give this type of blood to anyone)
- With any suspected transfusion reaction (febrile to fatal)
  - Stop the transfusion (imagine that)
  - Keep the IV open with saline
  - Send the remaining blood to the lab along with whatever blood and urine samples the lab wants
- Orders and advice
  - Verbal orders – Get them signed ASAP
  - Telephone advice – Unless you are a formally trained telephone advice nurse with protocols, don’t do it! (per ACEP and ENA)
- HIPAA
  - Everything’s changed since HIPAA
- Even for police, name, rank, and serial number is all they get – Everything else requires patient consent or a court order
Pediatric Pearls and Jeopardy Jewels

Let’s play…

How to play…

1) 2 teams – Blue DNR’s versus the Red RSV’s

2) If you are in the class, you may be chosen to play – It’s as simple as that

3) One side picks a question, then ONLY after I’ve finished reading the question, should you try to be the first to buzz in with your answer

4) Warning… Premature buzzing (i.e. before I’ve finished reading the question) will result in the other team being able to answer the question instead of you (bummer)

5) If you buzzed in first, answer the question – However, if you have a brain fart/TIA/performance anxiety and can’t remember squat, simply ask your team members for help and rest assured they will scream lots of suggestions your way

6) Most importantly, relax, have fun and thanx for playing

Pediatric Pearls and Jeopardy Jewels with me!
Fabulous Fluid Formulas

**Maintenance IV fluids:** 4-2-1

4 cc/kg/hr for 1-10 kg

4 cc/kg/hr for 1'st 10 kg (40 cc/hr), + 2 cc/kg/hr for 11-20 kg

4 cc/kg/hr for 1'st 10 kg 40 cc/hr), + 2 cc/kg for 11-20 kg (20 cc/hr), + 1 cc/kg/hr for each kg greater than 20

- Maintenance fluids for a 5 kg child
  
  4 cc/kg/hr = 4 cc/5 kg/hr
  
  Total maintenance fluids = 20 cc/hr

- Maintenance fluids for a 15 kg child
  
  4 cc/10 kg/hr for 1'st 10 kg = 40 cc/hr
  
  2 cc/5 kg/hr for next 5 kg = 10 cc/hr
  
  Total maintenance fluids = 50 cc/hr

- Maintenance fluids for a 30 kg child
  
  4 cc/10 kg/hr for 1'st 10 kg = 40 cc/hr
  
  2 cc/10 kg/hr for 2'nd 10 kg = 20 cc/hr
  
  1 cc/10 kg/hr for next 10 kg = 10 cc/hr
  
  Total maintenance fluids = 70 cc/hr

**Isotonic fluid (0.9NS or LR) boluses** - 20 cc/kg – Count their finger & toes

Repeat as needed x 3, then consider blood or wind up with "Kool-aid blood"

**Blood product boluses** - 10 cc/kg – Blood is thicker than water (0.9NS)

- 20 cc/kg for fluid boluses
- 10 cc/kg for blood boluses

**Pediatric Burn Fluid Resuscitation:**

2-4 cc/kg/body surface area burned (24 hour guide)

½ of above fluid in 1'st 8 hours since burn
Ten Commandments for Passing the CPEN

Preparing and passing the CPEN examination can be compared to my training and completion of the Chicago marathon. I trained sensibly (didn't try to run 20 miles the day before the marathon), and I completed the course because I did not let obstacles like uphill streets defeat me. You are NOT going to know EVERY single question with certainty, but you need to learn a strategy that will greatly increase your success.

Here's how:

You are motivated by the recognition and (possible) salary increases that comes from this certification. You are already part of an elite group because you are taking the test. In the marathon, there were six thousand runners, but there were tens of thousands of onlookers that I passed enroute. They recognized that what I was attempting was far beyond their capabilities. I had set aside time to train each day. Now those same people would see the results of my training, just as your fellow nurses will see the certification several weeks from now.

Let's talk about the science of the test:

1) Test questions have a specific anatomy, just as you do. The stem is the problem, stated in a question and the answer will be all of the following:
   A) Reference validation of 5 years of less (i.e. no CPR done with victim on stomach and pulling on his arms etc.)
   B) Plausible, i.e. the answer makes sense
   C) Usually two distracters or wrong answers can be found. Eliminate these promptly, just as contestants can have two answers removed on TV’s Who Wants to be a Millionaire?

2) No credible test preparer would have an obvious answer pattern for the test such as A, then B, then C, and then D. It may have worked for junior high teachers, but not for CPEN test item writers.

3) Is guessing allowed?
   Yes and so is prayer. Correct guess answers get the same credit as 100% certain answers.

4) Test makers include qualifiers like usually, commonly possibly and probably. How should I react to these?
   They are more likely to be right than wrong.
5) What about absolutes like all, always, none, or never? They are more likely to be wrong. Just as grammar rules have exceptions. So do these absolutes. Are you absolutely sure that the patient is a woman? Ever been fooled? You never really know until you place the Foley!

6) Can short answers also be correct? Do they have to be several sentences long to be the best answer? A shorter answer can certainly be the correct answer. Remember... everything in the answer must be correct. If one of the four facts stated are incorrect, it is the WRONG answer. You cannot be sort of pregnant any more than sort of right. You are either 100% correct or 100% wrong. The correct answer is 100% correct in its statements.

7) What about word fit? Word fit means; do the words in the sentence sound correct? A choice whose content or wording does not seem in the same class with the other choices is more than likely going to be wrong. Use this principle as an eliminator. (See 1C)

8) I want to prepare intelligently, not haphazardly; any suggestions?
A) Have a plan that uses these five keys:
   1) The right study references such as my CPEN Review Manual (www.Peds-R-Us.com), the ENPC and PALS textbooks, and the ENA peds core curriculum.
   2) A time and place that minimizes distractions. Been to the library in a while? Librarians enforce the quiet atmosphere. There are no TV's or radios in the library.
   3) Study for 20-30 minutes; then take a meaningful break away from study materials.
   4) Everyone is not an expert at everything. Review your weak areas, i.e. what kind of patients you don't see every day.
   5) Remember that the test is based upon evidence based practice, which means what your hospital does every day, may not actually be the correct answer.
B) Organize a study group of likeminded members. Each member will bring particular insights to the group.
C) Prepare flash cards on topics using 3 X 5 cards. Question on one side; answer on the other. You can whiz through a section of anatomy or unfamiliar emergencies quickly with well thought out questions.
D) These steps may seem like Study Skills 101, but the principles are the same; study smarter, not harder.

9) And the day of the test? What should be my focus?
A) You should have rested the night before, not indulged in a marathon cram session covering several anatomy and peds references. Preparation before the test involves weeks, not hours. You cannot chug-a-lug the materials in one night. You have a plan that has been followed. You could not read War and Peace the night before a World Literature final; don't try the equivalent for the CPEN.
B) Allow adequate travel time so that you do not arrive late. Test sites commonly schedule morning and afternoon sessions and if you are late, out of courtesy to the next person, they may
not let you begin your examination. Yes, there can be accident sites on the way to your exam
day; allow for the unexpected.
C) Arrive early. You can always engage in meaningless conversation with other test takers.
Your calmness prior to the test will only add to their anxiety level as they think why isn't this
person madly reviewing anything?

10) And the test itself?
A) Make sure your answer is the final answer. You have read through all the choices, you
eliminated as many as possible; you looked for the most correct answer where nothing is
incorrect.
B) Answer all the questions you are certain of first. All questions are of equal weight; do NOT
throw away valuable time agonizing over one question.
C) Mark and come back to the unanswered questions; do the ones you are confident of first.
This is making wise use of your time restrictions.
D) Unlike state board exams many years ago, in which you had to wait for weeks for your
results, you will know that you passed immediately after completing the test.

Web based resources:

- www.bcencertifications.org
- http://www.testtakingtips.com

Thanks to Lynn Mohr MS,RN,PCNS-BC,CPN and Larry DeBoer MA for their invaluable input
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References: CPEN Review


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 & 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 & 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 old’s 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 & 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 & 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 & eat it. Drink half bottle of vanilla extract or one vial of vegetable dye.

Lunch: Half tube of “pulsating pink” lipstick & 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 & continue slurping until it is clean again. Then bring inside & 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 yesterday’s sucker from rug, lick off fuzz, put it on the cushion of best chair.

Lunch: Three matches, peanut butter & jelly sandwich. Spit several bites onto the floor. Pour glass of milk on table & 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 & feed cereal to dog.

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

How To Raise Mom & Dad

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 & 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 & you’re lonely, call Mommy. She’ll come in & 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, one-dot Legos, Playmobil cuffs, collars, and hair thingies), put some in every room of the house. Mommy & Daddy will like finding this stuff because it reminds them of you.

11) Mommy & 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 & 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 & Daddy hug each other, always go and get in the middle because it’s the best kind when it’s everybody hugging.

Josh Lerman
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 fact that the thought that even God’s omnipotence did not extend to His own children. After creating Heaven & Earth, God created Adam & 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 & 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 & 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 & Eve should have children of their own. Thus the pattern was set & it has never changed!

But there is reassurance in the story! If you have persistently & lovingly tried to give children wisdom & 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?
Things to think about!

1) You spend the first two years of their life teaching them to walk & talk. Then you spend the next sixteen telling them to sit down & shut up.

2) Grandchildren are God’s rewards for not killing your own children.

3) Mothers of teens now know why some animals eat their young.

4) Children seldom misquote you. In fact, they usually repeat word for word what you shouldn’t have said.

5) The main purpose of holding children’s parties is to remind yourself that there are children more awful than your own.

6) We childproofed our homes, but they are still getting in!

7) Be nice to your kids. They will choose your nursing home one day.

8) If you have a lot of tension & you get a headache, do what it says on the Aspirin bottle... TAKE TWO ASPIRIN & KEEP AWAY FROM CHILDREN!”
Crash

Certified Pediatric Emergency Nurse (CPEN) Review

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