Pocket Guide to Pediatric Residency

WESTERN MICHIGAN UNIVERSITY
Homer Stryker M.D.
SCHOOL OF MEDICINE

2016-2017
Doctor (noun)
c. 1300, ‘ Medieval Latin doctor "religious teacher, adviser, scholar," in classical Latin "teacher," agent noun from docere "to show, teach, cause to know," originally "make to appear right," causative of decere "be seemly, fitting"
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VITAL

INFORMATION
1. VITAL INFO

I. VITAL SIGNS BY AGE

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Systolic BP in mm Hg</td>
</tr>
<tr>
<td>Term Neonates (0-28 days)</td>
<td>&lt;60</td>
</tr>
<tr>
<td>Infants (1-12 months)</td>
<td>&lt;70</td>
</tr>
<tr>
<td>Children 1-10 years</td>
<td>&lt; 70 + (age in years -2)</td>
</tr>
<tr>
<td>Children &gt;10 years</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

Weigh all children in kilograms.

1 kg = 2.2 lbs

Example: 20 lb child
20 lb divided by 2.2 = 9 kg

Method to estimate weight:
- Newborn (term): usually 3 kg
- 1-10 yrs: age multiplied by 2 + 10 (kg)
- >10 yrs: age multiplied by 2 + 20 (kg)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>HR beats/min</th>
<th>RR breaths/min</th>
<th>BP (sys) mm/Hg</th>
<th>BP (dias) mm/Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn 0-1 month</td>
<td>100-180</td>
<td>30-60</td>
<td>73-92</td>
<td>52-65</td>
</tr>
<tr>
<td>Infant 1-12 months</td>
<td>80-150</td>
<td>30-60</td>
<td>90-109</td>
<td>53-67</td>
</tr>
<tr>
<td>Toddler 1-3 years</td>
<td>75-130</td>
<td>25-35</td>
<td>95-105</td>
<td>56-68</td>
</tr>
<tr>
<td>Pre-School Age 3-5 years</td>
<td>75-120</td>
<td>22-32</td>
<td>99-110</td>
<td>55-70</td>
</tr>
<tr>
<td>School Age 5-11 years</td>
<td>70-110</td>
<td>20-30</td>
<td>97-118</td>
<td>60-76</td>
</tr>
<tr>
<td>Adolescent 13-18 years</td>
<td>65-105</td>
<td>16-22</td>
<td>110-133</td>
<td>63-83</td>
</tr>
<tr>
<td>Adult 18+ years</td>
<td>50-90</td>
<td>12-20</td>
<td>113-136</td>
<td>65-84</td>
</tr>
</tbody>
</table>
II. DIETS

Pediatric Diets:
- Baby Soft <1 yr
- Toddler 1-3 yrs
- Pediatric 3-10 yrs
- General >10 yrs

Clear Liquids: anything you can see through (Jello, Juice)
Full Liquids: All liquids, includes dairy
Low Fiber: low residue regular food - low fiber. no raw fruits/veggies, nuts, or seeds Post-GI surgery, ostomy
Diabetic Diet: 1800 kcal ADA, low sugar
Renal Diet: low K, low Na, low Phos, low protein, fluid restricted
Ketogenic Diet: high fat, low carb, adequate protein (seizure cases)

Caloric Needs (per Mara Melbardis, RD. based on Lowery's data)

<table>
<thead>
<tr>
<th>Calories (kcal/kg/day)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>Premie or Catch-up</td>
</tr>
<tr>
<td>115</td>
<td>Newborn</td>
</tr>
<tr>
<td>100-110</td>
<td>6 - 12 months</td>
</tr>
<tr>
<td>100-105</td>
<td>1 - 3 years</td>
</tr>
</tbody>
</table>

20 kcal/oz → Breast Milk & Formulas (can be mixed up to 24 kcal/oz)
30 kcal/oz → Pediasure, Peptamen, etc
Calculating Goal Feeds:

\[
4\text{kg} \times \frac{100\text{kcal}}{\text{kg}} \times \frac{1\text{oz}}{20\text{kcal}} \times \frac{30\text{cc}}{1\text{oz}} = \frac{600\text{cc}}{\text{day}} \times \text{day}/8\text{feeds}
\]

IV FLUIDS
< 2 yo = D5 1/2NS + 20KCl
>2 yo = D5 NS + 20KCl

4/2/1 Rule! for maintenance fluid rate
4 ml/kg/hr first 10kg = 40cc/hr
2 ml/kg/hr 2nd 10kg = ___ + 40cc/hr (60cc/hr total for 20kg patient)
1 ml/kg/hr for every kg >20 = ___ + 60cc/hr

*Consider 1:1 Replacement fluids for high output drain, NGT, or ostomy*
*Boluses should be NS only, NOT from maintenance IVF bag*
Vital Info

III. COMMON LAB ORDERS

BMP: Na, K, Cl, CO2, BUN, Cr, BUN/Cr, Glucose, anion gap, Ca
CMP: BMP + Albumin, AST, ALT, Alk Phos, Total Protein, Total Bili, Globulin **NO direct bili in CMP**
RFP: BMP + Albumin, Phosphorus **NO Mg in RFP**
LFT: AST, ALT, Alk Phos, Albumin, Tota Bili, Direct Bili **NO GGT in LFTs**

POCP: CMP, Phos, Mg, LDH, Uric Acid, Direct Bili

IV. LUMBAR PUNCTURES

CSF Findings in Meningitis

<table>
<thead>
<tr>
<th>Type</th>
<th>WBC</th>
<th>Differential</th>
<th>Protein</th>
<th>Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td>≥ 1000</td>
<td>PMN</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Viral</td>
<td>&lt; 100</td>
<td>Lymphocytes (PMN initially)</td>
<td>normal or ↑</td>
<td>normal</td>
</tr>
<tr>
<td>Fungal</td>
<td>variable</td>
<td>Lymphocytes</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>TB</td>
<td>variable</td>
<td>Lymphocytes</td>
<td>↑</td>
<td>↓</td>
</tr>
</tbody>
</table>

“Bacteria eat Glucose and poop Protein”

Other Causes of ↑ protein → GBS, Hemorrhage, Multiple Sclerosis, Malignancy, Endocrine abnormalities, Meds, Inflammatory conditions

Opening Pressure

- Normal infant/Child: 10-100 mmHg (~13.5-135 cmH2O)
- 8 yrs and up: 60-200 mmHg (~81.5-272 cmH2O)
- Intracranial HTN: > 250 mmHg (~340 cmH2O)

CSF WBC Corrections

\[ \text{WBC}_{\text{corrected}} = \text{WBC}_{\text{CSF}} - \text{WBC}_{\text{blood}} \times \frac{\text{RBC}_{\text{CSF}}}{\text{RBC}_{\text{blood}}} \]

1 WBC per 750 RBCs
V. PLACES THAT OFFER DELIVERY

Fourth Coast Café – Take out only
6AM-5:30AM
816 S Westnedge Ave
Kalamazoo, MI 49008
Phone number (269) 383-0202

Two Fellas Grill – Take out and delivery
11AM-3AM Sunday-Wednesday,
11AM-4AM Fri/Sat
907 S Howard St
Kalamazoo, MI 49006
Phone number (269) 492-9727

Cottage Inn Pizza – Take out and delivery
11AM-3AM
5038 W KL Ave
Kalamazoo, MI 49009
Phone number (269) 353-4800

Big Burrito – Take out and delivery
Mon Closed, Sun/Tues 11AM-12AM,
Wed/Thurs 11AM-3AM, Fri/Sat 11AM-4AM
5036 W KL Ave
Kalamazoo, MI 49009
Phone number (269) 372-2442

Menna’s Joint – Take out and delivery
10:30AM-3AM
3501 Stadium Dr
Kalamazoo, MI 49008
Phone number (269) 375-3827

Jimmy John’s – Take out and delivery
10AM-3AM Sun-Thurs, 10AM-4AM Fri/Sat
1128 W Michigan Ave
Kalamazoo, MI 49006
Phone number (269) 381-8400

Insomnia Cookies – Take out and delivery
11AM-3AM
2901 Howard St
Kalamazoo, MI 49008
Phone number (877) 632-6654

Buffalo Wild Wings – Take out and delivery *
11AM-12A Sun-Thurs, 11AM-2AM Fri/Sat
3209 Stadium Drive
Kalamazoo, MI 49008
Phone number (269) 353-9464

Domino’s Pizza – Take out and delivery
10AM-2AM Mon-Thurs, 10AM-4AM Fri/Sat
10AM-2AM Sun
2004 W Main St
Kalamazoo, MI 49006
Phone number (269) 343-3030

Campus Wok – Take out and delivery
12PM-12AM Sun-Tues, 11AM-3AM Wed,
11AM-4AM Thurs-Sat
909 S Howard St
Kalamazoo, MI 49006
Phone number (269) 552-9616

*Deliver through Mr. Delivery. Go to their website for more information and more locations they offer delivery for.
Tiongson’s Rules:

Rule #1: Say it like you mean it
Rule #2: Don’t underestimate the power of observation (in a controlled clinical setting)
Rule #3: Maintain a healthy degree of skepticism
Rule #4: Know your limitations
Rule #5: Know all that you can about the patient before you go in to see them
Inpatient

2. INPATIENT

PEARLS: ALWAYS use the Admission Navigator and be sure to RECONCILE HOME MEDICATIONS and order if necessary. Rec is not completed unless marked as “completed by provider” and also reviewed and signed. This is a part of your job...DO IT!

Morning Report: Every weekday morning at 7:45AM in Room of Magic. Show up, this again is part of your job...DO IT!

I. TUBES & DRAINS

NGT = Nasogastric Tube
   Feeding tube (1 lumen, thinner) for feeding
   Salem Sump (2 lumens) to low-cont suction to empty stomach contents
   - if not draining, flush with large syringe: use saline in main port (clear) and air in vent port (blue)
   Replogle = salem sump for preemies

OGT = Oropharyngeal tube

JP = Jackson-Pratt drain - closed suction, thicker flat section inside.
   Removal considered when < 30 cc/day

Blake drain = similar to JP, internal portion is same size

Penrose = open rubber tube

G-tube = gastrostomy tube - long-term feeds in pts who can’t take PO well

J-tube = jejunostomy tube - for patients whose pylorus/duodenum/biliary tree must be bypassed

CENTRAL LINES

Short Term

TLC = Triple Lumen Catheter = short-term central venous catheter for medications, TPN, IV Antibiotics. Needs changing every 7-10 days

Shiley = short-term large-bore catheter for dialysis or plasmapheresis. Bridge for permcath and AV fistula

Long Term

PICC = Peripherally inserted central catheter = long-term small-bore catheter for antibiotics or TPN. Should not be used for blood draws

Hickmann/Broviac = long-term tunneled central venous catheter for antibiotics or TPN

Permcath = long-term large-bore catheter for dialysis or plasmapheresis. Bridge to AV fistula

Port-a-cath = long-term catheter with subcutaneous port. For Chemotherapy
Inpatient

How to get a central line?
- PICC: arrange with transport nurse
- Call Surgery for: Hickmann/Broviac, Permcath, and Port-a-cath
- TLC: PICU only

II. FLOOR PROBLEMS

FEVER: Temp > 38°C or 100.4°F (different parameters for Heme/Onc)

Recurrent fever → Tylenol or Motrin if uncomfortable or > 103
PNA w/ cont. fever → consider Effusion, Empyema, or Abscess → CXR or U/S
New / unexpected fever?
Examine Patient (lungs, look at IV for phlebitis, look at any wounds)
Check Labs/Imaging: consider CBC, BCx, UA, UCx, CRP, PCT, CXR
Fever + ↑ WBC, ↑ HR, hypotension and/or tachypnea → early Sepsis?
*Call Senior
*See Clinical Practice Guideline in Inpatient Appendix
**Avoid Motrin in Heme/Onc d/t bleeding concerns. Use caution with Tylenol as to not mask a fever.

HYPOXIA/DYSPNEA

Ask RN to recheck vitals and start O2 while on your way.
Always examine patient

Diagnostic/Therapeutic actions:
- Nebulizer treatment, Albuterol
- Suction airway → deep suction for RSV
- Consider CXR, VBG/CBG, EKG
- Decompensating despite intervention? Follow PEWS flow

Discharge Criteria: For Asthma --> Albuterol q6h, RA x12-24h (clinical picture), FEV1 ≥ 70% predicted ( >5 yrs old)
*ALWAYS place Asthma Action Plan (AAP) in Discharge Instructions
Inpatient

**CF EXACERBATIONS**

- Tobramycin + Zosyn, Ceftazidime → look at doses from last admission
  - Tobra dosing by pharmacy
- Vest treatments QID
- Albuterol & Hypertonic Saline nebs with vest
  *Continue home meds* - pancreatic enzymes, dornase alpha, etc

**SEIZURE / STATUS EPILEPTICUS**

- Lorazepam (Ativan) 0.1 mg/kg IV, given @ 1-2 mg/min (max dose 4 mg)
  - May repeat once in 10 min

- Fosphenytoin
  - Initial dose - 20 mgPE/kg over 15 min
  - Repeat dose - 10 mgPE/kg over 15 min (max rate 3 mgPE/kg/min)
  - Consider PICU consultation

- PHENobarbital
  - Initial dose - 20 mg/kg (~ 50 mg/min)
  - Repeat dose - 10 mg/kg (~ 50 mg/min)

- **Still Seizing?** Needs PICU
  - Intubate, Continuous EEG
  - PENTobarbital 5 mg/kg, IV over 1h (max rate 50 mg/min)

**Other Medications for bolus** (consult Neuro first – see consultation instructions in appendix)

- Keppra 20 mg/kg dose (run @ 100 mg/min)
- Depakene 30 mg/kg dose (run @ 150 mg/min)

*See Diastat dosing card below (in appendix) for discharge. Needs Diastat Rx and instructions in Discharge Instructions. Need Diastat teaching prior to discharge as well.

**HIVES / ANAPHYLAXIS**

- Benadryl
  - 2-6 yo: 6.25 mg q4-6h prn
  - 6-12 yo: 12.5 - 25 mg q4-6h prn
  - 12 yo+: 25 - 50 mg q4-6h prn

- Epinephrine
  - 0.01 mg/kg 1:1000 IM
  - EpiPen → 0.3 mg IM (wt ≥ 30 kg)
  - EpiPen Jr → 0.15 mg IM (wt 10-30 kg)
Inpatient
Any Recent Medications?
Transfusion? Stop and Give Benadryl

Vancomycin → Red Man Syndrome (NOT Hives. It is an erythematous, itchy rash)
Stop Infusion, Give Benadryl
Restart at slower rate

III. PROCEDURAL SEDATION

Needs pre-sedation orders (use order set)
Diet: Allowed meal/formula ≥ 6h, breast milk ≥ 4h, clears ≥ 2h prior to sedation
NPO at least 2 hours prior to sedation
IVF while NPO

Versed
Bolus: 0.1 mg/kg IV (max 4 mg)
Onset: 2-3 min Duration: ~ 30 min

Propofol
Initial bolus: 1-2 mg/kg IVP over 20-30 sec
Subsequent boluses: 0.5-1 mg/kg IVP
Drip: 100-200 mcg/kg/min (usually start at 125)
Onset: 30s Duration: 3-10 min

Ketamine
Bolus: 1 mg/kg
Onset: 30s Duration: 3-10 min
SE: hallucination (↑ with age), Nausea, ↑ ICP, ↑ airway secretions, nystagmus

Atropine
Given to ↓ airway secretions with Ketamine and for EGD
Bolus: 0.01-0.02 mg/kg IV (min 0.1 mg, max 0.4 mg)

Fentanyl (analgesia & mild sedation)
0.5-2 mcg/kg IV q1-2h
Onset: immediate Duration: 0.5-1h with IV
Attendings
Drs. Elliott, Scott, Staddon, Schwalm, Broxson (locums)

COG Protocols: http://childrensoncologygroup.org

Chemotherapy Agents
Methotrexate: + Leucovorin Rescue
Monitor Urine SG < 1.010 & pH 7-8
4h MTX infusion - protocol specific level checks, but generally:
4, 24, 36, 42 & 48 hrs, then Daily in AM (24h <10, 36h <1.0, for d/c must be <0.1)
24h MTX infusion - protocol specific checks, but generally:
24, 36, 48 hrs, then Daily in AM (<0.1 for d/c)
MTX too high? (protocol MTX level nomograms)
→ increase IVF rate, increase Leucovorin (Speak to Attending @ Δ)
Ifosfamide:
Monitor Urine SG < 1.010, RBC
Potential for hemorrhagic cystitis (MESNA = protects bladder)
Etoposide:
Monitor ↓BP. Bone Marrow Suppression. Metallic food taste
Platins:
Nephro & oto-toxic
Doxorubicin:
Dexrazoxane = cardioprotective

Other Medications
Antiemetics
Zofran 0.15 mg/kg/dose IV q8-12h (adult dose 4-8mg q8h)
Kytril 20 mcg/kg/dose IV (max 3 mg/dose, 9mg/24h)
Ativan 0.05 mg/kg IV q6h PRN (max 2 mg/dose)
Can also consider Benadryl & Steroids with Attending

Cancer Pain / Sickle Cell Crisis
Morphine 0.04-0.07 mg/kg/hr, titrate to effect
Fentanyl 1-3 mcg/kg/hr, titrate to effect
Inpatient

Important dates to assess chemo response (Minimal Residual Disease [MRD])
Day 8: Peripheral blood
Day 29: Bone marrow

WBC Nadir 10-14 days after each chemo tx → 2-3 wks for recovery
*Technically no neupogen when counts are high (won't work)

How to Calculate ANC:
Total WBC x Neutrophils% + Bands = ANC
## Chemotherapy Side Effects

General side effects of chemotherapy include: nausea, vomiting, alopecia, myelosuppression, anorexia.

<table>
<thead>
<tr>
<th>AGENT</th>
<th>MAJOR TOXICITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparaginase (EColi, Erwinia)</td>
<td>CNS thrombosis or bleed, coagulopathy, encephalopathy, hyperglycemia, local/systemic allergic rx, pancreatitis, abnormal LFTs, increased triglycerides/cholesterol/ammonia levels</td>
</tr>
<tr>
<td>Bleomycin</td>
<td>ARDS, pulmonary fibrosis, hyperpigmentation, allergic reaction, mucositis</td>
</tr>
<tr>
<td>Busulfan</td>
<td>Seizures, pulmonary fibrosis, VOD, hyperpigmentation</td>
</tr>
<tr>
<td>Carboplatin*</td>
<td>N/V, electrolyte wasting, hypersensitivity, Increased LFTs, nephrotoxicity, ototoxicity</td>
</tr>
<tr>
<td>Cisplatin*</td>
<td>N/V, anorexia, electrolyte wasting, nephrotoxicity, ototoxicity, peripheral neuropathy</td>
</tr>
<tr>
<td>Cyclophosphamide*</td>
<td>N/V, hemorrhagic cystitis, SIADH, cardiotoxicity, gonadal dysfunction, secondary neoplasms, CNS toxicity</td>
</tr>
<tr>
<td>Ifosfamide*</td>
<td>N/V/D, prolonged myelosuppression with high doses, mucositis, conjunctivitis, hepatotoxicity/VOD, CNS toxicity, fevers, pain and erythema of palms/soles</td>
</tr>
<tr>
<td>Cytarabine (Ara-C)*</td>
<td>N/V, local ulceration if extravasated, Increased LFTs, mucositis</td>
</tr>
<tr>
<td>Dactinomycin*</td>
<td>Cardiomyopathy (need ECHO), hepatotoxicity, mucositis, sclerosis of the vein, pink/red color to body secretions</td>
</tr>
<tr>
<td>Doxorubicin*</td>
<td>Allergic phenomena, hypotension up to 24hrs after infusion, skin irritation, post-infusion fever, secondary malignancies</td>
</tr>
<tr>
<td>Daunorubicin*</td>
<td>Neurotoxicity, pulmonary toxicity</td>
</tr>
<tr>
<td>Fluorouracil*</td>
<td>Insomnia, hyperphagia, gastritis, pituitary-adrenal axis suppression, acne, personality changes, immunosuppression and increased risk of infections, Cushing's syndrome, hyperglycemia, poor wound healing, easy bruising, striae, muscle weakness, cataracts, osteopenia/vascular necrosis (e.g., with Dexamethasone)</td>
</tr>
<tr>
<td>Irinotecan</td>
<td>N/V, diarrhea (early and late onset), Increased LFTs/bilirubin levels, dehydration, allergic reaction</td>
</tr>
<tr>
<td>Mercaptopurine (6-MP)</td>
<td>Nausea/anorexia, rash, hepatotoxicity</td>
</tr>
<tr>
<td>Thioguanine (6-TG)</td>
<td></td>
</tr>
<tr>
<td>Methotrexate*</td>
<td>N/V, hepatotoxicity, severe mucositis (with high dose), renal toxicity, CNS toxicity</td>
</tr>
<tr>
<td>Vincristine</td>
<td>Alopecia, constipation, peripheral paresthesias, jaw pain, headache, loss of DTRs, foot/wrist drop, clumsiness, gait abnormalities, VOD</td>
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</table>
**Neutropenia with Fever** (ANC < 500 & Fever > 101.5)
Exam: Immediate assessment - be sure to look at Ears, Throat (mucositis), and Anus (NO rectal exam)
   - Consider typhlitis and line infection
Labs: CBC, POCP, UA (NO cath), blood cultures from both ports
   - Consider Viral NP swab and/or CXR (if respiratory Sx)
Tx: Broad spectrum antibiotics - Vancomycin & Cefepime
   - Consider Zosyn, Tobramycin, Acyclovir and/or Antifungal if indicated

Repeat Blood Cultures: daily until 48h negative or with T >101.5 (needs only 1 BCx in 24h period)

**Tumor Lysis Syndrome** (tumor lysis leading to acute renal failure)
Lab Syndrome = 2+ of following:
↑ Uric Acid > 8, Phos > 6.5, K > 6
↓ Ca < 7 (corrected), Ionized Ca < 1.12
Clinical syndrome = ↑ creatinine, seizures, cardiac dysrhythmia, or death
Treatment:
IVF without K -- goal UOP > 2 cc/kg/h
allopurinol or rasburicase
monitor K, Uric Acid, and Ca.

**SICKLE CELL**

On Admission: CBC, Retic (% most important), Fractionated Hgb, CMP, CXR

**Pain Crises**
Pain Control → morphine preferred = 0.1 mg/kg IV prn. Consider drip or PCA. Look at last admit for pain control plan.
**can use scheduled toradol if renal function ok
Hydration → 20cc/kg NS bolus on admission, 1.5-2x MIVF
Transfuse? → goal Hgb ~ 10 g/dL

**LUQ pain w/ Hgb ≥ 2 g/dL below baseline → Splenic Sequestration? → get U/S and transfuse**
Inpatient

**Acute Chest Syndrome**
New infiltrate on CXR ± fever, chest pain, cough, dyspnea, hypoxia
Hydration → 1.5x MIVF
Antibiotics → Ceftriaxone & Azithromycin (Strep and Mycoplasma coverage)
Transfuse? → Goal Hgb ~ 10 g/dL
Pain? → See above

**Target Hgb prior to Surgery**
Hgb 10-12 g/dL & HgbS ≤ 30%

**Transfusion vs Exchange** → Hct ≥ 30% requires exchange transfusion
May need specific blood (ex Kell, Duffy, Kidd)
May need pre-transfusion medications (Benadryl, steroids, etc)

**Penicillin Prophylaxis** → Start < 3 mo until at least 5 yrs (should take until adult)

**Treatment**
Hydroxyurea → HbF induction  **Can tell compliance by ↑ MCV**
Need Folic Acid Supplementation

V. INPATIENT APPENDIX

**Smartphrases**

**Admissions:**
Generic: .pedsHPGENERIC
Asthma: .pedsHPASTHMA
Bronchiolitis: .pedsHPBRONCHIOLITIS
Concussion: .pedsHPCONCUSSION

**Consults:**
From ED: .pedsEDCONSULT

**Progress Notes:** .pedsSOAP

**Discharge:**
Instructions: .pedsDCGENERIC
Summary: .pedsDCSUMMARYTEMPLATE
# PEWS Reference Ranges by Age

## <3 months old

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## 3 months to <12 months old

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### 12 months to <3 years old

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### 3 years to <5 year

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### Inpatient

#### 5 years to <8 years

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#### 8 years to <12 years

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Inpatient

12 years and older

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**Inpatient**

Patient admitted to Pediatrics Unit

Assessment by senior resident and RN

- **PEWS 0 - 2**
  - RN reassess every 4 hours

- **PEWS Total 3**
  - RN notify intern and charge nurse of clinical change
  - Intern make plan with treatment team
  - RN reassess every 2 hours *unless otherwise stated in plan

- **PEWS 4 (or 3 in any category)**
  - RN notify intern and charge nurse of clinical change
  - Intern notify senior and attending of clinical change & make plan with treatment team
  - *Consider RRT*
  - RN reassess every 1 hour *unless otherwise stated in plan

- **PEWS ≥ 5**
  - **CALL RRT** dial 123
  - Intern/Resident notify attending & make plan with treatment team
  - *Consider PICU consult*

*With any change in PEW score write significant event note with smartphrase*
Clinical Practice Guideline - Febrile infant less than 8 weeks (rule out sepsis).

Initial evaluation of febrile neonate
- Good history and physical exam
- Verify temperature ≥ 38 C or 100.4 F
- Initial laboratory evaluation: Blood culture, CBC with differential, catheterized UA with urine culture, Procalcitonin (PCT), comprehensive metabolic panel (CMP).

Is patient high risk? (any one of the following)
- < 28 days
- Chronic medical condition
- Abnormal WBC (< 5K or >15K)
- Abnormal PCT
- Abnormal UA
- Ill appearing

Admission with following work-up
- Blood, urine, and CSF cultures and enterovirus PCR
- RIDP if symptoms
- See algorithm for evaluation and empiric treatment of HSV on page 2 for infants <6 weeks.
- Empiric antibiotics—recommend single agent 3rd generation cephalosporin, consider addition of Vancomycin if skin/soft tissue infection or recent hospitalization

Culture positive?
- Yes
  - If GPC, consider addition of Amp +/- Vancomycin and continue treatment with broad spectrum antibiotics until sensitivities are known.
- No

Viral testing positive?
- Yes
  - Home after 24 hrs
- No
  - Home after 36 hrs

Barrier(s) to follow up?
- No
- Yes
  - ATBx not indicated
  - Consider admission
  - Consider viral testing

ATBx not indicated
- Can be sent home with follow up within 24 hours.
CONSULTS

Gastroenterology: Drs. Cameron and Jones.
Consult through Epic and page/call to discuss case.

Neurology:
During business hours, Caitlin Groeneveld, NP should be first contact for inpatient consults. She can be reached through Smart Web.
After hours inpatient consults via Helen DeVos Hospital 1-877-391-2345 (in Smart Web)

Nephrology: Via Helen DeVos or M-Line (University of Michigan on-call), with capability of Telemedicine as well. Try and pick location closer to family or based on their preference.
M-Line: 800-962-3555

Heme/Onc: Attendings as listed above.
Consult through Epic and page/call to discuss case.

ENT: Can consult on-call via Smart Web to see while in hospital. But Pediatric ENT through M-Line.

ID: Drs. Flynn, Garg, Lutwick, and Boapimp.
Consult through Epic and page/call to discuss case.

Child Abuse: Dr. Brown
Consult through Epic and page/call to discuss case.

For all other consults: Contact Helen DeVos or University of Michigan at numbers listed above.
“We’re topless, but that’s ok when you’re 18 months old”
~ Dr. Moore

“The patient can have a normal mini-mental status exam and still be flaming crazy”
~ Dr. Moore

“I’ve been telling my boys a philosophy in which I live by... If there is anything on your body, no matter where it is, you have to touch it!”
~ Father of patient

“It’s not about being thorough. It’s about being efficient”
~ Dr. Patel

“I’m staffing, here have some cheese” ~ Dr. Moore

“Residents should be promiscuous when performing rapid strep tests”
~ Dr. Feinberg
### 3. OUTPATIENT

#### I. SURVIVAL PAMPHLET

<table>
<thead>
<tr>
<th>Age</th>
<th>Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>- Within 72 hours of D/C</td>
</tr>
<tr>
<td>1 Month</td>
<td>- Check NB Screen</td>
</tr>
<tr>
<td></td>
<td>- Edinburgh Screen¹</td>
</tr>
<tr>
<td>2 Month</td>
<td>- Edinburgh Screen¹</td>
</tr>
<tr>
<td>4 Month</td>
<td></td>
</tr>
<tr>
<td>6 Month</td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td>9 Month</td>
<td>- Lead and CBC³</td>
</tr>
<tr>
<td></td>
<td>- ASQ⁴</td>
</tr>
<tr>
<td></td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td>12 Month</td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td>15 Month</td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td></td>
<td>- ASQ-SE⁵</td>
</tr>
<tr>
<td>18 Month</td>
<td>- Lead and CBC³</td>
</tr>
<tr>
<td></td>
<td>- MCHAT⁴</td>
</tr>
<tr>
<td></td>
<td>- ASQ⁴</td>
</tr>
<tr>
<td></td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td>24 Month</td>
<td>- MCHAT⁴</td>
</tr>
<tr>
<td></td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td>30 Month</td>
<td>- ASQ⁴</td>
</tr>
<tr>
<td></td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td>3-4 Year</td>
<td>- Ready to Read²</td>
</tr>
<tr>
<td></td>
<td>- Check BMI⁶</td>
</tr>
<tr>
<td></td>
<td>- Check BP⁷</td>
</tr>
<tr>
<td>5-12 Year</td>
<td>- Check BMI⁶</td>
</tr>
<tr>
<td></td>
<td>- Check BP⁷</td>
</tr>
<tr>
<td></td>
<td>- PSC-17⁵</td>
</tr>
<tr>
<td>13+ Years</td>
<td>- Check BMI⁶</td>
</tr>
<tr>
<td></td>
<td>- Check BP⁷</td>
</tr>
<tr>
<td></td>
<td>- Check GC/Chlamydia⁸</td>
</tr>
<tr>
<td></td>
<td>- Check PHQ-2⁹</td>
</tr>
</tbody>
</table>

1. Record in HPI>Edinburgh screen; enter CPT 99420
2. Give out age appropriate book and record in eCW>WCE>HPI>Ready to read book given (Yes/No)
3. Ordered and Done by Nurses, but review
4. CPT 96110; Record in HPI; completed form must be scanned into eCW
5. CPT 96127; Record in HPI; completed form must be scanned into eCW
6. ≥85 %tile, address per protocol. Use obesity template>Peds-Childhood Obesity
7. If BP ≥90 %tile address and record
8. If sexually active; order a non-clean catch urine
9. If “yes” on PHQ-2, then complete PHQ-9, enter Z13.89 and CPT 99420

*Every visit – Update Problem List & Med List
*Every visit – Put in Follow-up Appointment
*Every visit – Nurses review & order vaccines, but review
<table>
<thead>
<tr>
<th><strong>Outpatient</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>MCHAT-R/F Scoring Guide</strong></th>
<th><strong>Vanderbilt Parent Assessment Guide</strong></th>
<th><strong>Vanderbilt Teacher Assessment Guide</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>For all items except 2, 5, and 12 the response “<strong>NO</strong>” indicates ASD risk; for items 2, 5, and 12, “<strong>YES</strong>” indicates ASD risk</td>
<td><strong>Predominantly Inattentive Subtype</strong>&lt;br&gt;• Must score a 2 or 3 on 6 out of 9 items on questions 1-9&lt;br&gt;<strong>AND</strong>&lt;br&gt;• Score a 4 or 5 on any of the Performance questions (48-55)</td>
<td><strong>Predominantly Inattentive Subtype</strong>&lt;br&gt;• Must score a 2 or 3 on 6 out of 9 items on questions 1-9&lt;br&gt;<strong>AND</strong>&lt;br&gt;• Score a 4 or 5 on any of the Performance questions (48-55)</td>
</tr>
</tbody>
</table>

**Low Risk** = Total Score 0-2<br>**Medium Risk** = Total Score 3-7<br>**High Risk** = Total Score 8-20

| **Hypercative/Impulsive Subtype**<br>• Must Score a 2 or 3 on 6 out of 9 items on questions 10-18<br>**AND**<br>• Score a 4 or 5 on any of the Performance questions (48-55) | **Predominantly Hyperactive/Impulsive Subtype**<br>• Must score a 2 or 3 on 3 out of 5 items on questions 10-18<br>**AND**<br>• Score a 4 or 5 on any of the Performance questions (36-43) |

<table>
<thead>
<tr>
<th><strong>Edinburgh Depression Scoring Guide</strong></th>
<th><strong>ADHD Combined Inattention/Hyperactivity</strong>&lt;br&gt;• Requires the above criteria on both inattention and hyperactivity/impulsivity</th>
<th><strong>ADHD Combined Inattention/Hyperactivity</strong>&lt;br&gt;• Requires the above criteria on both inattention and hyperactivity/impulsivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Questions 1, 2 &amp; 4 (with *) are scored 0, 1, 2 or 3 with top box 0 and bottom 3.</td>
<td><strong>Oppositional-Defiant Disorder Screen</strong>&lt;br&gt;• Must score a 2 or 3 on 4 out of 8 behaviors on questions 19-26&lt;br&gt;<strong>AND</strong>&lt;br&gt;• Score a 4 or 5 on any of the Performance questions (48-55)</td>
<td><strong>Oppositional-Defiant/Conduct Disorder Screen</strong>&lt;br&gt;• Must score a 2 or 3 on 3 out of 10 items on questions 19-28&lt;br&gt;<strong>AND</strong>&lt;br&gt;• Score a 4 or 5 on any of the Performance questions (36-43)</td>
</tr>
<tr>
<td>• Questions 3, 5-10 (without an *) are reverse scored, top box is 3 and bottom is 0.</td>
<td><strong>Conduct Disorder Screen</strong>&lt;br&gt;• Must score a 2 or 3 on 3 out of 14 behaviors on questions 27-40&lt;br&gt;<strong>AND</strong>&lt;br&gt;• Score a 4 or 5 on any of the Performance questions (48-55)</td>
<td><strong>Anxiety/Depression Screen</strong>&lt;br&gt;• Must score a 2 or 3 on 3 out of 7 items on questions 29-35&lt;br&gt;<strong>AND</strong>&lt;br&gt;• Score a 4 or 5 on any of the Performance questions (36-43)</td>
</tr>
</tbody>
</table>

| Maximum Score = 30<br>Possible Depression = ≥10<br>**Always look at item 10 (suicidal thoughts)** | **Anxiety/Depression Screen**<br>• Must score a 2 or 3 on 3 out of 17 behaviors on questions 41-47<br>**AND**<br>• Score a 4 or 5 on any of the Performance questions (48-55) | **Anxiety/Depression Screen**<br>• Must score a 2 or 3 on 3 out of 17 behaviors on questions 41-47<br>**AND**<br>• Score a 4 or 5 on any of the Performance questions (48-55) |
II. MEIJER FREE MEDICATIONS LIST

- Amoxicillin
- Cephalexin
- SMZ-TMP (excludes suspension)
- Ciprofloxacin (250, 500 and 750mg strengths)
- Ampicillin
- Penicillin VK
- Prenatal Vitamins (Rx'd)
- Metformin immediate release
- Atorvastatin Calcium (10, 20, 40 and 80mg strengths; 30 tabs/fill)
*Antibiotics are a maximum of 14 day supply at normal oral dosages

III. IMMUNIZATIONS

RNs will place immunization orders
Remember to tell parents to wait for immunizations
DON'T FORGET TO MAKE NURSE READY after finished staffing

- **Flu Vaccine**
  - **IM Flu Vaccine** → 6mo+
  - → Ok with egg allergy if no anaphylaxis

- **No Flumist** → < 2 yo, chronic heart or lung disease (e.g. asthma)
  - → Chronic medical condition
  - → Immunocompromised or pregnant

IV. GROWTH

**Weight**

- **Newborn** < 10% weight loss, regain wt by 10-14 days
- **Until 3mo** Gain 25-30g/day
- **3-6mo** 15-20g/day
- **6-12mo** 10-15g/day

<table>
<thead>
<tr>
<th>Serving Size: 1 Tablespoon of table food per year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Double BW</strong> 4-5 months</td>
</tr>
<tr>
<td><strong>Triple BW</strong> 1 year</td>
</tr>
<tr>
<td><strong>Quadruple BW</strong> 2 years</td>
</tr>
</tbody>
</table>
Outpatient

**Height**

Mid-parental Height

\[
[(\text{Mom's Ht} + \text{Dad's Ht}) +/- 13.2\text{cm}] / 2
\]

Growth < 5 cm/yr after age 5 is worrisome

Normal height growth: 5 inches per year at 1-2 years of age
3 inches per year at 3 years of age

<table>
<thead>
<tr>
<th>Average Age</th>
<th>Head circumference (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>35</td>
</tr>
<tr>
<td>3 month</td>
<td>40</td>
</tr>
<tr>
<td>By 9 months</td>
<td>45</td>
</tr>
<tr>
<td>3 years</td>
<td>50</td>
</tr>
<tr>
<td>Adult</td>
<td>55</td>
</tr>
</tbody>
</table>

V. BREAST MILK/FORMULAS

20 kcal/oz $\rightarrow$ Breast Milk & Formulas (can be mixed up to 24 kcal/oz)
30 kcal/oz $\rightarrow$ Pediasure, etc

*Give at least 2 weeks on any new formula before changing!

<table>
<thead>
<tr>
<th>Type of Formula</th>
<th>Common Brand Names</th>
<th>Proteins</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow Milk Based</td>
<td>Enfamil Premium</td>
<td>Intact protein</td>
<td>Lactase deficiency</td>
</tr>
<tr>
<td></td>
<td>Similac Advance</td>
<td></td>
<td>Galactosemia</td>
</tr>
<tr>
<td></td>
<td>Parent’s Choice Advantage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soy Protein Based</td>
<td>Enfamil Prosobee</td>
<td>Intact Protein</td>
<td>Lactase deficiency</td>
</tr>
<tr>
<td></td>
<td>Similac Sensitive Insomil Soy</td>
<td></td>
<td>Galactosemia</td>
</tr>
<tr>
<td></td>
<td>Parent’s Choice Soy Based</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Milk based</td>
<td>Enfamil AR (THICKENED)</td>
<td>Intact Protein</td>
<td>Thickened formulas (AR) for Regurgitation</td>
</tr>
<tr>
<td></td>
<td>Enfamil Gentlease (PH)</td>
<td></td>
<td>Partially hydrolysed (PH)- constipation</td>
</tr>
<tr>
<td></td>
<td>Enfamil Rest Full (PH AND THICKENED)</td>
<td></td>
<td>Or if regurgitation does not improved.</td>
</tr>
<tr>
<td></td>
<td>Good Start Gentle Plus (PH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good Start Protect Plus (PH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Similac Sensitive for Spit – Up (THICKENED)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parent’s choice Gentle (PH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parent’s Choice Added Rice Starch (THICKENED)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensively Hydrolyzed</td>
<td>Nutramigen (liquid concentrate) Nutramigen with Enflora LGG Progestimil Similac Expert Care Alimentum</td>
<td>Partially Digested /Caesin hydrolysate</td>
<td>Cow Milk Protein Allergy</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Amino Acid Based</td>
<td>Elecare Neocate Infant Nutromigen AA</td>
<td>Fully Digested into AA</td>
<td>Cow Milk Protein Allergy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th>Approximate Daily Weight Gain</th>
<th>Approximate Monthly Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 months</td>
<td>30 g</td>
<td>1 kg</td>
</tr>
<tr>
<td>3 -6 months</td>
<td>20 g</td>
<td>0.6 kg</td>
</tr>
<tr>
<td>6 -9 months</td>
<td>15 g</td>
<td>0.5 kg</td>
</tr>
<tr>
<td>9-12 months</td>
<td>12 g</td>
<td>0.4 kg</td>
</tr>
<tr>
<td>1-3 years</td>
<td></td>
<td>0.25 kg</td>
</tr>
</tbody>
</table>

WIC (free, no form needed) Needs WIC form:
- Enfamil Premium, AR, Gentlease, Prosobee Lactaid Milk
- Neosure, Elacare, Enfacare, Nutramigen Soy milk for older child Pediasure, Ensure, Nutren Jr

Probiotic: Gerber colic smooth probiotic AR preferred to rice cereal as it does not increase calorie intake.

Donor Breast Milk

Breast Milk Bank will provide two 8 oz bottles upon discharge from nursery
If more is required after discharge:
Fax prescription (“12 oz of DBM/day for 1 week”) to 269-341-8365
This will be free

Special Indications
- GER → Enfamil AR
- Milk Protein Allergy → Neocate, EleCare, Nutramigen, Alimentum
- Lactose Intolerance → Same as above + Soy formulas
- Vegan → Prosobee or other Soy formula
- Colic → Gentlease (no evidence of effectiveness)

Vit D Supplementation - *All exclusively breastfed babies should be on Vit D*
- 0 - 1yr = 400IU, 1yr - adult = 600IU
- Need ~30 oz of formula to meet daily requirement
- Preparations: Enfamil Poly-Vi-Sol or Tri-Vi-Sol (formulations with Fe as well)-can Rx these, Baby D-Drops, and BioGaia (and maaaaaany more)
VI. **ANTICIPATORY GUIDANCE**

**Feeding Milestones**

<table>
<thead>
<tr>
<th>Age</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6 mo</td>
<td>Start solid foods</td>
</tr>
<tr>
<td>6 mo</td>
<td>Can give water &amp; juice - max 6oz from 6 mo to 6 yrs</td>
</tr>
<tr>
<td>6-8 mo</td>
<td>Introduce sippy cup</td>
</tr>
<tr>
<td>9 mo</td>
<td>Introduce finger foods (soft), meat ok</td>
</tr>
<tr>
<td>12 mo</td>
<td>Replace formula/breast milk with whole milk</td>
</tr>
<tr>
<td>12-14 mo</td>
<td>Wean from bottle (earlier the better)</td>
</tr>
<tr>
<td>24 mo</td>
<td>Most ready to consume adult foods. 2% milk ok</td>
</tr>
<tr>
<td>36 mo</td>
<td>Skim milk ok</td>
</tr>
</tbody>
</table>

**DEVELOPMENTALLY DELAYED**

<table>
<thead>
<tr>
<th>Failure to...</th>
<th>By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn to a voice</td>
<td>6 mo</td>
</tr>
<tr>
<td>Babble</td>
<td>9 mo</td>
</tr>
<tr>
<td>Orient to name</td>
<td>13 mo</td>
</tr>
<tr>
<td>Walk</td>
<td>18 mo</td>
</tr>
<tr>
<td>Point to request or comment</td>
<td>18 mo</td>
</tr>
<tr>
<td>Follow simple command without gesture</td>
<td>18 mo</td>
</tr>
<tr>
<td>Use 10-25 words</td>
<td>24 mo</td>
</tr>
<tr>
<td>Speak in 2 word phrases</td>
<td>26 mo</td>
</tr>
<tr>
<td>Speak in 3-word sentences</td>
<td>36 mo</td>
</tr>
</tbody>
</table>

VII. **FOLLOW-UP CARE OF NICU / NEWBORN**

**Growth**

Prematurity charts for 1-3 years depending on prematurity (Must add EGA to eCW)

Catch-up growth: 1st Head → Weight → Length last to catch up.

*HC not on normal growth curve by 8mo = poor cognitive function

Goal 110-130 kcal/kg/day for catch-up growth

Breast Milk → HMF may be stopped when growing adequately

Formula → Neosure 22 until weighs 2500g or nutrition recommends stopping

NEC → risk of strictures

TPN Cholestasis → Direct bilirubin may stay elevated for up to 1 year, follow periodically. If increasing may need work-up.
Outpatient

**Cardiorespiratory**
Apnea of Prematurity → Apnea Download 4-6 wks post-discharge
  Caffeine? → D/C if normal and repeat download in 1-2 wks
Bronchopulmonary Dysplasia (BPD) → May be oxygen or vent dependent
Diuretics → Monitor electrolytes q2-4 wks
PDA → F/U echo as recommended
Anemia → Should be on Iron (2mg/kg/day). follow H/H

*RSV vaccine? Check current Bronson requirements

**Neuro**
IVH → repeat Cranial U/S or MRI may be indicated.
All preterm infants are referred to Early-On.
Even without IVH, may need special education
Retinopathy of prematurity → need eye f/u?
Hearing → remain at risk even if passed hearing screen

**MSK**
Risk for Osteopenia → check Ca, Phos, Alk Phos as needed

**Services**
All are referred to OT, PT, and Early-On upon discharge
SW should ensure financial assistance is adequate (Children’s Special Health Care Services)

**Anticipatory Guidance**
Similar to any newborn (avoid sick contacts, hand-washing, etc)
Encourage normal home environment (avoid Vulnerable Child Syndrome)

Ordering a Bili-Blanket in eCW
Treatment → New Rx → Type (Equip/Supplies) → Search (contains) → Find (DME)
Print Rx & Demographic sheet → Fax to Airway oxygen or DME provider
Airway Oxygen 1-800-700-4022 or 269-372-2444 (Will deliver to patient’s home)

<table>
<thead>
<tr>
<th>Strength</th>
<th>Formulation</th>
<th>Take</th>
<th>Route</th>
<th>Frequency</th>
<th>Duration</th>
<th>Dispense</th>
<th>Refill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal Jaundice</td>
<td>Kit</td>
<td>As dir</td>
<td>Inhalation</td>
<td>Rx name</td>
<td>PRN</td>
<td>1</td>
<td>How many?</td>
</tr>
</tbody>
</table>
VIII. ADHD

For pre-school aged children, first line is behavior therapy. If not significantly improved, prescribe methylphenidate.

For elementary school aged children and adolescents (> 6 years of age), first line is methylphenidate/amphetamine.

GENERAL GUIDELINES FOR MEDICATION MANAGEMENT INCLUDE:

1. If one stimulant group does not work, switch to the other
2. Dosing of stimulant medication is not weight dependent: Start low and titrate up
3. Initiation of treatment with an extended-release preparation of medication often is preferred
4. Use Vanderbilt to monitor treatment
5. At each visit, monitor for growth impairment; monitor for cardiac effects of the medication (such as elevated blood pressure or tachycardia)
6. A 1-month follow-up visit is recommended after starting the medication. Additional follow-up visits are based on treatment response but should occur at least twice a year

Drug Class Side Effects/Monitoring Parameters

**All stimulants:**
**Avoid decongestants**

Cardiovascular: Syncope with exercise, history of structural/congenital heart defects and a family history of sudden unexpected cardiovascular death. Patients with a positive screen to one of these 3 questions should be considered for further evaluation, such as an EKG, prior to beginning stimulant therapy

GI: Anorexia, insomnia, abdominal pain/stomach upset. Weight loss, reduced growth velocity: Consider drug holidays, eating prior to taking the drug, scheduled meals.

Neuro: Headaches, irritability, flattened affect, social withdrawal, weepiness, mood lability, tics, tremor. Rare: visual hallucinations, seizures.

Rebound: temporary worsening of symptoms when drug wears off, adding a low dose of short acting stimulant at this time maybe helpful.

**Non-Stimulants:** Atomoxetine [Strattera]


Abdominal pain, decrease in appetite, vomiting, headaches, insomnia, somnolence, dizziness, irritability, increase in heart rate and blood pressure: Monitor blood pressure and pulse

Dosage adjustments are necessary for patients taking CYP450 2D6 inhibitors and poor metabolizers (PMs) of CYP2D6. (PMs can be identified by testing.)

Increase in suicidal ideation (↑0.4% FDA review of children and adolescents)

When transitioning from stimulants to atomoxetine, cross-taper (i.e., decrease stimulant gradually while increasing dose of atomoxetine).
<table>
<thead>
<tr>
<th>Medication</th>
<th>Brand</th>
<th>Initial Titration Dose</th>
<th>Frequency</th>
<th>Time to Initial Effect</th>
<th>Duration, h</th>
<th>Maximum Dose</th>
<th>Available Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed amphetamine salts</td>
<td>Adderall&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.5–5.0 mg</td>
<td>QD–BID</td>
<td>20–60 min</td>
<td>6</td>
<td>40 mg</td>
<td>5.0-, 7.5-, 10.0-, 12.5-, 15.0-, 20.0-, and 30.0-mg tablets</td>
</tr>
<tr>
<td></td>
<td>Adderall XR&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5 mg</td>
<td>QD</td>
<td>20–60 min</td>
<td>10</td>
<td>40 mg</td>
<td>5-, 10-, 15-, 20-, 25-, and 30-mg capsules</td>
</tr>
<tr>
<td>Dextroamphetamine</td>
<td>Dextedrine&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.5 mg</td>
<td>BID–TID</td>
<td>20–60 min</td>
<td>4–6</td>
<td>40 mg</td>
<td>5- and 10-mg (Dextrostat only) tablets</td>
</tr>
<tr>
<td></td>
<td>Dextrostat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dexamphetamine</td>
<td>5 mg</td>
<td>QD–BID</td>
<td>≥60 min</td>
<td>≥6</td>
<td>40 mg</td>
<td>5-, 10-, and 15-mg capsules</td>
</tr>
<tr>
<td>Lisdexamfetamine</td>
<td>Vyvanse</td>
<td>20 mg</td>
<td>QD</td>
<td>60 min</td>
<td>10–12</td>
<td>70 mg</td>
<td>20-, 30-, 40-, 50-, 60-, and 70-mg capsules</td>
</tr>
<tr>
<td>Methylphenidate</td>
<td>Concerta</td>
<td>18 mg</td>
<td>QD</td>
<td>20–60 min</td>
<td>12</td>
<td>54 mg (&lt;13 y), 72 mg (≥13 y)</td>
<td>18-, 27-, 36-, and 54-mg capsules</td>
</tr>
<tr>
<td></td>
<td>Methyl ER</td>
<td>10 mg</td>
<td>QD</td>
<td>20–60 min</td>
<td>8</td>
<td>60 mg</td>
<td>10- and 20-mg tablets</td>
</tr>
<tr>
<td></td>
<td>Methylphenidate</td>
<td>5 mg</td>
<td>BID–TID</td>
<td>20–60 min</td>
<td>3–5</td>
<td>60 mg</td>
<td>5-, 10-, and 20-mg tablets and liquid and chewable forms</td>
</tr>
<tr>
<td>Daytrana</td>
<td>10 mg&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Apply for 9 h</td>
<td>QD</td>
<td>60 min</td>
<td>11–12</td>
<td>30 mg</td>
<td>10-, 15-, 20-, and 30-mg patches</td>
</tr>
<tr>
<td>Ritalin&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5 mg</td>
<td>BID–TID</td>
<td>20–60 min</td>
<td>3–5</td>
<td>60 mg</td>
<td>5-, 10-, and 20-mg tablets</td>
<td></td>
</tr>
<tr>
<td>Ritalin LA</td>
<td>20 mg</td>
<td>QD</td>
<td>20–60 min</td>
<td>6–8</td>
<td>60 mg</td>
<td>20-, 30-, and 40-mg capsules</td>
<td></td>
</tr>
<tr>
<td>Ritalin SR&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20 mg</td>
<td>QD–BID</td>
<td>1–3 h</td>
<td>2–6</td>
<td>60 mg</td>
<td>20-mg capsules</td>
<td></td>
</tr>
<tr>
<td>Metadate CD</td>
<td>20 mg</td>
<td>QD</td>
<td>20–60 min</td>
<td>6–8</td>
<td>60 mg</td>
<td>10-, 20-, 30-, 40-, 50-, and 60-mg capsules</td>
<td></td>
</tr>
<tr>
<td>Dextmethylphenidate</td>
<td>Focalin&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.5 mg</td>
<td>BID</td>
<td>20–60 min</td>
<td>3–5</td>
<td>20 mg</td>
<td>2.5-, 5.0-, and 10.0-mg tablets</td>
</tr>
<tr>
<td></td>
<td>Focalin XR</td>
<td>5 mg</td>
<td>QD</td>
<td>20–60 min</td>
<td>8–12</td>
<td>30 mg</td>
<td>5-, 10-, 15-, and 20-mg capsules</td>
</tr>
<tr>
<td>Atomoxetine</td>
<td>Stratter</td>
<td>0.5 mg/kg per d, then increase to 1.2 mg/kg per d; 40 mg/d for adults and children at ≥154 lb, up to 100 mg/d</td>
<td>QD–BID</td>
<td>1–2 wk</td>
<td>At least 10–12 h</td>
<td>1.4 mg/kg</td>
<td>10-, 18-, 25-, 40-, 60-, 80-, and 100-mg capsules</td>
</tr>
<tr>
<td>Extended-release guanfacine</td>
<td>Intuniv</td>
<td>1 mg/d</td>
<td>QD</td>
<td>1–2 wk</td>
<td>At least 10–12 h</td>
<td>4 mg/d</td>
<td>1-, 2-, 3-, and 4-mg tablets</td>
</tr>
<tr>
<td>Extended-release clonidine</td>
<td>Kapvay</td>
<td>0.1 mg/d</td>
<td>QD–BID</td>
<td>1–2 wk</td>
<td>At least 10–12 h</td>
<td>0.4 mg/d</td>
<td>0.1- and 0.2-mg tablets</td>
</tr>
</tbody>
</table>
IX. OBESITY

**BMI** measured starting @ 3 years old

BMI 85%tile-94%tile → Overweight
BMI 95%tile-98%tile → Obesity
BMI ≥99%tile → Morbid Obesity

*Schedule Obesity Management Visit if unable to address during WCE due to time*

**Templates** for Initial visit and Follow-up

Readiness to Change - No, document. Yes, proceed with template.

Template includes ROS, PE, and Assessment (**Update** to be relevant to patient)

**Follow-up**

@ 1, 2, & 3 months
Then 3-6 months as appropriate

X. PEDIATRIC DYSLIPIDEMIA

Screening guidelines from the 2011 Expert Panel Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents

<table>
<thead>
<tr>
<th>Birth to 2 years</th>
<th>No lipid screening.</th>
</tr>
</thead>
</table>
| **2 to 8 years** | **Selective screening** using fasting lipid profile (FLP) two times*, based on a positive history of one of the following: Parent, grandparent, aunt/uncle, or sibling with coronary heart disease (ie, myocardial infarction, angina, stroke, coronary artery bypass graft/stent/angioplasty) at <55 years in males, <65 years in females
Parent with TC ≥240 mg/dL or known dyslipidemia
Patient has diabetes, hypertension, BMI ≥95th percentile, or smokes cigarettes or is exposed to second hand smoke
Patient has a moderate- or high-risk medical condition associated with cardiovascular disease (ie, chronic kidney disease, recipient of a cardiac transplant, Kawasaki disease with current or regressed coronary artery disease, or chronic inflammatory disease) |
| 9 to 11 years | **Universal screening with a non-fasting lipid screening using non-HDL-C levels.**  
Further evaluation (two FLP measurements*) is recommended with a positive result of either a nonfasting non-HDL-C level ≥145 mg/dL, and HDL <40 mg/dL, or a FLP with LDL-C ≥130 mg/dL, non-HDL-C ≥145 mg/dL, HDL-C <40 mg/dL, or TG ≥130 mg/dL. |
| 12 to 16 years | **Universal screening not recommended because of normal changes in lipid levels during puberty, which decrease the sensitivity and specificity for predicting adult LDL-C levels and increase false-negative results in this age group.**  
Selective screening using fasting lipid profile (FLP) two times*, if new knowledge of one of the following:  
Family history of coronary heart disease (ie, parent, grandparent, or aunt/uncle)  
Parent with TC ≥240 mg/dL or known dyslipidemia  
Patient has diabetes, hypertension, BMI ≥85th percentile, or smokes cigarettes  
Patient has a moderate- or high-risk medical condition associated with cardiovascular disease (ie, chronic kidney disease, recipient of a cardiac transplant, Kawasaki disease with current or regressed coronary artery disease, or chronic inflammatory disease) |
| 17 to 21 years | **Universal screening once during this time period with a non-fasting lipid screening using non-HDL-C levels.**  
Further evaluation (two FLP measurements*) is recommended with a positive result of either a nonfasting non-HDL-C level ≥145 mg/dL, and HDL <40 mg/dL, or a FLP with LDL-C ≥130 mg/dL, non-HDL-C ≥145 mg/dL, HDL-C <40 mg/dL, or TG ≥130 mg/dL.  
NHLBI: National heart lung, blood institute; BMI: body mass index; TC: total cholesterol; LDL-C: low-density lipoprotein cholesterol; HDL-C: high-density lipoprotein cholesterol; TG: triglycerides.  
* Interval between FLP measurements: after two weeks, but within three months. |

**Treatment for dyslipidemia**
Diet: lower in fat and higher in fruits and vegetables  
Exercise: Encourage 30 minutes of play each day, and reduction of sedentary lifestyle  
Elimination of cigarette smoke and/or second hand smoke exposure  
Pharmacological: Statins are first line. Start at lowest dose.  
Recommended to be used in children >10 years old who have not had improvement with lifestyle changes within 6 months or at any age with a familial hyperlipidemia or rare high-risk CVD condition.  
Check LFTs at baseline before starting statins, at 4 and 8 weeks after dose changes, and every 6 months if on stable dose.
XI. ASTHMA

Inhalers
New inhaler → First 4 puffs into air
Correct Use:
Big breath in & out → puff, slow inhale >5s → hold 10s → slow exhale
Repeat for each puff
Position: mouth open & place inside (may rest on bottom lip)
Types:
Metered Dose Inhaler (MDI) - Basic inhaler, use HFA propellent
Dry Powder Inhaler (DPI) - Newer, expensive (ex Advair Diskus) powered by
- User difficult in asthma attack or other poor function

Ordering Nebulizer in eCW
Treatment → New Rx → Type (Equip/Supplies) → Search (contains) → Find (nebulizer compressor)
Print Rx & Demographic sheet → Fax to Airway oxygen or DME provider
Meds must be ordered separately

<table>
<thead>
<tr>
<th>Strength</th>
<th>Formulation</th>
<th>Take</th>
<th>Route</th>
<th>Frequency</th>
<th>Duration</th>
<th>Dispense</th>
<th>Refill</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Kit</td>
<td>As dir</td>
<td>Inhalation</td>
<td>Rx name</td>
<td>PRN</td>
<td>1</td>
<td>How many?</td>
</tr>
</tbody>
</table>

Asthma Predictive Index

Asthma Predictive Index (API)
Children younger than 3 years who have had 4 or more significant wheezing episodes in the past year if they have either 1 Major criteria OR 2 Minor criteria

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent with asthma</td>
<td>Food allergies</td>
</tr>
<tr>
<td>Diagnosis of eczema</td>
<td>&gt;4% Eosinophils</td>
</tr>
<tr>
<td>Sensitivity to air allergens (dx w/ testing)</td>
<td>Wheezing without a cold</td>
</tr>
</tbody>
</table>
## Key Points for Asthma Guideline Implementation

### GOALS OF THERAPY

**Reduce Impairment**
- Prevent chronic and troublesome symptoms
- Minimize the need to use SABA for relief of asthma symptoms to ≤2 days/week
- Maintain (near) normal pulmonary function
- Maintain normal activity levels

**Reduce Risk**
- Prevent recurrent exacerbations
- Provide optimal pharmacotherapy with minimal or no adverse effects
- Minimize the need for ED visits or hospitalizations

**Optimize Health and Function**
- Provide initial and ongoing education to patient and family
- Educate patient and family to recognize and avoid triggers
- Partner with patient and family to identify treatment goals and achieve well-controlled asthma that allows patient to fully and safely participate in activities (eg, physical education, recess, sports, etc)
- Maintain patient's and family's satisfaction with asthma care

### ASSESSMENT
- Classify asthma severity and level of asthma control
- Identify precipitating and exacerbating factors (ie, asthma triggers, including those in the home, school, and child care settings)
- Identify comorbid medical conditions that may adversely affect asthma management
- Periodically inspect medications, inhaler, and spacer to verify appropriate type
- Regularly assess the patient's and family's knowledge and skills for self-management, including medication administration and inhaler and spacer technique

### VISIT FREQUENCY

**If asthma is not well controlled:** Visits at 2- to 6-week intervals are recommended

**If asthma is well controlled:** Visits at 3- to 6-month intervals are recommended to monitor how well asthma control is maintained and to adjust medications as necessary
**PATIENT AND FAMILY EDUCATION**

Incorporate the following into every clinical encounter:

**Use a written asthma action plan to share when and how to:**
- Take daily actions to control asthma
- Adjust medication in response to signs of worsening asthma

**Knowledge**
- Basic facts about asthma
- Role of medications

**Skills**
- Take medications correctly, use appropriate type of inhaler and spacer with proper technique
- Identify and avoid asthma triggers
- Self-monitor level of asthma control
- Recognize early signs and symptoms of worsening asthma
- Seek medical care as appropriate
- Communicate asthma information to school, child care center, and other caregivers

**OBTAIN SUBSPECIALIST CONSULTATION IF:**

(see Table 1 on the following page)
- 0-4 years and Step 3 care or higher is required (may consider consultation at Step 2)
- 5 years or older and Step 4 care or higher is required (may consider consultation at Step 3)
- Difficulty in achieving or maintaining asthma control

---

Information adapted from Texas Children's Health Plan's "Key Points for Asthma Guideline Implementation"

**Acronyms**
- SABA = Short acting beta agonist
- LABA = Long acting beta agonist
- ICS = Inhaled corticosteroid
- OCS = Oral corticosteroid
- ED = Emergency department
Table 1: Stepwise approach to managing asthma

<table>
<thead>
<tr>
<th>Steps</th>
<th>Preferred treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>SABA prn</td>
</tr>
<tr>
<td>Step 2</td>
<td>Low dose ICS</td>
</tr>
</tbody>
</table>
| Step 3 | 0–4 yrs: Medium dose ICS + subspecialist referral  
≥ 5 yrs: Low dose ICS + LABA or medium dose ICS |
| Step 4 | Medium dose ICS + LABA or montelukast + subspecialist referral |
| Step 5 | High dose ICS + LABA or montelukast + subspecialist referral |
| Step 6 | High dose ICS + LABA or montelukast + OCS + subspecialist referral |

Notes:
- The stepwise approach is meant to assist—not replace—clinical decision making.
- Before step up, review adherence, inhaler technique, environmental control and comorbid conditions.
- If clear benefit is not observed within 4–6 weeks and/or technique and adherence is not satisfactory, consider adjusting therapy and/or alternative diagnoses.

Table 2: Classifying asthma severity and initiating therapy

<table>
<thead>
<tr>
<th>Components of severity</th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>&gt;2 days/week</td>
<td>Daily</td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>0 (≤4 years)</td>
<td>1–2x/month (≤4 years)</td>
</tr>
<tr>
<td></td>
<td>≤2x/month (≥5 years)</td>
<td>3–4x/month (≥5 years)</td>
</tr>
<tr>
<td>SABA use for symptoms</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week</td>
</tr>
<tr>
<td>Limitation of normal activity</td>
<td>None</td>
<td>Minor</td>
</tr>
<tr>
<td>Lung function *</td>
<td>FEV1&gt;80% (5–11 years)</td>
<td>FEV1&gt;90% (5–11 years)</td>
</tr>
<tr>
<td></td>
<td>FEV1/FVC&gt;85% (5–11 years)</td>
<td>FEV1/FVC&gt;85% (5–11 years)</td>
</tr>
<tr>
<td></td>
<td>FEV1/FVC normal (≥12 years)</td>
<td>FEV1/FVC normal (≥12 years)</td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring OCS</td>
<td>≥2/6 months (0–4 years) **</td>
</tr>
<tr>
<td></td>
<td>0–1/year</td>
<td>≥2/6 months (0–4 years) **</td>
</tr>
<tr>
<td></td>
<td>≥2/year (≥5 years)</td>
<td>Step 2</td>
</tr>
<tr>
<td>Recommended step for initiating therapy ***</td>
<td>Step 1</td>
<td>Step 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Acronyms:
SABA = Short-acting beta agonist  
LABA = Long-acting beta agonist  
ICS = Inhaled corticosteroid  
OCS = Oral corticosteroid  
ED = Emergency department
### Table 3: Assessing asthma control and adjusting therapy

<table>
<thead>
<tr>
<th>Components of control</th>
<th>Well controlled</th>
<th>Not well controlled</th>
<th>Very poorly controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week or (if ≤11 years) multiple times ≤2 days/week</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤1x/month (if ≤12 years) ≤2x/month (if &gt;12 years)</td>
<td>≥2x/month (if ≤12 years) 1-3x/week (if &gt;12 years)</td>
<td>≥2x/month (if ≤12 years) ≥4x/week (if &gt;12 years)</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>SABA use for symptoms</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week</td>
<td>Several times per day</td>
</tr>
<tr>
<td>Lung function *</td>
<td>FEV1&gt;80%</td>
<td>FEV1 60-80%</td>
<td>FEV1&lt;60%</td>
</tr>
<tr>
<td></td>
<td>FEV1/FVC&gt;80%</td>
<td>FEV1/FVC 75-80%</td>
<td>FEV1/FVC&lt;75%</td>
</tr>
<tr>
<td>Exacerbations requiring OCS</td>
<td>0-1x/year</td>
<td>2-3x/year (if 0-4 years) ≥2x/year (if ≥5 years)</td>
<td>≥3x/year (if 0-4 years) ≥2x/year (if ≥5 years)</td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in lung growth</td>
<td>Requires long-term follow-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment related to adverse effects</td>
<td>Medication side effects do not correlate with specific levels of control, but should be considered in overall assessment of risk.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended action for treatment *****</td>
<td>Consider step down if well controlled for ≥3 months.*</td>
<td>Step up 1 step. Re-evaluate in 2-6 weeks.</td>
<td>Consider short course oral corticosteroid. Step up 1-2 steps. Re-evaluate in 2 weeks.</td>
</tr>
</tbody>
</table>

* Some individuals with smaller lungs in relation to their height (such as a thin individual with narrow A-P diameter to their chest) may normally have FEV1<80% and/or FEV1/FVC<85%. Lung function measures should be correlated with clinical assessment of asthma severity.

*** For 0-4 years, ≥4 wheezing episodes per year each lasting ≥1 day and risk factors for persistent asthma meets risk criteria for persistent asthma.

**** For initial therapy of moderate or severe persistent asthma that is poorly controlled, consider a short course of OCS.

***** Recommended guidelines.

*Spring 2013 (DOCSN/AAP)*
## XII. CONSTIPATION:

**Diagnosis:** NOTE RED FLAGS:

<table>
<thead>
<tr>
<th>History</th>
<th>Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to pass meconium within 48 hours of birth</td>
<td>Failure to thrive/ fever</td>
</tr>
<tr>
<td>Pencil thin stools</td>
<td>Tight sphincter</td>
</tr>
<tr>
<td>Fatigue, fever, bilious vomiting, rash</td>
<td>Anterior displaced anus</td>
</tr>
<tr>
<td>Global development delay</td>
<td>Absent anal wink / cremasteric</td>
</tr>
<tr>
<td>Bloody diarrhea</td>
<td>Empty rectum (no hx of recent passage of stool)</td>
</tr>
<tr>
<td>Poor response despite good adherence to therapy</td>
<td>Occult blood positive</td>
</tr>
<tr>
<td>Suspicion of abuse</td>
<td>Sacral agenesis/hair tuft/pilonidal dimple</td>
</tr>
<tr>
<td>Recurrent pneumonia</td>
<td>Decreased lower extremity strength/tone/reflexes</td>
</tr>
</tbody>
</table>

### Treatment: Educate!!

**Children > 1 year of age**

<table>
<thead>
<tr>
<th>Clean out</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycolax/PEG: 1.5 – 2 g/kg/day for 3 days. Max dose 17g tid</td>
<td>Glycolax/PEG: 17 g/240cc water or juice. 1g/kg/day ÷ bid (15cc/kg/day)</td>
</tr>
<tr>
<td>Enemas: 6 cc/kg every 12 – 24 hours (1- 3 times)</td>
<td>Milk of Magnesia:</td>
</tr>
<tr>
<td>Milk and molasses (max 500cc)</td>
<td>400mg/5cc: 1–3 cc/kg/day ÷ bid</td>
</tr>
<tr>
<td>Phosphate/ Fleet enema (max 4oz or 135cc)</td>
<td>800mg/5cc: 0.5-1.5cc/kg ÷ bid</td>
</tr>
<tr>
<td>Suppository: 12 -24 hours x1 -3days</td>
<td>Stimulants: for short term use only:</td>
</tr>
<tr>
<td>Glycerin:</td>
<td>Senna: 8.8gm sennoside/5cc</td>
</tr>
<tr>
<td>&lt; 6 yrs old: one infant suppository</td>
<td>2-6yr: 2.5-7.5 cc/day ÷ doses bid</td>
</tr>
<tr>
<td>&gt;/= 6 one adult suppository</td>
<td>6-12yr: 5-15 cc/day ÷ doses bid</td>
</tr>
<tr>
<td></td>
<td>Bisacodyl: 5 mg tablets, 1-3 tablets/dose 1-2 x daily</td>
</tr>
<tr>
<td></td>
<td>Glycerin suppository: 1-2 x daily</td>
</tr>
</tbody>
</table>

**Children < 1 year of age**

<table>
<thead>
<tr>
<th>Cleanout (rarely needed)</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerin suppository: 1 per x 1 day</td>
<td>Juices containing sorbitol – 1oz in a bottle daily (pear,prune,apple,grape) – max 2oz a day</td>
</tr>
<tr>
<td>if need more than this refer to specialist</td>
<td>Corn syrup (light or dark) 1 – 3 cc/kg/day ÷ doses</td>
</tr>
<tr>
<td></td>
<td>Glycolax 0.8 - 1.0 g/kg/day</td>
</tr>
<tr>
<td></td>
<td>Lactulose or Sorbitol: 1-3 cc/kg/day ÷ doses bid</td>
</tr>
</tbody>
</table>
Children (> 1 year)

Fibers: Daily requirements
Standard recommendation: 5 grams plus child age in years.
Functional constipation: 10 grams plus child age in years.

Fluid: Non dairy fluid
Target - 2 ounces of non-dairy fluids for each gram of fiber intake.

Juices.
Monitor absolute and relative amounts of juice:
• Avoid juice intake volumes that are higher than AAP recommendations for children.
• Encourage greater water intake over juice intake to meet daily clear fluid guidelines.

Calcium (whole milk can be linked to constipation)
Review daily calcium requirements for age and suggest alternative sources particularly if restricting diary intake

Behavioral Training:

1. Documentation. Document all stool passage on a chart or calendar.

2. Routines. Institute positive toileting routines:

3. Body position. Demonstrate proper toilet sitting position (upper body flexed forward slightly at the hips), and use of foot support

4. Praise. Praise the child for cooperation with the various components of treatment.

5. Attitude. Maintain a neutral to positive attitude around toileting and the child’'s progress.

6. Example. Set a good example for the routines of learning, eating, exercise and toileting.

7. Avoid negatives. Avoid punitive approaches and embarrassment.

Milk and Molasses Enema (prescribe enema tube)

For younger children:
Mix 12 ounces of milk and 12 ounces of molasses then give 4 ounces as an enema.
This should be repeated 6 times to use all of the mixture.

For older children:
Mix 24 ounces of milk and 24 ounces of molasses then give 6 to 8 ounces as an enema.
This should be repeated 6 times to use all of the mixture.
XIII. ABUSE

Suspect if there is:
Delayed presentation, changing story, poor explanation for injury, h/o many injuries or ER visits, FTT.

Physical Abuse

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruises</td>
<td>Various stages, multiplanar, pattern, location</td>
</tr>
<tr>
<td></td>
<td>Trunk, hands, buttock, other protected areas</td>
</tr>
<tr>
<td></td>
<td>Cannot reliably date bruises</td>
</tr>
<tr>
<td></td>
<td>“Those who don’t cruise, rarely bruise”</td>
</tr>
<tr>
<td>Burns</td>
<td>Pattern, linear, circular</td>
</tr>
<tr>
<td>Bones</td>
<td><strong>High Suspicion</strong> Spiral or long bone fx in infant, Ribs (esp &lt; 1yr)</td>
</tr>
<tr>
<td></td>
<td>Classic metaphyseal lesions, scapular, spinous process</td>
</tr>
<tr>
<td></td>
<td><strong>Mod Suspicion</strong> Multiple, diff ages, epiphyseal separations, vertebral body</td>
</tr>
<tr>
<td></td>
<td>Digital fx, complex skull fx</td>
</tr>
<tr>
<td>Shaken Baby</td>
<td>Retinal hemorrhage, intracranial trauma, diffuse axonal injury</td>
</tr>
<tr>
<td></td>
<td>2° cerebral edema, ant &amp; post rib fx</td>
</tr>
</tbody>
</table>

Work-up        | Skeletal Survey < 2 yrs, can repeat in 2 wks if equivocal (without skull)   |
|               | ± Ophthalmology evaluation                                                  |
|               | CBC, coags, vWF. consider factor studies (BRUISES)                          |
|               | UDS, CT Head (ALTERED MENTAL STATUS)                                        |
|               | CMP, UA, stool guaiac test, Abd Xray (ABDOMINAL PAIN)                       |

Sexual Abuse

Exam is suggestive but not diagnostic
Anal Dilation non-specific
Multiple fissures = evidence of penetrating trauma. Not dx of abuse

Certain Dx → Only if sperm visualized or other DNA evidence obtained
For STDs
Dual therapy for gonorrhea and chlamydia recommended even if one positive. Oral Cefixime no longer recommended for treatment of gonorrhea. (Adults/adolescents/Children >8yo)
**Recommended Regimens**

**Ceftriaxone** 250 mg in a single intramuscular dose

PLUS

**Azithromycin** 1 g orally in a single dose

OR

**Doxycycline** 100 mg orally twice a day for 7 days**

---

**Table 14. Implications Of Commonly Encountered Sexually Transmitted Diseases (STDs) For The Diagnosis And Reporting Of Sexual Abuse Of Infants And Prepubertal Children.**

<table>
<thead>
<tr>
<th>STD Confirmed</th>
<th>Sexual Abuse</th>
<th>Suggested Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonorrhea*</td>
<td>Diagnostic†</td>
<td>Report‡</td>
</tr>
<tr>
<td>Syphilis*</td>
<td>Diagnostic</td>
<td>Report</td>
</tr>
<tr>
<td>HIV*</td>
<td>Diagnostic</td>
<td>Report</td>
</tr>
<tr>
<td>Chlamydia*</td>
<td>Diagnostic‡</td>
<td>Report</td>
</tr>
<tr>
<td>Trichomonas vaginalis</td>
<td>Highly suspicious</td>
<td>Report</td>
</tr>
<tr>
<td>Condylomata acuminata* (anogenital warts)</td>
<td>Suspicious</td>
<td>Report</td>
</tr>
<tr>
<td>Herpes (genital location)</td>
<td>Suspicious</td>
<td>Report‡</td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>inconclusive</td>
<td>Medical follow-up</td>
</tr>
</tbody>
</table>

*If not perinatally acquired.
†Use definitive diagnostic methods, such as culture or DNA probes.
‡To agency mandated in the community to receive reports of suspected sexual abuse.
§If not perinatally or transfusion acquired.
‖Unless there is a clear history of autoinoculation. Herpes 1 and 2 are difficult to differentiate by current techniques.

---

**Mandatory Reporting**

Physicians = Mandatory Reporters of **suspicions** of child abuse/neglect

**Verbal Report Immediately** (call **855-444-3911**)

**Written Report < 72h** ([DHS-3200](#))

**Protections:**

Confidentiality → Reporting is confidential under the Child Protection Law

Liability → Protected from civil and criminal prosecution

**If not reported, physician is liable for civil damages and could face misdemeanor with fine and/or imprisonment**

**Admission** - If not going to Admit must meet the following:

Patient is safe

Follow-up arranged and confident in compliance

Current contact information

CPS notified

**Removal is Rare** → Only for suspected **serious** abuse/neglect or imminent danger
XIV. ACUTE OUTPATIENT MANAGEMENT

AOM:

Look for/ask about: Ear pulling, fever, pain, irritability, poor feeding, disrupted sleep, malaise, anorexia, hearing loss, decreased PO fluids and urinary frequency (dehydration).

Exam: Lymphadenopathy, discharge, pinna and mastoid tenderness. Otoscopy: note architecture, fluid level. Insufflation if architecture abnormal. Ask Rebecca for bulb, sign it out, and BRING IT BACK WHEN DONE!!

Differential Dx: Otitis media with effusion, otitis externa, mastoiditis, TEETHING, or other dental problems.

Treatment: Ask about allergies (if so, what meds?), check imm status, and when pt last received antibiotics.

1st line: High dose amoxicillin (90 mg/kg/day divided BID) Max 3 g/day.
If received amox within 30 days or suspect resistance: Augmentin 90mg/kg/day divided BID
If immediate PCN allergy: Azithro 10 mg/kg for day 1, 5mg/kg days 2-5.
If delayed PCN allergy: Ceftriaxone 50 mg/kg IM daily for 1-3 doses. Stop when symptoms begin to improve.

Conservative: Observe for 24-48 hours with instructions to return to clinic if symptoms do not improve or get worse. Reserve for those >2 year old with mild symptoms and unimpressive tympanum.

Pain control: Motrin/Tylenol. Topical Benzocaine in >2 years old only.

Strep Throat:

Look for/ask about: sore throat, poor feeding, fever, malaise, no cough, abdominal pain

Centor Criteria: 1 point for each: (0-1=no test or tx, 2-3= test & tx if culture positive, 4+= empiric treatment)

Age 3-14 years old
Swollen tonsils
Temp > 100.4F/38C
Absent cough
Lymphadenopathy

Differential Dx: Retropharyngeal/peritonsilar abscess, Mono, other viruses, Primary HIV
Test: Rapid strep in clinic: You run yourself. Works best if mom holds child if uncooperative. If positive → treat. If negative → send additional swab to lab for culture

Treatment:
- **Penicillin G IM 1 time,** or amoxicillin 50 mg/kg x 10 days (can give oral Penicillin but Amox tastes better)
  - Pen allergy: Azithromycin 12 mg/kg/day x 5 days
- Supportive care: Tylenol/Motrin, salt water gargles
- Ancillary facts: Non-contagous 24 hrs post starting first dose of penicillin, symptoms usually improve after 3-4 days after starting antibiotics. PATIENT MUST COMPLETE ANTIBiotic COURSE!

Sinusitis:
- Consider in any patient with *URI symptoms* and *fever >10 days* without improvement
- **Other signs and symptoms:** Purulent nasal discharge, facial pressure and congestion, Eye discharge, fever >102.2F

Exam: Press on sinuses, check tonsils, ear exam, LOOK IN NARES for foreign body or polyps!

Differential Diagnosis: viral URI, allergies, foreign body, structural abnormalities, enlarged tonsils, pertussis

Labs/Imaging: Largely clinical but can get CT sinus w/contrast to rule out complications of sinusitis. *Remember:* Frontal sinuses not present until about 6 years of age and not fully formed until 10 years. Maxillary and ethmoid present at birth, sphenoids at about 1-2 years of age.

Treatment:
- **1st line:** Augmentin rather than Amoxicillin due to *H. flu* resistance
  - Augmentin 45 mg/kg/day divided BID for simple cases
  - Augmentin 90 mg/kg/day divided BID for more serious cases or mild cases with additional risk factors
- **2nd line:** Cefdinir 14mg/kg/day divided BID, Cefpodoxime 10 mg/kg/day divided BID, or Levofloxacin 10-20 mg/kg/day divided BID if no other safe alternative

All treatments at least 10 days, up to 14 if more severe

Symptomatic treatments:
- Symptoms should improve with antibiotics within 2-3 days. MUST FINISH COURSE!
- Nasal Saline or Nettie Pots to improve drainage
- No evidence that nasal steroids or decongestants benefit in long run
- Sinus aspiration by specialist for intolerable pain despite Tylenol and Motrin
Gastro:

Usually viral (rota, noro, calcivirus, astro, adeno)

Look for/Ask about:
- Vomiting → Diarrhea
- Also fever, cramps, anorexia and signs of dehydration

Virus vs. Bacterial
- Age: usually viral if <2 years old
- Blood in Stool: think bacterial or parasite
- Exposure: Foreign travel, animals (reptiles and fowl) consumption of process meats

Diagnosis: usually clinical but can do additional studies if suspicious
- Ova and Parasite, stool culture, CBC
- Fecal leucocytes raised in bacteria and parasites (eosinophils)
- pH<6 and positive reducing substances in viral causes

Treatment: Usually self-limiting
- Supportive with ORT (Pedialyte). Instruct parents to watch # of wet diapers.
- Antibiotics, antispasmodics, antidiarrheals are NOT recommended
- Probiotics may resolve diarrhea quicker, but no great literature on benefits. FYI Culturelle is expensive, recommend yogurt.
- Decrease lactose after recovery. (Transient lactose intolerance).
- Prevention: Wash hands. THIS MEANS YOU TOO!

Animal bites and scratches:

Cat or Dog, think Pasteurella. Do not exclude Strep and Staph.
Ask what they know about the animal’s vaccine history.
Exam to see if bite invades bone or joint, feel for lymphadenopathy and fluctuance
Rabies in Kalamazoo is fairly low, but can confirm with Kalamazoo Health Department and ask recommendations

Treatment:
- Wound: good irrigation with saline, remove debris if there.
- Infection: Augmentin 20mg/kg divided BID is first line choice
- Consider tetanus toxoid/immunoglobulin if not UTD.
Diaper Rash:

Know different types. Look at Visual DX slides and show parents

- **Irritant**: Most common, spares the folds. Tx with frequent diaper changes, A+D or Desitin
- **Candidal**: Involves folds and satellite lesions, Beefy red. Look for oral candida. Tx: Nystatin or clotrimazole cream
- **Allergic**: Follows elastic band line of diaper: switch diaper brands

**Treatment:**

In irritant or candidal, recommend frequent diaper changes and airing out diaper area to keep in dry.
If ulcers: avoid diaper wipes. Clean with warm water bath and pat dry. Consider antimicrobials.
Note: if baby is having copious and prolonged diarrhea, ask why.

Oral Thrush:

Usually babies and kids on inhaled steroids. Also think immunocompromised.
White coating that does not wipe off tongue or buccal mucosa. Erythematous base.
May cause eating difficulty or painful swallow.

**Treatment:**

Nystatin mouth wash in immunocompetent, also Fluconazole. Use either daily until lesions go away and then 3 days after. (Typically takes 2 weeks to clear)

Dacryostenosis:

Clogged tear ducts, causing persistent tearing and yellow crusting

**Differential Diagnosis:** Conjunctivitis, acute dacryocystitis  Ask birth history if neonate (chlamydia?, Emycin drops?)

**Treatment:** Reassurance and massage (milk down towards nose several times a day).
Typically self resolves, but consider ophtho referral for cases persisting >12 months.
Neonatal Intensive Care Unit

“...a person’s a person, no matter how small.”
~ Dr Seuss
4. NICU

I. DEFINITIONS:

ELBW < 1000g  
VLBW < 1500g  
LBW < 2500g

SGA BW <10 percentile for gestational age  OR  >2 SD below mean
AGA BW between 10th and 90th percentile for GA
LGA- BW >90th percentile for GA

PPROM:  Premature=rupture >1 hr before onset of labor
Prolonged= >18 hours
Preterm=<37 weeks gestation

II. ADMIT WORKUP

Sepsis screen: Blood culture, CRP, CBC, Amp/Gent for >48 hrs,
Consider LP if SICK or + blood culture
Late onset sepsis (>day 3): CBC, CRP, BldCx, LP
Consider TORCH in symmetric IUGR: urine CMV cx & shell
vial Ag, quantitative IgM (if high, then check titers)

III. FLUIDS AND ELECTROLYTES:

Total fluids = XX mL/hr (but THINK mL/kg/d)

<table>
<thead>
<tr>
<th>Day</th>
<th>&lt;1000gm</th>
<th>&gt;1000 gm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100mL/kg/d D10W</td>
<td>80 D10W</td>
</tr>
<tr>
<td>2</td>
<td>120 D10 ¼ NS</td>
<td>100 D10 ¼ NS</td>
</tr>
<tr>
<td>3</td>
<td>140 D10 ¼ NS</td>
<td>120 D10 ¼ NS</td>
</tr>
</tbody>
</table>

"Vanilla" TPN: D10 with calcium & 3.5% protein for <1500g once stabilized on DOL 1

<table>
<thead>
<tr>
<th>Fluids</th>
<th>Kcal/kg/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>mL/kg/d</td>
<td>D10W</td>
</tr>
<tr>
<td>80</td>
<td>27</td>
</tr>
<tr>
<td>100</td>
<td>33</td>
</tr>
<tr>
<td>120</td>
<td>40</td>
</tr>
<tr>
<td>140</td>
<td>47</td>
</tr>
<tr>
<td>160</td>
<td>54</td>
</tr>
</tbody>
</table>

D10: kcal= (% dextrose x mL infused x 3.4)/100
3.5% protein = 35 grams protein per liter
Hypoglycemia: (IUGR, maternal diabetes)
CS < 40 mg/dL or symptomatic
2-4mL/kg of D10W (bolus)
Increase GIR (Central line if >D12.5%)

Hyperglycemia: Blood sugar >200mg/dL, glucosuria
Lower GIR to a minimum of 4 mg/kg/min
Insulin: 0.01- 0.1 units/kg/hr for glucose <180mg/dL

Hypokalemia:
Central K<3: 0.5-1 mEq/kg/dose

Hyperkalemia: Stop K+ fluids and get EKG. Treat if >7 or peaked T waves on EKG.
Remove K: Lasix, kayexelate, dialysis
Shift K (temporary): Albuterol, glucose/insulin, Bicarb

Hyponatremia: (& ↑wgt)= free water excess. Rx: Fluid restriction. Consider SIADH.

Hypernatremia: (& ↓wgt) Free water deficit (L)= [(actual Na/140)-1] x 0.8x kg. Rx: fluid replacement.

<table>
<thead>
<tr>
<th>Conversions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Saline:</td>
</tr>
<tr>
<td>K_3PO_4:</td>
</tr>
<tr>
<td>Na_3PO_4:</td>
</tr>
<tr>
<td>3% NaCl:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrolyte</th>
<th>Daily req/kg</th>
<th>Normals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na</td>
<td>3-5mEq</td>
<td>135-145</td>
</tr>
<tr>
<td>K</td>
<td>2-6mEq</td>
<td>3.5-5.5</td>
</tr>
<tr>
<td>Cl</td>
<td>3-5mEq</td>
<td>95-110</td>
</tr>
<tr>
<td>Bicarb</td>
<td>0.5-3mEq</td>
<td>20-26</td>
</tr>
<tr>
<td>Ca (iCa)</td>
<td>0.5-3mEq</td>
<td>1.7-</td>
</tr>
<tr>
<td>Phos</td>
<td>0.5-1.5mmol</td>
<td>2.7mmol/L</td>
</tr>
<tr>
<td>Mg</td>
<td>025-0.5mEq</td>
<td>5-7.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5-2.3</td>
</tr>
</tbody>
</table>
IV. PARENTERAL NUTRITION (TPN)

TPN total volume = (Total fluid - drips - lines - lipids - feeds)

GIR (mg/kg/min) = (%glucose) x rate (ml/hr) x 0.167 / wt
GIR DOL #1: 4-6 mg/kg/min. Minimum GIR is 4!
↑GIR by 1.5-2mg/kg/min daily until at 11-14 mg/kg/min
If C02 retention, decrease dextrose load
GIR IS ADDITIVE (check all IV sources)

See Cornell University GIR Calculator online

Amino Acids: Preterm infants: Goal 3.5-4g/kg/d

Lipids: 2-3g/kg/d
Add carnitine around DOL 10 at 10 mg/kg/day if birth weight <1000g helps with fat utilization, B oxidation

Ca/Phos ratio: 1.7:1 Ideal for bone accretion in VLBWs

Parenteral calorie calculation
Dextrose calculation = (% dextrose) x (ml infused) x 3.4/100
Lipid calculation = (ml of 20% lipid solution) X 2
Protein calculation = (grams/kg AA) x (wt) x 4 (not included in total)

TPN Basics
Start ELBW and VLBW on “vanilla” TPN first day!
Max glucose conc. in PIV = 12.5%; in central line = 35%
Labs (automatically ordered by TPN program):
Ensure daily lytes if making adjustments.
No famotidine if BW < 1500g, may be associated with NEC

Heparin: UVC, UAC, PAL need 0.5units of heparin per cc.
**V. ENTERAL NUTRITION**

Calculate ml/kg/d & kcal/kg/d daily
   Need to calculate ounces & caloric density per ounce (20 or 22 or 24)

Avoid enteral feeds with UAC or pressors (NEC risk)

Goal growth: 20-40g/day. Intake: 100-120 kcals/kg/day
   Sick or preterm babies may need higher calories

Feeding protocols for BW <1800g
   Trophic/gut priming for first few days: MBM/colostrum
   Advance by 15mL/kg/d thereafter
   Guidelines for feed intolerance standardized (“SFP”)

Donor breast milk:
   Pasteurized, lower protein, lower immunoglobulins than unprocessed MBM.
   Coordination of suck-swallow ~33-34 weeks

Enteral Supplements
   Iron: 2-6mg/kg/d elem iron for anemia
   Preemie formula (150mL/kg/d)= 2.2mg elem Fe/kg/day
   Enfamil HMF: 0.36mg Fe/packet
   Poly-Vi-Sol with iron: 0.5ml/day if breast milk only

**VI. NEC**

Distended abdomen, feed intolerance, bloody stool, apnea...
   NPO, NG/OG decompress and suction, abd film AP and cross table, CBC, CRP, volume for hypotension/shock.
   Sepsis eval: Culture blood, CSF; Vanc, gent, flagyl
   Serial AXR (q6-8h): Assess for free air, pneumatosis
   Monitor UOP, BP, pH/PaCO2/PaO2, plts.

**VII. HEMATOLOGY**

PRBC: 15 ml/kg
Plts: 10ml/kg
FFP: 10-15 ml/kg.
VIII. HYPERBILI IN PRETERM INFANTS

Not used in hemolytic processes.

Another approach:
Phototherapy level is 5x BW (kg) for VLBW. ie: a 1.2 kg infant has a light level of 6.

Goal of phototherapy
Prevent exchange transfusion (risks of stroke, ischemia, infection, hypocalcemia, NEC...)

Estimated exchange transfusion level = 10 x (BW kg).
Know ABO and DAT status when starting phototherapy.

Rebound: Expect 10% increase in bilirubin 12-24 hours after phototherapy stopped.

Conjugated bilirubin > 2.0 (or >20% of total bilirubin)= Bronze baby if under phototherapy. Irreversible skin discoloration.

IX. RESPIRATORY

RDS: Rapid compliance changes within minutes of surfactant
Goal saturation limits:
<1250g: 83-94% (prevent ROP)
>1250g: 86-94%
Term: >94%
Nasal cannula for oxygen use
0.1-0.3 lpm 100% “off the wall”

Nasal cannula:
0.5L for <32 weeks, 1L for >32 weeks

CPAP (bubble) 5cmH₂O
For 72 hours after Survanta,
Use if FiO₂ >25% on nasal cannula
Nasal cannula for CPAP effect (From UM)
<32 wks: lpm flow=0.92 + (0.68x kg)
>32 wks: Use bubble CPAP
ETT Selection and Placement

<table>
<thead>
<tr>
<th>GA</th>
<th>Kg</th>
<th>Size</th>
<th>Lip</th>
<th>Blade</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;28wks</td>
<td>&lt;1</td>
<td>2.5</td>
<td>6-</td>
<td>00</td>
</tr>
<tr>
<td>28-34</td>
<td>1-</td>
<td>3.0</td>
<td>7cm</td>
<td>0</td>
</tr>
<tr>
<td>34-38</td>
<td>2</td>
<td>3.5</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>&gt;38</td>
<td>3</td>
<td>3.5-</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

Acceptable Newborn Blood Gas Ranges

<table>
<thead>
<tr>
<th></th>
<th>ABG</th>
<th>CBG</th>
<th>VBG</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>7.3-7.4†</td>
<td>7.25-7.35</td>
<td>7.25-7.35</td>
</tr>
<tr>
<td>pCO2</td>
<td>35-45†</td>
<td>40-50</td>
<td>40-50</td>
</tr>
<tr>
<td>pO2</td>
<td>50-70</td>
<td>20-50</td>
<td>35-45</td>
</tr>
<tr>
<td>HCO3</td>
<td>18-24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† pCO2 40-70 in permissive hypercapnia (RDS, BPD, VLBW, PIE)

**Remember:** Look at the baby!
Baby on diuretics may have quite high CO2 and bicarbonate with normal pH.

Oxygenation Index (OI) = MAP x FiO2 x 100/PaO2 (post-ductal)
- OI >20, need Nitric Oxide
- OI >40, then ECMO.

Ventilator Management Basics:

- **To ↑ P02:** ↑ FiO2, PIP, PEEP, or insp time.
  - ie ↑MAP
- **To ↓ PCO2 (and ↑ pH):** ↑ tidal volume (aka DP), ↑ rate

Decompensation:
PTX, tube position, tube obstruction
Mechanical Ventilation Basics

**Volume-Targeted Ventilation**: preset volume (4-6mL/kg)

**VG/AC**: Same volume delivered for pt-initiated and backup (time-determined) breaths (40-60 bpm). PIP depends upon compliance (need to set a pressure limit, usually 22-30cmH2O). Set I time.

**PSV**: Volume-targeted, uniform breaths, patient-adjusted inspiratory time.

**SIMV**: Only a set amount of breaths will be ventilator-supported, but they are in sync with patient effort. Additional breaths are not given support to overcome endotracheal tube resistance. OK TO USE WITH PRESSURE SUPPORT ON DRAGER C500.

**Initial settings**: Start with 4mL/kg, PEEP 5, Rate 40-60, Itime 0.35sec. Adjust from here.

**Pressure-Limited Ventilation**: preset pressure

**PC/AC**: Same pressure provided for pt-initiated and backup (time-determined) breaths (20-40 bpm). Tidal volume depends upon compliance.

**PIP**: Adjust to obtain tidal volume 4-6mL/kg

**PEEP**: 4-6cmH2O, start at 5. Increase for oxygenation, atelectasis, pulm hemorrhage/edema.

**HFOV**: (generally used for CMV failure)

**Initial settings**: MAP = 2-4 higher than MAP on conventional vent (Goal: 8-10 rib expansion on CXR); Hz 6-15 cycles per second; ΔP (aka “power”) = wiggle to belly button (15-40)

↑O₂ by ↑MAP, FiO2; ↓CO₂ by ↑ΔP, ↓Hz

**Weaning**: Blood gas NOT necessary for weaning/extubation, clinical assessment (saturation, work of breathing) sufficient.

**Extubation**: Vigorous, intact gag reflex, handling secretions.

From VG/AC: Tolerating tidal volumes of 4mL/kg, rate of 40, low FiO2.

Spontaneous breaths.

Extubate to CPAP 5.

<32 weeks gestation: Caffeine load and maintenance

---

**NICU RESPIRATORY MEDICATIONS**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicarb</td>
<td>1-2mEq/kg/dose (1mEq/2ml) (don’t give if ↑C02)</td>
</tr>
<tr>
<td>Caffeine citrate</td>
<td>Load 20 mg/kg IV/PO then 5-8 mg/kg/day</td>
</tr>
<tr>
<td>Decadron</td>
<td>(Airway edema): 0.5mg/kg/dose q12h x 4 doses</td>
</tr>
<tr>
<td>Flovent (on vent)</td>
<td>44 or 110 mcg 2 puffs bid</td>
</tr>
<tr>
<td>Pulmicort (off vent)</td>
<td>0.25 or 0.5 mg NMT bid</td>
</tr>
<tr>
<td>Survanta</td>
<td>4ml/kg ETT q6h x 2-4</td>
</tr>
<tr>
<td>Diuril</td>
<td>20-40mg/kg/day div q12h PO</td>
</tr>
</tbody>
</table>
X. CARDIOVASCULAR

Target mean arterial pressure: Gestational age in weeks (25 weeks = 25 mmHg)

Indomethacin/Ibuprofen for PDA

Signs: Low DBP, metabolic acidosis, murmur, wide pulses = symptomatic PDA (poor perfusion, pulm overcirculation)

Mechanism: NSAIDs inhibit COX-mediated synthesis of prostaglandin H2 (and thereby PGE1) from arachidonic acid. It promotes ductal closure through smooth muscle constriction and may also constrict afferent arterioles to kidney (↓ GFR) and gut (NEC, in theory).

Contraindications: overt bleeding, thrombocytopenia, ductal dependent heart disease, kidney failure

Administration: See Lexicomp dosing.
Restrict IVF to 80 ml/kg/day.
Follow platelets, UOP

HTN:
Systolic or MAP >95% for BW, GA and postnatal age.
Systolic >65 mmHg at 24 wk and 90 mmHg at term
Seen in BPD, IVH, Rx: IV hydralazine.

<table>
<thead>
<tr>
<th>HYPOTENSION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalloid Bolus or PRBC</td>
<td>10 cc/kg NS, may repeat</td>
</tr>
<tr>
<td>Dopamine (Norepi precursor α1, β1)</td>
<td>2-20 mcg/kg/min</td>
</tr>
<tr>
<td>Dobutamine (β1)</td>
<td>2-20 mcg/kg/min</td>
</tr>
<tr>
<td>Epinephrine (α1, β1)</td>
<td>0.05-2 mcg/kg/min</td>
</tr>
</tbody>
</table>

Review of adrenergic receptors

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>α1:</td>
<td>smooth muscle vasoconstriction (Skin, GI tract)</td>
</tr>
<tr>
<td>β1</td>
<td>↑ heart rate &amp; contractility</td>
</tr>
<tr>
<td>β2:</td>
<td>smooth muscle relaxant (Bronchiole dilation)</td>
</tr>
<tr>
<td>Dopaminergic</td>
<td>mesenteric, splanchnic dilatation</td>
</tr>
</tbody>
</table>
**Hydrocortisone dose for** Adrenal insufficiency.
Do not use with NSAIDs due to risk of spontaneous intestinal perforation.

<table>
<thead>
<tr>
<th>Wt kg</th>
<th>3X Maint Q6°</th>
<th>1X Maint Q6°</th>
<th>½ Maint Q6°</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1.1mg</td>
<td>0.4mg</td>
<td>0.2mg</td>
</tr>
<tr>
<td>1.0</td>
<td>1.4mg</td>
<td>0.5mg</td>
<td>0.2mg</td>
</tr>
<tr>
<td>1.5</td>
<td>1.6mg</td>
<td>0.5mg</td>
<td>0.3mg</td>
</tr>
<tr>
<td>2.0</td>
<td>1.8mg</td>
<td>0.6mg</td>
<td>0.3mg</td>
</tr>
<tr>
<td>2.5</td>
<td>2.1mg</td>
<td>0.7mg</td>
<td>0.3mg</td>
</tr>
<tr>
<td>3.0</td>
<td>2.3mg</td>
<td>0.8mg</td>
<td>0.4mg</td>
</tr>
<tr>
<td>3.5</td>
<td>2.5mg</td>
<td>0.8mg</td>
<td>0.4mg</td>
</tr>
<tr>
<td>4.0</td>
<td>2.8mg</td>
<td>0.9mg</td>
<td>0.5mg</td>
</tr>
<tr>
<td>4.5</td>
<td>3.0mg</td>
<td>1.0mg</td>
<td>0.5mg</td>
</tr>
<tr>
<td>5.0</td>
<td>3.2mg</td>
<td>1.1mg</td>
<td>0.5mg</td>
</tr>
</tbody>
</table>

**Hydrocortisone** maintenance dose: 15mg/m²/d divided q6hr

**Prostins (PGE1):**
Ductal-dependent heart disease.
Start at 0.03mcg/kg/min to keep duct open (0.1mcg/kg/min to re-open closed ductus).
Watch for apnea, fever. Start caffeine to prevent apnea.

**XI. INFECTIOUS DISEASE**

**Sepsis**

**Suspected** (prenatal/maternal risks, but baby acting fine):
Blood culture, CRP, CBC. Rx: Amp, gent x >48 hrs.

**Early-onset sepsis** (<3 DOL, baby acting sick)
Blood, CSF cultures. Amp & Gent x >48 hours for E Coli, Listeria, GBS. (Bugs grow fast)

**Late-onset sepsis** (>DOL 4, baby acting sick):
Bld, urine CSF cultures. Vancomycin and Gentamicin >72 hours for E Coli, listeria, influenza, klebsiella, and STAPH species.

<table>
<thead>
<tr>
<th>Positive Culture Site</th>
<th>Rx Duration (from 1\textsuperscript{st} NEGATIVE cx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine</td>
<td>7-10 days</td>
</tr>
<tr>
<td>Blood</td>
<td>7-10 days</td>
</tr>
<tr>
<td>CSF</td>
<td>14-21 days</td>
</tr>
<tr>
<td>None</td>
<td>Baby well: 48-72 hrs</td>
</tr>
<tr>
<td>None</td>
<td>Baby sick: 7-10 days (&quot;Culture-negative sepsis&quot;)</td>
</tr>
</tbody>
</table>
CSF studies:
Tube 1: gram stain, cx
Tube 2: glucose, protein
Tube 3: CBC (last tube should be the clearest)

GBS sepsis: Penicillin G monotherapy
Aminoglycoside require peak/trough levels by pharmacy for dosage adjustments.

XII. NEUROLOGY

<table>
<thead>
<tr>
<th>Cerebrospinal Fluid Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Glucose</td>
</tr>
<tr>
<td>White Cell Count</td>
</tr>
<tr>
<td>Protein</td>
</tr>
</tbody>
</table>

Seizures:

Causes: Hypoglycemia, subarachnoid hemorrhage, cerebral edema, hyponatremia, meningitis, etc.

Treatment: Phenobarb
Load 30mg/kg (IV) then after 12 hours → 5mg/kg/day
<37 weeks 20 mg/kg load
Trough (20-50)
T₁/₂ is 100 hours (Infrequent levels needed)

Fosphenytoin: Oral route unreliable, IV route preferred

Cranial Ultrasounds:
Routine for < 32 weeks: on DOL #7 (to evaluate for IVH) and 36 weeks PMA (to evaluate for PVL).
If IVH ≥ Grade II, additional ultrasounds (every 1-2 weeks) for post-hemorrhagic hydrocephalus.
ROP Screening Guidelines (AAP)
BW < 1500g or GA < 31 weeks, or those > 30 weeks, 1500-2000g with unstable course.
On admit order sheet

<table>
<thead>
<tr>
<th>Gestational Age at Birth, wk</th>
<th>Age at Initial Examination, wk Postmenstrual</th>
<th>Chronologic</th>
</tr>
</thead>
<tbody>
<tr>
<td>22°</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>23°</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>26</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>27</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>31°</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td>32°</td>
<td>36</td>
<td>4</td>
</tr>
</tbody>
</table>

XIII. DISCHARGE CRITERIA
Feeds: MBM needs 400 IU vitamin D/day (Poly-Vi-Sol with iron or Tri-Vi-Sol)
Caffeine if central apnea persists on monitor
Most AOP resolves by 40 weeks
May need monitor for home
Hep B # 1, circumcision, hearing screen, call primary care physician (~day prior to discharge).

XIV. IMMUNIZATIONS
Hep B (0.5mL IM x 1 after parental consent):
If Mom is HBsAg (+) or unknown then give vaccine within 12 hrs of birth (repeat at 1 and 6mos) and HBIG

At 2, 4, and 6 months:
Pediarix = DTaP, IPV, and Hep B
Prevnar = Pneumococcal conjugate vaccine
HIB
NO ROTATEQ (while in the NICU)

Synagis (Palivizumab)
GA <32 wks need consideration. See AAP guidelines.
Congenital heart disease, chronic lung disease
**For infants with birth weight < 1.8 kg, if linear growth lag or osteopenia is present, or if there is an increased need for minerals or protein for other medical reasons, HMF may be continued 1 pkt/25 mL or 1 pkt/50 mL as needed until patient achieves 3.5 kg.**

Beneprotein (1/2 tsp per 100mL of feeds) adds 4kcal per 100mL of feeds.

150mL/kg/d of HMF 1:25 and beneprotein yields 126kcal/kg/d.
## NICU

### FORMULA COMPOSITIONS

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Breastmilk</th>
<th>Preterm</th>
<th>Transitional</th>
<th>Term</th>
<th>Soy</th>
<th>Elemental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal/oz)</td>
<td>20</td>
<td>20</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Protein (g/dL)</td>
<td>1.4</td>
<td>1</td>
<td>2.4</td>
<td>2.4</td>
<td>2.2</td>
<td>2.1</td>
</tr>
<tr>
<td>g/100 kcal</td>
<td>2.1</td>
<td>2.2</td>
<td>2.7</td>
<td>3</td>
<td>9</td>
<td>2.8</td>
</tr>
<tr>
<td>Fat (g/dL)</td>
<td>3.9</td>
<td>4</td>
<td>4.1</td>
<td>4.1</td>
<td>4.3</td>
<td>3.9</td>
</tr>
<tr>
<td>Carbohydrates (g/dL)</td>
<td>6.6</td>
<td>7.2</td>
<td>8.2</td>
<td>8.6</td>
<td>8.2</td>
<td>7.5</td>
</tr>
<tr>
<td>Calcium (mg/dL)</td>
<td>25</td>
<td>28</td>
<td>13</td>
<td>16</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Phosphorus (mg/dL)</td>
<td>13</td>
<td>14</td>
<td>78</td>
<td>85</td>
<td>81</td>
<td>51</td>
</tr>
<tr>
<td>Sodium (meq/dL)</td>
<td>1.1</td>
<td>0.8</td>
<td>1.7</td>
<td>1.5</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Potassium (meq/dL)</td>
<td>1.5</td>
<td>1.3</td>
<td>3</td>
<td>2.1</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>Iron (mg/dL)</td>
<td>.03</td>
<td>.03</td>
<td>.03</td>
<td>.3</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Osmolarity (mOsm/L)</td>
<td>280</td>
<td>280</td>
<td>380</td>
<td>280</td>
<td>310</td>
<td>280</td>
</tr>
</tbody>
</table>
**NICU**

<table>
<thead>
<tr>
<th></th>
<th>Preterm needs (intrauterine accretion) mg/kg/day</th>
<th>Amount in SSC 24 @ 150cc/kg/d*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>105</td>
<td>219</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>70</td>
<td>122</td>
</tr>
</tbody>
</table>

* Bioavailability varies
“As doctors, we live in a world of worse case scenarios. We cut ourselves off from hoping for the best because too many times the best doesn't happen. But every now and then something extraordinary occurs and suddenly best case scenarios seem possible. And every now and then something amazing happens, and against our better judgment we start to have hope.”
5. **PICU**

I. **SHOCK**

**SIRS Criteria**

2 or more of the following:

- Temp < 36°C (96.8°F) **OR** > 38°C (100.4°F)
- HR > 90
- RR > 20 **OR** pCO₂ < 32 mmHg
- WBC < 4,000 **OR** > 12,000 **OR** > 10% bands

[Sepsis = SIRS + source of infection]

**Shock**

- **Hypovolemic** → low fluid, hemorrhage
- **Cardiogenic** → MI, arrhythmia, cardiomyopathy, myocarditis, CHF, valvular insufficiency
- **Obstructive** → Tamponade, Tension Pneumothorax, PE, severe Aortic Stenosis
- **Distributive** → Septic Shock, Anaphylactic Shock, Neurogenic Shock (high spinal injuries)

**INTUBATION**

**ET tube size** → age/4 + 4

**ET tube depth** → ~3x size

**Medication Options**

- Atropine 0.01-0.02 mg/kg (0.1-0.5 mg)
- Ketamine 1 mg/kg
- Fentanyl 1 mcg/kg
- Versed 0.1 mg/kg
- Vecuronium 0.1-0.3 mg/kg
II. VENTILATORS (IN BRIEF)

Normal ABG

<table>
<thead>
<tr>
<th></th>
<th>Arterial</th>
<th>Capillary</th>
<th>Venous</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH:</td>
<td>7.35-7.45</td>
<td>7.35-7.45</td>
<td>7.32-7.42</td>
</tr>
<tr>
<td>PCO2 (mmHg)</td>
<td>35-45</td>
<td>35-45</td>
<td>38-52</td>
</tr>
<tr>
<td>PO2:</td>
<td>80-100</td>
<td>60-80</td>
<td>24-48</td>
</tr>
<tr>
<td>(mmHg)</td>
<td>22-26</td>
<td>22-26</td>
<td>22-26</td>
</tr>
<tr>
<td>HCO3: (mEq/L)</td>
<td>-2 to +2</td>
<td>-2 to +2</td>
<td>-2 to +2</td>
</tr>
<tr>
<td>Base Excess:</td>
<td>&gt;94% on RA</td>
<td>&gt;94% on RA</td>
<td>40-70%</td>
</tr>
<tr>
<td>(mEq/L)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O2: (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Basic Initial Vent Settings

- Rate: 12-40 (age specific)
- Volume Control: V; 6-10 ml/kg (low for ARDS), keep P < 30-35 cm H2O
- Pressure Control: PIP 20 cm H2O (titrate to VT 6-10 ml/kg)
- PEEP: 5 cm H2O +
- FiO2: 100% to start (< 60% associated with lower oxygen toxicity)
- Insp Time: 0.6-0.9 sec (I:E time is 1:2)

Vent Modes

- Assist Control (Volume or Pressure)
  - Same Pressure or Volume delivered → Time or Patient triggered
  - Volume → set VT → PIP depends on compliance, keep PIP < 30-35
  - Pressure → set PIP → VT depends on compliance, titrate to goal 6-10 ml/kg

SIMV

- Minimum # of assisted breaths set
- Synchronized to patient’s respiratory effort
- Spontaneous breaths are not assisted (*unless Pressure Support added*)
- SIMV = AC when patient is fully sedated and apneic

Pressure Support (PSV)

- Provides support for resistance of Endotracheal tube!!
- Patient-triggered, spontaneous breaths
- May be combined with SIMV
- *On our vents, we have ATC which compensates for resistance w/o PSV
High Frequency Oscillator

*Indications:* Failure of conventional ventilation, Air leak, ARDS, pulm HTN

Lower V & P than CMV: Reduces baro & volutrauma

Set MAP, goal 8-10 rib expansion on CXR.
Frequent CXR (Some Attending like q6)

NIPPV
= CPAP + rate

CPAP
5 cm H2O
Max < 12y = 15 cm H2O
Max > 12y = 20 cm H2O

BiPAP
IPAP = 8 cm H2O (Max < 12y = 20 cm H2O | > 12y = 30 cm H2O)
EPAP = 4 cm H2O
IPAP - EPAP = 4 to 10

Vent Management

**Oxygenation (O2):** FiO2 & PEEP
**Ventilation (CO2):** VT & Rate

Repeat ABG/VBG or Cap Gas 30 min after:
Intubation, major vent change, or change in Mean Airway Pressure*
* Optional if no change in minute ventilation or patient effort

**Extracorporeal Membrane Oxygenation (ECMO)** - per NY Presbyterian

**Indications**
- **Severe Hypoxemia → PaO2:FiO2 < 80** despite high PEEP and salvage therapies for at least 6 hrs
- **Uncompensated Hypercapnia** (pH < 7.15) or high plateau airway pressures despite intervention
- **Hypercapnic Respiratory Failure** due to exacerbation of asthma, COPD, other chronic lung disease as bridge-to-recovery
- **Lung Transplant Candidates** as a bridge-to-transplant
Relative Contraindications
- High-pressure ventilation x 7 - 10 days
- High FiO2 requirements (> 80% for 7 - 10 days)
- Limited vascular access
- Inability to accept blood products
- Any condition or organ dysfunction that would limit likelihood of benefit

Absolute Contraindications
- Contraindication to anticoagulation

III. TRANSFUSIONS (*USE EPIC ORDER SET*)

pRBC
10-15 ml/kg over 2-4 hours (one Unit ~ 250-350 ml)
Irradiated? Leukoreduced?
Raise Hgb 2-2.5 g/dl

Platelets
10 ml/kg over 30-60 min
Should increase platelets by 50k

FFP
10-15 ml/kg over 15-30 min
Replace pro- and anti-coagulants. High INR or PTT
Increases factors by 10-20%
*Use to treat clinical bleeding, NOT abnormal labs

Cryoprecipitate
1 unit = 7 ml. 1 unit per 5 kg
Factors VIII, XIII, fibrinogen and fibronectin
Raises fibrinogen ~50

Factor VIII
Hemophilia A
50 units/kg

Factor XI
Hemophilia B (Christmas Disease)
100 units/kg

Massive Transfusion
→ Hypocalcemia
→ Hyperkalemia
→ Dilutional coagulopathy
PICU

**TRANSFUSION REACTION**

**RN Protocol**
Vitals immediately before, 15 min after starting, on completion
Monitor for signs of reaction:
  - Fever, chills, Hives/urticaria, Dyspnea, Cyanosis
  - Pain at IV, Nausea, Hematuria/auria, Shock (BP)
  - Oozing blood, Chest pain, Back pain, Vomiting
  - **Fever > 2°F rise pre to post**
  - **Stop** transfusion and keep IV open!

RN will send to blood bank:
  - Send bag and tubing
  - Post transfusion reaction specimen (7ml lavender)
  - Hematuria or ↓UOP → Send urine

**Fever**
  - Hold Transfusion Vs Administration of Tylenol
  - Febrile nonhemolytic transfusion reactions (FNHTR)
    → Cytokine release from donor WBCs, prolonged storage
    → Reduced with leukocyte reduced blood

**Benign**
  - Routine premedication with Tylenol does not reduce incidence
  - Bacterial Contamination - very rare

**Immediate Hemolytic Response (ABO incompatibility, other Antibodies)**
  - Fever, tachycardia, hypotension → shock, DIC

**Urticaria**
  - Hold transfusion and **Give** Benadryl
    - If fast resolution, **may be ok to proceed** with transfusion
    - Consider premedication with corticosteroid
    - Anaphylaxis very uncommon

**SOB**
  - Hold transfusion, consider CXR
  - Fluid Overload
  - TRALI (Transfusion Related Acute Lung Injury)
    - More common in adults
    - Usually < 2h, **must be < 6h to be TRALI**
IV. MEDICATIONS / IV DRIPS

Sedation/Analgesia - PAY ATTENTION TO UNITS mcg versus mg

<table>
<thead>
<tr>
<th>Medication</th>
<th>Indication</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>Post-op pain</td>
<td>0.01-0.1 mg/kg/hr, titrate to effect</td>
</tr>
<tr>
<td></td>
<td>Sickle-cell/cancer</td>
<td>0.04-0.1 mg/kg/hr, titrate to effect</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>1-3mcg/kg/hr, titrate to effect</td>
<td></td>
</tr>
<tr>
<td>Versed</td>
<td>Sedation</td>
<td>0.02-0.2 mg/kg/hr</td>
</tr>
<tr>
<td></td>
<td>25-100 mcg/kg IV over 2-3 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repeat q2-3min prn (max 5 mg)</td>
<td></td>
</tr>
<tr>
<td>Propofol</td>
<td>Initial bolus:</td>
<td>1-2 mg/kg IVP over 20-30 sec</td>
</tr>
<tr>
<td></td>
<td>Subsequent bolus:</td>
<td>0.5-1 mg/kg IVP</td>
</tr>
<tr>
<td></td>
<td>Maintenance:</td>
<td>100-200 mcg/kg/min in children</td>
</tr>
<tr>
<td>Precedex</td>
<td>Loading Dose:</td>
<td>1 mcg/kg IV over 10 min</td>
</tr>
<tr>
<td></td>
<td>Maintenance:</td>
<td>0.2-2.4 mcg/kg/hr, titrate to effect</td>
</tr>
</tbody>
</table>

Pressors/Inotropes

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dopamine</td>
<td>2-20 mcg/kg/min</td>
</tr>
<tr>
<td></td>
<td>Low dose (2-5)</td>
</tr>
<tr>
<td></td>
<td>“Renal dose” → unproven, may cause diuresis</td>
</tr>
<tr>
<td></td>
<td>Med dose (5-10)</td>
</tr>
<tr>
<td></td>
<td>“Cardiac dose” → β1 effect</td>
</tr>
<tr>
<td></td>
<td>High dose (10-20)</td>
</tr>
<tr>
<td></td>
<td>“Pressor dose” → α1 effect</td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>α1 &gt; β1</td>
</tr>
<tr>
<td></td>
<td>0.05-0.1 mcg/kg/min</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>β1 &gt; α1</td>
</tr>
<tr>
<td></td>
<td>0.05-2 mcg/kg/min</td>
</tr>
<tr>
<td>Dobutamine</td>
<td>β1, Mild β2</td>
</tr>
<tr>
<td></td>
<td>3-20 mcg/kg/min</td>
</tr>
<tr>
<td>Milrinone</td>
<td>Loading Dose</td>
</tr>
<tr>
<td></td>
<td>50-75 mcg/kg over 10-60 min</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
</tr>
<tr>
<td></td>
<td>0.5-0.75 mcg/kg/min</td>
</tr>
</tbody>
</table>
**Antihypertensives**

Esmolol → 25-250 mcg/kg/min

**Other Common PICU Meds**

Insulin → 0.05 - 0.1 units/kg/hr, titrate to blood sugar
Ranitidine → 2-4 mg/kg/day IV divided BID (unavailable at Bronson)
Famotidine → 1 mg/kg/day IV divided BID

---

**V. TPN/PPN**

**Indications**

1. Existing nutritional deprivation (Crohn’s, Short-gut syndrome)
2. Inadequate oral intake (bowel rest or post-surgical without PO for 7 days)
3. Significant Multi-organ System Disease
4. Mechanical ventilation
5. Burns

**PICU Basic Rules**

| PPN: 10-12.5% Glucose, 2%Lipids, 2% protein, Electrolytes based on labs |
| TPN: 12.5-15% Glucose, 2-3% Lipids, 2-3% protein, Electrolytes based on labs |

*PPN limited by osmolarity → irritates vascular wall
*PPN can be TPN if higher rate tolerated or lower calories required

**Monitoring**

Chem 10, LFTs, and triglycerides initially daily then q3-4x/wk
Nutrition Consult!
VI. REPLETING ELECTROLYTES

Sodium (Goal 135-150)

*Hyponatremia* (free water excess)
Consider SIADH
Treatment: Fluid restriction
Correct *slowly* by \[ \leq 8 \text{ mEq/L/d} = 2 \times \text{mEq Na} = (120 \text{ - Na}) \times \text{wt} \times 0.6 \text{ (mL)} \]
If seizing, bolus 3% Saline

*Hypernatremia* (free water deficit)

**Free Water Deficit (L)** = \[ \text{Wt(kg)} \times 0.6 \times [(\text{actual Na/140}) - 1] \]
Most commonly dehydration \( \rightarrow \) Give IVF with NS until rehydrated then reassess.
Usually requires stepwise decrease in IV [Na] to effect progressive drop in Na to normal range.

Potassium (Goal 3.5 - 5.2)

*Hypokalemia*
Consider repleting in all patients who don’t have renal impairment
Use PO when tolerating
IV 0.5-1 mEq/kg/dose (maximum rate 0.3 mEq/kg/hr)
Low Magnesium affects ability to correct Potassium

*Note:* IV $\text{K}^+$ *burns at IV site and PO $\text{K}^+$ may cause nausea and diarrhea*

*Hyperkalemia*

Heal sticks commonly hemolyzed. Check lab about hemolyzed sample
Recheck $\text{K}^+$, remove $\text{K}^+$ from IV fluids
Asymptomatic \( \rightarrow \) check EKG, if concerns - give kayexelate PO
Symptomatic or EKG changes
  - Ca gluconate
  - Insulin + dextrose
  - Kayexelate
  - +/- Albuterol
Pseudohyperkalemia due to marked thrombocytosis \( \rightarrow \) check *plasma* $\text{K}^+$

Magnesium (Goal >2)

*Hypomagnesemia*
 Give 25-50 mg/kg/dose of MgSO$_4$ (max 2g)
PICU

**Calcium (Goal 8.6-10.3)**
- Corrected for Albumin = 0.8*(4 - albumin) + Ca
- Give Ca gluconate (Note: Calcium Chloride contains 3x Ca by weight)

**Phosphorus (Goal 2.7-4.5)**
- Important in critically ill, malnourished patients
- New low Phos after starting Feeds or TPN in malnourished patient may be sign of re-feeding syndrome - Replete with PO (Neutrophos) or IV (KPhos, NaPhos)

**Glucose**
- *Hypoglycemia*
  - Give 0.5 - 1 g/kg of Glucose IV available as 5-10 ml/kg D10W OR 2-4 ml/kg D25

VII. **DIABETES**

**DKA**
- 2 Bag IVF system + Insulin drip (0.05-0.1 units/kg/hr)
  - Bag A: 1/2NS + KPhos + KAcetate
  - Bag B: D10 1/2NS + KPhos + KAcetate
- Allows titration of Dextrose to maintain glucose while insulin to clears the ketones

**Sick Day Regimen** (never for new diabetic) *Continue Lantus!!*
- → Q2 hr blood glucose and urine ketones per void
  - Trace: PO hydration
  - 4-6 oz Q2 hours of non-sugar containing fluid,
  - Gluc < 200, then hydrate with sugary fluid)
  - Small - Mod: 10% TDD of Novolog q2h until ketones are trace (Gluc ≥ 200)
  - Mod - Large: 20% TDD of Novolog q2h until ketones small/mod (Gluc ≥ 200)
PICU

**Insulin Dosing**

Total Daily Dose (TDD) =

Pre-pubertal = 0.6 - 0.9 Units/kg/day
Post-pubertal = 0.9 - 1.2 Units/kg/day

<table>
<thead>
<tr>
<th></th>
<th>Lantus = ½ TDD QHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novolog = CF &amp; CR</td>
<td></td>
</tr>
</tbody>
</table>

Correction Factor (CF) = 1800/TDD
→ 1 Unit Novolog for every CF > 150 pre-meal (180 @ bedtime)

Carb Ratio (CR) = CF/3 → 1 Unit Novolog for every CR grams carbs

Glucose Checks → premeal, 2h postprandial, bedtime, 2am (calibration check)

** Cover Carbs Pre-meal, Correct High Glucose Pre-meal and at Bedtime **

**Blood Glucose Goal**

<table>
<thead>
<tr>
<th></th>
<th>Infant</th>
<th>Adolescent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-meal</td>
<td>80-180</td>
<td>70-150</td>
</tr>
<tr>
<td>Bedtime,</td>
<td>100-</td>
<td>100-200</td>
</tr>
<tr>
<td>2am</td>
<td></td>
<td>200</td>
</tr>
</tbody>
</table>

*will not achieve in hospital

**Dawn Phenomenon**
Natural effect of early AM release of GH, Cortisol, & Catecholamines

**Somogyi Effect** “Rebound Hyperglycemia”
Preceding hypoglycemia (usually No Sx, may have night sweats)
Body responds by releasing Cortisol & catecholamines to ↑glucose
Tx: Decrease lantus or have night time snack

Any Questions? Please consult Wilford Brimley.
VIII. DKA CLINICAL PRACTICE GUIDELINE

**Pediatric Diabetic Ketoacidosis Clinical Practice Guideline**
(Pediatric Use Only)
Please see admission order set for all dosing information

**Monitoring while in DKA:**
Capillary blood glucose monitoring every hour.
Urine ketones and glucose with each void.
Basic metabolic panel (BMP) every 2 hours x3.

**Two Bag System:**
Bag “A” - 0.45% sodium chloride with 14 mmol/L potassium phosphate (equals 20 meq of potassium) and 20 meq/L of potassium acetate.
Bag “B” - Dextrose 10%, 0.45% sodium chloride with 14 mmol/L potassium phosphate (equals 20 meq of potassium) and 20 meq/L of potassium acetate.

**Insulin glargine dose**
units sub-cue each ___ (HS or am)

**Rapid acting insulin (meal insulin):**
Be sure food is at bedside before giving this insulin.
Human analog insulin (Novolog)___ units/____grams of carbohydrate.
(Patients may eat when “feeling hungry” and no longer has nausea/vomiting). Do not give pre-meal correction while insulin dose is 0.1 units/kg/hour.
Pre-meal correction factor: ___ units for every ___ mg/dL of blood glucose greater than ___ mg/dL.

**Patient on insulin pump**

**No**

**Urine ketones clear prior to scheduled dose of long acting insulin**

**Total IVF rate 1.5-2x maintenance fluids.**
Total IVF rate (does not include insulin drip) for this patient ___ mL/hour.
Normal saline at specified rate until bags “A” and “B” are available.
Titrated dextrose based on hourly blood glucose checks.
Blood glucose is greater than 300 mg/dL - Bag “A” at total rate.
Blood glucose is between 200-299 mg/dL run Bag “A” at 50% of total rate and Bag “B” at 50% of total rate.
Blood glucose is 150-199 mg/dL run Bag “A” at 25% of total rate and Bag “B” at 75% of total rate.
Blood glucose is 80-149 mg/dL run Bag “B” at 100% of total rate.
If blood glucose is less than 80 mg/dL, hold insulin drip and contact physician with expectation of decreasing insulin dose or increasing IVF rate (do not exceed 2x maintenance).

**When urine ketones clear**
Start home insulin pump at basal rate: ___ units/hour.
Discontinue insulin drip and 2 bag system 30 minutes after starting insulin pump.
IVF - 0.45% sodium chloride with 2 0 meq. KCl/L at 1x maintenance = ___ mL/hour

Give insulin glargine at regularly scheduled time.
After 3 hours decrease insulin drip by (insulin glargine dose divided by 24 hours)= ___ units/hour.
Adjusted insulin drip rate is 0.1 units/kg/hour minus the basal rate ___ units/hour.
When urine ketones are clear (at least 3 hours after administration of insulin glargine), discontinue insulin drip and 2 bag system.
IVF - 0.45% sodium chloride with 2 0 meq. KCl/L at 1x maintenance = ___ mL/hour

Decrease insulin drip to basal rate (insulin glargine dose divided by 24 hours)= ___ units/hour.
Discontinue 2 bag system.
IVF - 0.45% sodium chloride with 2 0 meq. KCl/L at 1x maintenance = ___ mL/hour
Give insulin glargine (Lantus) at regularly scheduled time.
Discontinue insulin drip 3 hours after giving insulin glargine.

**Discontinue BMPs**
Discontinue hourly blood glucose checks.
Blood glucose checks before meals, 2 hours post meals, at bedtime and at 0300.
Correct pre-meal blood glucose according to orders.
Discontinue IVF when urine ketones are negative x4 voids.
Contact physician for discharge orders when urine ketones are negative x2 voids after discontinuing IVF. Diabetes education is complete, supplies have been verified with the family and caregivers are comfortable with discharge.
Clinical Practice Guideline- Diagnosis of diabetes type

Pediatric DKA:
Defined as BG >200 AND VBG <7.3 OR CO2 <15

Also consider PCOS for female patients

Do they also have 2 or more of the following?
- Acanthosis Nigricans
- First or Second Degree Relative with T2DM
- Hypertension or history of SGA
- Ethnicity with high risk (American Indian, Hispanic/ Latino, Asian/Pacific Islander, African American)

Treat as T1DM:
No further testing indicated at this time

Overweight patient (BMI >85 percentile)?

Age <10 years

- Abnormally low insulin level—consider Anti-GAD and Anti-Islet antibody testing if stunned pancreas unlikely

- Dyslipidemia (Goal LDL <100, HDL >35 and TG <150) – Repeat testing as outpatient at first follow up visit

- Depression screening is important for success in outpatient follow up and treatment should be followed.

Baseline Assessments for T2DM to be done inpatient:
- Insulin Level (prior to initiation of insulin therapy)
- Lipid Profile
- Liver assessment (CMP)
- Depression Screening

Early outpatient follow-up for T2DM
- Microalbumin/creatinine ratio
- Prepare family for possibility of sleep study, repeat blood tests and eventual need for dilated eye exam.

Abbreviations:
T1D- Type 1 diabetes
T2D- Type 2 diabetes
PCOS- Polycystic ovarian syndrome
SGA- Small for gestational age
BMI- Body Mass Index
X. BURNS

Parkland Estimation of Fluid Requirements

\[ = 4 \text{ ml/kg/\% burn BSA} \]

1st 1/2 in first 8h from time of burn
2nd 1/2 over 16h
LR is preferred fluid

Must run maintenance fluids as well
Add Dextrose to MIVF of pts < 20 kg
After 24h, Albumin if clinically indicated
XI. TRAUMATIC BRAIN INJURY (TBI)

Glasgow Coma Scale

<table>
<thead>
<tr>
<th>Motor</th>
<th>Verbal</th>
<th>Eye Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Follows Commands</td>
<td>5 Oriented</td>
<td>4 Spontaneous</td>
</tr>
<tr>
<td>5 Localizes</td>
<td>4 Confused</td>
<td>3 To Speech</td>
</tr>
<tr>
<td>4 Withdraws</td>
<td>3 Inappropriate words</td>
<td>2 To Pain</td>
</tr>
<tr>
<td>3 Abnormal flexion</td>
<td>2 Incomprehensible</td>
<td>1 No response</td>
</tr>
<tr>
<td>2 Extensor response</td>
<td>1 No response</td>
<td></td>
</tr>
<tr>
<td>1 No response</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Intubate for GCS ≤ 8 **

Elevated ICP
Cerebral Perfusion Pressure (CPP) = MAP - ICP
If CVP > ICP, then CPP = MAP - CVP

Goal CPP
Infant > 40-50 mmHg
Children > 60 mmHg

Goal ICP < 20 mmHg

XII. HOW TO LOWER ICP (ANSWER: CAREFULLY)

<table>
<thead>
<tr>
<th>General Rules</th>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Midline &amp; Elevated 30 degrees</td>
<td>3% Saline → 5 ml/kg bolus</td>
</tr>
<tr>
<td>Keep Temp down (No Fevers)</td>
<td></td>
</tr>
<tr>
<td>Avoid Hypoxia</td>
<td>Mannitol</td>
</tr>
<tr>
<td>Keep CO₂ normal</td>
<td>Fentanyl</td>
</tr>
<tr>
<td>Hyperventilate as needed to prevent herniation</td>
<td>Versed</td>
</tr>
<tr>
<td>Keep Glucose normal</td>
<td>Precedex (watch for hypotension)</td>
</tr>
<tr>
<td>Maintain BP</td>
<td>Pentobarbital</td>
</tr>
<tr>
<td>Sedate - movement/seizures will ↑ICP</td>
<td></td>
</tr>
<tr>
<td>minimize stimulation, including family</td>
<td></td>
</tr>
<tr>
<td>may need neuromuscular blockade</td>
<td></td>
</tr>
<tr>
<td>Keep Na elevated (145-155)</td>
<td></td>
</tr>
</tbody>
</table>

XIII. BRAIN DEATH

Irreversible unconsciousness and absence of brainstem reflexes

Prerequisites
- Known cause of impaired brain function
- Need to exclude reversible causes of coma:
  - Drugs, metabolic/endocrine disruptions, uncontrolled hypotension
- Conditions that may be repaired surgically

Brain Death Clinical Evaluation
- Absence of higher brain function
- Lack of consciousness, voluntary movement, or responsiveness
- No posturing or convulsions

Absence of brainstem function

<table>
<thead>
<tr>
<th>Function</th>
<th>Cranial Nerve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pupils mid-position / dilated</td>
<td>II, III</td>
</tr>
<tr>
<td>No pupillary response to light (direct/indirect)</td>
<td></td>
</tr>
<tr>
<td>Absence of spontaneous eye movement</td>
<td>III, IV, VI</td>
</tr>
<tr>
<td>No response to cold water calorics</td>
<td>III, IV, VI, VIII</td>
</tr>
<tr>
<td>Absence of doll’s eye phenomenon (oculocephalic reflex)</td>
<td>III, IV, VI, VIII</td>
</tr>
<tr>
<td>No blink response to corneal stimulation (corneal reflex)</td>
<td>V, VII</td>
</tr>
<tr>
<td>No gag or cough (gag reflex)</td>
<td>IX, X</td>
</tr>
<tr>
<td>No increase in HR with IV atropine or pressure applied to eyeballs (oculocardiac reflex)</td>
<td>V, X</td>
</tr>
<tr>
<td>No respiratory effort during apnea testing None in 10 min &amp; if PCO2 rises to 60mmHg or &gt; 20 over baseline</td>
<td></td>
</tr>
</tbody>
</table>

Confirmation of Brain Death
*Use one when unable to complete clinical eval or to shorten time to diagnosis*
- Electrocerebral silence on EEG for at least 30 min
- 4-vessel contrast angiography
“Great doctors aren't made, they're born. It takes gestation, incubation, sacrifice. A lot of sacrifice. But after all the blood and guts and gooey stuff is washed away that doctor you've become - totally worth it.”

“A physician's education never ends. Every patient, every symptom...is a test. A chance for us to demonstrate how much we know. And how much more we have to learn.”
6. TERM NEWBORN

I. BREAST FEEDING

Advantages
It’s Free!!
Bonding - evidence of decrease in non-accidental trauma

Infant Benefits:
Protect against infection          ↑ Height
Immunologic Development          ↓ Disease if ≥ 6 months
Enhance response to vaccines      [Celiac, JIA, Asthma, Allergies, Leukemia,
                                      ↓ risk of SIDS                  DM, UC, Crohn’s, Dental Caries, Obesity]
Improved motor development

Maternal Benefits:
Weight Loss!!                      ↓ Cancer risk (breast and ovarian)
Delayed fertility                  ↓ Osteoporosis
↓ Insulin                          ↓ Corticosteroid levels with stressors
↓ Post-partum bleeding

Anticipatory Guidance
First feeding ideally within 1h, Mother will get a colostrum bolus of up to 10cc
Note: Newborn stomach capacity only 4-7cc
After initial feed, may sleep 6-10h
Expect 6-10 feedings in first 24h then 10-16 feedings on day 2-3
Counsel mother on increased cluster feedings on night 2

Colostrum → primes gut, seals gut from pathogens, supports growth or bifidus flora, facilitates passage of meconium
Transitional Milk → day 3/4 to 10-12 = ↑ volume & ↑lactose
Mature Milk → 750-850 cc/day, increased calories with time (20-30 kcal/oz)

Vitamin Levels change with mom’s intake → continue prenatal vitamins
Supplement baby with 400mg Vit D daily
Medication Safety During Breastfeeding:  [www.medsmilk.com](http://www.medsmilk.com)

At Bronson, it automatically logs in
Away from Bronson, Username: bronson, Password: bronson
Can also use LactMed (by NIH)

Diet → very few restrictions. Limit caffeine.
No need to Pump and Dump (EtOH enters & leaves breast milk in ~ 1 hr)

Supplement?
Significant Dehydration, >10% wt loss, delayed stools or meconium, insufficient intake, breastfeeding jaundice where intake is poor, breast milk jaundice with bili > 20-25 mg/dl, hypoglycemia

Do NOT Supplement for:
- Sleepy infant in first 24-48h with <7% weight loss and no signs of illness
- Sleeping Mother
- Tbili < 20 mg/dL @ > 72h if feeding well, stooling, and < 7% wt loss (Full Term baby without other risk factors for hyperbili)
- Fussy at night or constantly feeding for several hours

KANGAROO CARE
Kangaroo Care = Skin-to-Skin with Mother
↓↓ morbidity and mortality
Stabilizes Temp, HR, RR, SpO2, glucose!!
Improved feeding!!
**Long-term**: more rapid weight gain

II.  TN “COMMON” PROBLEMS – PROTOCOLS SUBJECT TO CHANGE

**Brachial Plexus Palsy**

Associated with shoulder dystocia, breech, macrosomia, GDM
Natural forces of delivery may be sufficient to cause injury
C5/C6 (Erb’s palsy) [50%] → adducted, internally rotated; forearm extended
C5-C7 (Erb’s palsy plus “waiter’s tip”) [35%] → adduction, internal rotation; forearm extension and pronation; wrists and fingers flexed
C5-T1 → arm paralysis, sparing of finger flexion severe damage = flail arm + Horner’s Syndrome
C8-T1 (Klumpke’s palsy) [rare] → isolated hand paralysis + Horner’s Syndrome

**Diagnosis**: Xray chest and extremity to r/o fx

**Prognosis**: Majority spontaneously recover over 1-3 months, 18-30% persistent impairment
EMG studies between 1-3 months
Catastrophic CHF & Shock

- Tachypnea, tachycardia, ↓↓BP, poor/absent peripheral pulses
- Single loud S2, increased RV activity, or min abnormal post-ductal pulse ox

**Transfer to NICU and start PGE1 gtt immediately** (as above)
Consider: Critical Coarctation, Interrupted aortic arch, Critical Aortic Stenosis, Hypoplastic Left Heart Syndrome

Chorioamnionitis – See algorithm below (Page 90)

- IV Antibiotics given in nursery, use EPIC “Chorio” Order set (Amp 50 mg/kg)

Clavicle Fracture

- Crepitus, edema, lack of movement of extremity, asymmetry, crying with exam of extremity
- Diagnosis: Xray chest and upper extremities
- Treatment: Sleeve pinned to chest at 90 degrees, recheck 2 weeks

Cyanosis

- High suspicion for Ductal dependent cardiac lesion within first 2-4 wks
  (Transposition, Tetralogy, Tricuspid atresia, TAPVC, Truncus Arteriosus)
- Severe → Transposition, Pulm valve atresia, Ebstein’s Anomaly
- Others → cyanosis depends on degree of pulmonary stenosis

**Obtain:** 4 limb BP and SpO2
- Right Arm ↑BP or Left Arm/Legs ↓BP and ↓SpO2

**Abnormal:** Transfer to NICU and start PGE1 gtt (0.05 - 0.1 mcg/kg/min, up to 0.4), stat Echo to confirm but *do not delay* PGE1

Hypoglycemia Protocol – See algorithm below (Page 93-94)

- (All GDM babies, common in LGA babies, watch late preterm infants)

Hypothermia (< 97.6°F) with no other signs of sepsis – See algorithm below (Page 92)

- Check for - enough blankets? wearing hat? room temp?
- Encourage skin-to-skin

Hypotonia & poor/no reflexes

- Consider transfer to NICU ***
- Concern for Respiratory depression due to SMA Type I
- Initial labs include: Mg, CPK, CMP
- Can consider: MRI, muscle biopsy, EMG/NCS, genetic testing
Jaundice – See algorithm below (Page 91)

www.bilitool.org = Your best friend
Graph in epic, phototherapy threshold graph

**Keep Breast feeding!!** Bilirubin is cleared in a stooling baby
Maternal Blood Type O or Rh neg? r/o ABO or Rh incompatibility → send Cord Blood

In General:
- High Risk - start bili-blanket and repeat in 6h
- High-int Risk → repeat in 6-12h. Start bili-blanket if at risk patient
- Risk factors: Male, GDM, previous jaundiced sibling, East Asian, late preterm, bruising, breast feeding, Cephalhematoma, Rh incompatibility
- Increased Risk if “High Risk” < 24h
  
  < Bili-blanket → Phototherapy → Exchange Transfusion / IVIG >

***When on Term Newborn nights, you are responsible for documenting all bilirubin levels in a significant event note using “.bilirubinassessment” smartphrase. You must also order any repeats and document any management. ***

Murmur (asymptomatic)

- Obscures $S_1$ [$S_1$ coincident] → NEVER normal
- VSD, AV regurg, endocardial cushion defect
- Systolic murmurs after $S_1$ → Innocent or Pathologic
  - Pathologic: click, harsh, high-pitch
  - **Innocent:** soft, low-pitch, LSB

**Ductus Arteriosus** → functional closure w/i 10-15h, full closure 2-3 wks
“Pink” Tetralogy - may have soft systolic murmur

Neonatal Abstinence Syndrome

Poor Feeding (aggressive sucking with poor intake), diarrhea, vomiting, high-pitched cry, irritable, tremor, rapid breathing, increased tone, hyperreflexia, seizure

Obtain UDS/MDS - review maternal meds during labor

Finnigan Scoring > 8 → treatment in NICU Obs

Other Indications for MDS:
1. Abruptio Placenta without known cause
2. SGA without known cause
3. Maternal history of substance use
4. No or late prenatal care ( > 14 weeks)
Tachypnea
Transitioning? → up to 3-4h from birth, mod tachypnea, no other vital •
Transient Tachypnea of Newborn (TTN) - more common after c-section
R/o Sepsis → CBS, CRP
I:T ratio = immature cells/Total PMN (mature + immature) < 0.2
Consider CXR for Meconium aspiration or hypoxia

APGAR Scoring

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>blue/pale all over</td>
<td>blue extremities</td>
<td>pink</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>absent</td>
<td>&lt; 100</td>
<td>&gt; 100</td>
</tr>
<tr>
<td>Grimace (Reflex Irritability)</td>
<td>no response to stimulation</td>
<td>grimace/feeble cry</td>
<td>cry or pull away</td>
</tr>
<tr>
<td>Activity</td>
<td>none</td>
<td>some flexion</td>
<td>flexed arms &amp; legs</td>
</tr>
<tr>
<td>Respiratory Effort</td>
<td>absent</td>
<td>weak, irregular, gasping</td>
<td>strong cry</td>
</tr>
</tbody>
</table>

NICU Observation Unit
Front area of NICU (4th floor) reserved for < 24h observation
> 24h and still requiring increased nursing → stay in NICU or move to 3rd floor “NICU” Step Down

Indications
Poor feeding requiring NG/OG Feeds (Hypoglycemia, NAS)
Tachypnea / Hypoxia
Cyanosis
Profound Hypotonia (concern for SMA Type I)

What to Do?
Call Attending (NICU NP for BNHS during nights)
Signout patient to NICU so they are aware
Talk to RN to arrange bed and transport, place EPIC transfer to NICU Obs order
III. SKULL HEMORRHAGE

Caput Succedaneum: Benign, edema ± blood; cross suture lines; resolves in a few days

Cephalohematoma: Increases risk of jaundice and infection; typically does not cross suture lines; resolves in a few weeks

Subgaleal hemorrhage: Risk for significant blood loss into orbital ridges, nape of the neck posteriorly and level of the ears laterally
  - Diffuse, fluctuant, may shift with movement
  - Watch for shock - monitor BP, Hct, Head Circ, Coag studies, CT/MRI

LATE PRETERM INFANT
Late Preterm = 34 - 36 6/7 wks
www.ballardscore.com

Increased risk of:
  - Apnea, TTN, RDS
  - Temperature Instability
  - Hypoglycemia
  - Sepsis - 5x rate
  - Hyperbilirubinemia - bili tends to peak later than term infants
  - Difficulty Feeding
**Symptomatic: Consider NICU or Central Nursery**

- Full sepsis evaluation
  - Blood Cx (at birth), CBC/CRP (birth and/or 6-12 hrs of life). Consider CXR, LP. Start Amp and Gent.
  - Repeat CRP daily until normal. Continue axb 48 hrs after normal CRP IF blood culture negative ≥24hrs

**Neonatal Infection/Sepsis Clinical Practice Guidelines**

- **START HERE**
  - Signs/Symptoms of Potential Sepsis?
    - RR >70 for more than 4hrs
    - Respiratory distress
    - Temperature ≥ 100.4 or ≤ 97.4
    - Poor feeding for gestational age
    - Persistent hypoglycemia (Per guidelines)
    - Hypotonia, Lethargy

**Asymptomatic: With Mother**

- Maternal Chorioamnionitis?*
  - (Well Infant)
  - Blood Cx (birth), CBC/CRP (birth and/or 6-12 hrs of life). Start Amp and Gent.

**ASYMPTOMATIC: WITH MOTHER**

- GBS prophylaxis indicated??
  - Routine newborn care
  - Maternal IV PCN, Amp or Cefazolin ≥4 hrs before delivery?

**ASYMPTOMATIC: WITH MOTHER**

- Infant ≥37 wks gestation?
  - Yes
    - Maternal IV PCN, Amp or Cefazolin ≥4 hrs before delivery?
    - Provider to discuss infant placement with charge nurse to complete antibiotic care
  - No
    - Discontinue Antibiotics

**Chorioamnionitis:**
- (2 or more risk factors)
  - Maternal fever (T ≥ 100.4)
  - Uterine tenderness
  - Foul smelling fluid
  - Tachycardia:
    - * Mom: HR >100, >20 mins
    - * Fetus: HR >160, >10 mins

**GBS prophylaxis indications**:
- Previous infant with invasive GBS disease;
- GBS bacteruria THIS pregnancy;
- Positive vaginal-rectal GBS in late pregnancy (ideally 35-37 wks);
- Unknown GBS with fetus <37 wks, ROM ≥18 hrs or intrapartum temp ≥100.4.
Clinical Practice Guideline - Newborn Hyperbilirubinemia Screening

- Prenatal risk factor: Mother blood type O or Rh negative, antibody positive
  - Yes → Obtain cord blood: Is DAT +?
  - No → Initial Bilirubin (total and direct) after 24 hours of life with NBS

  - No further testing unless otherwise indicated by s/sx of hyperbilirubinemia

- Billirubin (total and direct) at 12 and 24 hours of life
  - Yes → Is total bilirubin HIRZ/HRZ based on AAP normogram?
  - No → No further testing unless otherwise indicated by s/sx of hyperbilirubinemia

  - Yes → Based on the AAP normogram is level above treatment threshold?
    - Yes → Ensure adequate feeding*, consider supplements if needed.
    - No → Repeat bilirubin (total and direct) in 6-12 hours and continue to follow guideline

- If DAT+ AND cord blood total bilirubin >5mg/dl?
  - Yes → Discuss with NICU and plan for possible transfer for possible IVIG or exchange transfusion
  - No → Is bilirubin decreasing with therapy?
    - Yes → If direct bilirubin > 20% or approaching 1 mg/dl consider additional GI evaluation
    - No → Consider increasing therapy (double/triple) and recheck 4-6 hours

  - No → Home when total bilirubin trending down and per provider discretion***, adequate feeding assured & close follow-up with PCP

  - Continue therapy and recheck bilirubin every 6-12 hours based on risk factors and clinical assessment

Notes:
*Do NOT interrupt phototherapy for feeds if rapidly rising. If not rapidly rising, infant not to be removed from lights for >20 minutes in 2-3 hour period. If breastfeeding, then consult lactation and assure adequate milk supply by pre and post weights or mom pumping x 1. May need to supplement temporarily. Attempt to use expressed breastmilk/donor breastmilk, if available, first for supplemental feeds.
** Risk factors for neurotoxicity: prematurity, G6PD, isoimmune hemolytic anemia, significant lethargy, sepsis, acidosis, asphyxia, temp instability, hypoalbuminemia
*** Use risk nomogram for appropriate level to discontinue phototherapy for infants less than 7 days old
Neonatal Hypothermia

This guideline is for all infants with hypothermia, but if there are other symptoms of sepsis (lethargy, poor perfusion, respiratory distress, unexplained hypoglycemia, etc) the provider should be notified.

**Temperature is less than 97.6°F in crib**

- Radiant warmer or skin-to-skin direct exposure (if infant meets criteria for skin-to-skin)
  - Temperature unchanged or lowered
    - Re-evaluate technique (ie direct skin exposure, room temperature, maternal temperature, etc). Check blood glucose and recheck temp in 15 minutes
    - If temperature still unchanged or lowered:
      - Infant skin-to-skin, place infant under radiant warmer
      - Infant already under radiant warmer – continue
      - Notify provider
  - Recheck temperature in 15 minutes
    - Temperature increasing
      - Double wrap with a hat and discontinue radiant warmer or skin-to-skin; may continue skin-to-skin if mother desires
      - Recheck temperature at 1&4 hours after therapy is discontinued
    - Recheck temperature every 4 hours x 3
      - If temperature remains normal, monitor every 4 hours x 3
  - If temperature has dropped below 97.6°F (36.4°C) repeat radiant warmer or skin-to-skin x1. If infant fails to maintain temperature again, notify provider for observation in nursery

- Continue radiant warmer or skin-to-skin & check temperature every 15 minutes for radiant warmer or 15-30 minutes for skin-to-skin until at least 98°F (36.7°C)
  - If infant not normothermic after 1 hour of skin-to-skin or symptoms of distress, place under radiant warmer & assess infant

Bronson Battle Creek Normal Newborn Clinical Pathway – Newborn Use Only
Asymptomatic Newborn Hypoglycemia Guidelines - L&D/Recovery Period

If signs & symptoms of hypoglycemia assessed at any time and BG less than 40, feed immediately, notify peds resident for orders to transfer to NICU.

Signs/symptoms include: jitteriness, irritability, hypotonia, lethargy, seizures, weak-high pitched cry, poor feeding, hypothermia, tachypnea, apnea, cyanosis.

Risk Factors:
- SGA or LGA
- Gestational age less than 37 weeks or greater than 42 weeks
- Infant of Diabetic mother
- ROM greater than 18 hours
- Suspected newborn sepsis or maternal chorioamnionitis
- Hypothermia for more than 30 min
- Apgar less than 7 at 5 minutes

Newborn on OB unit

Does baby have risk factors for hypoglycemia?

No

Routine care. Feed on demand as ordered. Check BG PRN

Yes

Routine care; First feeding by one hour of birth

Check BG 30 min after end of first feeding

p.c. BG less than 25:
- Notify peds resident
- Check temperature
- Re-feed if infant willing and re-check bld. glucose 30 min after end of feeding.
- If breast feeding and no latch/suck at breast, supplement with 15 ml donor milk or formula. Do BG 30 min after this.
- If has hunger cues after 15 ml, return to breast.
- If formula feeding, refeed with at least 15 ml
- If unable to re-feed, notify Peds. resident for orders to transfer to NICU and notify OB and NICU charge nurses

p.c. BG 25-39:
- Check temperature
- Re-feed if infant willing and re-check bld. glucose 30 min after end of feeding.
- If breast feeding and no latch/suck at breast, supplement with 15 ml donor milk or formula. Do BG 30 min after this.
- If has hunger cues after 15 ml, return to breast.
- If formula feeding, refeed with at least 15 ml.
- If unable to re-feed, notify Peds. resident and anticipate possible transfer to NICU

p.c. BG 40 or greater:
- Continue with feedings as ordered and bld. glucose checks based on risk factors (See page 2)

BG after re-feed 40 or greater:
- Continue with feedings as ordered and BG checks based on risk factors (See Postpartum page)

BG after re-feed less than 40:
- Notify Peds. resident for orders to transfer to NICU and notify OB and NICU charge nurses

11/2015
Asymptomatic Newborn Hypoglycemia Guidelines - Postpartum Status

If signs & symptoms of hypoglycemia assessed at any time and BG less than 40, feed immediately, notify peds resident for orders to transfer to NICU.

Signs/symptoms include: jitteriness, irritability, hypotonia, lethargy, seizures, weak-high pitched cry, poor feeding, hypothermia, tachypnea, apnea, cyanosis.

BG check guidelines based on risk factors:
- If infant of diabetic mother LGA:
  - Check a.c. BG no more freq than every 2-3 hours based on feeding frequency until 3 consecutive a.c. BGs are greater than 40. **
- If late preterm infant or SGA:
  - Check a.c. BG for 24 hours **
- If suspected newborn sepsis or maternal chorioamnionitis, ROM greater than 18 hr, Apgar less than 7 at 5 min. or over 42 week gestation:
  - Continue with frequent feeding as ordered and monitor for signs of hypoglycemia.

**BG checks may be extended beyond by provider based on individual infant needs/assessment

If a.c. BG less than 30:
- Check temperature
- Notify Peds. Resident
- Feed immediately and re-check BG 1 hour after end of feeding, while awaiting orders.
- If breast feeding and no latch/suck at breast, supplement with 15 mL donor milk or formula. Do BG 1 hr after this. If has hunger cues after 15 mL, return to breast.
- If formula feeding, refeed with at least 15 mL
- Anticipate possible transfer to NICU

If a.c. BG 30-39:
- Check temperature
- Feed immediately and check BG 1 hour after end of feeding
- If breast feeding and no latch/suck at breast, supplement with 15 mL donor milk or formula. Do BG 1 hr after this. If has hunger cues after this, return to breast.
- If formula feeding, refeed with at least 15 mL
- If unable to feed, notify Peds. resident

If p.c. BG less than 40:
- Notify Peds. resident for further feeding and blood glucose orders.
- Attempt to re-feed if infant willing, while awaiting orders.
- If breast feeding and no latch/suck at breast, supplement with 15 mL donor milk or formula. Do BG 1 hr after this. If has hunger cues after this, return to breast.
- If formula feeding, refeed with at least 15 mL
- Anticipate possible transfer to NICU

Follow provider orders for continued feedings and blood glucose checks.

APPENDIX*

*(not the organ)*

Lane-Davies’
Rules of Medicine

**Rule #1:** Expect more from yourself than you do from others

**Rule #2:** Expect a lot from others

**Rule #3:** Sit down when you talk to patients and families

**Rule #4:** Parents are usually right

**Rule #5:** We are all imperfect, but together we can approach perfection
### Clinical Observations in Dehydration

<table>
<thead>
<tr>
<th>Dehydration</th>
<th>Older Child</th>
<th>Infant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3% (30 mL/kg)</td>
<td>6% (60 mL/kg)</td>
<td>9% (90 mL/kg)</td>
</tr>
<tr>
<td>5% (50 mL/kg)</td>
<td>10% (100 mL/kg)</td>
<td>15% (150 mL/kg)</td>
</tr>
</tbody>
</table>

#### Examination

<table>
<thead>
<tr>
<th>Dehydration</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin turgor</td>
<td>Normal</td>
<td>Tenting</td>
<td>None</td>
</tr>
<tr>
<td>Skin (touch)</td>
<td>Normal</td>
<td>Dry</td>
<td>Clammy</td>
</tr>
<tr>
<td>Buccal mucosa/lips</td>
<td>Dry</td>
<td>Dry</td>
<td>Parched/cracked</td>
</tr>
<tr>
<td>Eyes</td>
<td>Normal</td>
<td>Deep set</td>
<td>Sunken</td>
</tr>
<tr>
<td>Tears</td>
<td>Present</td>
<td>Reduced</td>
<td>None</td>
</tr>
<tr>
<td>Fontanelle</td>
<td>Flat</td>
<td>Soft</td>
<td>Sunken</td>
</tr>
<tr>
<td>CNS</td>
<td>Consolable</td>
<td>Irritable</td>
<td>Lethargic/obtunded</td>
</tr>
<tr>
<td>Pulse rate</td>
<td>Normal</td>
<td>Slightly increased</td>
<td>Increased</td>
</tr>
<tr>
<td>Pulse quality</td>
<td>Normal</td>
<td>Weak</td>
<td>Feeble/impalpable</td>
</tr>
<tr>
<td>Capillary refill</td>
<td>Normal</td>
<td>~2 sec</td>
<td>&gt;3 sec</td>
</tr>
<tr>
<td>Urine output</td>
<td>Normal to Decreased</td>
<td>Decreased</td>
<td>Anuric</td>
</tr>
</tbody>
</table>
II. RANDOM EQUATIONS

\[ \text{FeNa} = \frac{\text{UNa}/\text{SNa} \times \text{SCr}/\text{UCr}}{} \times 100 \]

< 1% Prerenal

> 2% Intrinsic renal failure (ATN)

Mean plasma glucose = \((35.6 \times \text{HbA1c}) - 77.3\)

**Metzner Index** (Beta Thal vs Fe Deficiency for Microcytic Anemia) = \(\frac{\text{MCV}}{\text{RBC}}\)

< 13 more likely Beta Thalassemia

> 13 more likely Fe deficiency

**SAAG** (Serum Ascites Albumin Gradient) = \(\text{Albumin (serum)} - \text{Albumin (ascites)} > 1.1\) consistent with portal HTN

III. SCORES / ALGORITHMS

**Bacterial Meningitis Score**

- CSF Gram Stain
- CSF Protein \(\geq 80\)
- CSF PMNs \(\geq 1000\)
- ANC \(\geq 10,000\)
- Seizure with illness

0 = 100% likelihood aseptic \(\geq 2 = 87\%\) likely bacterial

**Westley Score** (Croup)

- Retractions 0-3 (none, mild, mod, severe)
- Stridor 0-2 (1=with agitation, 2=at rest)
- Cyanosis 0,4,5 (4=with agitation, 5=at rest)
- Level of Consciousness 0,5 (5=altered)
- Air Entry 0-2 (2=severely decreased)

Mild \(\leq 2\) Mod 3-5 Severe 6-11 Resp Failure \(\geq 12\)
### Ottawa Knee Rules
Knee X-ray → any one of the following:
- Age 55 years or older
- Tenderness at head of fibula
- Isolated tenderness of patella
- Inability to flex to 90°
- Inability to bear weight both immediately AND in ER (4 steps)

### Ottawa Ankle Rules
Ankle X-ray → Malleolar zone pain + one of the following:
- Tenderness along posterior edge of tibia or fibula (distal 6cm)
- Tenderness at tip of either malleolus
- Inability to bear weight immediately AND in ER

### Ottawa Ankle Rules
Foot X-ray → Mid-foot pain + one of following:
- Tenderness at base of 5th metatarsal
- Tenderness at Navicular bone
- Inability to bear weight immediately AND in ER

### Kocher Criteria (Septic Hip)
- WBC > 12,000
- Fever > 101.3°F (38.5°C)
- ESR > 40 mm/h or CRP > 2.0 mg/dl
- Inability to bear weight (fever & CRP are best predictors)
  - 1 = 3%, 2 = 40%, 3 = 93%, 4 = 99% chance

### Concussion Testing (Forms available in clinic)
- 5 - 12 yrs → Child-SCAT3
- > 12 yrs → SCAT3

### Wells Score for PE
- Symptoms of DVT (3 points)
- No alternative diagnosis better explains the illness (3 points)
- Tachycardia with pulse >100 (1.5 points)
- Immobilization (≥3 days) or surgery in the previous four weeks (1.5 points)
- Prior history of DVT or pulmonary embolism (1.5 points)
- Presence of hemoptysis (1 point)
- Presence of malignancy (1 point)

  - > 6 High Probability
  - 2 to 6 Moderate Probability
  - < 2 Low Probability
IV. PECARN HEAD TRAUMA ALGORITHM

Figure 3: Suggested CT algorithm for children younger than 2 years (A) and for those aged 2 years and older (B) with GCS scores of 14–15 after head trauma

Pediatric Asthma Score (for Bronson RTs)
## Asthma Severity Scoring Factors

<table>
<thead>
<tr>
<th>Asthma Severity</th>
<th>Normal</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scoring Factors</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>O₂ Saturation (SpO₂)</strong></td>
<td>&gt;98% on RA</td>
<td>95%-97% on RA</td>
<td>90%-94% on RA</td>
<td>&lt;90% on RA OR any O₂</td>
</tr>
<tr>
<td><strong>Auscultation</strong></td>
<td>Normal breath sounds with good aeration throughout</td>
<td>End expiratory wheezes only</td>
<td>Expiratory wheezing</td>
<td>Inspiratory and expiratory wheezing to diminished breath sounds</td>
</tr>
<tr>
<td><strong>Retractions / Accessory muscle use</strong></td>
<td>None</td>
<td>Intercostal and/or mild accessory use</td>
<td>Intercostal &amp; substernal, accessory muscle use</td>
<td>Intercostal, substernal and supraclavicular, accessory muscle use</td>
</tr>
<tr>
<td><strong>Dyspnea (Age appropriate)</strong></td>
<td>Speaks in complete sentences. Coos/babbles without distress</td>
<td>Speaks in short sentences, coos and babbles</td>
<td>Speaks in partial sentences, short cry, head bobbing</td>
<td>Speaks in single words. Short phrases/grunting</td>
</tr>
</tbody>
</table>

0-4 = prn  5-7 = q6h  8-11 = q4h  ≥ 12h = q2h & Physician notified
Light's Criteria for pleural fluid (any of the criteria met = likely an exudate)
- Pleural fluid protein/serum protein ratio > 0.5
- Pleural fluid LDH/serum LDH ratio > 0.6
- Pleural fluid LDH > 2/3 the upper limit of the labs normal serum LDH

Modifications, increased likelihood of exudate
- Cholesterol > 45 mg/dL
- Triglycerides > 110 mg/dL = Chylothorax
- Glucose < 60 mg/dL or pleural/serum < 0.5 → narrows possible types of exudate
  - Ex. rheumatic, parapneumonic effusion/empyema, malignant, TB, Lupus, Esophageal rupture
- pH: normal 7.60, exudate usually 7.30-7.45
- Amylase: possible pancreatic or esophageal etiology

Ranson Criteria (Prognosis in Acute Pancreatitis - Older Children/Adults)

<table>
<thead>
<tr>
<th>Present at 0 hrs</th>
<th>Present at 48 hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt; 55yrs</td>
<td>Hct fall of ≥ 10%</td>
</tr>
<tr>
<td>WBC &gt; 16,000</td>
<td>BUN rise ≥ 5 mg/dl</td>
</tr>
<tr>
<td>Glucose &gt; 200 mg/dl</td>
<td>Ca &lt; 8 mg/dl</td>
</tr>
<tr>
<td>LDH &gt; 350 U/L</td>
<td>pO2 &lt; 60 mmHg</td>
</tr>
<tr>
<td>AST &gt; 250 U/L</td>
<td>Base deficit &gt; 4 meq/L</td>
</tr>
<tr>
<td></td>
<td>Fluid Sequestration &gt; 6L</td>
</tr>
</tbody>
</table>

Mortality:
- 0-2 = 0-3%
- 3-5 = 11-15%
- 6-11 = ≥ 40%

Metabolic Syndrome Criteria (AHA/NHLBI 2005) - Older Children/Adults
- Abdominal Obesity
- Triglycerides ≥ 150 mg/dl
- HDL (male < 40, female < 50) ≥ 3 = Metabolic Syndrome
- SBP ≥ 130 or DBP ≥ 85
- Fasting Glucose ≥ 100 mg/dl
V. DISEASE DIAGNOSTIC CRITERIA

**Kawasaki Disease Criteria**
- Fever ≥ 5 days + 4/5 criteria
- B/l bulbar conjunctival injection
- Oral mucous membrane Δ (injected or fissured lips, pharynx, strawberry tongue)
- Extremity Δ (erythema palms or soles, edema of hands or feet, periungual desquamation)
- Polymorphous rash
- Cervical LAD (at least 1 LN > 1.5cm)

**Incomplete KD**
- Fever ≥ 5 days + at least 2/5 criteria + ≥ 3 lab criteria → Treat and get Echo
- The above with < 3 lab criteria + positive Echo finding → treat

**Lab Criteria**
- CRP ≥ 3.0 mg/dL or ESR ≥ 40 mm/hr
- ALT > 50 U/L
- WBC ≥ 15,000/microL
- Albumin ≤ 3 g/dL
- Normocytic, normochromic anemia
- Platelets ≥ 450k after seven days of illness
- Pyuria (≥ 10 WBC)

**Rheumatic Fever (Jones Criteria)**

<table>
<thead>
<tr>
<th>Major Criteria</th>
<th>Minor Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migratory arthritis (Large Joints)</td>
<td>Arthralgia</td>
</tr>
<tr>
<td>Carditis and valvulitis (eg, pancarditis)</td>
<td>Fever</td>
</tr>
<tr>
<td>Central nervous system involvement (eg, Sydenham chorea)</td>
<td>Elevated ESR, CRP</td>
</tr>
<tr>
<td>Erythema marginatum</td>
<td>Prolonged PR interval</td>
</tr>
<tr>
<td>Subcutaneous nodules</td>
<td></td>
</tr>
</tbody>
</table>

**Presumptive Diagnosis** of ARF:
- Chorea only
- Indolent carditis months after GAS infection
- Presumptive recurrent ARF if only 1 Major OR 2 Minor
Duke Criteria for Endocarditis

Definite Dx:
- Culture of vegetation/abscess OR pathologic evidence
- 2 Major OR 1 Major + 3 Minor OR 5 Minor

Possible Dx: 1 Major + 1 Minor OR 3 Minor

Rejected Dx: Alt Dx, resolution of sx with ≤ 4 days of abx

Major Criteria
- Positive Blood Culture
- Typical Organisms from 2 separate cultures
- Persistently positive Cx (Cx >12h apart OR 3+ positive Cxs over ≥ 1h)
- Coxiella burnetii or +IgG titre
- Endocardial Involvement - positive Echo or new valvular regurg

Minor Criteria
- Predisposition - predisposing heart condition or intravenous drug use
- Fever - 38.0°C (100.4°F)
- Vascular phenomena
- Immunologic phenomena
- Microbiologic evidence

Colic - Wessel Definition (1954) = Rule of 3s
- Crying ≥ 3 hrs/day ≥ 3 days/wk ≥ 3 weeks
- Starts at 2-4 wks old → Peaks at 6-8 wks → Resolves by 4 months

Pyloric Stenosis
- Typically occurs between 3wks - 3mo
- Hypochloremic, hypokalemic metabolic acidosis
- No clear U/S criteria, combination of positive measurements is most sensitive:
  - PMT < 3-4 mm
  - PML < 15-19 mm
  - PD < 10-14 mm

Hypoglycemia: Critical Labs (ask nurse to collect 5-10ml green or purple top)
- Endo: Serum glucose, CMP, Insulin, C-peptide, Beta-hydroxybuterate, cortisol, GH, IGF-1
- Metabolic: Acetylacetate, lactate, ammonia, carnitine, urine organic acid, urine ketones, acylglucose, FFA, urine tox screen
### Corticosteroid Conversion

<table>
<thead>
<tr>
<th>Glucocorticoid Potency</th>
<th>Mineralocorticoid Potency</th>
<th>Biologic Half-life (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortisone</td>
<td>25</td>
<td>0.8</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Prednisone</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Methylprednisolone</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>0.75</td>
<td>25</td>
</tr>
</tbody>
</table>

### Opiate Conversion

<table>
<thead>
<tr>
<th>Opiate</th>
<th>Route</th>
<th>Equivalent Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl</td>
<td>IV</td>
<td>100 mcg</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>Oral</td>
<td>30 mg</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>IV</td>
<td>1.5 mg</td>
</tr>
<tr>
<td>&quot;</td>
<td>Oral</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Meperidine</td>
<td>IV</td>
<td>75 mg</td>
</tr>
<tr>
<td>Morphine</td>
<td>IV</td>
<td>10 mg</td>
</tr>
<tr>
<td>&quot;</td>
<td>Oral</td>
<td>30 mg</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>Oral</td>
<td>20 mg</td>
</tr>
<tr>
<td>Propoxyphene</td>
<td>Oral</td>
<td>150 mg</td>
</tr>
</tbody>
</table>
Gram Negative

Bacilli

Lactose -

V. Cholerae
P. Aeruginosa
P. Mireabilis
H. Pylori
Y. Pesti
Y. Enterolitica
C. Jenuni
S. Dysenteriae
Salmonella
B. Fragilis

Lactose +

Klebsiella
E. Coli
Enterobacter
Serratia

Cocci - Neisseria Spp

N. Meningitidis
N. Gonorrhoea

Cocobacilli

H. Influenzae
B. Pertussis
Brucella
E. Tulariensis
P. Multocida
L. Pneumoniae
### Bronson Healthcare Group
Kalamazoo, Michigan

#### 2015 Antibiotic Activity Summary

**All locations**

**Percent of strains susceptible:**

<table>
<thead>
<tr>
<th>Gram Negative Enteric Bacteria</th>
<th>No. Tested</th>
<th>Unasyn</th>
<th>Zosyn</th>
<th>Aztreonam</th>
<th>Cefazolin</th>
<th>Cefotaxime</th>
<th>Cefepime</th>
<th>Meropenem</th>
<th>Gentamicin</th>
<th>Tobramycin</th>
<th>Amikacin</th>
<th>Levofloxacin</th>
<th>Sulfamethoxazole/Trimethoprim</th>
<th>Nitrofurantoin</th>
<th>Tetracycline</th>
<th>Tigecycline</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Citrobacter freundii</em></td>
<td>299</td>
<td>R</td>
<td>90</td>
<td>88</td>
<td>R</td>
<td>R</td>
<td>85</td>
<td>100</td>
<td>100</td>
<td>96</td>
<td>99</td>
<td>100</td>
<td>93</td>
<td>81</td>
<td>92</td>
<td>84</td>
</tr>
<tr>
<td><em>Citrobacter koseri</em> (diversus)</td>
<td>121</td>
<td>97</td>
<td>99</td>
<td>100</td>
<td>97</td>
<td>92</td>
<td>99</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>93</td>
<td>81</td>
<td>92</td>
<td>83</td>
</tr>
<tr>
<td><em>Enterobacter aerogenes</em></td>
<td>214</td>
<td>R</td>
<td>89</td>
<td>91</td>
<td>R</td>
<td>R</td>
<td>88</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>78</td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td><em>Enterobacter cloacae</em></td>
<td>345</td>
<td>R</td>
<td>84</td>
<td>85</td>
<td>R</td>
<td>R</td>
<td>81</td>
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<td><em>Escherichia coli</em></td>
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<td><em>Klebsiella oxytoca</em></td>
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<td><em>Klebsiella pneumoniae</em></td>
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<td><em>Morganella morganii</em></td>
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<td><em>Proteus vulgaris</em></td>
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<td>96</td>
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<td>100</td>
<td>97</td>
<td>100</td>
<td>97</td>
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<tr>
<td><em>Providencia rettgeri</em></td>
<td>31</td>
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<td><em>Providencia stuartii</em></td>
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<td>100</td>
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<td>R</td>
<td>100</td>
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<td>R</td>
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<tr>
<td><em>Serratia marcescens</em></td>
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<td>96</td>
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<td>R</td>
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<td>100</td>
<td>96</td>
<td>96</td>
<td>R</td>
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</table>

### Gram Negative Non-enteric Bacteria

<table>
<thead>
<tr>
<th>Gram Negative Non-enteric Bacteria</th>
<th>No. Tested</th>
<th>Unasyn</th>
<th>Zosyn</th>
<th>Aztreonam</th>
<th>Cefepime</th>
<th>Meropenem</th>
<th>Gentamicin</th>
<th>Tobramycin</th>
<th>Amikacin</th>
<th>Levofloxacin</th>
<th>Sulfamethoxazole/Trimethoprim</th>
<th>Minocycline</th>
<th>Tetracycline</th>
</tr>
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<tbody>
<tr>
<td><em>Achromobacter xylosoxidans</em></td>
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<td><em>Acinetobacter baumannii</em></td>
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<td><em>Pseudomonas aeruginosa</em></td>
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<td>77</td>
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<td>98</td>
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<td><em>Stenotrophomonas maltophilia</em></td>
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<tr>
<td>Gram Positive Bacteria</td>
<td>No. Tested</td>
<td>Penicillin/ampicillin</td>
<td>Penicillin, meningitis</td>
<td>Oxacillin/nafticlin</td>
<td>Ceftriaxone, non-meningitis</td>
<td>Ceftriaxone, meningitis</td>
<td>Erythromycin</td>
<td>Clindamycin</td>
<td>Gentamicin</td>
<td>Levofloxacin</td>
<td>Sulfquinol/Trimethoprim</td>
<td>Vancomycin</td>
<td>Rifampin*</td>
</tr>
<tr>
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<tr>
<td><em>Staphylococcus aureus</em></td>
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<td>11</td>
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<td><em>Staphylococcus epidermidis</em></td>
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<td><em>Staphylococcus lugdunensis</em></td>
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<td><em>Enterococcus faecalis</em></td>
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<td><em>Enterococcus faecium</em></td>
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<td>46</td>
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<td>98</td>
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<td><em>Streptococcus agalactiae</em></td>
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<td><em>Streptococcus pneumoniae</em></td>
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<td>84</td>
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</table>

* Rifampin should be used only in combination with another agent
** Doxycycline tested against *Streptococcus pneumoniae*

<table>
<thead>
<tr>
<th>Fungi</th>
<th>No. Tested</th>
<th>Caspofungin</th>
<th>Fluconazole</th>
<th>Voriconazole</th>
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<tbody>
<tr>
<td><em>Candida albicans</em></td>
<td>34</td>
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</table>
### VI. COMMONLY USED DRUGS:

#### Antibiotics

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Strength (oral and premade IVPB listed)</th>
<th>Dose</th>
</tr>
</thead>
</table>
| Acyclovir    | Zovirax    | IV: HSV encephalitis: 20mg/kg/dose q8hrs
*see appropriate dosing reference for other indications/routes of administration |      |
| Amoxicillin  | Amoxil     | See amoxicillin/clavulanate (Augmentin) for mg/kg dosing info |      |
| Amoxicillin-Clavulanate | Augmentin | IV to po conversion: see Augmentin |      |
| Ampicillin-Sulbactam | Unasyn | Premade IVPB: 1.5gm & 3gm
100-300mg/kg/day of ampicillin component divided q6h*
400mg/kg/day for severe infection (max 3gm/dose)
*Unasyn=2/3 ampicillin; multiply calculated dose by 1.5 to convert ampicillin dose to Unasyn dose when writing Rx |      |
| Azithromycin | Zithromax  | CAP: Monotherapy: 10mg/kg/day x 5 days (max 500mg)
Combo tx w/ Rocephin: 10mg/kg on day 1 (max 500mg), then 5mg/kg/day (max 250mg) x 4 days
Pertussis: <6 mo: 10mg/kg/day x 5 days
≥ 6 mo: 10mg/kg on day 1 (max 500mg), then 5mg/kg/day (max 250mg)x 4 days |      |
| Cefdinir     | Omnicef    | 14mg/kg/day once daily or divided BID (BID preferred for CAP)(max 600mg/day) |      |
| Ceftriaxone  | Rocephin   | UTI: 50mg/kg daily (max 1gm/day)
Pneumonia: 75mg/kg daily (max 1gm/day)
Meningitis: 100mg/kg/day divided q12h (max 2gm/dose) |      |
| Cefuroxime   | Ceftin     | po: 15mg/kg/dose q12h (max 1gm/day)
IV: 75-150mg/kg/day divided q8h (max 6gm/day) |      |
<table>
<thead>
<tr>
<th>Medicine</th>
<th>Brand</th>
<th>Susp (Premade IVPB)</th>
<th>Capsule</th>
<th>Premade IVPB</th>
<th>po</th>
<th>IV</th>
<th>Gram + synergy and endocarditis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin</td>
<td>Cleocin</td>
<td>75mg / 5ml</td>
<td>150mg &amp;</td>
<td>300mg</td>
<td>20-30mg/kg/day divided q8h (max 1.8gm/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IV: 20-40mg/kg/day divided q6 or 8hrs (max 900mg/dose)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td></td>
<td>80mg, 100mg, &amp; 120mg</td>
<td></td>
<td></td>
<td>Gram negative coverage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extended interval: 7.5mg/kg once daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Traditional: 2.5-3mg/kg/dose q8hrs</td>
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<tr>
<td>Nafcillin</td>
<td></td>
<td>1gm &amp; 2gm</td>
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<td>UTI/Cellulitis (non-MRSA) 6-12mg/kg/day divided BID of TMP component</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>MRSA 15mg/kg/day divided BID of TMP component</td>
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<tr>
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<td></td>
<td></td>
<td>Pneumonia 20mg/kg/day divided BID of TMP component</td>
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<tr>
<td>Sulfamethoxazole-</td>
<td>Bactrim or</td>
<td>200 – 40mg / 5ml</td>
<td>400 – 80mg (SS)</td>
<td>800 – 160mg (DS)</td>
<td>UTI/Cellulitis (non-MRSA) 6-12mg/kg/day divided BID of TMP component</td>
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<tr>
<td>trimethoprim (SMX-TMP)</td>
<td>Septra</td>
<td>tablets: 400 – 80mg</td>
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<td>MRSA 15mg/kg/day divided BID of TMP component</td>
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<td></td>
<td>Pneumonia 20mg/kg/day divided BID of TMP component</td>
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<tr>
<td>Tobramycin</td>
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<td></td>
<td>Same dosing as gentamicin</td>
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<td></td>
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<tr>
<td>Vancomycin</td>
<td></td>
<td>1gm</td>
<td></td>
<td>Liquid for oral use: 100mg / ml</td>
<td>IV: 15mg/kg/dose q 6 hrs (max 2gm/dose)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Oral (for pseudomembranous colitis only): 10mg/kg/dose every 6hrs (max 500mg/dose)</td>
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<td></td>
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<tr>
<td>GI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UTI/Cellulitis (non-MRSA) 6-12mg/kg/day divided BID of TMP component</td>
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</table>

### GI Drugs

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Brand</th>
<th>Strength (only oral listed)</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esomeprazole</td>
<td>Nexium</td>
<td>Tablet: 20mg (use lansoprazole for oral susp PPI)</td>
<td>1mg/kg/dose daily or BID (max 40mg/day)</td>
</tr>
<tr>
<td>Famotidine</td>
<td>Pepcid</td>
<td>po: 8mg / ml</td>
<td>Neonates (or &lt; 3 months old): 0.5mg/kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Peds: 1mg/kg/day divided BID (max 80mg/day)</td>
</tr>
<tr>
<td>Lansoprazole</td>
<td>Prevacid</td>
<td>po: 3mg / ml (use esomeprazole for IV or tablet PPI)</td>
<td>1mg/kg/dose daily or BID (max 60mg/day)</td>
</tr>
<tr>
<td>Metoclopramide</td>
<td>Reglan</td>
<td>po: 1mg / ml</td>
<td>0.1-0.2 mg/kg/dose 4 x daily 30min prior to feeds</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>Zofran</td>
<td>po: 4mg / 5ml Tablet: 4mg, 8mg ODT: 4mg</td>
<td>General nausea/vomiting: 0.1mg/kg/dose every 6 hrs prn (max 4 mg/dose)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chemotherapy-induced (high-dose): 0.15mg/kg/dose every 6 hrs prn (max 8 mg/dose)</td>
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</table>
### Pain

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Strength</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>Tylenol</td>
<td>po: 100mg / ml (infant drops) 650mg / 20.3ml (adult susp) 80mg chew tablets 325mg or 500mg tablets PR: 80mg, 120mg, 325mg, 650mg (may be cut in ½)</td>
<td>10-15mg/kg/dose every 4 hrs prn (max 80mg/kg/day all sources) (max 1gm/dose or 4gm/day)</td>
</tr>
<tr>
<td>acetaminophen w/ codeine</td>
<td>Tylenol w/ codeine</td>
<td>po: 120 – 12mg / 5ml elixir 300 – 30mg tablet</td>
<td>0.5-1mg/kg/dose of codeine component every 6 hrs prn</td>
</tr>
<tr>
<td>hydrocodone+ acetaminophen</td>
<td>Lortab or Norco</td>
<td>Lortab susp: 7.5 – 500mg / 5ml Norco tablet: 5/325mg, 7.5/325mg, 10/325mg</td>
<td>0.12 mg/kg/dose of hydrocodone component every 6-8 hrs prn</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>Motrin</td>
<td>susp: 100mg / 5ml tablets: 200mg, 400mg, 800mg</td>
<td>10mg/kg/dose every 6 hrs prn (max 800mg/dose or 3.2gm/day)</td>
</tr>
<tr>
<td>Morphine</td>
<td></td>
<td></td>
<td><strong>IV:</strong> 0.05-0.1mg/kg/dose every 2 hrs prn</td>
</tr>
</tbody>
</table>

### Steroids

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Strength</th>
<th>Dose</th>
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</thead>
<tbody>
<tr>
<td>methylprednisolone</td>
<td>Solu-Medrol</td>
<td>IV: 40mg and 125mg vials</td>
<td><strong>Asthma/pneumonia:</strong> IV: 1mg/kg/dose given q6-12 hrs based on severity of symptoms (max 60mg/dose)</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>Orapred</td>
<td>Syrup: 15mg / 5ml</td>
<td>Same dosing as methylprednisolone</td>
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<tr>
<td>Prednisone</td>
<td></td>
<td>Tablets: 1mg, 2.5mg, 5mg, 10mg, 20mg, &amp; 50mg</td>
<td>Same dosing as methylprednisolone</td>
</tr>
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</table>
How to calculate the appropriate individualized dose

The following table provides acceptable weight ranges for each dose and age category, such that patients will receive the maximum beneficial effect—between 90% and 180% of the calculated recommended dose. The safety of this strategy has been established in clinical trials.

<table>
<thead>
<tr>
<th>2 to 5 years</th>
<th>0.5 mg/kg</th>
<th>6 to 11 years</th>
<th>0.3 mg/kg</th>
<th>12+ years</th>
<th>0.2 mg/kg</th>
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<tbody>
<tr>
<td>Weight (kg)</td>
<td>Dose (mg)</td>
<td>Weight (kg)</td>
<td>Dose (mg)</td>
<td>Weight (kg)</td>
<td>Dose (mg)</td>
</tr>
<tr>
<td>6 to 10</td>
<td>5</td>
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<td>5</td>
<td>14 to 25</td>
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<tr>
<td>11 to 15</td>
<td>7.5</td>
<td>17 to 25</td>
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<td>26 to 37</td>
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<td>38 to 50</td>
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<tr>
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<td>12.5</td>
<td>34 to 41</td>
<td>12.5</td>
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<td>26 to 30</td>
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<td>42 to 50</td>
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<td>63 to 75</td>
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<td>31 to 35</td>
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<td>51 to 58</td>
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<td>36 to 44</td>
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<td>59 to 74</td>
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<td>88 to 111</td>
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# Bristol Stool Scale

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<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Type 1</td>
<td>Separate hard lumps, like nuts (hard to pass)</td>
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<tr>
<td>Type 2</td>
<td>Sausage-shaped but lumpy</td>
</tr>
<tr>
<td>Type 3</td>
<td>Like a sausage but with cracks on its surface</td>
</tr>
<tr>
<td>Type 4</td>
<td>Like a sausage or snake, smooth and soft</td>
</tr>
<tr>
<td>Type 5</td>
<td>Soft blobs with clear-cut edges (passed easily)</td>
</tr>
<tr>
<td>Type 6</td>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>Type 7</td>
<td>Watery, no solid pieces. Entirely liquid</td>
</tr>
<tr>
<td>I</td>
<td>Illness Severity</td>
</tr>
<tr>
<td>---</td>
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<tr>
<td>P</td>
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<tr>
<td>A</td>
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<tr>
<td>S</td>
<td>Situation</td>
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<tr>
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<td>Awareness and</td>
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<td>Planning</td>
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<td>Synthesis by</td>
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## Duty Hours

### Logging Hours

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<tr>
<th>On OUTPATIENT Rotation</th>
<th>On INPATIENT Rotation</th>
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<tr>
<td><em>(Clinic, DB, Acute Ill, Adol Med, Elective)</em></td>
<td><em>(Peds Floor, PICU, NICU, TN)</em></td>
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<tr>
<td>Intern</td>
<td>Intern</td>
</tr>
<tr>
<td>Day = Patient Care Outpatient</td>
<td>Day = Patient Care Inpatient</td>
</tr>
<tr>
<td>Night = Night Float</td>
<td>Night = Night Shift</td>
</tr>
<tr>
<td>Senior</td>
<td>Senior</td>
</tr>
<tr>
<td>Day = Patient Care Outpatient</td>
<td>Day = Patient Care Inpatient</td>
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<tr>
<td>Night: Did you work during the day?</td>
<td>Night: Did you work during the day?</td>
</tr>
<tr>
<td>Yes = Night Call</td>
<td>Yes = Night Call</td>
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<tr>
<td>No = Night Float</td>
<td>No = Night Shift</td>
</tr>
<tr>
<td>Wknd 24h call. All 24h = Night Call</td>
<td>Wknd 24h call. All 24h = Night Call</td>
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</table>

**Post Call** = 4 hours of transition of care time after a 24h call

**Backup and/or TN Home Call**

Home Call - Called into Hosp/Called to EMS scene

Home Call - Not Called into Hospital

**Etc**

Shift - ED = ER shifts

Vacation

Conference / No Patient Care = For Grand Rounds/Lectures OR Conference

### The Rules

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<thead>
<tr>
<th>Everyone</th>
<th>Interns</th>
<th>Seniors</th>
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<tr>
<td>At least 10 hrs off b/t shifts</td>
<td>Max 16 Hours</td>
<td>Max 24 Hours</td>
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<tr>
<td>Max 6 nights in a row</td>
<td></td>
<td>12 hrs off after 20-24h shift</td>
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<tr>
<td>Max 12 shifts in a row</td>
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<td>14 hrs off after 24h shift</td>
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<tr>
<td>1 day off in 7 (averaged)</td>
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<td>Start at 1pm the first day of</td>
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<tr>
<td>Must be available 21 days of rotation</td>
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<td>2 consecutive night shifts</td>
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<td>Post call day ≠ day off count</td>
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<td>Home Call → <strong>DO NOT</strong> need a block of 10h away from hospital</td>
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<tr>
<td>Floor #s</td>
<td>Departments</td>
<td>Attendings</td>
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<td>------------------------------------------</td>
<td>-------------------------------------------------</td>
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<td>Peds IP Senior: 6015</td>
<td>Lab: 6440</td>
<td>Nursery (DeTolve): 269-743-8535</td>
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<tr>
<td>Peds Heme/Onc: 7311</td>
<td>Micro: 7866</td>
<td>Nursery (Ertl): 860-205-1385</td>
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<td>Peds Floor: 6395</td>
<td>Virology: 6314</td>
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<tr>
<td>PICU: 8962</td>
<td>Radiology: 6380</td>
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<td>Peds Sedation: 6823</td>
<td>CT: 6239</td>
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<td>RT: 7114</td>
<td>MRI: 7524</td>
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<td>EMU: 7766</td>
<td>Ultrasound: 8380</td>
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<td>Nursery: 6498</td>
<td>Nuc Med: 7994</td>
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<td>Nursery Charge RN: 6192</td>
<td>Interventional (IR): 6380</td>
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<td>SCN Nursery: 6173</td>
<td>Pharmacy: 7962</td>
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<td>L&amp;D: 6433</td>
<td>Peds Pharmacy: 7977</td>
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<td>Lactation: 8849</td>
<td>Pathology: 8997</td>
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<td>NICU: 6475</td>
<td>Med Records: 6487</td>
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<td>NICU Resident: 6542</td>
<td>IT: 6330</td>
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<td>NICU NP (nights): 7001</td>
<td>Library Access: 6318#</td>
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<tr>
<td>Obs RN: 6174</td>
<td>Library Copier: 15505#</td>
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<td>ER: 6386, 6690</td>
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**Poison Control:** 1-800-122-1222

**Kalamazoo Health Department:**
- Main: (269) 373-5200
- ID: (269) 373-5265
- Patient Line: (269) 373-5267
<table>
<thead>
<tr>
<th>Staff</th>
<th>Departments</th>
<th>Faculty</th>
</tr>
</thead>
</table>
| Allison: 6453  
Joyce: 6450  
Jody: 4429  
Fax: 337-6474  
Tammy (Med-Peds): 6353 | Peds Clinic: 6400  
Peds Clinic Fax: 6434  
(Code = 4823)  
Pulm Clinic: 6433  
Med-Peds Clinic: 6345  
Ortho Clinic: 6200 | Peds Faculty  
Fakhoury: 6472(T) 232-4667(P)  
Gibson: 6464(T) 232-3144(P)  
Patel: 6395(T) 232-5204(P)  
Woodhams: 6459(T) 232-5208(P)  
Vanderkooy: 6458(T) |
| Clinic RN Desk: 6411  
HOT Doc: 6401/6402 | Lab: 4480  
Radiology: 6232  
(Optimed) Pharmacy: 6330  
Medical Records: 4477  
Managed Care: 6383, 6444  
IT (Help Desk): 4409 | Med/Peds Faculty  
D’Ambrosio: 6461(T) 232-5177(P)  
Melgar: 4498(T) 232-5305(P) |
| Marlene Pryson: 6437  
Dorthy Bennett: 6313  
Polly Harris (RT): 6442 | SW: 6461 (232-5177) | Peds Psychology  
Apple: 6339(T) |

CODE: dial 77, then 0 → Overhead pages → say "Code 0, Peds, Room #"

**Pediatric Print Code: 4858**  
**Pediatric Clinic Print Code: 4823**

**Mommy Pager: 269.232.4754**  
Transfer → Call Service @ 269-382-8528  
Document call in eCW as an “After Hours” Telephone Encounter.  
***Assign to the WMed On-Call Physician. Do NOT address encounter.***  
Always feel free to call back-up for support.
<table>
<thead>
<tr>
<th>Area Pediatric Clinics</th>
<th>Bronson Lakeview Family Care (Paw Paw)</th>
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</thead>
<tbody>
<tr>
<td><strong>Bright Futures Pediatrics</strong> (Kalamazoo)</td>
<td>269.372.3700</td>
</tr>
<tr>
<td>Drs: Carey, Hicks-Fox, Hilleren</td>
<td>Drs: Cartmill, Huggett, Kavanaugh, Miller, Roberson, Pung, Roth-Bowersock</td>
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<tr>
<td>PNP: Karnes</td>
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</tr>
<tr>
<td><strong>Rambling Road Pediatrics</strong> (Oshtemo)</td>
<td>269.372.1000</td>
</tr>
<tr>
<td>Drs: Dodson-Hunt, Dyk, Gaggino, Nagler,</td>
<td>Drs: Ehlke-Bejcek, Elias, Harden, Sikkema, Goodwin</td>
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<tr>
<td>Reddy, Lister, Dodich</td>
<td></td>
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<tr>
<td>PNP/NP: Fifelski, Jepsen</td>
<td>NP/PNP: Harig, Schira, DeMorrow</td>
</tr>
<tr>
<td><strong>Pediatrics PC</strong> (Portage)</td>
<td>269.327.1900</td>
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<tr>
<td>Drs: Blazek, Lemmen, Ohmart, Wiederhold</td>
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<tr>
<td>PNP: Sheehan</td>
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</tr>
<tr>
<td><strong>Trestlewood Pediatrics</strong> (Portage)</td>
<td>269.381.0118</td>
</tr>
<tr>
<td>Office - 269.381.0118</td>
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<tr>
<td>On-call Cell - 269.998.0554</td>
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<tr>
<td>Drs. Lampart, Page, Somers, Van-Es, Brown</td>
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<tr>
<td><strong>Children’s Medicine, PC</strong> (Portage)</td>
<td>269.345.8665</td>
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<tr>
<td>Dr. Ensfield, NP-Marilyn Timmer</td>
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<tr>
<td><strong>ProMed Pediatrics</strong></td>
<td>269.329.0944</td>
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<tr>
<td>Portage - 269.329.0944</td>
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<tr>
<td>Richland - 269.552.2500</td>
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<tr>
<td>On-call pager - 269-513-2379</td>
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<tr>
<td>Drs. Baumgarten, Diehl, Garrison, Lassila, Maira, Patel, Rahman, Segedy, Simpson, Sood-McMillen, Spitzer, Pelc, Akland</td>
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<tr>
<td><strong>Family Health Center</strong> (Kalamazoo)</td>
<td>269.349.2641 - Main</td>
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<tr>
<td>269.488.0814 - Scheduling (Paterson)</td>
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<tr>
<td>269.349.3505 - Scheduling (Portage)</td>
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<td>Borgess Lee (Dowagiac)</td>
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<td>Borgess Pipp (Plainwell)</td>
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<td>Lakeland (Niles)</td>
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<td>Lakeland (St Joseph)</td>
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<tr>
<th>Pediatric #s</th>
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<th>Cell Phone</th>
<th>PGY2</th>
<th>Pager (232-*)</th>
<th>Cell Phone</th>
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<tbody>
<tr>
<td>Jasmine Alsukhon</td>
<td>248.346.2945</td>
<td>408.858.6521</td>
<td>Karim Elghawy</td>
<td>0871</td>
<td>810.407.1530</td>
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<tr>
<td>Preeti Borgohain</td>
<td>616.648.4239</td>
<td>248.990.0816</td>
<td>Anna Jain</td>
<td>0867</td>
<td>248.679.6949</td>
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<tr>
<td>Cailly Jo Howell</td>
<td>571.294.3669</td>
<td>248.217.7090</td>
<td>Muki Kadochi</td>
<td>0866</td>
<td>269.267.0477</td>
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<tr>
<td>Sabrina Huq</td>
<td>201.486.2565</td>
<td>507.272.8023</td>
<td>Rasha Kazi</td>
<td>0880</td>
<td>818.294.0703</td>
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<td>Skye Lu</td>
<td>248.346.2945</td>
<td>408.858.6521</td>
<td>Garrett Koon</td>
<td>0896</td>
<td>573.355.2928</td>
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<tr>
<td>Alexander Mast</td>
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<td>248.990.0816</td>
<td>Paul Meiners</td>
<td>0886</td>
<td>801.369.8389</td>
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<tr>
<td>Sharmeen Samuel</td>
<td>571.294.3669</td>
<td>248.217.7090</td>
<td>Scottie Paitl</td>
<td>0877</td>
<td>715.292.4426</td>
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<tr>
<td>Kaite Udenberg</td>
<td>201.486.2565</td>
<td>507.272.8023</td>
<td>Christopher Schmehil</td>
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<td>Meveshni Govender</td>
<td>4954</td>
<td>801.833.9657</td>
</tr>
<tr>
<td>Manasa Josyula</td>
<td>1470</td>
<td>269.251.2729</td>
</tr>
<tr>
<td>Yamini Kuchipudi</td>
<td>1316</td>
<td>248.978.3296</td>
</tr>
<tr>
<td>Devika Malhotra</td>
<td>4553</td>
<td>480.329.8796</td>
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<tr>
<td>Anju Patel</td>
<td>2017</td>
<td>618.593.8214</td>
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<tr>
<td>Swati Patel</td>
<td>4955</td>
<td>815.944.0001</td>
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<tr>
<td>Michael Schmalz</td>
<td>0973</td>
<td>269.251.5298</td>
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<tr>
<td>Alissa Welsh</td>
<td>0978</td>
<td>319.423.4282</td>
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<td>Med / Peds #s</td>
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<tr>
<td>Interns</td>
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<tr>
<td>Rose Archemetre</td>
<td>502.693.3556</td>
<td>716.440.5413</td>
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<tr>
<td>Rose Archemetre</td>
<td>716.440.5413</td>
<td>617.877.2807</td>
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<tr>
<td>Rose Archemetre</td>
<td>320.469.2606</td>
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<tr>
<td>Cayleigh Blumrick</td>
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<td>716.440.5413</td>
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<td>Zahn Rich</td>
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<td>Rheanne Zimmerman</td>
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<td>PGY2</td>
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<tr>
<td>Emily Cordes</td>
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<tr>
<td>Claire Liepmann</td>
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<tr>
<td>Jason Lam</td>
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<tr>
<td>Matthew Siuba</td>
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</tbody>
</table>

**eCW ACCESS**

From Bronson:  
Inside Bronson > Physician > WMed Applications > WMed Electronic Med Rec  
OR  
[https://10.100.0.200](https://10.100.0.200)  
Accept/Allow any security prompts, login with WMed credentials

From Home:  [HTTPS://SSLVPN.MED.WMICH.EDU](https://SSLVPN.MED.WMICH.EDU) - Accept/Allow any security prompts & login with WMed Network credentials. Once at the bookmark screen, click Start button next to Junos Pulse

In a new window or tab ➔ [https://broker1.wmed.localnet](https://broker1.wmed.localnet) ➔ Login with WMed network, download leostream.rdp ➔ Login with WMed credentials ➔ eCW on desktop or under Start Menu
