Pediatric Survival Guide 2019-2020

Children's Hospital
HSHS St. John's

SIU SCHOOL of MEDICINE

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Welcome to the Pediatrics Clerkship!!

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Clerkship Nurse Educator
217-741-6253

Other important numbers:

Memorial Medical Center: 217-788-3000
Nursery: 788-3569

St. John's Hospital: 217-544-6464
Pediatric ICU: ext 30550
Pediatric IMC: ext 30530
Pediatric South: ext 30520

SIU Clinics
Pediatric Outpatient Clinic: 545-7485

All Faculty, Residents and Students can be paged through WebExchange and Sophia

Educational Goals

(**S**pecific **M**easureable **A**ttainable **R**elevant **T**ime-bound)

My educational goals are:

1. _____
   _____
   _____

2. _____
   _____
   _____

3. _____
   _____
   _____

My plan to achieve these goals is:

_____
_____
_____
_____

Coachability Curriculum:
https://mycourses.siumed.edu/course/view.php?id=1117

Frequently Called Numbers

HOSPITAL NUMBERS:

ST. JOHN CHILDREN'S HOSPITAL:	(217) 544-6464
CHARGE NURSE:	51423
CLERK:	51619
PICU:	30550
PIMC:	30540
SOUTH:	30520
NORTH:	30510
RESIDENT PHONE:	76227
FLOOR FAX #:	(217) 757-6166/(217) 757-6167
CENTRAL SUPPLY:	44161
HOUSEKEEPING:	44190
SECURITY:	44020
IT:	44980

PHARMACY:

PHARMACY	44660
WCC PHARMACY	30425/44551
IV ROOM	44675
HOME INFUSION	45956/45947
HOME HEALTH:	55641

THERAPIES:

RT:	51714
RT PAGER	7131
PT/OT:	30200
SPEECH THERAPY:	30217
WEEKEND OT:	(217) 527-2187
WEEKEND PT:	(217) 527-9870
WEEKEND ST:	(217) 527-6609
SOCIAL WORKER:	30478/51453
SOCIAL WORKER AFTER HOURS:	(217) 638-8373
CHILD LIFE:	51757/51573
DIETITIAN:	45298/44948
SEDATION TEAM:	30530
CASE MANAGEMENT:	51449

Frequently Called Numbers

EMERGENCY DEPARTMENT:	
ER:	44040
ED SOUTH:	40045

SJH RADIOLOGY:	
X-RAY:	44770
X-RAY (PORTABLE):	51550
CT:	55608
MRI:	47712
ULTRASOUND:	55609
ECHO:	45057
EKG PAGER:	1125

LAB:	
MAIN:	44120
COLLECTOR:	51585
MICRO:	44135
BLOOD BANK:	44140
CHEMISTRY:	48205
REFERENCE LAB	44121

CLINIC NUMBERS:	
CHILD PSYCH:	(217) 545-6900
SURGERY CLINIC:	(217) 545-9450

DEPARTMENT OF PEDIATRICS:	
DR. JANET PATTERSON:	(217) 545-7827
DR. MICHELLE MINER:	(217) 545-7214
DR. JODY LACK:	(217) 545-7017
ANNELISA HERTER	(217) 545-8980
CHIEF OFFICE:	(217) 545-8977
SUPERVISOR ROOM:	(217) 545-4333

What to do for an exposure to blood/body fluids

An exposure is a needle stick, cut, puncture wound, mucous membrane splash or cutaneous exposure (especially if the skin is broken).

1. Wash exposed site immediately
    a. For **needle stick, cut, puncture wound or cutaneous exposure**, wash with soap and water.
    b. For **mucous membrane** splash (eyes, nose, mouth), flush with water only for fifteen minutes.

2. IMMEDIATELY contact Employee Health by phone (545-8970) or by pager (492-2446)
    a. If exposure occurs after 4:30pm or on a weekend or holiday, contact the SIU Infectious Disease physician on call; contact the Employee Health Nurse the next working day.
    b. If exposure occurs at a satellite site, follow the site's procedures for exposures; contact the Employee Health Nurse as soon as possible.

3. Complete a Report of Exposure Form
    a. Describe the incident in detail, including route of exposure, description of the resident's duties as they relate to the exposure and type of device used during exposure.
    b. Include information about the source patient, if known (name, medical record number, date of birth, physician name).

HSHS St. John's Hospital

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FACILITY: St. John's Hospital	**MANUAL(S): Infection Prevention and Control**
TITLE: Exposures to Blood/Body Fluids	**ORIGINATING DEPARTMENT: Infection Control**
SUPERCEDES:	**POLICY NUMBER:**

I. POLICY:
HSHS St. John's shall take steps to protect hospital colleagues from exposure to potentially infectious body substances. Protection shall consist of the following components: a prioritized surveillance and immunization program, standard isolation precautions, continued education, and post exposure follow-up care.

II. PURPOSE:
To provide maximum protection of hospital colleagues at risk from exposure to bloodborne pathogens

III. DEFINTIONS:

IV. GUIDELINES/PROCDURES

A. Employee Responsibilities

1. The employee shall follow the following steps when the employee has experienced an exposure to blood or body fluids via a needle stick, cut, or puncture wound, a mucous membrane splash, or a cutaneous exposure to non-intact skin:

   a. Wash exposed site immediately.
      i. If needlestick, cut, puncture wound or cutaneous exposure with soap and water.
      ii. If splash to eyes or mouth, flush with water.

   b. Inform supervisor or charge person

   c. Contact Occupational Health Services immediately to initiate follow up. If Occupational Health Service is closed, notify the House Supervisor on duty at x51555, who will initiate immediate assessment and follow up as needed. Following this immediate evaluation, Occupational Health Services will arrange further follow up, which may include a medical evaluation and confidential counseling.

   d. Provide the source patient information (date of birth, medical record number, attending physician's name) to Occupational Health Services/ House Supervisor when seen by them.

   e. Fill out incident report in IRIS, including the following information:
      i. Detailed description of the incident.
      ii. Information about the source patient (patient name, medical record number).
      iii. Description of job duties involved in exposure incident.

   f. Colleagues shall obtain hospital issued scrubs in the event that their work attire becomes soiled with blood or body fluids. The colleague's soiled work attire will be laundered by the facility.

B. Occupational Health Service Responsibilities

Residency Program Monthly Checklist

July
- Review rotation description for next rotation
- Sign off on duty hours (Middle & End of month)
- Complete rotation evaluation

August
- Review rotation description for next rotation
- Sign off on duty hours (Middle & End of month)
- Schedule advisor meeting – Interns
- Complete rotation evaluation

September
- Schedule advisor meeting – Seniors
- Review rotation description for next rotation
- Sign off on duty hours (Middle & End of month)
- ILP due
- Prep questions due

October
- Schedule advisor meeting – Interns
- Review rotation description for next rotation
- Sign off duty hours (Middle & End of month)
- Complete rotation evaluation

November
- Review rotation description for next rotation
- Sign off duty hours (Middle & End of month)
- Complete rotation evaluation

December
- Schedule advisor meeting – All residents
- Review rotation description for next rotation
- Sign off duty hours (Middle & End of month)
- Prep questions due

January
- Review rotation description for next rotation
- Sign off duty hours (Middle & End of month)
- Complete rotation evaluation

February
- Schedule advisor meeting – Interns
- Review rotation description for next rotation
- Sign off duty hours (Middle & End of month)
- Complete rotation evaluation

March
- Schedule advisor meeting – Seniors
- Review rotation description for next rotation
- Sign off on duty hours (Middle & End of month)
- Complete rotation evaluation
- Prep questions due

April
- Schedule advisor meeting – Seniors
- Review rotation description for next rotation
- Sign off on duty hours (Middle & End of month)
- Complete rotation evaluation

May
- Review rotation description for next rotation
- Sign off duty hours (Middle & End of month)
- Complete rotation evaluation

June
- Schedule advisor meeting – Interns
- Review rotation description for next rotation
- Sign off on duty hours (Middle & End of month)
- Prep questions due
- SCRIHS certification due

Isolation Precautions

Red Book Online
http://redbook.solutions.aap.org/chapter.aspx?sectionid=56798173&bookid=886

Airborne Isolation:
Airborne transmission occurs by dissemination of airborne droplet nuclei (small-particle residue [≤5 μm in size] of evaporated droplets containing microorganisms that remain suspended in the air for long periods) or small respirable particles containing the infectious agent or spores. Microorganisms transmitted by the airborne route can be dispersed widely by air currents and can be inhaled by a susceptible host within the same room or a long distance from the source patient, depending on environmental factors. Special air handling and ventilation are required to prevent airborne transmission.

Use special ventilation, including 6 to 12 air changes per hour, air flow direction from surrounding area to the room, and room air exhausted directly to the outside or recirculated through a high-efficiency particulate air (HEPA) filter.

If infectious pulmonary tuberculosis is suspected or proven, respiratory protective devices (ie, National Institute for Occupational Safety and Health-certified personally “fitted” and “sealing” respirator, such as N95 or N100 respirators, powered air-purifying respirators) should be worn while inside the patient’s room.

Susceptible health care personnel should not enter rooms of patients with measles or varicella-zoster virus infections. If susceptible people must enter the room of a patient with measles or varicella infection or an immunocompromised patient with local or disseminated zoster infection, a mask or a respiratory protective device (eg, N95 respirator) that has been fit-tested should be worn. People with proven immunity to these viruses need not wear a mask.

Droplet Isolation:
Droplet transmission occurs when droplets containing microorganisms generated from an infected person, primarily during coughing, sneezing, or talking and during the performance of certain procedures, such as suctioning and bronchoscopy, are propelled a short distance (3 feet or less) and deposited into conjunctivae, nasal mucosa, or the mouth. Because these relatively large droplets do not remain suspended in air, special air handling and ventilation are not required to prevent droplet transmission. Droplet transmission should not be confused with airborne transmission via droplet nuclei, which are much smaller. Specific recommendations for Droplet Precautions are as follows:

Isolation Precautions

Provide the patient with a single-patient room if possible. If unavailable, consider cohorting patients infected with the same organism. Spatial separation of more than 3 feet should be maintained between the bed of the infected patient and the beds of the other patients in multiple bed rooms. Standard precautions plus a mask should be used.
Wear a mask on entry into the room or into the cubical space.

Specific illnesses and infections requiring Droplet Precautions include the following:

- Adenovirus pneumonia
- Diphtheria (pharyngeal)
- Haemophilus influenzae type b (invasive)
- Influenza
- Mumps
- Mycoplasma pneumoniae
- Neisseria meningitidis (invasive)
- Parvovirus B19 during the phase of illness before onset of rash in immunocompetent patients (see Parvovirus B19, p 539)
- Pertussis
- Plague (pneumonic)
- Rhinovirus
- Rubella
- Severe acute respiratory syndrome (SARS): airborne preferred; droplet if unavailable
- Severe acute respiratory syndrome (SARS): airborne preferred; droplet if unavailable
- Group A streptococcal pharyngitis, pneumonia, or scarlet fever
- Viral hemorrhagic fevers

Contact Isolation:
Contact Transmission is the most common route of transmission of health care-associated infections. Direct contact transmission involves a direct body surface-to-body surface contact and physical transfer of microorganisms between a person with infection or colonization and a susceptible host, such as occurs when a health care professional turns a patient, gives a patient a bath, or performs other patient care activities that require direct personal contact. Direct contact transmission also can occur between 2 patients when one serves as the source of the infectious microorganisms and the other serves as a susceptible host. Indirect contact transmission involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated instruments, needles, dressings, toys, or contaminated hands that are not cleansed or gloves that are not changed between patients.

Specific illnesses and infections with organisms requiring Contact Precautions include the following:

Isolation Precautions

Colonization or infection with multidrug-resistant bacteria judged by the infection control practitioner on the basis of current state, regional, or national recommendations to be of special clinical and epidemiologic significance (eg, vancomycin-resistant enterococci; methicillin-resistant Staphylococcus aureus; multidrug-resistant, gram-negative bacilli) or other epidemiologically important susceptible bacteria

- C difficile
- Conjunctivitis, viral and hemorrhagic
- Diphtheria (cutaneous)
- Enteroviruses
- Escherichia coli O157:H7 and other Shiga toxin-producing E coli
- Hepatitis A virus
- Herpes simplex virus (neonatal, mucocutaneous, or cutaneous)
- Herpes zoster (localized with no evidence of dissemination)
- Human metapneumovirus
- Impetigo
- Major (noncontained) abscess, decubitus ulcer
- Parainfluenza virus
- Pediculosis (lice)
- Respiratory syncytial virus
- Rotavirus
- Salmonella species
- Scabies
- Shigella species
- S aureus (cutaneous or draining wounds)
- Viral hemorrhagic fevers (Ebola, Lassa, or Marburg)

Isolation Precautions

Isolation Precaution: A Quick Guide

Symptoms/ Syndrome	Examples of Pathogens	Type of Precaution	Personal Protective Equipment
Rhinorrhea	Rhinovirus, Influenza, adenovirus	Contact and Droplet	Gown, Gloves, and Mask
Cough	Rhinorvirus, Influenza, Mycoplasma Pneumoniae, Bordetella Pertussis	Contact and Droplet	Gown, Gloves, and Mask
Conjunctivitis	H. influnenza, Adenovirus	Contact and Droplet	Gown, Gloves, and Mask
Bronchiolitis	RSV, Rhinovirus, parainfluenza, influenza	Contact and Droplet	Gown, Gloves, and Mask
Pneumonia	RSV, parainfluenza, Mycoplasma pneumoniae, Chlamydophila pneumoniae, Strep pneumoniae, Bordetella pertussis	Contact and Droplet	Gown, Gloves, and Mask
Pneumonia	Mycobacterium tuberculosis	Airborne	Gown, Gloves, negative pressure room, PAPR respirator or N95 mask if fit tested
Vomiting	Rotavirus, Norovirus	Contact	Gown and Gloves
Diarrhea	Rotavirus, salmonella, shigella, E. coli, E. coli O157:H7, C. diff	Contact	Gown and Gloves
Skin or soft tissue infection	MRSA	Contact	Gown and Gloves
Chicken Pox or Shingles	Varicella Zoster Virus	Airborne	Gown and Gloves if not immunized N-95 mask
Bacterial Meningitis	Neisseria Meningitidis	Contact and Droplet	Gown, Gloves, and Mask
Aseptic Meningitis or Encephalitis	Enterovirus, HSV	Contact	Gown and Gloves

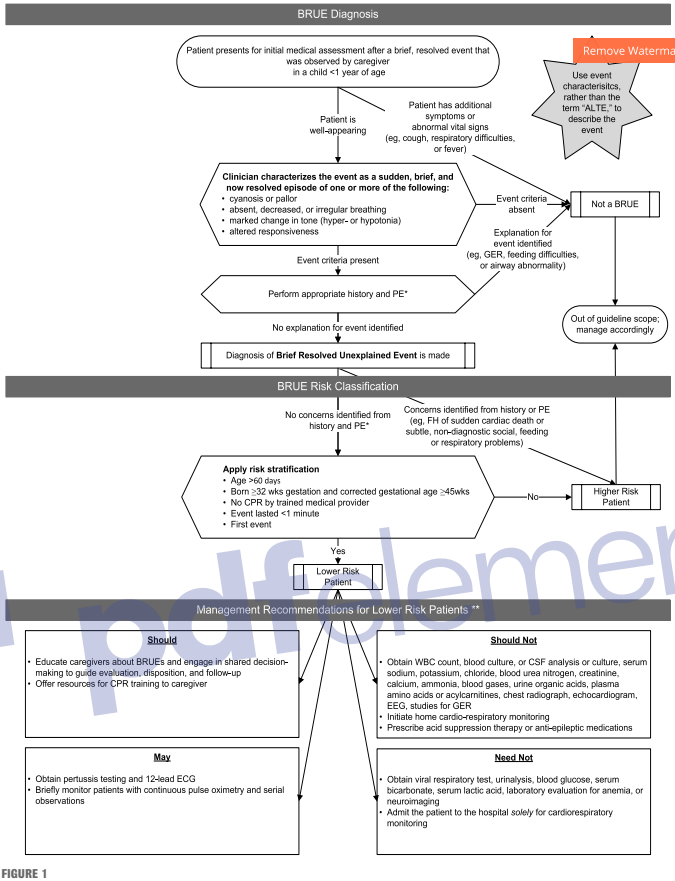


FIGURE 1
Diagnosis, risk classification, and recommended management of a BRUE. *See Tables 3 and 4 for the determination of an appropriate and negative FH and PE. **See Fig 2 for the AAP method for rating of evidence and recommendations. CSF, cerebrospinal fluid; FH, family history; PE, physical examination; WBC, white blood cell.

Rochester Criteria

Previously healthy febrile infants less than 60 days of age are considered at low risk for serious bacterial infection if all of the following criteria are met:

1. Infant appears generally well and nontoxic.
2. Infant has been previously healthy:
   - Born at term (> 37 weeks' gestation)
   - No antenatal or perinatal antimicrobial therapy
   - No treatment for unexplained hyperbilirubinemia
   - Not hospitalized longer than mother
   - Has not received and not currently receiving antimicrobial therapy
   - No previous hospitalization
   - No chronic or underlying illnesses
3. Infant has no evidence of skin, soft tissue, bone, joint, or ear infection on physical examination.
4. Infant meets the following laboratory parameters:
   - Peripheral white blood cell count of 5,000 to 15,000 per [mm.sup.3] (5.0 to 15.0 X [10.sup.9] per L)
   - Absolute band cell count of less than 1,500 per [mm.sup.3]
   - Less than 10 white blood cells per high-power field on microscopic examination of spun urine sediment
   - Less than 5 white blood cells per high-power field on microscopic examination of a stool smear (in infants with diarrhea)

Variables in the Prediction of Bacterial Meningitis

Positive cerebrospinal fluid Gram stain
Cerebrospinal fluid absolute neutrophil count ≥1000 cells/pL
Cerebrospinal fluid protein ≥80 mg/dL
Peripheral blood absolute neutrophil count ≥10 000 cells/pL
History of seizure before or at the time of presentation

Patients are classified as very low risk if none of these variables are present.

JAMA, January 3, 2007 – Vol 297, No. 1 (reprinted)

Asthma/Bronchiolitis Respiratory Scori

RR	0) Normal
	1) above tachypnea threshold Infant >50, Child >40; adol. >35
Accessory Muscles	0) Normal
	1) Subcostal/intercostal retractions
	2) neck or abdominal muscles
Air Exchange	0) normal
	1)** localized decreased
	2)** generalized area decreased
Wheeze	0) end exp/none
	1) entire expiration
	2) entire exp/inspiration
I:E ratio	0) </= 1:2 (normal)
	1) >/= 1:3 (prolonged)

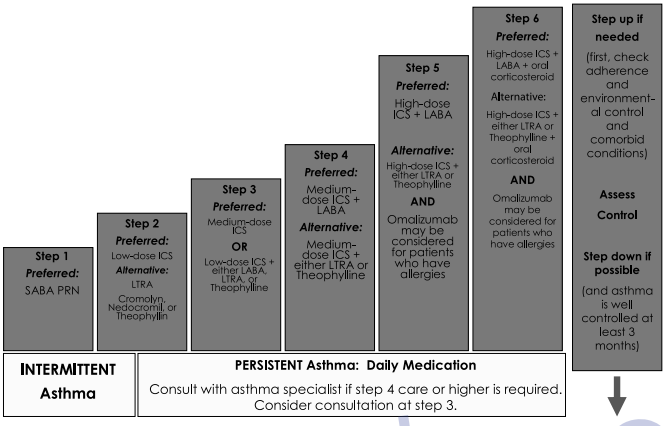
NHLBI Full Report of the Expert Panel 2007: Guidelines for the Diagnosis & Management of Asthma

Components of Severity		Classification of Asthma Severity (5-11 years of age)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment	Symptoms	≤ 2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤ 2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta$_2$-agonist use for symptom control (not prevention of EIB)	≤ 2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung Function	Normal FEV_1 between exacerbations • FEV_1 > 80 % predicted • FEV_1/FVC >85 %	• FEV_1 = > 80 % predicted • FEV_1/FVC >80 %	• FEV_1 = 60-80 % predicted • FEV_1/FVC = 75-80 %	• FEV_1 < 60 % predicted • FEV_1/FVC < 75 %
Risk	Exacerbations (consider frequency and severity)	0-2/year	>2 in 1 year →		
		← Frequency and severity may fluctuate over time for patients in any severity category →			
		Relative annual risk of exacerbations may be related to FEV_1			

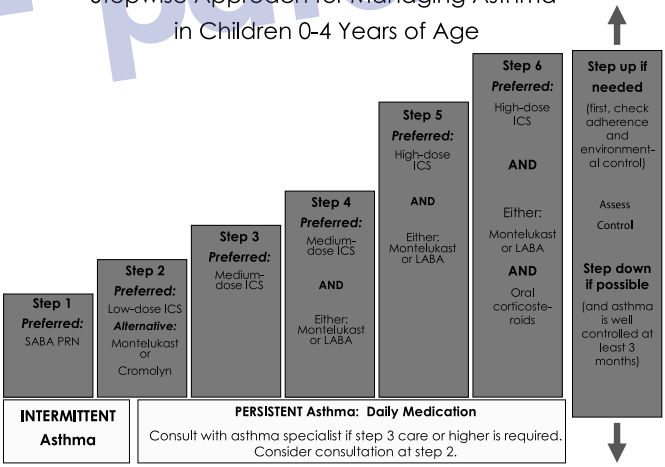
NHLBI Full Report of the Expert Panel 2007: Guidelines for the Diagnosis & Management of Asthma

Components of Severity		Classification of Asthma Severity (0-4 years of age)			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment	Symptoms	≤ 2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	0	1-2x/month	3-4x/month	>1x/week
	Short-acting beta$_2$-agonist use for symptom control (not prevention of EIB)	≤ 2 days/week	>2 days/week but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
Risk	Exacerbations (consider frequency and severity)	0-1/year	≥ 2 exacerbations in 6 months requiring oral steroids, or ≥ 4 wheezing episodes/1year lasting > 1 day AND risk factors for persistent asthma		
		← Frequency and severity may fluctuate over time →			
		Exacerbations of any severity may occur in patients in any severity category			

Stepwise Approach for Managing Asthma in Children 5-11 Years of Age



Stepwise Approach for Managing Asthma in Children 0-4 Years of Age



*Always know details
- What treatments being given (aerosol= neb, or MDI)
- when the last treatment was, how often they are receiving
- any hypoxia
- secretions suctioned (thick, thin, large, etc) and how (deep nasal vs bulb)

*Flovent: start or increase if there are frequent exacerbations **with regular and correct usage** of home albuterol, nighttime symptoms, moderate persistent or worse severity
*Singulair: consider if seasonal component to asthma flares
*Do spacer on any child over 5 years
*Do mask with spacer if <5 years
*Always order asthma education and fill out asthma action plan
*NEVER start a child at q 4 hours or give PRN nebs
*ICU transfers: always switch to po steroid, MDI from nebulizer.
*Severity
- Mild Intermittent: <2x per week, brief exacerbations(hrs-days)
  nighttime sxs <2x/month
- Mild persistent: sxs >2x/wk but <1/day
  exacerbations affect activity
  nighttime sxs >2x/mo
- Moderate persistent: daily sxs, daily use of albuterol
  exacerbations affect activity and occur >2x/wk
  nighttime sxs >1x/wk
- Severe perisistent: continual sxs, limited activity
  frequent exacerbations, frequent night sxs

Sedation Guidelines

Inpatient

Flow Chart to Schedule Inpatient Pediatric Sedations

Attending Physician

Non-Emergent

Contact Sedation Team at ext. 51620 or ext. 76122 M, T, Th, Fr 0700-1730

--

After hours, Wednesdays and weekends, contact Charge Nurse ext. 51423

--

Contact PICU On-Call Attending at 836-9187

Emergent

Criteria of Emergent Cases:
Loss of Life or Limb,
Significant change in management,
Significant change in clinical picture

Attending Physician who is requesting the study **Radiologist ext. 49729 or 814-9729** and then **Contact PICU Attending 836-9187**

Triage

Anesthesia Sedation Team

PICU Attending must do the following:
*Contact On-Call Anesthisiologist x51932
***Anesthesiologist** to contact Surgery Surgery Desk x44350
***Anesthesia** to Coordinate with Sedation Team x51620, when indicated
****Anesthesia** will contact ordering physician, only if more information is needed about patient.

PICU Sedation Team

Coordinate with :
*PICU Attending
*Charge Nurse
*Sedation Team

On Mondays-MRI tech to call DHSP at 0700 to discuss possible sedation times-if an anesthesia case will be on-call

NPO Guidelines

- Solid foods until **8 hours** before
- Milk/baby food/cereal/formula until **6 hours** before
- Breastmilk until **4 hours** before
- Clear liquids until **3 hours** before

Rev. 09/2014

Flow Chart to Schedule Inpatient Pediatric Sedations

Charge Nurse Responsibilities
(On Wednesdays, After hours and on weekends)

- Discuss the case with the PICU attending on call, 836-9187
- Schedule time for procedure/sedation when sedation team is involved
- Coordinate with MRI/IR
- Arrange for nurse to be available for sedation/recovery, if possible
- **When Anesthesia is involved**:
- Inform the Attending to contact x51932 (Anesthesia) to discuss the case
- Notify at the end of the shift to the incoming Charge Nurse
- Arrange for Nurse to be available for sedation/recovery, when appropriate.

Attending Physician Expectations

- Prior to requesting an imaging procedure where sedation is deemed necessary, the ordering physician will explore other imaging alternatives available with the Radiologist at ext. 49729 where sedation may not be required.
- The Attending Physician (ordering physician) will be expected to discuss the case with the PICU Attending (836-9187).

*If further clarification is needed in the case, the Anesthesiologist will contact the attending physician. *

Maintenance requirements

Caloric expenditure method:
For each 100 calories metabolized in 24 hours, the average patient will need 100 to 120 ml H2O, 2 to 4 mEq Na^+ and 2 to 3 mEq K^+.

Average Water and Electrolyte Requirements per 100 Calories per 24 Hours

Clinical State	H2O (ml)	Na^+	K^+
Average pt receiving parenteral fluids	100 to120	2 to 4	2 to 3
Anuria	45	0	0
Acute CNS infections and inflammation	80 to 90	2 to 4	2 to 3
Diabetes insipidus	Up to 400	Variable	Variable
Hyperventilation	120 to210	2 to 4	2 to 3
Heat stress	120 to 240	Variable	Variable
High humidity environment	80 to 100	2 to 4	2 to 3

Volume (ml/kg/day) *Preferred method

Patient's Weight Range	Maintenance Fluids needed per 24 hours
10 kg or less	100 ml/kg
11 to 20 kg	1000 ml plus 50 ml for each kg over 10
More than 20 kg	1500 ml plus 20 ml for each kg over 20

Examples:
15 kg child maintenance fluids = 1250 ml/24 hours
25 kg child maintenance fluids = 1600 ml/24 hours

Hourly Rate
Divide daily maintenance by 24 or use 4:2:1 rule *Shortcut method

Patient's Weight Range	Hourly maintenance fluid rate
10 kg or less	4 ml/hr for each kg
11 to 20 kg	40 ml/hr plus 2 ml/hr for each kg over 10
More than 20 kg	60 ml/hr plus 1ml/hr for each kg over 20

Examples:
15 kg child maintenance = 50 ml per hour for 24 hrs = 1200 ml
25 kg child maintenance = 65 ml per hour for 24 hrs = 1560 ml

Holliday-Segar Method

	Water		Electrolytes mEq/100 ml H2O
Body weight	ml/kg/d	ml/kg/hr	
First 10 kg	100 ÷24 hr/day	~4	Na^+ 3
Second 10 kg	50 ÷ 24 hr/day	~2	Cl^- 2
Each additional kg	20 ÷ 24 hr/day	~1	K^+ 2

Adapted from The Harriet Lane Handbook: A Manual for Pediatric House Officers, 18th ed., 2008.

Formulas and Rules of Thumb

1. total body water (TBW) = 0.6 X wt (kg) males
   0.5 X wt (kg) females

2. total osmolality = 2 X Na (mEq/L) + $\frac{\text{glucose (mg/dl)}}{18}$ + $\frac{\text{BUN (mg/dl)}}{2.8}$

3. osmolar Gap = measured osmolality – total osmolality

4. water deficit = TBW X $\frac{\text{plasma Na}}{140}$ - 1

5. sodium deficit (mEq Na)= TBW X (140-plasma Na)
   (add (140 X wt loss (kg) if patient known to have fluid deficit)

6. Normal Compensatory Response to Simple Acid-Base Disorders:
   a. metabolic acidosis ΔpCO2 = 0.1 – 0.3 (ΔHCO3)
   b. metabolic alkalosis ΔpCO2=0.6 (ΔHCO3)
   c. respiratory acidosis
      acute ΔpCO2=0.1 (ΔHCO3)
      chronic ΔpCO2=0.35 (ΔHCO3)
   d. respiratory alkalosis
      acute ΔpCO2=0.2 (ΔHCO3)
      chronic ΔpCO2=0.5 (ΔHCO3)

7. pseudohyponatremia:
   For every 100 mg/dl ↑glucose → (Na) ↓1.6 mEq

8. hypocalcemia:
   For every ↓ 1 gm albumin →↓ 0.8 (Ca)

9. anion gap = Na – (HCO3 + Cl) (nl 12 +/- 2)

10. HCO3 Deficit = 0.5 X wt (kg) X (24 – plasma HCO3)

11. in metabolic acidosis
    ↓ pH by 0.1 → ↑ K by 0.6 mEq/L

12. Corrected Reticulocyte Count (CRC) = % reticulocytes X patient HCT/normal HCT
    A CRC more than 1.5 suggests increased RBC production

a. Timed urine specimen: Standard measure of glomerular filtration rate (GFR); closely approximates inulin clearance in the normal range of GFR. When GFR is low, Ccr is greater than inulin clearance. Usually inaccurate in children with obstructive uropathy or problems with bladder emptying.

Ccr (mL/min/1.73m^2) = (U x [V/P]) x 1.73/BSA

where U (mg/dL) = urinary creatinine concentration; V (mL/min) = total urine volume (mL) divided by the duration of the collection (min) (24 hours = 1440 min); P (mg/dL) = serum creatinine concentration (may average two levels) and BSA (m2) = body surface area.

b. Estimated GFR from plasma creatinine: Useful when a timed specimen cannot be collected; reasonable estimate of GFR for children with relatively normal renal function and body habitus. If habitus is markedly abnormal or precise measurement of GFR is needed, more standard methods of measuring GFR must be used.

Estimated GFR (mL/min/1.73 m^2) = kL/Pcr

where k = proportionality constant; L = height (cm); Pcr = plasma creatinine (mg/dL).

TABLE 19-5 - PROPORTIONALITY CONSTANT FOR CALCULATING GLOMERULAR FILTRATION RATE

Age	*k* Values
Low birth weight during first year of life	0.33
Term AGA during first year of life	0.45
Children and adolescent girls	0.55
Adolescent boys	0.70

From Schwartz GJ et al: The use of plasma creatinine concentration for estimating glomerular filtration rate in infants, children, and adolescents. Pediatr Clin North Am 1987;34:571.

TABLE 19-6 - NORMAL VALUES OF GLOMERULAR FILTRATION RATE

Age	GFR (Mean) (mL/min/1.73 m²)	Range (mL/min/1.73 m²)
Neonates <34 wk gestational age		
2–8 days	11	11–15
4–28 days	20	15–28
30–90 days	50	40–65
Neonates >34 wk gestational age		
2–8 days	39	17–60
4–28 days	47	26–68
30–90 days	58	30–86
1–6 mo	77	39–114
6–12 mo	103	49–157
12–19 mo	127	62–191
2 yr–adult	127	89–165

From Holliday MA et al: Pediatric Nephrology. Baltimore, Williams & Wilkins, 1994, p 1306.

PICU Drugs

Cardiovascular:

Adenosine: 1st dose 0.1 mg/kg IV rapid push (max 6 mg), 2nd dose 0.2mg/kg IV rapid push (max 12 mg)
Amiodarone: 5 mg/kg IV over 10 mins (For VF/pulseless VT) or over 20 mins (For arrhythmias with Pulse)
Atropine: 0.02mg/kg/dose every 3-5 mins (min 0.1 mg, max 1mg)
Calcium Gluconate: 100 mg/kg (max 1 gram)
Dobutamine: 2.5-15 mcg/kg/min
Dopamine: 5-20 mcg/kg/min
Epinephrine: 0.1 mg/kg ETT (1:1,000); 0.01 mg/kg IV (1:10,000); 0.02-0.1 mcg/kg/min
Lidocaine: 1mg/kg IV
Milrinone: 0.25-1 mcg/kg/min
Nicardipine: 0.5-5 mcg/kg/min; Adult dosing 2.5-15 mg/hr
Nitroprusside: 0.25-0.5 mcg/kg/min
Norepinephrine: 0.02-0.1 mcg/kg/min
PGE: 0.0125-0.05 mcg/kg/min
Vasopressin: Shock Dosing 0.0003-0.002 units/kg/min

Neurovascular:

3% Sodium Chloride: 2-6 ml/kg IV (max 250 ml); 0.5-1 ml/kg/hr
Cisatracurium: 0.1-0.2 mg/kg; 0.1-0.3 mg/kg/hr
Dexmedetomidine: 0.2-1 mcg/kg/hour
Etomidate: 0.1-0.4 mg/kg infused over 30-60 seconds
Fentanyl: 1 mcg/kg IV; 1-3 mcg/kg/hr
Flumazenil: 0.01 mg/kg (max 0.2 mg)
Fosphenytoin/ Phenytoin: 20 mg/kg IV
Ketamine: 0.5-2 mg/kg IV; 5-20 mcg/kg/min
Lorazepam: 0.05-0.1 mg/kg IV q4-6 PRN; may repeat q5-15 min (max dose 4 mg)
Mannitol: 0.5-1 gm/kg IV q6 (To increase serum osmolality to 300-310)
Midazolam: 0.05-0.1 mg/kg IV q1-2 PRN (Adult 2-4 mg); 0.05-0.2 mg/kg/hour
Morphine: 0.05-0.15 mg/kg q1-2hours PRN; drip 0.1-0.3 mg/kg/hr
Naloxone: 1-10 mcg/kg q2-3 min (max 2 mg); >3 doses call pharmacy to initiate drip
Pentobarbital: For Burst Suppression load with 10 mg/kg, then 1-2 mg/kg/hr
Phenobarbital: 20 mg/kg IV
Rocuronium: 1mg/kg IV
Vasopressin: DI Dosing 0.0005-0.01 units/kg/hr
Vecuronium: Bolus 0.1 mg/Kg, drip 0.1-0.2 mg/Kg/hour

Respiratory:

Dexamethasone: Upper Airway Edema 0.6 mg/kg q6 x 4 doses
Glycopyrrolate: 4-10 mcg/kg/dose IV q4hours
Magnesium Sulfate: Asthma 50 mg/kg IV, then 25 mg/kg IV q6 PRN
Methylprednisolone: Asthma 1mg/kg q6 IV (max 80)
Terbutaline: Load 2-10 mcg/kg IV; then 0.1-0.4 mcg/kg/min

Gastrointestinal/FEN:
Albumin: 0.5-1 gm/kg IV of 25% solution
Bumetanide: 0.1 mg/kg q6-12 IV (max 2 mg); 0.01-0.03 mg/kg/hr
Calcium Gluconate: 100 mg/kg IV (max 1 gram)
Furosemide: 0.5-1 mg/kg IV; 0.05-0.3 mg/kg/hr
Magnesium Sulfate: Repletion 25 mg/kg IV
Pantoprazole: 0.5-1 mg/kg IV q24 (Adult 40 mg)
Potassium Chloride: 0.5-1 mEq/kg IV (max 20 mEq)
Potassium Phosphate: 0.08-0.25 mmol/kg IV (Adult 15-30 mmol)
Ranitidine: 1 mg/Kg/dose IV Q8 hours
Sodium Bicarbonate: 1mEq/kg IV (max 50 mEq)
Sodium Phosphate: 0.08-0.25 mmol/kg IV (Adult 15-30 mmol)
Zofran: 0.15 mg/kg IV Q6-8 PRN (max 4mg)

Endocrinology:
Hydrocortisone: Stress 50 mg/m2, then 50 mg/m2/day ÷ q8; Physiologic 8-12 mg/m2/day ÷ q8
Insulin: Hyperglycemia 0.02-0.2 units/kg/hr; DKA 0.1 units/kg/hr (max 6 units/hr)

Cardioversion/Defibrillation

Atrial Arrhythmias: Synchronized 0.5-1 joules/kg
Ventricular Tachycardia (Pulse Present): Synchronized 0.5-2 joules/kg
Ventricular Fibrillation/ Ventricular Tachycardia (Pulseless): 2-4 joules/kg

Pain Medications

Mild to Moderate Pain (select only one)
Acetaminophen: 10 mg/kg PO/PR q 4 hours PRN pain or 15 mg/kg PO/PR q6 hours PRN pain
Ibuprofen: 10mg/kg PO q 6 hours PRN pain (ONLY AFTER 6 months old)

For Moderate Pain (select only one)
Toradol: Infant (< 12 months) 0.5mg/kg IV q 8 hours PRN; Children/Adults 0.5 mg/kg IV q6 PRN (max 30mg)
Hydrocodone/Acetaminophen (Lortab/Norco/Vicoden)*:
< 50 kg 0.1 mg/kg/dose q 4-6 hrs PRN pain
> 50 kg 5-10 mg q 4-6 hrs PRN pain
*max dosing of Acetaminophen ≤ 75 mg/kg/day in ≤ 5 divided doses and not to exceed 4000 mg/day

For Severe Pain (select only one)
Dilaudid: 0.01 mg/kg IV push every 2-4 hours PRN pain
Fentanyl: 1 mcg/kg IV q 2-4 hours PRN
Morphine: 0.1 mg/kg IV q 1-2 hours PRN pain

Mild Sedation/Anxiolysis:
Midazolam: 0.03-0.15 mg/kg/dose IV once (max 1 mg)
0.5 mg/kg/dose PO once (max 20 mg)
0.2-0.4 mg/kg/dose intranasal once (use 5mg/ml formulation)

Pediatric Glasgow Coma Scale for infants and young children

Eye Opening	Pts	Best Verbal Response	Pts	Best Motor Response	Pts
Spontaneous	4	Coos, babbles	5	Normal spontaneous	6
To speech	3	Irritable, cries	4	movement	
To pain	2	Cries to pain	3	Withdraws to touch	5
None	1	Moans to pain	2	Withdraws to pain	4
		None	1	Abnormal flexion	3
				Abnormal extension	2
				None	1

Glasgow Coma Scale

	Infant	Child and older	
Eyes open	Spontaneously	Spontaneously	4
	To verbal stimulus	To verbal stimulus	3
	To pain	To pain	2
	None	None	1
	Neuromuscular blockade/edema		C
Best verbal response	Content, coos	Oriented	5
	Irritable cries	Disoriented	4
	Cries to pain	Inappropriate words	3
	Moans to pain	Inconprehensible sounds	2
	None	None	1
	ETT/Trach (always include verbal response with “T”)		T
Best motor response	Moves purposefully	Obeys commands	6
	Withdrawals to touch	Localizes pain	5
	Withdrawals to pain	Withdrawals to pain	4
	Decorticate to pain	Flexion to pain	3
	Deceribate to pain	Extension to pain	2
	None	None	1

Equipment Size

Equipment	Newborn/Infant (3-9 kg)	Toddler/ Small Child (10-14 kg)	Child (15-23 kg)	Large Child (24-36 kg)	Adult
Laryngoscope blade	0-1 straignt	1-2 straight	2 straight or curved	2-3 straight or curved	3 curved
Endotracheal Tube	Premies 2.5 uncuffed Term 3.0-3.5 uncuffed Infant 3.0-3.5 un-/cuffed	4.0-4.5 cuffed	5.0-5.5 cuffed	6.0-6.5 cuffed	Female 7.0-7.5 cuffed Males 8.0-8.5 cuffed
ETT Length (cm at lip)	9-11	11-13.5	14-16.5	17-19.5	21-25
Stylet (F)	6	10	10	14	14
Suction catheter (F)	6-8	8-10	10	10-12	12-14
Oral Airway (mm)	50	60	60-70	80	80
NP Airway (F)	14	18-20	22-24	26	26
Chest tube (F)	10-12	16-24	20-24	28-40	36-40
IV catheter (G)	22-24	18-24	18-22	18-20	16-18
NG tube (F)	5-8	8-10	10	14-18	14-16
Urinary catheter (F)	5-8	8-10	10-12	12	14-16

Estimating ET tube size for children 2-10 years of age:

Uncuffed ET tube size = (age in years/4) + 4, Cuffed ET tube = (age in years/4) + 3.5

Depth of insertion for children >2 years of age:

Depth= (age in years/2) + 12 OR tube size (mm) x3

Vent Settings

Initial BiPap Settings:

Inspiratory pressure 8-10

Expiratory pressure 5

Initial Vent Settings:

PEEP 5
*may need higher for pneumonia, ARDS, near drowning, pulmonary edema

Tidal volume 6-8 ml/kg

FiO2 1.0, then decreased as able

RR near or below physiologic rate for age

Remember

If CO2 is high, can try increasing rate or tidal volume

If CO2 is low, try decreasing the rate

PICU Respiratory Scoring Protocol

This protocol is only for patients managed by the PICU team. All patients will receive continuous nebulized albuterol (0.5 mg/kg, max 15 mg) and systemic steroids 2 mg/kg/day, max 80 mg/day.

Procedure:

1. All patients will receive continuous nebulized albuterol (0.5 mg/kg, max 15 mg).
2. The patient will have a clinical asthma score (CAS) done by a respiratory therapist at initiation of protocol and then every 2 hours.
3. **RT** to perform and document Peak flows qid on all children not on BIPAP and ≥6 years old.
4. Increasing Therapy:
    a. Initial score of ≥4: Place on BIPAP and **notify attending**.
    b. Initial score 2-4: evaluate the need for BIPAP **notify attending**.
    c. Initial score ≥6: Place on BIPAP and MgS04 and Heliox (see below for doses) **notify attending**.
    d. After 2 hours, if the CAS is more than the score at initiation, or if CAS does not decrease after 4 hours of initiation **notify attending and initiate adjunct therapy** in the following order:
        1. NIV Bi level ventilation
            a. BIPAP parameters:
                1. IPAP of 8 cm H_20 then increase as tolerated to achieve a TV of 6-9 ml/kg
                2. EPAP of 5 cm H_20 and increase as needed to decrease WOB.
            b. Smaller children: RAM cannula with Servo settings as needed to decrease WOB.

2. Intravenous magnesium sulfate 2 doses (max 2 grams per dose)
    a. 1st dose 50 mg/kg over 20 minutes
    b. 2nd dose 25 mg/kg over 20 minutes after 6 hours.
    AND

Heliox (80/20) at 8-10 L flow attached to the port on the continuous nebulizer to aid in driving albuterol.

5. **Decreasing Therapy:**
    a. If at any assessment point the CAS is 1 or less times 2 assessments - first Heliox will be stopped.
    b. Every 4 hours if 2 assessments with a CAS of 1 then wean albuterol. Albuterol will be weaned gradually-15 mg/hour, then 10 mg/hour, then 5 mg/hour, then 5 mg every 2 hours, then 2.5 every 2 hours, then 2.5 every 3 hours, then 2.5 every 4 hours.
    c. NPPV will be stopped 4 hours after albuterol is decreased to every 2 hours.
    d. If wean.ing is done but patient's CAS goes back up for 2 assessments then go back to the previous mode of therapy and **notify attending**.
    e. Transfer from PICU may be considered 4 hours after albuterol decreased to 2.5 mg every 2 hours

- **If on floor under intensivist, use this protocol**
- **Please document any deviation from protocol and reason**
- **Every change needs to be entered into Meditech as an order**

Hypernatremic Dehydration

- Correct at rate not to exceed 0.5 mEq/L/h and a total of 8-10 mEq/d
- Determine cause of hypernatremia
- First calculate total body water
    - 0.6 x weight(kg) males
    - 0.5 x weight(kg) females
- Calculate total water deficit based on weight loss or clinical estimation of dehydration
- Calculate free water deficit
    - TBW x [plasma Na/140] – 1
- Calculate isotonic loss = total water deficit – free water deficit
    - Can take initial fluid boluses out of this total
- In the first 24 hours, replace 2/3 of the free water deficit, the remainder of the isotonic deficit and also give maintenance on top of this
    - Calculate the amount of sodium needed to estimate which fluids to give
    - Give the remainder of the free water deficit + maintenance in the next 12 hours
- REMEMBER: while you are doing these calculations, give 1.5maintenance of NS – don't just let the kid sit there with nothing!

EXAMPLE

A 10 kg child (TBW 0.6 times body weight) is estimated to have a 10 percent hypovolemic loss (about 1 liter of fluid) and a serum/plasma sodium concentration of 156 mEq/L. He received a 20ml/kg bolus in the ER. The following calculations can be made:

- Total fluid deficit: 10 percent of 10 kg = 1000 mL
- Free water deficit: 6 L [(156/140 mEq/L) - 1] = 686 mL
- Isotonic loss: Total fluid deficit - water deficit = 314 mL (already received 200mL in bolus) = 114mL

Over the first 24 hours, the fluid regimen, which does not include replacement of excess ongoing losses, would entail:

- Free water deficit (two-thirds of total water deficit) = 460 mL
- Remaining isotonic deficit = 114 mL of water and 17 mEq of sodium
- Maintenance needs = 1000 mL of water and 30 mEq of sodium

Acute correction of hyperkalemia

Indications

- Indications
- Potassium level greater than 7 mEq/L
- Rapidly rising potassium level
- Significant electrocardiographic changes, such as widening of the QRS complex, loss of P waves, or arrhythmias thought to be caused by hyperkalemia

Management

- Confirm true hyperkalemia (>5.5)
- While awaiting confirmation, get EKG if hyperkalemia >6 mEq/L and they are otherwise healthy. If there are conduction abnormalities, place on cardiac monitor.
- Cardiac membrane stabilization with a slow infusion of calcium gluconate
    - Calcium gluconate 10% solution at dose of 0.5 mL/kg (max dose 20mL) by IV slow infusion over 5 minutes
    - Further infusions may be necessary
- Therapy to shift extracellular potassium into the cells
    - Albuterol administration
    - Insulin & Glucose
    - Regular insulin 0.1 units/kg (max 10 units)
    - Glucose in children <5years – D10 at 5ml/kg
    - Glucose in children >5years – D25 at 2mL/kg
    - Accuchecks hourly
- Give Kayexalate
    - 1g/kg/dose Q6 hr PO or Q2-6hr PR

MANAGEMENT OF INCREASED ICP

General Measures

- Rapid treatment of hypoxia, hypercarbia, and hypotension
- Elevation of the head of the bed from 15 to 30 degrees
- Aggressively treat fever with antipyretics and cooling blankets
- Control shivering in intubated patients with muscle relaxants
- Administer prophylactic anticonvulsants
- Maintain adequate analgesia

Specific medical measures

- **Mannitol**
  - 0.25-1 g/kg IV bolus
  - Start with lower dose and repeat doses every 6-8 hours to increase serum osmolarity to 300-310 mOsm/L
- **Hypertonic saline**
  - 3 percent saline bolus of 2-6 mL/kg
- **Hyperventilation**
  - Only for ICP elevation that fails to respond to other therapies
  - Cerebral perfusion pressure should be monitored as able

Adrenal Crisis

Signs and symptoms:

- Hypotension or shock, disproportionate to illness
- Serum electrolyte abnormalities:
  - Hyponatremia with or without hyperkalemia
  - Metabolic acidosis
  - Hypoglycemia
- Vomiting and diarrhea, sometimes with severe abdominal pain or unexplained fever, weight loss, and anorexia

Consider the diagnosis in:

- Any patient with known disorders of adrenal insufficiency
- Critically ill patients with septic shock, who are unresponsive to fluid resuscitation and inotropic medications
- Patients on or withdrawing from chronic treatment with corticosteroids
- Patients with other autoimmune endocrine deficiencies

Evaluation:

- Baseline blood samples should be drawn for subsequent testing for electrolytes, glucose, cortisol and other adrenal steroids, ACTH, and renin, prior to the administration of corticosteroids. Treatment should not be delayed pending results.

Treatment:

- Shock: give boluses of normal saline, 20 mL/kg IV as needed up to a total of 60 mL/kg
- Hypoglycemia: give an initial bolus of 0.25 g/kg of dextrose IV (maximum single dose 25 g). The glucose bolus is infused slowly, at 2 to 3 mL per minute, and the volume and concentration is based on age:
  - Infants and children up to 12 years of age: 2.5 mL/kg of D10W
  - Adolescents 12 years and older: 1 mL/kg of D25W), or 0.5 mL/kg of D50W
- Stress glucocorticoids: hydrocortisone sodium succinate
  - Infants and toddlers, 0 to 3 years old: 25 mg IV
  - Children 3 to 12 years: 50 mg IV
  - Children and adolescents 12 years and older: 100 mg IV
- Continue glucocorticoids at the same dose given as a constant rate or as four divided doses over the following 24 hours
- Manage electrolyte abnormalities

* Alternatively, the dose of hydrocortisone sodium succinate can be calculated based on body surface area (BSA) rather than age, using a dose of 50 mg/m2

Hyperglycemia/New-Onset Diabetic Order S

Labs

- Bedside Glucose Monitoring: Pre-prandial, QHS and 0200
- Urine for ketones with every void until result negative x2
- CBC, BMP, Hemoglobin A1c, UA and urine culture
  - if newly diagnosed, Transglutaminase Ab IgA, TSH, Free T4

Diabetes Education

- Watch videos: Diabetes: The Basics, Diabetes: Insulin Injection, Diabetes: Hypoglycemia
- Consult Endocrinologist, Dietitian, Diabetes educator, Pharmacy, Child life, Social Services

Diet

- 24 hour Caloric intake formula: 1000 calories + (age x 100)
- Carbohydrate intake formulas
  - weight <10kg = 25-35 gm carbohydrate per meal
  - weight 10-25kg = 40-50 gm carbohydrate per meal
  - weight 25-45kg = 55-65 gm carbohydrate per meal
  - weight 55-75 kg = 70-80 gm carbohydrate per meal
  - weight above 75 kg = 85-95 gm carbohydrate per meal
- 3 snacks per day if less than 5 years, 2 snacks per day if 5 years or over

Insulin

- Lantus – prepubertal 0.3 units per kg per day, postpubertal 0.5 units per kg per day
- Humalog – prepubertal 0.3 units per kg per day, postpubertal 0.5 units per kg per day
  - *divided 1/3 to each meal, give in whole unit increments
- Humalog sliding scale when base dose = 1 unit
  - Blood Glucose <80 – Subtract 1 unit from base dose
  - Blood Glucose 81-299 – Give base dose
  - Blood Glucose >300 – Add 1 unit to base dose
- Humalog Sliding Scale when base dose = 2-3 units
  - Blood Glucose <80 – Subtract 1 unit from base dose
  - Blood Glucose 81-200 – No additional units
  - Blood Glucose 201-300 – Add 1 unit
  - Blood Glucose 301-400 – Add 2 units
  - Blood Glucose >400 – Add 3 units
- Humalog Sliding Scale when base dose = 4+ units
  - Blood Glucose <80 – Subtract 1 unit
  - Blood Glucose 81-150 – No additional units
  - Blood Glucose 151-200 – Add 1 unit
  - Blood Glucose 201-250 – Add 2 units
  - Blood Glucose 251-300 – Add 3 units
  - Blood Glucose 301-350 – Add 4 units
  - Blood Glucose >350 – Add 5 units

DKA Order Set

General orders

- Admit as inpatient to PICU, Pulse ox/Telemetry, Vitals Q1hour, Neuro Checks Q1 and I/Os Q1
- Foley Catheter if obtunded, developmentally delayed or very young

Labs

- Accuchecks Q1H
- i-Stat Pedi POC Acute Panel STAT and then every 4 hours
  - sodium, potassium, hematocrit
- BMP stat and then every 4 hours
- Blood gas STAT and then every Q2 hours
- Hemoglobin A1c
- Urine for ketones every hour if there is a foley or with every void until result is negative x2

Fluid management and potassium replacement

- Total IV fluids in the first 24 hours including the initial bolus, not to exceed 4L/m2/24 hours. After boluses are complete, transition to IV fluids as follows based on potassium level. Rate to be calculated at 3L/m2/24hours.
  - *Potassium less than 4
  - Nacl 0.9% with Potassium Acetate 30MEQ/Potassium Phosphate 20.5MM
  - D10/0.45% Nacl with Potassium Acetate 30MEQ/Potassium Phosphate 20.5MM
  - *Potassium GREATER than or equal to 4
  - Nacl 0.9% with Potassium Acetate 20MEQ/ Potassium Phosphate 13.6MM
  - D10/0.45% Nacl with Potassium Acetate 20MEQ/Potassium Phosphate 13.6MM
  - *Potassium GREATER than or equal to 5.5 or no void since presentation
  - Discontinue this IV fluid once potassium is less than 5 and patient has voided. Then, initiate fluids as per potassium criteria above.
- Once serum glucose is 200-250, decrease IV NS to half the prior rate and start IV infusion of D10NS with K at same rate as NS with K
- Glucose 150-200: discontinue NS with potassium and continue D10NS potassium infusion at twice the previous rate

- Glucose less than 150 while on D10NS: continue D10NS with potassium at double the prior rate and decrease insulin infusion by 0.02 units/kg/hr
    - *Tolerate rise in glucose up to 300 mg/dL after increase in IV dextrose

Insulin

- Recommended dosing instructions for new onset diabetics OR known diabetics who have missed their most recent LANTUS dose.
    - If patient presents during afternoon or evening, give LANTUS at 8pm
    - If patient presents between 8pm and midnight, give LANTUS immediately
    - If patient presents after midnight, give LANTUS at 8am
    - If patient presents between 8am and noon, give LANTUS immediately
- If known diabetic, start home Lantus routine while still on continuous insulin infusion. If home Lantus dose is above 0.8 units/kg, notify endocrinologist for possible dose adjustment.
- Lantus dose:
    - New onset diabetic and pre-pubertal – 0.3 units/kg/day.
    - New onset and post-pubertal – 0.5 units/kg/day
- Insulin drip: start after first 10mL/kg NS bolus at rate of 0.1 units/kg/hour

Consults

- Endocrinology and education from pharmacy, diabetes educator, dietitian.

HYPOGLYCEMIA: CRITICAL LABS TO ORDER

- Blood drawn and sent to lab on ice
  - Plasma glucose, free fatty acids, ß-hydroxybutyrate, lactate, total and free carnitine and acylcarnitines
  - Plasma insulin, C-peptide, cortisol, and growth hormone
- Other tests that are helpful may include:
  - Serum electrolytes (for calculation of the anion gap)
  - Liver function tests
  - Toxicology studies
- First voided urine sent to lab for ketones and reducing substances

TREATMENT

- *easy way to remember is that you need to make 50
- -if you give D25, give 2ml/kg (25x2=50, get it?)
- -if you give D10, give 5ml/kg
- -if you give D5, give 10ml/kg

Table 1 Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger United States, 2019

These recommendations must be read with the Notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Table 1. To determine minimum intervals between doses, see the catch-up schedule (Table 2). School entry and adolescent vaccine age groups are shaded in gray.

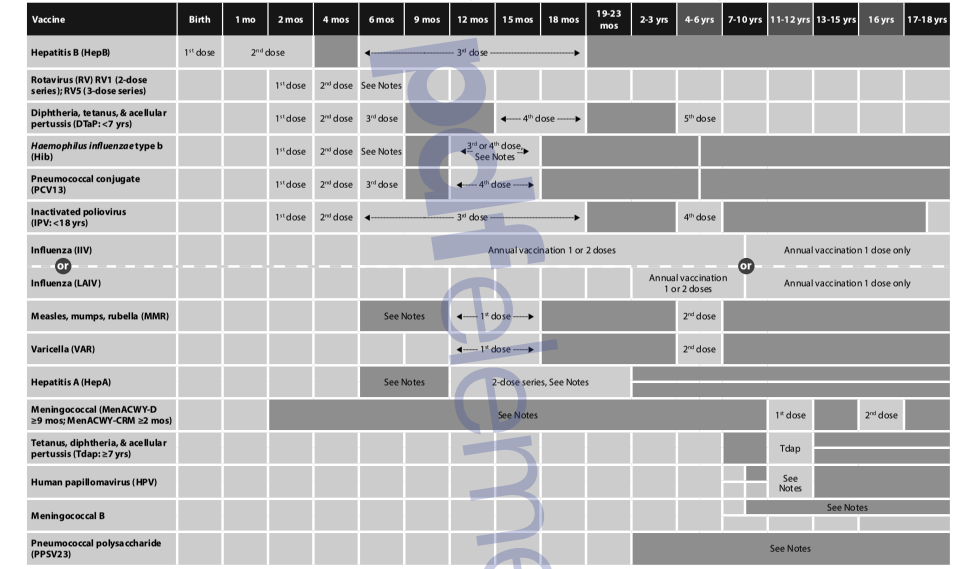


Table 2 Catch-up immunization schedule for persons aged 4 months—18 years who start late or who are more than 1 month behind, United States, 2019

The figure below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. Always use this table in conjunction with Table 1 and the notes that follow.

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Children age 4 months through 6 years					
Hepatitis B	Birth	**4 weeks**	**8 weeks *and* at least 16 weeks after first dose.** Minimum age for the final dose is 24 weeks.		
Rotavirus	6 weeks Maximum age for first dose is 14 weeks, 6 days	**4 weeks**	**4 weeks** Maximum age for final dose is 8 months, 0 days.		
Diphtheria, tetanus, and acellular pertussis	6 weeks	**4 weeks**	**4 weeks**	**6 months**	**6 months**
Haemophilus influenzae type b	6 weeks	**No further doses needed** if first dose was administered at age 15 months or older. **4 weeks** if first dose was administered before the 1st birthday. **8 weeks (as final dose)** if first dose was administered at age 12 through 14 months.	**No further doses needed** if previous dose was administered at age 15 months or older. **4 weeks** if current age is younger than 12 months ***and*** first dose was administered at younger than age 7 months, ***and*** at least 1 previous dose was PRP-T (ActHib, Pentacel, Hiberix) or unknown. **8 weeks *and* age 12 through 59 months (as final dose)** if current age is younger than 12 months ***and*** first dose was administered at age 7 through 11 months; OR if current age is 12 through 59 months ***and*** first dose was administered before the 1st birthday, ***and*** second dose administered at younger than 15 months; OR if both doses were PRP-OMP (PedvaxHIB; Comvax) ***and*** were administered before the 1st birthday.	**8 weeks (as final dose)** This dose only necessary for children age 12 through 59 months who received 3 doses before the 1st birthday.	
Pneumococcal conjugate	6 weeks	**No further doses needed** for healthy children if first dose was administered at age 24 months or older. **4 weeks** if first dose administered before the 1st birthday. **8 weeks (as final dose for healthy children)** if first dose was administered at the 1st birthday or after.	**No further doses needed** for healthy children if previous dose administered at age 24 months or older. **4 weeks** if current age is younger than 12 months and previous dose given at <7 months old. **8 weeks (as final dose for healthy children)** if previous dose given between 7–11 months (wait until at least 12 months old); OR if current age is 12 months or older and at least 1 dose was given before age 12 months.	**8 weeks (as final dose)** This **dose** only necessary for children age 12 through 59 months who received 3 doses before age 12 months or for children at high risk who received 3 doses at any age.	
Inactivated poliovirus	6 weeks	**4 weeks**	4 weeks if current age is < 4 years. 6 months (as final dose) if current age is 4 years or older.	**6 months** (minimum age 4 years for final dose).	
Measles, mumps, rubella	12 months	**4 weeks**			
Varicella	12 months	**3 months**			
Hepatitis A	12 months	**6 months**			
Meningococcal	2 months MenACWY-CRM 9 months MenACWY-D	**8 weeks**	See Notes	See Notes	
Children and adolescents age 7 through 18 years					
Meningococcal	Not Applicable (N/A)	**8 weeks**			
Tetanus, diphtheria; tetanus, diphtheria, and acellular pertussis	7 years	**4 weeks**	**4 weeks** if first dose of DTaP/DT was administered before the 1st birthday. **6 months (as final dose)** if first dose of DTaP/DT or Tdap/Td was administered at or after the 1st birthday.	**6 months** if first dose of DTaP/DT was administered before the 1st birthday.	
Human papillomavirus	9 years	**Routine dosing intervals are recommended.**			
Hepatitis A	N/A	**6 months**			
Hepatitis B	N/A	**4 weeks**	**8 weeks *and*** at least 16 weeks after first dose.		
Inactivated poliovirus	N/A	**4 weeks**	**6 months** A fourth dose is not necessary if the third dose was administered at age 4 years or older and at least 6 months after the previous dose.	A fourth dose of IPV is indicated if all previous doses were administered at <4 years or if the third dose was administered <6 months after the second dose.	
Measles, mumps, rubella	N/A	**4 weeks**			
Varicella	N/A	**3 months** if younger than age 13 years. **4 weeks** if age 13 years or older.			

Recommended and Minimum Ages and Intervals Between Doses

Vaccine and dose number	Recommended age for this dose	Minimum age for this dose	Recommended interval to next dose	Minimum interval to next dose
Hepatitis B (HepB)-1[3]	Birth	Birth	1-4 months	4 weeks
HepB-2	1-2 months	4 weeks	2-17 months	8 weeks
HepB-3[4]	6-18 months	24 weeks	—	—
Diphtheria-tetanus-acellular pertussis (DTaP)-1[3]	2 months	6 weeks	2 months	4 weeks
DTaP-2	4 months	10 weeks	2 months	4 weeks
DTaP-3	6 months	14 weeks	6-12 months	6 months[5,6]
DTaP-4	15-18 months	12 months	3 years	6 months[5]
DTaP-5	4-6 years	4 years	—	—
Haemophilus influenzae type b (Hib)-1[3,7]	2 months	6 weeks	2 months	4 weeks
Hib-2	4 months	10 weeks	2 months	4 weeks
Hib-3[8]	6 months	14 weeks	6-9 months	8 weeks
Hib-4	12-15 months	12 months	—	—
Inactivated poliovirus (IPV)-1[3]	2 months	6 weeks	2 months	4 weeks
IPV-2	4 months	10 weeks	2-14 months	4 weeks
IPV-3	6-18 months	14 weeks	3-5 years	6 months
IPV-4[9]	4-6 years	4 years	—	—
Pneumococcal conjugate (PCV)-1[7]	2 months	6 weeks	8 weeks	4 weeks
PCV-2	4 months	10 weeks	8 weeks	4 weeks
PCV-3	6 months	14 weeks	6 months	8 weeks
PCV-4	12-15 months	12 months	—	—
Measles-mumps-rubella (MMR)-1[10]	12-15 months	12 months	3-5 years	4 weeks
MMR-2[10]	4-6 years	13 months	—	—
Varicella (Var)-1[10]	12-15 months	12 months	3-5 years	12 weeks[11]
Var-2[10]	4-6 years	15 months	—	—
Hepatitis A (HepA)-1	12-23 months	12 months	6-18 months[5]	6 months[5]
HepA-2	≥18 months	18 months	—	—
Influenza, inactivated (TIV)[12]	≥6 months	6 months[13]	1 month	4 weeks
Influenza, live attenuated (LAIV)[12]	2-49 years	2 years	1 month	4 weeks
Meningococcal conjugate (MCV4)-1[14]	11-12 years	2 years	4-5 years	8 weeks
MCV4-2	16 years	11 years (+ 8 weeks)	—	—
Meningococcal polysaccharide (MPSV4)-1[14]	—	2 years[15]	5 years	5 years
MPSV4-2	—	7 years	—	—
Tetanus-diphtheria (Td)	11-12 years	7 years	10 years	5 years
Tetanus-diphtheria-acellular pertussis (Tdap)[16]	≥11 years	7 years	—	—
Pneumococcal polysaccharide (PPSV)-1	—	2 years	5 years	5 years
PPSV-2[17]	—	7 years	—	—
Human papillomavirus (HPV)-1[18]	11-12 years	9 years	2 months	4 weeks
HPV-2	11-12 years (+ 2 months)	9 years (+ 4 weeks)	4 months	12 weeks[19]
HPV-3[19]	11-12 years (+ 6 months)	9 years (+24 weeks)	—	—
Rotavirus (RV)-1[21]	2 months	6 weeks	2 months	4 weeks
RV-2	4 months	10 weeks	2 months	4 weeks
RV-3[21]	6 months	14 weeks	—	—
Herpes zoster[22]	≥60 years	60 years	—	—

1 Combination vaccines are available. Use of licensed combination vaccines is generally preferred to separate injections of their equivalent component vaccines. When administering combination vaccines, the minimum age for administration is the oldest age for any of the individual components; the minimum interval between doses is equal to the greatest interval of any of the individual components.

2 Information on travel vaccines including typhoid, Japanese encephalitis, and yellow fever, is available at www.cdc.gov/travel. Information on other vaccines that are licensed in the US but not distributed, including anthrax and smallpox, is available at www.bt.cdc.gov.

3 Combination vaccines containing a hepatitis B component (Comvax, Pediarix, and Twinrix) are available. These vaccines should not be administered to infants younger than 6 weeks because of the other components (i.e., Hib, DTaP, HepA, and IPV).

4 HepB-3 should be administered at least 8 weeks after HepB-2 and at least 16 weeks after HepB-1, and should not be administered before age 24 weeks.

5 Calendar months.

6 The minimum recommended interval between DTaP-3 and DTaP-4 is 6 months. However, DTaP-4 need not be repeated if administered at least 4 months after DTaP-3.

7 Children receiving the first dose of Hib or PCV vaccine at age 7 months or older require fewer doses to complete the series.

8 If PRP-OMP (Pedvax-Hib) was administered at ages 2 and 4 months, a dose at age 6 months is not required.

9 A fourth dose is not needed if the third dose was administered on or after the 4th birthday and at least 6 months after the previous dose.

10 Combination measles-mumps-rubella-varicella (MMRV) vaccine can be used for children aged 12 months through 12 years. (See CDC. General recommendations on Immunization: recommendations of the ACIP. *MMWR* 2011;60[No. RR-2],7.)

11 For persons beginning the series on or after the 13th birthday, the minimum interval from varicella-1 to varicella-2 is 4 weeks.

12 One dose of influenza vaccine per season is recommended for most people. Children younger than 9 years of age who are receiving influenza vaccine for the first time should receive 2 doses this season. See current influenza recommendations for other factors affecting the decision to administer one vs. two doses to children younger than 9 years.

13 The minimum age for inactivated influenza vaccine varies by vaccine manufacturer and formulation. See package inserts for vaccine-specific minimum ages.

14 Revaccination with meningococcal vaccine is recommended for previously vaccinated persons who remain at high risk for meningococcal disease. (See CDC. Updated recommendations from the ACIP for vaccination of persons at prolonged increased risk for meningococcal disease. *MMWR* 2009;58:[1042-3])

15 Menactra may be given as young as 9 months for high-risk children.

16 Only one dose of Tdap is recommended. Subsequent doses should be given as Td. For one brand of Tdap (Adacel), the minimum age is 11 years. For management of a tetanus-prone wound in a person who has received a primary series of a tetanus-toxoid containing vaccine, there is no minimum interval between a previous dose of any tetanus-containing vaccine and Tdap.

17 A second dose of PPSV 5 years after the first dose is recommended for persons ≤65 years of age at highest risk for serious pneumococcal infection, and for those who are likely to have a rapid decline in pneumococcal antibody concentration. (See CDC. Prevention of pneumococcal disease: recommendations of the ACIP. *MMWR* 1997;46[No. RR-8].)

18 Bivalent HPV vaccine (Cervarix) is approved for females 10 through 25 years of age. Quadravalent HPV vaccine (Gardasil) is approved for males and females 9 through 26 years of age.

19 The minimum age for HPV-3 is based on the baseline minimum age for the first dose (108 months) and the minimum interval of 24 weeks between the first and third doses. Dose 3 need not be repeated if it is given at least 16 weeks after the first dose (and if the intervals between doses 1 and 2 and doses 2 and 3 are maintained at 4 weeks and 12 weeks, respectively).

20 The first dose of rotavirus must be administered between 6 weeks 0 days and 14 weeks 6 days. The vaccine series should not be started after age 15 weeks 0 days. Rotavirus should not be administered to children older than 8 months 0 days, regardless of the number of doses received before that age.

21 If two doses of Rotarix are administered as age appropriate, a third dose is not necessary.

22 Herpes zoster vaccine is recommended as a single dose for persons 60 years of age and older.

SIU DEPARTMENT OF PEDIATRICS
RECOMMENDED IMMUNIZATION SCHEDULES

AGE	
2 months	Pediarix, Prevnar, HIB (Pedvax), Rotateq recommended
4 months	Pediarix, Prevnar, HIB (Pedvax), Rotateq recommended
6 months	Pediarix, Prevnar, HIB ??, Rotateq recommended
**HIB	Any patient who has previously received a dose of a different HIB product, other than Pedvax, MUST follow a 4 dose schedule @ 2, 4, 6 and 15 months.
9 months	no vaccines if UTD
12 months	Prevnar, Varivax Hep-A#1 recommended
15 months	DTaP, Hib #3 (Pedvax), MMR
18 mo-2 yrs	Hep-A #2 recommended

Prevnar 13 Booster if no previous dose of 13 up to age 59 months (4 yrs and 11 months)

4-6 years	Kinrix (DTap/IPV), MMR #2 Varivax #2 or Proquad(Varicella/MMR)
11-18 years	Tdap (Boostrix) Gardasil 9 recommended (*2 or 3* dose series depending on age) Menveo recommended (initial dose followed by a booster) Trumenba (Men B Vaccine)—recommended at provider discretion **Verify has received 2 doses of Varivax

Updated 5/4/18

Minimum Spacing for Immunizations

DTaP:

1. Four week intervals between doses one and two, and doses two and three. (prefer eight weeks-do give before 6 weeks of age)
2. Six month interval (or more) between dose three and dose four.
3. Last dose must be given on or after four years of age.

Four or more doses are required meeting the above requirements

IPV:

1. Four week intervals between doses one and two, and doses two and three (prefer eight weeks-do not give before 6 weeks of age)
2. Six month interval (or more) between dose three and four.
3. Last dose must be given on or after four years of age.

Three or more doses are required meeting the above requirements

MMR:

1. First dose given at 15months of age. (do not give before 12 months of age)
2. Second dose given at school entry. (around 5 years of age)

The two doses must be given over 4 weeks apart

VARIVAX:

1. Pediatric (12 months thru 12 years) = two doses. (At least 3 months apart; do not give before 12 months of age)
2. Adolescent and Adult (≥13 years) = two doses, 4-8 weeks apart.

PREVNAR 13:

1. Four week intervals between doses one and two, and doses two and three. (prefer eight weeks - do not give before 6 weeks of age)
2. The booster dose, which is recommended following the primary series, should be administered no earlier than 12 months of age and at least 8 weeks after the previous dose. Any dose of Prevnar given on or after the first birthday should be separated by at least 8 weeks from the previous dose.
3. A single dose of PCV13 should be given to all children age 14-59 months who have received 4 doses of PCV7 or other complete PCV7 schedule. Give dose 8 weeks after last PCV dose.

HEP-A:

1. Do not administer before 12 months of age.
2. Six month interval between dose one and dose two.

HEP-B:

1st dose = elected date (may be initiated at birth)
2nd dose = 4 weeks after 1st dose
3rd dose = 6 months after 1st dose (do not give before 6 months of age)

If vaccine series is interrupted after the t'1 dose, the second dose appropriate for the child's age should be administered as soon as possible. The interval betvveen the second and third doses should be at least 2 months, and optimally should be given within 4 to 11 months. If only the third dose is delayed, it may be given when convenient

HIBTITER/ACTHIB:

Age at 1st dose (months)	Primary Series	Age at booster (months)**
2-6	3 doses, 4-8 weeks apart (prefer 8 weeks)	15
7-11	3 doses, 4-8 weeks apart (prefer 8 weeks)	15
12-14	1 dose	15-16
15-71	1 dose	–

do not give before 6 weeks of age
the booster dose should be at least 8 weeks after the previous dose

PEDVAXHIB:

Age at 1st dose (months)	Primary Series	Age at booster (months)**
2-10	2 doses, 2 months apart	12-15
11-14	2 doses, 2 months apart 15	–
15-71	1 dose	–

PEDIARIX (DTaP/HEP-B/IPV):

1. Eight week intervals between doses one and two, and doses two and three. (do not give before 6 weeks of age)
2. The third dose should be administered at !east 16 weeks after the first dose and at least 8 weeks after the second dose but not before 6 months of age.

Tdap:

1. Ideally five years should elapse between last dose of DTaP vaccine and administration of Tdap.
2. No data to support repeat administration ofTdap vaccine.
3. Adacel for persons age 11 -64 years.
4. Boostrix for persons age 10-64 years.
5. Persons ages 11-64 who have not received a dose of Tdap: give 1 dose of Tdap as soon as feasible, **regardless of interval since last TD dose**. Longer intervals reduce injection site reactions, however benefits of protection outweigh risk of local reaction.

RotaTeq:

1. Three oral doses recommended at 2 months, 4 months, and 6 months of age.
2. First dose should be started at 6 to 12 weeks of age, with subsequent doses at 4 to 10 week intervals.
3. **Do not give any doses after 32 weeks of age (8 months of age)**
4. **Do not start if **> 15 weeks of age****

Gardasil:

1st dose = elected date (do not give before 9 years of age)
2nd dose = 2 months after the first dose
3rd dose = 6 months after the first dose

*** If the vaccine series is interrupted, the vaccine series does not need restarted. If the series is interrupted after the first dose, the second dose should be given as soon as possible and the second and third dose should be separated by an interval of at least 12 weeks. If only the third dose is delayed, it should be administered as soon as possible***

Menactra:

1. Do not give before 2 years of age.
2. Routine vaccination at ages 11 thru 12 years of age
3. Booster at age 16 yrs or 2 years after last dose if 1st dose at age 14 yrs and above

PENTACEL (DTaP/IPV/HIB):

1. Do not administer before 6 weeks of age.
2. Do not administer to children 5 years or above.
3. Must be used immediately after reconstitution.
4. Four IM injections at 2, 4, 6 and 15-18 months of age.

KINRIX (DTaP/IPV):

1. Do not administer before 4 years of age.
2. Do not administer after 6 years 11 months of age.
3. Indicated for use as DTaP #5 and IPV #4.

Well Child Checks

	Charge ticket?	NB	2 wk	1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	15 mo	18 mo	24 mo	30 mo	3 yr/ PreK	4 yr	5 yr/K	6 yr	7 yr/ 2nd gr	8 yr	10 yr	11 yr/ 6th gr	12 yr	14 yr/ 9th gr	15 yr	18 yr
Quick text		.nbpe or bfnbpe	.nbpe or bfnbpe	.1 mope	.2mope or .2mopevfc	.4mope or .4mopevfc	.6mope or .6mopevfc	.9mope	.12mope or 12mopevfc	.15mope or .15mopevfc	.18 mope or .18mopevfc	.2ype	.30mope	.pe	.pe	.kpe or .kpevfc	.pe	.pe	.pe	.pe	.pe	.pe	.pe	.pe	.pe
EPDS	IDPA only	X	X	X	X	X	X	X	X																
Length/Ht		L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
HC		X	X	X	X	X	X	X	X	X	X	X													
BMI	IDPA only											X	X	X	X	X	X	X	X	X	X	X	X	X	X
BP														X	X	X	X	X	X	X	X	X	X	X	X
Hearing	All IDPA, insurance for K visit only													**	X	X	X		X	X					
Vision	All IDPA, insurance for K visit only													**	X	X	X		X	X					
TB							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lead	Y if clinic lab							screen	++X	X	X	++X	X	X	**X	X	X								
Fluoride (IDPA ONLY)	Y							X			X	X		X											
ASQ	IDPA only							X			X		X												
M-CHAT	IDPA only										X	X													
PSC-17	IDPA only																X	X	X	X	X	X (both)	X (both)	X (both)	X (both)
Free book (IDPA only)							X	X	X	X	X	X	X	X	X	X	X								
PE required for school														X	**	X					X		X	X	X
Dentist req for school (notify parent)																X		X			X				

Ambulatory

DEVELOPMENTAL SCREENING CARD
Developed by Dr. David Kube

DQ: developmental/chronologic age x100
DQ >85: routine screening
DQ 75-85: follow closely
DQ <75: refer for consultation/comprehensive exam

Screening questions: What age does your child act like?
Are you concerned about his/her development?
Are there any speech problems?
Are there any behavioral problems?

Age	Gross motor	Visual motor	Language	Social	Red flags
1months	Raises head from prone Lifts chin up	Has tight grasp Visually fixes Follows to midline	Alerts to sound Soothes when picked up	Regards face	Failure to alert irritability
2 months	Holds head in midline Lifts chest off table	Diminished reflex grasp Follows objects past midline	Smiles after being stroked or talked to (social smile)	Recognizes parent	Rolling before 3 months (hyerptonia)
3 months	Supports head on forearms in prone Holds head up steadily	Holds hands open at rest Follows objects in circular fashion	Coos	Reaches for familiar people Anticipates feeding	No social smile
4-5 months	Rolls front to back, back to front Sits well when propped Supports on wrists Anterior protection	Moves arms in unison to grasp Manipulates fingers Shakes rattle Has visual threat	4m- orients to voice 5m- orients to bell/keys (localizes laterally) razz	Looks around	Poor head control at 5m No laughing No visual threat
6 months	Sits well unsupported Puts feet in mouth in supine position 7mo- lateral protection	Reaches with either hand Transfers Uses raking grasp	Babbles 7m- orients indirectly 8m- dada/mam indiscriminately	Recognizes strangers	Not rolling Head lag
9 months	Creeps/crawls Pulls to stand Pivots when sitting Posterior protection Cruises Parachute reflex	Pincer grasp Probes with forefinger Holds bottle Finger feeds Looks to floor when something dropped	Understands “no” Waves “bye-bye” 10m- dada/mama discriminately	Explores environment Plays pat-a-cake	W-sitting (hypotonia) Scissoring (hypertonia) Persistent primitive reflexes (moro, fencer, log roll) Absent babbling
12 months	Walks alone	Throws objects Voluntary release Mature pincer grasp	Understands “no” Waves “bye-bye” Orients to bell/keys directly 11m- one word other than mama/dada Follows one-step commands with gesture	Imitates action Comes when called Cooperates with dressing	No protective reactions Inability to localize sounds

15 months	Creeps up stairs Walks backwards	Builds tower of 2 blocks Scribbles in imitation	15m- uses 4-6 words 16m- follows 1 step commands without gesture 17m- knows 7-20 words. Points to 5 body parts; mature jargon	Solitary play Drinks from a cup	No single words Persistent toe walking (hypertonia)
18 months	Runs Throws ball from standing Push/pull large object	Turns 2-3 pages at a time Fills spoon and feed self Scribbles spontaneously	Names one picture on command Says "thank you", "stop it", "let's go"	Copies parents in tasks (sweeping, dusting, etc)	Hand dominance before 18 months (possible contralateral weakness)
21 months	Squat in play Goes up stairs with hand held	Builds tower of 5 blocks Drinks well from cup	21m- uses novel 2 word combinations Uses 50 words	Asks to have food Asks to use toilet	Lack of social interaction Poor joint attention
24 months	Walks up and down stairs without help Jumps in place Kicks ball	Turns pages one at a time Removes shoes, clothes Imitates pencil stroke	Uses pronouns inappropriately Understands 2 step commands Rapid vocabulary expansion	Parallel play Tolerates separation	Persistent poor transitions Family does not understand speech
30 months	Jumps with both feet off floor Throws ball overhand	Unbuttons clothes Holds pencil in mature fashion	Uses pronouns appropriately Repeat 2 digits forward Understands concept of "one"	Gives first and last name Gets drink without help	
3 years	Pedals tricycle Can alternate feet when climbing stairs	Dresses and undresses partially Dries hands if reminded Copies circle	3 word sentences Pleurals Minimum 250 words Repeats 3 digits forward	Group play (shares, takes turns) Plays well with others Knows full name, sex, age	Extended family does not understand speech Persistent echolalic phrases
4 years	Hops Alternates feet going down stairs	Buttons clothes fully Catches a ball Copies a square	Knows colors Says song or poem from memory Ask questions	Tells "tall tales" Plays cooperatively with group	
5 years	Skips alternating feet Jumps over low obstacles	Ties shoes Spreads with knife Copies triangle	Prints first name Asks word meanings Uses adult sentence structure	Plays competitive games Abides by rules Likes to help in household tasks	Non-family do not understand speech
School age	Is the child having problems? Ever failed a grade? Held back? Special classes or IEP? What grades does he/she make?				

Apgar Scoring

Sign	0	1	2	1 min.	5 min.
Heart Rate	Absent	< 100	> 100		
Respiratory Effort	Absent	Slow, irregular	Good cry		
Muscle Tone	Limp	Some flexion	Active motion		
Reflex, Irritability	No response	Grimace	Cry		
Color	Pale	Body pink, extremities blue	All pink		
			Total score		

TANNER STAGES

TABLE 12-2 -- Classification of Sex Maturity States in Girls

SMR STAGE	PUBIC HAIR	BREASTS
1	Preadolescent	Preadolescent
2	Sparse, lightly pigmented, straight, medial border of labia	Breast and papilla elevated as small mound; diameter of areola increased
3	Darker, beginning to curl, increased amount	Breast and areola enlarged, no contour separation
4	Coarse, curly, abundant, but less than in adult	Areola and papilla form secondary mound
5	Adult feminine triangle, spread to medial surface of thighs	Mature, nipple projects, areola part of general breast contour

From Tanner JM: Growth at Adolescence, 2nd ed. Oxford, England, Blackwell Scientific Publications, 1962. SMR, sexual maturity rating.

TABLE 12-3 -- Classification of Sex Maturity States in Boys

SMR STAGE	PUBIC HAIR	PENIS	TESTES
1	None	Preadolescent	Preadolescent
2	Scanty, long, slightly pigmented	Minimal change/enlargement	Enlarged scrotum, pink, texture altered
3	Darker, starting to curl, small amount	Lengthens	Larger
4	Resembles adult type, but less quantity; coarse, curly	Larger;glans and breadth increase in size	Larger, scrotum dark
5	Adult distribution, spread to medial surface of thighs	Adult size	Adult size

From Tanner JM: Growth at Adolescence, 2nd ed. Oxford, England, Blackwell Scientific Publications, 1962. SMR, sexual maturity rating
From Kleigman: Nelson Textbook of Pediatrics, 18th ed.

Ballard Scoring

NEUROMUSCULAR MATURITY

	0	1	2	3	4	5
Posture						
Square Window (Wrist)	 90°	 60°	 45°	 30°	 0°	
Arm Recoil	 180°		 100°-180°	 90°-100°	 < 90°	
Popliteal Angle	 180°	 160°	 130°	 110°	 90°	 < 90°
Scarf Sign						
Heel to Ear						

MATURITY RATING

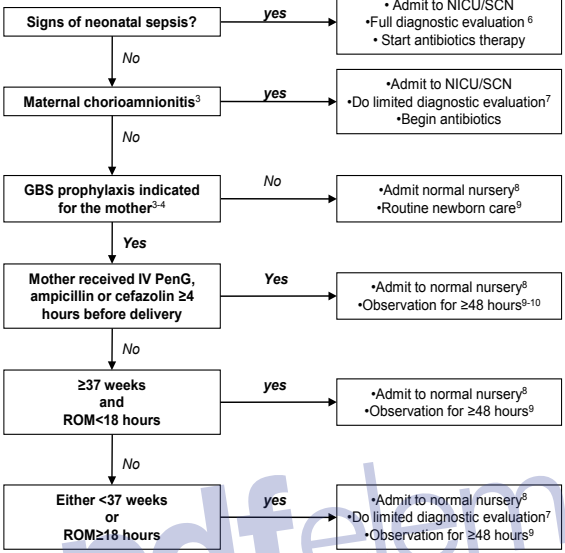
Score	Weeks
-10	20
-5	22
0	24
5	26
10	28
15	30
20	32
25	34
30	36
35	38
40	40
45	42
50	44

PHYSICAL MATURITY

	0	1	2	3	4	5
SKIN	gelatinous red, trans-parent	smooth pink, visible veins	superficial peeling &/or rash, few veins	cracking pale area, rare veins	parchment, deep cracking, no vessels	leathery, cracked, wrinkled
LANUGO	none	abundant	thinning	bald areas	mostly bald	
PLANTAR CREASES	no crease	faint red marks	anterior transverse crease only	creases ant. 2/3	creases cover entire sole	
BREAST	barely percept.	flat areola, no bud	stippled areola, 1-2 mm bud	raised areola, 3-4 mm bud	full areola, 5-10 mm bud	
EAR	pinna flat, stays folded	sl. curved pinna, soft with slow recoil	well-curv. pinna, soft but ready recoil	formed & firm with instant recoil	thick cartilage, ear stiff	
GENITALS Male	scrotum empty, no rugae		testes descend-ing, few rugae	testes down, good rugae	testes pendulous, deep rugae	
GENITALS Female	prominent clitoris & labia minora		majora & minora equally prominent	majora large, minora small	clitoris & minora completely covered	

Scoring system: Ballard JL, *et al*: A Simplified Assessment of Gestational Age, Pediatr Res 11:374, 1977. Figures adapted from "Classification of the Loe-Birth Weight Infant" by AY Sweet in Care of the High-Risk Infant by MH Klaus and AA Fanaroff, WB Saunders Co, Philadelphia, 1977, p. 47.

Algorithm for prevention of early onset GBS in the neonate:



[6] Full diagnostic evaluation includes blood culture, CBC with differential and platelet s count (at birth and/or at 6-12 hours of life), chest X-ray (if respiratory symptoms are present)and a lumbar puncture (if newborn is stable enough to tolerate the procedure and sepsis is suspected)

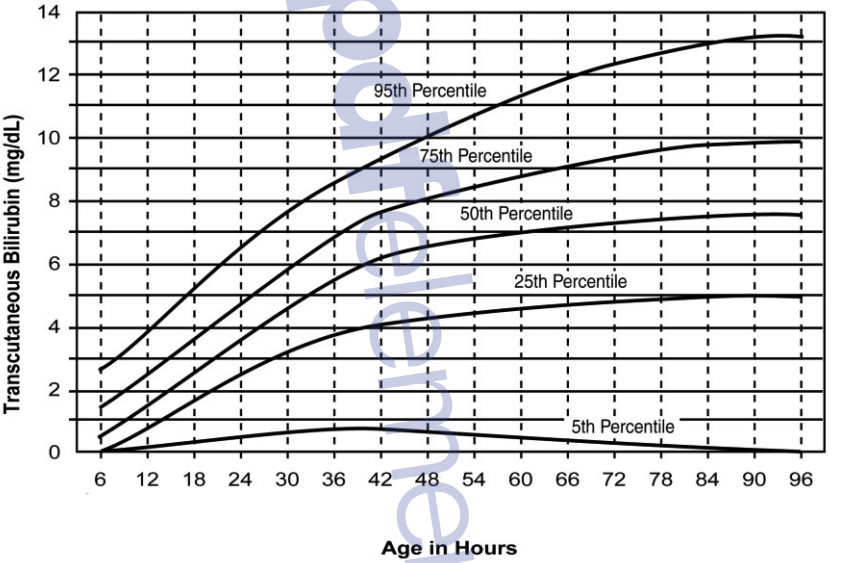
[7] Limited diagnostic evaluation includes blood culture (at birth), CBC with differential and platelet s count (at birth and/or at 6-12 hours of life); no CXR or lumbar puncture needed

[8] Unless there is other reason for admission to NICU

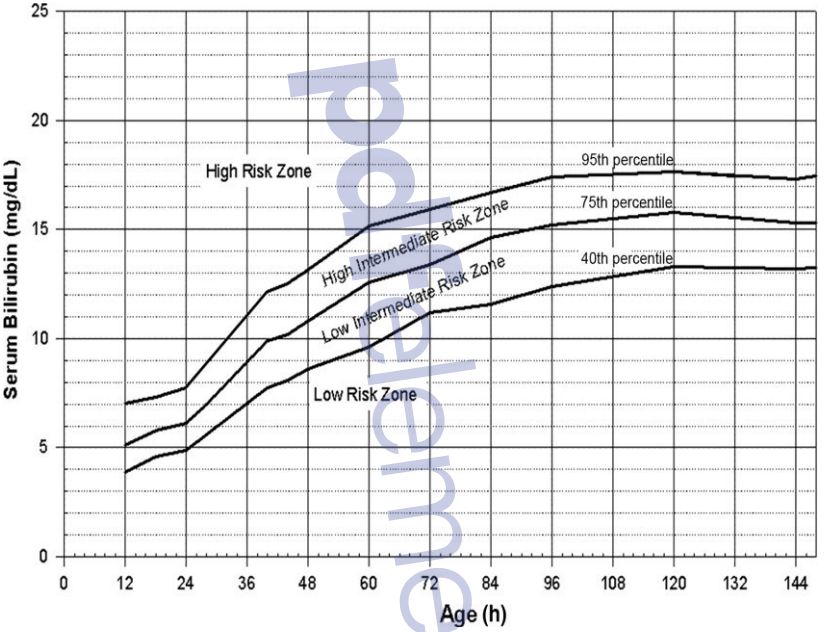
[9] If signs of sepsis develop, a full diagnosis evaluation should be conducted and antibiotic therapy initiated

[10] Observation may occur at home after 24 hours if gestational age ≥ 37 weeks, other discharge criteria have been met, access to medical care is readily available, and a person who is able to comply fully with instructions for home observation will be present. If any of these conditions is not met, the infant should be observed in hospital for at least 48 hours or until discharge criteria are achieved

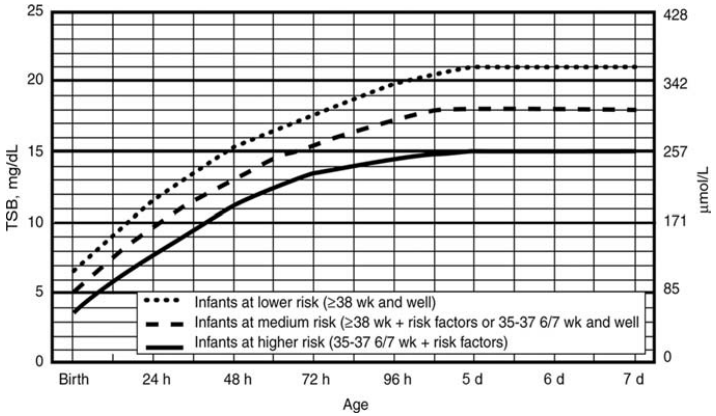
Transcutaneous Bilirubin Nomogram



Total Serum Nomogram



Phototherapy Guidelines for Infants ≥35 wks Gestation



Risks Factors for Severe Hyperbilirubinemia

- Prematurity: 35-36 wks > 37-8 wks
- History in a sibling
- Isoimmune or other hemolytic disease (e.g., G6PD deficiency)
- Jaundice in the first 24 hours
- Cephalhematoma or significant bruising
- East Asian race
- Exclusive Breastfeeding

Recommendations for Follow-up

Risk for severe hyperbilirubinemia based on TcB, TSB and risk factors

Risk	Follow-up
High (but below phototherapy level)	Repeat bilirubin the morning after discharge
Moderate (but below phototherapy level)	To be seen in 2 -3 days by a healthcare professional
Low	Regular clinic follow-up

ADHD Medication Guide*

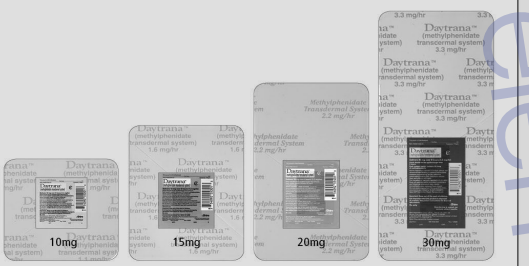
Revised: 4/1/15

Methylphenidate Derivatives – Long Acting/Extended Release

		Dose:	1 Bottle:	Dose:	1 Bottle:	Dose:	1 Bottle:	Dose:	2 Bottles:	Dose:	2 Bottles:	Dose:	2 Bottles:
5	Quillivant XR® 25mg/5ml (5mg/ml) (Banana Flavor)	10mg 2ml	300mg 60ml	20mg 4ml	600mg 120ml	30mg 6ml	900mg 180ml	40mg 8ml	600mg 120ml	50mg 10ml	750mg 150ml	60mg 12ml	900mg 180ml
	Concerta® †	C 18mg		C 27mg		C 36mg		C 54mg		C 72mg			
	Focalin® XR ‡ (dexmethylphenidate)	C 5mg				C 10mg		C 15mg		C 20mg		C 25mg	
2	Ritalin® LA ‡	10mg				C 20mg		C 30mg		C 40mg			
3	Metadate® CD ‡	C 10mg				C 20mg		C 30mg		C 40mg		C 50mg	
4	Ritalin® SR					C 20mg							
3	Daytrana®												

3	Focalin® (dexmethylphenidate)		C 2.5mg	C 5mg	C 10mg
4	Ritalin®		C 5mg	C 10mg	C 20mg
2	Methylin® Chewable § (Grape Flavor)	2.5mg	5mg	10mg	
3	Methylin® Solution (Grape Flavor)		C 5mg/5ml	C 10mg/5ml	

C indicates a generic formulation is available; generic products are not shown.



North Shore LIJ Steven & Alexandra Cohen Children's Medical Center of NY

ADHD Medication Guide*

Revised: 4/1/15

Amphetamine Derivatives – Short Acting/Immediate Release

10 Evekeo™ (d- & l- amphetamine sulfate)		5mg		10mg					
8 Zenzedi® (d-amphetamine sulfate)	2.5mg	5mg	7.5mg	10mg		15mg	20mg	30mg	
1 Adderall® (mixed amphetamine salts)		5mg	7.5mg	10mg	12.5mg	15mg	20mg	30mg	
8 ProCentra® (Bubblegum Flavor)		5mg/5ml							

Amphetamine Derivatives – Long Acting/Extended Release

5 Vyvanse® ¥ (lisdexamfetamine)	10mg	20mg	30mg	40mg	50mg	60mg	70mg	
Adderall XR® ‡ (mixed amphetamine salts)		5mg	10mg	15mg	20mg	25mg	30mg	
7 Dexedrine Spansule® (d-amphetamine sulfate)		5mg	10mg	15mg				

Non-Stimulants

3 Intuniv® † (guanfacine, extended release)	1mg	2mg	3mg	4mg				
3 Kapvay® † (clonidine, extended release)	0.1mg	0.2mg (only in dose pack)						
5 Strattera® † (atomoxetine)	10mg	18mg	25mg	40mg	60mg	80mg	100mg	

Ages for Which Medications Have an FDA Indication for Treatment of ADHD

Tab #	1	2	3	4	5	6	7	8	9	10
3-5 Years	✔							✔		✔
6-12 Years	✔	✔	✔	✔	✔		✔	✔		✔
13-16 Years			✔		✔	✔	✔	✔		✔
17 Years			✔		✔	✔				✔
Adults				✔	✔	✔			✔	✔

Administration Key

† Must be swallowed whole
¥ Vyvanse Can Be Mixed With Yogurt, Orange Juice, or Water
§ Chewable
‡ Capsule can be opened and medication sprinkled on applesauce

***Disclaimer:** The ADHD Medication Guide was created by Dr. Andrew Adesman of the North Shore-LIJ Health System. North Shore-Long Island Jewish Health System is not affiliated with the owner of any of the brands referenced in this Guide.

The ADHD Medication Guide is a visual aid for professionals caring for individuals with ADHD. The Guide includes only medications indicated for the treatment of ADHD by the FDA. In clinical practice, this guide may be used to assist patients in identifying medications previously tried, and may allow clinicians to identify ADHD medication options for the future. Medications have been arranged on the card for ease of display and comparison, but dosing equivalence cannot be assumed. Practitioners should refer to the FDA-approved product information to learn more about each medication. Although every effort has been made to depict each medication in its actual size and color, we cannot guarantee that there are not minor distortions in the final image. This Guide is accurate as of April 1, 2015.

- Updated versions of the ADHD Medication Guide can be viewed at www.ADHDMedicationGuide.com
- Laminated copies of the **ADHD Medication Guide** can be obtained at: www.ADDWarehouse.com
- Contact Dr. Andrew Adesman at ADHDMedGuide@NSHS.edu with any questions, suggestions or comments

North Shore-LIJ Steven & Alexandra Cohen Children's Medical Center of NY

SIU HealthCare Division of Pediatric Gastroenterology
301 North 8th PO Box 19661 Springfield, IL 62794-9661
217-545-0702 Fax: 217-545-5018

Bowel Clean Out - Miralax®
(Pediatric 25 lbs)

Please follow these instructions. These instructions are different than the instructions on the Miralax®/Glycolax bottle

This will cause you to have diarrhea.

Mix 50-60 grams Miralax®/Glycolax in 16 ounces of any clear liquid (clear fruit juices: apple, grape, cranberry), Kool-Aid™ (any flavor), Crystal Lite™, tea or water. Shake solution until Miralax®/Glycolax is dissolved.

- Starting at **8:00 am** or as early as possible, drink one **4** ounce glass or bottle of the Miralax solution every 30-60 minutes until solution is gone. If you start feeling full, wait 60 minutes before starting the solution again. (Usual prepping time is 4 to 8 hours).
- It will be necessary to drink all of the solution to make sure your colon is clean. The stool should be liquid and clear enough to see through, although it may still have a yellow, green or blue tint depending on what liquids you have been drinking
- It is important to continue drinking clear liquids even after you have finished the Miralax®/Glycolax to continue flushing the colon.

SIU HealthCare Division of Pediatric Gastroenterology
301 North 8th PO Box 19661 Springfield, IL 62794-9661
217-545-0702 Fax: 217-545-5018

Bowel Clean Out - Miralax®
(Pediatric 30 - 50 lbs)

Please follow these instructions. These instructions are different than the instructions on the Miralax®/Glycolax bottle

This will cause you to have diarrhea.

Mix 64 grams Miralax®/Glycolax in 16 ounces of any clear liquid (clear fruit juices: apple, grape, cranberry), Kool-Aid™ (any flavor), Crystal Lite™, tea or water. Shake solution until Miralax®/Glycolax is dissolved.

- Starting at **8:00 am** or as early as possible, drink one **4** ounce glass or bottle of the Miralax solution every 30-60 minutes until solution is gone. If you start feeling full, wait 60 minutes before starting the solution again. (Usual prepping time is 4 to 8 hours).
- It will be necessary to drink all of the solution to make sure your colon is clean. The stool should be liquid and clear enough to see through, although it may still have a yellow, green or blue tint depending on what liquids you have been drinking
- It is important to continue drinking clear liquids even after you have finished the Miralax®/Glycolax to continue flushing the colon.

SIU HealthCare Division of Pediatric Gastroenterology
301 North 8th PO Box 19661 Springfield, IL 62794-9661
217-545-0702 Fax: 217-545-5018

Bowel Clean Out - Miralax®
(Pediatric 60 - 90 lbs)

Please follow these instructions. These instructions are different than the instructions on the Miralax®/Glycolax bottle

This will cause you to have diarrhea.

Mix 128 grams Miralax®/Glycolax in 32 ounces of any clear liquid (clear fruit juices: apple, grape, cranberry), Kool-Aid™ (any flavor), Crystal Lite™, tea or water. Shake solution until Miralax®/Glycolax is dissolved.

- Starting at **8:00 am** or as early as possible, drink one **4** ounce glass or bottle of the Miralax solution every 30-60 minutes until solution is gone. If you start feeling full, wait 60 minutes before starting the solution again. (Usual prepping time is 4 to 8 hours).
- It will be necessary to drink all of the solution to make sure your colon is clean. The stool should be liquid and clear enough to see through, although it may still have a yellow, green or blue tint depending on what liquids you have been drinking
- It is important to continue drinking clear liquids even after you have finished the Miralax®/Glycolax to continue flushing the colon.

SIU HealthCare Division of Pediatric Gastroenterology
301 North 8th PO Box 19661 Springfield, IL 62794-9661
217-545-0702 Fax: 217-545-5018

Bowel Clean Out - Miralax®
(Pediatric over 90 lbs)

Please follow the instructions given below. The instructions for taking the bowel clean out solution are different than the Instructions on the Miralax bottle.

Mix the entire bottle of Miralax (either 238 or 255 grams) in 65 ounces of Gatorade or other clear liquid, except water. **DO NOT MIX IN WATER.** Clear liquids include Gatorade, other sport drinks, soda, tea, clear juices such as apple, grape, cran-apple, etc. (no pulp), lemonade, and crystal light. Shake until Miralax is dissolved.

Start taking the Miralax bowel clean out solution at Noon or as early as you can. **Do not take later than 6 p.m. or you will not get any sleep.**

Drink one 8-ounce glass (1 cup) of the Miralax solution every 30 - 60 minutes until gone. This will take approximately 4 - 8 hours to drink. It is necessary to drink all the solution to make sure your colon is clean.

If you become nauseated or feel full, stop drinking for at least 30 minutes. Then resume the Miralax solution using smaller amounts (4 - 6 ounces) every 45 - 60 minutes.

Continue drinking clear liquids even after you have finished the Miralax solution. Extra fluids will continue to clean out your colon and will keep you hydrated.

Miralax solution is designed to clean out your colon. It will usually cause you to have bowel movements within 2 to 6 hours. They may be tinted depending on what color of liquids you have been drinking .

Infectious Syndrome	Usual Etiology	Suggested Empirical Therapy	Length of Therapy
Bacteremia	S. pneumoniae, GAS, N meningitidis, E. coli, Salmonella. Consider S. aureus if focus of infection (Osteoarticular, SSTI, central line)	Ceftriaxone or Cefotaxime	Talk with ID team
Cellulitis	GAS, S. aureus	PO: Cephalexin or Clindamycin IV: Cefazolin, Clindamycin or Vancomycin	3 days after acute inflammation resolves (usually 7-10 days)
Acute Bacterial Lymphadenitis	S. aureus, GAS	PO: Clindamycin or cephalexin IV: Clindaymcin or Unasyn Alternative: Cefazolin	
Subacute Bacterial Lymphadenitis	Atypical mycobacteria, Bartonella henselae, Tularemia; M. tuberculosis,	Individual approach	
Mastoiditis	S. pneumoniae, S. pyogenes, S. aureus, H. influenzae	Consider Unasyn or Clindamycin based on clinical suspicion	10 days Consult pediatric ID and ENT
Meningitis, neonate <1mo	GBS, E. coli, L. monocytogenes	Ampicillin + cefotaxime	14-21 days for GBS and Listeria, 21 days for gram negative organisms
Meningitis, non-neonatal	S. pneumoniae, N. meningitidis, H. influenzae, neonatal pathogens	Cefotaxime or ceftriaxone + vancomycin	Duration depends on organism
Otitis Media	S. pneumoniae, H. influenzae, M. catarrhalis, viruses	Not severe: Amoxicillin 80-90mg/kg/day Severe (moderate-severe otalgia or fever >39): Augmentin Alternative: Cefdinir or azithromycin	10 days 5-7 days for healthy children >6years
Infectious Syndrome	Usual Etiology	Suggested Empirical Therapy	Length of Therapy
Osteomyelitis, septic arthritis	S. aureus, GAS, Kingella	> 5 y/o: Vancomycin or Clindamycin < 5 y/o: consider Kingella; add Ceftriaxone	Septic arthritis: 3-4 weeks Osteomyelitis: 4-6 weeks
Septic arthritis Adolescent	Add N. gonorrhoeae	Add Ceftriaxone	
Osteomyelitis with foot puncture	Add Pseudomonas	Add ceftazidime	
Osteomyelitis with sickle cell disease	Add Salmonella	Add cefotaxime or ceftriaxone	

Infectious Syndrome	Usual Etiology	Suggested Empirical Therapy	Length of Therapy
Orbital Cellulitis	S. pneumoniae, H. influenzae, M. catarrhalis, S. aureus, GAS, streptococci, anaerobes	Vancomycin+metronidazole+ cefotaxime/ ceftriaxone	Ophtho consult, CT to evaluate intracranial extension.Consullt ID
Periorbital cellulitis	Trauma/skin laceration: S. aureus Non trauma: Streptococcus pnemoniae, H. influenzae, M. catarrhalis Others: GAS	Trauma: Clindamycin or Vancomycin Non Trauma: Unasyn or Ceftriaxone	10-14 days
Pharyngitis	GAS	Amoxicillin 45-50 mg/kg/day Alternative: Cephalexin or Clindamycin	10 days
Infectious Syndrome	Usual Etiology	Suggested Empirical Therapy	Length of Therapy
Outpatient: Pneumonia <5 yr	S. pneumoniae, B. pertussis, S. aureus, Mycoplasma, C. pneumoniae, GAS, viruses, influenza	Amoxicillin (90 mg/kg/day in 2 doses) Alternative: amoxicillin clavulanate	10 days If treating chlamydia pneumonia or if there is concern for atypical pneumonia, use azithromycin
Outpatient: Pneumonia >5 yr		Amoxicillin, high dose Add azithro if concern for atypical Alternative: Augmentin	
Inpatient: Uncomplicated Pneumonia, fully immunized		Ampicillin or penicillin G Alternatives:ceftriaxone or cefotaxime Add vanc/clinda if MRSA suspected	
Inpatient: Complicated Pneumonia, not immunized		Ceftriaxone or cefotaxime Add vanc/clinda for suspected MRSA	
Peritonsillar Abscess	GAS, oral anaerobes, polymicrobial	Unasyn Alternative: Clindamycin	Consider ID and ENT consult
Retropharyngeal Abscess	GAS, Staph aureus, oral anaerobes, polymicrobial	Clindamycin Unasyn	Consider ID and ENT consult
Acute Sinusitis	S. pneumoniae, H. influenzae, M. catarrhalis	Augmentin	10-14 days

Pediatric Common Medication Doses

***Not to be used for NICU patients ***

All Antibiotic Doses are expressed as mg/kg/DAY unless otherwise indicated

Medication	Dose mg/kg	Route	Frequency	Notes
Acyclovir	30-60 mg/kg/day CNS <12yr: 60 mg/kg/day CNS >12 yr: 30 mg/kg/day	IV	Q8hr	
Amoxicillin	45-90 mg/kg/day	PO	Q8-12hr	Max. 1 g/dose
Amoxicillin/ clavulanate	25-90 mg/kg/day	PO	Q8-12hr	
Ampicillin	100-200 mg/kg/day CNS: 300 mg/kg/day	IV/IM	Q6hr	Max. 2 g/dose
Ampicillin/ sulbactam (Unasyn)	100-200 mg/kg/day	IV	Q6hr	Dosed on ampicillin Max. 2 g/dose
Azithromycin	5-10 mg/kg/day	PO	daily	
Cefazolin	50-150 mg/kg/day	IV	Q8hr	Max. 2 g/dose
Cefepime	100-150 mg/kg/day	IV	Q8-12hr	Max. 2 g/dose
Cefotaxime	150-300 mg/kg/day	IV	Q8hr	Max. 2 g/dose
Ceftriaxone	50-100 mg/kg/day	IV	Q12-24hr	Q12h for meningitis
Cephalexin	25-100 mg/kg/day	PO	Q8hr	
Ciprofloxacin	20-30 mg/kg/day	IV	Q12hr	Max. 400mg/dose
Clindamycin	30-40 mg/kg/day	IV	Q 8hr	Max. 600/day
Fluconazole	6-12 mg/kg/day	IV/PO	Daily	
Gentamicin/ Tobramycin	7.5 mg/kg/day	IV	Q 8hr	Peak & trough w/ 3rd dose *See back for once-daily dosing*
Meropenem	60 mg/kg/day CNS: 120mg/kg/day	IV	Q8hr	Max. 2g/dose
Metronidazole	30-50 mg/kg/day	IV	Q 6-8hr	Max. 2g/day
Oxacillin	100-200 mg/kg/day	IV	Q6hr	Peripheral Line
Piperacillin/ tazobactam (Zosyn)	200-300 mg/kg/day	IV	Q6-8hr	Dosed on piperacil-lin component
Trimethoprim/sulfa	8-12 mg/kg/day	IV/PO	Q12hr	
Vancomycin	45-80 mg/kg/day	IV	Q6-8hr	*See dosing table on back

Clinical situations may require alternative dosing

Pediatric Vancomycin Dosing	
Age	Initial Dose
< 3 months	15 mg/kg/dose Q 8 hr
3-11 months	15 mg/kg/dose Q 6 hr
1-8 years	20 mg/kg/dose Q 6 hr
9-13 years	20 mg/kg/dose Q 8 hr
14 years and greater	15 mg/kg/dose Q 8 hr
*Max dose 1500mg, exclude renal/cardiac insufficiency, check vancomycin trough prior to 4th dose	

Once-Daily Gentamicin/Tobramycin Dosing Guidelines

1. Exclusion criteria for once-daily dosing: use traditional dosing in these patients

    a. Altered volume of distribution: weight ≥120% IBW, ascites, or burns over ≥20% of body
    b. Unstable/compromised renal function or on dialysis
    c. Endocarditis, meningitis, tularemia, or osteomyelitis
    d. Hemodynamic instability

2. Dosing

    1 to <14 years: 7.5mg/kg/dose every 24 hours
    ≥14 to <18 years: 6.5 mg/kg/dose every 24 hours
    ≥18 years: 5mg/kg/dose every 24 hours
    *cystic fibrosis patients generally require 10-15 mg/kg/dose every 24 hours

3. Monitoring

    a. Consider checking baseline serum creatinine at initiation
    b. Check a peak level 30 min after second dose is complete. Check an additional level 6-8 hours after the peak level. Goal Peak 15-25 mcg/ml

    Goal Trough <0.5 mcg/ml (trough will be extrapolated from the 2 levels drawn)

    c. Patients on long-term therapy should have an audiology exam and weekly serum creatinine along with aminoglyco side level every 7-10 days

Lumbar Puncture Guidlines

1. Contraindications
    a. Clinical signs of increased ICP
    b. Unstable patient
    c. Overlying soft tissue infection
    d. Severe coagulopathy
2. Risks/Complications
    a. Headache
    b. Local pain
    c. Bleeding
    d. Less common
        i. Infection
        ii. Vomiting
        iii. Temporary paralysis
        iv. Epidermoid tumors
        v. Epidural hematoma
        vi. Subdural, subarachnoid hemorrhage
        vii. Acute deterioration
3. Timeline
    a. Order antibiotics so they are available and place topical anesthetic
        i. DON'T give antibiotic until after LP is complete
    b. Review indications and contraindications
    c. Obtain informed consent
        i. Discuss alternatives, risks, benefits, prognosis BEFORE procedure and have parents sign
    d. Time out
        i. Ensure correct procedure being done on correct patient
    e. Sedation/Analgesia
        i. Local, oral sucrose, PICU team
    f. Lumbar puncture
    g. Post-procedure communication with family
    h. Procedure note

4. Tubes
    a. 1st: culture and gram stain
        i. In infants under the age of 6 weeks, if HSV is suspected, CSF HSV PCR should be a priority
    b. 2nd: cell count and differential
    c. 3rd: glucose/protein
    d. 4th: hold
        i. Enterovirus PCR depending on clinical presentation, time of year, etc.
5. Traumatic tap
    a. First calculate WBC:RBC ratio
    b. Also calculate the predicted CSF WBC
        i. CSF WBC (predicted) = CSF RBC x (serum WBC / serum RBC)
    c. Then calculate the O:P ratio
        i. Observed CSF WBC / Predicted CSF WBC
    d. Interpretation
        i. WBC:RBC ratio less than or equal to 1:100, meningitis unlikely
        ii. O:P ratio <0.01, meningitis unlikely
        iii. O:P ratio 10 or greater was sensitive & specific indicator of meningitis

Evaluation of CSF		
WBC		Count/uL
	Preterm	0-26
	Term	7.2 +/- 13.8
	Child	0-7
Glucose		
	Preterm	25-64 mg/dL
	Term	51.1 +/- 12.9
	Child	40-80 mg/dL
Protein		
	Preterm	65-150 mg/dL
	Term	64.1 +/- 24.1
	Child	4-40 mg/dL
CSF Glucose/ Blood Glucose		
	Preterm	55-105%
	Term	44-125%
	Child	50%

Diagnostic criteria for Kawasaki disease

Table 3. Diagnosis of Classic KD

Classic KD is diagnosed in the presence of fever for at least 5 d (the day of fever onset is taken to be the first day of fever) together with at least 4 of the 5 following principal clinical features. In the presence of ≥4 principal clinical features, particularly when redness and swelling of the hands and feet are present, the diagnosis of KD can be made with 4 d of fever, although experienced clinicians who have treated many patients with KD may establish the diagnosis with 3 d of fever in rare cases (Figure 2):
1. Erythema and cracking of lips, strawberry tongue, and/or erythema of oral and pharyngeal mucosa
2. Bilateral bulbar conjunctival injection without exudate
3. Rash: maculopapular, diffuse erythroderma, or erythema multiforme-like
4. Erythema and edema of the hands and feet in acute phase and/or periungual desquamation in subacute phase
5. Cervical lymphadenopathy (≥1.5 cm diameter), usually unilateral
A careful history may reveal that ≥1 principal clinical features were present during the illness but resolved by the time of presentation.
Patients who lack full clinical features of classic KD are often evaluated for incomplete KD (Figure 3). If coronary artery abnormalities are detected, the diagnosis of KD is considered confirmed in most cases.
Laboratory tests typically reveal normal or elevated white blood cell count with neutrophil predominance and elevated acute phase reactants such as C-reactive protein and erythrocyte sedimentation rate during the acute phase. Low serum sodium and albumin levels, elevated serum liver enzymes, and sterile pyuria can be present. In the second week after fever onset, thrombocytosis is common.

Diagnostic criteria for Kawasaki disease

Other clinical findings may include the following:
Cardiovascular
Myocarditis, pericarditis, valvular regurgitation, shock
Coronary artery abnormalities
Aneurysms of medium-sized noncoronary arteries
Peripheral gangrene
Aortic root enlargement
Respiratory
Peribronchial and interstitial infiltrates on CXR
Pulmonary nodules
Musculoskeletal
Arthritis, arthralgia (pleocytosis of synovial fluid)
Gastrointestinal
Diarrhea, vomiting, abdominal pain
Hepatitis, jaundice
Gallbladder hydrops
Pancreatitis

(*Continued*)

Diagnostic criteria for Kawasaki disease

Table 3. Continued

Nervous system
Extreme irritability
Aseptic meningitis (pleocytosis of cerebrospinal fluid)
Facial nerve palsy
Sensorineural hearing loss
Genitourinary
Urethritis/meatitis, hydrocele
Other
Desquamating rash in groin
Retropharyngeal phlegmon
Anterior uveitis by slit lamp examination
Erythema and induration at BCG inoculation site
The differential diagnosis includes other infectious and noninfectious conditions, including the following:
Measles
Other viral infections (eg, adenovirus, enterovirus)
Staphylococcal and streptococcal toxin-mediated diseases (eg, scarlet fever and toxic shock syndrome)
Drug hypersensitivity reactions, including Stevens Johnson syndrome
Systemic onset juvenile idiopathic arthritis
With epidemiologic risk factors:
Rocky Mountain spotted fever or other rickettsial infections
Leptospirosis

BCG indicates bacillus Calmette-Guérin; CXR, chest radiography; and KD, Kawasaki disease.

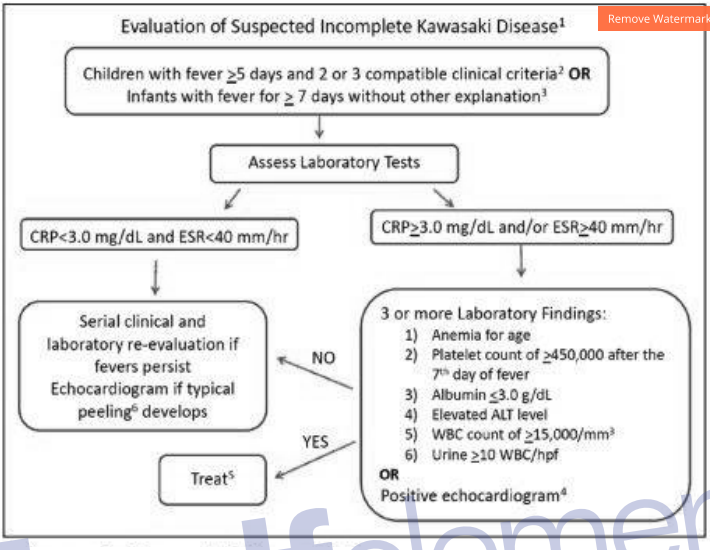


Figure 3. Evaluation of suspected incomplete Kawasaki disease.
(1) In the absence of a "gold standard" for diagnosis, this algorithm cannot be evidence based but rather represents the informed opinion of the expert committee. Consultation with an expert should be sought any time assistance is needed. (2) Clinical findings of Kawasaki disease are listed in Table 3. Characteristics suggesting that another diagnosis should be considered include exudative conjunctivitis, exudative pharyngitis, ulcerative intraoral lesions, bullous or vesicular rash, generalized adenopathy, or splenomegaly. (3) Infants ≤6 months of age are the most likely to develop prolonged fever without other clinical criteria for Kawasaki disease; these infants are at particularly high risk of developing coronary artery abnormalities. (4) Echocardiography is considered positive for purposes of this algorithm if any of 3 conditions are met: *Z* score of left anterior descending coronary artery or right coronary artery ≥2.5; coronary artery aneurysm is observed; or ≥3 other suggestive features exist, including decreased left ventricular function, mitral regurgitation, pericardial effusion, or *Z* scores in left anterior descending coronary artery or right coronary artery of 2 to 2.5. (5) If the echocardiogram is positive, treatment should be given within 10 days of fever onset or after the tenth day of fever in the presence of clinical and laboratory signs (C-reactive protein [CRP], erythrocyte sedimentation rate [ESR]) of ongoing inflammation. (6) Typical peeling begins under the nail beds of fingers and toes. ALT indicates alanine transaminase; and WBC, white blood cells.

Clinical Characteristics of Neonatal Conjunctivitis Caused by Various Agents

Agent	Day of Life at Onset	Discharge
Silver nitrate (chemical)*	1 (0-2)	Serous
Chlamydia trachomatis	7 (1-21)	Mucopurulent
Staphylococcus aureus	5 (1-21)	Mucopurulent
Neisseria gonorrhoeae	3 (0-21)	Purulent
Other bacteria	7 (1-21)	Mucopurulent
Herpes simplex virus	5 (0-21)	Serosanguineous
Other viruses	Not established	Probably serous

*Not used in Springfield

- **Conjunctivitis Treatment**
  - Ophthalmia neonatorum due to Chlamydia trachomatis
    - Azithromycin 20mg/kg daily for 3 days
    - Regular saline irrigation
  - Ophthalmia neonatorum due to Neisseria gonorrhoeae
    - Ceftriaxone 25-50 mg/kg x 1, alternative Cefotaxime
      - Admit these children for evaluation and treatment if possible disseminated disease – consider pediatric ID consult
      - Only single dose needed if work up is negative
  - Bacterial conjunctivitis in older children
    - Polytrim in outpatient setting
    - *If available, consider using moxifloxacin

Status Epilepticus

- Order labs
- Serum glucose and a rapid “finger-stick” glucose
- Serum electrolytes, calcium, and magnesium levels
- Arterial blood gases and pH
- A complete blood count
- Urine and blood toxicology
- Serum antiepileptic drug (AED) levels

- Give first medication at 5 minutes
- First Line: Benzodiazpine
  - Lorazepam 0.1 mg/kg, max 4mg
  - Rectal diazepam 0.5 mg/kg, max 20mg
- Administer second dose after 3-5 minutes
- Second line: Fosphenytoin - given after 10 minutes of seizure without response to other meds
  - 20 mg/kg IV
  - can give second dose after 10 minutes of 10mg/kg
- Third line: Phenobarbital
  - 20 mg/kg IV, max 1 gram

Diastat Dosing

Dosing Recommendations (by age and weight)					
2 to 5 years 0.5 mg/kg		6 to 11 years 0.3 mg/kg		12+ years 0.2 mg/kg	
Weight (kg)	Dose (mg)	Weight (kg)	Dose (mg)	Weight (kg)	Dose (mg)
6 to 10	5	10 to 16	5	14 to 25	5
11 to 15	7.5	17 to 25	7.5	26 to 37	7.5
16 to 20	10	26 to 33	10	38 to 50	10
21 to 25	12.5	34 to 41	12.5	51 to 62	12.5
26 to 30	15	42 to 50	15	63 to 75	15
31 to 35	17.5	51 to 58	17.5	76 to 87	17.5
36 to 44	20	59 to 74	20	88 to 111	20

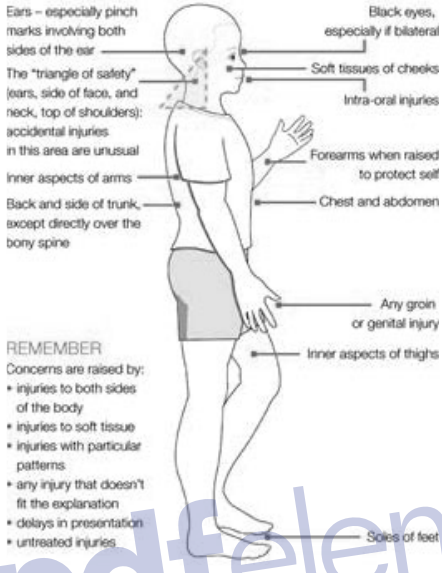
Suspected Non-accidental Trauma Workup

< 12 months old	13-24 month old	2-5 years old

Strongly recommend:
• Skeletal Survey
• CT Head
• Dilated Fundoscopic Exam with Ophthalmology
• Trauma Panel*
• Abdominal/Pelvic CT if:
  ○ Trauma Labs positive
  ○ Bruising on Abdomen/ Trunk
  ○ Bilious Vomiting
	Strongly Recommend
	• Skeletal Survey
	• Trauma Panel*
	• Dilated Fundoscopic Exam with Ophthalmology
	
	Recommend
	• CT Head if head/ face/ear/neck bruising or swelling, signs/symptoms of neurologic impairment
	• Abdominal/Pelvic CT if:
	  ○ Trauma Labs positive
	  ○ Bruising on Abdomen/ Trunk
	  ○ Bilious Vomiting
		Consider:
		• Skeletal Survey in cases of severe/life threatening trauma
		• CT Head if head/ face/ear/neck bruising or swelling, signs/symptoms of neurologic impairment
		• Trauma Panel*
		• Dilated Fundoscopic Exam if brain injury suspected with Ophthalmology
		• Abdominal/Pelvic CT if:
		  ○ Trauma Labs positive
		  ○ Bruising on Abdomen/ Trunk
		  ○ Bilious Vomiting

* CBC, Coagulation Profile, CMP, Catheterized U/A, Urine Culture, Vitamin D level, CPK if extensive bruising

- People to call if high suspicion of NAT
  - Social Work
  - DCFS
  - Consider Police involvement
  - Dr. Brenham for sexual abuse cases

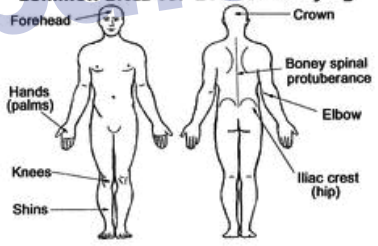


REMEMBER

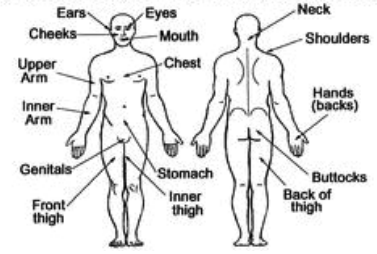
Concerns are raised by:

- injuries to both sides of the body
- injuries to soft tissue
- injuries with particular patterns
- any injury that doesn't fit the explanation
- delays in presentation
- untreated injuries

Common sites for accidental injury



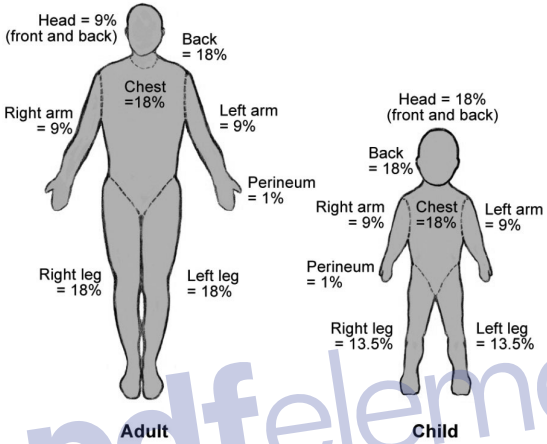
Common sites of Non-accidental injury



PARKLAND FORMULA

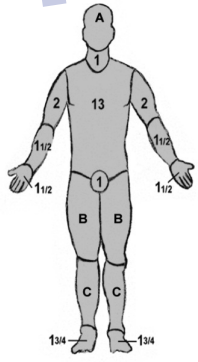
[Amount of IV fluid in mL to give over first 24 hours] = 4 x [weight(kg)] x [% total body surface]

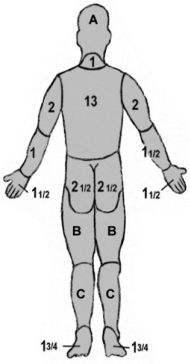
Give ½ over first 8 hours, remaining ½ over next 16 hours



% Total body surface area burn

Be clear and accurate, and do not include erythema.





	%	
Region	PTL	FTL
Head		
Neck		
Ant. trunk		
Post. trunk		
Right arm		
Left arm		
Buttocks		
Genitalia		
Right leg		
Left leg		
Total burn		

AREA	Age 0	1	5	10	15	Adult
A = 1/2 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2	3 1/2
B = 1/2 of one thigh	2 3/4	3 1/4	4	4 1/2	4 1/2	4 3/4
C = 1/2 of one Lower leg	2 1/2	2 1/2	2 3/4	3	3 1/4	3 1/2

Croup Scoring

	0	1	2	3	4	5
Level of Consciousness	Normal including sleep					disoriented
Cyanosis	None				With agitation	At rest
Stridor:	none	With agitation	At rest			
Air Entry	Normal	Decreased	Markedly decreased			
Retractions	None	Mild	Moderate	severe		

Mild croup = score less than or equal to 2

Moderate croup = score 3 to 7

Severe croup = greater than or equal to 8

Medication Treatment

- Decadron: 0.6 mg/kg/dose PO/IV/IM x1
  - At SJH, must order the IV form and then give it PO
- Racemic epinephrine:
  - <4 yr: 0.05 mL/kg/dose up to max 0.5mL/ dose diluted to 3mL with NS
  - >4yr: 0.5 mL/dose diluted to 3mL with NS

These summary guidelines reflect the 2015 CDC Guidelines for the Treatment of Sexually Transmitted Diseases. They are intended as a source of clinical guidance. An important component of STD treatment is partner management. Providers can arrange for the evaluation and treatment of partners either directly or with assistance from state and local health departments. Complete guidelines can be ordered online or by calling 1 (800) CDC-INFO (1-800-232-4636).

DISEASE	RECOMMENDED Rx		DOSE/ROUTE	ALTERNATIVES
Bacterial Vaginosis	metronidazole oral[1]	OR	500 mg orally 2x/day for 7 days	tinidazole 2 g orally 1x/day for 2 days OR
	metronidazole gel 0.75%[1]	OR	One 5 g applicator intravaginally 1x/day for 5 days	tinidazole 1 g orally 1x/day for 5 days OR
	clindamycin cream 2%[1,2]		One 5 g applicator intravaginally at bedtime for 7 days	clindamycin 300 mg orally 2x/day for 7 days OR
				clindamycin ovules 100 mg intravaginally at bedtime for 3 days
	★ Treatment is recommended for all symptomatic pregnant women.			
Cervicitis	azithromycin	OR	1 g orally in a single dose	Consider concurrent treatment for gonococcal infection if at risk of gonorrhea or lives in a community where the prevalence of gonorrhea is high. Presumptive treatment with antimicrobials for *C. trachomatis* and *N. gonorrhoeae* should be provided for women at increased risk (e.g., those aged <25 years and those with a new sex partner, a sex partner with concurrent partners, or a sex partner who has a sexually transmitted infection), especially if follow-up cannot be ensured or if NAAT testing is not possible.
	doxycycline[3]		100 mg orally 2x/day for 7 days	
Chlamydial Infections	azithromycin	OR	1 g orally in a single dose	erythromycin base[4] 500 mg orally 4x/day for 7 days OR
Adults and adolescents	doxycycline[3]		100 mg orally 2x/day for 7 days	erythromycin ethylsuccinate[4] 800 mg orally 4x/day for 7 days OR
				levofloxacin[5] 500 mg 1x/day orally for 7 days OR
				ofloxacin[6] 300 mg orally 2x/day for 7 days
Pregnancy[3]	azithromycin[3]		1 g orally in a single dose	★ amoxicillin 500 mg orally 3x/day for 7 days OR
				erythromycin base[4,5] 500 mg orally 4x/day for 7 days OR
				erythromycin base 250 mg orally 4x/day for 14 days OR
				erythromycin ethylsuccinate 800 mg orally 4x/day for 7 days OR
				erythromycin ethylsuccinate 400 mg orally 4x/day for 14 days
Infants and Children (<45 kg): urogenital, rectal	erythromycin base[6] ethylsuccinate	OR	50 mg/kg/day orally (4 divided doses) daily for 14 days	★ Data are limited on the effectiveness and optimal dose of azithromycin for chlamydial infection in infants and children < 45 kg
Neonates: opthalmia neonatorum, pneumonia	erythromycin base[6] ethylsuccinate	OR	50 mg/kg/day orally (4 divided doses) daily for 14 days	★ azithromycin 20 mg/kg/day orally, 1 dose daily for 3 days
Genital Herpes Simplex	acyclovir	OR	400 mg orally 3x/day for 7-10 days[13]	
First clinical episode of genital herpes	acyclovir	OR	200 mg orally 5x/day for 7-10 days[13]	
	valacyclovir[12]	OR	1 g orally 2x/day for 7-10 days[13]	
	famciclovir[12]		250 mg orally 3x/day for 7-10 days[13]	
Episodic therapy for recurrent genital herpes	acyclovir	OR	400 mg orally 3x/day for 5 days	
	acyclovir	OR	800 mg orally 2x/day for 5 days	
	acyclovir	OR	800 mg orally 3x/day for 2 days	
	valacyclovir[12]	OR	500 mg orally 2x/day for 3 days	
	valacyclovir[12]	OR	1 g orally 1x/day for 5 days	
	famciclovir[12]	OR	125 mg orally 2x/day for 5 days	
	famciclovir[12]	OR	1000 mg orally 2x/day for 1 day[13]	
	famciclovir[12]		500 mg orally once, followed by 250 mg 2x/day for 2 days	
Suppressive therapy[14] for recurrent genital herpes	acyclovir	OR	400 mg orally 2x/day	
	valacyclovir[12]	OR	500 mg orally 1x/day	
	valacyclovir[12]	OR	1 g orally once a day	
	famciclovir[12]		250 mg orally 2x/day	
Recommended regimens for episodic infection in persons with HIV infection	acyclovir	OR	400 mg orally 3x/day for 5-10 days	
	valacyclovir[12]	OR	1 g orally 2x/day for 5-10 days	
	famciclovir[12]		500 mg orally 2x/day for 5-10 days	
Recommended regimens for daily suppressive therapy in persons with HIV infection	acyclovir	OR	400-800 mg orally 2-3x/day	
	valacyclovir[12]	OR	500 mg orally 2x/day	
	famciclovir[12]		500 mg orally 2x/day	
Gonococcal Infections[16]	ceftriaxone	PLUS	250 mg IM in a single dose	★ If ceftriaxone is not available:
Adults, adolescents, and children >45 kg: uncomplicated gonococcal infections of the cervix, urethra, and rectum	azithromycin[7]		1 g orally in a single dose	cefixime[17] 400 mg orally in a single dose PLUS azithromycin[7] 1 g orally in a single dose
				★ If cephalosporin allergy:
				gemifloxacin 320 mg orally in a single dose PLUS
				azithromycin 2 g orally in a single dose OR
				gentamicin 240 mg IM single dose PLUS
				azithromycin 2 g orally in a single dose
Pharyngeal[18]	ceftriaxone	PLUS	250 mg IM in a single dose	
	azithromycin[7]		1 g orally in a single dose	
Pregnancy	See complete CDC guidelines.			
Adults and adolescents: conjunctivitis	ceftriaxone	PLUS	1 g IM in a single dose	
	azithromycin[7]		1 g orally in a single dose	
Children (≤45 kg): urogenital, rectal, pharyngeal	ceftriaxone[19]		25-50 mg/kg IV or IM, not to exceed 125 mg IM in a single dose	

***Nongonococcal Urethritis** (NGU)*	azithromycin[†]	OR	1 g orally in a single dose	erythromycin base[4] 500 mg orally 4x/day for 7 days	OR
	doxycycline[3]		100 mg orally 2x/day for 7 days	erythromycin ethylsuccinate[5] 800 mg orally 4x/day for 7 days	OR
				levofloxacin 500 mg 1x/day for 7 days	OR
				ofloxacin 300 mg 2x/day for 7 days	
★ Persistent and recurrent NGU[3,20,21]	Men initially treated with doxycycline :				
	azithromycin		1 g orally in a single dose		
	Men who fail a regimen of azithromycin:				
	moxifloxacin		400 mg orally 1x/day for 7 days		
	Heterosexual men who live in areas where *T. vaginalis* is highly prevalent:				
	metronidazole[22]	OR	2 g orally in a single dose		
	tinidazole		2 g orally in a single dose		
Pediculosis Pubis	permethrin 1% cream rinse	OR	Apply to affected area, wash off after 10 minutes	malathion 0.5% lotion, applied 8-12 hrs then washed off	OR
	pyrethrins with piperonyl butoxide		Apply to affected area, wash off after 10 minutes	ivermectin 250 µg/kg, orally repeated in 2 weeks	
Pelvic Inflammatory Disease[†9]	**Parenteral Regimens**			**Parenteral Regimen**	
	Cefoetan	PLUS	2 g IV every 12 hours	Ampicillin/Sulbactam 3 g IV every 6 hours	PLUS
	Doxycycline	OR	100 mg orally or IV every 12 hours	Doxycycline 100 mg orally or IV every 12 hours	
	Cefoxitin	PLUS	2 g IV every 6 hours		
	Doxycycline		100 mg orally or IV every 12 hours		
	Recommended Intramuscular/Oral Regimens				
	Ceftriaxone	PLUS	250 mg IM in a single dose		
	Doxycycline	WITH or	100 mg orally twice a day for 14 days		
	Metronidazole	WITHOUT	500 mg orally twice a day for 14 days		
		OR			
	Cefoxitin	PLUS	2 g IM in a single dose		
	Probenecid,	PLUS	1 g orally administered concurrently in a single dose	The complete list of recommended regimens can be found in	
	Doxycycline	WITH or	100 mg orally twice a day for 14 days	CDC's 2015 STD Treatment Guidelines.	
	Metronidazole	WITHOUT	500 mg orally twice a day for 14 days		
Scabies	permethrin 5% cream	OR	Apply to all areas of body from neck down, wash off after 8-14 hours	lindane 1%[2,7,24] 1 oz. of lotion or 30 g of cream, applied thinly to all	
	ivermectin		200 µg/kg orally, repeated in 2 weeks	areas of the body from the neck down, wash off after 8 hours	
Syphilis	benzathine penicillin G		2.4 million units IM in a single dose	doxycycline[3,25] 100 mg 2x/day for 14 days	OR
Primary, secondary, or early latent <1 year				tetracycline[3,25] 500 mg orally 4x/day for 14 days	
Latent >1 year, latent of unknown duration	benzathine penicillin G		2.4 million units IM in 3 doses each at 1 week intervals (7.2 million units total)	doxycycline[3,25] 100 mg 2x/day for 28 days	OR
				tetracycline[3,25] 500 mg orally 4x/day for 28 days	
Pregnancy	See complete CDC guidelines.				
Neurosyphilis	aqueous crystalline penicillin G		18–24 million units per day, administered as 3–4 million units IV every 4 hours or continuous infusion, for 10–14 days	procaine penicillin G 2.4 MU IM 1x daily	PLUS
				probenecid 500 mg orally 4x/day, both for 10-14 days.	
★ Congenital syphilis	See complete CDC guidelines.			See CDC STD Treatment guidelines for discussion of alternative therapy in patients with penicillin allergy.	
Children: Primary, secondary, or early latent <1 year	benzathine penicillin G		50,000 units/kg IM in a single dose (maximum 2.4 million units)		
Children: Latent >1 year, latent of unknown duration	benzathine penicillin G		50,000 units/kg IM for 3 doses at 1 week intervals (maximum total 7.2 million units)		
Trichomoniasis	metronidazole[22]	OR	2 g orally in a single dose	metronidazole[22] 500 mg 2x/day for 7 days	
	tinidazole[26]		2 g orally in a single dose		
Persistent or recurrent trichomoniasis	metronidazole		500mg orally 2x/day for 7 days		
	If this regimen fails:				
	metronidazole	OR	2g orally for 7 days		
	tinidazole		2g orally for 7 days		
	If this regimen fails, susceptibility testing is recommended.				

Heme/Onc Topics

Preparation of Blood Products:

Filtered and leukoreduced - All blood is filtered to remove small aggregates and blood clots. Leukoreduction reduces the number of WBCs by more than 99.9%. Any patient who may require frequent transfusions should receive leukoreduced blood

Irradiation – gamma irradiation stops proliferation of the remaining foreign lymphocytes. Should be done for any child who will undergo HSCT, children with Hodgkin lymphoma, premature infants, children with congenital cell-mediated immunodeficiencies, children with severe immunosuppression due to chemotherapy

Transfusions:

- Give approximately 10-20 ml/kg PRBC usually over 4 hours. Round up to the nearest unit or half unit.
- Give approximately 10-20 ml/kg platelets. Round up to the nearest full pharesis pack or half-pharesis pack.

Premedicate with Tylenol (15mg/kg/dose) and Benadryl (0.5mg/kg/dose).

Transfusion reaction:

- Occurs at rate of 1%. Many of the most severe reactions occur within the first 15 minutes.
- Suspect with a 1 degree C rise in temperature above baseline.
- **The big concern is sepsis during a platelet transfusion – if there is a fever, get a blood culture and stop the transfusion.**
- Acute hemolytic transfusion reaction– transfusion of ABO incompatible red cells. Fever, chills, flank pain.
- Febrile – No systemic symptoms. If fever not due to hemolysis, then due to presence of cytokines produced by passenger leukocytes. Treatment includes stopping the transfusion, excluding a hemolytic reaction or sepsis
- Delayed hemolytic – presents 2-10 days later with jaundice or anemia
- Allergic and anaphylactic reactions – varies from mild hives to fatal anaphylaxis. More common with plasma and platelet transfusions.
- Transfusion-associated lung injury – dyspnea, pulmonary edema, hypotension and fever within six hours of transfusion.

Febrile neutropenia:

- Rate of documented infection ranges from 10-40 percent with bacteremia most common
- Must give prompt empiric broad-spectrum antibiotics
- Order CBC, CMP, Blood culture, start Ceftazadime 50mg/kg/dose Q8hours. **Do NOT get a peripheral culture if there is a line available**. May only get one culture.
- Treated until negative blood cultures for at least 48 hours, resolution of fever for at least 24 hours, AND resolution of neutropenia

Other hem/onc tips:

- Check to make sure that all sickle cell kids have had their 23-valent pneumococcal vaccine.
- Many kids have Q2 hour urine checks in their orders. The only ones that MUST be woken up overnight are those on cyclophosphamide or ifosfamide.

Inpatient Rotation

- Required Content for H&P
  1. Chief Complaint
  2. Subjective – including ER/PCP course, also if asthma/wheezing the asthma questions
  3. Past Medical History – including birth hx and any NICU course
  4. Past Surgical History
  5. Family History – at least 2 generations back
  6. PCP Name/Specialist Seen
  7. Home Medications
  8. Immunization status
  9. Allergies and what allergic reaction is
  10. Diet History
  11. Developmental History – what milestones for younger kids
  12. Sexual History/Menstrual History – if adolescent
  13. Social History
  14. ROS – No Symptoms is not allowed to be used
  15. Vitals – with interpretation (Are they normal for the age?)
  16. Exam – Complete Physical Exam
  17. Labs
  18. Imaging
  19. Cultures
  20. Assessment and Plan – no bullet points, must explain your thought process and your likely/relevant differentials
  21. Copies to – PCP's Information so H&P can be sent to them

- Required Content for Discharge Summary (Discharge Summary with Instructions)
  1. Date of Discharge
  2. Updated Discharge Diagnoses
  3. Procedures (if applicable)

4. Reason for Admission (Chief Complaint)
5. Consultants (if applicable)
6. Brief HPI
7. Hospital Course (problem based for General Inpatient/Systems Based for PICU) - updated daily
8. D/C exam for PICU only
9. Relevant Labs/Imaging/Cultures (should be updated daily)
10. Discharge Medications
11. Discharge Disposition (Home with Parents/ Guardian, etc)
12. Condition
13. Discharge Instructions (Asthma Discharge Instruction available)
14. Follow Up time and phone numbers
15. Copies to – to relevant consultants and PCP.

Inpatient vs Observation:

Frequent diagnoses that are almost always observation status:

- Croup
- Acute Appendicitis without complications
- Bronchiolitis
- New seizures that no antiepileptic medications are started

Frequent diagnoses that are almost always inpatient status:

- Hyperbilirubinemia
- New onset diabetes
- BRUE/ALTE
- Cellulitis/abscess
- Conditions that require supplemental oxygen therapy
- Conditions that require IV antibiotics
- Conditions that require frequent nebulizer treatments

Charting Guidelines

I. SOAP Notes

- Date/time
- Subjective: summary of past 24 hours
- Vitals: temp current and temp max, P, RR, BP, oxygen saturation (include amt O2)
- I&O: calculate output to ml/kg/hr
  - Example for calculating urine output in ml/kg/hr:
    Pt weighs 3.2 kg, has 200 ml urine out in 24 hours
    200÷3.2=62.5 then 62.5÷24=2.6
    So this patient's output is 2.6 ml/kg/hr
  - For I's include how much po vs IV
- Exam: at a minimum include general, cv, lungs, abd, extremities
- Labs: include new labs from the morning, list all cultures and include # of day
- Assesssment and plan: list of problems/diagnoses with the plan for each. Include medications with dosage mg/kg/day, treatments, therapies, etc. Every patient should have F/E/N as a problem.
- Sign the bottom of each page of your note.

II. Admission Orders

ADC VANDALISM(C)

A: Admit
D: Diagnosis
C: Condition
V: Vitals
A: Allergies
N: Nursing
D: Diet
A: Activity
L: Labs
I: IVF
S: Specials such as studies, consults
M: Medications
C: Call orders
Precautions such as isolation, seizure precautions, etc.

III. Discharge Orders

Discharge to home or transfer to _____
Discharge diagnosis
Medications (mg/kg if <40kg)
Diet
Activity
Follow ups (appointments, labs, send discharge summary to Dr. ___, etc.)

H&P Helpful Hints

Informant: Informant: Usually a parent/caregiver

Chief complaint: Patient or caregiver's own words

HPI: Remember to include pertinent positives, negatives, past hx, family hx, social hx

PMH: Birth hx (pre and perinatal), illnesses, hospitalizations, allergies (with reaction), immunizations, diet, development (milestones), surgeries

FMH: minimum of 2 generations (parents, grandparents, siblings). Include ages (if known)

Social hx: location and age of home, water source, persons living in household, smoke exposure, pets, school grade, activities

PE: vital signs, growth parameters with %iles, head to toe findings

Problem list/assessment/discussion: comprehensive problem list, discussion of ddx, detailed treatment plan with rationale for workup and management, clear goals of therapy, include followup plans, referrals, etc. as needed

Signout

- know if on IVF (and at what rate → maint, half maint, 1.5x maint)
- IV abx, and what to do if the IV is lost
- Know whether Tylenol can be given
- What to do if develops fever (full or partial\ septic, or nothing)
- Be sure to pass on inactive but chronic diagnoses! (history of seizure disorder, VP shunts, asthma, etc)

LUMBAR PUNCTURE PROCEDURAL TIMELINE

***If necessary, order antibiotics and place local topical anesthesia as soon as possible PRIOR to procedure — GOAL SHOULD BE ANTIBIOTIC ADMINISTRATION WITHIN 1 HOUR OF ADMISSION**

1) **Indications/Contraindications**
2) **Informed permission/assent/consent**
    a) Discuss alternatives, risks, benefits, and prognosis BEFORE procedure and document
    **This is a process, not a piece of paper; allow opportunity*
    for questions
3) **Time out**
    **Ensure correct procedure is being performed on correct patient*
    as well as proper informed consent obtained
4) **Sedation/Analgesia/Anesthesia**
    a) Local topical (LMX)
    b) Local injectable (lidocaine)
    c) Oral sucrose
    d) Non-pharmacologic
    e) Pharmacologic/PICU Sedation Team*
        **Consider patient age and urgency of procedure*
5) **Lumbar puncture (with gloves and mask)**
6) **Post-procedure communication with family**
7) **Procedure note**

NORMAL VITAL SIGNS BY AGE			
Age	**HR (beats/min)**	**BP (mm/Hg)**	**RR (breaths/ min)**
Premie	120-170	55-75/35-45 (gestational age approximates nml MAP)	30-60
0-3 mo	110-160	65-85/45-55	24-38
3-6 mo	100-150	70-90/50-65	22-30
6-12 mo	90-130	80-100/55-65	22-30
1-3 yrs	80-125	80-105/55-70	20-24
3-6 yrs	70-115	95-110/60-75	16-22
6-12 yrs	60-100	100-120/60-75	16-22
>12 yrs	60-100	100-120/70-80	14-20
ENDOTRACHEAL TUBE FORMULAS			
Uncuffed ETT size: age (years)/4+4: Uncuffed ETT size: age (years)/4+3 ETT depth (from lip to mid-trachea): ETT internal diameter (size) x 3			

Blood Pressure Tables

Table 1

Blood Pressure Levels for the 90th and 95th Percentiles of Blood Pressure for Boys Age 1 to 17 Years by Percentiles of Height

Age	Height Percentiles* → / BP† ↓	Systolic BP (mm Hg) 5%	10%	25%	50%	75%	90%	95%	Diastolic BP (mm Hg) 5%	10%	25%	50%	75%	90%	95%
1	90th	94	95	97	98	100	102	102	50	51	52	53	54	54	55
	95th	98	99	101	102	104	106	106	55	55	56	57	58	59	59
2	90th	98	99	100	102	104	105	106	55	55	56	57	58	59	59
	95th	101	102	104	106	108	109	110	59	59	60	61	62	63	63
3	90th	100	101	103	105	107	108	109	59	59	60	61	62	63	63
	95th	104	105	107	109	111	112	113	63	63	64	65	66	67	67
4	90th	102	103	105	107	109	110	111	62	62	63	64	65	66	66
	95th	106	107	109	111	113	114	115	66	67	67	68	69	70	71
5	90th	104	105	106	108	110	112	112	65	65	66	67	68	69	69
	95th	108	109	110	112	114	115	116	69	70	70	71	72	73	74
6	90th	105	106	108	110	111	113	114	67	68	69	70	70	71	72
	95th	109	110	112	114	115	117	117	72	72	73	74	75	76	76
7	90th	106	107	109	111	113	114	115	69	70	71	72	72	73	74
	95th	110	111	113	115	116	118	119	74	74	75	76	77	78	78
8	90th	107	108	110	112	114	115	116	71	71	72	73	74	75	75
	95th	111	112	114	116	118	119	120	75	76	76	77	78	79	80
9	90th	109	110	112	113	115	117	117	72	73	73	74	75	76	77
	95th	113	114	116	117	119	121	121	76	77	78	79	80	80	81
10	90th	110	112	113	115	117	118	119	73	74	74	75	76	77	78
	95th	114	115	117	119	121	122	123	77	78	79	80	80	81	82
11	90th	112	113	115	117	119	120	121	74	74	75	76	77	78	78
	95th	116	117	119	121	123	124	125	78	79	79	80	81	82	83
12	90th	115	116	117	119	121	123	123	75	75	76	77	78	78	79
	95th	119	120	121	123	125	126	127	79	79	80	81	82	83	83
13	90th	117	118	120	122	124	125	126	75	76	76	77	78	79	80
	95th	121	122	124	126	128	129	130	79	80	81	82	83	83	84
14	90th	120	121	123	125	126	128	128	76	76	77	78	79	80	80
	95th	124	125	127	128	130	132	132	80	81	81	82	83	84	85
15	90th	123	124	125	127	129	131	131	77	77	78	79	80	81	81
	95th	127	128	129	131	133	134	135	81	82	83	83	84	85	86
16	90th	125	126	128	130	132	133	134	79	79	80	81	82	82	83
	95th	129	130	132	134	136	137	138	83	83	84	85	86	87	87
17	90th	128	129	131	133	134	136	136	81	81	82	83	84	85	85
	95th	132	133	135	136	138	140	140	85	85	86	87	88	89	89

*Height percentile determined by standard growth curves.
†Blood pressure percentile determined by a single measurement.

Blood Pressure Tables

Table 2

Blood Pressure Levels for the 90th and 95th Percentiles of Blood Pressure for Girls Age 1 to 17 Years by Percentiles of Height

Age	Height Percentiles* → / BP† ↓	Systolic BP (mm Hg) 5%	10%	25%	50%	75%	90%	95%	Diastolic BP (mm Hg) 5%	10%	25%	50%	75%	90%	95%
1	90th	97	98	99	100	102	103	104	53	53	53	54	55	56	56
	95th	101	102	103	104	105	107	107	57	57	57	58	59	60	60
2	90th	99	99	100	102	103	104	105	57	57	58	58	59	60	61
	95th	102	103	104	105	107	108	109	61	61	62	62	63	64	65
3	90th	100	100	102	103	104	105	106	61	61	61	62	63	63	64
	95th	104	104	105	107	108	109	110	65	65	65	66	67	67	68
4	90th	101	102	103	104	106	107	108	63	63	64	65	65	66	67
	95th	105	106	107	108	109	111	111	67	67	68	69	69	70	71
5	90th	103	103	104	106	107	108	109	65	66	66	67	68	68	69
	95th	107	107	108	110	111	112	113	69	70	70	71	72	72	73
6	90th	104	105	106	107	109	110	111	67	67	68	69	69	70	71
	95th	108	109	110	111	112	114	114	71	71	72	73	73	74	75
7	90th	106	107	108	109	110	112	112	69	69	69	70	71	72	72
	95th	110	110	112	113	114	115	116	73	73	73	74	75	76	76
8	90th	108	109	110	111	112	113	114	70	70	71	71	72	73	74
	95th	112	112	113	115	116	117	118	74	74	75	75	76	77	78
9	90th	110	110	112	113	114	115	116	71	72	72	73	74	74	75
	95th	114	114	115	117	118	119	120	75	76	76	77	78	78	79
10	90th	112	112	114	115	116	117	118	73	73	73	74	75	76	76
	95th	116	116	117	119	120	121	122	77	77	77	78	79	80	80
11	90th	114	114	116	117	118	119	120	74	74	75	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	79	79	80	81	81
12	90th	116	116	118	119	120	121	122	75	75	76	76	77	78	78
	95th	120	120	121	123	124	125	126	79	79	80	80	81	82	82
13	90th	118	118	119	121	122	123	124	76	76	77	78	78	79	80
	95th	121	122	123	125	126	127	128	80	80	81	82	82	83	84
14	90th	119	120	121	122	124	125	126	77	77	78	79	79	80	81
	95th	123	124	125	126	128	129	130	81	81	82	83	83	84	85
15	90th	121	121	122	124	125	126	127	78	78	79	79	80	81	82
	95th	124	125	126	128	129	130	131	82	82	83	83	84	85	86
16	90th	122	122	123	125	126	127	128	79	79	79	80	81	82	82
	95th	125	126	127	128	130	131	132	83	83	83	84	85	86	86
17	90th	122	123	124	125	126	128	128	79	79	79	80	81	82	82
	95th	126	126	127	129	130	131	132	83	83	83	84	85	86	86

*Height percentile determined by standard growth curves.
†Blood pressure percentile determined by a single measurement.

Age-Specific Blood Cell Indices

Age	Hemoglobin (g/dL)	Hematocrit (%)	MCV (fL)	MCHC (g/dL RBC)	Reticulocytes	WBC (x103/µL)	Platelets (x103/µL)
26-30 Weeks Gestation	13.4 (11)	41.5 (34.9)	118.2 (106.7)	37.9 (30.6)	--------	4.4 (2.7)	254 (180 - 327)
28 Weeks Gestation	14.5	45	120	31.0	5.0 - 10.0	--------	275
32 Weeks Gestation	15.0	47	118	32.0	3.0 - 10.0	--------	290
Term (Cord)	16.5 (13.5)	51 (42)	108 (98)	33.0 (30.0)	3.0 - 7.0	18.1 (9 - 30)	290
1-3 Days	18.5 (14.5)	56 (45)	108 (95)	33.0 (29.0)	1.8 - 4.6	18.9 (9.4 - 34)	192
2 Weeks	16.6 (13.4)	53 (41)	105 (88)	31.4 (28.1)	--------	11.4 (5 - 20)	252
1 Months	13.9 (10.7)	44 (33)	101 (91)	31.8 (28.1)	0.1 - 1.7	10.8 (4 - 19.5)	--------
2 Months	11.2 (9.4)	35 (28)	95 (84)	31.8 (28.3)	--------	--------	--------
6 Months	12.6 (11.1)	36 (31)	76 (68)	35.0 (32.7)	0.7 - 2.3	11.9 (6 - 17.5)	--------
6 Months - 2 Years	12.0 (10.5)	36 (33)	78 (70)	33.0 (30.0)	--------	10.6 (6 - 17)	150 - 350
2 Years - 6 Years	12.5 (11.5)	37 (34)	81 (75)	34.0 (31.0)	0.5 - 1.0	8.5 (5 - 15.5)	150 - 350
6 Years - 12 Years	13.5 (11.5)	40 (35)	86 (77)	34.0 (31.0)	0.5 - 1.0	8.1 (4.5 -13.5)	150 - 350
12 Years - 18 Years							
Males	14.5 (13.0)	43 (36)	88 (78)	34.0 (31.0)	0.5 - 1.0	7.8 (4.5 -13.5)	150 - 350
Females	14.0 (12.0)	41 (37)	90 (78)	34.0 (31.0)	0.5 - 1.0	7.8 (4.5 -13.5)	150 - 350

Normal Lab Values

ALT:

Infants < 5 days:	6-50 U/L	
Infants <12 months:	13-45 U/L	
1-3 years:	5-45 U/L	
4-6 years:	10-25 U/L	
7-9 years:	10-35 U/L	
10-11 years:		
Males:	10-35 U/L	Females: 10-30 U/L
12-13 years:		
Males:	10-55 U/L	Females: 10-30 U/L
14-15 years:		
Males:	10-45 U/L	Females: 5-30 U/L
> 16 years:		
Males:	10-40 U/L	Females: 5-35 U/L

Alkaline Phosphatase:

Infants:	150-240 U/L
2-10 years:	100-320 U/L
Adolescent Males:	100-390 U/L
Adolescent Females:	100-320 U/L
Adults:	30-120 U/L

Ammonia:

Newborns:	90-150 mcg/dL
0-2 weeks:	79-129 mcg/dL
Infants/Children:	29-70 mcg/dL
Adults:	15-45 mcg/dL

Amylase:

0-3 months:	0-30 U/L
3-6 months:	0-50 U/L
6-12 months:	0-80 U/L
> 1 years:	30-100 U/L

Normal Lab Values

AST:

0-10 days:	47-150 U/L
10 day-24 months:	9-80 U/L
> 24 months	
Females: 13-35 U/L	Males: 15-40 U/L

Bicarbonate:

Newborns:	17-24 mEq/L
Infants:	19-24 mEq/L
2months-2years:	16-24 mEq/L
> 2 years:	22-26 mEq/L

Total bilirubin:

Cord:	
Term and preterm:	< 2 mg/dL
0-1 days:	
Term and preterm:	< 8 mg/dL
1-2 days:	
Preterm:	< 12 mg/dL
Term:	< 11.5 mg/dL
3-5 days:	
Preterm:	< 16 mg/dL
Term:	< 12 mg/dL
Older infants:	
Preterm:	< 2 mg/dL
Term:	< 1.2 mg/dL
Adults:	< 1.5 mg/dL

Conjugated bilirubin:

Neonates:	< 0.6 mg/dL
Infants/Children:	< 0.2 mg/dL

CRP: 0-0.5 mg/dL

Normal Lab Values

Total Calcium:

Premature neonates:	6.2-11 mg/dL
0-10 days:	7.6-10.4 mg/dL
10 days-24 months:	9-11 mg/dL
24 months-12 years:	8.8-10.8 mg/dL
12-18 years:	8.4-10.2 mg/dL

Ionized Calcium:

0-1 months:	3.9-6 mg/dL
1-6 months:	3.7-5.9 mg/dL
1-18 years:	4.9-5.5 mg/dL
Adults:	4.75-5.3 mg/dL

Chloride:

0-6 months:	97-108 mEq/L
6-12 months:	97-106 mEq/L
Children/Adults:	97-107 mEq/L

Creatinine kinase:

Newborn:	145-1,578 U/L
> 6 week-Adult Males:	20-200 U/L
> 6 week-Adult Females:	20-180 U/L

Creatinine:

Cord:	0.6-1.2 mg/dL
Newborn:	0.3-1.0 mg/dL
Infants:	0.2-0.4 mg/dL
Children:	0.3-0.7 mg/dL
Adolescents:	0.5-1.0 mg/dL
Adult Males:	0.9-1.3 mg/dL
Adult Females:	0.6-1.1 mg/dL

ESR:

Children:	0-10 mm/hr
Adult Males:	0-15 mm/hr
Adult Females:	0-20 mm/hr

Normal Lab Values

Ferritin:

Newborn:	25-200 ng/mL
1 months:	200-600 ng/mL
2-5 months:	50-200 ng/mL
6 months-15 years:	7-140 ng/mL
Adult Males:	20-250 ng/mL
Adult Females:	10-120 ng/mL

Folate:

Newborn:	16-72 ng/mL
Children:	4-20 ng/mL
Adults:	10-63 ng/mL

GGT:

Cord:	37-193 U/L
0-1 months:	13-147 U/L
1-2 months:	12-123 U/L
2-4 months:	8-90 U/L
4 months-10 years:	5-32 U/L
10-15 years:	5-24 U/L
Adult Males:	11-49 U/L
Adult Females:	7-32 U/L

Haptoglobin:

Newborn:	5-48 mg/dL
>30 days:	26-185 mg/dL

Hemoglobin A1c:

Normal:	4.5 - 5.6%
At risk for diabetes:	5.7-6.4%
Diabetes mellitus:	>6.5%

Iron:

Newborn:	100-250 mcg/dL
Infants:	40-100 mcg/dL
Children:	50-120 mcg/dL
Adult Males:	65-175 mcg/dL
Adult Females:	50-170 mcg/dL

Normal Lab Values

Lactate:

Capillary blood:	
0-90 days:	9-32 mg/dL
3-24 months:	9-30 mg/dL
2-18 years:	9-22 mg/dL
Venous:	4.5-19.8 mg/dL
Arterial:	4.5-14.4 mg/dL

LDH:

0-4 days:	290-775 U/L
4-10 days:	545-2,000 U/L
10 days-24 months:	180-430 U/L
24 months-12 years:	110-295 U/L
> 12 years:	100-190 U/L

Lead: <10 mcg/dL

Lipase:

0-30 days:	6-55 U/L
1-6 months:	4-29 U/L
6-12 months:	4-23 U/L
>1 years:	3-32 U/L

Cholesterol:

Children/Adolescents:	
Desirable:	< 170
Borderline:	170-199
High:	> 200
Adults:	
Desirable:	< 200
Borderline:	200-239
High:	> 240

HDL:

Children/Adolescents:	>35
Adults:	40-60

Normal Lab Values

LDL:

Children/Adolescents:

Optimal:	< 110
Borderline:	110-129
High:	> 130

Adults:

Optimal:	< 100
Near Optimal:	100-129
Borderline:	130-159
High:	> 160

Magnesium: 1.26-2.1 mg/dl

Osmolality: 275-295

Phosphorus:

0-9 days:	4.5-9 mg/dL
10 days-24 months:	4-6.5 mg/dL
3-9 years:	3.2-5.8 mg/dL
10-15 years:	3.3-5.4 mg/dL
> 15 years:	2.4-4.4 mg/dL

Potassium:

Preterm:	3-6 mEq/L
Newborn:	3.7-5.9 mEq/L
Infants:	4.1-5.3 mEq/L
Children:	3.4-4.7 mEq/L
Adults:	3.5-5.1 mEq/L

Prealbumin:

Newborn:	7-39 mg/dL
1-6 months:	8-34 mg/dL
6 months-4years:	12-36 mg/dL
4-6 years:	12-30 mg/dL
6-19 years:	12-42 mg/dL

Normal Lab Values

Albumin:

0-15 days:	3-3.9 g/dL
15 days-1years:	2.2-4.8 g/dL
1-2 years:	3.6-5.2 g/dL
3-16 years:	3.6-5.2 g/dL
> 16 years:	3.9-5.1 g/dL

Sodium:

< 1 years:	130-145 mEq/L
> 1 years:	135-147 mEq/L

Therapeutic Drug Levels:

Digoxin	0.8-2.0 ng/mL
Phenobarbital	18-40 µg/ml
Phenytoin	10-20 µg/ml
Valproic Acid	50-100 µg/ml
Carbamezepine	6-12 µg/ml

Total Protein:

Cord:	4.8-8 g/dL
Premature:	3.6-6 g/dL
Newborn:	4.6-7 g/dL
0-15 days:	4.4-7.6 g/dL
15 days-1 years:	5.1-7.3 g/dL
1-2 years:	5.6-7.5 g/dL
3-16 years:	6-8 g/dL
> 16 years:	6-8.3 g/dL

Total Iron-binding Capacity:

Infants:	100-400 mcg/dL
Adults:	250-425 mcg/dL

Transferrin:

Newborn:	130-275 mg/dL
3 months-16 years:	203-360 mg/dL
Adults:	215-380 mg/dL

Total triglyceride:

0-7 days:		
	Males:	21-182 mg/dL
	Females:	28-166 mg/dL
8-30 days:		
	Males:	30-184 mg/dL
	Females:	30-165 mg/dL
31-90 days:		
	Males:	40-175 mg/dL
	Females:	35-282 mg/dL
91-180 day:		
	Males:	45-291 mg/dL
	Females:	50-355 mg/dL
181-365 day:		
	Males:	45-501 mg/dL
	Females:	36-431 mg/dL
1-3 years:		
	Males	27-125 mg/dL
	Females:	27-125 mg/dL
4-6 years:		
	Males:	32-116 mg/dL
	Females:	32-116 mg/dL
7-9 years:		
	Males:	28-129 mg/dL
	Females:	28-129 mg/dL
10-19 years:		
	Males:	24-145 mg/dL
	Females:	37-140 mg/dL

Troponin-I:

0-30 days:	< 4.8 mcg/L
31-90 days:	< 0.4 mcg/L
3-6 months:	< 0.3 mcg/L
7-12 months:	< 0.2 mcg/L
1-18 years:	< 0.1 mcg/L

Normal Lab Values

Urea Nitrogen:

Premature (<1 week):	3-25 mg/dL
Newborns:	2-19 mg/dL
Infants/Children:	5-18 mg/dL
Adults:	6-20 mg/dL

Uric Acid:

0-30 days:	1-4.6 mg/dL
1-12 months:	1.1-5.6 mg/dL
1-5 years:	1.7-5.8 mg/dL
6-11 years:	2.2-6.6 mg/dL
12-19 years:	
Males:	3-7.7 mg/dL
Female:	2.7-5.7 mg/dL

Quick Conversions:

F = 9/5 I + 32	C = 5/9 (F-35)
35 C = 95 F	36 C = 96.8 F
37 C = 98.6 F	37.8 C = 100 F
38 C = 100.4 F	38.3 C = 101 F
40 C = 104 F	

1 lb = 454 g	1 kg = 2.204 lb
1 lb = 16 oz	1 kg = 1000 mg
5 lb = 2.27 kg	10 lb 4.54 kg
22 lb = 10 kg	

1 fluid oz = 29.6 mL	100 mL = 3.38 oz
1 teaspoon = 5 mL	1 tablespoon = 15 mL
1 in = 2.54 cm	1 foot = 30.48 cm
1 cm = 0.394 in	1 m = 3.28 feet
1.0 mmHg = 1.36 cmH20	

Formulas

1. Total osmolality = 2 x Na + {glucose/18} + {BUN/2.8}
2. Osmolar gap = measured osmolality – total osmolality
3. Pseudohyponatremia – for every 100 mg/dl increase in glucose, Na decreases 1.6 mEq
    a. Corrected Na = Na + [(glucose – 100) x 0.016]
4. Corrected calcium = Ca + 0.8 x (4-Alb)
5. Schwartz - Estimated GFR (mL/min/1.73m2) = kL/Pcr
    a. K = proportionality constant, L = height (cm), Pcr = plasma creatinine (mg/dL)
    b. Proportionality constant
        i. Low birth weight during first year of life = 0.33
        ii. Term AGA during first year of life = 0.45
        iii. Children and adolescent girls = 0.55
        iv. Adolescent boys = 0.70
6. Anion Gap = Na – (Cl + HCO3)
    a. Delta Gap = Anion Gap – Normal Gap
7. Aa Gradient = $[(713 \times FIO_2) – (PaCO_2/0.8)] – PaO_2$
8. Arterial Oxygen Content = CaO_2 = (1.34 x Hgb (g/dL) x O_2 Sats) + (PaO_2 x 0.003)
9. Oxygen Delivery = CaO_2 x C.O.
10. BMI = weight (kg) / height $(m)^2$
11. Ankle-Brachial Pressure index = (systolic ankle pressure) / (systolic arm pressure)
12. Corrected QT (QT-C) = (QT) / $(RR^{1/2})$
13. Fractional excretion of sodium = [Na urine x Cr serum] / [Na serum x Cr urine]
14. Transtubular potassium gradient = [K urine x Osm serum] / [Osm urine x K serum]
15. Temperature conversion: °C x 9/5 + 32 = °F OR (°F - 32) x 5/9 = °C
16. Body Surface area $(m^2) = \sqrt{}$[(height cm x weight kg) / 3600]

My Notes

My Notes

My Notes

My Notes