

## **Assessment of FETAL WELL-BEING**

### **Non Stress Test (NST)**

The NST has a low specificity making it the most unreliable test of fetal well-being. It measures fetal movement and heart rate activity, indirectly measuring autonomic nervous system activity. If the NST is non-reactive, do BPP or CST next.

### **Biophysical Profile (BPP)**

This is a NST with an ultrasound to detect amniotic fluid volume, fetal movement, fetal tone and fetal breathing. A BPP of 8-10 is normal, reassure concerned parents next. A BPP of 4-6 indicates fetal compromise and a score of 0-2 predicts high perinatal mortality.

### **Contraction Stress Test (CST)**

The CST measures fetal tolerance of labor. Accelerations with contractions are reassuring. Early decelerations indicate fetal head compression, variable decelerations indicate fetal cord compression and late decelerations indicate uteroplacental insufficiency.

## **ANTENATAL testing**

### **First trimester screen**

Usually done between 11 and 13 weeks. Increased nuchal fold thickness greater than 6 mm is suggestive of Down syndrome. The detection rate for trisomy with a positive first trimester screen is between 72-75 percent. The detection rate for Turner's syndrome with a positive first trimester screen is about 85 percent. Chorionic Villus Sampling is indicated next for a positive first trimester screen.

### **Second trimester screen**

Usually done between 15 and 22 weeks. A low AFP is seen with Down syndrome and Edwards syndrome. The detection rate for Down syndrome with a positive triple or quad screen is between 75-80 percent. An amniocentesis is indicated next for a positive second trimester screen.

### **Amniocentesis versus Chorionic Villus Sampling (CVS)**

Early amniocentesis is associated with a high rate of fetal loss. CVS can cause fetal loss too but it also causes limb abnormalities. Genetic counseling is indicated at anytime for any abnormal screen, amniocentesis or CVS.

Amniocentesis and CVS have higher detection rates for trisomy than positive first or second trimester screens.

## Antenatal ULTRASOUND

Finding	Significance for the boards
Crown Rump Length Done at 8-12 weeks	Most accurate assessment of gestational age to within 4-7 days
Choroid Plexus Cyst Done <24weeks	Do nothing next
Echogenic Intracardiac focus	Associate with Down syndrome
Echogenic Bowel	With normal physical examination, do nothing next. <b>Associate with aneuploidy</b>
Enlargement or asymmetry of cerebral ventricles	Do cranial USS after delivery
Single umbilical artery	Associate with Low birth weight, cardiac and Renal anomaly. <b>No association with aneuploidy</b>
Hydronephrosis >4mm in 2 <sup>nd</sup> trimester or >7mm in 3 <sup>rd</sup> trimester	Get a renal USS after delivery. Do a VCUG next even if renal USS is normal.

### Oligohydramnios

**Oligogenitourinaminios** helps you remember genitourinary causes such as Potters Syndrome, bladder outlet obstruction and polycystic kidney disease. Rupture of membrane is the most common cause.

### Polyhydramnios

**PolyGUTneuramnios** helps you remember gastrointestinal and neurologic causes such as anencephaly, neural tube defects, duodenal atresia. Other causes are multiple-gestation, gestational DM and non-immune hydrops fetalis.

## **Postnatal Ultrasound**

At risk for Intraventricular hemorrhage are newborns <32 weeks and infants <1500grams. Seizures on day 2 or 3, apnea, hydrocephalus, low blood pressure are possible IVH presentations in a newborn at risk. The most likely complication of grade 3 or 4 IVH is hydrocephalus. If bilateral periventricular echodensities or cysts with ventricular dilation are described as the head ultrasound findings on the boards, periventricular leukomalacia (PVL) will be the most likely diagnosis. Patients with PVL are prone to spastic diplegia, cognitive deficit and visual deficits.

## **SGA versus LGA**

### **Small for Gestational Age /IUGR**

SGA is defined as weight for gestational age <10<sup>th</sup> percentile. SGA ≠ IUGR. While most IUGR infants will be SGA, not all SGAs will have IUGR. If IUGR is symmetric (head circumference, length and weight below the 10 percentile), a first trimester insult (chromosomal anomaly or TORCH) will be the most likely cause. **Symmetric IUGR infants do not catch up in growth typically.** If asymmetric (weight disproportionately below the 10th percentile compared to head circumference and length), a 3rd trimester insult (placental insufficiency or maternal malnutrition) will be the most likely cause. **Asymmetric IUGRs catch up in growth.**

### **Large for Gestational Age**

Defined as weight for GA >90<sup>th</sup> percentile. Associate with Infant of diabetic moms, Beckwith-Wiedemann syndrome, brachial plexus injury, shoulder dystocia, and hypoglycemia. Hypoglycemia in an infant of diabetic mom is usually due to hyperinsulinemia.

## **APNEAS**

### **Primary Apnea**

This is seen in the immediate post delivery period. It usually responds to **stimulation & suction next.**

### **Secondary Apnea**

This is assumed if no breathing in response to stimulation & suction or if heart rate drops to less than 100 bpm after the first thirty seconds of life. **Positive pressure ventilation is indicated next.**

### **Apnea of prematurity (AOP)**

Defined as respiratory pause (for at least 20 seconds) associated with bradycardia or color change. If vignette describes a newborn with respiratory pause for 3-10 seconds followed by rapid respirations, periodic breathing will be the most likely diagnosis. AOP is usually due to immature brain stem (central) or mal-positioned neck (obstructive). It is important to rule out sepsis and severe anemia in your search for a cause. Know the management sequence if AOP persists in the absence of infection or severe anemia! Reposition head first→ tactile stimulation next→ medication with caffeine citrate or begin high flow nasal canula→ nasal CPAP→then mechanical ventilation if apnea persists despite all of the above. **No evidence to support benefits from home monitors.**

## **Newborn RAAASHES**

### **Erythema Toxicum Neonatorum**

Rash is **not present at birth**. They are typically described as red macules with papules or vesicles in its center. A wright stain will reveal eosinophils. No treatment is necessary.

### **Transient Neonatal Pustular Melanosis**

Rash is **present at birth**. They are typically described as pustules, scaly rash or hyperpigmented macules. The scaly rash and hyperpigmented macules may last up to three months. A gram or wright stain will show PMNs. No treatment is necessary.

### **Milia**

Present at birth. They are typically described as white tiny confluent papules on the nose. Yellow papules on the nose are consistent with sebaceous gland hyperplasia and not milia. No treatment is necessary for milia.

### **Hemangiomas**

They usually get worse between 6 & 12 months and then they involute and start to get better. Hemangiomas are worrisome and may require steroids if midline on the back (get MRI next), if found above the neck (Know specific sites) and if multiple or if ulcerated. Hemangioma with thrombocytopenia equals Kasabach Merritt syndrome on the boards.

## Newborn PHYSICAL Examination

Finding	Most likely cause	Most appropriate next step
Plethora	Polycythemia, overheating or overoxygenation	Heel stick or venous hematocrit. Adjust temps or oxygen if indicated
Acrocyanosis	Cool temperature	Place under radiant warmer
Vaginal skin or hymenal tag	Normal variant	Reassurance
Isolated Bilateral ankle clonus	Normal variant	Reassurance
Vaginal discharge or bleed	Normal variant	Reassurance
Disconjugate gaze	Normal variant	Reassurance
Brush field spot	Down syndrome	Chromosomal analysis
Wide anterior fontanelle	Hypothyroidism, Osteogenesis Imperfecta and hypophosphatasia	Thyroid Stimulating Hormone assay
White reflex	Cataract, retinoblastoma	Refer to ophthalmology
Macroglossia	Beckwith-wiedemann syndrome (BWS), folate deficiency or Pompe's disease	CBCD if no stigmata of BWS
Polydactyly	Multifactorial Fifth digit polydactyly (post-axial) is more common in blacks.  Thumb polydactyly (pre-axial) is more common in whites but less common than pre-axial.	For post-axial, x-ray the extra digit and If no bone, tie off next. <b>Surgery is required next if bone is present on x-ray.</b>  Pre-axial polydactyly requires further evaluation and investigation starting with the heart. (echocardiogram)
Caput/Molding	Birth process	Reassurance
Cephalhematoma	Subperiosteal hemorrhage	Reassurance. May be bilateral

## **TRAUMATIC birth issues**

### **ERBS palsy**

Adduction and internal rotation of arm with pronation of the forearm (waiters tip) are typically described. **They can grasp**. Associate with phrenic nerve injury or diaphragmatic paralysis. An infant with thoracic breathing with no abdominal bulge when described is suggestive of diaphragmatic paralysis.

### **Klumpkes palsy**

The hands are clawed or flaccid. **They cannot grasp**. Associate with ipsilateral Horner's syndrome (ptosis, meiosis & enolpthamos).

### **Clavicle Fracture**

A newborn with localized crepitus with or without obvious clavicular deformity may be described. Absent Moro reflex in an infant less than 4 months old is suggestive. Treat with gentle handling and immobilization x 8-10 days.

### **Subcutaneous Fat Necrosis**

They are described as **firm nodules and plaques**. They appear following traumatic delivery on days 6-10. The concern is hypercalcemia. Lesion softens at around 2 months and regresses afterwards.

### **Facial Nerve Palsy**

Following traumatic delivery requires no treatment but reassurance. Usually self resolves in weeks to months.

## Subarachnoid Hemorrhage (SAH)

A history of vacuum extraction is a risk factor. **Head CT is diagnostic** and should be done before a lumbar puncture. Watchful waiting with serial head circumference measurements is the best initial treatment for a newborn with SAH. In subgaleal hemorrhage, bleeding extends to neck and may push ears.

## Torticollis

An immobile mass in the mid-portion of the SCM with a head tilt towards the involved side is suggestive. Treat with stretching and range of motion exercise.

### Maternal ISSUES and the Newborn

Mom with	Presentation in baby	Salient point for the boards
SLE	Bradycardia, skin rash, thrombocytopenia or jaundice	EKG next
Hypothyroidism	Doesn't affect the baby	Do nothing next if asymptomatic
Hyperthyroidism	Thyrotoxicosis with tachycardia or goiter	Usually self limiting but treat if symptomatic
Hypertension & Renal insufficiency	IUGR	Associate creatinine level > 1.6 with increased perinatal mortality
Gestational DM	H4: Hypoglycemia, Hypocalcemia, High hematocrit, Hyaline membrane disease.	Correlate with history to know what next
HIV	Asymptomatic	HIV PCR is diagnostic in babies less than 18 months
Malnutrition	IUGR, SGA & mineral deficiencies	Replace deficient mineral
Multiple sclerosis	Usually asymptomatic but may present with sepsis if the mom had UTI	Prednisone is safe in pregnancy but azathioprine isn't (causes thymic hypoplasia)
Exposure to tocolytic	Hypoglycemia	Treat with D10W

## **Respiratory DISTRESS in the Newborn**

### **Respiratory Distress Syndrome (RDS)**

Males, Infants of diabetic mom and second born twin are at risk. Chest x-ray may reveal a reticulogranular pattern, ground glass appearance, air bronchogram or a complete white-out. Positive pressure ventilation, mechanical ventilation and surfactant therapy are usually required for management. Note that **surfactant decreases oxygen requirement, decreases inspiratory pressure and increases lung compliance**. Start empiric ampicillin and gentamycin once airway is stabilized and labs drawn.

### **Transient Tachypnea of the Newborn**

The risk of TTN is increased with cesarean sections, in males, in infants of diabetic and asthmatic moms. A chest x-ray may reveal fluid in intralobular fissures, hyperinflation, cardiomegaly and increase perihilar streaking.

Treatment is usually with supplemental oxygen but some may require positive pressure ventilation.

### **Meconium Aspiration Syndrome**

This is your non vigorous post date baby. You will not be told that the amniotic fluid is meconium stained but it would be implied (fetal distress iutero). A chest x-ray shows hyperinflation with patchy atelectasis/infiltrates. Intubate and suction trachea next if newborn is not vigorous.

### **Congenital Diaphragmatic Hernia**

Respiratory distress in a **newborn with scaphoid abdomen** is a clue. Herniation is usually into the left thoracic cavity with mediastinal shift to the

right seen on chest x-ray. Chest x-ray will reveal a nasogastric curving into the left thoracic cavity. In the delivery room, **decompress stomach with orogastric tube first and intubate next**. Most of these newborns require surgery. Mortality is high. Transfer to a center with extracorporeal membrane oxygenation (ECMO).

## **Heart Disease causing respiratory distress**

A hyperoxia test is the best initial step in evaluating cardiovascular cause of respiratory distress in a newborn. Give prostaglandin E1 next if hyperoxia test is positive for heart disease. See cardiology for ductal dependent lesions requiring prostaglandins.

## **Air leak Syndromes (ALS)**

Two high yield conditions for the boards are Pneumothorax and Pulmonary Interstitial Emphysema. The buzz phrase for an ALS is **sudden deterioration** in the condition of a newborn on mechanical ventilation or receiving positive pressure ventilation. A chest x-ray is diagnostic and should be done next even when done previously. If pneumothorax becomes a tension pneumothorax (worsening respiratory distress with chest x-ray confirming displaced mediastinum), immediate decompression with needle thoracostomy and chest tube is required next.

In PIE, chest x-ray reveals linear or cystic radiolucencies. Best initial step in management is lateral decubitus positioning. Adjust vent pressures next (e.g. decrease mean airway pressure). Patients unresponsive to position change and pressure adjustments may require High Flow Oscillatory Ventilation next. HFOV decreases barotraumas.

## **Choanal Atresia (CA)**

The resulting respiratory distress in CA is from partial or total obstruction. This newborn turns **blue when fed and pink when crying**. Inability to pass a catheter through the nasopharynx is suggestive. A **head CT is diagnostic**. Associate with CHARGE (see genetics). Surgery is indicated next once diagnosed but maintain the airway with an oral airway first.

## **Pierre Robin Syndrome**

The airway obstruction is caused by posterior displacement of the tongue. Mandibular hypoplasia and cleft palate are consistent findings. Placing infant prone is the best initial step in management. Insert nasopharyngeal tube next after prone positioning.

## **Pulmonary Hypoplasia (PH) versus Congenital Cystic Adenomatoid Malformation (CCAM)**

They both may cause respiratory distress in the newborn. Associate PH with oligohydramnios and small lungs. Associate CCAM with polyhydramnios and depressed diaphragm on the affected side. Get a chest x-ray next. PH x-ray may reveal homogenous density on the involved side with mediastinal shift to the involved side. CCAM x-ray may reveal cystic air spaces in the involved lung and a mediastinal shift away from the involved side.

## **Umbilical CORD issues**

### **Delayed separation of cord**

Leukocyte Adhesion Deficiency (LAD) will be the most likely etiology on the boards. LAD babies are prone to recurrent bacterial infections, poor wound healing and

severe periodontal disease. Their **WBC is usually high (>20k)**. Diagnosis requires looking for adhesion markers on lymphocytes by flow cytometry.

### **Urachal abnormalities**

May also cause delayed separation of cord. If the adhesion markers aren't consistent with LAD, get an abdominal USS next to rule out urachal cyst or sinus.

### **Short umbilical cord**

When described on the boards in a neonate with reduced or absent fetal movement and oligohydramnios, Arthrogryposis will be your most likely diagnosis.

### **Single Umbilical Artery**

A single umbilical artery requires a renal USS as the most appropriate next step in evaluation. **Trisomy 18 is the most common associated trisomy.**

### **Umbilical stump bleeding**

Prolonged bleeding after the umbilical stump falls off should alert you to the possibility of Factor XIII deficiency on the boards. A supportive additional history for this deficiency is a history of intracranial hemorrhage. **PT & PTT are normal** in factor XIII deficient patients.

## **NO STOOL in 48hours since birth**

### **Imperforate Anus**

Do a **rectal inspection/examination first** to rule out imperforate anus before thinking of other causes below.

## **Meconium ileus**

Cystic Fibrosis and cocaine use by mom are clues. Get an abdominal x-ray first. This shows multiple dilated loops of bowel plus calcification. **Do UGI next.**

## **Hirschsprung's Disease**

Down syndrome is a clue. An abdominal x-ray may reveal a distended colon with multiple air fluid levels. **Get a barium enema next.** Diagnosis is via biopsy.

## **Meconium plug**

Infants of diabetic moms are at risk. An abdominal x-ray may show colon distension and multiple air fluid level. Get a **gastrografin enema next** (It is diagnostic and therapeutic).

## **The VOMITING newborn**

### **Duodenal Atresia**

A history of polyhydramnios and bilious vomiting in the first 24 hours of life is suggestive. Get an abdominal x-ray next. This usually shows double bubble sign with no air distally. Associate with Down syndrome.

### **Antral web Versus Duodenal Atresia**

Duodenal atresia is more common than Antral web as a cause of non bilious vomiting in the first 24 hours of life. If x-ray isn't suggestive of either, get a UGI series next. Radiolucent filling defect is suggestive of antral web.

## Malrotation with volvulus

Vomiting is bilious. Malrotation with volvulus (painful) is a surgical emergency.

Malrotation without volvulus may present with just abdominal distension and vomiting (the stools may be normal or bloody). Get an abdominal x-ray first.

Corkscrew appearance on x-ray is suggestive of volvulus. Do UGI next.

## Newborn INFECTIONS

### Toxoplasmosis versus CMV

	Toxoplasmosis	CMV
Exposure history	Cat or kitten litter/Raw meat	Daycare
Unique symptoms	Macrocephaly/AGA	Microcephaly/SGA
Common symptoms	Hepatosplenomegaly, jaundice & thrombocytopenia	Hepatosplenomegaly, jaundice & thrombocytopenia
CT findings	Calcifications are diffuse or intracranial	Calcifications are periventricular or Intracerebral
Diagnosis	CIA (Choose Immunofluorescence Assay). <b>The CIA found the cat</b>	Urine culture. <b>C for culture</b>
Treatment	Pyrimethamine, sulfadiazine and folinic acid	Gancyclovir

### Varicella infection in the newborn

Associate the congenital type (exposure is in 1st and 2nd trimester) with limb hypoplasia and cataracts. Associate perinatal type (exposure 5days before to 2 days after delivery) with disseminated disease. Newborns perinatally exposed need VZIG.

## Congenital Syphilis

History	Best initial step in eval	Treatment
Moms RPR/VDRL is reactive	Check maternal FTA ABS, and infants RPR	
Moms RPR and FTA ABS reactive but infants RPR is non reactive	<ul style="list-style-type: none"> <li>• Check to see if mom had adequate treatment</li> <li>• Do a physical examination on the infant</li> </ul>	<ul style="list-style-type: none"> <li>• If mom's treatment was inadequate and infants physical exam is normal, treat with a single injection of benzathine penicillin G 50,000u/kg</li> </ul>
Moms RPR and FTA ABS reactive and infants RPR is reactive	<ul style="list-style-type: none"> <li>• Compare RPR titers in mom and infant</li> <li>• Check to see if mom had adequate treatment</li> <li>• Do a physical examination of the infant</li> </ul>	<ul style="list-style-type: none"> <li>• If infants titer is <math>\geq 4x</math> higher RPR titer in infant, treat with IV aqueous penicillin G 50,000u/kg IV Q12hr for 1 week, then Q8hr for last 2 days</li> <li>• If infants titer is <math>&lt;4x</math> moms' but mom was treated adequately &amp; infants physical exam is normal, treat infant with benzathine penicillin</li> </ul>

## **Hepatitis B positive Mom**

- If newborn is less than 2 kg, give hepatitis B vaccine and HBIG within 12 hours. A 4<sup>th</sup> dose of the vaccine is required by 6 months.
- If newborn is greater than 2 kg, give hepatitis B vaccine and HBIG within 12 hours. Only 3 doses of the vaccine are required by 6 months.
- If mom's status is unknown and newborn is greater than 2 kg, give hepatitis B vaccine and HBIG within 7 days. Only 3 doses of the vaccine are required by 6 months.

## **HEMATOLOGIC Issues of the Newborn**

### **Anemia**

Hemoglobin level less than 13mg/dl (gestational age and gender dependent)

- Blood loss may be secondary but not limited to feto-maternal transfusion. If feto-maternal transfusion is the case and vital signs are stable, the most appropriate next step will be a Kleihauer Betke's test on mom's blood to check for fetal cells. Bloody vomitus, bloody residuals or bloody stool are usually secondary to swallowed maternal blood when described in the first 24 hours of life. To confirm swallowed maternal blood, an apt test of vomitus, gastric aspirate or stool will be the most appropriate next step.
- Hemolysis as a cause of anemia is more likely if jaundice is present. A high reticulocyte count is suggestive. Get a peripheral smear or Coombs test next as the most appropriate next step (correlate with history).
- Decreased production of red blood cells is rarely the cause of anemia on the boards. If baby has anemia of prematurity, erythropoietin is indicated next.

## Polycythemia

Hematocrit of 65 percent or greater.

- **Confirm with a venous sample next** if the initial sample was from a heel stick.
- Partial exchange transfusion is indicated for venous hematocrit levels  $\geq 70$ .
- Associate polycythemia with hyperviscosity syndrome, hyperbilirubinemia, hypoglycemia and thrombocytopenia.

## Thrombocytopenia

Platelets less than 100,000

- It is caused by **DATTS** commonly on the boards. **D**rugs (medications), **A**nemia (fanconi), **T**ORCH infections, **T**hrombocytopenia absent radii syndrome (TAR) and **S**LE. The medications to rule out in the history are vancomycin, thiazide, hydralazine & heparin.
- Next, make sure the physical examination doesn't have any findings consistent with SLE, TORCH, TAR or fanconi's anemia. If history and physical examination are normal & thrombocytopenia is an isolated or incidental finding, the most appropriate next step will be to check mom's platelet. If mom's platelets are low then the most likely cause of thrombocytopenia in the newborn will be autoimmune mediated thrombocytopenia.
- Alloimmune thrombocytopenia will be the most likely cause if mom's platelet is normal and no evidence of sepsis or disseminated intravascular coagulation (DIC).
- Treat the newborn with autoimmune mediated thrombocytopenia with mom's platelet or IVIG if symptomatic. If asymptomatic, no treatment is required

because autoimmune thrombocytopenia typically last for weeks and then self resolves.

## **Hemorrhagic Disease of the NB (HDNB)**

- Clues to this diagnosis are oral vitamin-K administration (because it doesn't prevent the disease), home delivery and exclusive breastfeeding.
- Symptoms suggestive are prolonged bleeding from circumcision site, venipuncture site or umbilical site. The bleeding may occur from as early as 3 days to as late as 3 months post delivery.
- **Platelet, fibrinogen and factor V are normal in HDNB** but decreased in both liver failure and DIC.

## **ABO/RH incompatibility**

- If there is a ABO or rhesus set up in a newborn with jaundice, get a total and direct bili first and a coombs test next.
- Phototherapy is the best initial step in management (dependent on the level of unconjugated bilirubin).
- Rhesus Incompatibility is more severe than ABO incompatibility and is more likely to require exchange transfusion.

## **Neonatal SEIZURES**

### **Hypoxic Ischemic Encephalopathy**

- Seizures in the first 24 hours of life. A low first and fifth minute APGAR's score DOES NOT correlate or predict the risk of developing cerebral palsy.

## **Intracranial Hemorrhage**

Seizures occur on day 2-3 of life with or without a drop in blood pressure in a newborn at risk. Risk factors are factor XIII deficiency and prematurity with or without a history of instrumental or traumatic delivery. Do head CT or USS next. If both are options, choose head USS as the most appropriate next step in evaluation and choose head CT for best diagnostic.

## **Inborn Error of Metabolism (IEM)**

This will be the most likely cause if seizure occurs hours to days after initiating feeds. Acidosis or high NH<sub>3</sub> are consistent with IEM.

## **Pyridoxine Deficiency**

This is the infant with seizures refractory to antiseizure medications.

## **ABO WITHDRAWAL symptoms**

### **Alcohol withdrawal**

Mnemonic is **NAS-ROH**. Remember NAS stands for neonatal abstinence syndrome and ROH symbolizes alcohol. **N**ervousness (jittery), **A**bnormal sugar (low), **S**eizure, **R**eflex abnormalities, **O**pisthotonus and **H**yperactivity.

### **Opioid withdrawal**

Mnemonic is **OPIATES**- **O**ral symptoms vomiting and diarrhea, **P**oor feeding, **I**ncrease tone, **A** lot of sucking (persistent suck), **T**remors, **E**levated temperature and **S**eizure.

## **Barbiturate withdrawal**

Mnemonic is **PHENOBARBS** - **P**oor suck, **H**yperaccusis/hiccups, **E**xcessive cry, **N**ervousness, **O**ral symptoms (vomiting), **B**inge eating (hyperphagia), **A**nnoyed (irritable), **R**estlessness, loose **B**owel and **S**eizures (in first 24 hours up to day 14 of life).

**Cocaine and amphetamines have NO withdrawal symptoms.**

## **ABO withdrawal management**

Management of alcohol or barbiturate withdrawal is placing patient in thermo neutral environment with minimal stimulation. Phenobarbital taper over 4-6wks is indicated for seizures. An alternative treatment will be using tincture of opioid and/or diazepam. Methadone is used to treat opioid withdrawal.

## **Newborn ILLICIT DRUG Exposure**

### **PCP exposure**

Mnemonic is **PCP**-**P**oor attention and visual tracking, **C**oarse flapping tremors and **P**oor feeding and head growth (microcephaly).

### **Methamphetamine exposure**

Mnemonic is **AMPHE**-**A**tresia (biliary), **M**ini baby (low birth weight), **P**oor quality movement, **H**ear defect and **E**arly birth (prematurity).

## **Cocaine exposure**

Mnemonic is **COCAINE**- **C**ongenital anomaly, **O**-zero abstinence, **C**rying is high pitched, **A**lertness and autonomic instability, **I**ncreased tone, **N**ervousness (jittery with tremors) and **E**xcessive suck.

## **Marijuana exposure**

Mnemonic is **JOINT**-**J**ittery with tremors, **O**-zero abstinence, **I**ncreased crying, **N**o LBW or prematurity and **T**one is decreased.

**PCP, marijuana and opioids do not cause low birth weight.**

## **PREEMIE issues**

Preemies need to be in an incubator to prevent fluid loss through their large body surface area and skin that lacks fat/adipose tissue. In the absence of obvious or apparent disease, changing to a preemie formula will be the most appropriate next step in management for an infant less than 4 months who was premature at birth and is failing to gain weight. No special growth charts after 2years for caught up preemies.

## **Re Umbilical Artery Catheters (UAC)**

- Most common reason for removal of UACs in the first postnatal week in very low birth weight infants is sepsis.
- Use of UACs for TPN increases the risk for sepsis.
- Hypoglycemia may ensue if the UAC is inserted into the thoracic aorta between T6 and T10.

## Hearing screen

This should be **done before discharge** from the nursery. The first screen is with an AABR. If patient fails the first screen, repeat AABR as most appropriate next step. If patient fails a repeat screen then refer for audiologic evaluation and ABR next. **Do not screen in the immediate postnatal period** because it may be falsely positive (high false positive if done immediately after delivery). Screening is **best done while the infant is asleep**. Risk factors for progressive hearing loss are parental concerns, family history of hearing loss, head trauma, hyperbilirubinemia & TORCH. Periodic screening is necessary for evaluation of progressive hearing loss.

## ALTE versus SIDS

	ALTE	SIDS
Occurrence	Males equal to females	More in males
Risk factors		Family history, prematurity and prone sleeping
Home monitors	Not required except premature or tech dependent	Not required
Protective		Pacifiers

## Teratogenic Child

Knowing at least two symptoms for each teratogen increases your chances of getting this right!

- Isotretinoin: small eyes, small jaw and small ears, absent thymus and truncus arteriosus.
- ACE inhibitors: PDA and anuria.
- Thalidomide: Limb reduction defects

- Lithium: ASD and thyroid problems.
- Warfarin: **Nail hypoplasia** and stippled epiphysis.
- Phenytoin: **Nail hypoplasia**, wide anterior fontanelle and prominent metopic ridge.
- Alcohol: **Nail hypoplasia**, smooth philtrum and thin upper lip.

## **Newborn Kidneys**

### **Mass palpated in the NB physical**

Hydronephrosis or multicystic dysplastic kidneys are the most common causes. Get a renal ultrasound as the most appropriate next step.

### **No pee in 24hours since birth**

- First obtain a thorough obstetric, family and drug history and rule out Oligohydramnios sequence (Potters sequence) on physical exam
- Perform bladder catheterization to obtain urine for analysis and also to assess anatomy
- Get a renal ultrasound next especially if no urine can be obtained by cath

Oligohydramnios sequence includes flat facies, malpositioned arms and legs (including bowing and club feet), low set ears and joint contractures

## Adolescent Medicine

### Male SMR

#### Key Points for male SMR

- First change is testicular size increase in SMR 2
- Pubic hair with descriptive terms **fine-coarse-dense** corresponds to stages **2, 3 & 4** respectively.
- **Phallic size increase starts in SMR 3**
- Sequence is testicular growth→pubarche→penile growth→ peak height velocity.

### Female SMR

#### Key Points for female SMR

- First change is breast bud development
- Pubic hair with descriptive terms fine-coarse-dense corresponds to stages 2, 3 & 4 respectively.
- **Menarche occurs in SMR 3-4**
- Sequence is breast bud→pubarche→peak height velocity→menarche.

**Note:** If vignette describes a premenarchal girl bleeding with a SMR of 2, the most likely cause of the bleeding will be foreign body or vaginitis and NOT menarche.

### Delayed Puberty

No developmental changes in boys by age 14 years and in girls by age 13 years.

## Precocious Puberty

- Defined as pubertal change in boys before the age of 9 years and in girls before 8 years.
- It is true precocious puberty if the sequence under male and female SMR above is met.
- **In pseudo precocious puberty, the sequence isn't followed.** For instance, pubarche occurring before testicular growth in boys or pubarche occurring before breast buds in girls.
- Most appropriate next step in evaluating precocious puberty is measuring leutinizing hormone (LH) or getting a wrist x-ray for bone age. If both are separate options, choose LH next if it is a female. **Recommend psychosocial counseling for affected males or females** who have emotional or social issues with peers.

## Premature Adrenarche

- Defined as isolated pubic hair development in boys before the age of 9 years and in girls before the age of 8 years.
- Next, look for signs of androgen presence like acne, clitoral or phallic enlargement. If vignette describes a 7 year old female with pubic hair and acne or clitoral enlargement, then the most appropriate next step in evaluation would be an ACTH stimulation test and measurement of 17HP to rule out congenital adrenal hyperplasia (CAH).
- If no signs of androgen presence (no acne, no clitoral or phallic enlargement), then getting an x-ray of the long bones to determine bone age will be indicated next. **In premature adrenarche, bone age is advanced** but rarely greater

than one year. If x-ray reveals advanced bone age greater than one year, work up for CAH next.

### **Adolescent Lab changes**

- Hematocrit increases with growth spurt and will also increase over time.
- HDL remains constant
- Serum aldosterone decreases over time

### **Androgen insensitivity or testicular feminization**

- This should be suspected if pubarche doesn't follow thelarche within a year of thelarche.
- Genotype (genetic make-up) is male and phenotype (external appearance) is female (**without uterus**). They are usually XY males with no external male structures.
- **Do karyotype and measure testosterone next.**

### **Dysfunctional Uterine Bleeding**

- Defined as unpredictable flow and duration of bleeding after menarche.
- If DUB occurs within three years of menarche and no ovulatory signs are present e.g. breast tenderness, mood & appetite changes, abdominal cramps or increase cervical mucus, then the most likely diagnosis will be Anovulatory Cycles.
- Reassurance is all that is needed for anovulatory cycles unless the patient is anemic or orthostatic then OCPs and possible transfusion with PRBCs will be indicated (correlate with history).

## AMENORRHEA

### Primary Amenorrhea

	Uterus +	Uterus Absent
Breast +	<ul style="list-style-type: none"> <li>• Imperforate Hymen. Physical examination next</li> <li>• Hypothalamic-pituitary problems. Do a <b>physical exam 1<sup>st</sup></b>, then progesterone challenge next</li> </ul>	<ul style="list-style-type: none"> <li>• Androgen Insensitivity Syndrome.</li> <li>• Get <b>karyotype with a testosterone assay</b></li> </ul>
No Breast	<ul style="list-style-type: none"> <li>• PCOS (if virilized). <b>FSH next.</b></li> <li>• Turners syndrome (if not virilized and short). Karyotype next</li> </ul>	<ul style="list-style-type: none"> <li>• Gonadal Enzyme deficiency.</li> <li>• Do karyotype next</li> </ul>

### Secondary Amenorrhea

You must know the order of evaluation. Get a **pregnancy test first** followed by **T4/TSH** and **Prolactin (TTP)** next. Do a progesterone challenge 3rd.

If the pregnancy test and TTP are negative and progesterone challenge causes withdrawal bleeding, anovulation is likely. In this scenario stress, drugs, exercise or anorexia will be your most likely cause. If no withdrawal bleeding occurs in response

to progesterone challenge then an OCP challenge is indicated next and if still no bleeding, uterine synechae is likely. If prolactin is increased do MRI or CT next.

**Dysmenorrhea:** NSAIDs are first line and OCPs are second line.

### **Asymptomatic high risk sexual adolescent**

- GC/Chlamydia screen at baseline then every 6-12 months
- HIV screen at baseline then every 12 months
- Syphilis screen next if known exposure to sexual partner with syphilis OR if any of the above is positive
- **No screen for herpes!**
- Begin Pap smear at 21 years or 18 years if sexually active

## **Adolescent Infectious Disease**

### **Urethritis**

Dysuria in a sexually active adolescent is suggestive. Get urinalysis first. Urinalysis may reveal pyuria (increase urine WBC). Get nucleic acid amplification test on either urine, vaginal or cervical swabs is next. Chlamydia is the most common cause. Empiric treatment should include coverage for GC & Chlamydia.

### **Pelvic Inflammatory Disease**

A presumptive diagnosis is based on clinical presentation and physical examination. Diagnosis requires the presence of adnexal and cervical motion tenderness. Endometrial biopsy, transvaginal sonography, MRI and laparoscopy are more definitive but usually unnecessary ways of diagnosing PID. Oral doxycycline is preferred to parenteral doxycycline because of pain associated with doxycycline

infusion even while inpatient (unless patient is vomiting). Add clindamycin or metronidazole to treatment regimen if tubo-ovarian abscess is present.

### **Fitz Hughs Curtis Syndrome (FHCS)**

The right upper quadrant pain is due to perihepatitis. **Bilirubin and liver function tests are normal in FHCS.** Laparoscopic exam of liver is diagnostic for Fitz Hughs. Treatment for PID is adequate for FHCS.

### **Joint pain/Reiters disease**

Associate can't pee, can't see, can't climb a tree with Chlamydia in a sexually active adolescent or with campylobacter if vignette mentions adolescent with diarrhea.

Associate pustular skin lesions and joint pain with Gonorrhea.

### **Trichomoniasis**

In females, they typically describe strawberry cervix, frothy yellow discharge & motile flagella on histology (wet prep). In males, it may cause urethral discharge and dysuria (urethritis). **Treat patient and partner** with flagyl.

### **Bacterial Vaginosis**

Vignette describes vaginal discharge, fishy odor of discharge and clue cells on histology (wet prep). Treat with flagyl & **don't treat partner.**

### **Syphilis**

A sexually active adolescent with pityriasis-like rash with or without involvement of the palms and soles has syphilis on the boards until ruled out!

Primary syphilis is low yield on the boards. Sensitivity of RPR or VDRL is higher in detecting secondary syphilis compared to primary or latent syphilis.

Dark field microscopy or direct fluorescent antibody tests are definitive methods of diagnosing early syphilis. RPR is best to follow or measure treatment success. **For neurosyphilis CSF VDRL is more specific** and CSF FTA-ABS is more sensitive.

Parenteral penicillin G is the drug of choice for syphilis in pregnancy. If vignette describes a pregnant adolescent allergic to penicillin with newly diagnosed syphilis, the most appropriate next step will be to desensitize and treat with penicillin G. Jarisch-Herxheimer reaction presents with fever, headache and muscle pain within 24 hours of initiating treatment for syphilis.

## **Genital warts**

If described in a prepubertal girl, suspect abuse. Note that HPV is the most prevalent sexually transmitted infection (STI) and Chlamydia is the most common cause of STI.

## **Vulvovaginitis**

Mnemonic is **DRIPS**. **D**ischarge from vagina, **R**edness in vulva or vagina, **I**tching in vagina or vulva, **P**ain with or without urination and **S**mill from the vagina. The causes below are not exclusive.

- **Preschool and toddlers:** Poor hygiene, bubble baths and foreign body are the usual culprits. Avoiding irritants, sitz baths and topical steroids may be required.
- **Preadolescents:** Usual culprits are poor hygiene and foreign body. Perineal hygiene should be taught.
- **Adolescents:** Candidiasis will be the most likely cause. Treat with Oral fluconazole single dose or topical azoles. Sexual partners do not need treatment unless they have balanitis.

## Ovarian Cysts

Presentation is appendicitis-like with right or left lower quadrant pain or mid-cycle discomfort. If clinical suspicion is high, get an abdominal USS next. **Signs of malignant cyst on ultrasound are septations, multiloculations, increase echoes or calcifications.** Do CT/ MRI next if ultrasound findings are suggestive of a malignant cyst or if an initial USS isn't yielding and clinical suspicion is high. For non malignant cyst < 6cm, observe with follow up ultrasound in months. For non malignant cyst >6cm, a laparoscopic cyst aspiration is indicated next or refer to gynecology.

## Gynecomastia

- Prepubertal or physiologic gynecomastia will be the most likely diagnosis if adolescent is in SMR 2 with no associated drug use, normal testicular exam and no evidence of renal, hepatic or endocrine disease.
- Reassure parents and patient next then reevaluate in 6 months as the best initial step in management for prepubertal gynecomastia.
- Suspect a secondary cause if vignette describes gynecomastia in a SMR 5 adolescent male.
- If secondary to medication use, stop the medication and reexamine patient in one month as the best initial step in management. Medications that cause gynecomastia are ketoconazole, metronidazole, isoniazid, cimetidine, spironolactone, **anabolic steroids**, alkylating medications and **marijuana**.
- Symptoms suggestive of anabolic steroid use are acne and slow growth. Time distortion, poor school performance and lack of concentration are associated with marijuana use.

## **Adolescent Immunization**

They are two groups of adolescents the boards may allude to as it pertains to adolescent immunizations.

- Those with no special condition, no high risk behaviors and are up to date at 11 or 12 years. Give Tdap, MCV and gardasil routinely. You may offer gardasil as early as 9 years in females.
- Those with a special condition, high risk sexual or drug abuse behavior and are not up to date at any age in adolescence. In addition to routine shots, these patients should be assessed for their hepatitis A and B status and vaccinated if no previous shots or serologic evidence of disease or immunity. Two doses of varicella are needed 4-8 weeks apart if patient is above 13 years with no history of previous varicella shot or disease. Hib vaccine is indicated if patient has had splenectomy or has functional asplenia.

## **Adolescent Consent Issues**

No parental consent or permission is required for sexual assault issues, life threatening emergencies, pregnancy, contraceptive, family planning, sexually transmitted infections (STIs) and substance abuse issues. If there is a dispute, **WHAT EVER** the adolescent wants the physician to do will be the right answer on the boards OR explaining to the parent that the adolescent must consent.

**Confidentiality:** You **MUST** maintain confidentiality if the adolescent requests it in any of the above situations. You may breach confidentiality if the adolescent poses a risk to self or someone else. If it pertains to an STI, encourage the adolescent to tell the partner. Emancipated minors require no parental consent for the same situations above (under parental consent and permission). Parental consent is required for blood donation.

## Adolescent CONTRACEPTION

Counseling the adolescent female who seeks contraception is high yield on the boards

Information requested about	Most appropriate statement/advice
Female condom	When used correctly and consistently they reduce the risk of STIs including HIV but no clinical studies to demonstrate the efficacy.
Vaginal spermicides	They are not effective in preventing GC/Chlamydia and HIV. <b>Spermicides increase the risk of candidiasis</b>
<b>Adolescent with asthma</b>	<b>All methods may be used</b>
Adolescent with cystic fibrosis	progesterone thickens bronchial mucus and can cause an exacerbation of her CF.
Adolescent with quiescent Inflammatory Bowel Disease:	May use OCPs but if disease is active, non oral hormonal is better
Adolescent with mental retardation	Will benefit best from progestin injections.
<b>Adolescent with epilepsy</b>	<b>Will benefit from depo shots</b>

### Absolute contraindications to OCPs

Mnemonic is **CAB HELPs** breast victims not on OCPs. **C**oronary **A**rtery Disease, **B**reast cancer, **H**epatic disease, **E**levated **L**ipids, **P**regnancy and **S**moking.

### Male Contraception

You may be asked which of the following is least prevented when a male condom is used properly, correctly and consistently? Options will be HIV, gonorrhea,

Chlamydia, trichomonas and syphilis. Syphilis will be the answer since the other four options are transmitted via fluids from mucosal surface while syphilis can be transmitted by skin to skin contact.

### **Key points on proper male condom usage**

- A new condom is required for each act of intercourse (oral, anal and vaginal)
- Only put the condom on if penis is erect and before any genital contact
- To ensure adequate lubrication, use water based lubricants
- **Note:** If vignette asks for the most common reason for condom failure, the answer will be inconsistent and incorrect or improper usage. **NOT CONDOM BREAKAGE.**

### **Adolescent smoking facts!**

- Most are light smokers
- Most wish and try to quit on their own
- With counseling or registration in a cessation program, their chances of quitting are doubled
- **Scare tactics (showing pictures) are not effective** quitting techniques
- School based education programs for smoking prevention are effective when based on role playing refusal skills and knowledge of short term health effects.

## **BREAST LUMPS**

### **Fibroadenoma**

Described as an outer quadrant, mobile and firm mass. May be multiple or bilateral. It is a benign mass with no increase risk of malignancy. It often self resorbs within weeks. Management is expectant with USS done every 6 months.

## Fibrocystic Changes

Described as bead-like masses, lumpy or multiple nodularity with cyclic pain. **No risk of malignancy.** Do USS next. Treat with analgesics or OCPs if severe.

## Breast Cysts

Described as smooth, firm or mobile masses that increase in size before menses and decrease afterwards. They may be simple or complex cysts. Complex is defined as persistent simple cyst despite fine needle aspiration (FNA). If simple, only FNA is needed. If complex, patient should be referred for simple excision.

## Cystosarcoma Phyllodes (CP) versus Breast adenocarcinoma (BA)

Cystosarcoma Phyllodes	Breast Adenocarcinoma
Not fixed	Fixed
Bloody nipple discharge	Bloody nipple discharge
No metastasis to axilla	Metastasizes to axilla

**Note:** CP is the most common breast sarcoma in adolescence. Treatment of CP is with wide local excision.

## Male genital Problems (not restricted to adolescents)

### Torsion of the appendix

A blue dot sign is suggestive. Labs and work up when done, are normal. Treat with analgesics and rest.

## **Testicular Torsion**

Pain described is typically **less than 24 hours**. Other findings are high and retracted testicles, a **negative phren's sign and cremasteric reflex**. Attempt manual detorsion first then emergent color Doppler ultrasound next. Patient requires emergent surgery.

## **Epididymitis**

Pain described is typically **greater than 24 hours**. Fever and **dysuria** are present. Phren and cremasteric reflex are positive. Get urinalysis and urine for gonorrhea and chlamydia next.

## **Orchitis**

Pain with overlying redness and warmth is suggestive. **No dysuria** typically. Get serum amylase or mumps serology next. Treatment is supportive. If a prior history of pleurodynia is given, choose group B coxsackie as the most likely causative organism.

## **Inguinal Hernia**

An inguinal or scrotal bulge that is non tender and changes with position, coughing or crying is suggestive. Surgery is indicated next (non emergent unless complicated). Inguinal lymphadenitis will have tenderness with differential warmth and the presence of a focal infection.

## **Hydrocele**

Described as a soft, painless scrotal swelling that transilluminates. **Diagnosis is clinical**. Associate with hernias and testicular tumors.

## **Varicocele**

Described as a heavy sensation and may be painful. Usually a left sided scrotal swelling that decreases with lying down. Decrease in size of the involved testis is a complication.

## **Testicular Tumor**

A description of a swelling that is **not painful** noticed while playing or after sports is the typical presentation on the boards. The swelling is **firm or hard**. Biopsy is indicated next.

## **Undescended Testis**

No testis palpable from birth. No work up necessary. Orchiopexy should be done by 1 year. **Refer concerned parents to surgery or urology as early as 9 months.** Orchiopexy reduces the infertility risk but not the cancer risk.

## **Retractile Testis**

History of palpable testis but now not palpable is suggestive. Examine the patient in a tailored or cross legged position next. Reassure parents next. No risk of infertility or testicular cancer.

## **Phimosis**

This is foreskin tightness in a male greater than 3 years. The best initial treatment is with topical steroids. Circumcision is indicated in an older child or in a younger child with recurrent or pathologic phimosis.

## **Balanitis**

This is inflammation of the glans penis. The lesion is as a result of improper hygiene and mixed flora infection of the glans.

## **Female genital Problems (not restricted to adolescents)**

### **Labial adhesions**

Asymptomatic females require no treatment but if dysuria is present, estrogen cream is indicated.

### **Imperforate hymen**

Typical patient on the boards is a female with SMR 5, no menarche and midline cyclic abdominal pain. The most appropriate next step will be to perform a physical examination of the external genitalia which may reveal a bluish bulging hymen. Hematocolpos (accumulated blood in vagina) is usually the cause of the midline mass.

## **INTOXICATIONS**

In all intoxications, airway, breathing and circulation should be taken care of first if the vignette describes a compromised or unstable patient.

Below are some common medications, herbs or alternative medicines abused or used to intoxicate self on the boards for various purposes.

## Medications

Intoxication	Best initial step in management	What next after best initial step
Acetaminophen	Activated charcoal	4 hour serum level or N-acetyl cysteine if indicated
Tricyclics	Activated charcoal	3-6hour level, then alkalinize urine
Ibuprofen	Activated charcoal (timing, dose & symptom dependent) versus observation.	Rule out co-ingestion by obtaining serum acetaminophen and salicylate levels

### Child drank unknown Liquid

**Caustics (drain cleaner):** Vignette typically describes a drooling child with dysphagia with or without perioral burn or respiratory symptoms. Garage is a clue. The most appropriate next step in evaluation is endoscopy.

**Hydrocarbons (kerosene or gasoline):** Vignette typically describes respiratory symptoms only but some may have systemic (fever, leukocytosis and hemoglobinuria) and gastrointestinal symptoms. Chemical pneumonitis may complicate aspiration of hydrocarbons. Administer oxygen first. Treatment is supportive.

**Ethylene glycol (antifreeze):** Increase anion gap metabolic acidosis in a child with crystals present in urine is highly suggestive. Patients with ethylene glycol ingestion are at risk of acute tubular necrosis and hypocalcaemia.

## Alternative/Herbal medicines

### Valerian Root (**valerian high**)

- Has sedative effect so don't use with sedatives.

### Echinacea (**echi-no-suppressants**)

- Do not give to patients on immunosuppressants.

### St Johns Wort (**Saint Serotonin**)

- Induces p450 so it decreases levels of OCPs and TCAs. St Johns wort causes serotonin syndrome if used with an SSRI.

### Garlic, Ginseng & Ginko bilboa (**Goshy bleeding**)

- They all inhibit platelet aggregation. Do not use with anticoagulant.

## Toxic Plants

### Jimson weed (**C-weed**)

When ingested may affect the **CVS** and **CNS** predominantly causing tachycardia, hypertension, agitation and aggression.

### Castor bean

When ingested affects the gut predominantly causing nausea and **vomiting**. Toxin is ricin.

**Foxglove:** When ingested may **affects all 3**:- gut (nausea and vomiting), CNS (drowsy) and CVS (prolonged PR, short QT and ventricular arrhythmias). Toxin is a cardiac glycoside. Get EKG next.

## Adolescent Intoxications Continued

Mnemonic is **SOC and SHAS**: D- decreased or meiosis & I- increased or mydriasis.

	<b>temp</b>	<b>pulse</b>	<b>resp</b>	<b>Bp</b>	<b>pupil</b>	Other findings
<b>Sedative</b> (barbiturates and benzos)	D	D	D	D	D	Sleepy, slurred speech
<b>O</b> poid (morphine, heroin, fentanyl)	D	D	D	D	D	flushing, constipation
<b>C</b> holinergic (organophosphates)	D	D	D	D	D	Salivation, lacrimation
<b>S</b> timulant (caffeine, amphetamines, pseudoephedrine, cocaine)	I	I	I	I	I	Insomnia & hyperalertness. Chest pain with cocaine
<b>H</b> allucinogens (PCP, LSD, psilocybin)	I	I	I	I	I	Psychosis, agitation & nystagmus (place in quiet room and administer benzodiazepine)
<b>A</b> nticholinergics (antihistamines, atropine, TCAs)	I	I	I	I	I	dry as sjorgen, red as red meat, mad as a luni
<b>S</b> erotonin syndrome	I	I	I	I	I	rigidity

## **Charcoal when not to use**

As a decontaminant, charcoal should NOT be used to CALM anyone. Do not use charcoal in **C**yanide, **A**lcohol, **L**ithium and **M**etal intoxications.

## **Other substances abused**

Marijuana causes red eyes, impaired cognition and time distortion. Choose ecstasy if vignette describes an adolescent with a high that is short lived after a weekend party. Ecstasy is methylenedioxyamphetamine (MDMA).

## **Post Traumatic Stress Disorder**

Recurrent nightmares or fear of being alone in a patient with a traumatic past is suggestive. Other findings consistent with PTSD are decreased appetite for school and food.

## **ANOREXIA Nervosa (AN)**

**4 key things** in diagnosis according to DMV.

1. She thinks her weight is okay (perception)
2. She is 15% below expected weight
3. She fears gaining weight
4. She has missed 3 consecutive menstrual periods

## **Laboratory findings in AN**

- Hypokalemic hypochloremic metabolic alkalosis (from vomiting or vomiting agents).
- Low hematocrit, WBC, FSH, LH & estradiol.

**Indications for admission** in AN: Bradycardia, hypotension and orthostatic changes.

**Complications** of AN: Osteopenia and osteoporosis are common complications and require a dexam scan, vitamin D and calcium. Hypophosphatemia is the feared complication with refeeding.

### **Bulimia Nervosa (BN)**

Binge eating followed by voluntary vomiting (in achalasia vomiting is involuntary).

Unlike anorexics, BN patients are normal or overweight usually. Physical findings consistent with BN are salivary/parotid gland enlargement, calluses on knuckles and dental enamel erosion.

## **Adolescent SKELETAL issues**

### **Scoliosis**

- The two types to know for the boards are juvenile idiopathic and adolescent Idiopathic scoliosis.
- It is not idiopathic if there are positive physical examination findings on the skin (hairy patch and café au lait), in Joints (hyperlaxity) or in extremity (limb-length discrepancy). Non idiopathic causes to think of are Neurofibromatosis, Marfans, Ehler danlos and spinal dysraphism.
- When idiopathic, the order of evaluation is high yield on the boards. Inspect patient standing first → forward bending next → scoliometer measurement next → If scoliometer measurement is  $\geq 7$ , get a scoliosis series (x-ray) next to measure the Cobb angle.

- Cobb angle is  $> 10$  but  $\leq 20$  degrees requires observation and repeat x-ray in 4-6 months.
- Cobb angle between  $> 20$  but  $\leq 40$  degrees requires bracing (depending on skeletal maturity).
- **Cobb angle  $> 40$  requires surgery.**

## Kyphosis

Juvenile kyphosis is usually postural and corrects itself with hyperextension while scheuermann's disease is usually painful and isn't corrected by hyperextension. Do spinal fusion for severe pain in scheuermann.

## Sports CleaRANCE

### Not Cleared for Sports

- Patients with carditis, myocarditis, enlarged spleen and liver should not be cleared.

### May participate in sports (see table below)

Condition	Caution
Well controlled seizures	Caution about swimming alone
HIV/hepatitis	Universal precautions needed in personnel
Hypertrophic cardiomyopathy	May participate in low intensity sports
Diabetes Mellitus	Requires monitoring sugars at 30 minute intervals during and 30 mins afterwards
Sickle cell disease or trait	Needs fluids for hydration during activity
Asymptomatic MVP	No restrictions

## Needs evaluation before participation

Do not clear for sports patients with atlanto/axial instability, bleeding disorder, significant murmur or arrhythmias, anorexia or bulimia. Refer them for evaluation and clearance before participation.

## Heart Disease and Sports allowed, patients with

- Small ASD or VSD, mild aortic stenosis and asymptomatic MVP may participate in **all sports**
- Severe aortic stenosis and long QT syndrome **may NOT participate** in sports.
- Moderate LV dysfunction may participate in **only low dynamic sports** like bowling, golf and cricket
- Moderate aortic stenosis may participate in low dynamic like above and moderate dynamic like volleyball, baseball and soft ball.

## Cholesterol SCREEN

Adolescent at risk for high lipids fall into 3 categories on your boards.

1. Vignette mentions the **adolescent parent's Total cholesterol >240**
  - Do total cholesterol next and if greater than 170, repeat TC or get a fasting lipid panel (FLP) as the most appropriate next step in evaluation. Lifestyle modification (diet, exercise and reduced sedentary activities) and weight loss are the best initial treatment for hypercholesterolemia (familial or not).
2. Vignette describes **adolescent with a known risk factor**: Hypertension, Obesity and Smoking or Sedentary lifestyle.
  - Do total cholesterol next.

- Other risk factors are beta blocker use, anticonvulsant use, alcohol and steroid use.
3. Vignette describes adolescent's parent or grandparent with history of angina or myocardial infarction at an age equal to or less than 55years.
- Do FLP next.

### Autosomal DOMINANT conditions

Mnemonic is **D** Wrath of **P**eurtz **W**illbrand **D** Noisy **G**ardner:-Dominant, **W**illiams, **R**etinoblastoma, **A**chondroplasia, **A**lagille, **A**pert, **T**uberous sclerosis, **H**untington's chorea, **P**eutz jehgers, von**W**illbrand, **N**eurofibromatosis, **G**ardner syndrome. Suspect an autosomal dominant disorder if vignette describes disease in mom.

### Autosomal dominant chances

Family history	Chances
One parent is a carrier	50% chance an off-spring will have the disease
Both parents are carriers	25% chance an off-spring will not be a carrier and thus not have the disease 50% chance an off-spring will be a carrier and thus have the disease

### Autosomal RECESSIVE conditions

Mnemonic is **RECESSIF GAP**: **R**oberts's syndrome, **E**hlers-Danlos syndrome, **C**ystic Fibrosis, **E**llis-Van Creveld syndrome, **S**ickle cell disease, **S**pinal muscular atrophy, **I**mperfecta osteogenesis, **F**anconi anemia, **G**auchers/Galactosemia, **A**lport syndrome and **P**henylketonuria.

## Autosomal recessive chances

Family history	Chances
One parent is a carrier	0% chance of an off-spring having the disease 50% chance of an off-spring being a non-carrier 50% chance of an off-spring being a carrier
Both parents are carriers	25% chance of an off-spring being unaffected 50% chance of an off-spring being a carrier 25% chance of an off-spring having the disease

## X-Linked DOMINANT conditions

Mnemonic is **eX** Vice **P**resident **Aicardi Alport**. Vitamin-D resistant rickets, **P**seudo hyperparathyroidism, **Aircadi** and **Alport** syndrome.

## X-Linked dominant chances

Family history	Chances
Mother alone is a carrier	50% chance a male off-spring will have the disease 50% chance a female off-spring will have the disease
Father alone is a carrier	100% chance a female off-spring will have the disease 0% chance a male off-spring will have the disease (no sons will have it)
Both parents are carriers	100% chance a female off-spring will have disease 50% chance a male off-spring will have the disease

## **X-Linked RECESSIVE conditions**

Mnemonic is **Do Not Resuscitate Testicular females Wisk X-linked HCG.**

**D**uchenes muscular dystrophy, **N**ephrogenic DI, **R**etinitis pigmentosa, **T**esticular **F**eminization Syndrome, **W**iskott Aldrich Syndrome, **H**emophilia, **C**GD & **G**6PD deficiency. Suspect an x-linked recessive disease if vignette describes **disease in mom's brother.** There is a 0% chance of having an affected offspring if dad is unaffected.

## **Multifactorial Conditions**

Mnemonic is multi-**CHAPTS.** **C**lubfoot, **C**ongenital hip and **C**left lip, **C**left palate, **H**ypospadias, **H**irschsprung, **A**genesis renal, **P**yloric stenosis, **T**rachea esophageal fistula, **S**pina bifida & **S**coliosis. Recurrence risk of multifactorial disease is 4% if no parent is affected.

## **Specific GENETIC syndromes**

### **Neurofibromatosis**

Mnemonic is **CAFO-N-LAI.** Diagnosis requires at least two of the following:-  
**C**haracteristic osseous lesion e.g. dysplasia of sphenoid bone or thinning of long bone, six or more **C**afe au lait macules (>0.5cm in prepubertal kids or >1.5cm in post pubertal kids), **A**xillary **F**reckling, **O**ptic glioma, more than two **N**eurofibromas, more than two **L**isch nodules, **A**ffected first degree relatives & **I**nguinal freckling.

### **Marfans Syndrome**

Mnemonic is **MARFANSSS.** **M**itral valve prolapse and **M**yopia, **A**ortic root dilation, **R**isk of aortic rupture, **F**lexible joint, **A**rachnodactyly, **N**o lens down (displaced anterior), **S**coliosis, **S**tretch marks without weight change & **S**pinal dural ectasia.

Diagnosis is clinical and is made if a family history of Marfans is present with at least two other system involvements. In the absence of a family history, involvement of at least three systems is required for a diagnosis. Think of the systems as the **SPOKI system**. **S**keletal, **P**ulmonary, **O**cular, **K**ardiovascular and **I**ntegumentary (skin).

## **Achondroplasia**

Mnemonic is **ACHONDROPS**. **A**bnormal vertebral body, **C**-spine injury, **H**ydrocephalus, **O**trident hand (trident hand), **N**ormal cognition, **D**warfism, **R**hizomelia, **R**edundant skin, **O**vert head (big head), **P**neumonia risk from small thorax, **S**IDS & **S**mall foramen magnum.

## **Cornelia de Lange**

Mnemonic is **DE-LANGE**. **D**epressed nasal bridge, **E**ars rotated posterior, **L**ow set ears, **L**ow hairline and **L**ong philtrum, **A**nteverted nares, **N**arrow head and jaws (narrow is small), **G**umming eyelash & **E**yelash curling.

## **CHARGE Syndrome**

**C**olobomas, **H**ear defect, choanal **A**tresia, **R**etarded growth, **G**onad abnormalities & **E**ar abnormalities.

## **Alport syndrome**

Mnemonic is **ALPORTS**: **A**nterior lenticonus, **L**ax abdominal muscles, **P**igmentosa retinitis, **O**edema, **R**enal failure, **T**hrombocytopenia (mega) & **S**ensorineural hearing loss. It affects males earlier than females. Affected males are more likely to develop end stage renal disease.

## **VACTERL Syndrome**

Vertebral defect, **A**nal atresia, **C**ardiac anomaly (VSD), **T**racheo **E**sophageal fistula, **R**adial hypoplasia, **R**enal anomalies & **L**imb abnormalities. In any combination of presentations on the boards, a renal ultrasound will be the most appropriate next step in evaluation if not done already and history is suggestive.

## **Treacher Collins Syndrome**

Mnemonic is **TEACH**. **T**iny jaw, **E**ye and **E**ar abnormality, **A**utosomal dominant, **C**onductive hearing loss & **H**earing loss in family member. Remember the teacher cannot be crazy, so there is no mental retardation.

## **Rubeinstein Taybi syndrome**

Taybi the cave man Came **5000 years BC**. **B**road thumb & **C**ryptorchidism.

## **Williams Syndrome**

Mnemonic is **WILLIAMS**. **W**ide spaced teeth, **W**ide mouth, **I**ris stellate, **L**in face, **L**ips full, **L**ong philtrum, **I**ncrease calcium, **I**ntellectual disability, **A**ortic stenosis (supravalvular), **M**icrognathia & **S**trabismus.

## **Edwards syndrome**

Mnemonic is **HEDWORD**. **H**ypoplastic nails, **H**orseshoe kidneys, **E**ighteen, **D**-mouth is small, **W**ide occiput (wide is prominent), **O**verlapped fingers, **R**ockerbottom feet & **D**-fist is clenched.

## **Patau syndrome**

Mnemonic is **PATAURRI**. **P**olydactyly, **P**alate and lip issues, **A**bsent brain, **T**hirteen, **A**plasia cutis (punched out scalp lesions) **U**lcer of scalp, **R**ockerbottom feet, **R**enal issues & **I**ris coloboma.

## **Fragile X syndrome**

Mnemonic is **FRAGILE**. **F**ace long, **R**etarded, **A**utistic behavior, **G**onadotrophy, **I**Q normal in 50% of affected females & **L**arge **E**ars.

## **Angelman syndrome**

Mnemonic is **ANGELMAN**. **A**taxia, **N**euroseizures, **G**ap tooth, **E**nlarged jaw, **L**aughing and **L**anguage issues, **M**ental retardation & **A**Nnoying tongue thrusts.

## **Prader Willi syndrome**

Mnemonic is **PRADER**. **P**aternal, **R**educed hand and feet (**reduced is small**), **A**lmond eyes, **D**evelopmental delay/**DM**, **E**ating problems (**eats too much**), **R**educed newborn tone (hypotonia) & **R**educed gonadal function later in life. Remember **do methylation study before FISH**.

## **Wolf -Hirschhorn syndrome**

Mnemonic is **5P**. **P**renatal growth deficiency, **P**etit head, **P**rofound MR, **P**rominent glabella and the **P**alate is cleft.

## **Fetal Alcohol Syndrome**

Mnemonic is **FETALROH**. **F**issures (palpebral) are short, **E**picanthal fold, **T**hin upper lip, **A**bnormal development (delay), **L**ong smooth philtrum, **R**ailroad track ears, **O**-heart problems & **H**irsutism.

## **Down syndrome**

Mnemonic is **DOWN**. **D**uodenal atresia, **O**-heart defects (AV canal defect & VSD), **W**ide gap btw first and second toes AND clinodactyly, **N**arrow fingers, ears & height (narrow means small or low set or short). Hypotonia is the most common abnormality in Down syndrome (occurs in about 90 percent of patients compared to 45 percent with O-heart defects). Down's syndrome is due to Nondysjunction 95% of the time.

- Get an ophthalmologic evaluation by 6-12 months.
- Screen for atlantaoaxial instability with lateral neck x-ray at 3-5 years.

Note: Suspect cord compression if unsteady gait and brisk DTR are mentioned in a patient with Down's syndrome.

## **Turner's syndrome**

Mnemonic is **TURNERS**. **T**hyroiditis (hashimoto), **U**nderdeveloped sexual characteristics, **R**otated ears posteriorly, **N**ipple widely spaced, **E**dema of feet, **R**egressed ovaries & **S**hort fourth and fifth metacarpals.

## **Noonan Syndrome**

Mnemonic is **Tina PURPLE**. **P**ulmonic stenosis, **U**nusual shaped chest (pectus deformities), **R**etarded, **P**hiltrum deeply grooved, **L**axity of joint & **E**picanthal fold, **E**ye-pertelorism (hypertelorism).

## **Klippel Feil Syndrome**

Mnemonic is **KLIPPEL**. **K**idney abnormality, **L**umbar, thoracic and C-spine abnormalities (c spine fusion), **I**ndex abnormality (cannot oppose fingers voluntarily), **P**rone to deafness, **P**alate is cleft, **E**levation of the scapula (sprengel deformity) & **L**ow hair line.

## **Aicardi Syndrome**

Mnemonic is **AICARDI**. **A**genesis of corpus callosum, **I**nfantile spasms, brain **C**ysts (porencephalic), **A**bnormal vertebrae, **R**etinal lacunae, **D**andy-walker malformation, **I**Q low (MR is moderate to severe).

## **Alagille syndrome**

Mnemonic is **ALAGILLE**. **A**bnormal vertebrae, **A**rterial stenosis and **A**neurysms can lead to HTN and coarctation, **L**arge ears, **A**bsorption of fat issues, **G**rowth issues, **I**mpassated bile duct, **L**iver issues (cholestatic jaundice), **L**arge head (triangular) & **E**mbryotoxon (eye abnormality).

## **Smith Lemli Opitz Syndrome**

Mnemonic is **SMITH**. **S**yndactyly, **M**ental retardation, **M**icrognathia, **M**icrocephaly, **I**nability to grow, **T**emporal narrowing (bilaterally), **H**ypotonia & pseudo-**H**emaphroditism.

## **Russell-Silver Syndrome**

Mnemonic is **RUSELL**. **R**etarded growth (short), **U**nsteady gait, **S**mall triangular face, **E**xtremity with clinodactyly, **L**imb asymmetry and **L**ow sugar (hypoglycemia).

## **Digeorge Syndrome**

Mnemonic is **CATCH22**. **C**ardiac, **A**bnormal facies, **T**hymic aplasia/hypoplasia, **C**left palate, **H**ypocalcemia & **chromosome 22 defect**. For **diagnosis choose FISH** (fluorescence in situ hybridization). Any infant with evidence of **DIRTT in the heart** should be screened for Digeorge/velocardiofacial syndrome. DIRTT is- **D**ouble-outlet right ventricle, **I**nterrupted aortic arch, **R**ight sided aortic arch, **T**etralogy of fallot and **T**runcus arteriosus.

## **Charcot Marie Tooth**

Mnemonic is **CHAST**. **C**law hand, **H**igh arch, **A**utosomal dominant, **S**tork like appearance & **T**oe is hammered.

## **Carpenter Syndrome**

Mnemonic is **CARPENTERS**. **C**raniosynostosis, **A**crocephaly, **R**etarded, **P**olydactyly, **E**picanthal folds, **N**asal bridge flat, **T**estis undescended, **E**ar low set, **R**educed (short) fingers and toes and **S**yndactyly

## **PHACE syndrome**

Occurs with large segmental facial hemangiomas. PHACE is- **P**osterior fossa abnormalities (dandy walker), **H**emangiomas in V1 distribution, **A**rterial abnormalities (usually intracerebral arterial abnormalities), **C**ardiac defects (coarctation of aorta usually) & **E**ye abnormality (micro-ophthalmia).

## **Hypospadia syndromes**

Mnemonic is **SLOB**. **S**ilver rusell, **L**aurence moon biedl, **O**pitz lemi smith and **B**eckwith wiederman syndrome. For hypospadias associated with cryptorchidism, do karyotype next.

## **Syndromic Hearing loss**

### **Usher syndrome**

- Associated with retinitis pigmentosa. Refer to ophthalmology next.

### **Pendred syndrome**

- Associated with thyroid disease. Get TSH and free T4 next.

### **Jervelle Lange Neilson**

- Associated with long QT and ventricular arrhythmias. Get EKG next.

## **Hypoglycemic syndromes**

### **Hyperinsulinism**

- Head, weight and height are above the 95<sup>th</sup> percentile.

### **Beckwith Wiedemann Syndrome**

- Big tongue & omphalocele are present.

### **Hereditary fructose intolerance**

- Vomiting starts with onset of ingestion of fructose and ketonuria and reducing substance are present in urine.

### **Galactosemia**

- Hepatomegaly, jaundice and reducing substance is present in urine. Diagnose galactosemia with G1P activity in RBCs. These infants need soy based formulas.

## **Genetic Syndrome COMPARISONS**

### **Crouzon versus Aperts**

- Both are autosomal dominant. Both cause craniosynostosis. Apert has syndactyly.

## Hurlers versus Hunters

- They both have coarse facies.
- Hunters need their sight to hunt so no corneal clouding in hunters and hunters also need a target to shoot, so they hunter is X linked.
- Hunters are prone to joint contractures from all the running around and dysostosis multiplex.
- Hurler has grown a lot of hair (hirsutism) sitting in one place AND because of his eye issues (corneal clouding present in hurlers).

## Homocystinuria versus Marfans

- In homocystinuria the lens is displaced posteriorly
- In homocystinuria, cognition is impaired and they are prone to osteoporosis and vascular occlusion (e.g. strokes).

## Tay sach versus Niemann pick

- Both are lipid storage diseases.
- Choose Tay Sachs if cherry red spot plus macrocephaly (**SAC- head**) is given.
- Choose Niemann pick if cherry red spot plus hepatomegaly (**PICKY-liver**) is given.
- Tay sach is due to Hexoaminidase deficiency.

## Gauchers versus Fabrys

- Gauchers has organomegaly, bone pain with lytic bone lesions and thrombocytopenia with easy bruising.
- Fabry affects mostly skin (orange skin), eye, kidney and brain.

## Menkes Kinkey Hair versus Wilson's Disease

- Both have low serum copper, low ceruloplasmin and high tissue copper
- Menkes is X-linked & doesn't cause hepatic failure
- Wilson is autosomal Recessive & may cause hepatic failure

## Von Gerkes versus Pompe

- Von gierke has hepatomegaly, hypoglycemia, increased lipids, uric acid and lactic acidosis. For treatment, use glucose infusion if patient is less than 2years and cornstarch after age 2yrs.
- Pompes will be the floppy infant with big tongue and cardiomegaly. Pompes usually will not have hypoglycemia or acidosis and they usually die early.

## Inborn Error of Metabolism

	NH3 high	NH3 normal
Acidosis	<p><b>Organic acidemias:</b> PA, MA, and IA. May suppress marrow causing thrombocytopenia and neutropenia. Hypoglycemia is consistent with MA. Measure urine organic acid next.</p> <p><b>Fatty acid oxidation defects</b> (MCAD &amp; LCAD). Hypoglycemia and hepatomegaly with no reducing substance in urine are consistent findings. Measure plasma acylcarnitine profile next.</p>	<p><b>MSUD.</b> Hypertonia or hypotonia in the first week of life. May have hypoglycemia.</p>
No acidosis	<p><b>Urea cycle defects:</b> Respiratory alkalosis is consistent with UCDs. Most have neurologic and intellectual sequelae. If NH3 is greater than 560, think citrullinemia</p>	<p>Aminoaciduria</p> <p><b>Galactosemia</b></p> <p><b>Non ketotic hyperglycinemia</b></p> <p>Menkes syndrome</p>

### Sensitivity and specificity

	Disease present	No disease
Positive test	a	b
Negative test	c	d
	Sensitivity	Specificity

#### Sensitivity

- $a/a+c$ : Probability that a person with disease will have a positive test. Best for screening.

#### Specificity

- $d/b+d$ : Probability that a person without disease will have a negative test. Best for confirming.

#### Positive predictive value (PPV)

- $a/a+b$ : Probability that a person with a positive test has the disease.

#### Negative predictive value (NPV)

- $d/c+d$ : Probability that a person with a negative test is disease free.

## Relative Risk (RR) and Odds Ratio (OR)/Prevalence

	Disease develops	No disease develops
Exposed		
Not exposed	A	B
	C	D

### Relative Risk (RR)

- $A/A+B$  divided by  $C/C+D$ . RR is used in prospective or cohort studies to determine risk. A RR of 2.5 means there is a 2.5 times greater probability of disease occurring in exposed compared to the nonexposed. RR is used in prospective studies.

### Odds Ratio (OR)

- $AD/BC$ . An OR of 9.9 means there is a 10 fold greater odds of disease occurring in those exposed compared to the non-exposed. Used in case control or retrospective studies.

### Prevalence

$A+C / (A+B) + (A+C)$  i.e. number with disease divided by (number at risk of disease plus number with disease).

For example if the total in columns A & C is 200 (total with disease) and the total in row A & B is 100 (total exposed) then the prevalence of the disease is  $200/100+200 = 200/300 = 0.66$  or 66%. Imagine if a disease X is very common, it would be very common for a test T to be positive for disease X.

**High prevalence of a disease increases the PPV** of a test.

## **Confidence intervals (CI)**

The 95th % confidence interval says the observed RR or OR from the study has about 95% chance of being within the interval given. For example if they give you the RR of alcohol causing liver cancer is 2.0 in a study with a 95% CI of 1.3-3.7, then they are saying that the observed RR of liver cancer was 2.0 and that there is a 95% certainty that the actual RR (in reality) of liver cancer from alcohol falls somewhere between 1.3-3.7. If the Confidence Interval includes 1, then it is not significant.

**On the boards you will be tested on CIs.** If the question asks **which confidence Interval is most significant**, cross out the ones that include 1 first (e.g.-0.3 to +1.7), next sort out the differences between the numbers that make up the interval and choose the one with the smallest difference in interval or range. For example a CI of 1.2-2.5 is more significant than 1.2 to 3.5 because the former interval has a smaller range and they both do not include 1.

## **P-VALUE**

A p-value is a measure of how much evidence you have against the null hypothesis. Remember the null says the difference, if any, is due to random chance. The alternative hypothesis says the difference is due to something and not by chance. The researcher is always trying to prove the null wrong all the time by using the p value. The smaller the p-value the more evidence you have.

**On the boards your interpretation of the p value will surely be tested!**

- **A p-value of <0.01** says there is a less than 1% chance that the observed value or difference noted in the study or research was due to random chance. In otherwords; there is a less than 1% chance that the null hypothesis is right.

- A **p-value of <0.05** says that there is a less than 5% chance that chance is the reason for the difference found (same thing, just tweaked the statement a bit).
- A **p-value of <0.10** says there is a less than 10% chance that the observed value or difference noted in the researchers study was due to random chance. A p value of <0.01 is more significant than <0.05 and <0.10 is the least significant.

## **Pediatric Ethics**

- Never hide the diagnosis from the patient
- Use restraint if patient poses harm to self
- Be confidential if patient wants confidentiality
- A parent cannot request a test without the patient's permission or consent
- Emancipated minors can consent for themselves regarding issues like pregnancy, family planning, STI, contraception & substance abuse.
- The courts have the ultimate say about competency.

**Autonomy:** This is a patient or its representative's right to choose. Informed consent, **explaining benefit and risk** or discussing alternatives are ways of empowering the patients/parents or representatives to make informed decisions (thus autonomy).

## **Preventive Pediatrics**

### **DTaP/TdaP Myths**

- The following are **NOT** contraindications to DTaP/Tdap: well controlled seizures, cerebral palsy, latex allergy, history of extensive limb swelling with prior shot. Give the vaccine if any of the above is described in a vignette.

- The pertussis component is implicated if patient has progressive neurological disease. Giving Td in place of Tdap will be the answer in this scenario.
- Defer Tdap for 10 years if Arthur's reaction occurs.

## **Pertussis exposure**

- Everyone exposed needs erythromycin.

## **Wound/Tetanus prophylaxis**

- **Dirty wound:** No vaccine or TIG is required for patients with greater than 3 prior tetanus shots with the last given less than 5 years ago. **Vaccinate and give TIG for <3 prior tetanus shots or unknown shot history.**
- **Clean wound:** No vaccine or TIG required for patients with greater than or equal to 3 prior tetanus shot with the last given less than 10 years ago. Vaccinate if **<3 prior tetanus or >10 years** since last shot (**No TIG for clean wounds!**)

## **HIB exposure and prophylaxis**

- All household contacts need rifampin regardless of age.
- All attendees and supervisory personnel at school or daycare need rifampin if exposure is to greater than one case of invasive HIB infection within 2 months.
- At school, if exposure is to a single case of invasive HIB, no prophylaxis is required for personnel or attendees.
- Vaccination is indicated after invasive HIB infection in children less than 24 months.

## **Hepatitis A exposure and prophylaxis**

- Household and sexual contact should receive Immunoglobulin within 2 weeks of exposure.

## **Varicella exposure and prophylaxis**

- VZIG should be given within 96 hours of exposure. Significant exposure includes household contact, face to face indoor play and infants exposed 5 days before until 2 days after delivery.

## **MMR Myths**

MMR may be administered in the following conditions on the boards: positive PPD, immunodeficiency in a household member, egg allergy, asymptomatic HIV, breastfeeding and presence of mild illness.

## **Measles exposure and prophylaxis**

The time from exposure and the age of the child determines the most appropriate next step.

- Within 72 hours of exposure in a child greater than 6 months old, give the measles vaccine next. Greater than 72 hours but less than 6 days from exposure in a child greater than 6 months old, give measles immunoglobulin next.
- **If less than 6 months old and exposed, no intervention is required.**

## **Meningococcal Exposure and prophylaxis**

- Household, close intimate and daycare contact should receive rifampin within 24 hours of the primary case diagnosis. Ciprofloxacin (>18 years) or ceftriaxone may be used for prophylaxis.

- Classroom contacts and casual contacts such as the BP nurse or attending who examined the child do not need antibiotic prophylaxis.

## **Flu Shot Myths**

- Guillain Barre Syndrome, Immunosuppressive conditions and therapy are NOT contraindications.
- If there is a history of egg allergy, then skin testing is required before given the flu.

## **HIV and daycare**

- Exclude from school or daycare if a child with HIV has uncovered exudative skin lesions or unacceptable behaviors such as biting and scratching.
- Mild eczema, contact with saliva & tears, minor nose bleeds ARE NOT reasons to exclude from school or daycare. Daycare or school personnel should use standard precautions and child's HIV status shouldn't be disclosed.

## **Malaria prophylaxis**

Key to getting this right is looking at the weight of the child and knowing your geography!

**Travelling to an African, middle-eastern or south East Asian country:** These areas have chloroquine resistant bugs. Use atovaquine-proguanil or mefloquine for prophylaxis.

- If child is less than 11kg or has a seizure disorder, use atovaquine-proguanil for prophylaxis instead.
- If greater than 11kg and no seizure disorder, use mefloquine for prophylaxis.

- If child is less than 5kg, delay the travel.

**Travelling to South America:** The prophylactic antimalarial of choice is chloroquine. Pathogens in this part of the world are chloroquine sensitive.

### **Injury and prevention (TIPPS)**

<b>Age</b>	<b>Falls</b>	<b>Burns</b>	<b>Drowning</b>	<b>Poisoning/Choking</b>
2 months		Set hot water heaters at 120 <sup>o</sup> f. Test water before baths and feeding	Don't leave alone in bathtub	SIDs prevention, no cobedding, one thin linen well tucked in on well fitting and firm mattress, back to sleep.
4 months	Don't leave on high surfaces	Never hold hot liquids while holding child	Don't leave alone in bathtub	SIDs prevention
6-9 months	Use gates	Keep in safe place while cooking, never hold hot liquids while holding child	Empty all water containers, keep bathroom door/s shut	Remove small objects from child's reach, don't feed hot dogs, carrots, peanut & popcorn
9-12 months	Use gates, window guards no walkers	<b>No hot liquids on stove or table edges</b>	Install 4 sided fence around pool	Remove small objects from child's reach, don't feed hot dogs, carrots, peanut & popcorn
<b>12-18 months</b>	Lower crib mattress and window guards	Keep in safe place while cooking (crib or playpen)	Never leave alone near water containers, fence the pool	Keep chemicals and medications out of reach, use <b>safety latches and locks</b> on drawers and cupboards, <b>safety caps</b> on all medicines

## **TIPP FACTS (Injury and Prevention)**

- Fencing the pool is the best way to prevent toddler and preschool drowning
- Firearms in the house increases adolescent suicide risk 5 folds
- Use of smoke alarms is better than having an exit plan in preventing burn from fires

## **CAR SIT: the Front, the back and the BOOSTERS**

### **Rare facing seat**

- From birth -1 year

### **Convertible seat**

- 1 year and >20 pounds

### **Booster seat (belt positioning)**

- 40-80 pounds and <4 feet 9 inches tall

### **Back sit/shoulder strap with Belt**

- >8years or >4 feet 9 inches

### **Front seat with air bag**

- $\geq 12$  years or  $\leq 12$  years but at least 5 feet tall.

## **SHARPS**

Know the 4Ds

- Do not recap
- Discard sharps yourself
- Do not empty sharp boxes when full
- Don't make them accessible to patients

## Lead exposure/toxicity

Heel stick level	Most appropriate next step	Treatment
Level >10mcg/dl	Confirm with a venous sample next	Advice on environmental control measures, home visit and provide educational materials. Consider oral chelation for levels > 25mcg/dl
Level > 60mcg/dl	Confirm with a venous sample next	Work up with FEP levels, abdominal and long bone films. <b>Chelate next</b>

### Lead lines

When seen in long bone films, they suggest at least 6-8 months of lead intoxication and they are due to an abnormal calcium deposition at the metaphysis.

### Chelation

- Use succimer or oral DMSA when indicated for levels less than 70.
- For levels >70 mcg/dl, begin chelation with IM dimercaprol followed by IV calcium EDTA.

### Tuberculosis exposure

Exposure history	Best initial step in infant	Next step in management
Mom with positive PPD and positive follow up chest x-ray	PPD 1 <sup>st</sup> → Chest x-ray next if PPD is positive	Positive CXR-Begin triple anti-TB meds <b>Negative CXR-</b> Give INH for a year

## **Tuberculosis testing**

Associate false negative PPD with recent viral infection, kwashiorkor and poor technique. Associate false positive PPD with previous BCG. Get a chest x-ray next if PPD positive.

## **Pre-employment immunization status**

Before employment, health care personnels need proof of immunization for **MMR**, **Influenza**, **Hepatitis B**, **TB** and **Varicella**. The new employee needs to **get on MIH-TV before employment.**

## **Diaphragmatic Paralysis**

Paradoxical inward movement of the abdomen with inspiration is suggestive. It may be unilateral or bilateral. **Chest x-ray is diagnostic** if unilateral.

## **Diaphragmatic Hernia**

They are usually left sided. Respiratory distress in a newborn with a scaphoid abdomen is suggestive. Bowel sound heard on auscultation of left thoracic cavity. The most appropriate next step in a stable child is getting a chest x-ray. Chest x-ray reveals bowel or NG tube in the left thorax and mediastinal shift to right. If x-ray is suggestive, get real time fluoroscopy next.

## **Foreign body aspiration**

Unilateral wheeze when described or unilateral diminished breath sounds are suggestive. Get a chest X-ray first. The most appropriate next step in evaluation in an older child that can cooperate is an inspiratory and expiratory film or an airway fluoroscopy in a child that cannot cooperate.

Bronchoscopy is diagnostic. Rigid bronchoscopy is preferred because in addition to being diagnostic, the foreign body can be removed (objects cannot be removed with a flexible bronchoscopy). Food is the most common aspirated foreign body. Toy balloon is the most fatal.

## **Nasal Obstruction**

### **Acute Rhinitis**

- Instruct on bulb suction with saline drops next.

### **Foreign body**

- Remove with forceps next.

### **Piriform aperture stenosis**

- Refer to ENT next.

### **Nasopharyngeal tumor**

- Get head CT or MRI next.

## **Silent Aspiration**

Recurrent pneumonias in a child at risk should make you think of silent aspiration. At risk children are those with gastro esophageal reflux disease, neurologic dysfunction, cerebral palsy and anatomic abnormality of the upper airway.

The most appropriate next step in evaluation if history is suggestive is bed side feeding evaluation by an occupational therapist or a speech therapist. Gold standard for diagnosis is video fluoroscopic swallow study.

## **Hypocalcemic Laryngospasm**

Vignette typically describes an infant (usually greater than 4months) with croup-like symptoms unresponsive to steroids, cool mist, epinephrine nebs and oxygen. A history of exclusive breast feeding is a clue. Get an EKG and serum calcium as the most appropriate next step in evaluation.

## **Sinusitis**

URI that persists for greater than 10 days even in the absence of fever is suggestive. When Coughing is present, it must be present during the day. Allergic rhinitis increases the risk of sinusitis and may be present at diagnosis. Diagnosis is clinical and no imaging is necessary usually.

In older kids, suspect *Aspergillus* or *Candida* as a cause if patient is on chronic steroids, chronic antibiotics or chemotherapy. Mucormycosis is a likely cause in patients with poorly controlled DM. Giving a longer course of amoxicillin will be the answer sought on the boards if a patient with acute bacterial sinusitis fails to respond to a 10 day course of amoxicillin.

## **Retropharyngeal abscess (RPA)**

Fever, dysphagia, neck stiffness and drooling in a patient with prior history of pharyngitis or sinusitis should alert you to a possibility of RPA. Trismus may be present. Most likely additional findings are dysphonia, shoulder or back pain upon swallowing and unilateral cervical lymphadenopathy. Do lateral neck x-ray or CT scan next.

## **Peritonsillar abscess (PTA)**

A picture showing a mouth wide open with uvula deviation will be peritonsillar abscess on the boards until proven otherwise. Fever, drooling, dysphagia, neck pain, trismus may be described just like in RPA.

Contralateral uvula deviation and peritonsillar fluctuance on examination distinguishes PTA from RPA clinically. No imaging is necessary, diagnosis is clinical.

## **Epiglottitis**

This is the leaning forward and drooling kid in respiratory distress. Epiglottitis patients cannot lie flat. Symptoms are more abrupt than in RPA. It is best to leave the child with mom and do not examine. Most appropriate next step in management is getting personnel needed to intubate as soon as possible.

## **Bacterial Tracheitis**

Vignette may describe epiglottitis like child with higher fevers (>39 degrees centigrade). Unlike epiglottitis, tracheitis patients can lie flat and have no drool. Intubation is the most appropriate next step in patients suspected of having bacterial tracheitis.

Staph aureus and H influenza are the most likely organisms in bacterial tracheitis when considering empiric antibiotics. Begin empiric antibiotics with rocephin (for h. influenza) AND vancomycin or clindamycin (to cover MRSA).

Do not choose the third generation + nafcillin or oxacillin combination. For diagnosis, bronchoscopy or laryngoscopy are more definitive.

## **STRIDOR**

### **Croup**

Noisy breathing (per mom) associated with barking cough that improves with cool mist therapy enroute the emergency room is suggestive. The Presence of stridor at rest requires epinephrine nebs next. If stridor is persistent after epinephrine treatment, admit patient next.

Most likely causative organism is parainfluenza virus. Associate spasmodic croup with GE reflux.

## **Laryngomalacia**

This causes wet inspiratory stridor from birth, worsens while supine or agitated and improves with expiration. Laryngomalacia usually resolves by 18-24 months. Reassure parents.

## **Tracheomalacia**

This causes biphasic or expiratory stridor or wheeze worse when crying or lying supine. Change to prone position next if patient has stridor while supine with hypoxia, apnea or bradycardia. Associate tracheomalacia with tracheoesophageal fistula repair or with mechanical ventilation. Diagnosis of tracheomalacia is via fluoroscopy or bronchoscopy.

## **Vascular Rings**

Dysphagia is present with stridor. Get a chest x-ray first. A chest x-ray may show hyperinflation, atelectasis, right or double aortic arch. Do UGI or barium swallow next. Vascular ring is confirmed with a CT angiography.

## **Other causes of stridor**

- **Paralyzed vocal cords:** High pitched inspiratory stridor associated with weak cry.
- **Big tonsils and adenoids:** Inspiratory stridor in an obese patient who snorrs and has bilateral tonsillar hypertrophy.

- **Subglottic stenosis:** Biphasic stridor in patient with history of long term intubation. Recurrent croup is a pointer to subglottic stenosis. For subglottic stenosis, do direct laryngoscopy or microlaryngoscopy for diagnosis.

### **Vocal cord paralysis versus vocal cord dysfunction**

	VCP	VCD
Presentation	Hoarseness, stridor, weak cry and dysphagia	Hoarseness, stridor, wheezing and cough
Laryngoscopy	No motion of the vocal cord during inspiration and expiration.	Paradoxical vocal cord motion or anterior cord adduction.

## **ASTHMA**

### **Re classification**

Intermittent and severe persistent asthma are low yield on the boards. For mild persistent asthma, begin low dose inhaled corticosteroids (ICS) next. For moderate persistent asthma, beginning a long acting beta agonist and ICS combo (e.g. advair) is more efficacious than doubling the dose of ICS. ICS with singulair will be an acceptable answer as best initial treatment for moderate persistent asthma.

### **Re Pulmonary function test (PFT)**

- Do not use PFTs in preschoolers.

### **Re stepping up or stepping down asthma meds**

- Check adherence, inhaler technique, environmental control and co morbidities (GERD, allergic rhinitis) before stepping up treatment.

- If vignette describes a poorly controlled patient on an alternative medication for persistent asthma, change to the preferred medication as the most appropriate next step in management before stepping up

### **Re Inhaled corticosteroids (ICS) effects**

- Final adult height is not affected by ICS. To decrease local side effects of ICS, have patient rinse mouth after use.

### **Re asthma exacerbations**

Antibiotics will be wrong for acute asthma exacerbation and fever unless there is obvious consolidation described on chest x-ray (atelectasis is consistent with asthma). Starting oral steroids (or IV if patient is vomiting) will be the answer for exacerbations associated with fever. URI is the most common cause of exacerbations and fever.

### **Re asthmatic hospitalization**

Tachypnea may initially cause low PCO<sub>2</sub> but if tachypnea is prolonged, the PCO<sub>2</sub> may begin to increase from a low level to a normal level. A normal PCO<sub>2</sub> seen in asthmatics with prolonged tachypnea is worrisome. It may indicate impending respiratory failure. Before discharge make sure patient has an action plan and is educated about the disease.

### **Psychogenic cough**

- Buzz phrase will be cough present all day and absent during sleep.

## **Idiopathic Pulmonary Hemosiderosis**

Chest x-ray shows diffuse interstitial pattern. Suspect in a kid with hemoptysis and hemosiderin laden macrophages seen in bronchoalveolar lavage specimen.

Hypochromic microcytic anemia is a consistent finding.

## **Bronchiolitis**

Diagnosis is clinical. Chest x-ray reveals perihilar cuffing and hyperinflation typically. Contact precaution is required. Intermittent suctioning, nebulized therapy and supplemental oxygen are the mainstay of treatment. Oral or inhaled steroids may be useful if patient has a history of wheeze or bronchiolitis. Suspect pneumonia or otitis media if “new fever” occurs or patient worsens.

## **SynaGIS Schedule**

L-PCR helps you determine candidates for synagis. **Less than 2yrs, Premature (<35wks), Chronic medical condition present (congenital heart disease or chronic lung disease), Risk factor present (daycare attendance, neurologic disease, exposure to school aged sibling).**

- CHD and CLD patients require 5 doses of synagis. **Begin if < 2 years** at the start of the RSV season
- Premature infants < 29 weeks and those with Neurologic disease require 5 doses of synagis. **Begin if < 12 months** at the start of the RSV season
- Premature infants between 29 and 32 weeks require 5 doses of synagis. **Begin if < 6 months** at the start of the RSV season

- Premature infants between 32 and 35 weeks and/or attends day care or have a sibling <5 years at home should receive 3 doses of synagis. **Begin if < 3 months** at the start of the RSV season
- >35 weeks infants require NO SYNAGIS regardless of age at onset of RSV season

## **Transudate versus Exudate**

### **Transudate (transless)**

Transudate have protein < 3g/dl, LDH <200 and ph>7.45. Congestive heart failure and nephrotic syndrome are causes of transudate.

### **Exudate (exugrate)**

Exudates have protein greater than 3g/dl, LDH greater than 200 and ph<7.3.

Pneumonia is a common cause of exudate. If chylothorax (milky white effusion) is described, choose lymphomas as the most likely cause (correlate with history).

Another cause of chylothorax is superior vena cava syndrome.

## **PNEUMONIAS**

### **Re most likely causative organism**

In the newborn, group B strep is the most common cause. Choose E coli if a history of chorioamnionitis is given. After the newborn period, viruses are the most common cause up until 4 years but strep pneumoniae is the most common bacterial cause.

Chlamydia is the most common cause if patient is between 2-8weeks and has tachypnea without fever (conjunctivitis may or may not be present). Mycoplasma is the most likely cause after 4 years (correlate with history and imaging findings).

## Re Imaging

Usually the images are shown on the boards. In **consolidation** there is homogenous opacity confined to one lobe. Blunting of the costophrenic angle (depending on how much effusion there is) is suggestive of pleural effusion. In **lung abscess**, thick walled cavities with or without air fluid levels are described or shown.

## PERTUSSIS

Paroxysmal cough associated with cyanosis, whoop or post tussive emesis is suggestive. Infants described are typically less than 3 months but older infants not up to date on shots are at risk. Most likely additional finding on physical examination may be **subconjunctival hemorrhage or facial petechiae**. A CBC with differentials will reveal leukocytosis and lymphocytosis.

A chest X-ray doesn't help but should be done if patient is hypoxic to rule out other causes or complications. It typically reveals perihilar infiltrate and atelectasis.

Nasopharyngeal swab for pertussis DFA or PCR is diagnostic (PCR has a higher sensitivity and specificity than DFA). Treatment is with oral erythromycin for a total of 14 days. ALL household and close contacts need prophylaxis.

## Cystic Fibrosis (CF)

At the 2 week visit, repeat newborn screen if initial CF screen is positive. If the repeat screen is positive, do genetic testing or a sweat chloride test next. Failure to thrive in a kid with diarrhea and recurrent pneumonias is suggestive of CF.

A sweat chloride test  $\geq 60$  mmol/L is diagnostic. **Results between 40-60 mmol/L require repeat testing next.** CF patients are prone to pneumonias from staph, pseudomonas, stercorotrophomonas and B. capacia. They are also prone to recurrent

sinus infections, GI tract issues (vitamin A, D, E & K malabsorption), hepatobiliary system issues (portal HTN and cirrhosis) and endocrine system issues (pancreatitis and DM). Think pulmonary osteoarthropathy if joint pain is mentioned in a patient with CF.

## **Obstructive Sleep Apnea (OSA)**

OSA causes obstructive hypoventilation (high  $paCO_2$ ) and respiratory acidosis. Tonsil and adenoid hypertrophy are the most common cause of OSA. Increase daytime sleepiness in a patient that snores is suggestive. Obesity is a risk factor. A sleep study or polysomnography is the most appropriate next step in evaluation.

Other causes of obstructive hypoventilation are Treacher Collins syndrome, allergic rhinitis, poor pharyngeal tone & big tongue. OSA patients at risk for post surgical pulmonary edema are children <3 years, with neuromuscular disease or Downs syndrome. Get a chest x-ray next if respiratory distress occurs post T & A surgery.

## **Near Drowning (ND)**

On the boards, associate ND with Long QT syndrome and acute respiratory distress syndrome (ARDS). Patients with submersion injury (near drowning) are prone to hypothermia. **Rewarming techniques for hypothermia are frequently tested.**

Look at the temp in the vignette! For temps between 34-36 degrees centigrade, warming blankets or heating packs are appropriate. For temps between 30-34 degrees centigrade, choose warming with humidified oxygen and warm intravenous fluid (>40 degrees centigrade). For temps less than 30 degrees, ECMO may be indicated.

## Spirometry and Lung Volumes

- **Obstructive Lung disease:** Asthma and CF are examples. Findings include reduced FEV1/FVC ratio, **increased TLC AND FRC.**
- **Restrictive Lung disease:** Interstitial fibrosis, pneumonitis, neuromuscular disease and scoliosis are examples. Findings include a normal FEV1/FVC ratio, **decreased TLC AND FRC.** Most with **neuromuscular respiratory disease** require intubation.

## Respiratory ABGs

Disturbance	Result
Acute respiratory acidosis	↑Paco2 , ↑HCO3 & ↓PH
Chronic respiratory acidosis	↑Paco2, ↑↑HCo3 & normal PH
Acute respiratory alkalosis	↓Paco2, ↓HCo3 & ↑ PH
Chronic respiratory alkalosis	↓Paco2, ↓↓ HCo3 & normal PH

## **GROWTH**

### **Normal growth**

Healthy term babies lose no more than 10 percent of their birth weight in the first week of life but regain it by 2 weeks. The initial weight loss in the first week of life is due to extracellular water loss. If vignette describes a normal term infant with >10 percent weight loss in the first two weeks of life, assess feeding next. Birth weight doubles by 5 months and triples by 12 months while birth length doubles by 4 years and triples by age 13 years. An infant should gain 25-30 grams per day in the first 3 months then 15-20 grams per day between 3 & 6 months.

### **Head growth**

- Normal head circumference at birth is 35 cm and it grows 1 cm per month for the first 6 months and 0.5 cm per month from 6 to 12 months.
- For **macrocephaly** (head circumference >98 percentile), measure parents head first. Think hydrocephalus if bulging fontanelle & vomiting is associated with macrocephaly. Eye findings in hydrocephalus are divergent strabismus, abducens nerve paresis and impaired upward gaze. Get a head CT or MRI next if hydrocephalus is suspected.
- For **microcephaly** think trisomies, TORCH infections, and craniosynostosis on the boards. Correlate with history and typical facies for trisomies and TORCH infections. Craniosynostosis described as long narrow head with

prominent occiput is scaphocephaly (due to early fusion of the sagittal sutures). If craniosynostosis is suspected, order plain skull films first and head CT next if the plain film is inconclusive. If craniosynostosis is associated with an abnormal physical examination, such as syndactyly or developmental delay then a chromosomal study is indicated next to rule out causes such as Apert syndrome. Treat synostosis between 6 and 12 months with surgery. Remember apert has syndactyly.

## Obesity

- Underweight:- BMI <5TH percentile defines
- Overweight:-BMI > or equal to the 95<sup>th</sup> percentile
- At risk for overweight:- **BMI between the 85<sup>th</sup> and 95<sup>th</sup> percentile**

**Note:** Measuring skin fold thickness will be the most appropriate next step to determine excess body fat in an adolescent.

**Familial tendencies:** A 6 year old obese child has a 25 percent chance of being obese as an adult while a 12 year old obese child has a 75% chance of being an obese adult. The most common and immediate psychosocial effect of obesity in childhood is social isolation and discrimination.

## Failure to Thrive

Definition can be based on a one point in time measurement or based on a pattern noted on the growth curve over time. Non organic causes such as psychosocial, behavioral and nutritional etiologies are more common. First step is evaluation of

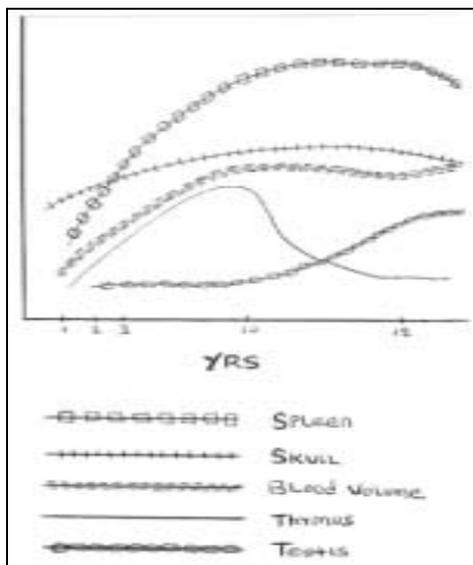
child's diet. Next is developmental and behavioral assessment. Third is feeding/interaction observation (usually done inpatient).

## Predicting final height

Use mid parental height

- For boys =  $(\text{moms height} + 13) + \text{fathers height} / 2$
- For girls =  $(\text{Fathers height} - 13) + \text{moms height} / 2$ .

Lymphoid/skull/Testis growth curves



## DEVELOPMENT

### Mile stones

- **2 months:** Lifts head to 45 degrees, lifts shoulder off the bed while prone, fixates on face and objects and follows objects for about 180 degrees.
- **4 months:** Rolls from prone to supine, laughs loud, squeal and imitates laughs
- **6 months:** Sits with support, transfers and reaches for objects, babbles and imitates speech.

- **9 months:** Sits without support, stranger anxiety, says non-specific mama or dada and plays peek-A-boo.
- **12 months:** Pulls to stand and cruises, follows single command with gestures and specifically says mama and dada.
- **15 months:** Walks independently, follows single step command without gesture and Stacks 2 blocks.
- **18 months:** Climbs upstairs held, can name five body parts, stacks 4 blocks and imitates chores.
- **24 months:** Climbs upstairs one foot at a time, copy straight line, knows 50 words, 50 percent intelligible speech to stranger follows 2 step commands and stacks 6 blocks.
- **36 months:** Alternates feet upstairs, copy a circle, rides a tricycle, 75 percent intelligible speech to stranger, uses plural & present tenses, knows sex and name of friend.
- **4 years:** Walks up and down steps, can copy a cross, uses past tense, knows 4 colors, can count to 4, does pretend play and has 100% intelligible speech.
- **5 years:** Skips, walk backwards, can copy square, play board games and defines words.
- **6 years:** Ties shoelace, can copy triangle, rides bicycle and can count ten objects.

**Question format on the boards:** The milestones of a 4 month old will be described and you will be asked what he or she would be able to do during his or her next visit. Answer will be the 4 month milestone achieved.

### **Child with severe visual impairment**

Sits independently between 10-12 month, walks with hands held between 14-18 months and walks alone between 21-36 months. **Language is the least affected.**

## **TEETHING**

### **Eruption and myths**

First to erupt are the mandibular central incisors. Teething will not be the cause of diarrhea, rhinorrhea, rash or fever on the boards. No fluoride toothpaste before 2yrs. Supplement fluoride if drinking water has less than 0.3ppm of fluoride.

### **Nursing Bottle Decay**

Suspect this if maxillary incisors look decayed (blackish) and mandibular incisors are ok (protected by the tongue during bottle feeding). Not putting the infant to sleep on the bottle overnight, cutting late night breast feeding & introducing the cup when due are all ways to prevent this and possible answers on the boards. If all 3 are options, choose the no bottle in mouth overnight option.

### **Delayed Tooth Eruption**

Defined as no tooth eruption >16months. On the boards, It is commonly caused by **4H & Rickets.**

- Hypothyroidism
- Hypopituitarism
- Hypoplasia of enamel
- Hypohidrosis
- Rickets

## Developmental Screening test

Testing	How best to test	Key points
Intelligence	School-aged:-WISC Preschoolers:-Stanford Binet	<b>Needed for MR and Learning disorder</b>
Achievement	Wide range achievement test	Needed for Learning disorder
School readiness	Early screening inventory revised	
Social adjustment/behavior	Eyeberg child behavior	
Ability to perform skill for daily living	Vineland Adaptive	Needed for MR
Language delay	Early language milestones scale (ELMS) & clinical linguistic and auditory milestone scale (CLAMS)	
Autism	Checklist for autism in toddlers (CHAT) & pervasive developmental disorder screening test (PDDST)	CHAT done at 18-24 months

**Components of WISC:** Verbal comprehension (VC), Perception reasoning (PR), Working memory (WM) and Processing speed (PS).

**Dyslexia: (low voice normal Public Relations)**

Think dyslexia if a patient has a low VC with normal PR on the WISC. If dyslexic patient is less than 7 years, reassurance is all that is needed.

## **Non verbal Learning disorder (low voice no public relations)**

Think NVLD if VC and PR are low on the WISC. Suspect neurologic impairment if there is a difference of greater than 25 between PR and VC.

## **Learning disorder**

These kids have specific subject difficulty e.g. math and reading. Do psycho educational evaluation first. Patients may need to be in special education classes or may need resource services. Strong family support has a positive long term impact and prognosis in patients with learning disorder.

## **Reading Disorder**

Early risk factors for reading difficulties: Mnemonic is LANGUAGE-**L**ower case identification issues: **A**bnormal understanding of letter-sound understanding, **N**o familiarity with book reading, **G**uardian (parents) with history of reading problems, **U**pper case identification issues, **A**bnormal phonemic awareness in kindergarten, **G**uardian with history of similar difficulty and **E**arly childhood language delay.

## **Stuttering**

- Normal up to age 4years. Reassure parents next if child is less than or equal to 4 years.

## **Language Delay**

### **Know red flags**

- At 6 months cannot turn to voice
- No babble by 12 months
- No pointing or using gestures by 18 months
- No two word phrase by 26 months

- No three word sentence by 3 years or echolalia at 3yrs, parents cannot understand child at 3 years.
- Strangers cannot understand child by 4yrs
- Stuttering at 5yrs
- Regression in language at any age.

**Note:** Most appropriate next step if speech or language is delayed is doing a hearing screen first.

## **Hearing screen**

Do a screening audiometry at age 3-5 years. Under special circumstances such as inability to cooperate, developmental or behavioral abnormality, use the following age appropriate screens.

- a) Behavioral Observation Audiometry for children <6 months
- b) Visual Reinforced Audiometry for children 6 months to 3yrs.
- c) Conditioned Play Audiometry for children 3 years to 5 years.

## **Audiologic evaluation**

This is done next with ABR if hearing screen is failed or inconclusive. Other causes of language delay are mental retardation, autism, dysphasia, dysarthria, child abuse and neglect. Screen for these causes next if hearing screen & audiologic evaluation are inconclusive OR refer to appropriate specialist. If audiologic evaluation is positive for hearing loss, refer to ENT next.

## **Mental Retardation**

### **Mild MR (IQ 50-69)**

Most of these kids will have delay in adaptive areas e.g. self-care and play. Mild MR can learn to read and write and do simple math. Mild MR can also receive vocational training and live independently.

### **Moderate MR (IQ 35-49)**

These kids can read and write up to the first or second grade. In the future, a child with moderate MR may be able to work in a sheltered workshop that provides close supervision.

### **Causes of MR**

- Fetal Alcohol Syndrome is the **most common preventable** cause of MR.
- Fragile X Syndrome is the **most common inherited** cause of MR.

**Note:** Children with MR are eligible for medicaid and social security benefits at age 18yrs regardless of parental ability to care for them.

## **Autism Spectrum Disorder (ASD)**

Impairment in social skills, language delay and odd interests with compulsive behaviors is suggestive. Lack of eye contact is an additional finding consistent with autism. Do not choose autism as a cause of isolated language delay if a hearing test has not been done or if the child's social skill is normal. In Aspergers, cognition and language are normal.

## Principles and components of effective early intervention in ASD

- Early intervention before or as soon as diagnosis is made
- Intensive intervention with active engagement of the child for at least 25 hours a week, 12 months a year
- Low student to teacher ratio to allow sufficient amounts of 1-on-1 time
- Inclusion of a family component including parent training
- Incorporation of a high degree of structure through elements such as predictable routine, visual activity schedules, and clear physical boundaries to minimize

## **ASD Myths**

For moms concerned about links between MMR and ASD, reassure her and tell her they are no proven associations or studies.

## **Complementary and Alternative Medicine in ASD**

The practitioner should encourage families to seek additional information when they encounter families with claims of cure, seeking clarification on a CAM study or with questions about CAM treatments claiming to have no side effects.

## **Formal supports for ASD families**

Includes publicly funded, state-administrated programs such as early intervention, special education, vocational and residential/living services, respite services, Medicaid, in-home and community-based waiver services, Supplemental Security Income benefits, and other financial subsidies.

## **BEHAVIOR**

### **Colic**

This is unexplained crying >3hours per day and >3 days per week. It usually begins in the first week of life and resolves by 3-4 months. If vignette describes a baby that cries for 2 hours a day in the 1st 6weeks of life, reassure mom that this is normal. If crying is consistent with colic then management involves counseling parents on different soothing techniques (e.g. rocking) but varies depending on the child's preference. For best option, choose the option that reduces the stress on the mom like getting another caretaker to take over care.

### **Head Banging**

- Normal between 8 months and 4years. Reassure parents next.

### **Masturbation**

- Normal if child is preschool or school aged. It may cause vulvovaginitis in these age groups. Rule out sexual abuse if child masturbates in a way that mimics adult sexual behavior.

### **Sexual Exploration**

- Normal if child touches private part frequently, runs around showing private part and is less than or equal to 3 years. Suspect abuse if imitation is inappropriate. Refer the adolescent who does exhibitionism repeatedly to a mental health specialist.

## **Attention Deficit Hyperactive Disorder**

### **Diagnosis**

- Symptoms (Hyperactivity, inattention and impulsivity) must persist for  $\geq 6$  months
- Onset of symptoms before 7 years
- Symptoms **MUST** be present in two or more settings.

### **Re: Work up**

- **Prior to diagnosis:** Rule out hyperthyroidism with a thyroid function panel. No imaging is necessary.
- **Prior to starting stimulants:** Get baseline CBCD and CMP. A baseline EKG is unnecessary unless a family history of sudden death is present or patient has a known structural heart disease.
- **Prior to sports participation:** In the absence of cardiovascular risk factors, no preparticipation EKG is required. No restrictions, clear patient for sports even while he is on stimulants.

### **Re: Stimulants**

- Amphetamine is more potent than methylphenidate
- Initiating treatments with methylphenidate has been shown to be as successful as amphetamine trials as it pertains to symptom relief
- Methylphenidate acts by interfering with the re-uptake of dopamine at the pre-synaptic level
- Headaches, stomach aches and problems initiating sleep are common side effects of stimulant therapy

- Restart stimulants on the boards if they were stopped for tics.

**Note:** 45 percent of children with ADHD have a life time increased risk of being diagnosed with substance abuse disorder. Early initiation of treatment reduces this risk.

## **Aggressive Behavior**

### Risk factors

- Exposure to domestic violence, corporal punishment, divorce and **maternal unemployment**.
- Neglect
- Exposure to violence in the media (TV)
- Elevated blood lead levels

### **Management of Aggressive behavior**

- Parent management training and cognitive behavior therapy usually in the form of problem solving skills training and coping strategy are the most effective.
- Medication is indicated when behavioral interventions are insufficient or when co-morbidity is present such as depression, bipolar disorder, anxiety or ADHD.

### **Conduct Disorder**

Mnemonic is **CONDUCTT**. **C**rack-head (substance abusing), **O**ne incident in the past 6 months for diagnosis, **N**aughty and aggressive towards others, **D**estruction of property, **U**nlawful, **C**ruelty to animals, **T**hree incidents within the last 12 months for

diagnosis and Theft Stealing, truancy, setting fires and cruelty to animals are consistent with conduct disorder and not ODD.

## **Oppositional Defiant Disorder**

Mnemonic is **that oppositional BASSTARD**. These defiant behaviors (usually for 6 months or more) may cause impairment in social, academic and occupational function. When asked for additional findings consistent with ODD, think BASTARD. **B**lames others, **A**nnoys/annoyed, **S**piteful, **S**ix months of symptoms to make diagnosis. **T**ouchy, **A**ngry, **R**esentful and **D**efies rules.

## **Temperamental Variation (TV)**

If vignette describes a preschool child with ODD-like symptoms, do not choose ODD as the most likely diagnosis. Temperamental variation (TV) will be the most likely diagnosis in these preschoolers. **In TV, child's development is not affected.**

## **Homosexuality**

It is not a choice. They are prone to substance abuse, homelessness & eating disorders. For worried parents, encourage parents to be supportive.

# **ENURESIS**

## **Nocturnal Enuresis**

Night time bed wetting only. With nocturnal type, the patient has to be greater than 6 years for a work up to be done in the absence of secondary symptoms. If vignette describes a 5 year old patient who wets his or her bed at night with no symptoms of organic disease, do not work this patient up. Also **do not work up a 7 year old with a developmental age of 5 years** with nocturnal bedwetting. A small percentage (5-10 percent) of affected kids will have an organic cause of nocturnal enuresis.

Clues to an organic cause are dysuria (UTI), urgency or small frequent voids (bladder instability), polyuria/polydipsia (diabetes mellitus and insipidus) and constipation (encopresis). Get urinalysis next if patient is greater than 6 years with nocturnal enuresis regardless of presence of symptoms.

### **Diurnal enuresis**

Day and night bed wetting or incontinence is usually secondary to organic disease (UTI, DM, DI, over-active bladder, constipation). Get a urinalysis next (correlate with history).

**Re Familial tendencies:** If one parent has history of bed wetting, there is a 40% chance child will have it. If both parents had it, then there is a 70% chance of child having it.

**Re Management:** Alarms are best for long term care. With DDAVP, the problem is high relapse rates when medication is stopped. DDAVP is best for picnics or camping. Choose fixed voiding routine for daytime enuresis. Most cases of enuresis are transient and will self resolve even without intervention.

### **Encopresis**

On the boards, emphasis is made on the treatment sequence. Treatment sequence is education/demystification→cleansing and evacuation of retained feces→ maintenance therapy with laxative for 6months→ regular bowel establishment (in this order).

If this sequence isn't followed and symptoms recur then the most appropriate next step will be to start all over and follow the sequence. If vignette asks for reason for failed therapy, choose the option that states what was omitted from the sequence.

## **Breath holding spell**

Typical presentation is a 6-18 month old with tantrums, seizure-like activity, cyanosis or "loss of consciousness" or sleepiness post spell. This may lead to an extensive work up but key to diagnosis is normal physical exam and work up. Answers sought on the boards may be to give iron supplements or reassure parents or tell parents to ignore the behavior (yes! ignore the "loss of consciousness").

A seizure disorder is more likely if the post-spell sleepiness lasts greater than 10 minutes or if the episode occurs in a child less than 6 months.

## **Night/sleep issues**

### **Night Terror (NT)**

It occurs about 1-3 hours after the start of sleep. Child CANNOT recall event. Associate NT with stage IV sleep. The child can be mobile and is thus at risk for falls or injuries.

### **Night Mare (NM)**

It occurs in the latter half of the night. Child recalls events. Associate NMs with REM sleep. The child is not mobile thus no risk for falls or injuries.

## **Night Awakening**

When it occurs in a 6-12 month old, it is usually due to learned behavior. Ignoring scheduled awakening is the best initial step in management.

## **Sleep walking**

It occurs in first third of the night and usually in 4-8 year olds. Short PM naps help.

## **Restless Leg Syndrome**

Vignette typically describes a child with leg discomfort before falling asleep.

## **Narcolepsy**

Vignette typically describes a patient with recurrent bouts of irrepressible daytime sleeping even while standing. Patient may have cataplexy (syncopal-like fall) with no postictal state. EEG shows recurrent REM sleeping pattern. Scheduled naps or stimulants are the preferred treatment options.

# **SCHOOL ISSUES**

## **School Readiness**

**TIPS** is a mnemonic that assesses a child for school readiness. A child is ready for school if he or she **T**akes turns, is **I**nvolvement and attentive, **P**lays with other kids and can **s**eparate from mom for several hours at a time.

## **School Refusal**

This is usually associated with somatic complaints such as headaches, stomach ache, phobias and other behavioral problems. It is more common in boys. It occurs equally in low and high socioeconomic class and also equally in whites and blacks. Parents

who seek evaluation for the somatic complaints should be told to set strict expectations for school attendance and focus on getting the child to school despite the complaints.

## **BITTING GRINDING SUCKERS**

### **Onychophagia**

- Nail biting. Positive reinforcement is the best initial step in management.

### **Bruxism**

- Clinching or grinding of the teeth. It usually is implicated in TMJ pain. It is familial and more common in boys. Splints or bite guards may help.

### **Thumb Sucking**

- No intervention until 4 years because child is likely to outgrow it. Best initial intervention is positive reinforcement.

## **The Weird Moms**

### **Munchausen Syndrome By-Proxy**

Know the red flags: Symptoms are real but created by the caregiver (moms usually).

- Socially isolated moms with no dad involvement
- Mom is a nurse or physician
- Mom using medical jargons (usually in quotes in the question)
- A history of unexplained sibling death

## **Vulnerable Child Syndrome (VCS)**

In VCS, parents are excessively concerned about a child they perceive as vulnerable. A history of excessive medical visits is consistent with VCS. At risks are preterm, congenital abnormal or near death babies and moms with post partum depression. Best initial question is- has your child experienced a life threatening illness in the past? Best strategy is to interrupt the cycle of parental anxiety and child behavior.

## **Response to Divorce**

<b>Patient</b>	<b>Response</b>
2-5 year pre-schoolers	Regress in milestone
6-8year early-schoolers	Overtly grief and fear rejection
9-12 year late-schoolers	Get angry at one or both parent
Teenager	Act out with suicidal ideation

## Cardiology

### Murmurs

Mnemonic is **V HAS 3 PAC**, a **VHS** and **mental retardation (MR)**

<p><b>VHAS</b></p> <p><b>VH-venous hum:</b> Continuous &amp; disappears with head turning, when supine and with JVP pressure</p> <p><b>AS- Aortic stenosis:</b> Ejection click doesn't vary with respirations AND paradoxical split S2.</p>	<p><b>3PAC</b></p> <p><b>P-PPS:</b> Systolic, louder in axilla, disappears by 12 months</p> <p><b>P-PS:</b> Systolic, radiates to back and axilla,</p> <p><b>P-PDA:</b> Continuous, heard intraclavicular</p> <p><b>A-ASD:</b> Systolic ejection, fixed split S2</p> <p><b>C-Coarctation:</b> Continuous, heard in back</p>
	<p><b>VHS</b></p> <p><b>V-VSD:</b> Harsh, holosystolic</p> <p><b>H-HOCM:</b> Systolic ejection, loud when upright</p> <p><b>S-Stills:</b> Systolic ejection, vibratory, loud when supine</p> <p style="text-align: right;"><b>MR</b></p> <p><b>Mitral regurgitation:</b> Holosystolic decrescendo</p>

**Location murmur is loudest: VHAS-RUSB, 3 PAC-LUSB, a VHS-LLSB & MR-apex**

### Clinical/Imaging clues to Heart Disease

Chest x-ray described with	Left to right lesions	Admix lesions	Right to left lesions
Increased pulmonary vascular marking	<b>Tachypnea</b> but no cyanosis present e.g. VSD, PDA, ASD, CAVC	<b>Tachypnea + cyanosis</b> + e.g. TAPVR, <b>Truncus Arteriosus</b> , HLH, TGA	
Decreased pulmonary vascular marking			<b>Cyanosis</b> but no tachypnea e.g. TOF, <b>Tricuspid Atresia</b>

## **LEFT TO RIGHT Heart Lesions**

### **VSD**

Most are asymptomatic (size dependent). Small VSDs have a normal EKG. EKGs of Large VSDs may reveal biventricular hypertrophy. EKG showing LVH and LAE are consistent with medium-sized VSDs. Echo is diagnostic.

If asymptomatic and lesion is small, do nothing and monitor at well child clinics.

**Refer asymptomatic patients to cardiology if murmur is persistent for one year.**

Symptomatic infants may present with the classic murmur, poor feeding and dyspnea without cyanosis. A chest x-ray may reveal cardiomegaly and increased pulmonary markings. **Get a cardiology consult next if symptomatic.**

### **PDA**

Presentation is size dependent. A continuous machinery murmur loudest at the LUSB is classic. **Bounding pulse and wide pulse pressure** are consistent with PDAs.

Large PDAs can cause biventricular hypertrophy on EKG otherwise it may be normal or reveal LVH. Chest x-ray may reveal cardiomegaly and increase pulmonary markings. Echo is diagnostic. **Indomethacin is indicated for lesions less than 5mm.**

Surgery is indicated if the lesion is greater than 5mm. Ductal dependent heart lesions need the PDA open for compatibility with life (see below).

### **ASD**

Typical presentation with the classic murmur is in toddlers or preschoolers but it may present with transient cyanosis in the first week of life. Chest x-ray may reveal

cardiomegaly and increase pulmonary markings. Echo is diagnostic. Perform surgical closure early.

## **Complete AtrioVentricular Canal defect**

Typical presentation is with congestive heart failure in the first few weeks of life. The murmur heard in CAVC may be due to mitral insufficiency, ASD or large flow across the tricuspid valve. Associate with Down syndrome. Chest x-ray may reveal cardiomegaly and increase pulmonary markings. **Electrocardiography is diagnostic** and may reveal left axis deviation, prolonged PR interval and biventricular hypertrophy.

## **Admix Heart Lesions**

### **TAPVR**

Presentation is type dependent.

The unobstructive type presents with cyanosis and a chest x-ray may reveal a snowman heart (figure 8) which is due to dilated left vertical vein, innominate vein and the superior vena cava and NOT cardiomegaly.

The obstructive type presents with severe cyanosis and respiratory distress. No murmurs are present. The chest x-ray in the obstructive type may be normal or may reveal evidence of pulmonary congestion and a **small heart shadow**.

Echo may be misleading so a **cardiac cath or angiography is diagnostic**. Surgery is indicated for both types.

## **Truncus Arteriosus (TA)**

Here there is a single arterial trunk out of the ventricles. Presentation is with cyanosis in the newborn period and CCF as the cyanosis resolves weeks later.

The presence of a wide pulse pressure, 2 murmur types, a single second heart sound and cardiomegaly distinguishes TA from TAPVR. EKG may reveal biventricular hypertrophy. Associate TA with digeorge syndrome or right aortic arch.

Echocardiography is diagnostic. Surgery is done usually within six months.

## **Ductal Dependent Heart Lesions**

These lesions require prostaglandin E as the most appropriate next step in management for symptomatic infants. But get a hyperoxia test first.

Mnemonic for right sided heart lesions is **Tricuspid Atresia's tough PUPU (TOF, PULmonary atresia & PULmonary stenosis)**.

Mnemonic for left sided heart lesions is **THICK** left heart to the body (**TGA, HLH, Interrupted aortic arch, Coarctation of aorta**) for the left sided heart lesions.

## **Tricuspid Atresia (TA)**

TA causes **early cyanosis** (first 3 -5 days of life) and **decreased pulmonary markings** on chest x-ray. It **MUST** have PFO, ASD, VSD or PDA for compatibility with life. A **murmur when present is due to the VSD or PDA**. EKG reveals **LAD, LVH** and RAE. Echocardiography is diagnostic.

## **Tetralogy of Fallot**

TOF causes **late cyanosis** (not in the first few days of life) and **decreased pulmonary markings** on the chest x-ray.

The degree of pulmonary stenosis (PS) determines the presence or absence of cyanosis with mild PS presenting with no cyanosis and moderate to severe PS presenting with right to left shunt, thus cyanosis. The harsh systolic ejection **murmur heard is caused by pulmonary stenosis** and not by the VSD. The heart size is normal with an upturned apex that appears boot-shaped. EKG shows **RAD and RVH**.

**TET spells present with sudden dyspnea and intense cyanosis.** For TET spells, calm patient first then place on abdomen or place in a knee chest position next. TOFs are more commonly associated with right aortic arch than with truncus arteriosus. Surgery is done within a year.

## **TGA (complete transposition)**

TGAs cause **early cyanosis** shortly after birth or in the first few days of life with **increase pulmonary markings** and cardiomegaly on chest x-ray.

Without treatment, CHF can occur especially in those without a VSD. The heart size is normal when there is no VSD.

Echocardiography is diagnostic. Balloon atrial septostomy is the most appropriate next step in management after diagnosis is confirmed. An **arterial switch surgery is the treatment of choice for unstable patients.**

## **Hypoplastic Left Heart**

In the first week of life, a tetrad of tachypnea, cyanosis, shock-like state and cardiomegaly on CXR is suggestive. Patient requires surgery. Patients are at risk for speech and behavioral problems post surgery (so are other patients post cardiac surgery). Initiate early neurodevelopmental evaluation in kids who have undergone cardiac surgery.

## **Coarctation of Aorta**

Most children are asymptomatic but about 10 percent develop CHF in the neonatal period and in early infancy. It is more common in males. When seen in females, rule-out Turners syndrome by performing a chromosomal analysis.

A characteristic sharp and brisk radial pulse in an infant when described is highly suggestive. A clinical diagnosis can be made by finding differential oximetry, pulse and blood pressures in upper and lower extremities. Significant BP difference is 20mmhg more in the arms than in the leg. Significant pulse oximetry discrepancy >5% between upper and lower extremity is also suggestive. Note if CHF symptoms are present, this differential BP in upper and lower extremity may not be present (they may both be low and equal).

In neonates or early infants, EKG reveals RVH and inverted T waves in left precordial leads and a chest x-ray reveals cardiomegaly with increased pulmonary markings. Echocardiography is diagnostic.

## **CARDIAC CATHETERIZATION**

Knowing the normal pressures and saturations (%) in each chamber is key to getting questions right on cardiac cath.

## Normal cardiac cath

	75%		95%
2	75%	6	95%
22/2	75%	110/10	95%
	80/15		110/20

## PDA

Cath reveals increased saturation in the pulmonary artery.

	↑S	PDA	

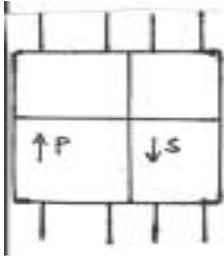
## ASD

Cath reveals increased saturations from the level of the right atrium downwards. If pressure is increased in the pulmonary artery in a cath that looks like ASD, choose CAVC as the most likely cause of the cath finding.

	↑S ← ASD		
	↑S		
	↑S		

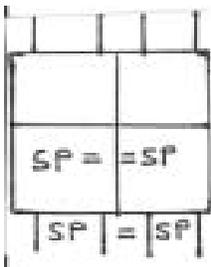
## TOF

The pulmonary stenosis and RVH increases pressure in the right ventricle. This pressure forces right ventricular blood with low oxygen saturation through the VSD to the left ventricle. The left ventricle will have decreased saturations.



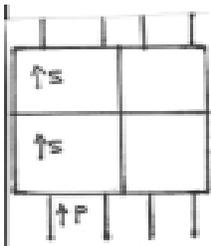
## Truncus Arteriosus

Cath reveals equal pressures and saturations in both ventricles and both arteries exiting the heart.



## TAPVR

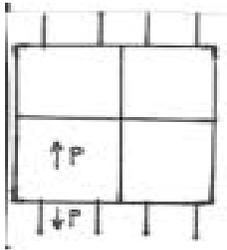
Cath reveals increased saturations from the right atrium downwards. Pressure in the pulmonary artery is increased if the type of TAPVR is the obstructive type.



**Aortic stenosis:** Cath reveals decreased pressure in the aorta and increased pressure in the Left ventricle (no diagram).

### **Pulmonary stenosis**

Cath reveals decreased pressure in the pulmonary artery and increase pressure in the Right ventricle.

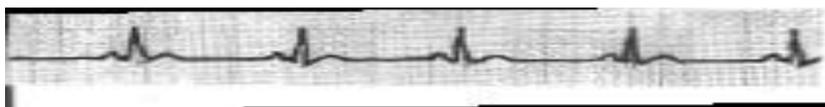


### **TGA**

Cath reveals a reversal of pressures in the great vessels only. That is, pulmonary artery will have a pressure of 110/70 while aorta will have a pressure of 30/15.

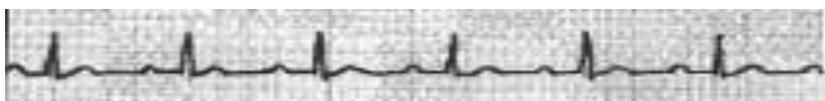
## **ARRYTHMIAS**

### **Sinus Bradycardia**



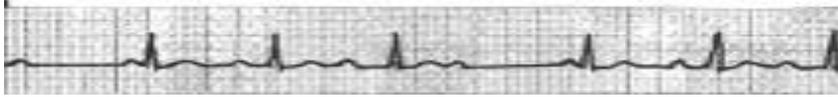
Heart rate is < 5<sup>th</sup> percentile for age. Causes are beta blockers, LQT, increased ICP, anorexia, **hyperkalemia, hypercalcemia and hypothyroidism**. Treat by correcting the underlying cause.

### **First degree AV Block**



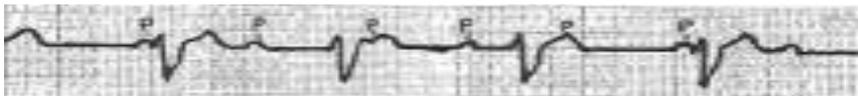
Bradycardic rate with PR >5small squares (prolonged PR).

## Second degree AV block mobitz type 1



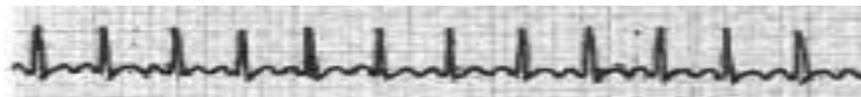
Look for progressive lengthening of PR interval.

## Third degree AV block



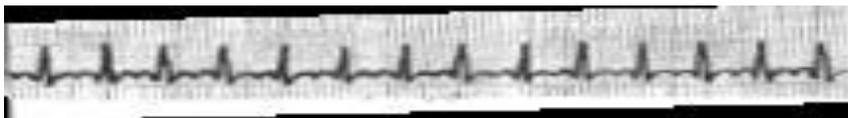
P wave unrelated to QRS complexes

## Sinus Tachycardia



Heart rate greater than 95<sup>th</sup> percentile for age. Causes are pain, anemia, sepsis, fever and hypovolemia. P wave is present and it precedes QRS. Treat the underlying cause.

## SVT



Heart rate >180-220 with narrow QRS complexes and no preceding p wave seen or p wave is retrograde when seen. If stable, apply ice to face first, then adenosine IV with saline flush next. If unstable, do synchronized cardioversion next.

Other vagal maneuvers are unilateral carotid massage, gagging with tongue blade, head standing and breath holding with abdominal straining.

## Atrial Fibrillation

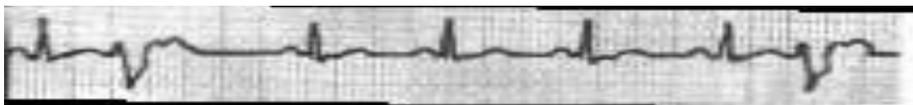


Heart rate  $>350$ /min, no distinct P waves seen and ventricular response is irregular. Common causes are hyperthyroidism, alcohol, cocaine and **caffeine**. If stable, control rate first with diltiazem, digoxin or beta blocker (DDB) then anticoagulate before medical cardioversion.

## Atrial Flutter

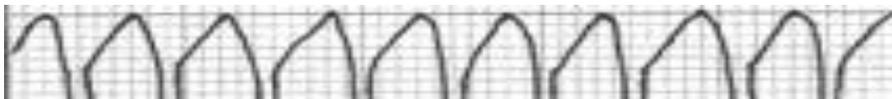
Heart rate between 250-350, no distinct p waves and normal QRS complexes. If stable, control rate first with DDB then medically cardiovert. Most effective treatment is synchronized electrical cardioversion (no EKG shown).

## Premature Ventricular Contraction



These are abnormally wide QRS complex that appear prematurely. The heart rate is usually normal (this differentiates PVCs from heart blocks or sinus bradycardia). PVCs are common post op, in tuberous sclerosis or in patients with cardiac tumors. Isolated PVCs are usually benign and require no treatment.

## Ventricular Tachycardia



Wide QRS complexes occurring at regular intervals without evidence of atrial activity. Common causes are torsades de pointes (TDP) and hyperkalemia. If V-tach is unstable do electrocardioversion as the best initial step in management. Isoproterenol

or IV magnesium will be appropriate antiarrhythmic choices if TDP is the cause of the V-tach and patient is stable.

### **Wolf Parkinson White syndrome**

EKG (not shown) reveals delta wave, short PR and wide complex QRS. If EKG reveals delta wave with a narrow complex QRS, treat like SVT. Otherwise, radiofrequency ablation is the preferred treatment of choice.

### **Rabbit Bundle Branch Block (RBBB)**



**Presence of rsR' (rabbit ears QRS) in V1, V2 & V3.**



### **Right Ventricular Hypertrophy**

**Tall R in V1 and deep S waves in V5 & V6 (see EKG left)**

## The Anti-arrythmic Team

Mnemonic is PFQL: **P**rocaïnamide, **F**lecainide, **Q**uinidine, and **L**idocaine.

	Medication/codes	Mechanism of action	Side Effects
Class 1	<b>PFQL</b> 1 Plays FrequentLy	Slows conduction or decrease upslope of action potential	<b>PFQ</b> - causes Long QT & Torsades <b>Procaïnamide</b> -causes neutropenia and thrombocytopenia <b>Lidocaine</b> -causes seizures
Class 2	<b>Beta blockers</b> 2 is a Better Blocker	Decrease sympathetic activity	Depression, insomnia, decreased school performance
Class 3	BAD- <b>B</b> retylium, <b>A</b> miodarone, <b>D</b> ofetilide 3 is the BAD guy	Prolongs action potential	<b>Bretylium</b> -transient HTN then postural Hypotension <b>Amiodarone</b> - corneal deposits and pulmonary fibrosis
Class 4	<b>Calcium Channel Blockers</b> 4 is a channel blocker	Blocks slow inward ca <sup>2+</sup> current	<b>Low yield</b>

## SYNCOPE

### Wolf Parkinson white

A positive family history or a history of ebsteins anomaly may be given. See above.

### Long QT Syndrome

A positive family history of syncope, seizure or cardiac arrest or a history of near drowning may be given. EKG shows corrected QT interval of greater than 0.44secs (450msec).

### Aortic Stenosis

The pulse may be described as normal, weak or feeble. Auscultation may reveal a **systolic ejection murmur that follows a click**. An EKG reveals LVH (deep S wave in v1 and tall R waves in v6) and LAE (biphasic p waves). No cardiomegaly on chest

x-ray typically but a prominence of the ascending aorta when described is highly suggestive of AS.

### Third degree Heart Block

Complete AV block is the usual type implicated in syncope. EKG shows P wave unrelated to QRS complexes with bradycardia (heart rate <70 in teenagers).

### Neurocardiogenic syncope

Prolonged standing with orthostatic changes is suggestive. EKG is normal.

### Hypertrophic Cardiomyopathy (HCM)

HCM is the most common cause of sudden death in an athlete. EKG may reveal LVH, LAE and deep Q waves in left precordial leads.

## Congenital/Genetic heart defects

**CHEAP** is a mnemonic for defects commonly associated with VSD.

CHEAP defects/others	Specific heart defects	CLUES
Criduchat	VSD	Part of CHEAP
Turners	Bicuspid AV/Coarctation	You should know this
Downs	AVC/ <b>VSD</b>	You should know this
Patau	VSD	part of CHEAP
Edward	VSD	part of CHEAP
Williams	Supravalvular aortic stenosis	You should know this
Noonan	<b>H</b> ypertrophic cardiomyopathy/ <b>P</b> ulmonary stenosis	Noonan's <b>H</b> istory and <b>P</b> hysical
Apert	Coarctation/VSD	Aperts resume (CV). Also part of CHEAP
Digeorge	Truncus Arteriosus	You should know this
<b>H</b> olt Oram	ASD/VSD	Holt Oram is full of holes. Also part of CHEAP.
Alagille	PS	Allagile is a pimp
Ellis Van Creveld	<b>S</b> ingle <b>A</b> trium	Ellis the <b>S</b> outh <b>A</b> frican

## **Cardiac Malpositions**

- **Right Atrial isomerism:** Bilateral right sidedness, **no spleen** and bowel malrotation.
- **Left Atrial Isomerism:** Bilateral left sidedness with **many spleens**.
- **Dextrocardia:** Heart on right side
- **Situs inversus:** Asymmetric organ switch

## **Acute pericarditis**

The typical chest pain is worse with coughing or deep breathing & relieved by leaning forward. **Pericardial friction rub is pathognomic**. EKG changes of ST elevation are seen in most leads. The presence of a muffled heart sound is suggestive of pericardial effusion. **Coxsackie and adenovirus are the most common cause** of acute pericarditis. First line medication for treatment is NSAIDs. Steroids, antibacterial or antituberculous medications may be indicated depending on cause. Correlate with history.

## **Cardiac Tamponade**

A triad of **increase jugular venous pressure, decreased blood pressure and a narrow pulse pressure** are suggestive of tamponade. Immediate pericardiocentesis is required.

## **Myocarditis**

A prior history of upper respiratory infection in a patient presenting with symptoms and signs of congestive heart failure (tachycardia, tachypnea and hepatomegaly) is suggestive. Cardiomegaly may be seen on x-ray. Viral serology and cultures are needed for causative organism. Most common causes are coxsackie and adenovirus.

## **Acute Rheumatic Fever**

The **JONES** major criteria are **J**oint, **O**-heart, **N**odules, **E**rythema marginatum & **S**ydenhams chorea. You may be asked for most likely additional finding. Know the minor criteria. They are Prolonged PR, Athralgias, fever, ESR increased, CRP increased.

### **Diagnosis**

- Evidence of group A Strep (GAS) plus 2 major criteria
- Evidence of group A strep plus 1 major and 2 minor criteria.

### **Evidence of GAS**

A positive throat culture, an elevated antistreptolysin O titer or D-nase will be the correct choices for evidence of GAS. A positive rapid strep isn't good enough but for the boards' sake, it may be your only evidence.

**Treat:** GAS with Penicillin. Use erythromycin or azythromycin for those allergic to penicillin. Give haloperidol for the chorea.

## **Chest Pain**

Musculoskeletal causes are the most common cause of chest pain overall in pediatrics.

- **Costochondritis** causes unilateral costochondral pain that is tender to palpation, give motrin next.
- With Palpitations, think arrhythmias (**SVT most common**) or **anxiety**. Get an EKG next

- Chest pain associated with a systolic ejection murmur loudest in left midsternal border with radiation to the right infraclavicular region is consistent with **aortic valve stenosis**.
- With exercise and associated chest tightness, think **asthma**. Do a trial of albuterol or get a PFT next. You will not be told the patient is wheezing (that will be too easy).
- Chest pain on exertion that radiates is concerning for **ischemia or infarction**. ABCs first if unstable, then EKG and cardiac enzymes next.
- Chest pain after meals and worse at night or on lying down, think **GERD**. Give a PPI next.
- Chest pain worse lying or coughing but relieved when leaning forward is suggestive of **pericarditis**. Get an EKG next.
- One sided chest pain associated with fever, cough and difficulty breathing, think **pneumonia** or its complications. Get a chest x-ray next.
- Chest pain at rest and not associated with activity or sports in a patient with low blood pressure, low pulse rate and physiologic left ventricular hypertrophy, think **athletes heart**. Deconditioning reverses the hypertrophy.
- Transient chest pain described as sharp or stabbing in left sternal border and relieved by forceful inspiration, think **precordial catch**.
- With a normal physical examination in a patient with school or sleep problems, think **psychogenic chest pain**. Reassure parents next.

### **Infective Endocarditis**

Streptococcus Viridans is the most common causative agent. It may occur in the absence of pre-existing heart lesions. When heart lesions are present, the most common ones that predispose to IE are Aortic stenosis, PDA, VSD and TOF. Heart

lesion least predisposing to IE is ASD. A new murmur is suggestive of IE in a patient with unexplained high fevers. Echocardiography isn't useful because the absence of vegetations doesn't exclude IE.

**Diagnosis is via blood culture** and the chances of obtaining a positive culture is dependent on the volume of blood obtained and not on when it is obtained in relation to fever spikes. Following 6-weeks of antibiotics, blood cultures should be drawn to confirm eradication.

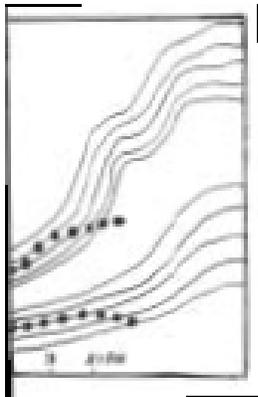
### **Endocarditis Antibiotic prophylaxis**

<b>Recommended</b>	<b>Not recommended</b>
Surgical pulmonary shunts or conduits/ Prosthetic valves	<b>Pacemakers and implanted defibrillators</b>
Previous bacterial endocarditis	Previous Kawasaki without valvular dysfunction
<b>Hypertrophic cardiomyopathy</b>	Endotracheal intubation
MVP with valvular regurgitation	<b>MVP with no valvular regurgitation</b>
Previous rheumatic disease with valvular dysfunction	Previous rheumatic fever with no valvular dysfunction
<b>Rigid bronchoscopy</b>	Flexible bronchoscopy

### The **SHORT** guys

#### Growth Hormone deficiency

Drop of in height and weight occurs early (<2 years of age) with height affected more or first. After the age of 2 years height is still affected more or first but weight may be normal or increasing. See table below for specific findings



Growth chart depicts **GHD**, note that the height drops first at about age 3.5 yrs followed by weight drop at about 5 years. Height>weight means height either drops first or drops more compared to weight which may be normal or increased. H>W=endocrine cause of short stature.

#### Growth Hormone deficiency table

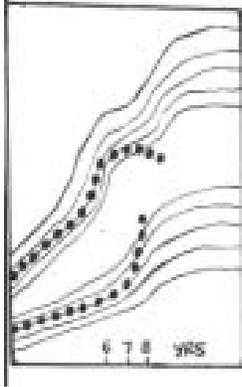
Weight	Bone age	Pubertal development	Adult height	Specific finding	Dysmorphic features
Low, normal or High (>2yrs)	Delayed	Delayed	May be compromised	<b>Reduced GH</b> and low IGF-1/IGFBP3	Face appears younger

#### Growth Hormone Insensitivity table

Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic features
Normal or High	Delayed	Delayed	May be compromised	Elevated BP <b>Elevated GH</b> Low IGF-1 and low IGFBP3	None

## Hypothyroidism

Like other endocrine causes, height drops and weight increases. Cushing's disease can have this same picture, so look out for other pointers to Cushing's.



**Height drops at 6 years and weight increases at 7 years. So  $H > W$  since H drops first and weight actually increases. This suggests an endocrine cause of short stature. Cushing's or glucocorticoid excess can give a similar picture**

### Hypothyroidism Table

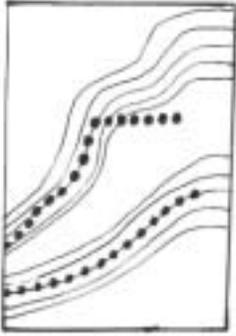
Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
High	Delayed	Delayed	May be compromised depending on duration of treatment	Low TSH elevated free T4	May have goiter or not

### Glucocorticoid excess table

Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
High	Delayed	Delayed	Depends on dose and duration of exposure but usually compromised	<b>Abnormal 24hr urinary free cortisol</b>	Cushinoid facies

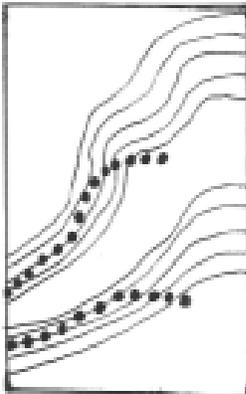
### Untreated CAH

Normal growth until early fusion of growth plates that causes a **plateau in growth around 6-8 years.**



### GI causes of short stature

Children with low caloric intake have normal height and weight initially then simultaneously drop off in height and weight. Note that **in Celiac's Disease or Crohns Disease, weight is affected first before height**. You must look at the chart and trace the weight and height lines to see what drops off first. The difference between psychosocial dwarfism and low caloric intake is high yield (know!)



**Growth chart attempts to depict simultaneous drop off in height and weight suggestive of low caloric intake. Other GI causes will affect weight first or weight more. Renal and metabolic causes also have this GI picture but are low yield on the boards. Choose a renal or metabolic cause if no GI causes are listed as options**

### Low caloric Intake table

Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
Low	Delayed	Delayed	May be compromised (depends on timing of intervention)	<b>Simultaneous drop off</b> in height and weight	None usually unless marasmic

### Psychosocial Dwarfism table

Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
Most low but <b>some high</b>	Delayed	Delayed	Catches up if <b>removed from home environment</b> and conditions	Bizarre behavior described if >3yrs onset e.g. encopresis and <b>aggressive food and water seeking.</b>	None

### Celiac Disease table

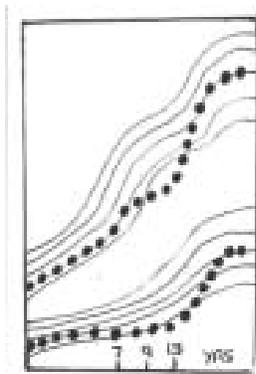
Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
Low	Delayed	Delayed	May be compromised (depends on time of intervention)	Abnormal serology and stool test	None

### Crohns Disease table

Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
Low	Delayed	Delayed	May be compromised	<b>Elevated ESR</b>	None

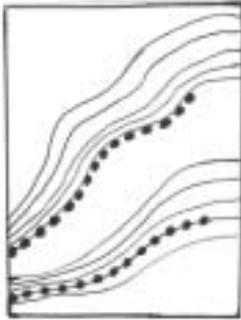
### Constitutional Delay

A family history of someone with similar growth pattern is usually given. Sexual development may be delayed too. Patient remains **low in height until puberty when growth shoots up.**



## Familial short stature

Both parents are short. Low percentile height and weight throughout. In FSS, bone age is normal. See growth chart below.



### Constitutional Growth Delay Versus FSS table

	Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
CGD	Normal OR Low initially	Delayed	Delayed	Normal (without intervention)	<b>Father with similar history</b>	None
FSS	Low OR Normal initially	Normal	Normal	<b>Short but appropriate for parental height</b>	Short parents	None

### Turners Syndrome Versus Achondroplasia table

	Weight	Bone age	Pubertal development	Adult height	Specific finding or note	Dysmorphic or facial features
<b>Achondro</b>	Normal	Normal	Normal or delayed	Dwarfs	X-ray shows rhizomelia	<b>ACHONDROPS</b> See genetics
<b>Turners</b>	Normal	delayed	<b>Absent or delayed</b>	Short	Abnormal karyotype	<b>Tina TURNER</b> see genetics

## **Russell Silver Syndrome**

Mnemonic is **RUSELL**. **R**etarded growth (short), **U**nsteady gait, **S**mall triangular face, **E**xtrernity with clinodactyly, **L**imb asymmetry and **L**ow sugar (hypoglycemia).

## **The TALL guys**

### **Acromegaly**

Big hands, big feet, coarse facies including **enlarged jaw** and elevated growth hormone levels are suggestive. **Get a head MRI next.**

### **Sotos Syndrome**

Rapid early growth: Big head, big hands, big feet, clumsy facies including **small pointing jaw** and normal growth hormone levels are suggestive. **Bone age is advanced.** Soto kids are prone to developmental delay, behavioral and learning disorder. Most affected kids with **Soto end up with normal adult height.** Growth hormone and IGF are normal.

### **Klinefelter**

Klinefelters are **prone to learning disabilities, delayed puberty and social interaction** issues. **Intelligence and weight are normal.** Scoliosis is common in klinefelters (differentiating klinefelters from marfans and high caloric intake+ is very highyield on the boards). Additional findings in klinefelters are long arm span and small testis. LH and FSH are high and a **karyotype done next shows 47XXY.**

### **Kallaman Syndrome**

Presents like klinefelter except that in kallaman, LH/FSH are low and chromosomal study may reveal 46XY

## High caloric intake (HCI)

They are **tall and overweight (height and weight above the 95<sup>th</sup> percentile for age) with advanced bone age**. This is your typical 12 year old that eats too much!

They may have low grades in school (must know how to differentiate HCI from klinefelter).

## Diabetes Insipidus/SIADH/Cerebral salt wasting/Water

### Intoxication

The table below is **worth five points** on the boards. Poly= polyuria, Olig= oliguria

	DI	SIADH	CSW	WI
Urine output	poly	Olig	poly	poly
Serum Na	high	low	low	low
Urine Na	low	high	high	low
Serum Osmo	high	low	low	low
Urine Osmo	low	high	low	low
CVP	low/normal	high	low	high
Kode: U-su-suck	Phil-hill	Opposite of DI	Polo hill	Poly4 lhigh

- Polygraph for lies, and then make him drink water when caught.

## Polyglandular Autoimmune Syndrome (PAS)

### Type-1 PAS

Mnemonic is **AIRE Vitiligo's PHACT**. Gene defect is in **AIRE**. **V**itiligo, **P**ernicious anemia, **H**ypoparathyroidism, **A**ddisons, **C**andidiasis (mucocutenous) and **T**ype 1 diabetes mellitus. The candidiasis occurs the earliest (< age 5 years typically) followed by the hypoparathyroidism

## Type 2 PAS

Gene defect is unknown. Mnemonic is **2PAS-2-CHAT**. Celiac disease, **H**ashimoto thyroiditis, **A**ddison disease and **T**ype 1 diabetes mellitus.

## Thyroid Disorders

### Congenital Hypothyroidism

- Usually asymptomatic at birth but symptoms develop within 1<sup>st</sup> 2 weeks of life.
- ↓ or ↑ TSH and ↓T4 when screened. They are **prone to speech, motor and dentition delays**. Treat with L thyroxine as soon as possible.

### Hashimoto Thyroiditis

- May be euthyroid, hyperthyroid (initially) or hypothyroid (mostly) on presentation. It is due to circulating anti-thyroid antibodies.
- ↑ TSH and ↓T4, RAIU is decreased.
- If euthyroid, do not choose getting a RAIU next if patient or has symmetric gland with no goiter. Instead monitor TSH and free T4 every 6 months.
- Antithyroglobulin and antimicrosomal antibody is suggestive of hashimoto. **Biopsy is diagnostic.**

### Subacute Thyroiditis (De Quvian)

Fever and gland pain in a patient with hyperthyroid or hypothyroid symptoms are suggestive. A prior history of URI is supportive. Condition is self limited. **Best initial treatment is with analgesics.**

**Suppurative Thyroiditi:** Here, in addition to fever and gland pain, there is **gland swelling, tenderness to touch and differential warmth**. It affects the left lobe usually. TFT normal, antibiotics required against staph.

## **Graves Disease**

In addition to typical symptoms of hyperthyroidism, **hyperactivity and emotional lability may be described in these children with graves**. TSH is low and free T4 is high. RAIU is increased. As part of your initial work up for ADHD, get a thyroid panel to rule out hyperthyroidism. Acute onset of hyperthermia, tachycardia and restlessness in these children and on the boards is suggestive of thyroid storm. Give propranolol next for thyroid storm.

## **Thyroid Binding Globulin deficiency**

In TBG deficiency there is **low total T4 and normal free T4 and normal TSH**. **Patients are clinically euthyroid**. Increase resin uptake. No treatment. Reassure parents.

## **Thyroid CA**

The most common is follicular carcinoma. Medullary carcinoma produces calcitonin and ACTH. **Hypocalcemia and skin hyperpigmentation** when described, are suggestive of medullary CA of the thyroid. Correlate with history.

## **Parathyroid Issues**

### **Hypoparathyroidism**

Symptoms are of hypocalcemia. When described in infants and on the boards, think digeorge or velocardiofacial syndrome, prematurity & infant of diabetic mom. It may

be part of PAS type 1(AIRE vitiligo's PHACT). Parathyroid hormone (**PTH**) is **low**, **calcium is low**, **phosphorus is high**, alk phos is normal or low and 1-25 D3 is low.

### Pseudohypoparathyroidism

Short rounded face crazy (MR) stocky guy with short fingers and dimpling at the dorsum of the hand. **PTH is high**, **calcium is normal or low** and **phosphorus is normal**.

### Primary Hyperparathyroidism

Symptoms are of hypercalcemia. Usually due to adenoma or hyperplasia of the gland and associated with MEN type 1. **PTH is high**, **calcium is high**, **phosphorus is low** and **alk phos is normal or high**.

### Rickets

**Key-D** = decreased; **I** = increased; **N** = normal: Table below is worth five points!

	Vitamin D deficient type	Vitamin D dependent type1	Vitamin D dependent type 2	Familial hypophosphatemic type
How it happens	Food and light deficiency	Decrease 1 alpha hydroxylase	End organ resistance to D3	Defect in tubular reabsorption of phosphate leading to a loss
<b>Calcium</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>N</b>
<b>Phos</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>
<b>Alk phos</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>
<b>PTH</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>N</b>
Code is <b>CPAP</b>	25 D decrease	Decrease 1-25 D	Increase 1-25 D	NDIN... <b>a familial NDIN</b>

**CPAP = DDII except at the familial NDIN.** Treat familial hypophosphatemic rickets with oral neutral phosphate and calcitriol.

## **DiabetiCs**

### **Falsely elevated blood glucose**

Vignette may describe a child with elevated blood glucose per glucose meter reading and ask for the most likely reason for the result. It will be falsely elevated if the child just ate something sweet with his or her hands and didn't wash them before the test (residual glucose on fingers). Other causes of falsely elevated readings are failure to recalibrate glucometer after use and cold temperatures.

### **Honeymoon Period**

In newly diagnosed type one diabetics started on insulin, there usually is still some residual beta cells that can produce insulin and these residual B cells can cause recurrent hypoglycemia in these patients. **Measure C peptide next.**

### **Waning Period**

After the honey moon period is the "waning period". This is the period when the insulin producing residual beta cells really act dead and cannot produce any more insulin. So the patient is truly dependent on exogenous insulin now. In this period, despite adequate diabetic diet adherence, the blood sugar monitoring may look bad with elevated values. **Get Hemoglobin A 1C next.** Insulin doses may need to be adjusted depending on the HBA1C level.

### **Dawn's phenomenon**

In the dawn, you have high blood glucose due to counter regulatory hormones. Increase evening dose of insulin next or delay dose of intermediate insulin by 2-3hrs.

## **Somogyi's phenomenon**

Late night or early am (~2am) hypoglycemia due to insulin. Decrease the dose of the intermediate acting insulin next.

## **Diabetic & Intercurrent illness**

Add about 20 percent of the total daily dose as regular insulin before meals. For the vomiting child with type one DM on long acting insulin regimen once a day and short acting insulin pre meals, give clear glucose with electrolyte rehydration fluids like you would for regular vomiting and also give small amounts of the short acting insulin every 2-3hours trying to keep blood sugar greater than 100 mg/dl.

## **Preparing a diabetic for surgery**

Admit patient a day before the surgery. On the morning of surgery, start D5 1/4 NS +20meq/l KCL. Add 1 unit of insulin to the fluid for every 4 grams of glucose.

**Optimal blood glucose level for the surgery is 120-150mg/dl.**

## **Diabetic Keto Acidosis**

**Best initial step in management:** If clinical presentation and labs are suggestive, the best initial step in treatment will be to give the patient a bolus of normal (0.9%) saline followed by a continuous insulin drip at 0.1units/kg/hour.

**Goal of therapy:** Tell the parents your goal is to drop the glucose by 80-100mg/dl/hr. Change IV fluids to D5-1/4 NS when serum glucose is less than 300 mg/dl or if the rate of decrease exceeds your goal (e.g. glucose dropping >100mg/dl/hr).

**Re Potassium:** DKA patients have total body depletion of potassium and are at risk for hypokalemia with therapy. They need potassium monitoring and replacements in addition to fluids replacement. Do not add potassium to fluid if initial serum K is greater than 6. Avoid potassium phosphate if serum calcium is low.

**Re stopping insulin drip:** Begin subcutaneous insulin when acidosis is corrected (PH >7.30 and anion gap normalized). Only stop the continuous insulin drip about an hour after beginning subcutaneous insulin. Monitor the labs and total fluids to prevent cerebral edema.

### **Adrenal Insufficiency (AI)**

In AI, there is hypofunctioning of the adrenals. A lack of cortisol and aldosterone leads to low sodium, increased potassium and a feedback **increase in ACTH that causes hyperpigmentation**. Whatever the cause of the adrenal insufficiency, **cortisol is low and ACTH is high**.

### **Adrenoleukodystrophy**

This is a condition whereby long chain FA accumulates in the adrenal gland causing it to hypofunction. Neurologic decline from infancy associated with symptoms of AI is suggestive.

### **Addison's disease**

It is mostly due to autoimmune destruction of the adrenal gland causing it to hypofunction. Addisons will be the most likely diagnosis if symptoms of AI are associated with PAS type one.

**CAH:** The salt loosing type presents soon after birth with signs of shock, vomiting and electrolyte issues. Girls are virilized but the boys appear normal. Low NaCl, high K, high renin with low aldosterone. For diagnosis, **measure 17OHP in urine.**

## **Conns Syndrome**

It is caused by an adrenal adenoma. The adenoma produces excess aldosterone that leads to high sodium retention (hypertension) and potassium excretion. Hypokalemia and low renin are consistent with primary hyperaldosteronism. Muscle cramps or weakness and headaches are your typical presentation.

Screen with plasma renin and 24 hr urine aldosterone. A high aldosterone with a low renin is suggestive of Conns Syndrome or primary hyperaldosteronism. Get an abdominal CT scan next to look for adrenal adenomas, if CT is negative, do adrenal vein catheterization next. Cath result will reveal a high level of aldosterone in the vein on the same side with the adenoma.

A high aldosterone with a high renin is suggestive of a secondary cause of hyperaldosteronism e.g CHF, renal artery stenosis and wilms tumor.

Treat primary hyperaldosteronism with hydrocortisone succinate and florienef. Give stress doses prior to and for 24hrs after surgery.

## **Cushings Syndrome**

Cushings **disease refers to a pituitary adenoma causing Cushings syndrome.** The adenoma produces excess cortisol that leads to its facies. Cushings Syndrome refers to other causes of high cortisol. The **most common cause of Cushings**

**syndrome is exogenous administration of glucocorticoids.** Its presentation of growth and developmental delay is high yield on the boards.

Do a dexamethasone suppression test or a 24 hour urinary cortisol assay next to screen. If any are positive, get a CT of adrenals or MRI of head next.

**If treated, catch up growth and catch up pubertal developmental occurs.** Bone density and final adult height remain abnormal despite treatment.

### **Phaechromocytoma**

Excess catecholamines (norepinephrine), presents with sustained hypertension, palpitations, headaches, dizziness, **abdominal pain, trouble gaining weight and elevated VMA in urine.** Surgery to remove the tumor is indicated. Use alpha and beta blockers pre-op for the hypertension.

### **Metabolic HODINI Syndrome**

Mnemonic is **HODINI: Hypertension, Obesity, Dyslipidemia, Insulin resistance, Not enough HDL, Increased TGs.** 20-40 percent of affected patients have non alcoholic fatty liver disease which may lead to Cirrhosis. **Best treatment is weight loss.**

## **B Cell DEFECTS**

### **Transient Hypogammaglobinemia**

It is due to transient deficiency of IgG in a baby after moms IgGs in baby wanes off. At ~6months of age, child starts having recurrent viral or bacterial infections of the respiratory tract (mainly otitis media and bronchitis). **Watchful waiting first but affected patients may require antibiotics or IVIG.** They typically outgrow this by 3-4yrs.

### **X-Linked Agammaglobinemia (Brutons)**

Boys with no **BTL GAME** (no **B** cells, no **T**onsils, no **L**ymph nodes, no **IgG**, no **IgA**, no **IgM** & no **IgE**). Vignette typically describes recurrent bacterial infections of the respiratory tract (sinusitis, otitis media & pneumonias) in affected patients. They are also **prone to enteroviral infections and gardiasis**. They respond to antibiotics but IVIG is needed to prevent recurrence. **Do not give live vaccines.** They are at risk for bronchiectasis and chronic pulmonary insufficiency.

### **Hyper IGM**

**Low AGE and high Moral** (low **IgA**, **IgG** & **IgE** AND **high IgM**). Usually due to a T cell defect (T cells do not express CD40L and thus cannot signal class switching). This is your patient with PCP pneumonia without HIV. **IVIG is needed.**

## Common Variable ID

**Older kid (>10yrs) with no GAME** (low IgG, IgA & IgM). Usually **presents like bruton** except that in addition they are prone to noncaseating granulomas of spleen liver lung and skin. Ig E is normal. Associated with T cell defect and may present with recurrent herpes zoster infections. Frequently associated with autoimmune diseases e.g. rheumatoid arthritis, cytopenias pernicious anemia. **IVIG is needed.**

## Selective IgA deficiency

The most common Immunodeficiency. They are Prone to sinupulmonary and GI infections (gardiasis). Vignette typically describes anticonvulsant usage or a patient that develops anaphylaxis with transfused blood or immunoglobulin therapy. 20 percent of selective IgA deficient patients have IgG subclass 2 deficiency. Autoimmune disorders are commonly associated. **No IVIG is needed.** Give antibiotics.

## IgG subclass Deficiency

Subclass 2 deficiency is associated with selective IgA deficiency. Prone to similar types of infections like selective IgA deficient patients. Get IgG subclass levels and **specific antibody titers to HIB, Strep Pneumo and N meningitides** as the most appropriate next step in evaluation. **Antibiotic needed.**

## Combined Immunodeficiency

### Severe Combined Immunodeficiency

Vignette typically describes an infant with **failure to thrive, chronic diarrhea and/or absent thymic shadow on chest X-ray.** They are Prone to bacterial, fungal, viral and protozoan infections. Do not give live vaccines to SCID patients. **Early**

**diagnosis is important because bone marrow transplant (BMT) prior to age 4 months is associated with improved survival.** Use irradiated blood when transfusion is needed. The autosomal recessive form is due to adenosine deaminase deficiency. **Transplant or gene therapy achieves cure.**

Two high yield SCID syndromes are **Omen's syndrome** (SCID + eosinophilia + rash) & **Reticular Dysgenesis** (SCID + neutropenia).

### **Wiskott Aldrich Syndrome**

X linked-boys with eczema, thrombocytopenia and recurrent sinopulmonary infections. **Increase IgA and IgE, low IgM.** They are at risk of malignancies (lymphomas and leukemias).

### **Ataxia Telangiectasia**

Autosomal recessive disease with cerebellar ataxia and oculocutaneous telangiectasias. Affected patients are prone to recurrent sinopulmonary infections and bronchiectasis. Measure **alpha fetoprotein levels next** if characteristic lesion is described in a patient with ataxia. Patients are at risk of malignancies (lymphomas and leukemias).

### **Digeorge Syndrome**

Think Digeorge if thymic hypoplasia, conotruncal anomalies or dysmorphic facies are present. Patients are at risk of GVHD from transfusion with non irradiated blood. **Do thymic transplants in those with complete T cell depletion.** Those with partial T cell depletion have improvement in immune function with time.

## **Mucocutaneous Candidiasis**

Part of Polyendocrine Autoimmune Syndrome type 1. Work up reveals **cutaneous anergy to candida**. These patients have normal T cells. Remember AIRE vertigos PHACT is mnemonic for PAS-1

## **Phagocyte Issues**

### **Chronic Granulomatous Disease**

**Affected patients are prone to** recurrent skin boils, pneumonias and **granulomas** caused by **catalase positive organisms** such as staph A, serratia, acinetobacter, salmonella, klebsiella, norcadia & burkholderia AND fungi such as aspergillus.

For **diagnosis, choose dihydrorhodamine flow cytometry** since the nitroblue tetrazolium test (NBT) cannot differentiate the X-linked type from an Autosomal Recessive type. **Complications are urinary retention and bowel obstruction (pyloric outlet obstruction) from the granulomas.**

Treat the skin and lung infections with antibiotics, antifungals and interferon gamma (depending on the cause). **Give steroids for obstructive lesions.**

### **Leukocyte Adhesion Deficiency**

Explain to a concerned mom that **neutrophils cannot migrate out of blood vessels** to the site of infection. Vignette typically describes an **abscess without pus** in a patient with a history of delayed separation of the umbilical cord.

**Myeloperoxidase Deficiency:** Presents with recurrent candidiasis. **A decrease myeloperoxidase level in leukocytes is diagnos**

## Hyper IgE Syndrome

Presents with recurrent sinopulmonary infections and skin abscesses due to staph mostly. Prone to delayed shedding of primary teeth, severe eczema and osteoporosis (thus frequent fractures). Affected patients **need lifelong antistaphylococcal antibiotics.**

## Hereditary Angioedema

An autosomal dominant condition that presents with recurrent facial swelling, lip swelling, extremity swelling & abdominal pain. There is lack of C1 esterase inhibitor which causes consumption of C2 and C4 complements. **Gamma aminocaproic acid is used for acute attacks and danazol is used to prevent recurrent attacks.**

## Food Allergies

### IgE mediated Food Allergies

Symptoms begin within 2 hours of ingestion. The spectrum of symptoms range from hives to overt anaphylaxis due to mast cell degranulation. The reason for the range or variation in presentation and severity of symptoms is unclear. Eliminating diet and rechallenging with the diet may be helpful and might be the most appropriate next step if an IgE food allergy is suspected.

A skin test is more helpful negative than when positive. Patients tend to outgrow allergy from egg, soy and milk. Peanut and fish IgE mediated allergies tend to be lifelong. **About 50-60 percent of patients with peanut allergies will have allergies to treenuts.**

## **Non IGE mediated Food allergies**

Symptoms here are more subtle such as vomiting, bloody diarrhea, rash, irritability and this is seen in cow or soy milk intolerance or gluten enteropathy. Here **stopping the offending agent results in resolution and should be done first**. If mom breast feeds and drinks whole milk, tell her to eliminate whole milk from her diet. **Switch to a protein hydrolysate formula next.**

## **Drug Reactions**

### **Serum Sickness**

**Mechanism:** IgG mediated-type 3 reaction

**Usual culprit:** **Cefaclor** (also penicillin)

**Symptoms:** Includes but not limited to fever, rash urticaria, N&V, joint aches, muscle aches, wheeze, hives, shortness of breath (choking feeling) and diarrhea

**Treatment:** Stop medication first then give NSAIDs, antihistamines and steroids

### **Anaphylaxis**

**Mechanism:** IgE mediated type-1 reaction

**Usual culprits:** Penicillin and cephalosporin (cross reactivity)

**Symptoms:** Wheeze, hives, shortness of breath, choky feeling, diarrhea, vomiting and tachycardia.

**Treatment:** Stop medication first, then epinephrine, steroids, albuterol, histamine blockers, IVF and then admit. Discharge home on 2 epipen auto injections.

**Desensitization is necessary if the penicillin must be used.**

## **Complement Deficiency**

**Early Complement Deficiency:** Do CH50 as the initial screening test for complement deficiency. Most C1-C4 deficient patients are **prone to SLE and diabetes mellitus**. 10 percent will have pyogenic infections.

**Late Complement Deficiency:** C5-C9 deficient patients are **prone to recurrent Neisserial infections**.

## **HiGh YIELD AllERGIES**

### **Chronic Urticaria (CU)**

Recurrent urticaria for greater than 6 weeks defines CU. A skin test may be positive for dust mite in patients with CU but dust mite isn't the cause of the urticaria. It is usually **due to circulating autoantibody directed at IgE receptors**. Do autologous serum skin test next and treat with fexofenadine.

### **Latex allergy/Latex Fruit Syndrome**

Kids with early childhood surgeries, spina bifida and congenital urologic problems are particularly at risk for latex allergy. Skin testing (if negative) and RAST are helpful. A latex free environment is needed. Kids with latex allergy should avoid papaya, pineapple, peach, avocado, tomato, mango and melon if previous allergies to these fruits have been noted.

### **Contrast Allergy**

This is a **non IgE mediated reaction**. Pretreatment is required if patient has had a prior history of allergy to contrast. If patient has had prior anaphylaxis to shrimp and requires contrast, **reassurance will be the answer and contrast may be given**

**because it is non IgE mediated.** The osmolarity of the contrast is the usual culprit. While pretreating with benadryl may suffice, **switching to a low osmolar contrast may be the answer sought** on the boards.

**Egg Allergy: MMR** (unlike flu and yellow fever vaccines) **can be given to a patient with a history of prior egg allergy.** Egg, milk and soy protein allergy tends to be outgrown. Cooking or prolonged boiling doesn't change the antigenicity of the egg. The egg white is more allergic than the yolk.

### **Rhinitis Medicamentosa**

Rebound nasal congestion. The typical patient on the boards will have a history of **prior nasal decongestant use.** Most appropriate next step would be to **stop the nasal decongestant.** Nasal steroid may be indicated and oral steroids if severe.

### **ALLERGIC RHINITIS**

	Seasonal	Perennial
Occurrence	Seasonal	All year round
Symptoms	same	same
Allergens	Outdoor:-ragweed, outdoor mold, pollen	Indoor:-cockroach, indoor mold, dust mite
Work up	Nasal smear & skin test positive	Nasal smear and skin test positive
Prevention	Stay indoors, shut windows, HEPA airfilters	Allergic bed coverings, remove carpet, HEPA vacuum cleaners
Treatment	Intranasal steroids 1 <sup>st</sup> line	Intranasal steroids 1 <sup>st</sup> line

## **Vasomotor rhinitis (non allergic rhinitis)**

**Occurrence:** anytime

**Symptoms:** same as above (nasal symptoms predominantly)

**Allergens:** non allergic e.g. chemicals, perfumes, change from hot to cold environment

**Work up:** nasal smear with no eosinophil, skin test negative

**Prevention:** avoid specific triggers

**Treatment:** intranasal antihistamine first line.

## **Allergy Shots**

- Indicated for the treatment of allergic rhinitis in children 5 years of age and older in whom allergen avoidance and medications have failed to control symptoms
- Local reaction and anaphylaxis are the most common side effects. Observation for 20-30 minutes is mandatory after each shot. Local reactions are self limiting BUT if anaphylaxis occurs, discontinuation of the allergy shot is indicated next followed by administration of IM epinephrine.

## **Bee Sting**

If the lesion is non tender and no fever is present, then this is a local reaction and no treatment required. If there is a life threatening reaction then venom immunotherapy is indicated. For systemic reactions, refer to an allergist. If a stinger from a honeybee is mentioned, scraping away the stinger with a tongue blade or a credit card will be the best way to remove the stinger. Do not leave stingers in place because it increases the risk of envenomation which may cause an allergic reaction.

### Developmental Hip Dysplasia

A positive gallazi sign (with knees together the affected knee appears lower) indicates posterior dislocation. After age 3 months, skin fold asymmetry and decreased hip abduction become more reliable signs. Diagnosis is with ultrasound if age is less than 6 months and x-ray if greater than 6 months. Best initial treatment if less than 6 months is pavlik harness. **After age 6 months, traction/closed reduction surgery is required.** If not treated, patients with DHD are at risk of developing degenerative hip arthritis.

### INTOEING

Forefoot adducted medially. **Hind foot not affected.** See causes in table below.

Age of presentation	<1yr	1-3yrs	>3-9yrs
Most likely cause	Metatarsus Adductus (MA)	Medial tibial torsion	Medial femoral torsion
Treatment	If flexible, cast after 6-9months. If rigid do serial casting x6-8wks	Gradually improves. No treatment required	Corrects itself by age 8-10yrs

### Club foot

**Description:** Plantar flexed, **heel elevated (equino)**, high arch (cavus) and forefoot adducted medially (like in MA). Note that to differentiate club foot from MA, the hind foot is normal in MA. In club foot, the affected foot and calf will get smaller with age. Associate club foot with hip dysplasia. **Best initial treatment is early**

**casting and splinting.** If casting and splinting fails then surgery is done usually in the first year of life. Bracing is done after casting and tendon lengthening surgery to prevent the deformity from returning.

### **Bonyon (metatarsus primus varus)**

**For females with bonyons,** using non compressive shoes will be the best initial step in management. **Delay surgery until patient is skeletally mature.**

### **Calcaneovalgus**

This is usually positional like Metatarsus adductus (**due to fetal positioning**). They resolve spontaneously in the first 2 weeks of life.

### **Genu Varum (bow legs)**

Physiologic bowing will be the most likely diagnosis in patients less than 2 years on the boards. Reassure concerned parents next. If greater than 2years at presentation or bowing worsens less than 2 years, **get a standing AP x-ray of the lower extremities next.** If signs of rickets are present, get serum calcium, phosphate and alkaline phosphatase with the initial x-rays. In Blount's disease, the medial aspect of the proximal tibia stops growing.

**Genu Valgum (knock knees):** Normal at 3-4years. No treatment necessary.

**Pes Cavus (high arch):** Think of friedrich's ataxia, hurlers and Charcot Mary tooth if arching is unilateral, painful or progressive.

**Pes Planus (flat feet):** If flexible (when the patient stands, the arch forms), no intervention needed.

## **Toe Walking**

In patients less than 4 years toe walking is normal. Reassure concerned parents. If greater than 4 years, cerebral Palsy (with spasticity), spinal cord issues, tight heel cord or myopathy should be on your list of differentials. They are usually pointers from the history and physical to a specific cause. Treatment is dependent on the cause. Best initial treatment is with stretching and serial casting or use of ankle foot orthosis. If these don't work then medications for spasticity or tendon release surgery may be indicated.

## **Transient Synovitis of Hip**

This is the 3-7yr old with a limp & normal or minimally elevated WBC and ESR. **Management is typically with bed rest and NSAID.** Aspirate the hip if ESR markedly elevated and effusion present in the joint.

**Toddlers Fractures:** It is a spiral fracture of the distal tibial metaphysis. It is common in 1-4 year olds. **Treat with long leg cast** for 8-10weeks.

## **Radial Head Subluxation**

This is the toddler that refuses to use his hand and holds it in pronation. Clues are history of patient being swung, pulled, dragged or lifted by one hand. Most appropriate **next step is manipulation to reduce the displaced radial head** using either supination and flexion method or hyperpronation method. Imaging is typically not required pre or post reduction.

## **Supracondylar Fracture of the Humerus (SFH)**

Vignette describes **fall on an outstretched hand typically**. X-ray reveals **posterior fat pad**. If not displaced, patient would need a long arm posterior splint for ~ 3weeks. **Neurovascular compromise is common**. Identification of the potential complications is high yield on the boards.

- **Brachial artery injury**: Acute onset of pain in the hand that is not relieved by removal of the splint and associated with pallor
- **Volkmann's ischemic contracture**: Flexion contraction of fingers, hand and wrist seen in a patient with SFH. It is due to forearm muscle ischemia.
- **Anterior interosseous nerve injury**: Weakness in index and middle finger.

## **Compartment Syndrome (CS)**

Seen following fractures or casting. Patient may present with **pain, paresthesia, pallor, paralysis & pulselessness**. Pulselessness and paralysis are late findings and may not be described in CS. If symptoms and signs are suggestive, **remove or loosen cast tightness first, then measure compartment pressure next**. Treat with emergent fasciotomy.

## **Osgood Schlatter disease**

Knee pain and swelling below knee (tibial tuberosity) noted after running or jumping are consistent findings. Advice on RICE therapy, tell patient to decrease activity to permit healing and that training may be stopped for 2-3 months.

## **Ankle Injuries**

Salter 1 fracture is likely in a skeletally immature child if there is point tenderness and swelling of the ankle following trauma even when an x-ray is negative. In the skeletally mature child, think more of sprain following an inversion or eversion injury. Preferred X-ray views are AP, Lateral and Oblique. **Refer to orthopedics if fracture of the malleolus is seen on x-ray of a skeletally mature child.**

## **Plantar Fasciitis**

Medial heel **pain on waking up in the morning or on taking the first few steps.** Overweight is a risk factor and a clue. The pain is relieved by non weight bearing. Physical exam requires deep palpation to elicit tenderness over the medial aspect of the heel (medial calcaneal tuberosity). Achilles tendon may be tight. Treatment involves **observation, padding heel, stretching exercises** of the Achilles tendon.

## **Hind Foot Fracture (HFF)**

**Tenderness in front of the medial malleolus** or on compression of the heel **following MVA or fall from a height** and landing on foot is suggestive of HFF. They may also be heel or ankle swelling. If the arch of the foot becomes swollen compartment syndrome is likely. Get AP, Lateral and mortise (oblique) view of hind foot and ankle. If not displaced, patient needs posterior leg splint from toes to upper calf.

## **Calcaneal apophysitis**

Presentation is with heel pain mostly in boys who overuse their foot (playing soccer or running). There is a positive calcaneal compression test (compressing the medial

and lateral aspect of the heel elicits tenderness). Treat calcaneal apophysitis with heel stretching exercises and heat.

## **Metatarsal Fractures**

Most common is proximal fifth metatarsal. Clues to this diagnosis are marathon racing, prolonged walking, vigorous training or a change in running surface from a smooth & flat surface to an elevated & rough surface. Physical exam may reveal point tenderness, swelling, ecchymosis and **pain on twisting the toe distal to the fractured metatarsal**. Get AP, lateral and oblique X-ray next if suspected. Call orthopedic or refer if fracture is seen. Casting or bracing may be needed. **Weight bearing is tolerated and permitted.**

## **Fractures suggestive of abuse**

- Child less than 1 year with **femoral fracture**
- **Metaphyseal chip, scapular or rib fracture**
- **Fractures at different stages of healing** seen on x-ray
- **Solitary spiral or transverse fractures of long bones with an inconsistent history**

## **Acromioclavicular Separation**

Sports related injury to the shoulder with **pain tenderness and prominence over distal clavicle**. Xray shows **widening of the acromioclavicular space**. Most likely additional finding is inability to raise arm.

## **Legg Calve Perthes Disease (LCP)**

Mostly boys (4-8years) that present with hip pain, knee pain or limp. Positive tredelenberg test (cannot stand on affected foot) and leg length discrepancies are consistent findings suggestive of LCP. **Get MRI of hip first if early** because it takes about 3 months for frog leg AP x-rays of the pelvis or hips to show joint space or femoral head changes. Otherwise choose frog leg AP x-ray of pelvis if presentation isn't early. Treatment is with NSAIDs, rest and range of motion exercises. Prognosis is excellent if presenting less than 6 years of age.

## **Slipped Capital Femoral Epiphysis**

Obese preadolescent or teenager presenting with hip pain, knee pain or limp. Get AP and frog leg lateral pelvic x-ray for diagnosis. **Surgical pinning is required for unstable slips.** Chondrolysis is a complication of surgical pinning.

## **Spondylolysis**

This is the **gymnast with back pain secondary to hyperextension injury.** There is fracture of one pars interarticularis. Neurologic examination is usually normal.

**Oblique x-ray is best for diagnosis.**

## **Spondylolisthesis**

Insidious lumbosacral back pain that radiates to the buttocks and thighs. There is fracture of both pars interarticularis with or without detached spinous processes. **Best initial imaging study is lateral x-ray of the lumbosacral spine.** A bone scan or CT confirms diagnosis.

**Discitis:** Back pain with MRI showing narrowing of the disc space and vertebral body irregularity. Fever may or may not be present. **Cast, brace and use antibiotics.**

## **Growing Pain**

The 3-12 year old with recurrent leg pain that awakens him or her up from sleep. The pain is intermittent and bilateral usually. No pain in the morning and no joint involvement usually. There are no signs of inflammation & pain is usually not in the same spot. **Reassure parents next.** No imaging, consults or lab work up is necessary. Some patients with growing pains may benefit from muscle stretching or application of warm packs.

## **OSTEOPENIA**

Affected females are at risk for pathologic fractures. A DEXA scan is diagnostic.

Three important causes on the boards are-

1. **Anorexia nervosa:** Weight 15 percent below expected weight and body image perception issues point to this as a cause. Excessive exercise, vomiting induction and amenorrhea may be part of the history. See anorexic lab findings under the adolescent section
2. **Hypoestrogenic states:** Low estrogen leads to delayed menarche and secondary amenorrhea. These patients are not on contraception and they deny anorexic behaviors or perceptions. **Get FSH next** to rule out primary ovarian failure
3. **Contraception use: Depo povera** is the usual culprit. Stated in the history usually with a list of other medications and then you are asked which medication is responsible for her osteopenia.

## **Medial Epicondylitis**

This may present with **medial elbow pain in throwers.** Pain worsens with resistance to wrist flexion or with pronation. X-ray may show widening physis or apophyseal

avulsion. **Affected adolescents are usually out for the rest of the season.** Treat with RICE therapy, NSAIDs and Range of motion exercises. Avascular necrosis is the feared complication.

## **Patellofemoral Syndrome**

Affected patients have poorly localized anterior knee pain that increases with activity. Patient may describe stiffness or a give out or locked sensation. **Females with knocked knees (k-legs) are at risk.** On physical examination, there is medial and retropatellar tenderness decreased knee flexion and decreased vastus medialis tone. Treatment is **quadriceps and vastus medialis stretching and strengthening exercises.**

## **Juvenile Rheumatoid Arthritis**

Chronic joint **pain (>6weeks), worse in mornings or with inactivity and gets better as the day progresses or with activity.**

- **Oligoarticular (pauci):** Less than 4 joints. Affected pre-scholars are more likely to be girls (most are ANA positive). Affected kids greater than 9 years are more likely to be boys (most are ANA negative). **ANA positivity predicts risk of Uveitis** which is usually present. **Inflammatory markers are elevated.**
- **Polyarticular Systemic:** Greater than 5 joints. Affects girls more than boys generally. Those greater than 10yrs are more likely to be rheumatoid positive. **Inflammatory markers are elevated with hypergammaglobinemia.**

- **Systemic type:** Presence of self resolving daily fevers, myalgias and lymphadenopathy. **Affects girls and boys equally.** A rash if present is described as **Pink salmon colored evanescent rash, discrete borders with central clearing.** In addition to elevated inflammatory markers, **transaminases are elevated.** CBCD shows a left shift with a microcytic anemia consistent with anemia of chronic disease.

## **Enthesitis Related Athropathy**

Lower extremity joint or lower back **pain worse in the mornings or with inactivity and relieved as the day progresses or with activity just like in JRA.** Yeah! Lots of differentials for this description of pain. These are typically older boys (>8 years).

- **Reiters or reactive arthritis:** Cannot climb a tree and cannot pee! The vignette on the boards may omit the conjunctivitis (cannot see). More common in boys. Choose chlamydia trachomatis as the most likely cause if it occurs in sexually active adolescents. Inflammatory markers are elevated. Choose **campylobacter jejuni as the most likely cause if preceding diarrheal illness.**
- **Ankylosing spondylitis:** Lower back or sacroiliac pain. More common in boys. HLA B27 positive.
- **Psoriatic arthritis:** Arthritis in the presence of nail pitting or psoriatic rash is suggestive. More common in boys.
- **IBD arthritis:** Arthritis in the presence of weight loss, oral ulcers or abdominal pain is suggestive. Boys equal girls. ESR elevated.

## **Henoch Schonlein Purpura**

A self limiting small vessel vasculitis characterized by **palpable purpura** (usually from buttocks downwards but may include hands and wrist), **polyarthralgia** (ankles and knees), **abdominal pain** and **glomerulonephritis**. It usually follows a viral or bacterial illness in kids less than 7 years. It affects males more than females and can present with orchitis that mimicks torsion of the testes.

**Platelet is normal or elevated** and urine or stool may have blood. GAS throat culture may be positive or ASO titers may be elevated. **It is very important to monitor urine weekly for worsening proteinuria (if present) until symptoms abate.** Consult pediatric nephrology next for proteinuria in the nephritic range. Hematuria and significant proteinuria is an indication for renal biopsy in patients with HSP.

Associate HSP with intussuception. Get an **abdominal USS as the most appropriate next step if bloody stool and severe abdominal pain are present.** Do not use NSAIDs for the joint pain in a patient with renal involvement.

## **Kawasaki Disease (KD)**

A self limiting medium sized vessel vasculitis that occurs in males greater than females & age less than 5 years typically. Early presentation in 1-2 weeks is with **high fever & SLEEM.** **S**kin (rash is nonbullous, non purpuric), **L**ymphadenopathy (cervical LAD with one node >1.5cm), **E**ye (non purulent bulbar conjunctivitis), **E**xtremity changes (swollen hands and feet with desquamation in extremities), **M**ucocutaneous changes (strawberry tongue, cracked and fissured lips).

Coronary Artery Aneurysm (CAA) occurs usually after day 10 and up to 4 weeks. At **increased risk for CAA are males, age <1yr, fever >16days and fever recurrence after 48 hours of being afebrile.** Conjunctival injection may persist into the subacute phase (day 10-day 25) and thrombocytosis is also seen predominantly in this phase. **CRP & ESR remain high the longest (4-6 weeks).**

Initiate treatment with IVIG and aspirin. **If by 48 hours, no fever break give a second dose of IVIG.** For patients non responsive to IVIG, steroids or Infliximab are second line. **Aseptic meningitis will be the most common side effect of IVIG.** Other side effects of IVIG are anaphylaxis, acute renal failure, myalgias and arthralgias. Since IVIG interferes with live vaccines, **delay MMR and varicella for at least 11 months after IVIG administration.** Myocardial Infarction is the main cause of death in patients with KD.

### **Polyarteritis Nodosa (PAN)**

This will be your diagnosis if vignette describes a patient with a history of hepatitis B or group A strep infection now having **constitutional symptoms, painful skin nodules with ulcers and infarcted digits.** Orchitis and renovascular hypertension are consistent findings. PANCA is non-specific. **Diagnosis is via biopsy or arterial angiography.** Treat with steroids.

### **Wegener's Granulomatosis (WG)**

A granulomatous vasculitis of small vessels. **Hemoptysis and glomerulonephritis** are suggestive of WG. CANCA is not specific. Diagnosis is via biopsy. Treat with steroids and immunosuppressants. Relapse occurs in up to 50% of patients. **Chronic bactrim therapy prevents relapse.**

**Behcets Disease:** Recurrent painful oral and genital ulcers with eye inflammation are symptoms suggestive of behcets. Other skin lesions seen in behcets are erythema nodosum and necrotizing folliculitis. Positive partheyry test is seen.

### **Hypermobile Joints**

Consistent findings in **Ehler danlos** are poor wound healing and easy bruisability. For **Marfans**, you have MARFANS (see genetics), With **Lowe** there is hypotonia, blindness and mental retardation.

### **LYMES DISEASE**

Erythema Chronicum Migrans is noticed first usually at site of tick bite. This is followed within 2 weeks by flulike illness, joint pain and fatigue. **Months later, Lyme CAN ring a bell;** Cardiac involvement, **Arthritis**, **Neurologic bell's palsy** is noted months later. **Years later the arthritis progresses.** Work up first with lymes antibody titer. Confirm with western blot. Doxycycline, marcolide or ceftriaxone is used to treat.

### **Rheumatic Fever**

Do not ignore the murmur described in a patient with joint pain. Diagnosis is with 2 major (JONES) criteria and evidence of group A strep infection. If you suspect rheumatic fever (new murmur in a patient with joint pain or sydenhams chorea described) on the boards and you aren't given a history of recent strep throat or skin infection, **get antistreptolysin-O titers or a streptozyme test next** (see cardiology). Diagnosis can also be established with one major criterion and two minor criteria (fever, elevated CRP or ESR and prolonged PR on EKG).

## **Systemic Lupus Erythematosus**

**Diagnosis:** You will need **4 out of 11 SOAP BRAIN MDs** to make this diagnosis.

**Serositis** (chest pain or abdominal pain), **Oral ulcers** (painless), **Arthritis** or **Athralgias**, **Photosensitivity**, **Blood** (cytopenias), evidence of **Renal** (nephritic or nephritic syndromes) disease, **ANA** elevated (>1:160), **Immunologic** manifestations (positive anti DS DNA, antismith, false positive VDRL), **Neurologic** manifestations, **Malar** rash and **Discoïd** rash.

**Immunologic manifestations:** Antismith most specific and diagnostic. **ANA most sensitive and used to screen.** Antihistone clues you to drug induced lupus (procainamide hydralazine and quinidine). Lupus anticoagulant causes thromboembolic disease and false positive VDRL for syphilis. **Signs of active renal disease are increasing antiDNA titers and decreased C3, C4 &CH50.**

## **Sjorgen Syndrome**

Chronic autoimmune disease with dry eyes, dry mouth and elevated ESR. Diagnosis is with salivary gland and lip biopsy showing lymphocytic infiltration of the exocrine gland. **Positive Rolarfana- Ro, La, RF (Rheumatoid Factor) & ANA.**

## **Juvenile Dermatomyositis (JD)**

Heliotrope rash and Gottron's papule described typically. Muscle weakness with positive gowers sign and athralgias are consistent findings in JD. **Know the difference between the butterfly rash and knuckle lesions in JD and SLE. See dermatology.**

## **Sarcoidosis**

Typically, this is the African American with TB-like symptoms, bilateral hilar adenopathy and node biopsy showing non caseating granulomas. The lesions typically secrete a form of vitamin D which leads to **hypercalcemia and hypercalcuria**.

## **Scleroderma**

The localized type is a self limiting condition. Vignette describing a skin lesion that goes through stages of hyperpigmentation to fibrosis to hypopigmentation with brown borders is suggestive of the localized scleroderma. Systemic type is associated with raynaud's phenomenon and dysphagia. **Give ACE inhibitors for associated renal hypertension in the systemic type.**

## **Periodic Fevers**

- **Familial Mediterranean Fevers:** Chronic fevers with 3-5 days fever per month, rash, joint pain. **Treat with colchicine.**
- **PFAPA:** This is the patient with chronic fevers 5-7days of fever per month, aphthous stomatitis, pharyngitis and cervical adenitis. **Treat with a short course of prednisone first, then cimetidine next.**

**Conditions with Abnormal Labs**

<b>Condition</b>	<b>Abnorma labs</b>
<b>CAH</b>	Hyponatremia, hyperkalemia, low bicarb and urine sodium greater than 20
<b>Cystic fibrosis</b>	Hyponatremia and hypochloremic alkalosis
<b>Pseudohyponatremia</b>	Hyponatremia with hyperglycemia or hyperlipidemia
<b>SIADH</b>	Hyponatremia, high urine sodium, high urine osmo
<b>Cerebral Salt wasting</b>	Hyponatremia, high urine sodium, low urine osmo
<b>Water intoxication</b>	Hyponatremia, low urine sodium, low urine osmo
<b>Diabetes insipidus</b>	Hypernatremia, low urine sodium, high urine osmo
<b>Diarrhea with bicarb loss</b>	Normal anion gap metabolic acidosis with history of diarrhea
<b>RTA</b>	Normal anion gap metabolic acidosis with a history of failure to thrive.

## The right fluids

Conditions	Best initial fluid or electrolyte therapy
Maintenance fluid for a sickle cell disease patient	Maintenance fluid for a sickle cell disease patient
Older kid with moderate dehydration from volume loss	D5W1/2 NS at 1x or 1.5x maintenance if insensible loss is present (tachypnea and fever)
New born with normal MAP, delayed feeding initiation and normal vitals	D10W to run at 1X maintenance
Newborn with symptomatic hypoglycemia (<25mg/dl):	D10W bolus followed by D10W or D12.5W maintenance via peripheral vein
Severely dehydrated, shock or hypotensive patients	0.9% NS or ringers lactate intravenous bolus
Hyponatremia less than 120 meq/l and seizures	3% NS intravenous bolus
Asymptomatic hypokalemia from volume depletion	Add KCL20meq/l to intravenous fluids to run with maintenance fluid
Hypokalemia in DKA	Add KCL and Kphos to 2 separate bags and run at 20-60meq/l depending on the serum potassium, calcium or phosphate levels.

## **Dehydration following diarrhea/vomiting**

You are expected to know how to classify, recognize and quickly assess a child for dehydration. Moderate dehydration is high yield. Vignette may describe a kid with moderate dehydration and ask for the most likely additional finding. **Lethargy, hypotension or 3 seconds delayed capillary refill time will be wrong choices for moderate dehydration.**

- **Mild (<5%) dehydration:** Alert with **normal vitals**.
- **Moderate (5-10%) dehydrated:** Appears weak with orthostatic changes. Other findings are **DIRT**. **D**ecreased urine output, **D**ry skin and buccal mucosa, **I**rritability, **R**educed tears, skin **T**enting, **T**wo seconds cap refill time and **T**achycardic.
- **Severe (>10%) dehydration:** Lethargy, greater than 3-4 seconds cap refill time and **hypotension**.

## **Hyponatremia**

When ever you see a patient with serum sodium less than 130, look for the presence of edema and hypotension to help narrow down the cause quickly. Unless the vignette is straight forward, this method may be needed if you are pressed for time and cannot read the entire question. **Pseudohyponatremia is seen in hyperglycemic and hyperlipidemic states.**

- **Hyponatremia with low blood pressure:** Think **AGE CASTED**. **A**cute gastroenteritis, **C**ystic fibrosis, **A**ddison's disease, **S**alt wasting CAH, **T**hird spacing; **E**xtrême burn and **D**iuretics. Correlate with history.

- **Hyponatremia and normal BP:** Think **SHhh** quiet BP. **SIADH** & Hypothyroidism.
- **Hyponatremia and edema:** Nephrotic syndrome, congestive heart failure and renal failure.

## Heat problems

- **Heat stress** causes decreased exercise performance.
- **Heat stroke** has temp greater than 104F and is associated with **no sweating**.
- **Heat exhaustion** (temperature between 100.4 & 104F) causes nausea, vomiting, **excessive sweating** and confusion
- **Allowing free water drinking during sports is the best way** to prevent heat problems. This is the best statement to make even in an obese kid.

## Mineral deficiencies

I know PDDP, PAAN and APDDP don't mean anything to you. That is why this should stick. You know the DD is diarrhea and dermatitis. Common try!

	Code/clue	Deficiency
Zinc ( <b>pddp zinc</b> )	<b>PDDP</b> /History of weaning from breast milk.	<b>Perioral rash, Diarrhea, Dry skin, Poor wound healing. Low alkaline phosphatase.</b>
Selenium	TPN/Premature patients	Macrocytic anemia, skin and hair depigmentation and <b>hypothyroid symptoms</b>
Copper ( <b>copper paan</b> )	<b>Copper PAAN/History of TPN or prematurity</b>	<b>Pancytopenia, Anemia is microcytic, Ataxia and Neuropathy</b>
Essential FA deficiency (Linolenic/linoleic)- <b>Assential-pddp</b>	<b>A-PDDP/History of cystic fibrosis, TPN, biliary atresia, &amp; Prematurity</b>	<b>Alopecia, Poor growth, Diarrhea, Dermatitis, Poor wound healing</b>

## Vitamin deficiencies and Excess

	Code/clue	Deficiency	Toxicity
Retinol/A	<b>PseudoXnight</b>	Xerophthalmia (dry skin) Nyctalopia ( <b>night</b> blindness)	<b>Pseudo</b> tumor cerebri
Thiamine/B1	<b>Beri weak and confused but big hearted thiamine</b>	Beriberi, Weakness, confusion, cardiomegaly	
Riboflavin/B2	<b>SAD Ribo hates the light</b>	Stomatitis (angular), <b>Anemia, Dermatitis</b> , phototherapy increases risk of deficiency	
Niacin/B3	<b>Nice 3D Vessel</b>	<b>Diarrhea, Dementia, Dermatitis</b>	Vasodilatation
	Code/clue	Deficiency	Toxicity
Pyridoxine/B6	You should remember this <b>neuropath!</b>	<b>Neuropathy</b>	<b>Neuropathy</b>
Folate/B9 Best source is cereal	<b>Folargetonguemia</b> Goat milk, methotrexate increase the deficiency risk	<b>Big tongue/ Big anemia</b> (increase MCV)	
Cyacobolamin/B12	<b>Cyberanemias BIP</b> Infants of strict vegetarians and IBD are at risk	<b>Big anemia</b> (increase MCV)/ <b>Iron deficiency anemia/Pernicious anemia</b>	
Biotin/B13	<b>BIO NASA</b>	<b>Neuropathy, Alopecia</b> <b>Seborrheic rash,</b> <b>Achromotrichia</b> (loss of hair pigment or color)	
Ascorbic acid/C	Evapourated milk intake increases the risk of deficiency state	Scurvy	Oxalate or cysteine stones. <b>Hemolysis in G6PD deficient patients.</b> Diarrhea/cramps

	<b>Code/clue</b>	<b>Deficiency</b>	<b>Toxicity</b>
Cholecalciferol/D	Exclusive breast feeding and no sunlight exposure increases the risk of deficient state	Rickets (costochondral beading, bow legs, skull bossing, delayed eruption of tooth)	Stones from hypercalcuria Renal failure with DM like presentation
Tocopherol/E	<b>ALOE vera.</b>	<b>A</b> taxias, <b>A</b> nemia (hemolytic), <b>L</b> oss of vibration and position sense, <b>L</b> oss of deep tendon reflexes, <b>O</b> phthalmoplegia, <b>E</b> dema and <b>E</b> levated platelets	

### **Caloric Needs for optimal growth**

Preterm	100-120kcal/kg/day
Term	100-120kcal/kg/day
6-12month	100-105kcal/kg/day
Congestive heart failure	Give higher caloric formula

## **MILK COMPARISONS**

### **Breast milk versus Formula**

- **Breast Milk (lower in most things):** Lower calcium, phosphate, renal solute load, vitamin D, E & K, **protein** and iron (**iron more bioavailable**).
- **Formula: Higher in most things** (higher calcium, phosphorus, renal solute load, vit D, E, K, protein and iron).

### **Breast Milk versus Cow's milk**

Breast milk has higher lactose but lower phosphorus compared to cow's milk. The higher phosphorus content of cow's milk leads to hypocalcemia if given to a child less than 1year.

## Preemie versus Term Formulas

Preemie formulas have **more weight** (more whey) **and pros** (more protein), **more facts** (more fat as MCT) **and cars** (more calcium).

### SPECIFIC FORMULAS

Type of milk	Content facts	Studies have shown	Indications for use
<b>Cow milk-based formulas</b>	Contains lactose, prebiotic and nucleotides.  <b>Whey: Casein ratio is 60:40 compared to human milks 70:30</b>	It supports normal growth pattern in term and preterm infants.  <b>The prebiotic content leads to the prevention of respiratory and intestinal infections</b>	Term Infants as standard formula
<b>Soy protein based formulas</b>	All lactose free  Contains soy phytates that interferes with the absorption of calcium, phosphate, zinc and iron	No benefit in cow milk protein intolerance compared to cow based milk  <b>No benefit in colic</b>	<b>Galactosemia</b>  Transient lactase deficiency
<b>Modified cow/soy based formula</b>	<b>Low yield on the boards</b>	<b>Significance of reduction of symptoms of GERD is unclear</b>  The only adverse effect reported in a met-analysis were <b>increased coughing and diarrhea</b>	<b>GERD</b>
<b>Amino acid based formula</b>	All lactose free  LCT:MCT 67:33	Not been studied in the prevention of allergy.	Malabsorptive syndromes & Transient lactase deficiency

Type of milk	Content facts	Studies have shown	Indications for use
<b>Extensively Hydrolyzed formulas (EHF)</b>	All lactose free. Predominant protein is hydrolyzed casein.	<b>Superior to cow milk but not human milk</b> in the prevention of allergies.  <b>Beneficial in colic.</b>	Infants at risk for allergies  <b>Cow milk protein Intolerance</b>

### Early introduction of foods

Early introduction of solids to a breastfed infant before the age of 6 months increases the risk of gastrointestinal infections. Studies regarding early introduction of solids and the risk of obesity or allergies are inconclusive and will be wrong answers on the boards.

### Enteral feeding

**NG Tube feeding:** Most common complication is diarrhea and next most common is GE Reflux. Most severe complication is vomiting with aspiration. Indications for enteral feeds in patients with crohns disease are hypophosphatemia, ileitis and perianal fistula. **Contraindications to enteral feeds in crohns are small bowel obstruction (air fluid levels on abdominal x-ray).**

### Bolus versus Continuous enteral feed

- **Bolus feeds**

**How it works:** Stimulates extrahepatic and biliary tree motility more physiologically

**When to start:** If continuous feed is tolerated or initially in oromotor discoordination

- **Continuous feeds**

**How it works:** Optimizes absorption and Saturates carrier protein.

**When to start:** Preferred to bolus feeding in patients with GERD, Crohns, CHD, Malabsorption syndromes.

**Advantages of continuous feeds:** Less GERD, less vomiting and less diarrhea.

## TPN/Cholestasis

Early enteral feeds even in small volumes decrease severity of cholestasis by stimulating bile flow and increasing intestinal motility. Other managements for cholestasis are use of ursodeoxycholic acid which increases bile flow too. Treating bacterial overgrowth also helps in cholestasis.

## Protein Energy Malnutrition

Differentiating kwashiorkor from marasmus is very high yield.

<b>Kwashiorkor</b>	<b>Marasmus</b>
Protein is deficient	Protein & calories are deficient
Edema present	Edema absent
Hair abnormal	<b>Hair normal</b>
<b>Not cachectic</b>	Cachectic

## Food myths

- **Food Additives:** Food additives & sugars do not cause autism or ADHD. Reassure parents who are concerned about this.
- **The BRAT diet:** Has no nutritional value and will be the wrong answer in a patient with diarrhea. Allow patient eat his or her regular diet.

## **The Diarrheas**

### **Acute non bloody Diarrhea (watery diarrhea)**

In these infants, transient lactase deficiency may occur after the acute illness resolves and this responds to lactose free formulas temporarily. Vomiting frequently accompanies the diarrhea but may precede it. Admission is indicated for severe dehydration or shock or for symptomatic electrolyte abnormality.

**Most likely causative organism:** Rotavirus in the winter and adenovirus in the summer. With exposure to apple orchard or unpasteurized apple juice, **enteropathogenic E. coli (EPEC)** will be the most likely causative organism. With exposure to a public pool or a recreational swimming pool and oocyst is seen in stool, **cryptosporidium** will be the most likely causative organism. Keep children with cryptosporidium diarrhea away from recreational pools for an additional 2 weeks after diarrhea stops.

### **Osmotic Diarrhea (OD)**

An imbalance between fructose and galactose concentrations in juices is a common cause of OD in pediatrics. Normal fructose to galactose ratio should be 1:1. If fructose is higher than galactose, diarrhea occurs. Apple juice and pear nectar have F:G ratio of 2:1 hence worsens or causes diarrhea.

**White grape juice and orange juice have F: G ratio of 1:1 hence doesn't worsen or cause diarrhea.** Osmotic diarrhea may also be due to lack of enzymes that breaks down sugars like in lactose intolerance or transient lactase deficiency seen post viral gastritis.

## **Chronic Diarrhea**

- Ongoing for greater than 2 weeks. Common causes are

### **Gardiasis**

Recent travel or immigrants are at risk. Camping and stream water drinking also increase the risk of gardiasis. If any of the above risk factors including immunocompromised patients are described as having bulky foul smelly stools, weight loss, abdominal cramps and distension then gardiasis is likely.

**The most appropriate next step in evaluation will be to get an Elisa stool assay. A small bowel biopsy is the most sensitive test for gardiasis.** Most asymptomatic carriers self resolve. Use flagyl for symptomatic patients. Treat all household members.

### **Amoebiasis**

This has the same risk factors and presentation as gardiasis. The presence of dysentery or liver abscess should make you lean towards amoebiasis. The most appropriate next step in evaluation will be an Elisa stool assay. Next, get an ultrasound or CT-scan to check for liver abscess if suggestive.

Treat with flagyl and amebicide for symptomatic carriers and amebicide monotherapy for asymptomatic carriers.

### **Cow/soy milk intolerance (non IgE mediated)**

This is typically seen in the first three months of life or later in infancy after exclusive breast feeding with the introduction of formula (cow or soy based). It may occur even

while breast feeding if mom drinks cow based milks. Symptoms consistent with cow/soy milk intolerance are bloody stools, vomiting, eczema or irritability.

**Stop the formula first or tell mom to stop drinking cow based milk if breast feeding.** No recurrence of symptoms after stopping the offending formula is suggestive. Get stool occult blood first if no complaint of bloody stool but suspicion is high. Endoscopy and biopsy is the gold standard for diagnosis (but unnecessary). Switch to protein hydrolysate formulas next.

### **Lactose intolerance**

This is typically seen greater than 2 years of age. Bloating with recurrent abdominal pain & flatulence in a child that eats dairies or lactose containing milk is suggestive. Get **stool for reducing substance first** if clinical suspicion is high.

A **breath hydrogen test is the most reliable diagnostic test** (greater than 10-20PPM is a positive breath test). Gold standard again here is endoscopic biopsy.

### **Celiac disease**

Symptoms begin at about 4 months after introduction of solids containing barley, rye or wheat with vomiting, irritability, abdominal distension and diarrhea which may become chronic and associated with failure to thrive.

Always ask the mom about the type of food she gives her infant. Gluten enteropathy is considered a non IgE mediated food allergy just like cow milk intolerance.

Associate celiac disease with dermatitis herpetiformis and IgA nephropathy.

Screen patient first with serum IgA, antiendomysial antibody (more specific) and antitransglutaminase antibody (more sensitive). Diagnosis is with intestinal biopsy. Best initial treatment is discontinuing the gluten diet just like in cow/soy milk intolerance.

### **Malabsorptive diarrhea**

Seen in premature infants with history of ileal resection or in older infants or kids with cystic fibrosis (CF). Symptoms are diarrhea, steatorrhea, bulky or foul smelly stool.

**Get stool for fecal fat next.**

Treat by changing to premature formula high in medium chain triglycerides if history is suggestive or by replacing enzymes in CF.

### **Chronic Non Specific Diarrhea (CNSD)**

This occurs in children between 9 months and 3 years. The cause is unknown really but it may be associated with excessive fruit juices or water intake. Vignette may describe a toddler with recent gastroenteritis or recent antibiotic use for an ear infection (these are decoys).

Key to CNSD diagnosis is the child goes on with diarrhea beyond the period an acute viral illness should have resolved. The patient usually **sleeps through the night without diarrhea** and then has loose stools in the morning that gets better as the day progresses. Mushy stools that contain undigested food are consistent with CNSD).

**Treat by limiting CHO in diet, increase fat and fiber.**

## Bloody Diarrhea

Organisms	Clues from history	Diagnosis	Management
<b>Campylobacter</b>	Associate with <b>guillain barre</b> syndrome.	Stool Culture	<b>Self limiting</b> otherwise Erythromycin is used if symptoms persist
<b>Yersinia</b>	Chitterlings and appendicitis-like abdominal pain	Stool Culture	<b>Self limiting</b> otherwise <b>bactrim or ceftriaxone</b> for persistent symptoms
<b>Shigella</b>	High fevers, leukocytosis & seizures that precede diarrhea	Stool Culture	<b>Bactrim or ceftriaxone</b>
<b>Salmonella</b>	Reptiles in home	Stool Culture. Blood culture and <b>spinal tap if less than 3months</b>	Requires only supportive therapy. Treatment indicated if bacteremic, immunocompromised or toxic or less than 6 months. Use <b>bactrim or ceftriaxone</b>
<b>Clostridium Difficile</b>	Antibiotic use up to 10 days prior	Stool for clostridium difficile toxin assay	Flagyl is first line, <b>vancomycin next for resistance or failed initial treatment</b>
<b>EHEC</b>	Hemolytic uremic syndrome	Stool Culture	Self limiting
<b>Inflammatory Bowel Disease</b>	Weight loss and joint pain	Endoscopy & biopsy	Steroids and immunosuppressives

## Congenital Diarrhea

### Congenital Transport Defects

<b>Abetalipoproteinemia</b>	<b>Chylomicron Retention Disease</b>
Defect in fat transport	Defect in fat transport
Steatorrhea and failure to thrive are common	Steatorrhea and failure to thrive are common
No synthesis of chylomicrons because no apo B	There is exocytosis of chylomicrons
Acanthocytosis and retinitis pigmentosa are consistent findings	<b>No acanthocytosis or retinitis pigmentosa</b>

<b>Hartnup</b>	<b>Lowes</b>
Defect in amino acid transport	Defect in amino acid transport
<b>Malabsorption of nicotinamide</b>	<b>Malabsorption of lysine and arginine</b>
Pallegra-like presentation	Mental retardation, cataract and rickets

<b>Congenital chloride diarrhea</b>	<b>Congenital sodium diarrhea</b>
Defect in chloride ion channels	Defect in sodium ion channels
Polyhydramnios	Polyhydramnios
Stool PH and stool chloride increased	<b>Stool PH decreased</b> but stool sodium increased

**Congenital Glucose-Galactase Deficiency:** Autosomal recessive. There is inability to digest disaccharides leading to diarrhea and abdominal pain due to deficiency of the enzymes. Give Fructose.

**Congenital Sucrase-Isomaltase Deficiency:** Autosomal recessive. The typical patient is a six month old recently introduced to fruits and juices containing complex sugars such as sucrose that cannot be digested. This leads to diarrhea and poor weight gain. Most infants with this condition cannot tolerate soy or protein hydrolysate formulas. Give Sucrase.

## **VOMITING**

### **Cyclic Vomiting**

Typically lasts 48hrs followed by a vomiting free periods. These patients have emotional overtones and are at risk for migraines. There is usually a positive family history. Diagnosis of exclusion. Treat like migraine with cyproheptadine, propranolol or TCAs.

### **Acute gastroenteritis**

Acute onset of fever & diarrhea and hyperactive bowels with or without vomiting. Daycare is a clue.

### **Achalasia**

Post eating and involuntary vomiting or regurgitation, dysphagia to solids first then liquids later. **Barium esophagogram first then manometry next confirms.**

### **Mallory Weiss tear**

Protracted vomiting or retching with vomiting. If mild, condition self limits and reassurance will be the answer. If question asks for most appropriate next step for diagnosis then **endoscopy** will be the answer.

## **Intestinal Obstruction**

Abdominal pain, distension & bilious vomiting. Get an abdominal X-ray next.

## **Pyloric stenosis**

Typically occurs in a 1-5month old and presents with non bilious vomiting after each feed. Child is hungry after vomiting and eats vigorously. **Get abdominal USS & BMP next.**

## **Acute abdomen**

Localized pain, loss of appetite, rigid belly, hypoactive bowels. Emergent abdominal USS or X-ray first. **CT-scan afterwards or emergent surgery next (depending on cause).**

## **Increase ICP**

Vomiting (projectile and worse in mornings) without diarrhea. May have associated bulging fontanelle in infants and headaches in older patients. **Get head CT-scan next.**

## **Bulemia**

Vomiting induced. Binge eating, use of laxatives or syrup of ipecac. **Psychiatry referral next or admission if patient meets criteria.**

## **Anthral Web**

**Nonbilious vomiting** in the newborn. History of Polyhydramnios and low birth weight. Upper GI done next showing **radiolucent filling defect** is suggestive. Pyloric stenosis will typically be in a child greater than 2 weeks old.

## **Intussuception**

Buzz word is lethargy or severe pain. Child is typically 3 months to 6 years with intermittent sudden pain, crouching with or without vomiting which may be bilious or non bilious. Classic currant jelly stool or sausage mass history is usually not given. X-ray revealing minimal gas in right abdomen and ascending colon is suggestive. **Do air or contrast enema next (diagnostic and curative).**

## **Anular Pancrease**

**Bilious vomiting** in the new born. Remember duodenal atresia will be the most likely cause of bilious vomiting on the first day of life.

## **Swallowed foreign body**

- If coin is seen in the esophagus (x-ray) and patient is symptomatic (drooling, dysphagia, refusing food), patient needs urgent endoscopy and removal
- If coin is seen in the esophagus (x-ray) and patient is asymptomatic, non urgent endoscopy is required next.
- If coin is seen in the stomach (x-ray) or below, reassure and tell parents to examine stool for coin which should pass withing 4-6 days. **Repeat x-ray in 2 weeks if parents report no passage to document retained versus passed coin.**
- If button battery is swallowed, **urgent removal is needed regardless** of where it is seen on x-ray.

## **Gastroesophageal Reflux**

Concerned parents of infants (<12 months) that spit up excessively need **reassurance**. Most are outgrown by 2years. If there is evidence of esophagitis

(posturing, chest discomfort, failure to thrive or Apnea) then a work up is indicated and possible treatment with H2 blocker or proton pump inhibitor to prevent Barrett's esophagus later. **An upper GI if done may show wide GE junction for GERD & irregular mucosa with superficial erosions or ulcers for esophagitis.** Begin medication with a PPI as first line. Nissen fundoplication (which isn't exactly curative) is reserved for those unresponsive to medical therapy.

**Rumination:** Resolving the emotional trigger is the usual right answer.

### **Peptic ulcer Disease**

A triad of epigastric pain, postprandial vomiting (may be hematemesis), dark stools or heme positive stool is suggestive. **A Positive family history of PUD is a very strong risk factor.** Two main causes are NSAIDs and H.pylori. **Endoscopy & biopsy is diagnostic.** Serology and Urase breath test (UBT) are unreliable in kids even when positive (doesn't rule out other causes of the pain). UBT or fecal H pylori antigen are best to document cure after eradication treatment for H pylori. For H pylori treatment, use a proton pump inhibitor, amoxicillin and either clarithromycin or flagyl for 2 weeks.

### **Referred abdominal pain**

Referred pain is very significant for abdominal pathology. Some referred pain and common causes are listed below.

- Pain referred RLQ is suggestive of RLL Pneumonia.
- Pain referred to the right infrascapular region is suggestive of Gall bladder Inflammation.

- Pain referred to the posterior flank pain is suggestive of Acute Pancreatitis.
- Pain referred to the scrotum is suggestive of Rectal or Gynecologic pathology.

## **Functional Abdominal Pain (FAP)**

Onset of FAP is usually between the ages of 6-14 years. Pain is on & off for >3 months. Patients with FAP may exhibit findings like guarding, rubbing and grimacing on palpation. Otherwise there is a normal physical examination with no weight loss usually. Working up a patient with FAP usually yields nothing (normal work up).

Reassure parents if symptoms are consistent with FAP. Thirty to fifty percent of kids with FAP resolve their symptoms within 2 weeks AND the rest have recurrent abdominal pain into adulthood.

Rule out organic cause of abdominal pain in kids you suspect have FAP if any of the following are present from the history, physical examination or work up: weight loss or FTT, positive occult blood.

## **Inflammatory Bowel Disease**

**Common to both: ulcerative colitis and crohns disease is PHARTEN (stinky)**

**P** panca positive, **P**ubertal delay, **H** hlab27 antigen associated, **A** ankylosing spondylitis, **R** retarded growth, **T** toxic megacolon, **EN** erythema nodosum.

**Specific to Ulcerative Colitis:** Entire gut not involved but lesions are continuous.

**Colectomy is curative & eliminates cancer risk.** Affected patients are prone to pyoderma gangrenosum and primary sclerosing cholangitis.

**Specific to Crohns Disease:** Entire gut involved with skip lesions, mouth ulcers and perianal lesions. **Granulomas may cause urinary retention and bowel obstruction.** They are prone to anal fistulas, abscesses and strictures.

## **Irritable Bowel Syndrome (IBS)**

Abdominal pain in a late teen that has gone on for at least 3 months (continuous or intermittent) that has two of the three features

- 1) **Pain relieved with defecation**
- 2) **Onset associated with a change in frequency of stool or**
- 3) **Onset associated with a change in form/consistency of stool (soft or hard)**

Patients with IBS may have other somatic complaints e.g. chest pain, headaches, anxiety. The abdominal pain does not disturb sleep. **Fever, weight loss, hematochezia are not consistent with IBS.**

The physical examination is usually normal. It is a diagnosis of exclusion and as such to rule out an organic cause, limit testing to CBC with diff, serum albumin, ESR, TFT, stool occult blood, **serologic test for celiac disease** and endoscopy.

Best initial step in management is reassurance, education about disease and **dietary intervention with high fiber diet.**

## Lower GI Bleed

### Blood mixed with normal stool

In infants less than 6 months eosinophilic proctitis and milk protein Intolerance should be high on your list of potential causes. In children between 2-6 years with painless SMALL VOLUME rectal bleed, think juvenile polyp. In children 2-3 years with Large volume rectal bleed, think Meckels diverticulum.

### Blood coating stool

Anal fissure from constipation, perianal group A strep infection, rectal prolapse, hemorrhoids and inserted foreign body. Correlate with history.

## Functional constipation versus Hirschsprung's Disease

Functional Constipation	Hirschsprung
Age > 2 years	Usually <2 years
No FTT	FTT
Rectum with stool	<b>Rectum with no stool</b>

## Constipation syndromes

- Vignette describes an 11 month old who **strains when he poops** but stool is regular, soft and not pellet-like. **Reassure mom next.**
- Vignette describes a 3 month old exclusively breastfed infant whose mom says she has **passed stool just once this week.** **Reassure mom next.**
- Vignette describes a preschool child with hard stools. Most common cause will be **withholding behavior.**

- Vignette describes an 8yr old boy with a history of painful constipation or anal fissure and now has fecal incontinence. Most appropriate next step is education/behavioral modification, stool softeners and positive reinforcement. **Most likely additional history is fear of using rest room in school** for whatever reason.

## **LIVER ISSUES**

### **Hepatitis A**

Spread may be via feco-oral or sexual route. In acute infections there is high anti HAV IgM. For those exposed, Immunoglobulin is used for prophylaxis within 2 weeks of exposure and is given to all household, sexual and close contact.

### **Auto Immune Hepatitis (AIH)**

Vignette may describe a female with symptoms (acute or chronic hepatitis) and lab evidence of liver disease (increase transaminases, increase direct and total bilirubin) and **elevated gamma globulin** (high total protein but decreased albumin). Other autoimmune diseases may be present e.g. thyroiditis, DM, vitiligo, IBD and sjorgens. **Diagnosis is via biopsy.** Treat with prednisone and azathioprine. AIH may cause acute liver failure (ALF).

Labs consistent with ALF are

- Elevated or normal transaminases
- Hyperbilirubinemia (direct and indirect)
- Hypoalbuminemia
- Hypoglycemia
- Prolonged PT and PTT

- Elevated ammonia

**Liver transplant is indicated in a patient with acute liver failure if there is evidence of encephalopathy (drowsiness described) OR coagulopathy (elevated PT, PTT with or without thrombocytopenia).** Tylenol toxicity is a more common cause of acute liver failure than autoimmune hepatitis.

### **Biliary Atresia**

Infant less than 6 weeks with jaundice, clay colored stools, dark urine and hepatomegaly. Direct and indirect fractions may be high and also liver enzymes, alkphos and GGT may be high.

The most appropriate next step in evaluation will be an abdominal ultrasound. **If an ultrasound is suggestive a radionuclide (HIDA) scan should be done next** and it may show failure of the dye to be excreted through the ducts.

Kasai procedure is usually indicated and done preferably before 3 months of age. Liver transplant is indicated for complete atresia.

### **Choleduchal Cyst versus Hydrops of the Gall Bladder (GB)**

- **Common to both:** Right upper quadrant (RUQ) pain, **RUQ mass**, jaundice and fever
- **Ultrasound findings:** In choleduchal cyst USS shows Intra and extra hepatic biliary tree dilation BUT in hydrops of the GB, it shows markedly dilated stone-free GB.

## **Acute cholecystitis**

This patient usually presents with RUQ pain that worsens with inspiration (positive murphy's sign) and fever. A work up will reveal leukocytosis with left shift, increase bilirubin and elevated transaminases. If GGT, alkaline phosphatase and bilirubin are high, it usually means biliary obstruction from stones or whatever.

Getting an abdominal ultrasound will be the most appropriate next step in evaluation. A hida scan should be done next if the ultrasound is inconclusive and clinical suspicion is high.

Treatment is supportive and **definitive is with laparoscopic cholecystectomy.**

## **Cholelithiasis**

May be asymptomatic or cause biliary colic. At risk are obese and sickle cell patients. Most pediatric stones are pigment stones (from RBC breakdown) and will not respond to oral bile acids (e.g. ursodeoxycholic acids). Observe if asymptomatic. **Do laparoscopic cholecystectomy for biliary colic.**

## **Typhylitis**

**The immunocompromised appy-like child.** This is inflammation of the cecum. An immunocompromised child with right lower quadrant pain and fever should alert you to a possibility of typhylitis. Work up may reveal neutropenia. Abdominal X-ray may show thick bowel wall and pneumatosis intestinalis.

**Short bowel syndrome (SBS):** Malabsorptive issues result in growth issues in these kids with a portion of their GUT cut of for what ever reason. SBS patients with intact ileo-cecal valve post surgery usually have normal growth. Protein hydrolysate formulas

and modular formulas are preferred in these patients. They are also prone to small bowel overgrowth and this can cause feeding intolerance. A stool PH is the most appropriate test of choice to assess feeding tolerance. **A stool PH of <0.25 percent is consistent with good tolerance.**

**Rectal Prolapse:** Most common cause is constipation followed by diarrhea and then Cystic Fibrosis.

**Anal stenosis:** These patients strain to **pass small liquid stools**. Anal stenosis usually resolves by 1 year. **Reassure parents.**

## STAPH Infections

### Toxic Shock Syndrome

It is toxin mediated and caused by **staph aureus (tampons)** or **strep pyogenes** status post chicken pox. On the boards, hypotension and desquamating rash is enough to entertain this diagnosis. The vignette may not describe the classic four system involvement or negative serologies for measles, RMSF or leptospirosis. Blood culture is usually negative if due to staph (less than 5 percent positive) and positive for strep (greater than 50 percent positive). Treat with rapid rehydration, antistaphylococcal antibiotics and eliminate the source of the toxin e.g. remove tampons and drain abscesses.

### Staph Scalded Skin Syndrome

It is also toxin mediated and caused by staph aureus with the source of the toxin being a focal cellulitis or an abscess. A tetrad of **blisters, desquamation, fever and positive nikolsky is highly suggestive**. Differentiate SSSS from Toxic Epidermal Necrolysis which also causes positive Nikolsky. TEN has prior history of use of causative medication such as antibiotics or anticonvulsants and more Steven Johnson like presentation with mucous membrane involvement.

### Food Poisoning

Vignette may describe a patient with “stomach upset” (vomiting, cramping, diarrhea, fever and prostration) 2-6 hours after eating poorly cooked or refrigerated food. **The**

**timing is key and staph will be the most likely cause.** Bacillus cereus can also cause acute food poisoning within the same time frame as staph. Usually both staph and bacillus cereus acute food poisoning are due to preformed toxins in the foods. **Choose bacillus cereus as the most likely causative organism if the food eaten is fried rice.** If symptoms starts 8-16hrs after eating poorly refrigerated food then the organism must have been present long enough to produce the toxin (not preformed). Choose Clostridium perfringens as the most likely causative organism in this latter case. The toxins can be detected in stool. Treatment is supportive.

### **Staph as a contaminant**

Staph epidermidis will be your most likely contaminant if culture yields **coagulase negative staph** in a patient with no external devices on body (like catheters, prosthetics or shunts) and if patient is not in NICU. **Repeat blood culture or reassure parents next.** It will not be a contaminant if a device is present or if child is in NICU or if child weights less than 1.5 kg or if child is being treated for leukemia. Remove device first and treat next in all of the above non contaminant scenarios.

## **STREP Infections**

### **Group-A-Beta Hemolytic Strep**

GABHS causes **strep pharyngitis**, cellulitis, **erysipelas**, toxic shock syndrome and **scarlet fever** (duh!). Scarlet fever is toxin mediated (erythrogenic exotoxin). Choose pharyngitis as the most likely source of scarlet fever when asked. Other sources of scarlet fever are cellulitis, wound infection or pyoderma. For the concerned mom whose daughter has strep throat requesting that her asymptomatic son gets treated too, **offer to see him if or when symptoms develop.**

Penicillin is the drug of choice for GAS infections. For patients with a history of type 1 anaphylactic reaction to penicillins, **choose zithromax or clindamycin as the drug of choice**. If patient has non-type one allergy, choose a cephalosporin like cephalexin as drug of choice. If vignette describes a mom who says her son has allergies to penicillin “in quotes” and they do not describe what the allergy is then they usually mean patient can get the penicillin because mom doesn’t know what the heck she is talking about. Treatment decreases the risk of rheumatic fever as long as antibiotics are started within 9 days of infection.

Choose pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (**PANDAS**) as the most likely diagnosis **if GAS is associated with obsessive compulsive disorder and tic disorders**.

### **Group-B-Streptococcal Infections (GBS)**

Intrapartum antibiotic prophylaxis given to GBS positive moms is adequate for preventing early or late onset GBS infections in the newborn if **penicillin, ampicillin or cefazolin is used at least 4 hours prior** to delivery. A GBS positive mom with penicillin allergy that got clindamycin or a marcolide prior to normal vaginal delivery is considered not adequately prophylaxed unless the sensitivities to clindamycin and marcolides are stated in the vignette as sensitive. GBS will be the most common or most-likely cause of neonatal meningitis on the boards. Next is E.coli and then listeria in that order. The most likely organism will be listeria when vignette describes mom as having a flu-like illness prior to delivery. Intravenous ampicillin and gentamycin are the best initial combination therapy. **Do not choose any cephalosporin combo because cephalosporins do not work against listeria**. Treat for 14 days if Meningitis, 10 days if Pneumonia, 2-3 weeks if septic arthritis and 3-4 weeks if osteomyelitis.

**Group-C-Streptococcal Infections (GCS):** College outbreak pharyngitis will be your clue that GCS is the most likely cause.

## **Bartonella Henselae Infections (BH)**

BH causes cat scratch disease and perinaud oculoglandular syndrome. Cat scratch disease is a misnomer because it may be transmitted **either through a bite or a scratch** from the tiny kitty cute cat. Usually no cat history is given in the history (that sucks I know). A distal papule (bite site) is described usually followed by fever, headache, malaise and suppurative or necrotizing painful regional lymphadenopathy weeks later. **The CIA (Choose Immuno Assay) can confirm the cat.** Cat scratch disease is a self limiting condition but zithromax or rifampin can reduce the time of lymph node swelling.

In **perinaud oculoglandular syndrome**, there is **painless non purulent conjunctivitis and preauricular lymphadenopathy.**

Remember if a local wound is described 24 hours to a few days after a cat bite then **Pasteurella multocoda is the organism causing the local wound.** Treat P. multocoda with augmentin or bactrim.

## **Enterococcus Infections (EI)**

**Entering the Coccus List means no cephalosporin for enterococcal and listerial infections.** Enterococcus causes urinary tract infections, polymicrobial abdominal infections or sepsis. Indwelling catheter is a risk factor. Remove catheter and treat with either ampicillin or gentamycin OR vancomycin and gentamycin. If they specify

organism from culture results as **E. Gallinarium** or **E.casselflavus** then ampicillin will be the drug of choice.

## **Listeria Monocytogen Infections**

Entering the Coccus List means no cephalosporin for enterococcal and listerial infections. Vignette may describe listeria as gram **positive bacilli or diphtheroid-like organism**. It causes newborn meningitis. Mom may be described as having a flu-like illness. Intravenous ampicillin and gentamycin are the preferred medications for treatment because of synergy. **If patient is allergic to Penicillin and listeria is suspected, use bactrim and gentamycin.**

## **Corynebacterium Infections**

Diphtheria will be the most likely diagnosis in the immigrant or unimmunized patient with low grade fevers, membranous sorethroat, hoarseness, conjunctivitis and bulls neck. **Myocarditis is the most common toxic effect.** Black colonies with halos seen on tindale culture media OR metachromatic granules on loffler culture media are consistent findings. **Treatment is with antitoxin and antibiotics. Diphtheria antitoxin prevents neurotoxicity if given within 1-2 days of illness. Antibiotic therapy is with erythromycin orally or intravenously for 14 days.** Erythromycin eradicates organism, stops toxin production and renders patient non contagious. **Post antibiotic therapy, two cultures 24 hours apart is needed to document cure.** Treat all household contacts of patients with diphtheria with one shot of penicillin G or 10-14days of oral erythromycin regardless of their immunization status.

## **Clostridium infections**

C. difficile causes pseudomembranous colitis **up to 10 weeks post antibiotic therapy**. Stop the antibiotic as the best initial step in management. Flagyl is first line. Give vancomycin next if flagyl fails. C. tetani causes Tetanus. In neonates with poor cord hygiene, trismus, sardonic looks and rigidity are suggestive symptoms. Patients with tetanus need a quiet environment to prevent worsening of their spasms which can be triggered by minimal noise.

## **Neisseria Infections**

**N. Gonorrhoeae:** Adolescent with pustular skin lesions and joint pain has N.gonorrhoeae until proven otherwise on the boards. See chapter 2 for STIs. **If a preadolescent female is described with N.gonorrhoeae, think abuse.**

**N. Meningitidis:** For N. Meningitidis, late complement deficiency is a risk factor. Never choose meningococemia if Childs symptoms have been on for more than 24hrs. **On the boards, differentiating between meningococemia and RMSF is high yield.**

**Re prevention and treatment:** The blood pressure nurse or history taking resident will not need rifampin prophylaxis. The resuscitating MD and all close intimate or daycare or household contacts will need rifampin. Remember the vaccine for meningitis doesn't cover strain B. If meningococemia is diagnosed, hospitalize for intravenous antibiotics and Intravenous fluids for associated shock in the ICU.

**Respiratory precautions may be discontinued after 24 hours of antibiotics.**

**Chlamydia Infections:** C. trachomatis causes the same things as N.gonorrhoeae but **more commonly. Pneumonia** will be the most likely complication of chlamydial

**conjunctivitis** on the boards. Chlamydia is the most likely organism if **reiters (reactive) arthritis** is described.

## **Bordetella Pertussis Infections**

**Nasopharyngeal swab for pertussis DFA or PCR is diagnostic** (PCR has higher sensitivity and specificity than DFA). Nasopharyngeal swab for **culture is gold standard** for diagnosis. Treatment is with oral erythromycin for **a total of 14 days**. Choose bactrim if marcolide allergy is present. Remember all household and close contacts need prophylaxis with marcolides.

## **Pseudomonas Auriginosa Infections**

**Your clues to P.auriginosa infections** are a history of **nail injury, cystic fibrosis, burns or use of improperly chlorinated hot tubs**. The antibiotic of choice for pseudomonas infections is very high yield on the boards. Choose any of the following antibiotics **ceftazidime, cefipime, imipenem or meropenem**.

## **Mycoplasma Infections**

Mycoplasma will be the most likely cause of atypical pneumonia after 4years of age with non focal findings on chest X-ray. Diagnosis is with **serum mycoplasma titers** (IgM & IgG). IgM may persist for several months so you need to correlate with clinical history to say it is an acute infection or not. **Marcolides are first line for treatment**.

**Brucellosis:** For diagnosis choose serology. Blood samples taken two weeks apart showing a four fold increase in antibody titer is diagnostic. If serology isn't an option choose blood culture as best diagnostic test for brucellosis. For treatment, combination regimens are better than single regimens. Choose doxycycline AND

either rifampin (for 6 weeks) OR streptomycin (for 2-3 weeks). Use bactrim in place of doxycycline in children less than 8 years.

**Citrobacter Infections:** In neonates think brain abscess. **Get MRI or Head CT next.**

### **Ehrlichiosis versus Lymes Disease**

- **Ehrlichiosis:** History of tick exposure/bite with fever, headache, malaise and **pancytopenia OR presence of opportunistic infection** (e.g. candida) are consistent with ehrlichiosis. Treat ehrlichiosis with doxycycline.
- **Lymes disease:** History of **tick exposure/bite followed days to weeks later by fever, headache, malaise and erythema migrans** are consistent with lymes. Meningitis, bells palsy, neuritis, myocarditis are early disseminated manifestations of lymes. Arthritis and encephalopathy are late manifestations of lymes. Treat early lymes with doxycycline or amoxicillin (less than 8 years) for 21 days. **For CNS lymes, use high dose rocephin or penicillin for 21 days.**

### **Mycobacterium Therapy**

- **Pulmonary Tuberculosis:** A chest X-ray is indicated whenever a PPD is positive. Begin treatment with rifampin, isoniazid, pyrimethamine and ethambutol (RIPE). With CNS involvement, use RIPS instead (S is streptomycin). **For HIV patients on protease inhibitors use rifabutin** instead of rifampin. If INH resistance is described, stop INH and continue other medications in the regimen.

- **Mycobacterium Avium Complex (MAC):** The lymphadenitis it causes is unilateral, firm and nontender with normal CBC, ESR and PPD negative. Although the lymphadenitis self resolves, diagnosis and treatment may be achieved in non disseminated MAC lymphadenitis by excising the node. Disseminated disease is common in immunocompromised hosts. Begin treatment with clarithromycin and ethambutol for disseminated disease. **With CNS involvement and for patients on protease inhibitors, use clarithromycin as the preferred macrolide.**

### **Norcadia versus Actinomyces**

- **Norcadia:** Aerobic and weakly acid fast. It causes neutrophilic meningitis, **focal brain abscesses** and subcutaneous nodules. Bactrim is first line. Minocycline is second line.
- **Actinomyces:** Anaerobic and not acid fast. It causes neutrophilic meningitis, chronic pneumonias and indolent **cervicofacial or intra-abdominal abscesses**. Penicillin G is first line. Incision & drainage may be indicated.

### **Candidal deadly syndromes**

- **Septic peripheral Thrombophlebitis:-**Needs resection. Treat with amphotericin B for 4-6 weeks
- **Septic thrombosis of great veins:-Remove catheter next.** Treat with amphotericin B for 4-6 weeks
- **Hepatosplenic Candidiasis: - Do CT next.** Begin treatment with amphotericin B for 4-6 weeks

**Cryptococcal infections:** It causes cavitary Pneumonia like norcadia and may have peripheral cannon ball lesions (nordadia has nodules).

### **Cryptosporidium versus Isospora infections**

**Common to both:** Chronic watery diarrhea in immunocompromised

**Differentiates both:-Cryptosmall** (crypto is small and round on acid fast stain).

**Isolarge** (isospora is large and round on acid fast)

**Treatment:** Treat cryptosporidium with nitazoxanide or paromomycin and zithromax. **Treat isospora with bactrim**

### **Leptospirosis**

**Doggy Doggy Ratiosis Leapt-to-spill-urinesis.** Exposure to dog or rat urine leads to acute febrile illness. History of swimming with dog in pool or drinking contaminated water with rats in home may be given. **Do blood culture first then urine culture after for diagnosis.**

### **Leishmaniasis**

**Sand flies un-leash maniasis:** Diagnosis is via biopsy and cultures. Use sodium stibogluconate for visceral disease and amphotericin B and itraconazole for cutaneous disease.

## **THE WORMS**

### **Ascaris Lumbricoids (roundworm)**

These worms make a **round trip** from the gut (after feco-oral ingestion) to the lungs where they are coughed up and reswallowed into the gut. **In the lungs**, they induce hypersensitivity reaction (type 1 like) causing wheezing, coughing and DIB. On the

boards with lung manifestations, you will think it is asthma but a **shifting infiltrate** on chest x-ray is consistent with round worm. **In the gut** they may cause PUD-like pain, duct obstructive symptoms (cholangitis, cholecystitis) or intestinal obstruction (with heavy worm infestation). Eosinophilia is in the lung phase but not the GI phase. Eosinophilia alone isn't helpful. **Diagnosis is finding characteristic egg or worm in stool.** Treatment: **MAP the worm out;** Mebendazole is second line, Albendazole or Pyrantel pamoate are first line.

### **Enterobius Vermicularis (pinworm)**

**Enter-anus very-itchylaris:** It causes perianal pruritis at night. Vignette may describe excoriation and impetigo from the scratching. Scotch tape test overnight is the most appropriate next step. Treatment: **MAP this worm out too.**

### **Trichuris Trichura (whipworm)**

**Trichuric tenesmus Trichural prolapse:** Associate with tenesmus, bloody stools and rectal prolapse. Treatment: **MAF it out** (F-flagyl). Iron replacement is indicated for anemia.

## **VIRAL INFECTIONS**

### **Hepatitis A Viral (HAV) Infection**

Self limiting disease transmitted commonly via feco-oral and sexual routes. HAV infection does not result in chronic infection or chronic liver disease. Diagnosis is based on both clinical symptoms and serologic testing showing positive IGM antibody to HAV. A positive total anti HAV indicates immunity to HAV infections and doesn't differentiate past from acute disease.

## Hepatitis B

Mom to baby **transmission is most likely during delivery** and NOT in utero.

Significance/Markers	HBsAg	Total HcAb	IgM HBcAb	HBsAb
No infection No immunity	Negative	Negative	Negative	Negative
Immunity post immunization	Negative	Negative	Negative	Positive
Immunity post infection	Negative	Positive	Negative	Positive
Acute infection	Positive	Positive	Positive	Negative
Chronic infection	Positive	Positive	Negative	Negative

## Neonatal Herpes Simplex Viral Infections (HSV)

For neonates delivered vaginally and exposed to mom with active lesions, do surveillance cultures, get CSF for HSV PCR after 24-48hrs, place in contact isolation and defer circumcisions. Begin Acyclovir empirically and if the PCR is positive, treat like herpes encephalitis for 21 days and for a positive surveillance culture treat skin and mucous membrane disease for 14 days.

## Varicella Infection

**Infection:** After exposure it takes 10-21 days (incubation period) for prodrome symptoms (fever headache and malaise) to occur then another 1-2 days before the classic rash appears. See dermatology for differences between chicken pox and small pox rash. Treatment is supportive. Tell moms concerned about school that the child may return to school when all lesions have crusted. The most common complication of chicken pox is **secondary bacterial infection**. The most common CNS complication is **transient cerebellar ataxia and encephalitis**. Aspirin given to a patients with varicella increases their risk of Reyes syndrome. NSAIDs given to patients with chicken pox increases the risk of group-A-strep infections.

## Herpes Zoster SHINGLES

Painful vesicles in a dermatomal pattern. Post herpetic neuralgia (PHN) is a complication. Suspect PHN if pain that occurs without touching (allodynia) is described. **Varicella DFA is diagnostic.** Famcyclovir or valacyclovir decrease incidence of PHN.

## CMV Infections

Perinatally, daycare is a risk. Transmission may be via contact through infected urine or blood transfusion. Note that latent CMV reactivates if blood from donor or recipient is sero positive.

Congenitally, transmission is transplacentally. The child may have a microcephaly, hepatomegaly, thrombocytopenia with petechiae, chorioretinitis and periventricular or intracerebral calcifications. No treatment for congenital CMV.

Special circumstances: Treat with gancyclovir or foscarnet if immunocompromised with chorioretinitis. For HIV patients on **zidovudine, do not give gancyclovir because they both cause granulocytopenia.**

## Rabies

- Kids in same room with bats are treated as if they were bitten by prophylaxing with Rabies Immunoglobulin and vaccinating ASAP.
- Treat bites from skunks, raccoons, foxes and woodchucks with immediate rabies immune globulin and vaccination.
- For bites from cats, dogs or ferrets observe the animal for 10days and if the animal behaves normal under observation then no prophylaxing or vaccination is necessary. Prophylax only if animal develops signs of rabies.

- Diagnostic test of choice is reverse transcriptase PCR. Prior rabies immunization doesn't induce CSF antibody so the presence of high CSF antibody means clinical disease.
- Euthanize (as soon as possible) and test rabid animal or animals that develop symptoms of rabies during the observation period

## **HIV**

### **HIV diagnosis**

- **Diagnosis >18months:** ELISA and Western blot
- Diagnosis >18 months but recently exposed for less than 2 months: **HIV PCR**
- **Diagnosis <18months:** HIV DNA PCR or culture.
- **HIV monitoring:** With viral load (HIV RNA) & CD4 cell count.

### **HIV medications and side effects**

- **Zidovudine:** Bone marrow suppression and myopathy
- **Didanosine:** Pancreatitis & peripheral neuropathy
- **Stavudine:** Lipodystrophy & Mitochondrial toxicity
- **Abacavir:** Hypersensitivity reaction
- **Efavirenz:** Teratogenic & wild dreams
- **Indinavir:** Kidney stones

## **Arboviral meningoencephalitis**

Suspect in the **spring or summer** if vignette describes a patient with fever headache and altered mental status. CSF shows mild pleocytosis, increased protein and normal glucose. **Confirm diagnosis with viral specific IgM in CSF or serum OR with**

measurement of acute & covalent antibody titers in CSF or Serum (usually 4 fold increase in IgG).

### **Toxocara Canis Infection**

Toxocariasis should be suspected in a child who eats dirt and has hepatosplenomegaly with eosinophilia. Cat litter is a clue but will not be mentioned. Do serologic test next. Treat with albendazole.

Precautions

**Droplets:** Mumps, rubella, parvo and pertussis. **MumpsRuPPlets**

**Airborne:** Aspergillus, TB, Measles and Varicella. **Air™ Vachine**

**Contact:** RSV, Parainfluenza and Rota virus. **Don't touch the RPR sample**

## Seborrheic-like Rash

### Seborrheic Dermatitis

Scalp, face, diaper rash described as scaly, red, greasy or flaky. Reassurance is all that is needed. Low potency steroids or use of baby oil may be the answers sought on the boards as best initial treatment. Other agents that shorten the course of disease are ketoconazole cream or zinc/selenium containing shampoos for refractory cases.

### Class 1 Histiocytosis (LCH)

Rash described as seborrhea-like brown to red papules especially in intertriginous areas like the axilla, diaper, scalp and pre-auricular area. Presence of *ear drainage* is a clue. Depending on the type, affected patients may also have painful osteolytic bone lesions (skull and long bones), lymphadenopathy, pancytopenia and evidence of diabetes insipidus. Tissue biopsy is needed to confirm the diagnosis (Birbeck granules on electron microscopy).

## TINEA THIS TINEA THAT

### Tinea Capitis

Erythematous oval lesions on the scalp associated with hair loss. Treat with oral griseofulvin for 4-6 weeks. A baseline LFT prior to therapy is not necessary. For Kerions, add oral steroids for 10-14 days. Shampoos aren't curative but they reduce transmission of disease.

## **Tinea Coporis**

Oval or ringed shaped lesions with *scaly raised borders* and central clearing. Treat with topical imidazole for 3-4 weeks.

## **Tinea unguium**

Low yield on the boards! Differentiating T. unguium from psoriasis is important. Both may have nail lusterness, brittleness and friable that leads to separation, discoloration, crumbly thickening. If two or less nails are involved, T. unguium is likely but If all nails are involved think psoriasis.

## **Tinea Pedis**

Dry and scaly red lesions that progresses to fissuring or maceration, burning or stinging in toe web spaces. Also scaling and vesicles on palms and soles may be described. Know picture! Treat with topical imidazoles for the dry and scaly stage. Terbanifine if topical imidazole fails. Aluminium subacetate soaks twice daily for macerations and fissuring.

## **Tinea Cruris**

Peripherally spreading, **sharply well demarcated** red lesion with central clearing in the intertriginous area but **sparing the scrotum**. Treat with topical imidazoles. Griseofulvin is indicated for severe or refractory cases.

## **Tinea. Vesicolor**

Hypopigmented scaly macules that coalesce into patches. Treat with selenium sulfide shampoo or with topical ketoconazole.

## **Atopic Dermatitis**

- **Eczema:** Described as pruritic, dry, scaly, erythematous and in late stages, lichenified, hypo or hyperpigmented lesions.
- **Eczema Herpeticum:** Vesiculopustular rash in areas of eczema. Know the picture of poison ivy and contact dermatitis. You will surely be shown one of these.

## **Oval & Round rashes**

### **Pityriasis Rosea**

Herald patch described as single annular scaly red lesion that occurs 1-2 weeks before X-mas tree rash. X-mas tree rash described as multiple red macules that become oval and are along cleavage lines. Itching may or may not be described. If vignette describes pityriasis-like rash in an adolescent with involvement of his palms and soles, **rule out syphilis as the most appropriate next step.**

### **Granuloma annulare**

Described as *annular skin-colored to slightly violaceous plaque that feels firm* and papular underneath the skin.

### **Nummular Eczema**

Coin shaped lesions that ooze or become crusty erosions with scaly macules. Look at and know picture! Lesions are not raised.

### **Erythema Chronicum Migrans**

Bite site is described as a papule with gradual expansion of redness around the papule. Red area expanding has a raised **non scaly border** (compared to tinea corporis that

has scaly raised borders). The papule (bite site) may clear centrally leaving a peripheral rim of redness or it may become indurated or vesicular.

## **Viral RAAAAASHHES**

### **Chicken pox**

Prodrome followed by acute onset and transition from macular to papular to vesicular rash then crusting. Lesions are in various stages of healing. Distribution is **from center of body outwards**.

### **Small pox**

Same transition as chicken pox but rash is **in same stage of healing**. Distribution is from outwards (face and extremities first) inwards.

### **HHV6, 7 rashes (Roseola)**

Maculopapular rash that follows high fever by 3-4 days. **No fever occurs after rash appears**. Tell mom the rash fades in about 3 days.

### **Enteroviral rash**

Maculopapular rash that follows fever by 1-2 days. Here the fever may occur intermittently after the rash. It is supported by the presence of other symptoms like diarrhea or headaches (aseptic meningitis).

### **Measles (Rubeola)**

Maculopapular rash that spreads from head downwards. Patients usually have a prodrome of fever, cough, coryza and conjunctivitis. Rash **heals by desquamation**

days after onset. Patients are at risk of vitamin A issues, diarrhea and bronchopneumonia.

## **Rubella**

Maculopapular rash that may spread from head downwards (just like measles).

**Lymphadenopathy** (posterior auricular or occipital) is the pointer to rubella. **No desquamation.**

## **Papular acrodermatitis of childhood**

Also known as Gianotti-Crosti Syndrome. Patient (1-6year old) presents with red-flesh colored papules or papulovesicles on face buttocks and extremities but **sparing the trunk**. It is not itchy and does not recur. Associate with EBV or hepatitis B.

Topical steroids worsens rash. Rash self resolves in weeks to months.

## **Erythema Infectiosum**

Caused by parvo virus. They usually describe a confluent erythematous and flushed cheeks followed by lacy reticulated erythema in extremities and trunk. Lesions fade in 3-4 days but may return with sun exposure. Also **if a glove and stocking papular, purpuric or petechial rash is described, think parvo virus.**

## **Molluscum contagiosum**

Translucent papule with central umbilication. The causative virus is a DNA poxvirus called Molluscum contagiosum virus. No treatment necessary. Reassure parents.

## WARTS

Whether flat, common, plantar or veneral most self resolve but it may take too long that most parents request treatment. Choose **keratolytics (trichloroacetic or salicylic acid) as best initial treatment for plantar and common wart**. Choose electrocautery and laser treatment if question ask for most effective option or option for recurrent warts unresponsive to other agents. Choose **podophyllin as best initial treatment for veneral or anogenital wart**. Suspect child abuse if preadolescent has condylomata acuminata.

## Drug Rashes

### He sulfed N SAID “ocp nodosum”

Rash	Description	Offenders
Urticaria	Red, itchy wheals. <b>Last &lt;24hrs</b>	<b>Sulfa</b> , Penicillin, opiate, <b>NSAID</b>
Erythema major	Target or edematous with bullae. <b>Last &gt;24hrs</b>	<b>Sulfa</b> , penicillamine, barbiturate, <b>NSAID</b>
Erythema <b>nodosum</b>	Painful red nodules on anterior sheen. Last weeks	<b>Oral Contraceptive Pills</b>
Fixed drug Eruption	Well demarcated edematous plaques & bullae	<b>Sulfa</b> , anti-seizure meds, pseudoephedrine, <b>NSAID</b>
Photodermatitis	Vesicles or papules in sun exposed areas	<b>Sulfa</b> , diuretics, tetracycline, <b>NSAID</b>

## **RMSF versus Meningococemia RASH**

### **Rocky Mountain spotted fever**

Rash described as erythematous macules that become papules and then becomes petechiae (symptoms usually **greater than 24hrs**) on the wrist and ankles that spread centrally or inwards. **Doxycycline is indicated ASAP regardless of age.**

### **Meningococemia**

Acute (**less than 24hrs**) onset of maculopapular rash that becomes petechial or purpuric rash (just like RMSF). Affected skin may become necrotic quickly. Associate with acute onset of high fevers and shocky presentation.

### **Scarlet Fever Rash**

Described as generalized fine, punctuate erythematous lesions in skin fold areas mostly but may be everywhere. Associated desquamation is fine and involves both hands and feet. Rash is toxin mediated. **Associate with pharyngitis.**

## **Cellulitis versus Erysipelas**

### **Cellulitis**

Not well demarcated. May expand but no streakiness described usually. No vesicles or bullae on its surface. **Staph aureus will be the most likely cause on the boards.**

### **Erysipelas**

Well demarcated with clear margins. Streakiness may be present and spread is rapid. Lesion may be described with vesicles or bullae on its surface. **Group-A-strep will be the most likely cause** of erysipelas on the boards.

## **Spider Bite**

### **Brown recluse**

Bite is usually unnoticed (not painful). Victims present with mild to moderate pain and itching initially 2 to 8 hours after bite followed by an erythematous, swollen and indurated lesion with central pustule or blister. Central area may become necrotic.

Treatment of brown recluse bite is dependent on severity of symptoms and size of necrotic lesion. For local reaction associated with a necrotic area <2cm, treatment is with local wound care. For systemic symptoms present or if necrotic area is larger than 2 cm within 48 hours of bite, debridement and oral antibiotics are required.

### **Black widow**

Bite is noticed (ouch!). Local symptoms are absent usually. Systemic symptoms occur within hours of bite and may include headaches, muscle rigidity and paralysis. Antivenin must be administered as soon as possible.

## **Ecthyma versus Impetigo**

### **Ecthyma**

Looks like impetigo but they are described as **painful ulcers covered with tightly adherent crust and surrounded with elevated margins**. It is caused by streptococcus pyogenes (GAS). Treat with oral penicillin and local wound care.

### **Impetigo**

Honey colored crusts **not tightly adherent, painless** and caused commonly by staph aureus.

## **Gosh it itches!**

### **Scabies**

**Non clustered** erythematous papules in interdigital spaces, belt lines, areolar or penis. Lesions are itchy until treated with 5 percent permethrin cream. Treat everyone in house.

### **Papular Urticaria**

**Clustered** erythematous papules some with central punctum and itchy. Lesions are recurring and mostly due to delayed hypersensitivity to biting insects (**e.g. fleas**). Lesions are not scaly. Think fleas fleas fleas for papular urticaria but it may also be caused by mosquitoes, mites and lice. Choose the flea option.

### **Juvenile plantar Dermatitis**

Pruritic scaly rash on soles of foot due to occlusive stockings or synthetic stockings. **Interdigital space is spared.**

### **Head Lice (pediculosis)**

For treatment, topical permethrin is used to treat all members of the family. **Topical Malathion (has ovicidal activity) is used as second line** for failed initial therapy or recurrent infestation (given just once to affected members only). Lindane (topical) will NEVER be the right answer on the boards.

### **SLE versus Dermatomyositis**

- **SLE rash:** Rash on dorsum of hands but **no Knuckle involvement**. Butterfly rash involves **cheeks and nose**. Alopecia present.

- **Dermatomyositis:** Red rash on dorsum and **present on knuckles**. Butterfly rash involves **cheeks and eyelid**. Positive gowers sign.

**Epidermolysis Bullosa:** Large blisters in areas of trauma. **Do skin biopsy for diagnosis.**

**Psoriasis:** Silvery scales on raised erythematous plaques in knees, elbows and scalp. The lesions may itch. Nail pitting and onycholysis are associated findings. **Koebners phenomenon** may be described.

**Salmon Patch:** Birth mark in nape of neck, eyelid or nasolabial area. May be described as a flat, pink or red macule. Most resolve with time. **Reassure parents.**

## **The Nervi Nevis**

- **Nevus Sebaceous:** Hairless plaques on head or neck of infants. **Increase risk of Basal Cell CA after puberty.** Total excision before puberty.
- **Epidermal Nevus:** Discolored scaly patch that becomes verrucous and hyperpigmented. **No risk of carcinoma.** Total excision is curative.
- **Congenital Melanocytic Nevus:** Described as capelike or coat sleeved brown to black lesions that may be dermatomal. **Larger lesions greater than 20 cm increases the risk of carcinoma.** If located close to the face or over the spine, they might be associated with leptomeningeal involvement OR neurocutaneous melanosis. **Do MRI of the brain or spinal cord next if leptomeningeal involvement is suspected.**

## **Alopecia syndromes**

- **Alopecia Areata:** Oval smooth patches of hair loss. Associate with hypothyroidism or psoriasis. **Positive hair pull test.** Most regrow in 12-24 months. **Most appropriate next step in management is reassurance or watchful waiting/observation.**
- **Alopecia Totalis:** Like areata but involves eyebrow, eyelash or beard. **Offer a wig next.**
- **Traction Alopecia:** Hairloss or hair thinning along scalp or hairline margins. Vignette may describe papules or pustules along hair line. **Change hair style or advice about not braiding tightly next.**
- **Trichotillomania:** Irregular patches of hair or short broken hair shafts of varying length. Psych referral next.
- **Telogen Effluvium:** Diffuse hair thinning with positive hair pull test or loss of hair with combing. Reduce stressors next. Regrowth expected in 3-5 months after stressors are reduced.

## **Neurocutaneous Rashes**

### **Tuberous sclerosis**

**Major criteria:** Presence of three or more Ash leaf or hypermelanotic macules (**most common lesion**), shagreen patch (described as rough or yellowish raised lesions with an orange peel consistency), facial angiofibromas (described as reddish-brown firm papules or fleshy growths on nose and cheeks), periungual fibromas or brain hamartomas (cortical tubers, subependymal nodules and subependymal giant cell astrocytomas).

**Minor criteria** are **bone or renal cysts, dental pits, rectal polyps and gingival fibromas**. Diagnosis is with 2 major criteria or with 1 major with 2 minors present. **An MRI is done next to see the brain hamatomas**. Associate tuberous sclerosis with cardiac rhabdomyomas (major), renal angiomyolipomas (major) and infantile spasms.

### **Portwine stain**

Unilateral portwine stain in V1 or V2 distribution is consistent with sturge weber syndrome. Other findings in Sturge Weber are Ipsilateral CNS malformations of the leptomenigeal vessels and vascular malformations of the choroid of the eye and congenital glaucoma. Refer to pediatric ophthalmologist next and get neuro imaging.

### **Café au lait**

Well circumscribed hyperpigmented lesions or brown macules. The presence of 6 lesions that measure 0.5cm or more in children or 1.5cm or more in adolescents is significant for neurofibromatosis. The presence of axillary freckling with significant café au lait lesions is diagnostic of NF. Associate **unilateral café au lait lesions and precocious puberty with McCune-Albright** syndrome.

### **Incontinenti Pigmentosa**

Patterned blistering to verrucous papules to hyperpigmented linear swirls to hypopigmented macules. **Associate with delayed eruption of tooth, alopecia, blindness and seizures**.

### **ACNE**

Acne types with best initial treatment.

- **Comedonal (non inflammatory):** Topical retinoid or azeleic acid

- **Papular (inflammatory):** Either one above with topical benzoyl or clindamycin
- **Pustular (inflammatory):** Include oral antibiotics
- **Nodulocystic (inflammatory):** Acutane.

## **Ichthyosis**

- **Ichthyosis Vulgaris (AD):** Generalized mild fine white scales on lower extremities mostly, **flexures spared**. Improves with age or in hot humid climates (summer). Thickened palms and soles may be described. **Associate with atopic dermatitis.**
- **X-linked Ichthyosis:** Bigger, darker and dirtier scales on trunk & extremities. May be present at birth. Palms and soles are not affected. **Associate with Cryptorchidism.**

## Anemias

- **Iron Deficiency:** Lab findings consistent are increase TIBC, RDW and FEP. **Ferritin is decreased. Metzer index is greater than 13.5.** Ferritin is the first to fall. Reticulocyte count is first to increase with therapy. Hematocrit increases in 1-4 weeks with therapy. Iron stores are repleted in 3 months with therapy.
- **Anemia of chronic disease:** Decrease TIBC and **increase ferritin.** Microcytic and normocytic anemia.
- **Beta Thalassemia:** **Decreased RDW** and **metzer index <11.5.**
- **Lead toxicity:** Decreased TIBC

## Peripheral smear findings & most likely diagnosis (know slides!)

Finding	Most likely diagnosis
Increase central pallor and sparse RBCs	Iron deficiency anemia
Basophilic stippling	Lead poisoning. Iron Deficiency Anemia if lead poisoning isn't an option
Spherocytes and increased reticulocytes	Hereditary spherocytosis. <b>Do coombs test next to rule out autoimmune hemolytic anemia.</b>
Macrocytosis with megaloblastic changes and hypersegmented neutrophils	B12 deficiency. Choose folate deficiency if B12 deficiency is not an option

Findings	Most likely diagnosis
Macrocytosis without megaloblastic changes or hypersegmented neutrophils	Drugs, Bone marrow failure and hypothyroidism. Correlate with history
Bite cells and heinze bodies	G6PD deficiency or thalasemias
Burr cells (echinocytes)	Uremia, HUS. Correlate with history
Spur cells (acanthocytes)	Liver Disease
Fragmented RBCs (schistocytes)	Microangiopathic Hemolytic Anemia (e.g. HUS, TTP, DIC), Severe Burns
Giant Platelet	Idiopathic Thrombocytopenic Purpura
Howell Jolly bodies	Functional asplenia & splenectomy

## Neutropenia

- Mild neutropenia defined as absolute neutrophil count (ANC) between 1000-1500. **Usually asymptomatic.**
- Moderate neutropenia (ANC 500-1000). Prone to stomatitis, **gingivitis** & skin infections.
- Severe neutropenia (ANC <500). Commonly caused by viruses or medications. Prone to pneumonia, abscesses, sepsis.
- You will be tested on the most appropriate empiric antibiotic therapy for a neutropenic with fever. If vignette describes a well appearing patient on chemotherapy for leukemia with fever and neutropenia, an empiric monotherapy like meropenem or ceftazidime are appropriate choices. **A combination therapy with vancomycin added to cover MRSA and**

coagulase negative staph is appropriate if the patient appears ill or has had a central line in place for too long.

## **Neutropenic Syndromes**

- **Felty's syndrome:** This is your most likely diagnosis if you have a trio of seropositive rheumatoid arthritis, splenomegaly and neutropenia.
- **Chidiak Higashi:** Autosomal recessive with moderate neutropenia and hypopigmentation. Lymphohistocytic infiltration of the liver, spleen and bone are consistent findings.
- **Kostmann Syndrome:** Autosomal Recessive with **ANC less than 200 and omphalitis.** They are Prone to Myeloid leukemia.
- **Schwachmans Diamond:** Autosomal recessive with short stature and pancreatic insufficiency. They are Prone to metaphyseal chondroplasia, cutaneous syndactyly and bifid uvula.

## **Cyclic Neutropenia**

ANC less than 200 usually. The cycles of neutropenia with infections occur every 19-21 days. **They are Prone to C perfringens infections.**

## **Chronic Benign Neutropenia**

Autoimmune with ANC between 200-1500. They are Prone to mild skin and mucous membrane infections. **Antineutrophil antibody is present.**

## Bleeding disorders

- **Factor VII deficiency:** Autosomal recessive condition that present with prolonged bleeding after minor cuts (know other presentations). **PT is prolonged.** Best diagnostic test is factor assay.
- **Factor VIII & IX deficiency:** Hemophilias are X-linked recessive. Vignette may describe bleeding following circumcision or into joints following minimal trauma or contact. **PTT is prolonged.** Family history is negative in 30 percent of cases. Best diagnostic test is factor assay. Treat with DDAVP for mild to moderate factor VIII deficiency. For active bleeding use recombinant factor VIII or IX concentrate.
- **Von Willbrand Disease:** Autosomal dominant condition. They usually describe heavy menstrual bleed. PTT may be prolonged or normal. PT is normal. Additional findings are decrease VWF, decrease factor VIII activity and decreased ristocetin co-factor assay. Treat like hemophilia.
- **Factor 13 deficiency:** Autosomal recessive disorder that presents with prolonged umbilical stump bleed (after it falls off) or intracranial bleed with normal PT & PTT. Best diagnostic test is factor assay. Treat with Fresh Frozen Plasma.

## Vitamin K deficiency

Prolonged bleeding from circumcision or venipuncture site days to a week after delivery. Oral vitamin K administration or exclusive breast feeding are risk factors. PT and PTT may be prolonged. Fibrinogen level, thrombin time & platelet are normal).

## Pure Red cell aplasia

Most likely diagnosis	Usual age	MCV (80-100)
Transient erythroblastopenia of childhood	Toddlers	Normocytic
Iron deficiency anemia	Any age	Microcytic (use 78 -100 for 6 months -2year old kids)
Diamond blackfan	Infants	Macrocytic

## Thrombosis

- Factor V Leyden will be the most likely genetic cause of venous or arterial thrombosis. It is due to activated protein C resistance. **Most appropriate next step for factor V Leyden is a genetic assay or genetic mutation analysis.**
- Less common genetic causes are Prothrombin G20210A, Protein C deficiency (autosomal dominant), Protein S deficiency and antithrombin III deficiency (autosomal dominant). Protein C when present inactivates factor V & VIII and promotes fibrinolysis. Antithrombin III when present inhibits thrombin and activated factors IX, X, XI & XII.
- Treat **Prothrombin G20210A with LMW heparin**. Treat protein C def with FFP or protein C concentrate. Treat protein S def with lifelong warfarin. Monitor LMW heparin by following anti Xa activity. For warfarin, monitor PT INR. Goal is 2-3 times baseline.

## **Sickle Cell highlights**

- Begin flu shot yearly after 6 months
- Begin penicillin as soon as diagnosis is made.
- Do annual ophthalmologic exam after 10yrs
- Do annual transcranial Doppler for SS patients between 2 and 16 years.

## **Leukamias**

### **Acute Lymphoblastic Leukemia**

**Clinical Features:** Bone pain, fatigue, fever bleeding with pancytopenia and blasts on peripheral smear

**Prognostic/salient points:** Haploidy, immunophenotype B cell, M3 or M2 marrow after induction are poor prognostic factors.

### **Leukemia Lymphoma Syndrome**

**Clinical Features:** Lymphadenopathy above diaphragm, mediastinal mass (thymic) and **hepatosplenomegaly present**. Thrombocytosis usually present too.

**Prognostic/salient points:** Patients at high risk of testicular relapse

### **AML**

**Classification:** M3-acute promyelocytic; M4-acute myelomonocytic; M5-acute monoblastic M7-megakaryoblastic

**Clinical Features:** Auer rod present. Leukoerythroblastic reaction (presence of **nucleated RBCs, tear drop cell and primitive WBC**)

**Prognostic/salient points:** Down's syndrome is a good prognostic factor. M7 is a poor prognostic factor. Think M5 if patient has hyperleukocytosis. Think M4 or M5 if

gum hypertrophy or chloromas are present. Think M3 if increase WBC and DIC are present in the setting of AML.

## **CML**

**Clinical Features:** Teenager with splenomegaly and thrombocytosis. Additional findings are neutrophilia, basophilia, increase b12 and low leukocyte alkaline phosphatase (LAP).

**Prognostic/salient points:** Only cure is allogenic BMT.

## **Leukemia syndromes**

**Fanconi BLONKKS** is mnemonic for syndromes associated with leukemia.

**BLO**oms, **N**eurofibromatosis, **K**ostmann, **K**linefelter & **S**chwachmann.

## **Tumor Lysis Syndrome (TLS)**

**PLUcK** is acronym for electrolyte abnormalities in TLS. **P**hosphorus, high **LDH**, high **U**ric acid, low **calcium**, high **K**. TLS can lead to acute renal failure. **Vigorous hydration first**. Remember the small c.

## **Lymphomas**

### **Burkitts Lymphoma**

**Clinical Features:** Child with right lower quadrant mass, abdominal pain and inguinal LAD (all below diaphragm)

**Prognostic/salient points:** LDH >1000 is a poor prognostic factor. Intussusception is associated with sporadic cases. Associate African burkitts (jaw swelling) with EBV and malaria.

## **Lymphoblastic Leukemia**

Here the lymphadenopathy is above the diaphragm, there is mediastinal mass (thymic) and **no hepatosplenomegaly**. Differentiate from leukemia lymphoma syndrome.

## **Hodgkin's Lymphoma**

**Clinical Features:** Painless cervical and supraclavicular lymphadenopathy (above diaphragm).

**Prognostic/salient points:** Organomegaly and pruritis are poor prognostic factors. Monitor ESR. Acute nonlymphocytic leukemia (ANLL) is the most common secondary malignancy in patients with hodgkin's lymphoma.

## **Neuroblastomas versus Wilms tumor**

### **Wilms Tumor**

**History:** Infant with painless abdominal Mass. May be noted while mom is bathing child. Hematuria & hypertension are consistent findings.

**Associate with:** Neurofibromatosis, beckwith wiedemann and WAGR syndrome (Wilms, Aniridia, GU anomalies, Retarded mental state and development).

**Prognostic/salient points:** Anaplastic clear cell histology & age greater than 2 years are poor prognostic factors.

### **Neuroblastoma**

**History:** Less than 4 year old (typically) with periorbital ecchymosis and blasts.

Dancing eye (vignette may say funny eye movements), myoclonic jerks and dancing feet (may be described as broad based gait) are paraneoplastic manifestations. The triad of ataxia, dancing eye and myoclonic jerks is suggestive of opsoclonus

myoclonus ataxia syndrome. **Get urine for VMA and HVA next.** Abdominal mass if present may be non tender.

**Associate with:** Hirschsprung's disease, von recklinghausen disease and horner's syndrome

**Prognostic/salient points:** Monitor serum ferritin. N-myc amplification & diploid DNA are poor prognostic factors

## **Retinoblastoma**

Strabismus and visual impairment are early manifestations. Leukokoria and glaucoma are in-between manifestations. Proptosis, bone pain (from metastasis) and increase ICP are late manifestation. Spread to choroid indicates bone metastasis and spread to optic nerve indicates CNS metastasis. **Most common secondary malignancy is Osteogenic Sarcoma. Know the CT findings of retinoblastoma and glaucoma.** Treat unilateral disease with enucleation & treat bilateral disease with chemotherapy. Referral to ophthalmology next if CT findings are consistent with retinoblastoma.

## **Osteogenic Sarcoma**

Metaphyseal mass in the long bones above or below the knee. When pain is present, it may awaken patient at night. The typical patient is an **adolescent in his growth spurt or a patient with retinoblastoma after radiation therapy.** They are prone to pathologic fractures because the lesion/mass is painless. X-ray may reveal a sunburst appearance. **Choose biopsy for definitive diagnosis.**

## **Osteochondroma**

Metaphyseal mass in long bones like Osteogenic Sarcoma. Painless lesion that grows until patient is skeletally mature. **X-ray may show bony spikes or projections from the bone surface.**

## **Osteoid Osteoma**

If they describe pain that is persistent or worse at night and relieved with aspirin in the morning, think Osteoid Osteoma. **Metaphyseal or diaphyseal lucency surrounded by sclerotic bone may be seen on x-ray.**

## **Ewings Sarcoma**

Mid shaft or diaphyseal lesion that presents with swelling and pain associated fever and weight loss. **X-ray reveals lytic lesion with periosteal reaction “onion skin appearance”**. CT-scan is used to rule out metastasis. Biopsy is diagnostic.

## **Brain Tumors**

Buzzers for tumors are early morning headaches, vomiting without diarrhea and signs of elevated intracranial pressure. **Choose MRI as the best initial diagnostic test.** Ependymomas will be the answer sought if hydrocephalus is present. Cerebellar astrocytomas are the most common posterior fossa tumors.

## **Liver Tumors**

- **Hemangioendothelioma:** Most common benign tumor. Age less than 2 years usually. **AFP normal**
- **Hepatoblastoma:** Most common primary malignancy of childhood & kids less than 3 years. **AFP is elevated**
- **Hepatocellular CA:** Second most common primary malignancy of childhood but most common in children greater than 3years. AFP may be elevated.

## **Renal Formulas**

**Bladder capacity:** Child's age divided by 2 plus 6. For example, a 6 year old will have a capacity of nine ( $6/2+6=9$ )

**Fractional Excretion of Na:** Urine sodium x Plasma creatinine divided by Plasma sodium x Urine creatinine multiplied by 100

**Anion gap:** Na minus ( $\text{HCO}_3 + \text{chloride}$ ). Normal 8-12.

**Urine anion gap:** Na + K minus chloride.

**Estimate of creatinine clearance:** Age constant multiplied by height in cm divided by plasma creatinine in mg/dl. For the Age constant, use 0.45 if <2yrs and 0.55 for children and adolescent girls. Use 0.7 for adolescent boys.

## **Metabolic acidosis**

Mnemonic is **MUDPIELS**. **M**ethanol, **U**remia, **D**KA, **P**araldehyde, **I**ron, **I**NH, **E**thylene glycol, **L**actic acidosis & **S**alicylate. Normal anion gap metabolic acidosis on the boards will be either secondary to diarrhea (loss of bicarb in stools) or Renal Tubular Acidosis (RTA).

## **Metabolic alkalosis**

Mnemonic is Chloride **BRAAGS**. **C**hloride loss in stool or vomit, **B**artter's syndrome, **R**efeeding syndrome and **R**enal drugs (diuretics), **A**drenal (high aldosterone/renin), exogenous **A**lkali (from baking soda, antacids), **G**ittleman syndrome, **S**teroid.

## **Renal Tubular Acidosis**

The RTAs do not progress to renal failure but presents with failure to thrive, polyuria, dehydration, constipation or vomiting. **GFR is normal.** Urine anion gap reflects the ability of the kidney to excrete  $\text{NH}_4\text{Cl}$  in response to metabolic acidosis.

### **RTA type 1**

**How it happens:** Distal renal tubule loss of bicarb

**Labs/work up:** Normal or decreased serum potassium. **Urine PH greater than 5.5.**

Urine anion gap positive.

**Best initial treatment:** Bicitra ( $\text{NaHCO}_3$ )

**Associate with:** Sensorineural deafness, nephrocalcinosis and rickets

### **RTA type 2**

**How it happens:** Bicarb is not reabsorbed proximally.

**Labs/work up:** Decreased serum potassium. Urine PH is less than 5.5. Urine anion gap is negative (also negative in diarrhea).

**Best treatment:** Larger doses of alkali than for type 1 with thiazides (watch the K!)

**Associate with:** Fanconi syndrome and acetazolamide intake.

### **RTA type 4**

**How it happens:** Mineralocorticoid deficiency

**Labs/work up:** **increased serum potassium**, urine PH less than 5.5 positive urine anion gap.

**Best initial treatment:** Stop any K sparing diuretics.

**Associate with:** Autoimmune diseases

## **Hematuria**

**Just follow the hematuric bounce. (Try your best. It's not that hard)**

It starts with mom reporting blood (macroscopic) in urine, dark urine or coke colored urine. **Get Urinalysis (dip stick) as the most appropriate next step.** If dip stick is positive for blood, **get urine microscopy of spun or unspun urine next.** If microscopy shows greater than 20 RBCs/HPF for unspun urine OR greater than 5RBCs/HPF for spun urine then this is consistent with microscopic hematuria.

If no RBCs are seen on microscopy (no microscopic hematuria) then the positive dip stick might be secondary to hemoglobinuria or myoglobinuria. **Correlate with history next.** A sickle cell patient would suggest hemoglobinuria. Snake bite OR vigorous exercise would suggest myoglobinuria. If nothing in history is suggestive then **check urine for myoglobin next.**

If microscopic hematuria is confirmed via microscopy, **repeating the urine microscopy x 2 more times will be the most appropriate next step** (2 out of 3 samples positive for microscopic hematuria confirms diagnosis of microscopic hematuria).

**Isolated microscopic hematuria (when confirmed) is benign if no proteinuria, no hypertension and no evidence of renal failure** (from BUN & Creatine values). Proteinuria is the best indicator of underlying renal pathology especially if associated with hematuria.

Urine microscopy also tells you about the presence and types of cast. Presence of RBC casts suggests glomerular disease (HSP, HUS, Wergerners, goodpasture, PAN, PSGN, SLE, IgA nephropathy, Alport, MPGN & MN). If RBC cast is seen on

microscopy, correlate with clinical history first to know the most appropriate next step. **A complement assay (C3 & C4), ASO titers, ANAs will be a good combination choice.**

No RBC casts might mean renal interstitial or urinary tract (infections, stones blocking, Reflux) cause of hematuria. **Getting urine calcium to creatinine ratio will be the most appropriate next step.** A value greater than 0.22 is suggestive of hypercalcuria. If normal ( $<0.22$ ) then ordering an USS or VCUG may be done next but again correlate with clinical history first.

## **Proteinuria**

**Now follow the proteinuric bounce!**

Parents rarely report frothy urine in pediatrics but if routine urinalysis (dip stick) reveals trace, 1+ or 2+ proteinuria, It is usually secondary to transient proteinuria (most common) OR orthostatic proteinuria. A **repeat test** is usually the most appropriate next step for transient proteinuria or a **repeat test with patient in a recumbent position** for orthostatic proteinuria.

If repeat test shows persistent proteinuria, the dip stick will need to be quantified either by doing a **24hr urine quantification next OR urine protein to creatinine concentrations in first void next.** Significant proteinuria is defined as **Urine protein to creatinine ratio greater than 0.5 in kids less than 2 years OR a ratio greater than 0.2 in older children.** Nephrotic range is a ratio greater than 2.

Once significant proteinuria is established, an evaluation for the potential cause is warranted. Now get CMP, Serum creatinine, Serum albumin, Hepatitis B serology,

Hepatitis C serology, C3 & C4 assays, ANA & renal USS OR refer to nephrology.  
Correlate with history to know specific next step.

## **HSP versus HUS**

### **HSP**

**Clinical Features:** Purpuric rash in lower extremities, **abdominal pain**, arthralgias and glomerulonephritis with IgA deposition. **No thrombocytopenia**

**Associate with:** Orchitis, Intussusception and get abdominal ultrasound next if abdominal pain is severe.

**Treatment:** No role for prophylactic steroids in those with a normal urinalysis. Avoid NSAIDs if there is evidence of microscopic hematuria

**Monitoring:** Weekly urinalysis until symptoms abate

**Referral:** To pediatric nephrologist if 2+ or greater proteinuria for renal biopsy

### **HUS**

**Clinical Features:** Microangiopathic hemolytic anemia, **thrombocytopenia** and evidence of renal failure. HUS typically develops 5-9 days after the diarrheal illness and 2-6 days after the appearance of bloody stools.

**Associate with:** Diarrheal illness (E. coli 0157:H7) and rectal prolapse.

**Treatment:** Antibiotics do not alter the duration or outcome of the illness

## **Urinary Tract Infection**

Increase urine PH is consistent with proteus. Asymptomatic bacteruria requires no treatment. Pyelonephritis should be assumed in any child less than 3 months with abnormal cath urine and admitted. An USS and VCUG are indicated in all male patients with their first UTI, all female patients younger than 5yrs and all patients with recurrent UTIs.

## **Vesicoureteral Reflux**

- **Grade 1:** Reflux into ureter. No treatments required but do periodic cultures.
- **Grade 2:** Reflux into kidney (pelvis and calyces) No treatments required but do periodic cultures.
- **Grade 3:** Reflux into kidney with ureter dilatation. Prophylaxis required with follow up VCUG
- **Grade 4:** There is ureter dilatation **with mild blunting of calyces**. Refer to urology for surgery. Before surgery, prophylaxis and periodic cultures are needed next.
- **Grade 5:** There is ureter and pelvis dilatation and **gross blunting of calyces**. Refer to urology for surgery.

## **Ureterocele**

**VCUG shows left or right sided filling defect with partial nephrosis.** More common in girls.

## **Bladder Diverticulum**

VCUG shows outpouching of the bladder wall **with no filling defect**.

## **Prune Belly Syndrome**

**Phunxy belly syndrome:** Posterior Urethral Valve, **H**ydronephrosis, **U**ndescended testis; **Y** chromosomes only (boys only) & bladder dysfunction. If you suspect this in a male, choose abdominal USS as most appropriate next step in evaluation. If hydronephrosis is present on USS, do renal scintigraphy next to differentiate

obstructive from non obstructive hydronephrosis. In non obstructive, the tracer exits the kidney. **Prophylactic antibiotic is needed.**

### **Posterior Urethral Valve (PUV)**

The “p” in **phunny** belly syndrome. It causes massive unilateral reflux. It is the most common obstructive uropathy in males. **Bilateral hydronephrosis on VCUG is suggestive of PUV.** Renal function may be normal in unilateral cases. **Immediate bladder drainage is needed at birth.**

### **UPJ obstruction**

Obstruction is at the uretero pelvic junction leading to unilateral hydronephrosis. At birth a VCUG and an USS is indicated. **Do IVP or renal scan next to determine severity of obstruction.**

### **Autosomal Recessive Polycystic kidney disease**

Suspect in infancy if bilateral flank mass with a history of oligohydramnios is described. Associate with sequelae of Oligohydramnios such as potters facies, pulmonary hypoplasia and club foot. Most likely other organ affected is the liver. If **portal hypertension is described in a patient with ARPKD then congenital hepatic fibrosis** is the diagnosis.

### **Nephronophthisis**

Autosomal recessive condition that presents like diabetes mellitus (polyuria, polydipsia) but with anemia. Additional findings are **failure to thrive and retinitis pigmentosa.**

## Acute Renal Failure

	Pre-renal	Renal	Post renal
feNa	<1%	>1%	normal
Urine Na	<20	>20	normal
Urine osmo	>400	300-350	normal
<b>Most likely diagnosis</b>	AGE, Nephrotic syndrome, CCF	ATN, AIN, PSGN	PUV, UPJ, ureterocele

## Chronic Renal Failure

It is caused commonly by **PRODA Fish** on the boards.

- Prune belly syndrome, Polycystic autosomal recessive kidney disease,
- Reflux,
- Obstructive uropathies (see above)
- Dysplasia (renal)
- Alport,
- Focal sclerosing GN,
- IgA nephropathy,
- SLE,
- HUS, HSP

CRF may present with **short stature or failure to thrive**, normocytic anemia.

**Metabolic acidosis** seen is due to bicarb loss and decreased production. **Secondary hyperparathyroidism** seen is due to increase phosphate and decrease calcium.

**Hypertension** seen is due to sodium & water retention. **Hypocalcemia** seen is due to reduced calcitriol. Treat hypocalcemia by restricting oral phosphate, using phosphate binders & replacing calcium. For uremia restrict protein. **Renal**

**Osteodystrophy** will have low calcium, low vitamin D-1-25, high phosphorus, high PTH and high alkphos. **Remember PRODA Fish in the except question section.**

## Hypertension

Clues from history	Most likely cause
NICU and premature	Umbilical cath
Joint pain and swelling	Lupus
Flushing and palpitation	Pharchromocytoma
Muscle cramp and weakness	Hyperaldosteronism
Short and obese with strai	Cushings
History of asthma	Chronic steroid use
Increase daytime sleepiness	Obstructive sleep apnea

For hypertension noted in the clinic, ensure the right cuff size is used and technique is correct first. Repeating the measurement x 2 more times at 1-2 weekly intervals would be the most appropriate next step. **Best initial step in management if essential hypertension, is lifestyle modification.**

## Syndromes of Renal disease

- **Potters syndrome:** Oligohydramnois, small ears, small jaw, pulmonary hypoplasia
- **Drash Syndrome:** Wilms tumor, Male pseudohemaphrodite
- **Senior Loken:** Nephronophthisis and blindness
- **Alagille:** ALAGILLE (see genetics)-**Alport:** ALPORT (see genetics)
- **Brachio oto renal:** Preauricular pits and hearing loss

## **Nephrotic Syndrome (NS)**

Anasarca at birth and hyperechogenic shadows on USS (large kidneys) are suggestive of congenital nephritic syndrome. Labs consistent with congenital nephrotic syndrome are **low TBG and low transferrin**. Otherwise in older kids nephritic syndrome presents as dependent edema with proteinuria in the nephrotic range if 3+ and above OR if urine protein: creatinine ratio is greater than 2. Additional findings in NS are hypercholesterolemia, pseudohyponatremia (**due to increased lipids**) and hypocalcemia (**due to decreased albumin**). Most common cause of NS is minimal change disease. Other causes are focal sclerosing GN, MPGN.

### Indications for Biopsy

- No response after 4-6 weeks of steroids
- Age less than 1 year or greater than 10 years
- Good initial response to steroids with 2 relapses in 6 months
- Low complement or hypertension at presentation.

## **Post strep glomerulonephritis (PSGN)**

Symptoms begin **weeks after acute GAS pharyngitis or skin infection. Low C3**. This is usually a self limiting condition. Microscopic hematuria may persist for 18 months while hypocomplementemia resolves with disease. Associated low serum albumin is due to hemodilution and not from the proteinuria.

## **IgA nephropathy**

Symptoms occur **concurrently with acute URI or pharyngitis**. Additional findings are gross painless hematuria and abdominal pain. **Normal C3**. Most self resolve in 1-5 yrs. Persistent or nephrotic range proteinuria is bad sign. Renal biopsy is indicated for impaired renal function, hypertension or persistent proteinuria.

## Membrano-Proliferative Glomerulonephritis (MPGN)

May mimic PSGN and also may present like nephrotic syndrome **Low C3**. Biopsy is diagnostic. 50% may progress to ESRD. Choose this if C3 & C4 are low

## Membranous Nephropathy

Nephrotic syndrome described in a patient with a history of hepatitis B or C infections, SLE, Rh arthritis OR patient on nsaid or captopril. **Normal C3**.

## Lupus Nephropathy (LN)

SLE patients with nephrotic range proteinuria. Early complement deficient or IgA deficient patients are at risk of LN. **Low C3 and False positive VDRL are consistent findings.**

### Renal Medications and the side effects

	Where it acts	Side effects
Furosemide	Thick ascending loop	Hypokalemic alkalosis, high TGs and cholesterol, impaired glucose tolerance
Thiazide	Distal convoluted tubule	Contraction alkalosis
Acetazolamide	Prox convoluted tubule	RTA type 2
Spirolactone	Collecting duct	Gynecomastia. Stop immediately in patients with RTA type 4
Mannitol	Brain & kidney. Pulls fluid from ICF to ECF	No acid base abnormalities

## Acute Dystonic Reaction

- Dysturbs the movement dysturbs the sleep **Not**.

Dystonia would be described as rhythmic and can be stopped when touched but it doesn't occur during sleep. **Myoclonus is described as jerky or involuntary movements that cannot be stopped when held and occurs during sleep.** Think acute dystonic reaction if patient is on neuroleptics or metoclopramide even at normal doses. **Discontinue medication first.** Give Benadryl or benztropine next.

## Choreas

- Sydenham has a chareer in behavioral strep.

Most common cause of sydenhams chorea is acute rheumatic fever. It occurs weeks to months after group-A-strep infection. Behavioral change is consistent with Sydenhams chorea. Presence of SLE is a bad prognostic factor in sydenhams chorea. Emotional lability is consistent with both sydenhams and hutingtons chorea but hypotonia is not seen in Sydenham (unlike hutington that has hypotonia)

## TICS

- Motor **Bleeng** bling while Vocal **Blogss** to clear throat

**Motor tics:** Blink, elevation of shoulder, eyes shutting, nose twitch, grimace

**Vocal tics:** Blowing, grunting, squeaking, sniffing, throat clearing).

## Tic disorders

- **Transient Tic Disorder:** Duration of tic less than 1 year. May be motor, vocal OR combined tics. **Reassure concerned parents.**
- **Chronic Tic Disorder:** Duration of tics greater than 1 year. **Motor tics only.** Reassure & tell parents the tics resolve by about 18 years
- **Tourettes Syndrome:** Combined (motor and vocal) tics for greater than 1 year. **Give neuroleptics next.**

## Muscle weakness

### Muscle disorders

- **Duchennes Muscular Dystrophy:** X-linked recessive disorder of muscle due to a mutation in dystrophin gene. **Pseudohypertrophy** (due to fat deposition and proliferation of collagen) and **positive gowers sign are suggestive. CPK is elevated.** Diagnosis is via muscle biopsy. No tongue fasciculation. No eye involvement. Most have mental retardation and cardiomyopathy. **Heart failure causes death.**
- **Myotonic Muscular Dystrophy:** Autosomal dominant. **CPK is normal.** Diagnosis is via biopsy.
- **Fascioscapohumeral dystrophy:** Autosomal dominant. Cannot close eyes, smile, blow a whistle or balloon or use straw. **Eye muscle may be spared.** Muscle biopsy for diagnosis.
- **Myositis:** Prior viral illness or URI described usually. There is pain and weakness in the particular muscle/s with normal deep tendon reflexes. Fever may or may not be present. CPK is elevated. No treatment necessary.

## NMJ disorders

- **Juvenile Myasthenia gravis:** Antibodies against ACH receptors in NMJ. **Weakness worsens with activity or as day progresses but better with rest or in the morning.** Confirm with tensilon test. Treat with pyridostigmine. Thymectomy is curative.
- **Botulism:** Toxin blocks release of ACH from presynaptic neurons. In older kids, Diplopia and dysphagia may be described. In infants, weak suck, weak cry, constipation and drooling may be described. **Avoid aminoglycosides!** For diagnosis do stool toxin assay. Begin treatment with antitoxin ASAP. Also give IVIG.

## Peripheral nerve disease

**Clues: Diminished reflexes or areflexia should clue you into peripheral nerve disease**

- **Guillain barre:** Ascending weakness and areflexia with or without evidence of dysautonomia. Get **EMG or LP next.** Get pulmonary function test next if respiratory compromise is a concern. Associate guillain barre with campylobacter jejuni diarrheal illness.
- **Tick paralysis:** Rapid ascending paralysis with pain, paresthesias (sensory loss limited to face) & areflexia or diminished deep tendon reflexes in all extremities. **Diagnosis is via toxin in stool OR EMG.** Remove the tick first.

- **Hereditary Sensorimotor neuropathy (Charcot Marie tooth):** Autosomal dominant disease of peripheral nerve. Distal weakness and wasting with areflexia or diminished DTRs. Positive family history is a clue. Get **EMG or NCS next**

Spinal cord disease

**Clue: Loss of sensation, hypo/hyperreflexia, loss of anal tone and bladder or bowel incontinence.**

- **SMA type 1(Werdnig-Hoffmann):** Degeneration of anterior horn Cells. Weakness or hypotonia, **tongue fasciculations**. No eye muscle involvement. MRI next.
- **Transverse Myelitis:** Lymphocytic infiltration and demyelination. Prior URI, abrupt weakness associated with voiding problems. Patient may have diminished reflexes that become hyperreflexia. **MRI next.**
- **Epidural abscess:** Fever plus signs of cord compression (decreased anal tone, lower extremity sensation and increase reflexes). **MRI next. Antibiotics and immediate surgical decompression needed.**

### **Neural tube defects (NTD)**

- **Spina bifida occulta:** Suspect if midline defect is seen over L5-S1. Spinal cord and meninges do not protrude. **Get an USS next if less than 6months and MRI if greater than 6months old.** Usually no treatment is necessary.

- **Meningocele:** Meninges protruding through midline defect. If well covered by skin and no neuro abnormality on physical examination, surgery may be delayed. **If CSF leaks or incompletely covered, then immediate surgery is required.**
- **Myelomeningocele:** Spinal cord and meninges protrudes through midline defect. If noted at birth, place in decubitus position and cover with warm soaked gauze and wrap prior to transfer. Multidisciplinary team needed for management.
- **Re Folic acid:** There is a 25-50 percent reduction in NTD occurrence in babies of moms who took folic acid supplementation from one month prior to conception through the first trimester. The recommended dose is 0.4mg/day in moms with no previous history. If mom has had a previous NTD child, then the recommended dose is 4 mg/day.

## **ATAXIA**

### **Acute onset**

This will be most likely post infectious or secondary to acute intoxications on the boards. Influenza and varicella infections are your typical infections that cause post infectious cerebellitis or acute disseminated encephalomyelitis. Most likely intoxications will be from alcohol, anti-epileptics or sedatives but typically these should be mentioned in the history. Get CBC with differentials, electrolytes, toxic screens, drug levels, LP next (correlate with history).

## **Chronic onset or progressive ataxia**

Usually Structural e.g. tumors, dandy walker, arnold chiari malformations or inherited e.g. ataxia telangiectasia or friedreichs ataxia. Correlate with history. Imaging is indicated.

## **Diseases of cell division and migration**

They present with seizures, mental retardation, developmental delay and microcephaly.

- **Holoprosencephaly:** Failed formation of telencephalic vesicles. No interhemispheric fissures this makes it **hard to tell left from right brain**. Associate with cyclopia (one eye).
- **Lisencephaly:** No sulci, No gyri. CT or MRI is diagnostic. Associate Miller Dieker Syndrome.
- **Schizencephaly:** Abnormal slits/clefts in one or both cerebral hemispheres. CT is diagnostic. Associate with optic nerve hypoplasia which leads to blindness.
- **Agenesis of the Corpus Callosum:** Absent corpus callosum. MRI is better for diagnosis. Associate with Aicardi syndrome, Trisomy18 and maternal cocaine use.

## **Hydrocephalus**

- **Obstructive hydrocephalus: DAMP Head causes obstructive hydrocephalus.** Dandy walker, Aqueductal stenosis, AVMs, Midline brain tumors and Posterior fossa tumors. CT or MRI is diagnostic.

- **Communicating hydrocephalus:** Causes are meningitis, choroid plexus papilloma and subarachnoid hemorrhage.
- **Vein of Galen Malformation:** This will be the most likely diagnosis if symptoms or signs of **congestive heart failure and cranial bruit are present** in a patient with hydrocephalus.
- **VP-Shunt malfunction:** Vignetter typically describes a patient with headache and signs of increased intracranial pressure. Get CT of head next with or without shunt series. If fever is present tap the shunt. Choose head CT if MRI is an option because CT scan can be done more emergently.

## **Cerebral Palsy (CP)**

In the first year of life, motor delay & behavioral abnormality should arouse your suspicion. On the boards, two things are high yield as it pertains to CP. **1) The CP type. 2) The area of insult.** The insult to the brain is non progressive.

- In **spastic diplegic CP**, the patient has increased tone and hyperreflexia in the lower extremities bilaterally. Choose periventricular injury with this type.
- In **dystonic/choreoathetoid CP** there is movement disorder, hearing loss, truncal hypotonia. Other finding is tongue thrust. Choose basal ganglia injury (secondary to kernicterus).
- In **spastic quadriplegia**, all four extremities are spastic. Hypoxic Ischemic Encephalopathy must be entertained as the cause if global intellectual

impairment is mentioned. **The first and fifth minute APGARs score do not correlate with CP.**

## **Vertigo**

- **Benign Positional Vertigo:** Nystagmus, nausea, vomiting or spinning sensation with change in head position. **No loss of consciousness** with change in head position. **No tinnitus, no hearing loss.** Best treatment is canalith repositioning manoeuvre.
- **Labrynthitis:** History of prior URI and hearing loss is present with Nystagmus.

## **SEIZURES**

### **Infantile spasm**

**Presentation:** Head nodding with flexion and extension of the trunk and extremities.

May be triggered by startling.

**EEG finding:** Hypsarrythmia

**Management points:** **ACTH 1st line.** Other medications used- vigabatrin, valproate, topiramate & ketogenic diet.

### **Simple febrile seizures**

**Presentation:** Child 6 months to five years with brief (less than 15minutes) with generalized tonic clonic (GTC) seizures & associated with high fevers. There is usually only one seizure in 24 hours.

**EEG finding:** Not indicated

**Management points:** Educate parents about its benign nature. Provide seizure first aid for recurrences. Risk of recurrence is 30% after 1st febrile seizure and 50% after 2nd. Risk of epilepsy is 2 percent versus 1percent in the general population. Risk of epilepsy is higher if child has neurodevelopmental disorder, a family history of epilepsy or a first febrile seizure that is complex.

### **Atypical febrile seizures**

**Presentation:** Not brief (greater than 15 minutes), not GTC (may be focal), multiple seizures within 24 hours, & also associated with fevers

**EEG finding:** May be normal

**Management points:** Needs further evaluation.

### **Lenox gastaut**

**Presentation:** Intractable seizures. Multiple types of seizure may occur in 24 hours. No fever usually

**EEG finding:** Generalized polyspike, slow spike & wave activity

**Management point:** Topiramate may help

### **Landau Kleffner**

**Presentation:** Child usually less than 7 years with aphasia, language (expressive or receptive) issues and ADD

**EEG findings:** Diffuse or multifocal spike/ wave discharges

**Management point:** Most appropriate treatment is Valproate

### **Absence seizures**

**Presentation:** Blank stare no jerks no stretch.

**EEG finding:** Generalized 3hz spike and wave discharges

**Management point:** Ethosuximide is first line, valproate is an alternative.

### **Rolandic Epilepsy**

**Presentation:** 7-10yr old boy with Jerking of one side of face mostly at night but may occur on awakening

**EEG finding:** Independent left & right centrotemporal spike

**Management point:** Most not treated because it remits excellently at puberty. But if treatment is warranted, carbamazepine is first line.

### **Juvenile Myoclonic Epilepsy**

**Presentation:** Usually a 12-18year old with early morning jerks with activity. Seizures occur while performing an activity like brushing or combing hair or drinking. Seizure could be myoclonic jerks of shoulder and arms.GTC or absence-like but associated with activity

**EEG finding:** 3-6Hz polyspike/ wave

**Management point:** Valproate or lamotrigine

### **Partial Seizures**

**Presentation:** Complex or simple.

**EEG finding:** Right centrotemporal spike

**Management point:** Treat with Carbamazepine.

## Complex partial versus absence seizures

	<b>Complex partial</b>	<b>Absence</b>
Blank stare	Present	Present
Movement during stare	Facial and lip	<b>No facial or lip movement</b>
Postictal state	<b>present</b>	No postictal state
Response to command	May respond	No response

## Concussions

After first injury and return to sports advice for parents

- **Grade 1:** Confused only. May return in 20 minutes if no symptoms on immediate evaluation.
- **Grade 2:** Confused and amnesic. May return in 1week if symptom free for 1week.
- **Grade 3:** Confused, amnesic & loses consciousness. **May return in 1 month if symptom free for 1 week.**

## Anti seizure medications/Side effects

<b>Med</b>	<b>Side effect</b>	<b>Code phrase</b>
Ethosuximide (Zanrontin)	GI distress, hiccups	<b>Ethol sucks in my gut</b>
Phenobarb (Luminal)	Hyperactivity	<b>Phenomenal activity</b>
Phenytoin. (Dilantin)	Hirsutism, gingival hyperplasia, coarse facials	<b>Pheny tone my facial features</b>

<b>Med</b>	<b>Side effect</b>	<b>Code phrase</b>
Levetiracetam. (Keppra)	Irritability & aggression	<b>Levied for aggression</b>
Carbamazepine (Tegretol)	Neutropenia & steven johnson syndrome	<b>To greet al</b> is BS ( <b>B</b> lood dyscrasias and <b>SJS</b> )
Valproic acid (Depakote)	Weight gain, pancreatitis, tremors, ITP	Valpro ate so much he's having tremors & poopin his fats
Topiramate (Topamax)	Weight loss, glaucoma, renal stones, metabolic acidosis	Topi <b>stones</b> his <b>fat eye and</b> <b>acid</b> pours out
Lamotrigine (Lamictal)	SJS & TEN	<b>Lamotrijunsin syndrome</b>
Felbamate (Felbatol)	Sleep disturbance, aplastic anemia	Fell by me cos his <b>weak and</b> <b>lacks sleep</b>

## **HEADACHES**

### **Tension headaches**

**History:** Generalized, throbbing, bandlike and stress related

**Management:** NSAIDs first line

### **Migraine headaches**

**History:** Unilateral or behind eyes, may be Frontal and may be throbbing with photophobia, nausea and vomiting. They **usually do not occur daily**. Affected individual may have focal neurologic signs or auras. May be stress related with a positive family history.

**Management:** NSAIDs first line. **Prophylax with cyproheptadine, topiramate or valproate if migraine is affecting school.** Head CT is indicated for atypical migraine with focal neurologic signs, school failure, behavioral change or seizures.

### **Analgesic headache**

**History:** Persistent headaches despite medications or increasing frequency of headaches (daily) in a patient on chronic analgesics.

**Management:** Discontinue analgesic first.

## **STROKES**

Key points

- **Acute hemiplegia from Todd's Paralysis:** Hemiplegia post seizure that may last from a day up to a week. EEG may be positive (non specific finding) but **imaging is negative.**
- **Acute hemiplegia from migraines:** Hemiplegia post headaches that may last from hours up to a week. **EEG negative, imaging negative.**
- **Embolic strokes from carotid Dissection:** Hemiplegia following blunt trauma to the chest. **Do carotid angiography next.**
- **Ischemic stroke from hereditary deficiencies:** Most common is activated protein C resistance (factor V Leyden).
- **Hemorrhagic strokes:** Get non contrast Head CT if acute bleed or intracranial bleeding from head trauma or shaky baby. Get **contrast Head CT**

**for AVMs.** AVMs are described on CT as contrast enhancing cerebral mass with no midline shift or surrounding edema.

- **Sickle cell disease strokes:** May cause ischemic or hemorrhagic strokes. Best prevention is scheduled transfusions. **Choose transcranial Doppler USS as best test to predict children at risk.**
- **Mitochondrial disease:** Stroke in a patient with elevated lactate and sensorineural hearing loss is suggestive. **Do molecular analysis of mitochondrial DNA next.**

## The Ears

### Acute otitis media

- **Pneumatic Otoscopy:** Assesses mobility of tympanic membrane. Ear speculum must be large enough to make a good seal for optimal results. Doing pneumatic otoscopy will be the most appropriate next step in diagnosing acute otitis media if clinical symptoms and signs are suggestive.
- **Re Management:** Use oral amoxicillin as first line for treatment. If patient has a fever with or without persistent ear pain 2-3 days after initiating therapy then 2nd line medication is indicated. Choose augmentin as second line medication next. If amoxicillin causes a rash, use cefdinir (omnicef) next. **If patient has anaphylaxis to amoxicillin, use azithromycin (zithromax) next.** If vomiting amoxicillin or other oral medications, give parenteral ceftriaxone (rocephin) x 1-3 doses next. If greater than 4weeks since completing antibiotics for an acute infection and patient has acute symptoms again then treat as new infection with amoxicillin (even if used previously).
- **Otitis media with effusion:** Usually follows AOM. Suspect if patient complains of ear pain and clear fluid or air fluid levels or bubbles is described on otoscopy. **No treatment required.** Tell concerned parents it takes months for the fluid to self resolve.

- **Indication for T-tubes or ENT referral:** Six infections in a year or four infections in 6 months. **Tympanostomy tubes prevent cholesteatoma but it is unclear if they prevent hearing loss.**

## Discharge from the ears

- **Cholesteatoma: Persistent or recurrent otorrhea refractory to treatment is suggestive.** Greasy looking mass or pearly white debris in retraction pockets is also suggestive.
- **Tympanic Membrane perforation:** Vignette may describe painless otorrhea that heals spontaneously. If perforation is central then there is low risk of cholesteatoma. If perforation is peripheral then there is high risk of cholesteatoma. **If it doesn't resolve in 3 months, then refer to surgery or ENT next.** If pain is present, a concurrent infection might necessitate treatment with antibiotics.

## Tympanosclerosis

White plaque on ear drums caused by chronic inflammation or trauma that produces granulation and hyalinization. Associate with minimal hearing loss.

## TYMPANOMETRY

Done to supplement pneumatic otoscopy & usually after 6 months of age. See diagrams below (Y axis is compliance and x axis is pressure).

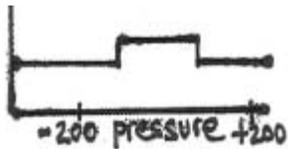
**Normal tympanogram (diagram A)**

A



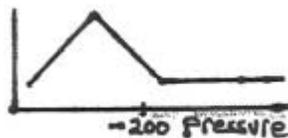
**Non mobile TM with middle ear effusion (diagram B)**

B



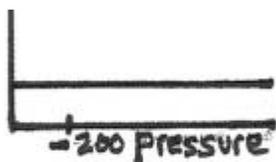
Intact mobile TM with poor ET tube function and excessive negative pressure (diagram C)

C



TM perforation (diagram D)

D



## Otitis Externa

Diagnosis is clinical. Perforation of the tympanic membranes should be assumed if the debris seen blocks your view of the tympanic membrane. For management, **topical fluoroquinolone is first line and safe enough to use with or without perforated ear drums**. Oral antibiotic is indicated if signs of systemic involvement like fever, lymphadenopathy or auricle cellulitis are present. Topical steroids are indicated if canal is too edematous and painful to allow speculum examination.

## Acute mastoiditis

May follow poorly treated acute otitis media and it presents with posterior auricular redness and tenderness. It may be fluctuant. **Do CT next to see extent**. For coalescent lesions cortical mastoidectomy is best next step in management. For non coalescent lesion, myringotomy with tube placement and IV antibiotics are appropriate options.

## Perilymphatic Fistula

Perilymphatic fluid leaks from the inner ear into the tympanic cavity through the round or oval window. May follow blunt head trauma or slap to the ears. Suspect if hearing loss is associated with vertigo and ataxia. Refer to ENT next.

**Foreign body in Ears:** Attempt removal if seen. Refer to ENT. Emergent removal is indicated if it is a battery.

**Auricular hematoma:** Needs **urgent evacuation with needle and syringe by ENT**. Cauliflower ear occurs if not evacuated promptly. Post evacuation care is with splints, pressure dressing, application of ice and topical antibiotics.

## **The NoSE**

### **Upper Respiratory Infection**

Rhinovirus is the most common cause. Reassurance is always the right answer or supportive treatment. No medication over the counter would be correct on the boards. 12 colds a year doesn't mean immunologic disorder, it is normal, reassure parents.

**Chronic recurrent rhinosinusitis:** Most appropriate next step here will be to **give longer courses of antibiotics** or refer to ENT.

**Choanal atresia:** Patient turns blue while feeding and pink while crying. May be part of CHARGE syndrome (see genetics). **Do head CT for diagnosis.**

**Nasal polyp:** When described or shown on the boards, **think Cystic Fibrosis. Do sweat chloride test next.** Nasal polyps may also be seen in asthmatics or in patients with chronic allergic rhinitis or sinusitis. **Do not use aspirin if patient has asthma and nasal polyp** because it may precipitate severe bronchospasm.

**Epistaxis:** Nose picking or hot non humid homes will be your most likely cause even when denied in the history. Teach first aid to stop bleeding and reassure parents if bleeding is benign and bleeding site is seen on examination. If recurrent nosebleed is described, think nasopharyngeal CA and get a CTscan next. Choose CBC and coagulation panel as best initial work if history is suggestive of a bleeding disorder.

**Septal Hematoma:** Widening of the anterior septum following trauma to the nose is suggestive. An urgent **ENT referral is needed for surgical drainage or evacuation of the hematoma.** Saddle nose deformity occurs if evacuation isn't done promptly.

## **The Neck**

### **Lymphadenitis**

The most likely cause if acute cervical or submandibular lymphadenitis is described on the boards will be **staph aureus or strep pyogenes (GAS)**. CBCD may or may not reveal leukocytosis with a left shift. With systemic symptoms or leukocytosis, **blood culture is usually positive** and more reliable than exudates or wound cultures. A trial of empiric parenteral or oral antibiotics that covers both organisms should be used first. Remember Cat scratch can also cause warm tender cervical nodes but it is subacute & typically they give a history of a distal papule (bite or scratch site). If symptoms are consistent with cat scratch disease, remember the CIA (**Choose Immune Assay**) can find the cat.

### **Acute bacterial sialadenitis**

Infection of the parotid or submandibular salivary gland. Usually secondary to inspissated mucus plug that causes salivary stasis which leads to a super imposed bacterial infection (staph usually). **Dehydrated states (recent vomiting or diarrhea described) or sjorgens disease increases the risk**. These patients have redness and tenderness noted in the stensons duct (**examine the mouth next to see this if not done already**). Admit for intravenous antibiotics. Get an ultrasound or CT-scan if patient doesn't improve with initial antibiotics to rule out abscess, stone, ductal stricture or tumor causing obstruction.

### **Thyroglossal duct cyst**

Midline mass above thyroid that moves with swallowing. **Do not excise but consult surgery next!**

### **Branchial cleft cyst**

They are described as a smooth and fluctuant swelling **located along the anterior sternocleidomastoid muscle.**

### **Cystic hygroma**

The swelling is located in the **posterior triangle above the clavicle.** It is soft and it transilluminates.

### **Sternocleidomastoid hematoma**

Noted at age 2-4 weeks and associated with torticollis. Range of motion exercises next.

## **The Mouth/Throat**

### **Exudative Pharyngitis**

Group A Strep, adenovirus and EBV will be the common causes on the boards. **A negative rapid strep test requires a throat culture as the most appropriate next step before starting antibiotics for group A strep pharyngitis.** Adenovirus will be the most likely cause if conjunctivitis is present. Choose **EBV as the most likely cause if associated splenomegaly or hepatomegaly is present (especially hepatomegaly, even if rapid strep is positive).** For EBV, do a monospot test first then serology next. Atypical lymphocytosis on CBCD is consistent with EBV infections

### **Aphthous Ulcers**

Cause is unknown. Presents with Painful red spot or bump in the mouth, inner lip upper throat that becomes an ulcer which has a tendency to recur. Lesions may be

described as **whitish with surrounding redness** and they are **usually discrete**.  
**Ulcers may last 1-2 weeks**. Beclamethasone topical ointment may help.

## **Gingivostomatitis**

HSV 1 will is the most likely cause. Presents with gum redness, swelling and pain with **vesicular lesion on an erythematous base** in the mouth, inner lip and anterior tongue. **Lesions may occur in crops** and rupture later coalescing leaving ulcerated plaques. Lymphadenopathy and fever may be present. **Ulcers last 5-7 days**. **DO NOT USE TOPICAL STEROIDS!**

## **Herpangina**

Coxsackie virus strains A, 2, 6 & 10 are the most likely cause. They usually describe **petechiae and papules on the soft palate that becomes shallow ulcers** in the posterior tongue, pharynx or soft palate. **Ulcers last ~ 3 days then heal**.

## **Ludwig angina**

Submental swelling and tongue elevation with fever, dysphagia and stridor. Airway stabilization first then admit and start IV antibiotics first with GABHS in mind. Then **consulting ENT, Maxillofacial or dentist will be the most appropriate next step**.

## **TMJ syndrome**

Ear pain or sorethroat that radiates to chin, jaw or neck with normal ear and throat on physical examination is suggestive. Pain is worse with chewing, talking or yawning. May have associated **dysphagia** (due to muscle spasms) and **swelling on the affected side of the face**. Clicking and popping sounds are commonly heard when the mouth is opened. Most likely associated habits are chewing gum or grinding teeth.

**Cold Induced Paniculitis:** A tender red nodule on the cheeks of a child who uses cold pacifiers is suggestive. No treatment necessary. Reassure parents.

## Dental injuries

- For **tooth concussion** (trauma with no displacement or mobility) no treatment required.
- For **tooth subluxation** (displaced in its socket and mobile) refer to dentist for splinting.
- For **tooth intrusion and extrusion injuries emergent dental consult is most appropriate next step.**
- For tooth avulsion, replace within 30minutes to prevent resorption and destruction of the root. **Transport in milk or saliva.**

## **The EYES**

### **Lacrimal duct obstruction**

Gentle massages first then refer to ophthalmology if persistent after 9-12 months. If dacrocystitis or dacrocystocele suspected then refer to ophthalmology ASAP.

**Congenital Glaucoma:** Associate with sturge werber.

### **Strabismus**

**Transient up to 4 months.** So if less than four months, reassure parents. Refer to ophthalmology if child is greater than 4 months with strabismus. Other findings are asymmetric corneal light reflex. It is pseudostrabismus if patient has prominent epicanthal folds or flat nasal bridge.

## Eye injuries

- **Chemical Burns:** Copious lavage or irrigation next.
- **Corneal lacerations:** Suspect if tear drop pupil or iris prolapse is described. Affected patients need urgent referral to ophthalmology next.
- **Corneal abrasion:** Fluorescein eye exam next then ophthalmologic antibiotic if abrasion is present.
- **Hyphema:** First apply cycloplegics, shield and elevate head of bed then refer to ophthalmology.

## Orbital fractures

- **Floor:** Limitation of upward gaze, lower eyelid bruise, hypoesthesia of ipsilateral cheek and upper lip. Refer next
- **Medial wall:** Depressed nasal bridge, enophthalmos. Refer next.
- **Superior wall:** CSF rhinorrhea, superior and lateral subconjunctival hemorrhage. Refer next.

## Lens issues

- **Lens subluxation:** Remember **marfan is up and outgoing & homos are down low and in (homocystinuria)**.
- **Lens dislocation:** Tremulous iris described.

## Eyelid issues

### Stye

Localized red, painful swelling in the upper or lower eyelid. If internal it may lead to generalized cellulitis of the lid. Gland of zeis affected. Treat with warm compress and a topical ophthalmic antibiotic.

### Chalazion

Described as a hard non-tender swelling of the eyelid. Meibomian gland affected. Treat small chalazion with warm compresses or expectant management. Refer large ones, or chalazions interfering with vision to ophthalmology.

**Blepharitis:** Inflammation of lid margin with crusty or scaly debris at the base of the eyelash. Treat with warm damp cloth and shampoo wipes to remove scales or debris with topical ophthalmic antibiotic.

**Phthriasis palpebrum:** Eyelash lice. Best initial treatment is with vaseline or topical phospholine iodide or 1% mercuric oxide ointment.

**Preseptal cellulitis:** Periorbital or preseptal swelling and tenderness. No ophthalmoplagia, No photophobia, No proptosis. Most likely source is by direct extension (sinusitis or insect bite) if greater than 2 years and hematogenous spread if less than 2 years.

**Orbital Cellulitis:** Fever, eye lid swelling with **proptosis, photophobia and ophthalmoplegia present**. Do head/orbital CT next. Admit and begin IV antibiotics (ceftriaxone or cefotaxime plus clincamycin).

## Iris problems

- Associate iris colobomas with CHARGE syndrome
- Associate aniridia with WILMS
- **Associate heterochromia with congenital Horner's syndrome.**

### Papillitis versus Papilledema

	<b>Papillitis</b>	<b>Papilledema</b>
Definition	Inflammation of optic nerve	Edema of optic disc
Clues	Usually unilateral with history of URI	Usually bilateral with signs of increase ICP
Visual acuity	Decreased	Normal

## Contact lens Issues

Contact lens wearers are prone to corneal ulceration and keratitis. **Soft lenses or extended wear lenses pose the greatest risk** for corneal ulceration.

- **Microbial Keratitis: History of injury, then** pain, redness, photophobia and tearing. **Florescein stain is described as multifocal.** Remove contact lens first before florescein. Prompt referral next when confirmed.
- **Contact lens induced peripheral ulcer:** History of trauma, then Pain, redness, photophobia or tearing. **Florescein stain is described as diffuse.** Remove contact lens first before fluorescein and then prompt referral next when confirmed.

## **MONKEY Q Bank TWO-LINERS**

1. Vignette describes a patient with symptoms and lab evidence of Infective Endocarditis. Question is which of the following is most indicative of infective endocarditis.
  - a. New Murmur
  - b. High grade fever
  - c. Red painful nodules on shin
  - d. Splinter hemorrhages
  - e. Positive rapid strep screen

**Answer is a**

2. Vignette describes an infant whose mom develops chicken pox 4 days after delivery and question is what next.
  - a. No intervention
  - b. Administer VZIG to baby
  - c. Isolate baby
  - d. Administer acyclovir to baby
  - e. Administer varicella vaccine and VZIG to baby

**Answer is a**

3. Term newborn delivered via c/section with cyanosis. Tripple dye used to clean umbilical cord daily. On day 3, cyanosis worsens and question is what happened.
  - a. Increase metabolic demand from hypoglycemia
  - b. Persistent pulmonary hypertension
  - c. Ductus closed
  - d. Transient increase resistance of blood flow to lungs (TET spell)
  - e. Methemoglobinemia

**Answer is c**

4. Vignette describes symptoms consistent with Marfans syndrome and Homocystinuria. Question is what differentiates them.

- a. Hypercalcemia in marfans
- b. Thromboembolism in homocystinuria
- c. Lens displaced posteriorly in Marfans
- d. Short stature in homocystinuria
- e. None of the above

**Answer is b**

5. Vignette describes an infection identified by a test in 48 patients. Two other patients also found to have the infection but the test did not pick them up. What is the sensitivity of test?
- a. 100 percent
  - b. 99 percent
  - c. 98 percent
  - d. 97 percent
  - e. 96 percent.

**Answer is e**

6. Vignette describes acute generalized abdominal pain, high fever and decrease bowel sound in a preadolescent male with history of somatization disorder. Question is most likely diagnosis.
- a. Constipation
  - b. Somatic abdominal pain
  - c. Perforated appendix.
  - d. Abdominal migraine
  - e. Peptic Ulcer Disease

**Answer is c**

7. Vignette describes an asymptomatic 7 month old infant with Gastro Esophageal Reflux. Question is best advice for the concerned parent.
- a. Add cereal to formula
  - b. Reassurance
  - c. Burp after every minute while feeding
  - d. Keep baby upright always
  - e. Change to a protein hydrolysate formula

**Answer is b**

8. Chest x-ray with focal consolidation shown. You are told the x-ray belongs to a 4 year old immigrant. Question is most likely cause
- Haemophilus influenza
  - Chlamydia psitacci
  - Mycoplasma pneumonia
  - Rhinovirus
  - Pneumocystis Jiroveci

**Answer is a**

9. Vignette asks for the best test to diagnose HIV in a 7 month old recent immigrant to the United States.
- HIV RNA PCR
  - Viral culture
  - Western blot
  - HIV antibody by enzyme immunoassay
  - HIV DNA PCR

**Answer is e**

10. Vignette describes a 3 year old female with recurrent bacterial pneumonias, failure to thrive, hypergammagloinemia and Lymphadenopathy. Question is most likely diagnosis
- Cystic fibrosis
  - HIV.
  - Common variable Immunodeficiency
  - SCID
  - Hyper IgM syndrome

**Answer is b**

11. Vignette describes a 16 month old toddler with history of perinatal HIV exposure. Question is which of the following least excludes the presence of disease.

- a. Negative Elisa and western blot at the age of 12 and 16 months regardless of method of feeding and toddler is currently asymptomatic
- b. HIV antibody negative result at the age of 15 months in an asymptomatic child who isn't breast fed
- c. Two negative HIV RNA PCR test done at age 2 months and 6 months respectively and toddler is currently asymptomatic
- d. HIV antibody negative result done at age 7 months and 9 month

**Answer is a**

12. Growth chart of Constitutional delay shown (you are not told it is constitutional delay). Question is amongst the following, which is a correct statement.
- a. Catch up growth occurs usually with treatment
  - b. Bone age is normal
  - c. Puberty is always delayed
  - d. One parent is usually short and the other tall
  - e. Weight may be normal or low

**Answer is e**

13. Growth chart of year old female with crohn's disease shown (you are not told it is crohns). Question is patient is likely to have what?
- a. Elevated ESR
  - b. Short parents
  - c. Elevated IGFBP3
  - d. Arthritis
  - e. Hyperproteinemia

**Answer is a**

14. Vignette describes a premature infant with jitteriness and difficulty feeding on day 2 of life. Later on the neonate is hyperirritable with high pitched crying and diarrhea. Question is most likely substance mom abused.
- a. Heroin
  - b. Cocaine
  - c. LSD
  - d. Alcohol

e. Lorazepam

**Answer is a**

15. Vignette describes a patient with coarse facies and big ears (photo shown). His height is at the 85<sup>th</sup> percentile for age. Question is most likely diagnosis.
- a. Hunters syndrome
  - b. Hurlers syndrome
  - c. Gauchers disease
  - d. Fragile X syndrome
  - e. Russell Silver syndrome

**Answer is d**

16. Vignette asks for best test to diagnose Fragile X syndrome.
- a. High resolution karyotype
  - b. FISH analysis
  - c. Brain MRI
  - d. Diagnosis is clinical
  - e. Trinucleotide repeat CAG.

**Answer is e**

17. Vignette describes a patient with Wiskott Aldrich syndrome. Question is what is the chance of another child having it if dad isn't affected.
- a. 0 percent
  - b. 4 percent
  - c. 8 percent
  - d. 25 percent
  - e. 50 percent

**Answer is a**

18. Picture of hypospadias shown. Question is what the recurrence risk is if no parent is affected.
- a. 0 percent
  - b. 4 percent

- c. 8 percent
- d. 25 percent
- e. 50 percent

**Answer is b**

19. Pedigree (diagram) of a patient with autosomal recessive disease shown. You aren't told it is autosomal recessive. Question is most likely disease that runs in the family.
- a. Vitamin D resistant ricket
  - b. Cystic fibrosis
  - c. Hypospadias
  - d. Wiskott Aldrich Syndrome
  - e. Retinoblastoma

**Answer is b**

20. Vignette describes an exclusively breast fed 2 month old infant whose mom is concerned she hasn't had a bowel movement in 1 week. Question is most appropriate next step
- a. Advice to begin formula
  - b. Supplement breast milk with fiber
  - c. Reassurance
  - d. Administer glycerin suppository
  - e. Barium enema

**Answer is c**

21. The following are causes of long QT-U except
- a. Hyppokalemia
  - b. Verapamil
  - c. Hypocalcemia
  - d. Tricyclics
  - e. Hypomagnesemia

**Answer is b**

22. Vignette describes 17 year old female comatose from ecstasy intoxication. Question is death in this patient is likely to be caused by which of the following.
- a. Hyperthermia
  - b. Hyponatremia
  - c. Hyperkalemia
  - d. Hypothermia
  - e. Myocardial infarction

**Answer is a**

23. Approximately what percentage of serious brain injury is prevented in bicycle riders who use a helmet?
- a. About 20%
  - b. About 40%
  - c. About 60%
  - d. About 90%
  - e. 100%

**Answer is d**

24. Vignette describes a 9 month old with iron deficiency anemia. Question is when to expect bone marrow response with treatment.
- a. In 24 hours
  - b. In 48 hours
  - c. In 1 week
  - d. In 3 months
  - e. In 6-12 months

**Answer is b**

25. Vignette describes a patient with Cat bite. Patient is allergic to Penicillin. Question is drug/s of choice.
- a. Cefotaxime and erythromycin
  - b. Cefotaxime and ceftriaxone
  - c. Clindamycin
  - d. Azithromycin

- e. Bactrim and clindamycin.

**Answer is e**

26. Rocky Mountain spotted fever described in a 5 year old boy. Question is medication of choice for treatment.
- a. Ampicillin and sulbactam
  - b. Chloramphenicol
  - c. Metronidazole
  - d. Doxycycline
  - e. Azithromycin

**Answer is d**

27. Hand Foot Mouth photo shown. Question is the causative organism is implicated in which of the following.
- a. Endocarditis
  - b. Erythema infectiosum
  - c. Orchitis
  - d. Aphthous ulcers
  - e. Sinusitis

**Answer is c**

28. CT of Congenital Cystic Adenomatoid Malformation shown. Question is most likely presentation in utero
- a. Diarrhea
  - b. Bradycardia
  - c. Hydrops
  - d. Oligohydramnios
  - e. None of the above

**Answer is c**

29. Vignette describes infant with symptoms of congestive cardiac failure at 2 months of age with failure to thrive and a murmur. Question is most likely cause of findings.

- a. AV malformation.
- b. Small VSD
- c. Obstructive type TAPVR
- d. Pulmonary hypoplasia
- e. Hypoplastic right heart

**Answer is a**

30. Image of barium swallow and follow through of an infant shown with contrast not going through the 2<sup>nd</sup> part of the duodenum. Question is most likely diagnosis

- a. Duodenal atresia
- b. Jejunal atresia
- c. Ileal atresia
- d. Annular pancreas
- e. Antral web

**Answer is d**

31. The following are true of ALTE except.

- a. Use of a pacifier is protective
- b. Affects males and females equally
- c. Home monitors may be beneficial
- d. An observer or caretakers fear of patient's demise is consistent with ALTE

**Answer is a**

32. Preterm on chronic diuretic therapy. Question is most likely longterm complication.

- a. Renal calcification
- b. Ototoxicity
- c. Hypocalcuria
- d. Hyponatremia
- e. Renal artery stenosis

**Answer is a**

33. Infant described with small eyes, micrognathia and absent thymic shadow on x-ray. Question is most likely teratogen.
- a. azathioprine
  - b. Phenytoin
  - c. Warfarin
  - d. Isotretinoin.
  - e. Lithium

**Answer is d**

34. Picture of two localized scalp swellings on both sides of the midline of a newborn. Question is most likely diagnosis.
- a. Subgaleal hemorrhage
  - b. Caput succedaneum
  - c. Extradural hemorrhage
  - d. Cranial aponeurosis
  - e. Cephalohematoma

**Answer is e**

35. Photograph of portwine stain in V1 distribution shown. Question is most likely association.
- a. Amblyopia
  - b. Glaucoma.
  - c. Strabismus
  - d. Cataract
  - e. Ptosis

**Answer is b**

36. Vignette describes a patient with Von willebrand. Question is which of the following is consistent with diagnosis?
- a. Normal platelet count
  - b. Decreased factor IX
  - c. Prolonged PT
  - d. Normal PTT
  - e. Increased ristocetin cofactor activity

**Answer is a**

37. Vignette describes a patient with HSP. Question is which of the following is not a consistent finding?
- a. Normal platelet
  - b. Elevated platelet
  - c. Low platelet
  - d. Elevated IgA level
  - e. Positive stool guaic

**Answer is c**

38. Vignette describes 9 year old girl with initial and repeat (in recumbent position) urinalysis showing persistent 2+ proteinuria. Question is what's the most appropriate next step in evaluation?
- a. Obtain urine protein to creatinine ratio
  - b. Obtain a comprehensive metabolic panel
  - c. Obtain serum creatinine and albumin
  - d. Renal ultrasound
  - e. Renal biopsy

**Answer is a**

39. Vignette describes appropriate for age infant who can roll over, orients to voice and laughs. Question is what he/she will do in next 2 months?
- a. Reaches with arms in unison
  - b. Crawls well
  - c. Bring hands to midline
  - d. Imitates action
  - e. Transfer objects

**Answer is e**

40. Vignette describes age appropriate mile stones in fine motor, language and social skills of 4 month old. Mom concerned about not rolling over from back to front. Question is most appropriate next step.

- a. Watchful waiting
- b. Refer to Physical therapy
- c. Refer to early intervention
- d. Obtain stool for botulinum toxin assay
- e. Obtain a head CT and electromyography

**Answer is a**

41. Vignette describes a 2 month old with possible colic. Question is which of the following is the least effective intervention?

- a. Hiring a nanny
- b. Taking infant out for a car ride
- c. Changing the formula.
- d. Rocking the infant
- e. Swaddle infant

**Answer is c**

42. Vignette describes a Korean family with an infant brought in by her father and grand mother. For the second month running, you still haven't seen the baby's mom. You are aware of a Korean tradition that mothers should be in bed for a month after giving birth. Question is what is the most appropriate statement to make?

- a. How is the mother doing? I hope she doesn't miss the next visit.
- b. How is mother doing? Does she have any questions?
- c. I understand why mom isn't here but in America this is unacceptable!
- d. How is mom doing? Will she get out of bed soon?
- e. How is the mom doing? I hope she's got some help at home.

**Answer is b**

43. The following primitive reflexes may be present at birth except.

- a. Positive support reflex
- b. Tonic labyrinthine prone
- c. Tonic labyrinthine supine
- d. Upper extremity placing
- e. Plantar grasp

**Answer is d**

44. Vignette describes a 6 year old child with a recent onset of not doing well in school, stopped playing because he is getting tired ALL THE TIME and finds sports boring. Question is best initial step in evaluation.
- a. Screen for child abuse
  - b. Screen for hypothyroidism
  - c. Reassurance considering he has temperamental behavioral variation
  - d. Screen for depression
  - e. Screen for autism

**Answer is d**

45. You are about to start SSRI antidepressant on a teenager. His father is aware of a black-box warning of suicidality with fluoxetine. Question is what is the most appropriate next step and statement to make?
- a. Medication is contraindicated and inform dad about the increase risk of suicide with initiation of medication and prescribe an alternative
  - b. Medication is indicated and inform dad about the increase risk of suicide with initiation of medication and tell him to watch out for it.
  - c. Suggest to dad that cognitive behavioral therapy with emphasis on coping strategies be done before medication considering the circumstance
  - d. Assess suicide risk and if not suicidal, prescribe the medication
  - e. Advice dad to purchase restraint tools and equipments incase he needs them.

**Answer is b**

46. Vignette describes a 3 year old child with one sided acute knee pain, limping, Synovial fluid WBC of 15,000, ultrasound of knee reveals joint effusion and ESR is slightly elevated. Physical examination of the knee is normal except for slightly decreased range of motion limited by pain. Question is most likely diagnosis.
- a. Toxic synovitis
  - b. Lymes arthritis
  - c. Early septic arthritis
  - d. Growing pain

e. Reactive arthritis

**Answer is a**

47. Which of the following findings is consistent with type 1 DM in a 3 year old female?
- a. Elevated insulin
  - b. Weight for age greater than the 95<sup>th</sup> percentile
  - c. Low C peptide
  - d. Positive family history of insulin intolerance
  - e. Glucosuria

**Answer is c**

48. Photograph of scoliosis and many café au lait macules shown. Question is most likely diagnosis.
- a. McCune Albrights Syndrome
  - b. Marfans syndrome
  - c. Neurofibromatosis.
  - d. Homocystinuria
  - e. None of the above

**Answer is c**

49. Vignette describes patient with tuberous sclerosis. Question is what is the earliest lesion to appear?
- a. Hypermelanotic macules
  - b. Hyperpigmented macules
  - c. Rough raised lesions with orange peel consistency
  - d. Cortical tubers
  - e. Subependymal nodules

**Answer is a**

50. Vignette describes 4 year old kid with his first simple febrile seizure. Question is which of the following is most predictive of this child developing epilepsy.

- a. A family history of neurocutaneous lesions
- b. A family history of simple febrile seizure
- c. A prior history of myoclonus as an infant
- d. His risk after this is 75 times higher compared to the general population
- e. Presence of a neurodevelopmental disorder

**Answer is e**

51. Vignette describes a child with febrile seizure. Question is best indication for lumbar puncture.

- a. Child is 13 months old and presentation is simple
- b. Fever is 39.9 degrees centigrade and physical examination cannot elicit the focus of the fever
- c. History of prior simple febrile seizure
- d. Child is 15 months old and presentation is atypical
- e. LP is indicated regardless of age or presentation type

**Answer is d**

52. Vignette describes cyanosis in a previously well 18 month old child. As you approach him he begins to have seizure-like activity that has lasted for about 3 minutes. Question is most appropriate next step.

- a. Administer oxygen
- b. Administer rectal diazepam
- c. Wait for it to resolve
- d. Obtain an accucheck stat
- e. Administer naloxone IM

**Answer is c**

53. Referring to above child, his seizure-like activity aborts after 6 minutes after which he experiences a brief loss of consciousness that is short lived. Physical examination and work up (including EEG) are normal. Question is most appropriate next step.

- a. Obtain a head CT
- b. Obtain a complete metabolic panel
- c. Begin iron supplements

- d. Obtain a serum toxicologic screen
- e. Refer patient to department of family and child protective services

**Answer is c**

54. Vignette shows a picture of a patient with a midline lower lumbar hemangioma. Question is most appropriate next step in evaluation
- a. CBC with Diff
  - b. Reassurance
  - c. MRI of spine
  - d. Head CT
  - e. Administer Intralesional steroids

**Answer is c**

55. Vignette describes patient with Werdnig-Hoffman's disease. Question is what is the underlying pathophysiology.
- a. Blocked pre-synaptic response
  - b. Blocked re-uptake of post synaptic neurotransmitters
  - c. Chronic inflammation of anterior horn cells
  - d. Degeneration of anterior horn cells
  - e. Degeneration of proximal skeletal muscles

**Answer is d**

56. Vignette describes a child in school with a blank stare and lip movement during stare. Question is most likely diagnosis.
- a. Normal variance
  - b. Complex partial seizure
  - c. Absence seizure
  - d. Atypical febrile seizure
  - e. Lennox gestaut syndrome

**Answer is b**

57. Vignette describes a 15 month old child with pneumococcal meningitis. Question is what is the best empiric antibiotic or combo.

- a. IV cefotaxime and vancomycin.
- b. IV ampicillin and gentamycin
- c. IV clindamycin and vancomycin
- d. IV clindamycin and gentamycin
- e. IV Azithromycin and ceftriaxone

**Answer is a**

58. Vignette describes a patient with conductive hearing loss that persists even after tympanostomy tube placement. Question is most common cause of conductive hearing loss.
- a. Acute otitis media
  - b. Otitis media with effusion
  - c. Cholesteatoma
  - d. Water in ears post swimming
  - e. Cerumen impaction

**Answer is e**

59. Vignette describes respiratory distress in a 31 weeker, after mother had 4 weeks of PROM and baby has developed bilateral pneumothoraces secondary to manual ventilation. Question is what is the reason why this happened?
- a. Bronchopulmonary dysplasia
  - b. Surfactant deficiency
  - c. Pulmonary hypoplasia
  - d. Congenital pneumonia
  - e. Missed Meconium aspiration

**Answer is c**

60. Vignette describes a 4 year old boy who ingested castor bean. Question is most likely symptom to expect. Within 24 hours.
- a. A rash
  - b. Vomiting
  - c. Increased sleepiness
  - d. Arrhythmia
  - e. Seizure

**Answer is b**

61. Vignette describes a 3 year old boy with seizure disorder on a ketogenic diet. He is having abdominal discomfort with a normal KUB, CMP and urinalysis. Question is what additional medication is needed.
- a. Pottasium citrate
  - b. Ibuprofen
  - c. Sodium docusate
  - d. Ranitidine
  - e. Sucralfate

**Answer is a**

62. Vignette describes a critically ill 7 year old patient with EKG revealing SVT. Question is next best initial step in management.
- a. Ice to face
  - b. DC cardioversion
  - c. IV amiodarone
  - d. IV adenosine with saline flush slowly
  - e. Perform bilateral carotid massage

**Answer is b**

63. Question describes positive ortolani in a 2 month old female. Question is most appropriate next step in evaluation-
- a. X-ray of hip
  - b. Refer to orthopedic
  - c. Ultrasound of hip
  - d. Refer to surgery
  - e. Attempt pavlik harness

**Answer is c**

64. Vignette describes a 9 month old status post admission, bowel rest and IVF for acute gastroenteritis with recurrence of diarrhea at home after reintroducing his regular formula, cereal and fruit juices. Question is best initial step in management.

- a. Stop all juices temporarily and resume once diarrhea resolves
- b. Give gluten and casein free milk until diarrhea resolves
- c. Change to a lactose free formula
- d. Limit milk intake to 24 ounces a day
- e. Prescribe an antispasmodic temporarily

**Answer is c**

65. Vignette describes patient with symptoms and signs consistent with nurse maid's elbow. Mechanism of injury fits the diagnosis. Question is which of the following is correct.
- a. Reduction using hyperpronation technique is indicated next
  - b. X-ray the involved extremity then reduce next if no displaced fractures
  - c. Reduction by hypersupination technique is indicated next
  - d. Open reduction is indicated if patient doesn't use hand after manual reduction
  - e. Abuse should be suspected if mother accuses father openly of always picking the patient up by the hand.

**Answer is a**

66. Lateral x-ray of neck shows widening of prevertebral space (no additional history). Question is most likely diagnosis.
- a. Subarachnoid hemorrhage
  - b. Peritonsillar abscess
  - c. Retropharyngeal abscess
  - d. Epiglottitis
  - e. Vertebral abscess

**Answer is c**

67. You suspect retropharyngeal abscess in an 8 year old with high fevers, neck stiffness, central uvula, normal oral exam and CSF findings. Lateral neck x-ray appears to be taking of patient with head in neutral position reveals normal prevertebral space. Question is most appropriate next step.
- a. Reassure parents

- b. MRI of the neck
- c. Repeat x-ray with an AP view
- d. Repeat x-ray with neck hyperextended and on end inspiration
- e. Treat empirically as meningitis until CSF cultures are known

**Answer is d**

68. Vignette describes a 9 year old boy with supracondylar fracture of the humerus. Question is earliest sign of compartment syndrome.
- a. Pain on passive extension of finger
  - b. Diminished radial pulse
  - c. Pallor in the distal digits
  - d. Loss of distal sensation to touch
  - e. Pain proximal to fracture site

**Answer is a**

69. Breast abscess, Right sided, develops in a breast feeding mom. Question is what NOT to advice.
- a. Continue breast feeding from the left breast
  - b. Continue breast feeding from the right breast
  - c. Stop breast feeding from right breast
  - d. Express breast milk if discomfort or engorgement is experienced from the right breast
  - e. Continue clindamycin while breast feeding

**Answer is c**

70. Vignette describes SLE female patient on NSAIDs. Patient has increasing ANA titers and decreasing complements c3 and c4. Question is most appropriate next test in evaluation.
- a. BMP
  - b. Renal USS
  - c. Renal biopsy
  - d. Repeat ANA titers
  - e. Urinalysis

**Answer is e**

71. Vignette describes patient with egg allergy. Question is which vaccine not to give
- a. Measles
  - b. Rubella
  - c. IPV
  - d. Influenza
  - e. Pertusis

**Answer is d**

72. Your clinic currently has influenza vaccine in short supply. Question is who amongst the following needs it most.
- a. 15 year old with asthma
  - b. 7 month old ex 28 week primip with hemoglobin SC disease
  - c. 4 month old infant with alpha thalassemia minor
  - d. 7 year old with history of allergies but mom isn't sure what she is allergic to
  - e. 4 year old with history of wheeze whose mom is refusing the flu shot because she says "it always makes her sick"

**Answer is a**

73. Vignette lists a group of patients and question is who amongst them shouldn't get the measles vaccine
- a. 5 year old female with 10 colds in the past 12 months
  - b. 6 year old recent immigrant from Nigeria with no prior infection or record of shot
  - c. 4 year old with a history of prior local reaction to MMR at shot site
  - d. 5 year old with fever of 100.4 degree F and coughing with congestion that started 4 days ago.
  - e. 7 year old who received IVIG 3 weeks ago

**Answer is e**

74. Vignette describes a patient with stridor and direct visualization showing adduction of the cord. Question is most likely cause of stridor.

- a. Vocal cord dysfunction
- b. Vocal cord paralysis
- c. Vocal cord cyst
- d. Vocal cord stenosis
- e. Vocal cord hyperplasia

**Answer is a**

75. Inversion injury described in a 16 year old basketballer with pain and swelling over involved ankle. The X-ray is inconclusive. You are awaiting a final read from the radiologist. Question is what is your greatest concern?
- a. Medial malleolus fracture
  - b. Ligament injury
  - c. Lateral malleolus fracture
  - d. Distal fibular fracture
  - e. Dislocation of the distal talo-fibula joint

**Answer is c**

76. Vignette describes progressive lower extremity weakness in a patient with ptosis. Question is best test to help in diagnosis.
- a. Stool toxin assay
  - b. MRI of spine
  - c. Electromyography
  - d. Edrophonium test
  - e. Lumbar puncture

**Answer is d**

77. Vignette describes an infant of diabetic mom with no stools in 48hrs. X-ray shows colon distension and air fluid levels. Vital signs are normal. Question is most likely diagnosis.
- a. Impeforate anus
  - b. Ileal atresia
  - c. Hirschsprung disease
  - d. Meconium plug
  - e. Meconium ileus

**Answer is d**

78. Acquired muscle disease is characterized by which of the following.
- Muscle pain
  - Muscle spasm
  - Muscle twitching
  - Weakness
  - Excessive tone

**Answer is a**

79. Vignette describes an 8 week old infant with “constipation” whose mom has been giving him fleet Phosphate enemas. Question is patient is at risk of having what.
- Seizures
  - Increased sweating
  - Bradycardia
  - Short QT interval on EKG
  - Worsening of the constipation

**Answer is a**

80. Vignette describes a small for gestational age infant with tachycardia and tachypnea. Question is most likely cause of symptoms.
- Polycythemia
  - Hypoglycemia
  - Labetalol
  - Maternal synthroid intake
  - Hypercalcemia

**Answer is b**

81. A mother is concerned about delayed separation of cord x 6 weeks. You ordered a CBC with diff. Question is most likely associated finding.
- Low platelets
  - High platelets
  - Polycythemia

- d. Elevated WBC
- e. Macrocytosis and hypochromia

**Answer is d**

82. Chest X-ray of infant in respiratory distress with ET tube in right main bronchus. Tube pulled up and x-ray retaken and tube is still below carina. Infant with respiratory distress. Question is most likely cause of respiratory distress in this infant.
- a. ETT in right main bronchus
  - b. Equipment failure
  - c. Tube obstruction
  - d. Pneumothorax
  - e. Normal variant as respiratory distress will resolve within the next 5 minutes

**Answer is a**

83. Ex 35 weeker, 3 week old with poor oral intake and abdominal distension. Pneumatosis intestinalis on KUB and slight decrease in MAP. Patient is NPO, NG decompression done and IVF began. Question is what next
- a. Obtain Upper GI series
  - b. Initiate empiric parenteral antibiotics
  - c. Consult surgery
  - d. Consult GI
  - e. Obtain stool for occult blood

**Answer is b**

84. 5 year old female not immunized with symptoms and signs of sepsis, confluent petechial rash on extremity and low blood pressure. Question is what is best next step in management

- a. Obtain a blood culture
- b. Obtain a stat ABG
- c. Obtain Urinalysis
- d. Obtain Urine culture
- e. Obtain platelet count

**Answer is b**

85. Mother brings child to ED because Ixodes tick was found on the skin of her 3 year old daughter. The tick was removed 18 hours ago and she is asymptomatic. Question is what next.
- a. No intervention
  - b. Begin oral doxycycline
  - c. Refer to Infectious disease
  - d. Draw lymes serology
  - e. Observe in ED for six more hours

**Answer is a**

86. Vignette describes cyanosis in a 4 year old autistic boy that occasionally eats dirt and drinks well water. Parents live on a farm and his mother has type 2 diabetes. Pulse oximetry and venous blood gas findings are normal. Question is most likely cause of cyanosis.
- a. Accidental ingestion of mom's metformin
  - b. Accidental ingestion of mom's sucralfate
  - c. Lead in sand
  - d. Nitrites in well water
  - e. Early onset type 1 DM

**Answer is d**

87. SCID diagnosed in a 4 month old infant. Question is best initial step in management.
- a. IVIG
  - b. Prophylactic antibiotics
  - c. Initiate treatment with antifungal, antibiotic and interferon gamma
  - d. Bone marrow transplant
  - e. Thymic transplant

**Answer is d**

88. You are told a patient has recurrent and resistant candida (Picture shown). Question is which cell is deficient
- a. B-cell
  - b. T cell
  - c. B and T cell
  - d. Phagocytes
  - e. Complements c3 and c4

**Answer is b**

89. Sprengel deformity shown (you aren't told it is sprengel). Question is most likely association
- a. Marfans syndrome
  - b. Scheuermann's disease
  - c. Klippel feil syndrome
  - d. Adolescent with bad posturing
  - e. Neurofibromatosis

**Answer is c**

90. Vignette describes a 16 year old non sexually active female with primary amenorrhea, no breast and short stature. Question is most appropriate next step in evaluation.
- a. Progesteron challenge
  - b. Obtain a testosterone assay
  - c. Obtain a pregnancy test
  - d. Obtain a karyotype

- e. Obtain thyroid function panel and prolactin assay

**Answer is d**

91. 13 year old sexually active female presenting with a three month history of infrequent menstrual bleeding. Menarche was just before her 12<sup>th</sup> birthday and since then she has developed normally with age appropriate SMR, weight and height.. Hemoglobin 12mg/dl and no orthostatic changes. Question is most appropriate next step in the management.
- a. Reassurance
  - b. Begin iron supplements
  - c. Begin OCPs
  - d. Obtain urine for beta HCG
  - e. Refer to gynecology

**Answer is a**

92. Vignette describes a patient with hyponatremia and labs showing high urine sodium, total cholesterol of 120 mg/dl and high urine osmolarity. Question is lab findings are consistent with what.
- a. SIADH
  - b. Water Intoxication
  - c. Cerebral salt wasting
  - d. Diabetes insipidus
  - e. Pseudohyponatremia

**Answer is a**

93. The following are risk factors of SIDS except
- a. Unemployment
  - b. Maternal obesity
  - c. Prone sleeping
  - d. Native American
  - e. High maternal parity

**Answer is b**

94. Vignette describes a subdued child with fast breathing and labs consistent with increased anion gap metabolic acidosis. Question is excessive ingestion of what is most likely responsible for the findings.
- a. Acetaminophen
  - b. Antacids
  - c. Frusemide
  - d. Methylprednisolone
  - e. Iron

**Answer is e**

95. You are asked what the most likely etiologic agent for chronic suppurative otitis media is.
- a. Pseudomonas. A
  - b. Staph. A
  - c. Strep. P
  - d. Hemophilus Influenzae type B
  - e. Moraxella. M

**Answer is a**

96. Vignette describes a young lady with symptoms of pregnancy and two negative home urine pregnancy tests. LMP was 5 weeks ago. Question is most appropriate next step.
- a. Reassurance
  - b. Psych referral
  - c. Abdominal Ultrasound
  - d. Serum Beta HCG
  - e. Thyroid function and prolactin assay

**Answer is d**

97. Photo shown of a dry scaly and erythematous lesion around a ear stud. Question is mechanism of reaction.
- a. Type I hypersensitivity reaction
  - b. Type II hypersensitivity reaction
  - c. Type III hypersensitivity reaction

- d. Type IV hypersensitivity reaction
- e. Toxin mediated

**Answer is d**

98. Vignette describes a patient with a history of seizure disorder on various antiseizure meds. Mom has noticed he has become a bit hyperactive of recent and wonders which of his medications can cause this. Question is what is responsible.

- a. Ethosuximide
- b. Phenobarb
- c. Levetiracetam
- d. Topiramate
- e. Felbamate

**Answer is b**

99. Vignette describes a patient with acute abdominal pain on asparaginase. Question is best initial test that aids the diagnosis.

- a. CBC with diff
- b. Hydrogen breath test
- c. Stool for occult blood
- d. CT abdomen
- e. Serum amylase and lipase

**Answer is e**

100. Mother with breast cancer is requesting that her 9 year old daughter be tested for BRC 1 gene. Question is the most appropriate response to the mom.

- a. Sure, why not
- b. Wait until child grows up and then we can determine if test needs to be done or not
- c. You are a breast cancer survivor, there is absolutely nothing to worry about
- d. Your daughter will need to consent to this
- e. The test is not sensitive or specific enough to tell anything at her age

**Answer is b**

101. Vignette describes female with anorexia nervosa. Question is additional finding consistent with the diagnosis.
- a. Erosion of the dental enamel
  - b. Hypokalemic hypochloremic respiratory alkalosis
  - c. Parotid enlargement
  - d. Hypokalemic hyperchloremic metabolic alkalosis
  - e. Low estradiol

**Answer is e**

102. Patient with acute gastroenteritis status post admission for associated moderate dehydration. Vomiting has stopped but patient is still having residual diarrhea that appears to be resolving. Question is the best advice for diet is.
- a. Give regular diet
  - b. Give the BRAT diet for the next 48 hours then begin regular diet as soon as diarrhea stops
  - c. Give regular diet but avoid milk and juice at least until diarrhea stops
  - d. Sprinke a sachet of pre and probiotic tablets in gluten free-lactose free food until diarrhea stops then advance to regular diet
  - e. Give pedialyte or Gatorade only for the next 12 hours in small frequent amounts then advance diet as tolerated afterwards

**Answer is a**

103. Growth chart of five different kids at five different points shown. Question is to identify the kid at risk for overweight.
- a. Kid at point between the 80<sup>th</sup> and 90<sup>th</sup> percentile
  - b. Kid at point above the 90<sup>th</sup> percentile
  - c. Kid at point between the 85<sup>th</sup> and 95<sup>th</sup> percentile
  - d. Kid at point above the 95<sup>th</sup> percentile
  - e. Kid at point between the 75<sup>th</sup> and 85<sup>th</sup> percentile

**Answer is c**

104. Growth chart shown of a 12 year old obese male with weight at the 95<sup>th</sup> percentile for age. Question is best evidence the cause of his obesity is NOT endocrine.
- a. Coarse facies present
  - b. Height at 98<sup>th</sup> percentile for age
  - c. SMR 4 for phallic development
  - d. Both of his parents are tall
  - e. No family history of thyroid disease

**Answer is b**

105. Least likely cause for failure to thrive amongst the following is.
- a. Achondroplasia
  - b. VATER Syndrome
  - c. Celiac disease
  - d. Cystic fibrosis
  - e. Emotional deprivation

**Answer is a**

106. Vignette describes a 7 year old well appearing boy in the ER with ALL, fever and neutropenia with a central line in place. He is on chemotherapy. Question is most appropriate empiric antibiotic therapy.
- a. Vancomycin and gentamycin
  - b. Ancef and gentamycin
  - c. Cefotaxime
  - d. Ciprofloxacin
  - e. Ceftazidime

**Answer is e**

107. Ill appearing 2 year old female with unexplained fever. Physical examination is unremarkable. Question is most appropriate next step
- a. Draw CBC with diff
  - b. Obtain a start ABG
  - c. Obtain a CRP
  - d. Obtain a suprapubic urine aspiration for analysis and culture

- e. Reassure parents that it is most likely viral and advice on alternating antipyretics

**Answer is d**

108. 15 year old female with exudative pharyngitis and hepatomegaly. Work up reveals a negative rapid strep test and two negative monospot tests. Throat culture is pending. Question is most likely diagnosis.

- a. Group A strep
- b. EBV
- c. CMV
- d. Adenovirus
- e. Group C strep

**Answer is c**

109. Diffuse calcifications in brain matter, macrocephaly and hepatosplenomegaly described in a 2 week infant. Question is best test for diagnosis.

- a. Urine culture
- b. CSF for PCR
- c. Throat culture
- d. Diagnosis is clinical
- e. Positive T. gondi IgG

**Answer is b**

110. Mild persistent asthma described in a 7 year old on intermittent albuterol nebs at home. Patient has an action plan, is compliant with home medication. Question is most appropriate best step in management.

- a. Begin high dose ICS
- b. Switch to metered dose inhaler and teach technique of use
- c. Begin medium dose inhaled corticosteroid and add a daily antihistamine to his regimen
- d. Begin a leukotriene modifier
- e. Begin low dose ICS

**Answer is e**

111. Vignette describes 10 year old girl presenting with a 3 day history of gait problems back pain and falling while walking. Mom says she had a tick on her yesterday that was removed immediately. MRI of head and spine and physical exam are normal. Question is most likely diagnosis.
- a. Conversion disorder
  - b. Transverse myelitis
  - c. Hypochondriasis
  - d. Hereditary sensorimotor neuropathy
  - e. Early onset Tick paralysis

**Answer is a**

112. PAP smear result of a 16 year old sexually active female reveals low-grade squamous intraepithelial lesion. Question is most appropriate next step in management.
- a. Ablative therapy
  - b. Reassurance
  - c. Repeat Pap in 6 months
  - d. Colposcopy
  - e. Repeat pap in 2 years and advice to abstain from unprotected sex until then

**Answer is c**

113. Congenital diaphragmatic hernia is described. Question is most important intervention to reduce mortality.
- a. Administration of nitric oxide as soon as possible
  - b. Intubation as soon as possible
  - c. Initiating antibiotic coverage for group B strep as soon as possible
  - d. Transfer to a center with ECMO
  - e. Orogastric tube decompression as soon as possible

**Answer is e**

114. X-ray of long bones in lower extremity showing lead lines. Question is most likely underlying pathophysiology.
- a. Abnormal deposition of lead in the distal metaphysis
  - b. Abnormal calcium deposition at the distal metaphysis
  - c. Increase resorption of calcium from the distal metaphysis
  - d. Abnormal growth of medial aspect of proximal tibia
  - e. None of the above

**Answer is b**

115. The following are true of mental retardation except.
- a. Mild MR with an IQ of 75 can live independently
  - b. Mild MR with an IQ of 65 have a potential to read and write up to the 6<sup>th</sup> grade
  - c. Moderate MR with an IQ of 40 may attain an ability to dress self
  - d. Severe MR with an IQ of 25 can be toilet trained
  - e. Profound MR with an IQ of 15 have no academic potential

**Answer is b**

116. Vignette describes a patient with UTI and increased urine Ph. Question is most likely etiologic organism.
- a. Proteus
  - b. Staph. saprophyticus
  - c. E. Coli
  - d. Pseudomonas
  - e. Enterococci

**Answer is a**

117. Vignette describes a newborn with abdominal mass. Question is most common kidney mass in newborn.
- a. AR polycystic kidney disease
  - b. Nephroblastoma
  - c. Renal granuloma

- d. Multicystic kidney
- e. Nephronophthisis

**Answer is d**

118. Vignette with diagram of different parts of the nephron labeled A through E. Question is where does spironolactone act?

- a. Thick ascending loop
- b. Proximal convoluted tubule
- c. Distal convoluted tubule
- d. Collecting duct
- e. Bowman's capsule

**Answer is d**

119. Most important stimulant for ADH release.

- a. Hypovolemia
- b. Hyponatremia
- c. Hypervolemia
- d. Increase intracranial pressure
- e. Hypernatremia

**Answer is a**

120. 17 year old female with dysuria and increase frequency of urination, seen 2 days ago in the ER and seeing you for follow up today. Physical examination today and 2 days ago is normal and clean catch urinalysis done prior to bactrim prescription 2 days ago reveals pyuria but no growth on culture. Question is most likely causative organism of her symptoms.

- a. E. Coli
- b. Staph saprophyticus
- c. Chlamydia trachomatis
- d. N. gonorrhoea
- e. Proteus. M

**Answer is c**

121. Vignette describes a child who has been vomiting. Question is high levels of which of the following suggests that child has been fasting.

- a. Urine ketones
- b. Urine urobilinogens
- c. Urine glucose
- d. Urine sodium
- e. Urine protein

**Answer is a**

122. Vignette describes a family planning a camping trip. Question is best advice to give to campers to avoid diarrhea.

- a. Drink only from fast flowing streams
- b. Drink only from stagnant streams
- c. Sterilize containers for drinking
- d. Drink from any source as long as flagyl is taken prior
- e. Bring bottled water from a trusted source

**Answer is e**

123. Obese child seeing you for sports physical. Question is most important advice to give.

- a. Play for 30 minutes at a time with compulsory breaks inbetween
- b. Avoid contact sports
- c. Use protective gear when available
- d. keep drinking to maintain hydration
- e. Monitor glucose intermittently during and then 30 minutes after sports

**Answer is d**

124. Vignette describes a 12 year old female with sickle cell HBSC disease seeing you for sports physical . She plays soft ball. Hemoglobin is 11.9 g/dl. Question is best advice to give.

- a. Only low intensity sports are permitted
- b. Avoid dehydration
- c. Use sun screen with an SPF of at least 30

- d. Avoid drinking energy drinks prior to sports
- e. Do not play any sports until hemoglobin is at least  $> 12$  g/dl

**Answer is b**

125. Vignette describes a toddler being seen for routine physical. There is a pool in the home. Question is best advice for parents to prevent drowning.

- a. Ensure the pool depth is  $\leq 3$  feet
- b. Build a fence around the pool
- c. Ensure floaters are available for use
- d. Keep house doors locked always
- e. Keep toddler in play pen when busy

**Answer is b**

126. Vignette describes a hospital where medical errors are not being reported as they happen- Question is the best possible long term solution.

- a. Perform periodic peer and chart reviews
- b. Parental reporting of errors as they note them
- c. Immediate adoption of EMR
- d. Withhold the salaries of the usual culprits
- e. Amend hospital policy to include a zero tolerance for failed reporting

**Answer is a**

127. You have started the child on IV rehydration for a child with acute gastroenteritis, and asked for BMP. As you are in a hurry, you forgot to check the BMP and later it was noticed that sodium is 128. Question is what is this called.

- a. Systematic error
- b. Corporal event
- c. Sentinel event
- d. Distinguished event
- e. Aberral event

**Answer is c**

128. A nurse has given a sedating agent inadvertently, child is intubated and supported and now doing fine. Question is what is the next best step?
- a. Inform hospital ethic board at the next meeting
  - b. Inform your supervisor before the patient is discharged
  - c. Document it but don't say anything since the patient is fine
  - d. Have the nurse inform and apologize to the parents since she did it
  - e. Inform parents as soon as possible and apologize

**Answer is e**

129. 12 year old boy treated with 1.2 mega units of bicillin LA intramuscularly 3 weeks ago for culture positive GAS pharyngitis. Today his throat culture is positive for GAS. Question is most appropriate antimicrobial therapy indicated.

- a. Azithromycin
- b. Clindamycin
- c. Amoxicillin
- d. Cefdinir
- e. Chloramphenicol

**Answer is b**

130. You note Insulin dosage errors are increasing in your hospital. Question is what is the best possible method to avoid them?
- a. Change insulin vendors and contract with one that supplies more user friendly insulin vials
  - b. Arrange for independent and separate dose calculation
  - c. Arrange for independent review of the pharmacy
  - d. Identify responsible nurses and arrange for a remedial training
  - e. Identify responsible MDs and arrange place on probation

**Answer is b**

131. Amongst the following, which will best prevent drug dosing errors?
- a. Allow parent to ask the purpose of each and every medication while it is administered to the child
  - b. Use of calculators

- c. Having a pharmacy assist in inpatient medication review
- d. Having less than 2 adults in an outpatient room permitted to ask questions
- e. Having a CAN assist a LPN while medications are administered

**Answer is a**

132. Vignette describes a patient with Myocarditis. Question is most likely cause.

- a. Enterovirus
- b. RSV
- c. Mycoplasma
- d. Hemophilus influenza B
- e. Strep. Pneumo

**Answer is a**

133. Vignette describes a 3 week old infant with history of conjunctivitis presenting with tachypnea. X-ray is consistent with pneumonia. Question is antibiotic of choice.

- a. Ampicillin and Cefotaxime
- b. Ampicillin and Gentamycin
- c. Ampicillin
- d. Erythromycin
- e. Gentamycin

**Answer is d**

134. Vignette describes an outbreak of folliculitis in a community that recently opened a public swimming pool. Question is most likely organism responsible.

- a. Clostridium
- b. Pseudomonas
- c. Staph. A
- d. Group C strep
- e. Cryptococcus. N

**Answer is b**

135. Cat scratch disease described. Question is which of the following antibiotics will reduce the time of lymph node swelling?

- a. Azithromycin
- b. Ceftriaxone
- c. Amoxicillin/clavulanate
- d. Doxycycline
- e. Clindamycin

**Answer is a**

136. Macrocytosis is associated with the following except.

- a. Folate deficiency
- b. Anemia of chronic disease
- c. Bone marrow failure
- d. Hypothyroidism
- e. Vitamin B12 deficiency

**Answer is b**

137. Vignette describes a 2 year old male with right forefoot adducted medially. The right hind foot is normal. Question is most likely cause.

- a. Talipes quino varus deformity
- b. Metatarsus adductus
- c. Medial tibial torsion
- d. Medial femoral torsion
- e. Genu varum deformity

**Answer is c**

138. Which of the following fractures is least suggestive of child abuse?

- a. 9 month old female whose mom reports she fell while playing in her play pen with a transverse femoral fracture
- b. 18 month old with posterior rib fractures dad attributes to his falling off a bed 1 week ago
- c. 5 year old with fractures in different stages of healing
- d. 9 year old with bilateral hind foot fracture he reports he sustained when he jumped off the balcony of a 2 story building

- e. 4 year old with spiral fracture of the right proximal tibial metaphysis. Dad reports that the television fell on him.

**Answer is d**

139. Vignette describes typical Kawasaki in a 4 year old asian female. Question is which of the following increases her risk of developing coronary artery aneurysm?

- a. Her age
- b. Presence of conjunctival injection 2 weeks after onset of symptoms
- c. Her gender
- d. Persistence of thrombocytosis up to 2 weeks from onset of symptoms
- e. Cardiomegaly

**Answer is e**

140. Which of the following is most concerning about a 2 year olds development?

- a. Inability to copy a circle
- b. Ignoring his 6 month old brother as if he does not exist
- c. Inability to walk up and down stairs
- d. Alternating feet one at a time while climbing stairs
- e. Inability to count to 4

**Answer is b**

141. You diagnose GAS pharyngitis in a 6 year old boy in early spring. Your nurse has read it is self limiting and wants to know why it is treated. Question is which of the following is the least reason to treat GAS pharyngitis with antibiotics?

- a. Treatment reduces transmission of disease
- b. Treatment decreases duration of symptoms
- c. Treatment started within 2 weeks of onset prevents acute rheumatic fever
- d. Treatment reduces the likelihood of suppurative complications
- e. All of the above are valid reasons to treat

**Answer is c**

142. Vignette describes patient with retropharyngeal abscess. Lateral neck x-ray shown. Question is which of the following signs in this patient when present indicates impending respiratory failure?

- a. Sorethroat
- b. Cyanosis
- c. Tachypnea
- d. Neck stiffness
- e. Stridor

**Answer is b**

143. 4 month old with congestion, rhinorrhea, retractions and wheezing. Chest x-ray reveals hyperinflation and increased peribronchial markings. Patient is unresponsive to albuterol nebs and RSV screen is negative. Question is most likely cause of symptoms.

- a. Strep Pneumo
- b. Human metapneumovirus
- c. Rhinovirus
- d. Adenovirus
- e. RSV

**Answer is b**

144. Which of the following is a criteria required to make the diagnosis of ADHD.

- a. Symptom duration for at least 6 weeks
- b. Age of onset < 3 years
- c. Occurrence of symptoms in at least in 2 different settings
- d. Report of symptoms by the teacher
- e. Clinical symptoms of ADHD correlating with CT scan findings

**Answer is c**

145. ADHD was diagnosed and child was started on stimulant medication, he improved in attention but has developed tics. Question is what do you do next.

- a. Begin haloperidol
- b. Stop the stimulant temporarily
- c. Decrease the stimulant dose
- d. Change to a non stimulant
- e. Do nothing

**Answer is e**

146. Medication compliance of the patient under the age of 12 years is best when.

- a. The patient and physician rapport is good
- b. The patient is complimented at the end of each visit
- c. An incentive is used
- d. The parents are involved in overseeing the administration
- e. The patient is reminded of the potential deleterious effects of noncompliance

**Answer is a**

147. Newborn baby treated with prostaglandin for a ductal dependent heart lesion. Question is most likely adverse effect of prostaglandin amongst the options listed below.

- a. Cyanosis
- b. Diarrhea
- c. Rash
- d. Intestinal ischemia
- e. Death

**Answer is d**

148. Vignette describes patient with peritonsillar abscess. Question is best modality for diagnosis.

- a. Diagnosis is clinical
- b. Contrast enhanced CT
- c. Lateral neck radiograph with neck fully extended
- d. Percutaneous ultrasound
- e. Throat culture

**Answer is b**

149. Vignette describes a patient with eating disorder. Question is which of the following is likely to follow refeeding-

- a. Hypokalemia
- b. Hypercalcemia
- c. Hypophosphatemia
- d. Hypermagnesemia
- e. Hyperphosphatemia

**Answer is c**

150. The following are neuromuscular causes of ptosis except.

- a. Chronic progressive external ophthalmoplegia
- b. Vincristine
- c. Duchennes muscular dystrophy
- d. Tick paralysis
- e. Diphtheria

**Answer is c**

151. The following symptoms are common to both retropharyngeal abscess and peritonsillar abscess except.

- a. Fever
- b. Sorethroat
- c. Dysphagia
- d. Drooling
- e. Cervical lymphadenopathy

**Answer is e**

152. Vignette describes septic arthritis in a 5 year old 24 hours after onset of symptoms. Question is best modality for diagnosis.

- a. Synovial fluid culture
- b. Blood culture

- c. Plain radiograph
- d. Ultrasound
- e. MRI

**Answer is a**

153. Vignette describes acute chest pain in a 7 year old boy which is worse with breathing and there is positive family history of father who had angioplasty at 46. The pain is central but not reproducible, vital signs are normal and an EKG is normal. Question is what next.

- a. Reassurance
- b. Obtain cardiac enzymes
- c. Obtain a chest x-ray
- d. Do a trial of albuterol
- e. Refer to psych

**Answer is a**

154. Photo showing exudative pharyngitis and conjunctivitis. Question is most likely causative organism.

- a. Rhinovirus
- b. Group A strep
- c. Group B strep
- d. Strep pneumo
- e. Adenovirus

**Answer is e**

155. 11 month old boy with ALL in early remission exposed within 36 hours to varicella. Question is what patient should receive within the next 36 hours.

- a. Varicella vaccine and varicella Immunoglobulin
- b. Varicella Immunoglobulin
- c. IV acyclovir
- d. Nothing
- e. Varicella vaccine only

**Answer is b**

156. Koebner 's phenomenon was described. Question is to identify type of reaction.

- a. Isomorphic reaction
- b. Idiosyncratic reaction
- c. Polymorphous reaction
- d. Hypersensitivity reaction
- e. Biomorphic reaction

**Answer is a**

157. Cephalosporin was started for an infection and 10 days later patient developed a generalized rash and arthralgia. Question is to identify type of reaction.

- a. Hypersensitivity reaction type I
- b. Hypersensitivity reaction type II
- c. Hypersensitivity reaction type III
- d. Hypersensitivity reaction type IV
- e. Biomorphic reaction

**Answer is c**

158. Parents of a 16 month old twin B are concerned that she is yet to sit up without support compared to her twin A male. No issues at birth, both AGA and 33 weeks GA. Question is most common cause of gross motor delay.

- a. Cerebral palsy
- b. Mental retardation
- c. Myopathy
- d. Normal variation
- e. Muscular dystrophy

**Answer is d**

159. Mom concerned about her 24 month old's inability to make believe play. He is playing with a doll appropriately and is not easily distracted by you the examiner. Question is what next.

- a. Screen for autism

- b. Perform a hearing test
- c. Reassure mom that she should achieve this by her next visit
- d. Reassure mom that she would achieve this when she turns 5 years old
- e. Refer to ophthalmology

**Answer is c**

160. The most ethical reason to reject participation in a study in which participation of an adolescents is required is.

- a. There is no consent from both parents to participate
- b. There is no treatment for the disease being studied
- c. There is no benefit to the parents
- d. Incentive is given to the parent and not the participating adolescent
- e. The adolescent attends school

**Answer is b**

161. Vignette describes a patient with rare but fatal disease. His parents are contemplating signing consent for participation in a study and are seeking your advice. Question is best advice for parents regarding patient's participation.

- a. It is a good idea if benefits outweighs the risk of participation
- b. It's a great opportunity considering the possibility of cure
- c. It's a great idea considering its free
- d. It's a great idea considering he will be contributing to society in his final days
- e. He has nothing to lose, go for it

**Answer is a**

162. Vignette describes a previously dry 5 year old male who over the past 6-8 months continues to wet his bed at night almost every day. His sister got bladder control at 3. Question is best next step.

- a. Obtain a urinalysis
- b. Prescribe DDAVP
- c. Screen for depression
- d. Restart diapers at night only
- e. Reassurance

**Answer is e**

163. Vignette describes a 6 week old male child with persistent vomiting after each feed. Question is what additional history helps with the diagnosis.
- a. Presence of prenatal Polyhydramnios on ultrasound
  - b. Type of vomiting and content of vomitus
  - c. Frequency of bowel movement
  - d. History of reflux
  - e. Type of formula

**Answer is b**

164. Vignette describes a 5 year old child with mental retardation, short stature, brachydactyly, obesity and short neck. Accompanied by grandmom who says he has an appointment with an ophthalmologist next. Question is most likely additional finding.
- a. Hypophosphatemia
  - b. Almond eyes
  - c. Hyperphosphatemia
  - d. Elevated vitamin D3
  - e. Hypocalcaemia

**Answer is e**

165. 6 day old boy with vomiting and dehydration is noted to have hyperpigmented nipples. Work up reveals low sodium, high potassium and serum glucose of 125. Question is most likely associated finding.
- a. High bicarbonate
  - b. CNS trauma
  - c. Prolonged steroid use
  - d. Hypothalamic tumor
  - e. High urine sodium

**Answer is e**

166. Vignette describes individual in same room with bat and received rabies immunoglobulin and is receiving the vaccine series. Bat is captured 24 hours

after exposure and examination of its brain is negative for rabies. Question is what next.

- a. Complete the vaccine series
- b. Give rabies immunoglobulin one more time then discontinue the vaccine series
- c. Re-examine other organs for rabies in 9 days. In the meantime, continue the vaccine series
- d. Discontinue the vaccine series
- e. Complete the rabies immunoglobulin and vaccine series

**Answer is d**

167. Vignette describes an adolescent child who was hit on face with a base ball bat. Question is which of the following needs immediate referral to ENT.

- a. Septal hematoma
- b. Subluxed tooth
- c. Bleeding from the nose
- d. Hematemesis 6 hours later
- e. Headache 6 hours later

**Answer is a**

168. Vignette describes a patient admitted for croup. Question is which of the following is required as a precaution to prevent spread of disease by an attending physician examining patient.

- a. Gloves, face mask and hand washing
- b. Sterile gloves, N-95 mask and hand washing
- c. Gloves, gown and hand washing
- d. Face mask, gloves, gown and hand washing
- e. Hand washing only

**Answer is c**

169. Vignette describes 16 year old boy brought to ED by friends for fever, sweating and he is not acting like himself. He was at a party. Physical exam reveals pulse of 120bpm and Bp of 140/95. Question is most likely substance ingested.

- a. Heroin
- b. Marijuana
- c. Metamphetamine
- d. Fluoxetine
- e. Alcohol

**Answer is c**

170. Vignette describes a 6 year old boy with a rash that is itchy and been on and off for 6 months. Rash is described as clustered red papules some with central punctum all over body. Other family members have similar rash. Question is best additional question to aid in diagnosis.

- a. Did he travel to south America recently
- b. Is he up to date on his shots
- c. Is there a family history of eczema
- d. Does he have any pets
- e. Does he have a sorethroat

**Answer is d**

171. Same vignette above. Question is most likely diagnosis.

- a. Chaga's disease
- b. Chicken pox wild type
- c. Papular urticaria
- d. Papular eczema
- e. Gianotti-Crosti Syndrome

**Answer is c**

172. 3 year old bitten by a cat has fever, cellulitis and regional lymphadenopathy 30 hours after bite. Question is most appropriate antimicrobial.

- a. Amoxicillin
- b. Azithromycin
- c. Clindamycin
- d. Augmentin
- e. Doxycycline

**Answer is d**

173. You discharge a 3 day old term female neonate. Mom has questions about cord care. Question is best advice for mom.
- Clean cord with povidone-iodine twice to three times a day until cord falls off in 10-14 days
  - Keep cord dry by avoiding water during baths and use topical mupirocin bid for 2 weeks
  - Clean cord after each diaper change with isopropyl alcohol until cord falls off
  - Do nothing but ensure diapers are folded under cord
  - Clean cord with triple dye at least twice a week until it falls off

**Answer is c**

174. A school aged female is described with symptoms consistent with rhinitis and conjunctivitis. She stays indoors most of the time. Nasal smear is positive for eosinophils and skin test is positive for mold. Mom denies using any over the counter decongestants recently. Question is most likely diagnosis.
- Seasonal allergic rhinitis
  - Rhinitis medicamentosa
  - NARE
  - Perennial allergic rhinitis
  - Vasomotor rhinitis

**Answer is d**

175. Vignette describes 8 year old female with symptoms suggestive of recurrent rhinitis (itchy nose, congestion, sneezing). Skin test and nasal smear are negative. Question is most appropriate statement to make.
- Intranasal steroid is indicated
  - Avoid nasal decongestants
  - Avoid perfumes with strong smells
  - Anti-histamines may help
  - Remove the carpet in her room

**Answer is c**

176. Your clinic has a 50% immunization rate for kids <18 months. Question is, in order to improve Immunization, what is the best strategy?
- a. Have certified nurse assistants trained in administering shots if staff shortage exists
  - b. Review the immunization status of patients at every visit
  - c. Review the immunization status of patients during well child visits
  - d. Provide age appropriate vaccination materials to parents during each visit
  - e. Offer catch up immunizations to every child less than 18 months regardless of health status

**Answer is b**

177. Which of the following is least consistent with conduct disorder?
- a. Trauncy
  - b. Cruelty to animals
  - c. Stealing
  - d. Loss of temper
  - e. Setting fires

**Answer is d**

178. Vignette describes a 9 month old too big for his rare facing car sit. Question is what next.
- a. Get a convertible sit but still rare facing
  - b. Get a booster sit but still rare facing
  - c. Get a forward facing booster sit
  - d. Get a forward facing convertible sit
  - e. Have infant sit on an adult's lap in the back

**Answer is b**

179. Picture of pre-auricular pits shown and you are told this patient has some hearing loss. Question is most likely associated syndrome.

- a. Pendred syndrome
- b. Usher syndrome
- c. Brachio-oto-renal syndrome
- d. Senior Loken syndrome
- e. Drash syndrome

**Answer is c**

180. Vignette describes a frantic mom concerned about recurring headaches and abdominal pain in her 7 year old son that has necessitated multiple visits; work ups and missed school days. Mom is seeking evaluation of symptoms and a school excuse. Question is advice for mom.

- a. An MRI will definitely be reassuring and can put everyone's mind at ease
- b. Set strict expectations for school attendance
- c. Chewable vitamin C daily may be beneficial through its placebo effect
- d. Rechecking his stool for occult blood may be beneficial
- e. It is most likely viral and should self resolve

**Answer is b**

181. Picture of a 15 month old with blackish maxillary incisors and normal mandibular incisors. Question is best way to prevent this.

- a. Use of oral B and pediatric dental floss
- b. Avoidance of fluoride containing toothpaste
- c. Avoidance of candies
- d. Introducing the cup at 6-9 months
- e. No bottle in mouth overnight

**Answer is e**

182. Vignette describes infant with failure to thrive secondary to short bowel syndrome. Question is which of the following is most indicative of feeding intolerance in this patient?

- a. Presence of stool fecal fat
- b. Presence of renal calculi
- c. A stool PH of 0.60 percent
- d. Failure to gain weight

- e. Presence of macrocytic hyperchromic anemia

**Answer is c**

183. What is the earliest age at which a child is able to build 2 cubes, say 4 to 6 words with meaning and is able to follow a simple one step commands?
- a. 12 months
  - b. 15 months
  - c. 18 months
  - d. 21 months
  - e. 24 months

**Answer is b**

184. The following may cause exudative pharyngitis except.
- a. Mycoplasma
  - b. EBV
  - c. Group A strep
  - d. N. gonorrhoea
  - e. CMV

**Answer is a**

185. 4 year old male is admitted to ICU for surgery and suddenly he becomes more anxious and has night mares and also starts bedwetting- Question is which of the following explains this behavior.
- a. Surgery induced anxiety
  - b. Temperamental variation
  - c. Age expected regression
  - d. Age expected variation
  - e. Delirium tremens

**Answer is c**

186. You are reviewing a lipid panel screening result that reveals total cholesterol of 180 mg/dl, HDL of 48 mg/dl and a triglyceride of 140 mg/dl. Question is what is the estimated LDL level?

- a. 96 mg/dl
- b. 100 mg/dl
- c. 104 mg/dl
- d. 160 mg/dl
- e. 174 mg/dl

**Answer is c**

187. X-ray 2 views of lung abscess shown. It is small and non loculated. Question is best initial treatment.

- a. Surgical decortication
- b. Initiate appropriate antibiotics
- c. Consult surgery for I & D
- d. Thoracentesis and chest tube placement
- e. Do nothing as most self resolve

**Answer is b**

188. Vignette describes HUS in a 3 year old. Question is which of the following is not a consistent finding?

- a. Thrombocytopenia
- b. Hypoalbuminemia
- c. Peripheral smear revealing helmet cells and schistocytes
- d. Coombs positive microangiopathic hemolytic anemia
- e. Elevated creatinine

**Answer is d**

189. The following are live attenuated vaccines except.

- a. Measles vaccine
- b. Rotavirus vaccine
- c. Mumps vaccine
- d. Varicella vaccine
- e. Yellow fever vaccine

**Answer is e**

190. Vignette describes a school aged child who is not able to fall asleep until 11 pm. His parents put him to bed at 8 pm, but he does not fall asleep until 11 pm. Question is most likely cause
- a. Prolonged TV watching
  - b. Prolonged day time naps
  - c. Withdrawal effect of caffeine
  - d. Chronic Benadryl ingestion
  - e. Normal variation

**Answer is b**

191. Vignette describes female patient with amenorrhea, and known athlete/cross country runner, and above average student, and BMI <16. Question is a BMP is likely to reveal.
- a. Hypokalemic hyperchloremic metabolic alkalosis
  - b. Elevated BUN and creatinine
  - c. Hypokalemic hypochloremic metabolic alkalosis
  - d. Metabolic acidosis
  - e. Hypercalcemia

**Answer is c**

192. Cardiac infant on 20 calorie formula and vignette specifically states it is the recommended daily allowance but patient isn't gaining weight. Question is best initial step in management.
- a. Change to a 24 calorie formula
  - b. Change to a 30 calorie formula
  - c. Admit for NG tube feeding
  - d. Begin TPN
  - e. Observe parental interaction and feeding

**Answer is a**

193. Vignette describes a patient with suspected peptic ulcer disease. Question is which of the following is the strongest predictor of PUD.
- a. Presence of anorexia
  - b. Presence of hematemesis

- c. Nocturnal pain
- d. Family history of PUD
- e. Presence of hematochezia

**Answer is d**

194. Cessation of smoking is requested. Question is which drug is indicated

- a. Flouxetine
- b. Bupropion
- c. Trazodone
- d. Lithium
- e. Flexeril

**Answer is b**

195. A 16 year old rape victim is brought to the ER by her parents. Question is which of the following can be done without the consent of the patient or parents?

- a. Administer emergency birth control pill
- b. Inform her boy friend
- c. Inform the police.
- d. Obtain samples from her vagina
- e. Obtain a HIV test

**Answer is c**

196. An adolescent has come for an annual exam. She confesses to frequent marijuana use. She has no concerns and denies being sexually active. Question is what the next best step is.

- a. Inform parents
- b. Obtain a urine drug screen
- c. Obtain urine for GC/chlamydia
- d. Screen for hepatitis A
- e. Refer to a drug rehab program

**Answer is e**

197. Vignette describes adolescent male in SMR 4 with bilateral breast tenderness and swelling for 4 weeks. Question is most relevant additional history.

- a. Weight above the 95<sup>th</sup> percentile for age
- b. History of smoking cigarettes
- c. History of alcohol consumption
- d. History of illicit drug use
- e. History of consumption of energy drinks

**Answer is d**

198. Vignette describes bacterial vaginosis in an adolescent. Question is which of the following is a consistent finding.

- a. Dysuria
- b. Yellow frothy discharge
- c. KOH prep of discharge reveals numerous WBCs
- d. Vaginal PH of 4.1
- e. NaCl prep of discharge reveals few WBCs

**Answer is e**

199. Vignette describes a 12 year old female with precocious puberty and psychosocial and emotional issues with peers. Question is most appropriate next step.

- a. Behavioral counseling
- b. Reassurance
- c. Referral to a plastic surgeon
- d. Psychologic counseling
- e. Prescribe tamoxifen

**Answer is d**

200. Vignette describes hypernatremic dehydration in an infant of a primigravid mom. Question is most likely cause.

- a. Improperly mixed Formula.
- b. Excess spit ups
- c. Vomiting
- d. Use of modular formula

- e. Use of phosphate enemas for perceived constipation

**Answer is a**

201. Which of the following in a 2 year old male child is consistent with motor delay?
- a. Inability to walk upstairs
  - b. Inability to walk backwards
  - c. Inability to walk downstairs
  - d. Inability to skip
  - e. Inability to dance

**Answer is a**

202. Photograph of ash leaf spot shown. Question is best test to confirm diagnosis.
- a. Head CT
  - b. MRI of head
  - c. Wood light examination
  - d. Examination of the eyes
  - e. Diagnosis is clinical

**Answer is c**

203. Vignette describes parotid enlargement in a patient with alkalosis. Question is most likely diagnosis.
- a. Mumps
  - b. Achalasia
  - c. Bulimia
  - d. Parotitis secondary to stones
  - e. Parotid papilloma

**Answer is c**

204. Vignette describes mother of a 23 month old uncircumcised male with whitish, cheesy material arising from the foreskin and inability to fully retract the foreskin. Question is most appropriate next step in management.

- a. Reassurance
- b. Exudates culture
- c. Daily sitz baths with baking soda
- d. Administer topical antibiotic ointment
- e. Advice circumcision as soon as possible

**Answer is a**

205. Vignette describes 7 year old male with intermittent chest pain on inspiration, pain not reproducible, father had bypass at 65. Vital signs, EKG and chest x-ray normal. Question is best next step.

- a. Trial of albuterol
- b. Reassurance
- c. Screen for anxiety
- d. Obtain a fasting lipid panel
- e. Trial of H2 blockers

**Answer is b**

206. Vignette describes a 9 year old with acute rheumatic fever. Question is medication of choice for his arthritis.

- a. Acetaminophen with codeine
- b. Ibuprofen
- c. Aspirin
- d. Naproxen
- e. Acetaminophen

**Answer is c**

207. Vignette describes Lyme arthritis in a 7 year old boy allergic to penicillin. Question is most appropriate antimicrobial therapy.

- a. Doxycycline
- b. Cefuroxime
- c. Augmentin
- d. Chloramphenicol
- e. Pyridoxine

**Answer is b**

208. Vignette describes infant with history of interrupted aortic arch, hypocalcemia and cleft palate. Question is most likely consistent lab findings with his diagnosis.
- a. Decreased serum IgA, decreased T cell function and normal parathyroid function
  - b. Normal serum IgA, decreased T cell function and increased parathyroid function
  - c. Increased serum IgA, decreased T cell function and decreased parathyroid function
  - d. Normal serum IgA, decreased T cell function and decreased parathyroid function
  - e. Decreased serum IgA, decreased T cell function and increased parathyroid function

**Answer is d**

209. Photograph of a newborn with missing digits. Question is most likely cause.
- a. Oligohydramnios sequence
  - b. Achondroplasia
  - c. Amniotic bands
  - d. Syphilis
  - e. Fanconi anemia

**Answer is c**

210. Vignette describes child with asymptomatic cyclic neutropenia. Question is most appropriate next step.
- a. Begin prophylactic ceftazidime
  - b. Check serial CBCs
  - c. Begin prophylactic cefipime
  - d. Do nothing and reassure parents
  - e. Aspirate marrow for histology

**Answer is b**

211. Vignette describes a 7 month old who fell from window (about 5 feet high) with loss of consciousness about an hour after incident. Question is best next step after stabilization.

- a. Head CT-scan
- b. Skeletal survey
- c. Ophthalmologic examination
- d. Emergent surgery consult
- e. Emergent neurosurgery consult

**Answer is a**

212. Vignette describes a 1 year old child requiring steroids. Question is what steroid dose has more side effects.

- a. IV methylprednisolone 5mg BID
- b. Oral dexamethasone 6mg BID
- c. Oral prednisolone 10 mg BID
- d. Oral prednisolone 30 mg single dose
- e. IV methylprednisolone 30 mg single dose

**Answer is b**

213. You are giving a talk about effects of smoking and quitting smoking. Question is which of the following has the least impact on teenagers quitting?

- a. Long term effects
- b. Pictures of smokers with lung cancer
- c. Nicotine patches
- d. Parental awareness of teenager's smoking status
- e. Nicotine gum

**Answer is a**

214. Vignette describes an infant on TPN for bowel resection with increasing LFT's. Question is what to do next.

- a. Do serial LFT's
- b. Decrease carbohydrate in TPN
- c. Remove copper from TPN
- d. Stop lipids
- e. Initiate oral feeds ASAP

**Answer is e**

215. Vignette describes a preschooler with constipation. Weight is at the 75<sup>th</sup> percentile since birth and height has been at the 25<sup>th</sup> percentile. Question is most likely cause of his constipation.
- a. Withholding behavior
  - b. His diet
  - c. Genetic predisposition
  - d. A multivitamin
  - e. Hypothyroidism

**Answer is a**

216. Mom says 3 year old daughter walks funny. Physical examination reveals genu valgum (k-legs). Question is most appropriate next step.
- a. X-ray of the extremity
  - b. Early splinting
  - c. Refer to orthopedics
  - d. Reassurance
  - e. Early casting

**Answer is d**

217. Vignette describes patient with chronic malabsorption problem (steatorrhea, foul stool). Question is most likely finding on physical.
- a. Muscle wasting
  - b. Bruises
  - c. Dry cracked fissured lips
  - d. Large tongue
  - e. Pallor

**Answer is b**

218. Vignette describes an asymptomatic 4 year old male with positive staph from nasal swab. Question is what next.
- a. Do nothing
  - b. Bacitracin ointment

- c. Oral bactrim
- d. Oral amoxicillin
- e. Mupirocin ointment

**Answer is e**

219. What study decreases bias the most?

- a. Prospective study
- b. Randomised study
- c. Retrospective study
- d. Ecological study
- e. Meta-analysis

**Answer is b**

220. Vignette describes 9 year old female with persistent inspiratory wheezing not responding to albuterol or steroids. Question is best next step in evaluation.

- a. Laryngoscopy
- b. Trial of lev-albuterol
- c. Chest- x-ray 2 views
- d. Administration of a long acting beta agonist
- e. Administration of inhaled corticosteroids

**Answer is a**

221. Photograph of club foot shown. Question is best initial treatment.

- a. Surgery
- b. Early casting and splinting
- c. Use of ankle foot orthosis
- d. Reassurance as most self resolve
- e. Refer to plastic surgeon

**Answer is b**

222. A photograph of Williams shown (you aren't told it is Williams) with no additional history. Question is most likely additional finding.

- a. Coloboma
- b. Cataracts
- c. Strabismus
- d. Glaucoma
- e. Uveitis

**Answer is c**

223. The following psychosocial developmental changes are consistent with a 12 year old boy except.

- a. Wide mood swings
- b. Preoccupation with privacy
- c. Preoccupation with self
- d. Lack of impulse control
- e. Ability to compromise

**Answer is e**

224. Vignette describes a previously healthy 8 year old girl with zoster viral infection. Question is this is most likely a result of

- a. VZV vaccine failure
- b. Wild type zoster infection
- c. Phagocytic dysfunction
- d. Defect in humoral immunity
- e. Defect in cellular immunity

**Answer is e**

225. Vignette describes 15 month old female with ALL in early remission exposed to varicella 1 day ago. Question is what must happen within the next 72 hours

- a. Administer VZIG
- b. Administer varicella vaccine IM
- c. Administer VZIG and varicella vaccine
- d. Begin oral acyclovir
- e. Isolate child, give VZIG and begin acyclovir

**Answer is a**

226. Concerning treatment and prevention for varicella viral infections, which of the following is false?

- a. Nsaids when used, increases the risk of group A strep infections
- b. Aspirin increases the risk of Reyes syndrome
- c. Valacyclovir is better absorbed orally than acyclovir
- d. Child may attend school as long as zoster lesions are covered
- e. No isolation is required as long as patient is in a negative pressure room

**Answer is e**

227. Which of the following is least consistent with kawasaki's disease?

- a. Red dry peeling or fissured lips
- b. Bilateral tender anterior cervical lymphadenopathy
- c. Deep transverse groove across nail
- d. Periungual desquamation
- e. Strawberry tongue

**Answer is b**

228. Which of the following is not a risk factor for delinquency?

- a. Divorced parents
- b. Low socioeconomic status
- c. Low self esteem
- d. Gang membership
- e. Alcohol use

**Answer is c**

229. Kawasaki described and question is, which of the following skin findings isn't consistent?

- a. Bullous and vesicular rash on hands and feet
- b. Maculopapular rash on back and trunk
- c. Scarletiform rash over chest
- d. Urticarial rash over back and upper extremities
- e. Desquamation of the fingers and toes

**Answer is a**

230. 16 year old female with history of seizures has been seizure free for 3 years. Question is what factor increases her risk of seizure recurrence after her anti seizure meds are discontinued?
- a. History of speech delay as a child
  - b. History of simple febrile convulsion as a child
  - c. Presence of Juvenile myoclonic epilepsy
  - d. Seizure onset after 2 years of age
  - e. EEG finding of independent left and right centro-temporal spikes

**Answer is c**

231. A photograph of a mass in the left anterior cervical triangle is shown. You are told it is M avium complex. Question is best test for diagnosis.
- a. CT scan of the mass
  - b. Culture of the excised node
  - c. Fine needle aspiration
  - d. Nontuberculous mycobacterial antigen test
  - e. Sputum culture

**Answer is b**

232. Vignette describes a 6 year old boy with HIV on protease inhibitor who is recently diagnosed with disseminated MAC infection of his liver. Question is most appropriate initial therapy.
- a. Rifabutin
  - b. Pyrizinamide
  - c. Rifampicin
  - d. Clarithromycin
  - e. Piperacin

**Answer is d**

233. A patient is inadvertently noted to have mild neutropenia with an absolute neutrophil count of 1200. Question is most common underlying cause.

- a. An immunosuppressant
- b. An immune mediated reaction
- c. A viral illness
- d. Sequestration of white cells
- e. A syndromic ailment

**Answer is c**

234. Which of the following administered at birth decreases the incidence of bronchopulmonary dysplasia in VLBW infants?

- a. Palivizumab
- b. Vitamin K
- c. D10W
- d. Vitamin A
- e. Vitamin D

**Answer is d**

235. Vignette describes toddler with diarrhea consistent with toddler's diarrhea. Question is least effective method of treatment.

- a. Increase fiber in diet
- b. Increase fat in diet
- c. Increase carbohydrate in diet
- d. Reduce fruit juices
- e. Eliminate fruit juices

**Answer is c**

236. 12 year old female with diffusely enlarged thyroid gland and clinically euthyroid. Gland is not tender. Family history is positive for a cousin with "goiter". Question is what is the most likely cause of her gland swelling?

- a. Thyroid dysmorphogenesis
- b. Circulating anti-thyroid antibodies
- c. Iodine deficiency
- d. Iodine excess
- e. Neoplasia

**Answer is b**

237. Vignette describes 3 year old with foul smelly, brownish discharge from vagina. No redness or excoriation of vulva. Question is most likely cause of symptoms.

- a. Irritant chemicals
- b. Pinworm
- c. Gonorrhea
- d. Group A strep
- e. Foreign body

**Answer is e**

238. Photograph of a newborn shown. You are told prenatal ultrasound revealed IUGR. Question is newborn in photo is at risk of what?

- a. Hyperthermia
- b. Hyperbilirubinemia
- c. Hyperglycemia
- d. Hypercalcemia
- e. Anemia

**Answer is b**

239. Listeriosis is most commonly transmitted via what route?

- a. Airborne
- b. Intrapartum
- c. Food-borne
- d. Skin to skin contact
- e. Droplet

**Answer is c**

240. Vignette describes 9 year old with a hard lump on dorsum of hand. X-ray (shown) of a well defined, expansile lytic lesion of third metacarpal. Question is most likely diagnosis.

- a. Osteosarcoma
- b. Histiocytosis X
- c. Ewings sarcoma

- d. Aneurysmal bone cyst
- e. Osteochondroma

**Answer is d**

241. 12 year old with pain in lower leg. X-ray (shown) reveals very well defined, lobulated lytic lesion in proximal tibia centered in cortex. Question is most likely diagnosis.

- a. Non ossifying fibroma
- b. Osteosarcoma
- c. Aneurysmal bone cyst
- d. Histiocytosis X
- e. Orthogenic cyst

**Answer is a**

242. A concerned mother brings her 4 month old infant to you concerned about congenital hip dislocation. Question is most likely finding on physical examination consistent with her concerns?

- a. Positive ortolani test
- b. Positive barlow test
- c. Increase in hip flexion
- d. Decrease in hip abduction
- e. Skin fold symmetry

**Answer is d**

243. Vignettes describes newborn with proximal shaft hypospadias noted on newborn physical examination. Remainder of physical exam is normal. Question is what to do next.

- a. Renal Ultrasound
- b. Refer to surgery
- c. Karyotyping
- d. Intravesicular catheterization
- e. Do nothing

**Answer is e**

244. Photograph of a newborn with distal shaft hypospadias shown. Remainder of physical exam is normal. Question is when should surgery be done.
- a. As soon as possible
  - b. Before discharge
  - c. At the 2 week visit
  - d. At the 2 month visit
  - e. At the 6 month visit

**Answer is e**

245. Photograph of lateral neck swelling shown. You are given a history of cat exposure and told the lesion is fast growing, warm and tender. Question is most likely causative organism.
- a. Staphylococcus Aureus
  - b. Group A strep
  - c. EBV
  - d. CMV
  - e. Bartonella Henselae

**Answer is a**

246. 16 year old female recently immigrated from south America with her first GTC seizure episode. CT reveals two calcified cyst-like lesions. Question is most likely cause of seizure.
- a. Enterobius vermicularis
  - b. Taenia solium
  - c. Ascaris lumbricoides
  - d. Trichuris trichiuria
  - e. Toxoplasma gondii

**Answer is b**

247. Vignette describes 5 year old with swelling, redness and pain at site of cat bite that occurred 48 hours after the bite. Question is most likely organism responsible.
- a. Pasteurella Multocida
  - b. Staph Aureus

- c. Strep Pyogenes
- d. Bartonella Henselae
- e. Pseudomonas Auriginosa

**Answer is b**

248. What is the mechanism of action of sulfamethoxazole?

- a. Binds to 50s ribosomal subunit
- b. Inhibits folic acid synthesis
- c. Binds to 30 s ribosomal subunit
- d. Inhibits methylcobalamin synthesis
- e. Inhibits nucleic acid synthesis

**Answer is b**

249. You refer a 10 year old boy to cardiology with a grade 3, high pitched mid to early systolic ejection murmur loudest in the left upper sterna border. No cyanosis, pulses are equal and strong. Question is which finding would necessitate further evaluation?

- a. Decreased intensity of murmur with head rotation
- b. Decreased intensity of murmur with shoulder shrugging
- c. Decreased intensity of murmur with JVP pressure
- d. Pulmonic ejection click
- e. Decrease intensity of murmur when upright

**Answer is d**

250. Primi formulas compared to standard term infant formulas have

- a. Low whey to casein ratio
- b. Higher protein
- c. Carbohydrate as fructose
- d. Phosphorus to calcium ratio of 2:1
- e. Higher percentage of fat as very long chain fatty acids

**Answer is b**

251. What is the best source of folate is amongst the options below.

- a. Applesauce
- b. Plums
- c. Chicken
- d. Cereal
- e. Bacon

**Answer is d**

252. Vignette describes a 4 year old with Kawasaki who just received a second dose of IVIG for persistent fever. Question is most likely complication of IVIG to occur in this patient.

- a. Athralgia
- b. Myalgia
- c. Acute tubular necrosis
- d. Anaphylaxis
- e. Meningitis

**Answer is e**

253. Vignette describes a 4 year old girl with maculopapular rash that follows a high fever by 4 days. You suspect Roseola. Mom is concerned about contagiousness. Question is most appropriate statement to mom.

- a. Child may return to school a week to 10 days after the onset of the rash
- b. Rash heals by desquamation 24 hours after onset, so she should be ok to return in 48hours
- c. This isn't a reason to stay out of school
- d. She may experience intermittent fevers after the rash appears, this is ok and doesn't preclude her from attending school
- e. Return to school after the rash fades in about 3 days

**Answer is c**

254. Toddler with failure to thrive. Initial work up reveals normal anion gap metabolic acidosis. Question is most likely cause of his weight issues.

- a. Acute gastroenteritis
- b. Aspirin intoxication
- c. Renal tubular acidosis

- d. Psychologic failure to thrive
- e. Low caloric intake

**Answer is c**

255. Infant with a history of intestinal resection now having recurrent diarrhea with cow based formula. Question is most appropriate next step.

- a. Change to formula high in MCT
- b. Change to protein hydrolysate formula
- c. Add polyose to formula
- d. Change to soy based formula
- e. Give regular formula as long as weight is normal

**Answer is a**

256. Exclusively breastfed 2 month old with no poop in 1 week. Mom is concerned. Abdomen is soft and bowel sound heard. Question is most appropriate next step.

- a. Prescribe glycerin suppository
- b. Advice to mix formula with prune juice
- c. Add more water to formula than instructed to
- d. Obtain a KUB 2 views
- e. Reassurance

**Answer is e**

257. Vignette describes a patient with X-linked agammaglobinemia. Question is best therapy to prevent recurrence of symptoms.

- a. Bone marrow transplant
- b. Prophylactic antibiotics
- c. IVIG
- d. Administration of all childhood vaccines when due
- e. Intermittent plasmapheresis

**Answer is c**

258. 28 weeker now 31 weeks with RDS post intubation and still in respiratory distress. Question is what intervention would best prevent long term complication.

- a. Reintubation
- b. CPAP with low PEEP pressures
- c. Nitrous oxide
- d. Alternating epinephrine with albuterol nebs at low doses
- e. HFOV to reduce barotraumas

**Answer is c**

259. The bilingual mother of a 2 year old boy is concerned about his speech because your neighbours cannot understand half of what he says. He has achieved normal gross motor, fine motor and social skills for age. Question is what to tell mom.

- a. Speak only one language to him
- b. Allow him watch wonder pets every now and then, it is educational
- c. He would need a hearing test
- d. His language skills is appropriate for his age
- e. Your neighbours are a handful huh

**Answer is d**

260. A 3 year old girl who cannot walk up and down stairs but she uses 2 words in a sentence, can copy a circle but not a cross and she knows the name of a friend. Question is what you should be concerned about.

- a. Language delay
- b. Nothing her milestones are normal for age
- c. Cerebral palsy
- d. Muscular dystrophy
- e. Fine motor delay

**Answer is a**

261. Vignette describes a preschool child being seen for routine well child check up. Question is what is the best test to determine verbal and perceptive function?

- a. Stanford binet test
- b. Vineland adaptive test
- c. Eyeberg child behavior test
- d. Wide range achievement test
- e. WISC

**Answer is a**

262. 17 year old with 2 week history of left knee pain. Signs of inflammation are present. CBCD, antistreptolysin O, lymes serology and synovial fluid analysis are unremarkable. You not mild conjunctival injection. Question is most appropriate next step.

- a. Obtain RPR
- b. Repeat synovial fluid analysis in 1 week
- c. Obtain urinalysis
- d. Obtain a blood culture
- e. Obtain a throat culture

**Answer is c**

263. A study described in which the relative risk of alcohol causing liver cancer is found to be 2. Question is which of the following confidence interval is most significant.

- a. 1.2 to 4.5
- b. 1.2 to 3.5
- c. 1.4 to 4.1
- d. 1.2 to 3.7
- e. 1.1 to 4.9

**Answer is b**

264. Vignette describes a patient with Prader willi (photo shown). Question is best diagnostic test.

- a. Methylation study
- b. Karyotype
- c. FISH
- d. FMRP antibody test
- e. Prader willi serologic assay

**Answer is c**

265. A father has concerns about his son participating in a study. Question is best way that depicts a researcher's consideration of a parent's autonomy.
- Obtaining verbal consent
  - Obtaining informed consent
  - Addressing all parental concerns and providing information on possible outcomes that will be beneficial to the participant
  - Including a parent in the study as an eye witness
  - Providing incentives to the parents

**Answer is b**

266. Vignette describes a list of patients with high risk behaviors and family histories. Question is which patient needs total cholesterol screen.
- A female teenager on oral contraceptive pills
  - A male teenager whose father had a coronary artery bypass surgery at the age of 65 years
  - A 123 year old teenager above the 95<sup>th</sup> percentile for height and weight
  - A teenager who smokes
  - A teenager who asides from playing daily basket ball, watches TV and plays video games all day

**Answer is d**

267. Vignette describes a one year old with progressive anemia and MCV of 74. Question is most likely cause of his anemia.
- Diamond blackfan
  - Transient erythroblastopenia of childhood
  - Iron deficiency anemia
  - Pyridoxine deficiency
  - Lead toxicity

**Answer is c**

268. Vignette describes a patient on multiple medications with hypertension. Question is which medication is causing the hypertension?
- a. Prednisolone
  - b. Tylenol with codeine
  - c. Neosynephrine nasal spray
  - d. Methotrexate
  - e. Vincristine

**Answer is a**

269. A mother is concerned about her 3 year old son who she thinks has autism. Question is which additional symptom supports a diagnosis of autism the most?
- a. Plays with one specific friend in school all the time
  - b. Failure to respond spontaneously to name when called
  - c. Uses only 2 word sentences
  - d. Refusal to make eye contact
  - e. Head banging

**Answer is d**

270. Vignette describes a 4 hour neonate with severe cyanosis, hypoxic but stable and pulmonary stenosis seen on bed-side echo. Question is most appropriate next step.
- a. Give oxygen
  - b. Intubate patient
  - c. Obtain a chest x-ray
  - d. Obtain a hyperoxia test
  - e. Administer Prostaglandin E1

**Answer is e**

271. Vignette may describe a Patient with Kawasaki disease on aspirin. Question is which immunization is indicated.
- a. MMR
  - b. Influenza
  - c. Diphtheria

- d. Polio
- e. Menactra

**Answer is b**

272. Natal teeth noted on the physical examination of a newborn. Question is what genetic syndrome is most likely associated with this finding

- a. Holt Oram
- b. Ellis-van Creveld syndrome
- c. Senior loken syndrome
- d. Trisomy 13
- e. Noonan's syndrome

**Answer is b**

273. Photograph of small ranula shown (bluish mass under the tongue). It is painless. Question is most appropriate next step in management.

- a. Surgical excision
- b. Surgical marsupialization
- c. Reassurance
- d. Application of trichloroacetic acid spray
- e. Incision and drainage followed by antistaphylococcal antibiotics for 10 days

**Answer is c**

274. Your astute 9 year old daughter asks you how fluoride prevents tooth decay. Question is the least likely way

- a. Fluoride increases remineralization of enamel
- b. Fluoride inhibits bacterial fermentation of sugar into acids
- c. Fluoride incorporates into the hydroxyapatite crystals of developing teeth making it less susceptible to erosion
- d. It works with saliva to protect tooth enamel from plaque formation
- e. It acts by protecting the pits and fissures of the tooth surface

**Answer is e**

275. An infant is held suspended in a prone position, flexion of the neck results in shoulder protraction and hip flexion, whereas neck extension causes shoulder retraction and hip extension. Question is what primitive reflex is described?

- a. Parachute reflex
- b. Asymmetric tonic neck reflex
- c. Symmetric tonic neck reflex
- d. Tonic laryngeal reflex
- e. Jig-saw reflex

**Answer is d**

276. Vignette describes a 4 year old patient with history of egg allergy and mom concerned about MMR. Question is most appropriate next step.

- a. Refer to allergist for clearance
- b. Give the vaccine without the rubella component
- c. Give the vaccine
- d. Give the vaccine after pretreating with oral diphenhydramine
- e. Give the vaccine without the measles component

**Answer is c**

277. Vignette describes a 5 year old girl with history of fall from her bike witnessed by mom's boy friend. There is presence of recent blood on her clothing from the labia majora and unilateral labial bruise. There is no active bleeding. Her posterior fourchette, hymen and anus are intact. Question is most likely cause of her injury.

- a. Physical abuse
- b. Sexual abuse
- c. Foreign substance
- d. Straddle injury
- e. An adult's finger nail

**Answer is d**

278. Strabismus noted in a five month old. Question is what next.

- a. Refer to ophthalmology

- b. Reassurance
- c. Refer to optometrist
- d. Refer to geneticist
- e. Obtain a TORCH assay

**Answer is a**

279. Vignette describes a child drooling in the garage without lesions on his lip or mouth. Question is what he ingested.

- a. Gasoline
- b. Drain cleaner
- c. Antifreeze
- d. Kerosene
- e. Fox glove

**Answer is b**

280. Patient on asparaginase with acute abdominal pain (periumbilical and epigastric). He denies radiation of the pain. Question is most likely test to reveal diagnosis.

- a. Stool for occult blood
- b. Liver function test
- c. Abdominal x-ray 2 views
- d. Amylase and lipase
- e. Urase breath test

**Answer is d**

281. Vignette of patient with many symptoms including diarrhea on medications and normal anion gap metabolic acidosis. Question is what is responsible for the electrolyte findings.

- a. Loss of bicarb in stool
- b. Distal renal tubule loss of bicarb
- c. Mineralocorticoid deficiency
- d. Loss of potassium in stool
- e. Loss of sodium in stool

**Answer is a**

282. Nineteen year old male with puncture wound through shoes. Question is best empiric oral antibiotic for wound infection.

- a. Erythromycin
- b. Doxycycline
- c. Ciprofloxacin
- d. Amoxicillin and clavulanate
- e. Cefdinir

**Answer is c**

283. Vignette describes a patient with mastoiditis unresponsive to two oral broad-spectrum antibiotics. Question is most appropriate next step in management.

- a. Begin IV vancomycin and ceftriaxone
- b. Refer to ENT
- c. Obtain a plain radiograph of the mastoid
- d. Obtain CT of the paranasal sinus
- e. Obtain a CT of temporal bone

**Answer is e**

284. Assessment of which of the following differentiates diamond blackfan syndrome from transient erythroblastopenia of childhood?

- a. Reticulocyte count
- b. Hemoglobin level
- c. Platelet count
- d. Adenine deaminase
- e. Bone marrow

**Answer is d**

285. A primigravid mom is concerned about what she can do to prevent developmental hip dysplasia in her unborn child. You tell her the risk is highest if.

- a. The presentation is Breech
- b. It is a female

- c. It is a male
- d. Polyhydramnios is present
- e. Oligohydramnios is present

**Answer is a**

286. Vignette describes a patient with grade 2 concussion five days ago but still with headache. Question is when to return.

- a. Immediately if up to it
- b. Immediately only if symptom free
- c. In one week if symptom free for one week.
- d. In one month if symptom free for at least the week prior to return
- e. Next season (in 12 months)

**Answer is c**

287. Vignette describes adolescent with inflammatory acne (papules with no pustules). Photograph shown. Question is best treatment.

- a. Retin-A and benzoyl peroxide
- b. Topical clindamycin.
- c. Oral tetracycline
- d. Accutane
- e. Topical azeleic acid

**Answer is a**

288. Vignette describes a patient in urgent care with symptoms consistent with auricular hematoma (painful). Question is most appropriate next step.

- a. Referral to ENT
- b. Urgent surgical evacuation
- c. Send home on oral analgesics
- d. Discharge with instructions to apply cool compress initially followed by warm compress hours later
- e. Do nothing, most are benign and self resolve

**Answer is b**

289. Vignette describes a patient with five day history of fever, appears ill with a rash that transitioned from macular to petechial in the lower extremity. Question will be most likely diagnosis.

- a. Meningococemia
- b. Syphilis
- c. Rocky Mountain Spotted Fever
- d. EBV
- e. CMV

**Answer is c**

290. Orbital cellulitis described in a 4 year old up to date on shots. Question is most likely organism.

- a. Hemophilus Influenzae type B
- b. Strep pyogenes
- c. Hemophilus Influenzae non typable
- d. Staph Aureus
- e. Strep pneumoniae

**Answer is e**

291. Vignette describes a 14 year old up to date with symptoms and CXR finding consistent with atypical pneumonia. Question is best test to establish diagnosis.

- a. Chest x-ray is diagnostic
- b. Mycoplasma PCR
- c. Mycoplasma serology
- d. Blood culture
- e. Fluoroscopy

**Answer is c**

292. Rubeola is described in a 2 year old immigrant. Question is most likely vitamin deficiency.

- a. Vitamin A
- b. Vitamin C

- c. Vitamin D
- d. Vitamin E
- e. Vitamin K

**Answer is a**

293. Vignette describes a none sexually active 13 year old female with menstrual cramps that started with her first menstrual bleeding. She is unresponsive to NSAIDs. Question is most likely cause of her cramps.

- a. Cervicitis
- b. Primary dysmenorrhea
- c. Bicornuate uterus
- d. Endometritis
- e. Salpingitis

**Answer is c**

294. A father brings in his 3 year old with a history of GERD and recent ear infection with “jerky movements” that doesn’t occur during sleep. He doesn’t remember the medications mom gave her recently. Question is most likely diagnosis.

- a. Myoclonic jerks
- b. Complex partial seizure
- c. Simple partial seizure
- d. Acute dystonic reaction
- e. Normal sleep variation

**Answer is d**

295. Follow up question on the above 3 year old asks for most effective next step in management.

- a. Discontinue metoclopramide
- b. Administer oral diphenhydramine
- c. Administer intramuscular dantrolene
- d. Provide rectal diazepam for home use
- e. Obtain an EEG

**Answer is a**

296. Vignette describes a 6 year old with dysuria secondary to vulvovaginitis. Physical exam is normal except for redness, a smell and excoriation in the vulva and introitus. Question is most relevant additional question to ask at this point is.
- a. Do you wipe yourself from back to front
  - b. Do you have increase frequency of urination
  - c. Has anyone touched you inappropriately
  - d. Do you have scotch tape
  - e. Do you have a sorethroat

**Answer is a**

297. Vignette describes a 7 year old girl with isolated pubic hair, acne and clitoromegaly. Question is most appropriate next step.-**Measurement of 17 hydroxyprogesterone** (other options wrist x-ray, serum testosterone).
298. Photograph of treacher collins syndrome shown. Question is child in picture is at risk for.
- a. Conductive hearing loss
  - b. Mental retardation
  - c. Sensorineural hearing loss
  - d. Cataracts
  - e. Autism

**Answer is a**

299. Vignette describes an 8-year-old boy, with history of asthma and allergies to dust mites and cockroaches. He awakens during the night at least twice a week owing to difficulty breathing. His mother reports that exercise triggers his symptoms. His physical exam indicates some wheezing during forced exhalation. A spirometry test reveals an initial FEV<sub>1</sub> that is 80% of predicted with an FEV<sub>1</sub>/FVC of 75%. After bronchodilator administration, his FEV<sub>1</sub> improved to 78% and the FEV<sub>1</sub>/FVC ratio improved to 81%. Question is what is the classification of his asthma?
- a. Intermittent asthma

- b. Mild intermittent
- c. Mild persistent
- d. Moderate persistent
- e. Severe persistent

**Answer is d**

300. Vignette describes chronic diarrhea, weight loss, abdominal distension and cramps in a hiker. You suspect giardiasis. Question is most sensitive test for diagnosis.

- a. Elisa stool assay
- b. Stool for ova and parasite
- c. Small bowel biopsy
- d. Giardia serologic test
- e. Giardia Immunofluorescent assay

**Answer is c**

301. Photograph of Itchthyosis vulgaris shown. Question is best initial treatment.

- a. Protopic
- b. Hydrocortisone 0.1% ointment
- c. Tacrolimus
- d. Clotrimazole ointment
- e. Emollients

**Answer is e**

302. Prepubescent girl brought in by mom concerned about sexual abuse. Question is finding most suggestive of abuse.

- a. Bleeding per vagina with intact hymen
- b. Vaginal discharge
- c. Redness and excoriation in introitus
- d. Inner thigh bruise
- e. Dysuria with smell from the vagina

**Answer is d**

303. Listeriosis diagnosed and question is what precautions should be ordered.

- a. Standard
- b. Contact
- c. Droplet
- d. Airborne
- e. None

**Answer is a**

304. Vignette describes a kid with scarletiform rash. Question is most likely associated infection.

- a. Cellulitis
- b. Pharyngitis
- c. Conjunctivitis
- d. Impetigo
- e. Ecthyma

**Answer is b**

305. Newly diagnosed type one diabetic on insulin having recurrent hypoglycemic episodes. Question is most appropriate next step in management.

- a. Increase insulin dose
- b. Measure hemoglobin A1C
- c. Obtain a urinalysis
- d. Measure C peptide
- e. Obtain a stat ABG

**Answer is d**

306. Vignette describes rheumatoid arthritis in an 11 year old with a history of recurrent sinus and pulmonary infection. Question is which is true of his diagnosis.

- a. Presence of dysmorphic facies
- b. Increase IgA
- c. Decrease myeloperoxidase level in leukocytes
- d. IVIG is contraindicated
- e. Prone to skin granulomas

**Answer is e**

307. Acute abdominal pain described in an adolescent. Ultrasound shows 7.5 cm ovarian cyst but no multiloculations, septations or calcifications. Question is most appropriate next step.
- a. Prescribe oral contraceptive pills
  - b. Obtain an MRI to rule out malignant cyst
  - c. Admit, make NPO, prescribe a narcotic and NSAID combo and advice bed rest
  - d. Laparoscopic aspiration of cyst
  - e. Refer to gynecologist

**Answer is d**

308. Vignette describes a female who finds nothing wrong with her profound weight loss. Question is what additional history makes a diagnosis of AN more likely.
- a. Membership in the gymnastic squad
  - b. Binge eating and purging behavior
  - c. Fear of gaining weight
  - d. High expectation to perform academically
  - e. High expectation to excel in sports

**Answer is c**

309. Indian couple planning a trip to India with their 6 week breast-fed infant. He weighs 10 pounds. Question is best advice for parents regarding malarial prophylaxis for their infant.
- a. Prescribe mefloquine 25 mg weekly, beginning one week before trip, continuing weekly in endemic zone up until 4 weeks after return
  - b. Prescribe atovaquone-proguanil 50 mg at least 4 days before trip and weekly in endemic area
  - c. Prescribe chloroquine 60 mg once per 4 week period and repeat after 4 weeks if still in endemic area
  - d. Delay the trip
  - e. No prophylaxis indicated as maternal IgGs are protective against malaria

**Answer is d**

310. Vignette describes the mother of a prenatally diagnosed downs syndrome female. She is concerned and has questions. Question is most common abnormality to expect the first week of life.
- a. Hypotonia
  - b. Polycythemia
  - c. Hypothyroidism
  - d. Constipation
  - e. Diarrhea

**Answer is a**

311. Milestones of a 3 month old described. Question is most likely milestone to achieve next.
- a. Imitates laugh
  - b. Fixates on face
  - c. Raises head to 75 degrees when prone
  - d. Imitates speech
  - e. Reaches out for objects

**Answer is a**

312. Photograph of skin desquamation shown in a 4 year old boy. Question is which of the following is most consistent with a diagnosis of TEN.
- a. Preceding high fevers
  - b. Crusting and fissuring around lips
  - c. Intraoral mucosal surface erosions
  - d. Tenderness of skin
  - e. Absence of blisters

**Answer is c**

313. A medical literature shows drug A to be statistically superior to drug B in treating ADHD with a p value of  $<0.10$ . Question is what are the odds that

the difference between drug A and drug B observed in the study were only a chance variation?

- a. Less than 1 in 5
- b. Less than 1 in 10
- c. Less than 1 in 20
- d. Less than 1%,
- e. Greater than 10%

**Answer is b**

314. Photograph of scabies shown on the foot of a 6 year old boy. Question is least likely site to be affected in this boy.

- a. Groin
- b. Elbow
- c. Interdigital spaces
- d. Face
- e. Ankle

**Answer is d**

315. Of the following, the animal bite that is least likely to require rabies prophylaxis is a bite from a

- a. Coyote
- b. Beaver
- c. Woodchuck
- d. Chipmunk
- e. Cat

**Answer is d**

316. Vignette describes a 12 month old infant whose parents are concerned about a 4<sup>th</sup> DTaP. Question is absolute contraindication of DTaP.

- a. Altered mental status within 7 days of previous DTaP
- b. Family history of allergic reaction to DTaP
- c. Seizures 2 weeks after previous DTaP
- d. Presence of URI and fever of 38.5 degrees centigrade
- e. Redness, tenderness and swelling at site of last DTaP shot

**Answer is a**

317. Vignette describes a full term formula fed infant with bloody Meconium at 6 hours of age. Physical exam, prenatal, labor and delivery history are unremarkable. Question is most appropriate next step in evaluation.
- a. Make NPO and obtain a KUB 2 views
  - b. Change to a protein hydrolysate formula
  - c. Obtain a blood gas analysis
  - d. Perform an apt test
  - e. Perform a kleihauer-Betke test

**Answer is d**

318. Vignette describes an 11 year old boy in the summer with high fevers, disorientation or confusion. Question is most likely cause of symptoms.
- a. Arbovirus
  - b. Enterovirus
  - c. Herpes simplex virus
  - d. A prion
  - e. Mumps virus

**Answer is a**

319. Vignette describes an 8 year old girl in the summer with fever, disorientation, confusion, seizures and headache with focal signs. Question is most likely cause of symptoms.
- f. Arbovirus
  - g. Enterovirus
  - h. Herpes simplex virus
  - i. A prion
  - j. Mumps virus

**Answer is c**

320. Vignette describes a 5 year old unimmunized child with acute otitis media and mastoiditis. Question is most likely causative organism.

- a. Pseudomonas Aeruginosa
- b. Moraxella catarrhalis
- c. Streptococcus pneumoniae
- d. Hemophilus Influenzae type b
- e. Hemophilus Influenza nontypable

**Answer is c**

321. Vignette describes severe itchy rash in a 3 year old that occurs 12 hours after beginning amoxicillin for a presumed ear infection. Question is what is the best treatment for the condition described.

- a. Continue amoxicillin but pretreat with oral diphenhydramine
- b. Continue amoxicillin but pretreat with oral prednisolone
- c. Prescribe a topical steroid and an oral antihistamine while reassuring the parents that the rash is secondary to a virus
- d. Avoid amoxicillin
- e. Stop amoxicillin and begin augmentin

**Answer is d**

322. Vignette describes a healthy three year old boy on long term aspirin therapy for suspected arthritis. Question is most likely complication of aspirin in this boy.

- a. Gastric ulcer
- b. Thrombocytopenia
- c. Reye syndrome, rash
- d. Hypertension
- e. Nasal polyp

**Answer is a**

323. Vignette describes 30 minute old near term newborn in nursery. Ancef, erythromycin, toradol and tocolytics given to mom during labor which lasted > 18 hours. Prenatal labs normal. Question is most likely complication to expect in the infant.

- a. Pyloric stenosis

- b. sepsis
- c. Bloody gastric aspirate
- d. Hypoglycemia
- e. Seizures

**Answer is d**

324. You note single umbilical artery in the physical examination of a term newborn. Question is most likely associated genetic anomaly amongst the options.

- a. Trisomy 21
- b. Noonan's syndrome
- c. Ellis-van Creveld syndrome
- d. Allagile syndrome
- e. Trisomy 18

**Answer is e**

325. Vignette asks for sequence consistent with a female going through puberty.

- a. Breast bud, then puberche, then peak height velocity, then menarche
- b. Breast bud, then puberche, then menarche, the peak height velocity
- c. Breast bud, then puberche, then adrenarche, then menarche, then peak height velocity
- d. Breast bud, then puberche, then menarche, then adrenarche, then peak height velocity
- e. Adrenarche, the breast bud, then puberche, then peak height velocity, then menarche

**Answer is a**

326. Vignette asks who amongst the following may participate in the summer football season with the least restrictions.

- a. 14 year old with well controlled seizures
- b. 16 year old with hypertrophic cardiomyopathy
- c. 11 year old with enlarged spleen
- d. 12 year old with a grade 3/6 systolic ejection murmur
- e. 13 year old with downs syndrome having unsteady gait and brisk DTR

**Answer is a**

327. Vignette describes hypoglycemia in an infant who has been vomiting his new formula, Urinalysis is positive for ketones and reducing substance. Question is most likely diagnosis.
- a. Hereditary fructose intolerance
  - b. Sucrose-galactose deficiency
  - c. Von gierke's disease
  - d. Galactosemia
  - e. Congenital diabetes mellitus

**Answer is a**

328. Von gierke described in a 23 month old. Question is best modality for treatment.
- a. Glucose infusion
  - b. Corn starch
  - c. Soybased whole milk
  - d. Sorbitol orally
  - e. Prebiotic infusion

**Answer is a**

329. Vignette describes a 6 week old infant with unexplained crying for greater than 3 hours per day for 4 days a week. Mom is frantic and asking for a formula change. Question is infant will benefit best from.
- a. Modified soy based formula
  - b. Modified cow based formulas
  - c. Lactose free formulas
  - d. Aminoacid based formulas
  - e. Casein hydrolysate formula

**Answer is e**

330. Vignette describes a mother concerned about her 3year old daughter who runs around the house naked and sometimes touching and playing with her

vagina. They both live with mom's boy friend. Physical examination is unremarkable. Question is most appropriate next step.

- a. Send urine for GC and chlamydia
- b. Reassure mom
- c. Obtain urinalysis
- d. Interview the 3 year old alone
- e. Report suspected abuse to child protective services

**Answer is b**

331. The following are true of constitutional growth delay except.

- a. Bone age is delayed
- b. Pre pubertal growth velocity is reduced
- c. Pubertal onset is delayed
- d. Growth spurt is delayed
- e. Their final adult height is normal

**Answer is b**

332. Vignette describes night terror in a seven year old female. Question is what is she at risk of having?

- a. Post traumatic stress disorder
- b. Encopresis
- c. Elevated blood pressure
- d. Injuries from falls
- e. Nothing, condition is completely benign

**Answer is d**

333. Photograph of brownish corneal deposits shown (you aren't told they are corneal deposits). Question is most likely medication exposed to.

- a. Erythromycin ophthalmic ointment
- b. Gentamycin ophthalmic ointment
- c. Amiodarone
- d. Bretylium
- e. Methothrexate

**Answer is c**

334. Vignette describes adolescent with obesity, hypertension, acanthosis nigricans, dyslipidemia and elevated TGs. Question is best way to treat his condition.
- a. Weight loss
  - b. Low carb diet
  - c. Elimination of fat from diet
  - d. Metformin twice daily
  - e. Limit TV to less than two hours a day

Answer is a

335. Vignette describes a girl with seasonal allergic rhinitis allergic to ragweed. Question is best way to avoid this allergen.
- a. Remove carpet in room
  - b. Keep pets outside room
  - c. Use of allergic bed coverings
  - d. use of HEPA air filters in room
  - e. Use of HEPA vacuum cleaners

**Answer is d**

336. Vignette describes macula-papular rash that appears in a 6 year old 2 days after fever onset. He has a headache and is febrile with a temp of 101 today. Question is most likely cause of rash.
- a. Rubeola
  - b. Enterovirus
  - c. Roseola virus
  - d. Group A strep
  - e. Adenovirus

**Answer is b**

337. Photograph of anogenital warts shown. Question is best initial treatment.

- a. Podophyllin.
- b. Trichloroacetic acid
- c. Electrocautery
- d. Laser ablation
- e. Salicylic acid

**Answer is a**

338. Vignette describes adolescent female with painful red nodules on anterior sheen. Question is most likely offending agent.

- a. Ibuprofen
- b. Cefaclor
- c. Tetracycline
- d. Morphine
- e. Oral contraceptive

**Answer is e**

339. Photograph of teenager with alopecia showing irregular patches of hair and short broken hair shafts of varying length. Question is most appropriate next step.

- a. Reassurance
- b. Prescribe griseofulvin
- c. Psych referral
- d. Offer wig
- e. Advice to reduce stress

**Answer is c**

340. Vignette describes a term newborn with dark brown scaly lesions greater than 4mm on his neck, trunk and extremities but sparing the palms and soles. Question is most likely associated finding.

- a. Purulent rhinitis
- b. Atopic dermatitis
- c. Preaxial polydactyly
- d. Cryptorchidism
- e. Preauricular pits

**Answer is d**

341. Vignette describes painless abdominal mass in a 3 year old with periorbital ecchymosis. Question is what is a poor prognostic factor?
- a. Anaplastic clear cell histology
  - b. Age < 1 year
  - c. Diploid DNA
  - d. Haploidy
  - e. Immunophenotype B-cell

**Answer is c**

342. Vignette describes a 15 month old female with runny nose and congestion for 6 days. She has had 10 colds over the past 12 months, the last two unresponsive to a 10 day courses of low dose amoxicillin. Question is most appropriate next step.
- a. Reassurance and supportive care of cold
  - b. X-ray of sinus
  - c. Amoxicillin high dose for 10 days
  - d. Amoxicillin high dose for 21 days
  - e. Work up for immunologic disorder

**Answer is a**

343. Vignette describes a 4 year old with painful white bumps with surrounding redness in the mouth and inner lip. Lesions appear discrete. No fever, no lymphadenopathy, no rhinorrhea. Question is most appropriate intervention.
- a. Oral acyclovir
  - b. Topical acyclovir
  - c. Topical benadryl
  - d. Oral Benadryl and Maalox
  - e. Beclamethasone ointment

**Answer is e**

344. Vignette describes post kidney transplant patient on cyclosporine. Question is what common adverse effect is most likely.

- a. Alopecia
- b. Hypotension
- c. Hyperglycemia
- d. Gingival hyperplasia
- e. Neurotoxicity

**Answer is d**

345. Vignette describes a 7 year old girl with mild persistent asthma started on Inhaled corticosteroids (ICS) 6 weeks ago. Mom is concerned about side effects of the ICS. She seems well controlled. Question is next best step.

- a. Discontinue inhaled corticosteroid and begin montelukast.
- b. Begin diphenhydramine on as needed basis but continue her current medication
- c. Begin long acting beta agonist and inhaled steroid combo
- d. Begin montelukast and continue ICS
- e. Discontinue ICS

**Answer is a**

346. Vignette describes a 24 month old female with recurrent eczema flare-ups. Question is most likely chronic trigger of her eczema.

- a. Animal dander
- b. Dust mite
- c. Ragweed
- d. Mold
- e. Wheat

**Answer is e**

347. Vignette describes brown recluse spider bite in the volar aspect of the arm of a 4 year old. Area of induration and central pustule becomes necrotic 36hours after the bite. Necrotic area is 3 cm. Question is most appropriate next step in management.

- a. Debridement and antibiotic therapy
- b. Debridement followed by local wound care

- c. Debridement and antivenin administration
- d. Admission for parenteral antibiotics
- e. Administer Td

**Answer is a**

348. Vignette describes nodulocystic acne in an adolescent started on accutane. Question is most likely side effect to expect.

- a. Athralgia
- b. Dry eyes and mouth
- c. Pseudotumor cerebri
- d. Corneal opacity
- e. Rectal bleeding

**Answer is b**

349. Vignette describes a 2 year old with purulent nasal discharge from the right nostril. Question is most likely cause of symptom.

- a. Chronic rhinitis
- b. Chronic allergies
- c. Foreign body
- d. Chronic otitis media
- e. Angiofibroma

**Answer is c**

350. Vignette describes failure to regain birth weight in a 3 week old female with ambiguous genitalia and signs of shock. Question is what electrolyte abnormality is consistent with her diagnosis.

- a. Hypochloremia
- b. Hypokalemia,
- c. Hypernatremia
- d. Hyperglycemia
- e. Hyperphosphatemia

**Answer is a**

351. Vignette describes anaphylactic-like reaction in a patient receiving IVIG. Question is most likely cause of symptoms.

- a. Prior desensitization
- b. Dosing error of IVIG
- c. IgA deficiency
- d. IgG deficiency
- e. Inadvertent diphenhydramine administration

**Answer is c**

352. Vignette describes prolonged bleeding from the left nares in an adolescent with posterior nasal mass. Question is most likely diagnosis.

- a. Nasopharyngeal angiofibroma
- b. Nasopharyngeal carcinoma
- c. Nasal polyp
- d. Piriform adenoma
- e. Enlarged adenoids

**Answer is a**

353. Vignette describes a patient on meropenem for a nosocomial acquired enterobacter infection. Question is most likely adverse effect.

- a. Seizures
- b. Rash
- c. Vomiting
- d. Diarrhea
- e. Headache

**Answer is a**

354. The following drugs are considered teratogenic except.

- a. Propylthiouracil
- b. Streptomycin
- c. Penicillamine
- d. Valproic acid
- e. Erythromycin

**Answer is e**

355. Vignette describes a teenager with syncope 30 minutes after completing a 200 meter race. He has a systolic murmur that gets louder with standing. You suspect HOCM. Question is most sensitive test for detecting HOCM in other family members.
- a. Chest x-ray
  - b. Echocardiography
  - c. EKG
  - d. Genetic testing
  - e. Cardiac cath

**Answer is d**

356. Gasoline aspiration described in an 18 month old child with vomiting initially and then later with coughing and tachypnea. Question is best initial step in management.
- a. Obtain a chest x-ray
  - b. Administer oxygen
  - c. Administer charcoal
  - d. Endoscopy as soon as possible
  - e. Do nothing and observe

**Answer is b**

357. Vignette describes a patient intubated for suspected tracheitis and admitted to the ICU. Question is most appropriate empiric parenteral antibiotic/s.
- a. Ceftriaxone only
  - b. Ceftriaxone and nafcillin
  - c. Cefotaxime and gentamycin
  - d. Ceftazidime and gentamycin
  - e. Ceftriaxone and Clindamycin

**Answer is e**

358. Vignette describes a 3 year old boy whose mom is concerned about his risk of developing asthma. She tells you her son has had 3-4 episodes of

wheezing in the past year and that it occasionally disturbs his sleep. Question is which of the following predicts his risk of developing asthma the most?

- a. Presence of comorbid allergic rhinitis and eosinophilia
- b. Presence of outdoor smokers in the home
- c. A parent with history of chest pain and eosinophilia
- d. Spirometry findings consistent with obstructive airway disease
- e. Wheezing with Upper respiratory Infection

**Answer is a**

359. Vignette describes a 3 year old with hoarseness, wheezing and cough unresponsive to albuterol nebs and oral steroids. Laryngoscopy shows the cords adducted anteriorly with paradoxical motion. Question is most likely diagnosis.

- a. Vocal cord granuloma
- b. Subglottic stenosis
- c. Vocal cord paralysis
- d. Vascular ring, laryngitis
- e. Vocal cord dysfunction

**Answer is e**

360. Vignette describes a patient with a history of recurrent pneumonias and ear infections. A chest x-ray reveals a right sided heart. Question is most likely consistent finding.

- a. Dysfunctional cilia
- b. Absent cilia
- c. Absent nasal mucosal glands
- d. Nasal polyps
- e. Nasal septal perforation

**Answer is a**

361. A mother of a 4 month old infant is asking questions about teething. You explain that the maxillary central incisors erupt typically around.

- a. 6-8months

- b. 5-7 months
- c. 8-10 months
- d. 10-12 months
- e. 12-15 months

**Answer is c**

362. Vignette describes a pink to tan-like nodule with a peau d' orange surface in an infant. Robbing the lesion elicits erythema and urticarial lesions. Question is most likely diagnosis.

- a. Benign epithelioma
- b. Congenital melanocytic nevus
- c. Nevus sebaceous
- d. Mastocytosis
- e. Pyogenic granuloma

**Answer is d**

363. Photograph of telogen effluvium shown (you aren't told this). Question is most likely predisposing factor.

- a. Fever
- b. Thyroid disease
- c. Use of public hair trimmers
- d. Habitual hair twirling
- e. Chemotherapy

**Answer is a**

364. Vignette describes breast feeding mom concerned about medications she is on and its effect on her breast-fed infant. Question is which medication is contraindicated in breast feeding mothers.

- a. Synthroid
- b. Acyclovir

- c. Lithium
- d. Labetolol
- e. Carbamazepine

**Answer is c**

365. Vignette describes a pregnant woman in her third trimester worried about a medication her obstetrician is about to start her on and how it would affect her unborn child. Since you see her other kids, she is asking you for advice. Question is which medication prescribed by her OB is likely to cause harm to the unborn child.

- a. Heparin
- b. Phenytoin
- c. Acyclovir
- d. Propanolol
- e. Penicillin

**Answer is d**

366. Vignette describes a 15 year old girl with jaundice, anemia, hepatomegaly, prolonged PTT and PT and hypoglycemia. She has a history of tremors. Question is amongst the options, which will help best with her diagnosis.

- a. Examination of her gait
- b. Examination of her oropharynx
- c. Examination of her eyes
- d. Obtaining a hemoglobin electrophoresis
- e. A urinalysis

**Answer is c**

367. You are shown an x-ray of a nasogastric tube curving into the left thoracic cavity in a fullterm newborn with respiratory distress in the first hour of life. Question is which is true of this newborn's diagnosis.

- a. Mortality is significantly high despite surgery and aggressive management
- b. Drooling, coughing and abdominal distension will be worsened with crying
- c. Bilateral pulmonary rales on auscultation are a consistent finding
- d. The upper esophageal segment is connected directly to the trachea
- e. The lower esophageal segment is connected directly to the trachea

**Answer is a**

368. Vignette describes a mother concerned that her 6 month old infant doesn't understand that her toy still exists when it is not seen. You explain that the concept of object permanence becomes apparent at.

- a. 6-9 months
- b. 9-12 months
- c. 12-15 months
- d. 15-18 months
- e. 21-24 months

**Answer is b**

369. You are shown a picture of bilateral cleft lip and cleft palate. Mom has questions. The correct statement to make is.

- a. The cleft lip is usually repaired first followed by the cleft palate later
- b. The defect occurs in 25% of siblings of affected infants
- c. Feeding problems are common but can be overcome initially with parenteral alimentation
- d. Propped positioning during feeding may increase the risk of reflux
- e. The ailment has a multifactorial etiology hence evaluation for other structural and chromosomal anomaly is unnecessary

**Answer is a**

370. A criterion used to diagnose asthma is an objective assessment of pulmonary function. For patients in whom the diagnosis of asthma is being considered, the NHLBI guidelines recommends that spirometry measurements be undertaken for patients.

- a. 3 years of age and older

- b. 4 years of age and older
- c. 5 years of age and older
- d. 6 years of age and older
- e. 7 years of age and older

**Answer is c**

371. The caloric requirement for a term infant for adequate growth in the first month of life is approximately.

- a. 60-80 kcal/kg/day
- b. 80-100 kcal/kg/day
- c. 100-120kcal/kg/day
- d. 120-160kcal/kg/day
- e. The caloric requirement is none specific

**Answer is c**

372. The following increase the risk of sudden infant death except.

- a. Use of a sleep sack in crib
- b. Use of soft bedding with single linen
- c. Infant in separate room from parents
- d. Side positioning
- e. Prone positioning

**Answer is a**

373. Ex 28 week, now 16 month old male toddler described. Question is what milestone he ought to have achieved.

- a. Sit without support
- b. Crawling
- c. Sit with support
- d. Transfer and reaches out for objects
- e. Imitate laugh

**Answer is e**

374. The following reduce the risk of RDS in a newborn except.

- a. Antenatal corticosteroids
- b. Maternal PIH
- c. Maternal narcotic addiction
- d. Prolonged rupture of membrane
- e. Male

**Answer is e**

375. Vignette asks which of the following is least associated with Polyhydramnios.

- a. Cystic adenomatoid malformation of the lung
- b. Gastroschisis
- c. Maternal diabetes
- d. Placental insufficiency
- e. Werdnig-Hoffman syndrome

**Answer is d**

376. Vignette describes the mother of a 6 month old who is concerned about house fires. Question is best way to protect infant from house fires.

- a. Keep the infant in a play pen each time you are busy
- b. Use electric cookers
- c. Install smoke alarms in furnace
- d. Remove carpet from child's room
- e. Ensure fire extinguisher is in home and working properly

**Answer is c**

377. The following are associated with low maternal alpha fetoprotein except.

- a. Down's syndrome
- b. Edwards syndrome
- c. IUGR
- d. Patau's syndrome
- e. Turner's Syndrome

**Answer is e**

378. You are rounding in the newborn nursery when a resident asks you for the amount of insensible water loss to expect from a 1.6 kg premature infant. You rightly say.

- a. 10-20 ml/kg/day
- b. 20-30 ml/kg/day
- c. 30-40 ml/kg/day
- d. 40-50 ml/kg/day
- e. 50-60 ml/kg/day

**Answer is b**

379. Vignette describes milestones of a 6 month old. Question is what he will achieve in the next 4 months.

- a. Object permanence
- b. Saying mama, dada and uncle specifically
- c. Climbing stairs assisted
- d. Transferring objects from hand to hand
- e. Imitate speech

**Answer is a**

380. A mother is concerned about handedness and asks you what age handedness is established. You rightly say.

- a. First year of life
- b. At 2-3 years
- c. At 4-6 years
- d. At 6-8years
- e. At 8-10 years

**Answer is c**

381. A nurse calls you to evaluate an asymptomatic term newborn at 90 minutes of age with a blood glucose level of 34mg/dl. Question is most appropriate next step in management.

- a. Repeat blood glucose in 30 minutes
- b. Begin D10W IV at maintenance

- c. Give a bolus of D10W via peripheral vein
- d. Give a bolus of D10W via central vein
- e. Initiate breast feeding

**Answer is e**

382. Endocarditis prophylaxis is recommended in all of the following except.

- a. Patient with implanted defibrillator
- b. Previous bacterial endocarditis
- c. Hypertrophic cardiomyopathy
- d. Mitral valve prolapsed with valvular regurgitation
- e. Rheumatic heart disease with valvular dysfunction

**Answer is a**

383. Photograph of hypoplastic nails shown in an infant. You are told mom took the following medications during pregnancy captopril, phenytoin, heparin and phenobarb. Question is most likely additional finding in the infant.

- a. Uprturned nose
- b. PDA
- c. Small metopic ridge
- d. Thrombocytopenia
- e. Rudimentary nipples

**Answer is a**

384. Teenage mother of a 4 month old concerned about falls. Question is most appropriate advice to give.

- a. Fix stair-way gates and keep shut at all times
- b. Leave alone in the play pen when you are busy
- c. Install operable window guards
- d. Remove plastic wrappers from the floor
- e. Keep kitchen and bathroom floor dry always

**Answer is b**

385. Vignette describes school aged child with acute cervical lymphadenitis. Question is least likely causative organism.

- a. Group A strep
- b. Group B strep
- c. Staph aureus
- d. Adenovirus
- e. CMV

**Answer is b**

386. Vignette describes 4 year old female who talks back to teachers, does not obey orders from father and hits his brother. Question is most likely diagnosis.

- a. Temperamental Variation
- b. ODD
- c. ADD
- d. Conduct disorder
- e. Learned behavior

**Answer is a**

387. Which of the following findings in a newborn is most suggestive of Cystic Fibrosis?

- a. Weight loss
- b. Meconium ileus
- c. Pneumonia, weight loss
- d. Diarrhea
- e. Wheezing

**Answer is b**

388. Vignette describes 18 year old male with urinary frequency, dysuria and urethral discharge. Question is most likely organism responsible.

- a. Trichomonas vaginalis
- b. Proteus mirabilis
- c. Syphilis
- d. E-coli

- e. Klebsiella

**Answer is a**

389. Skeletally immature female with left sided thoracic scoliosis and x-ray reveals a cobb angle of 20 degrees. She is asymptomatic. Question is most appropriate next step.

- a. Bracing
- b. Surgical correction
- c. Reassurance with no follow up required
- d. Follow up radiograph in 4 months
- e. Echocardiography

**Answer is d**

390. 12 year old is noted to have a narrow pulse pressure on physical examination during a preparticipation physical examination. Question is which of the following is consistent with this finding.

- a. Aortic Insufficiency
- b. Thyrotoxicosis
- c. Tachycardia
- d. PDA
- e. AV malformation

**Answer is c**

391. Mother of a 15 year old boy whom you referred to a cardiologist for a evaluation of a heart murmur has concerns about sports. Cardiologist diagnosed him with moderate aortic stenosis. Question is which of the following sports can he participate in.-

- a. Volley ball
- b. Basketball
- c. Downhill skiing
- d. Race walking
- e. Weight lifting

**Answer is a**

392. Photograph of an infant with hemangioma in his mandibular and neck region shown. Question is what are you most concerned about?
- a. Airway involvement
  - b. Visceral involvement
  - c. Kasabach-Merritt phenomenon
  - d. Hemorrhage
  - e. Nothing, as most self resolve

**Answer is a**

393. Lethargic 2 year old is brought in by parent for ingestion of an unknown amount of liquid tylenol 8 hours after ingestion. Acetaminophen plasma concentration is 40 mcg/ml. Question is what is the concern?
- a. Liver toxicity
  - b. Tylenol induced encephalopathy
  - c. Cardiomyopathy
  - d. Acute tubular necrosis
  - e. Co-ingestion of another substance

**Answer is e**

394. Spirometry and lung volume result noted as normal FVC, reduced FEV1, reduced FEV1/FVC, increased TLC and increased FRC. Question is the result most likely belongs to a patient with what.
- a. Interstitial fibrosis
  - b. Cystic fibrosis
  - c. Scoliosis
  - d. Neuromuscular disease
  - e. Pneumonitis

**Answer is b**

395. Vignette describes fetal distress in a near term neonate with Meconium stained amniotic fluid, apgars scores of 3 and 5 at 1 and 5 minutes and intubated for respiratory distress. Question is most likely sequelae to expect.

- a. Cerebral palsy
- b. Thrombocytosis
- c. Forced closure of PDA
- d. Retinal hemorrhage
- e. persistent pulmonary hypertension

**Answer is e**

396. Vignette describes a female who drinks a lot of coffee and feels light headed. EKG reveals wide QRS complexes following narrow complex QRS (EKG is shown). Question is most likely diagnosis.

- a. PVCs.
- b. Ventricular tachycardia
- c. Hyperkalemia
- d. Hypokalemia
- e. Atrial fibrillation

**Answer is a**

397. On rounds, your nurse asks at what age visual acuity reaches 20/20. You rightly say at the age of.

- a. 18 months
- b. 2-3 years
- c. 4-5 years
- d. 6-8 years
- e. 8-10 years

**Answer is c**

398. Vignette describes a 1 hour old newborn intubated at birth for suspected RDS and started on mechanical ventilation. Newborn was stable on vent settings but suddenly becomes distressed with abnormal ABGs. Question is least likely reason for his sudden distress.

- a. Machine failure
- b. Persistent pulmonary hypertension
- c. Tube displacement
- d. Pneumothorax

- e. Obstruction of ETT

**Answer is b**

399. Vignette describes muscle spasms in a 10 year old known asthmatic with a serum K of 7.2. Question is most appropriate next step.

- a. Repeat serum K
- b. Administer potassium binding resins
- c. Obtain EKG
- d. Obtain urinalysis
- e. Administer albuterol

**Answer is c**

400. What is the best explanation of the reliability of a test.

- a. A test that gets a similar result with a different performer
- b. A similar test design applicable to different performers
- c. The extent to which a test result is generalizable
- d. The probability that a disease when present will be detected by the test
- e. The probability that a disease when absent will be ruled out by the test

**Answer is a**

## **Must Know Picture List**

Using Zitelli, look at the list below as often as possible before the examination and preferably before you attempt the simulated examinations

### **A**

**Achondroplasia (x-ray of rhizomelia)**

**Acne (neonatal and adolescent)**

**Acrocyanosis**

**Acute pericarditis (EKG)**

**Adenoma sebaceum (facial angiofibromas)**

**Air leak syndrome (ALS) (x-ray of pneumothorax, pneumomediastinum)**

**Alopecia areata**

**Ambiguous genitalia**

**Amniotic bands**

**Androgen insensitivity**

**Angelman syndrome**

**Atrial fibrillation/flutter (EKG)**

**Auricular hematoma**

**Auspitz sign**

**Axillary freckling**

### **B**

**Bacterial Vaginosis (slide of clue cells)**

**Balanitis and Balanoposthitis**

**Bartonella henselae infections (lymphadenitis & bite site)**

**Beckwith-Wiedemann syndrome (BWS)**

**Bell's palsy**

**Biventricular hypertrophy (EKG)**

**Black widow spider**

**Blue berry muffin rash (congenital rubella)**

**Brain abscess (CT scan)**

**Brown recluse spider**

**Brush field spot**

**Bucket handle metaphyseal fracture (abuse)**

### **C**

**Calcaneovalgus**

**Candidal Infections (slide)**

**Caput**

Cellulitis versus erysipelas  
Cephalhematoma (bilateral)  
Cerebral contusion (CT scan)  
Cholesteatoma (otoscopy)  
Club foot  
Congenital Diaphragmatic Hernia (x-ray)  
Congenital hypothyroidism (the big tongue)  
Constitutional Delay (growth chart)  
Corneal abrasion  
Cornelia de Lange syndrome  
Crohn's disease (growth chart)  
Croup (steeple sign on AP x-ray)  
Crouzon versus Apert's syndrome (craniosynostosis, syndactyly)  
Cushing's syndrome (abdominal striae, truncal obesity and moon facies)

## D

Dermatomyositis (facial rash and knuckle)  
Developmental hip dysplasia (x-ray)  
Diarrhea (Rota virus slide)  
Down's syndrome (hand and digit findings)  
Drug Rashes (see topic)  
Duodenal atresia (x-ray)

## E

Ecthyma gangrenosum  
Eczema  
Edward syndrome  
Epidermolysis bullosa  
Epidermolytic hyperkeratosis  
Epidural hematoma (CT scan)  
Epiglottitis (thumbprint x-ray)  
Erythema Chronicum Migrans  
Erythema infectiosum  
Erythema marginatum  
Erythema nodosum  
Erythema toxicum Neonatorum  
Ewing's sarcoma (x-ray)

## F

Familial short stature (growth chart)  
Fetal alcohol syndrome (hypoplastic nails, facies)  
Fetal hydantoin syndrome (hypoplastic nails, facies)  
Fifth metatarsal avulsion fracture (X-ray)  
Foreign body aspiration (x-ray)  
Fragile X syndrome (big ears, coarse facies)

## G

Genu valgum deformity  
Genu varum deformity  
Gottron papules (dermatomyositis)  
Granuloma anulare  
Growth hormone deficiency (growth chart)  
Gynecomastia (prepubertal)

## H

Halo nevus  
Heliotrope rash (dermatomyositis)  
Hemangiomas  
Henoch-Schönlein purpura (rash)  
Herald patch  
Herpes Zoster rash (shingles)  
Heterochromia (waardenburg syndrome)  
Histiocytosis (rash)  
Humeral spiral fracture (abuse)  
Hydrocele (transillumination)  
Hyphema  
Hypospadia

## I

Ichthyosis vulgaris  
Impetigo  
Inguinal Hernia  
Inguinal lymphadenitis  
Intoeing  
Iris coloboma  
Iris hamartomas (Lisch nodules of NF-1)

## J

Juvenile dermatomyositis (malar rash)  
Juvenile Rheumatoid Arthritis (rash)

## **K**

**Kawasaki Disease (buccal mucosa and tongue changes)**

**Kerion**

**Klinefelter's syndrome**

**Klippel Feil syndrome (sprengel deformity)**

**Kwashiorkor (eyelid edema)**

## **L**

**Lead exposure (lead line x-rays and basophilic stippling slide)**

**Legg calve perthes (x-ray)**

**Lens dislocation**

**Lentigines (Peutz Jeghers)**

**Leukamias (blasts slide)**

**Leukocoria**

**Lichen sclerosis**

**Lymphadenitis (cervical)**

**Lymphoid growth (growth chart)**

## **M**

**Macroglossia**

**Malrotation (x-ray)**

**Marasmus**

**Marfan's syndrome (fingers)**

**Meconium ileus (x-ray)**

**Meconium plug (x-ray)**

**Milia**

**Mites and eggs of scabies (microscopy)**

**Molluscum contagiosum (rash)**

**Mongolian spot**

**Morbilliform rash**

**Morphea**

**Myelomeningocele**

## **N**

**Necrotizing fasciitis**

**Neural tube defects (spina bifida occulta, myelomeningocele)**

**Neurocutaneous rashes (ash leaf, incontinentia pigmenti)**

**Neurofibromatosis (neurofibromas, café au lait macules, lisch nodules, tibial bowing)**

Noonan Syndrome  
Numular eczema  
Nursing bottle tooth decay

## O

Obesity (acanthosis nigricans)  
Omphalitis  
Ophthalmia neonatorum  
Optic neuritis (fundoscopy)  
Orchitis  
Osteochondroma (x-ray)  
Osteogenic sarcoma (x-ray)  
Osteoid osteoma (x-ray)  
Osteoporosis (x-ray)

## P

Papillitis (fundoscopy)  
Papilledema (fundoscopy)  
Paraphimosis  
Patau syndrome  
Pedigrees for inheritance patterns (AD, AR, X-linked dominant)  
Peritonsillar abscess (uvula deviation)  
Pes Cavus  
Pes Planus  
Pierre Robin Syndrome  
Pityriasis rosea (rash)  
Pneumonia (x-rays of RML, RUL, parapneumonic effusion and lung abscess)  
Polydactyly (pre and postaxial)  
Polymorphous light eruption (rash)  
Posterior rib fracture x-ray (abuse)  
Prader-Willi syndrome  
Pseudoarthrosis (NF-1)  
Pseudostrabismus  
Psoriasis (rash)  
PUD/H. pylori (endoscopy-nodular gastric antrum)  
Pyogenic granuloma

## R

Retinal detachment  
Retinoblastoma (CT-scan)  
Retropharyngeal abscess (X-ray & CT-scan)

Rickets (rachitic rosary, x-ray of metaphyseal cupping and fraying)  
Right ventricular hypertrophy (EKG)  
RMSF rash  
Rocker bottom feet (trisomy 18)  
Rubinstein-Taybi syndrome (broad thumb)

## S

Salmon Patch  
Schizencephaly (CT-scan)  
Silver-Russell syndrome  
Sinusitis (x-ray and CT-scan)  
SLE (malar and knuckle rash)  
Slipped capital femoral epiphysis (x-ray)  
Smith-Lemli-Opitz syndrome  
Soto's syndrome (macro dolichocephaly)  
Staph scalded skin syndrome  
Strabismus  
Subcutaneous nodules (rheumatic fever)  
Supracondylar fracture (x-ray)  
Swallowed coin (x-ray)  
Syphilis (secondary palm rash, congenital snuffles and rhinitis)

## T

Thrombocytopenia (Slide for ITP)  
Tinea capitis  
Tinea corporis  
Tinea cruris  
Tinea pedis  
Toddlers Fractures (x-ray)  
Transient tachypnea of the newborn (x-ray)  
Treacher Collins Syndrome (facies)  
Trichotillomania  
Tuberous sclerosis (ash leaf macules, shagreen patch, facial angiofibromas)  
Turner's syndrome  
Tympanosclerosis (otoscopy)

## U

Untreated CAH (ambiguous genitalia)

## V

Varicella (rash)

**Varicocele**

**Vascular rings (chest x-ray and UGI)**

**Ventricular tachycardia/fibrillation (EKG)**

**Vesicoureteral reflux (VCUG)**

**Volvulus (x-ray)**

**W**

**Warts**

**White reflex**

**Williams Syndrome**

**Wolf Hirschhorn syndrome**

**Wolf Parkinson white (EKG)**

## **ABOUT THE EXAMINATION**

### **1. What is the examination like?**

It consists of a paper based multiple choice questions. There are two sessions each of 3 1/2 hours duration with a lunch break between sessions. The total numbers of questions vary. It may be 165 questions in the morning and about 168 in the afternoon. So technically you have about an hour per block.

### **2. Can I take breaks during the exam?**

You are in control of your break time. Use your time wisely. To take a break you may be required to turn in your booklet and answer sheet temporarily until you return.

### **3. What are the venues like?**

Generally, quite comfortable and you are allowed to bring in drinks and snacks.

### **4. What is the pass rate for first time takers?**

In 2005, 76.6% of 2850 passed. In 2006, 75.8% of 2892 passed. In 2007, 76.5% of 3009 passed. In 2008, 77.7% of 2916 passed. In 2009 79.1% of 2950 passed. So you see regardless of how many take the examination, the pass rate is in the high 70s.

### **5. How is the passing score determined?**

The minimum passing score reflects a standard developed by the ABP prior to administering the examination. My hunch is an average score of 72.5 percent and above (range 69.5 to 75.5) on the prep questions will get you a passing score on the boards (first attempt only). It's a hunch.

### **6. What is the question format?**

It ranges from patient based clinical vignettes to non patient based single best answer questions to matching questions and also except questions.

### **7. What preparation question bank simulates the examination the best?**

YIPM simulated examination in my opinion. That is why I recommend it highly. The PREP questions are also close to the examination.

### **8. How would you advice a repeat test taker?**

- Get rid of the materials used previously.
- Invest in your success by getting YIPM early and read it as often as possible.

- When you do the prep questions, make sure you understand and read the explanations thoroughly
- Believe in yourself and be disciplined about your preparations

### **INSTRUCTIONS FOR THE SIMULATED EXAMINATION**

1. Each volume has 163 board style clinical vignettes
2. You have 3 hours per volume. Ensure you time yourself.
3. Take a 60 minute break between volumes. The total break time allowed for the simulated exam is 2 hours. You are responsible for your break time. i.e you may take intermittent breaks during the examination (volumes 1 & 2) but this intermittent breaks must not exceed a total of 1 hour.
4. Ensure you simulate this examination in an environment with minimal distractions like a public library
5. You **MUST** follow these instructions for your scores to be interpretable
6. Do not view the answers until both volumes are completed
7. Score yourself using the formula provided before viewing the answers provided
8. If you score below the percentile suggested to ace the boards, do not view the answers. Read the book one more time and if possible, purchase the monkey Q bank and study the explanations to the monkey two liners before retaking the simulated examination
9. Do not begin the examination until you have your timer, answering sheet and pen ready

## Your Intraining Pediatric Manual Simulated Examination Volume 1

- 1) A three year old male has just been diagnosed with autistic disorder by a neuropsychologist. You last saw him six months ago when you referred him to the speech and hearing center for evaluation of his speech and language delay. His mother is tearful as she asks you about his language delay and new diagnosis. In addressing her concerns, you rightly say
- a. Autistic disorder is more common in boys of low socioeconomic background
  - b. Autistic disorder is more common in whites compared to blacks
  - c. The decreased incidence rate of autistic disorder is due to a better understanding of the spectrum
  - d. Autism spectrum disorder is more common in girls
  - e. Children living in poverty are at risk of developing language delay

- 2) Refer to photograph below of a female



Which of the following is true of her condition?

- a. She is at risk of aortic rupture
  - b. Intelligence quotient is normal in 50 percent of affected females
  - c. She has big hands, big feet with elevated growth hormone level
  - d. Her bone age, growth hormone and IGF are normal
  - e. Her caloric intake is high and bone age is advanced
- 3) A 7-year-old boy has started having fecal soiling since starting school. He denies any history of abdominal pain, vomiting or diarrhea. There is no previous history of soiling. You determine that he started having fecal retention

shortly after toilet training. What test would be most helpful in evaluating this child?

- a. Anal manometry
  - b. Barium enema
  - c. Rectal biopsy
  - d. X-ray of the abdomen
  - e. No work up is necessary
- 4) Refer to chest x-ray (below) of a 23 month old brought to your clinic by mom for “wheezing”.



What is the most likely diagnosis?

- a. Acute asthma exacerbation with atelectasis
  - b. Acute laryngotracheobronchitis
  - c. Subglottic stenosis
  - d. Bronchiolitis with hyper-inflated lungs
  - e. Right upper lobe lung abscess with tracheal compression
- 5) A two-year old girl says only single words and has a total vocabulary of six words. Her mother reports that she follows 2 step commands without gesture, points to just six body parts and sometimes pretends to feed a doll. You note she is a very cuddly. She had an ear infection at 6 months of age that was treated and resolved; otherwise her past medical history is unremarkable. The most likely cause for this child’s observed language development is
- a. Pervasive developmental disorder
  - b. Expressive language disorder
  - c. Mixed expressive-receptive language disorder
  - d. Her language development is normal

- e. Hearing loss secondary to otitis media with effusion
- 6) A newborn is noted to have developed cyanosis several hours after an uneventful delivery. Physical examination shows an infant with cyanosis in no distress. Heart rate is 140 bpm and regular, respiratory rate is 40/min and BP is 72/42. Hemoglobin oxygen saturation by pulse oximetry is 70% on room air in the right hand. A 3/6 long, harsh systolic murmur is heard in the upper left sternal border. The liver is 2 cm below the right costal margin. What is the most likely diagnosis?
- Tetralogy of fallot
  - Coarctation of aorta
  - Truncus arteriosus
  - Transposition of great arteries
  - Tricuspid atresia

7) Refer to CT scan below



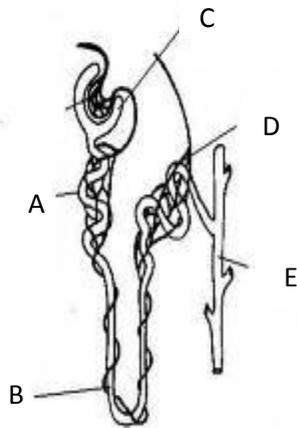
A likely associated finding in patients with the above CT scan is

- Optic nerve hypoplasia
  - Retinal hemorrhages
  - Cyclopia
  - Periungual fibromas
  - All of the above
- 8) A six-year old boy is seen for a well child visit. He is in good health overall and is asymptomatic. Examination is notable for a vibratory systolic murmur in the area of the lower left sternal border and apex which becomes softer during

inspiration and with standing. You are unsure about grading the murmur a 2 or a 3. The remainder of the examination is normal. What is the most appropriate next step in management?

- a. Obtain a chest X-ray
- b. Reassure the parents
- c. Refer to cardiology
- d. Obtain an EKG
- e. Obtain an echocardiogram

9) Refer to diagram below



Where does spironolactone act?

- a. A
  - b. B
  - c. C
  - d. D
  - e. E
- 10) A 12 year old girl presents to the emergency room with severe lip and tongue swelling six hours after a dental extraction. She responds to subcutaneous epinephrine and steroids. Past medical history has been unremarkable until recently her mother reports she has had some very uncomfortable swelling in her hands that lasted several days after trying out for the handball team. She has had one 2-day episode of abdominal pain and diarrhea after eating at a fast-food restaurant and the family attributed this to food poisoning. A work up will most likely reveal

- a. Elevated IgE
  - b. Low C4 and low alternative CH50
  - c. Low C4 and low classical CH50
  - d. Absent properdin
  - e. Elevated alkaline phosphatase
- 11) The parents of an 18 month old boy bring him to you for evaluation of “constipation since early infancy”. He has been managed at home with fair success using glycerin suppositories and laxatives. Physical examination reveals no distention of the abdomen. A copious amount of fecal material is palpated in the large bowel but the rectal ampulla is empty. What is the most appropriate next step in management?
- a. Barium enema
  - b. Administer pediatric fleet enema
  - c. Prescribe longer treatments with laxatives for at least six months
  - d. Obtain an abdominal x-ray
  - e. Discontinue all medications, reassure the parents and begin high fiber diet
- 12) A 2 year old boy is admitted to the hospital because of a generalized seizure. His temperature was 37.8 Celsius. Within an hour of admission he passes loose, watery stools that appear slimy and bloody. He most likely has
- a. Shigellosis
  - b. Salmonellosis
  - c. Yersiniosis
  - d. Staphylococcal enteritis
  - e. Gardiasis
- 13) A three week old infant is brought to the emergency room with a chief complaint of inactivity. The mother reports the infant has a history of “feeding intolerance” and is currently being fed a combination of breast milk and soy based formula. The infant has vomited 4-5 times a day for 3 days. He has 2-3 wet diapers a day and 2-3 loose stools per day. Labor, delivery and prenatal history are unremarkable. Physical examination reveals an infant who is dehydrated and somewhat lethargic. His weight is 7 pounds 6 ounces. His vitals are pulse 182, BP 40/20, RR 32. His skin has poor turgor and his capillary refill time is 3 seconds. His eyes and fontanelle are sunken. You notice

hyperpigmentation in his nipples and scrotal skin. Amongst the options, the most appropriate next step in evaluation is

- a. Measure 17-hydroxyprogesterone in blood
- b. Obtain a BMP
- c. Measure 17-hydroxyprogesterone in urine
- d. Obtain a serum ammonia assay
- e. Obtain urine organic acid

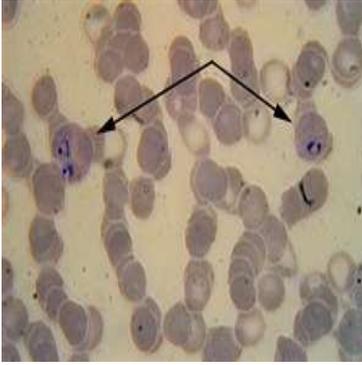
14) Refer to photograph below. What is the most likely diagnosis?



- a. Granuloma annulare
  - b. Tinea corporis
  - c. Nummular eczema
  - d. Erythema chronicum migrans
  - e. Herald patch
- 15) A 5 year old boy presents with a history of growth acceleration, pubic hair development, acne and phallic enlargement. On physical examination, he is tall and muscular and has pubic and axillary hair. He also has testicular and phallic enlargement. Bone age is advanced and LHRH stimulation testing indicates a pubertal response. Your next step in evaluation is
- a. ACTH stimulation test
  - b. Dexamethasone suppression test
  - c. HCG stimulation test
  - d. MRI of head
  - e. Ultrasound of abdomen

- 16) An 8 year old girl is noted to be hypertensive on routine physical examination. Family history is positive for hypertension in her mother, maternal uncle and maternal grandfather. Laboratory evaluation reveals mild hypokalemia, suppressed plasma rennin activity and elevated serum and urinary aldosterone. Your next step in evaluation is
- Adrenal vein sampling
  - MRI of the adrenals
  - Renal arteriography
  - Dexamethasone suppression test
  - Urine cortisol
- 17) A newborn infant is noted to have ambiguous genitalia with one opening on the perineum, a phallic structure with chordee and no palpable gonads. Physical examination is otherwise unremarkable. The infant is feeding well and gaining weight. Karyotype is 46XY and ultrasound does not reveal a uterus. ACTH stimulation test is normal. The most appropriate next step in evaluation is
- Measurement of androstenedione, testosterone and DHT
  - VCUG
  - MRI of the abdomen
  - LHRH stimulation test
  - Obtain a BMP
- 18) A 14 month old infant is referred to you for evaluation of his bow legs. He is exclusively breastfed. He is noted to have signs and lab findings consistent with vitamin D deficient rickets. Consistent lab findings include
- Low calcium, low phosphorus, low alkaline phosphatase and low 1-25 (OH) vitamin D<sub>3</sub>
  - Low calcium, high phosphorus, elevated alkaline phosphatase and low 25 (OH) vitamin D<sub>3</sub>
  - Low calcium, low phosphorus elevated alkaline phosphatase and elevated parathyroid hormone level
  - Low calcium, low phosphorus, elevated alkaline phosphatase and increase 1-25 vitamin D
  - Low calcium, high phosphorus and elevated parathyroid hormone level.

- 19) You are seeing a newborn in the nursery whose mother admits to abusing PCP during pregnancy. A likely manifestation of PCP exposure in this baby is
- Roving eye movement
  - Hypertonicity
  - Prematurity
  - Low birth weight
  - Tachypnea
- 20) An infant in the newborn nursery is jittery and crying excessively. You note he is having tremors. Past medical history is significant for a 19 year old mother who had no prenatal care and no prenatal labs prior to a normal spontaneous vaginal delivery. A urine drug screen is positive for cannabis. A likely expected finding in this infant is
- Prematurity
  - Low birth weight
  - Hypotonia
  - Microcephaly
  - Neonatal abstinence syndrome
- 21) An infant was born at term with a birth weight of 2kg. The most likely intrauterine drug exposure associated with this infants birth weight is
- Fentanyl
  - Marijuana
  - Nicotine
  - PCP
  - Methadone
- 22) Refer to slide below of a patient with jaundice



What is the most likely diagnosis?

- a. Hereditary elliptocytosis
  - b. Hereditary spherocytosis
  - c. Leukemoid reaction
  - d. Malaria
  - e. Liver disease with acanthocytosis
- 23) A 15 year old boy received a diagnosis of Crohn's disease six months ago. He has had active disease despite 5 months of 6-mercaptopurine therapy and two courses of corticosteroid therapy. Of the following, which is the most likely to induce and maintain remission?
- a. Azathioprine
  - b. Infliximab
  - c. Mesalamine
  - d. Metronidazole
  - e. Rifaximin
- 24) You suspect inflammatory bowel disease in an adolescent male with abdominal cramps, bloody diarrhea and weight loss. What is the most effective non invasive test to differentiate Ulcerative colitis from Crohn's disease?
- a. Serologic panel
  - b. Fecal calprotectin and lactoferrin assay
  - c. Serum albumin assay
  - d. Stool for occult blood
  - e. Erythrocyte sedimentation rate

- 25) An infant is brought in to your clinic by mom one week after discharge from the nursery for fever and “back pain”. She is a term infant with birth weight of 3.7kg. Labor was induced for maternal preeclampsia. Amniotic fluid was meconium stained and although baby required no resuscitation, apgars were 4 and 9 at one and five minutes respectively. The mother is blood group O negative with a history of amniocentesis and she received rhogam for this pregnancy. Physical examination reveals an irritable infant with warm, confluent, blanching, erythematous and somewhat purpuric area covering the upper third of his back with shotty axillary adenopathy. What is the best test for definitive diagnosis?
- a. Blood culture
  - b. Skin biopsy
  - c. Diagnosis is clinical
  - d. Lymph node biopsy
  - e. Bone marrow biopsy

- 26) Refer to the picture below of a 12 year old boy



Consistent with his diagnosis is a history of

- a. Chelation with succimer for heavy metal intoxication
  - b. Untreated group A streptococcal pharyngitis
  - c. Camping in the woods
  - d. Sulfonamide containing antibiotic use
  - e. Brown recluse spider bite
- 27) An otherwise healthy 12 year old boy is concerned about what his mom calls “acne” on his face. His mom admits to using several over the counter acne

preparations for the past three years but the lesions are worse and she is requesting you prescribe oral doxycycline. You note 3 mm, well demarcated domed papules with a reddish-brown color on the nose, cheeks and nasolabial folds. His lesions are most commonly associated with

- a. Multiple Endocrine Neoplasia type 1
  - b. Neurofibromatosis
  - c. Incontinentia pigmenti
  - d. Androgen exposure
  - e. Rubinstein Taybi syndrome
- 28) A concerned mom brings in her 14 year old son who she says is hostile, bullies other kids and trusts no one. As an adult, hostile kids who mistrust others are at increased risk of what?
- a. Suicide
  - b. Depression
  - c. Heart disease
  - d. Post traumatic stress disorder
  - e. Substance abuse
- 29) During a medicaid screen check up visit of a nine-year old male, you ask his parents for their source of drinking water. In addressing potential contaminants of tap water you tell his mom that the two most common microbiologic contaminants of concern are
- a. *Gardia lambia* and *E. hystolitica*
  - b. *E.coli* and *E. hystolitica*
  - c. *E.coli* and *cryptosporidium*
  - d. *Cryptosporidium* and *gardia lambia*
  - e. *Salmonella thyphi* and Nitrate
- 30) After you examine a term newborn delivered via normal spontaneous vaginal delivery, you discuss feeding options with the mother. The mother asks you which infant feeding is best to prevent atopic disease in the infant. You rightly say

- a. Cow milk-based formula
- b. Human Milk
- c. Soy based formulas
- d. Extremely hydrolyzed formula
- e. Modified soy formula

31) You take care of an 11 year old male with moderate persistent asthma. He has had two ICU admissions in the past. His mother is concerned about ways to improve patient adherence and medication compliance. Medication compliance of a patient under the age of 12 years is best achieved when

- a. An action plan is available and is understood by the teachers and parents
- b. Parent and patient relationship is very good
- c. Patient self administers medications and is in charge of his action plan
- d. Doctor-patient communication is better
- e. Parent education about asthma is improved

Match the following nutrients, minerals or vitamins to their deficient state in the options below. Each answer may be used only once or not at all.

- 32) Vitamin B2
- 33) Essential fatty acids
- 34) Biotin
- 35) Zinc
- 36) Copper
- 37) Vitamin E

- a. Microcytic anemia, ataxia and neuropathy
- b. Achromotrichia, alopecia and seborrheic rash
- c. Diarrhea, dermatitis and dementia
- d. Diarrhea, dermatitis, alopecia and poor wound healing
- e. None of the above

38) A mother has brought her 2 week old infant for a well baby check up. She has heard that extensive hydrolyzed formulas are better than cow based formulas. For which of the following conditions is extensive hydrolyzed formula indicated?

- a. GERD

- b. Lactose intolerance
- c. Very low birth weight infants
- d. Colic
- e. First degree relative with contact dermatitis

39) Which of the blood gas results below is consistent with an obese adolescent with obstructive sleep apnea?

- a. PH 7.37, pco2 60, po2 50 BE 7
- b. PH 7.47, pco2 48, po2 78, BE 11
- c. PH 6.97, pco2 101, po2 19, BE16
- d. PH 7.42, pco2 60, po2 92, BE 10
- e. None of the above

40) Photograph below is of a 5 year old female with sore throat



What is the most likely causative organism?

- a. Herpes simplex virus
  - b. Coxsackie virus
  - c. Strep Pyogenes
  - d. Adenovirus
  - e. N. Gonorrhoea
- 41) A 17 year old female presents to the ER with generalized weakness associated with perioral numbness. She is on a weight loss diet. On physical exam, she has mild pallor. She denies use of any medications. BP 120/88 mmHg and physical exam is normal. Lab data: Cr 1.2mg/dL, BUN 15mg/dL, Na 136 , K 2.8 , Cl 88 , HCO3 38. Urine Na 45 meq/L, Urine K 35 meq/L, Urine Cl 8 meq/L, Urine

specific gravity 1.010, Urine pH 7. What is the most likely diagnosis?

- a. Laxative Abuse
  - b. Surreptitious vomiting
  - c. Licorice abuse
  - d. Diuretic abuse
  - e. Hyporeninemic Hypoaldosteronism
- 42) What is the most appropriate next step in the management for the patient above?
- a. IV normal saline
  - b. Spironolactone
  - c. Amiloride
  - d. Psychiatry consult
  - e. Reassurance because this is self limiting
- 43) You are rounding with a group of medical students and talking about water contaminants. You tell them that bisphenol is an emerging contaminant of concern. One of the students asks you for a potential source of bisphenol. You rightly say
- a. Lead pipes
  - b. Organic fertilizers
  - c. Polycarbonated plastic bottles
  - d. Sewage
  - e. Ceramic mugs
- 44) A man spends a long evening during a summer heat wave in air-conditioned comfort with his teenage daughter. They both enjoyed a savory meal, including a fresh salad sprinkled with wild mushrooms gathered from the nearby woods. This was followed by a dessert of freshly baked brownies slathered in organic honey. While driving home from dinner, his daughter experiences abdominal cramps and weakness. He is puzzled but not concerned until she begins to complain of confusion. The man pulls the car to the roadside as his daughter becomes progressively worse, eventually suffering a brief episode of loss of consciousness. What may be responsible for her' signs and symptoms?
- a. Amatoxin

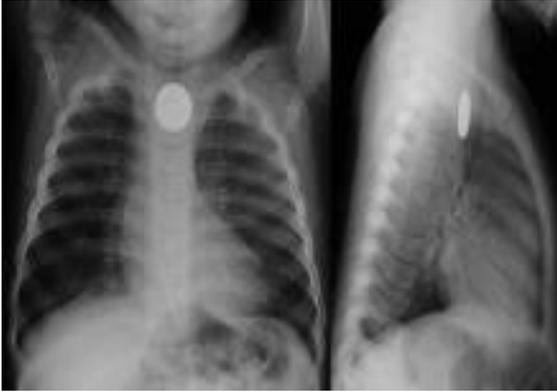
- b. Botulism poisoning
  - c. Acute staphylococcal poisoning
  - d. Marijuana ingestion
  - e. Organic solvent intoxication
- 45) A 7-year-old boy is brought to the emergency department by his mother because of “tea-colored urine” for the last several days. He has also had some nausea and vomiting, and his eyes appear swollen when he wakes up in the morning. The eye swelling tends to resolve over the course of the day. He is generally very healthy and there is no family history of any chronic diseases. His temperature is 36.7 C (98.0 F), blood pressure is 130/90 mm Hg, pulse is 96/min, and respiratory rate is 16/min. Physical examination is unremarkable. A urinalysis shows red cell casts. At this time the most appropriate study to confirm your diagnosis is
- a. Antinuclear antibody
  - b. Antistreptolysin O antibody
  - c. Renal biopsy
  - d. Renal ultrasound
  - e. Urine culture
- 46) A concerned mother brings her 23 month old son to see you because he is having “difficulty with his language”. He uses only eight distinct words. Prenatal, labor and delivery history are unremarkable. Although he can make his wants known through gesturing and use of limited vocabulary, he throws temper tantrums when his parents insists he uses words for requests rather than gestures. You note he is playing with a toy truck and making sounds that sound like a moving truck, he picks up a toy dog and mimics a bark appropriately. His father admits he himself was a late talker. In addressing the mothers concerns, you tell her that
- a. He has isolated expressive language delay and will most likely catch up but will perform within a slightly limited range for reading
  - b. He requires a WRAT to assess single-word reading and spelling skills
  - c. He requires a referral to a neuropsychologist for a comprehensive evaluation.
  - d. His receptive language is adequate
  - e. He requires behavioral therapy

47) Refer to image below



What is the most likely diagnosis?

- a. Osteoid osteoma
  - b. Unicameral bone cyst
  - c. Osteochondroma
  - d. Chronic osteomyelitis
  - e. Histiocytosis X
- 48) A five year old female who received speech therapy as a preschooler is brought in by her concerned parent for “problems with language formulation”. Her mother reports that she struggles to recognize most lower case and some upper case letters of the alphabet. Her last evaluation by the speech pathologist was unremarkable and speech therapy was discontinued when she met the set goals. Although she is happy to have her parents and teacher read to her, she is easily distracted and seems uninterested in guided reading books provided by her kindergarten teacher. Her kindergarten nurse reports 20/25 and 20/25 in visual acuity in left and right eyes respectively. Her teacher is recommending she repeats kindergarten. What is the most appropriate next step in management?
- a. A hearing screen with age appropriate screening audiometry
  - b. Referral for ADHD screening
  - c. Referral for cognitive testing and assessment of prereading skills
  - d. Referral to optometry for corrective glasses evaluation
  - e. Referral for autism screen
- 49) The father of a 26 month old female brings her to the emergency room because he suspects she might have swallowed a coin about 6 hours ago. Besides from drooling, the patient has been asymptomatic. Her x-ray is below.



What is the most appropriate next step in management?

- a. Non urgent endoscopy
  - b. Urgent endoscopy
  - c. Reassure her father that the coin will pass in 4-6 days
  - d. Tell her father the coin is in the trachea and then prepare to intubate
  - e. Consult surgery
- 50) A seven year old boy is at your clinic with his foster mom because of what she perceives to be his failure to progress in reading development. He has problems in spelling and written expression. “He always was a slow reader’ she says’ but everyone said he would catch up”. There is no known family history of language or academic problems to the best of his foster mom’s knowledge. His teacher reports that he struggles to sound words out and feels that if he was more effective at decoding words, comprehension of what he reads may be adequate. What is the most important additional history to obtain?
- a. Nutritional history
  - b. History of lead exposure
  - c. Family history
  - d. Immunization history
  - e. Social history
- 51) A 7 year old girl recently diagnosed with allergic rhinitis had blood taken for allergy testing. Results of her allergy test shows moderate allergy to indoor mold, outdoor mold, dust mite, shrimps, grass pollen, cockroaches, and animal dander. Allergen avoidance will be least effective against which of the following
- a. Indoor mold

- b. Cigarette smoke
- c. Pollen
- d. Outdoor mold
- e. Dust mite

52) The typical rash seen in rocky mountain spotted fever is

- a. Intensely pruritic
- b. Always present on day 1 of illness
- c. Presents initially as non blanching erythematous macules
- d. Presents initially as blanching erythematous macules
- e. Spreads from trunk to extremities

53) An 8 year old male sustained an injury to his right elbow after falling from a height with his hands outstretched. He was evaluated in the ED with a splint placed about six days ago. His x-ray is shown below.



He is now experiencing weakness in flexion of his right index finger and thumb. Which of the following complications is most likely?

- a. Brachial artery injury
  - b. Anterior interosseous nerve injury
  - c. Median nerve injury
  - d. Volkmann ischemic contracture
  - e. Radial nerve injury
- 54) A term newborn delivered via normal vaginal route in the summer is noted to have a vesicular lesion on her abdomen on day 3 of life. Prenatal, labor and delivery history are unremarkable and mom denies any history of genital herpes.

You check the delivery records and no documentation of lesions noted in the vagina before or at delivery. The child appears limp, lethargic and she develops a generalized tonic clonic seizure and becomes apneic. She is intubated. What is the best test to order to diagnose this patient's illness promptly?

- a. Electroencephalogram
- b. C.S.F for enteroviral PCR
- c. C.S.F for herpes PCR
- d. Viral culture of vesicle content
- e. CSF gram stain

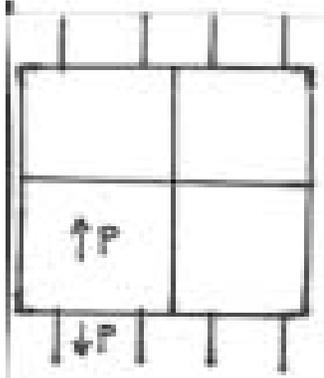
55) You refer a 2 year old boy to a dentist. His photograph below is consistent with a boy who



- a. Eats too much candies
  - b. Used fluoride containing toothpaste for the past 9 months
  - c. Hasn't been weaned from the bottle
  - d. Inadvertently received a course of tetracycline
  - e. Is deficient in folate and has a teeth grinding habit
- 56) A two week old male infant is having a routine well child check up visit post an uneventful delivery. Your nurse alerts you to his newborn screen result which reveals elevated TSH. Asides from the mother's complaints of poor feeding, his evaluation today reveals no goiter or abnormal finding. What is the most appropriate next step in management?
- a. Reassure his mother
  - b. Obtain serum for free T4 assay
  - c. Obtain serum thyroglobulin

- d. Initiate treatment with L-thyroxine
- e. Confirm the elevated screening TSH with a repeat serum TSH

57) Refer to cardiac cath result diagram below (pressure, p is increased in the right ventricle and decrease in the pulmonary artery)



The cath result is consistent with

- a. Tetralogy of Fallot
  - b. Total anomalous pulmonary venous return
  - c. Pulmonary stenosis
  - d. Transposition of great arteries
  - e. Truncus arteriosus
- 58) A 16 month old female presents with red nodules on her cheeks. She is otherwise healthy. Her mother admits to using cold pacifiers to sooth her teething problem. Her 3 year old male sibling has a history of nickel dermatitis. Of the following, the most appropriate next step in management of this patient is
- a. Reassurance that no work up or treatment is necessary
  - b. Application of low potency topical steroids to the lesions
  - c. Application of emollients to the lesions
  - d. Explore teething concerns then advice mom on better soothing techniques
  - e. Discontinue use of the cold pacifier and advice on twice daily warm compresses
- 59) A five year old boy was bitten 2 days ago by a stray dog. The patient was seen at a local emergency room. Animal control and the police are having difficulty finding the dog for confinement. He was started on a 10 day course of

augmentin orally after wound irrigation and dressing were done in the emergency room. He received his 4<sup>th</sup> DTaP at age 4 years. He is at your clinic today for a follow up visit. What is the most appropriate next step in management?

- a. Administer rabies immunoglobulin and rabies vaccine
- b. Do nothing until the dog is found
- c. Give 5<sup>th</sup> DTaP and rabies immunoglobulin
- d. Give rabies vaccine only
- e. Give 5<sup>th</sup> DTaP, rabies immunoglobulin and rabies vaccine

60) The x-ray below belongs to a 14 year old male.



Which of the following is consistent with his diagnosis?

- a. He is an unrestrained passenger in a motor vehicle accident
  - b. His diet is low in fiber
  - c. He is obese
  - d. He is on chronic steroid therapy
  - e. He is rheumatoid factor positive
- 61) A 6-month-old boy is brought to you for a follow-up examination. He was born at 35 weeks' gestation and has had persistent wheezing since shortly after birth despite treatments with bronchodilators and oral corticosteroids. His diet consists of 32 ounces of iron-fortified cow's milk-based formula daily. He has no difficulty eating. He appears well nourished and happy. On examination, there is moderate relief of wheezing when his neck is hyperextended. Which of the following is the most likely cause of his symptoms?
- a. Laryngomalacia
  - b. Aspiration of a foreign body
  - c. Compression of the airway by a vascular ring

- d. Tracheomalacia
  - e. Persistent immaturity of lungs
- 62) A health screen CBC done on a 6-year-old African American female reveals hemoglobin of 9.1g/dl. Her mother denies any relevant past medical history except that she was exclusively breastfed for 12 months and had jaundice in the first week of life. She eats a lot of meat now and she is not on a special diet. She has mildly icteric sclera bilaterally. A follow up peripheral smear reveals bite cells and heinze bodies. You suspect hemolytic anemia. What is the most likely cause of hemolysis in this patient?
- a. Hemoglobin SC disease with hemolytic crisis
  - b. Vitamin E deficiency
  - c. Functional asplenia
  - d. Vitamin C toxicity
  - e. Autoimmune hemolytic anemia
- 63) The mother of a 3 year old boy solicits the help of a neighbor to care for her son while she works. The neighbor has just been diagnosed with pulmonary tuberculosis. His mother brings him to your clinic anxious and wearing an N-95 face-mask. A PPD test on the 3-year-old reads 1mm induration. What is the most appropriate next step in management?
- a. Repeat PPD in 48 hours
  - b. Isoniazid chemoprophylaxis
  - c. Begin airborne precautions by putting an N95 mask on the boys face and then obtain a more detailed history
  - d. Obtain a chest x-ray
  - e. Eliminate further contact with or exposure to the neighbor, educate mom about appropriate isolation and place another PPD on the boy 2 weeks later
- 64) You refer a 2-month-old infant to a pediatric cardiologist for evaluation of a heart murmur and cyanosis. The infant was noted at birth to have an upper left sternal border ejection murmur. The infant at that time was not cyanotic, but slowly developed cyanosis over the next two months. The pediatric cardiologist evaluates the patient and orders an EKG and a chest x-ray. The EKG reveals

right axis deviation and right ventricular hypertrophy. The heart appears small on the chest x-ray and pulmonary blood flow appears diminished. What is the most likely diagnosis?

- a. Complete atrioventricular canal defect
- b. Hypoplastic left ventricle
- c. Isolated atrial septal defect
- d. Tetralogy of Fallot
- e. Transposition of the great arteries

65) Refer to photograph below of a 16 year old boy. He describes the lesions as painful.

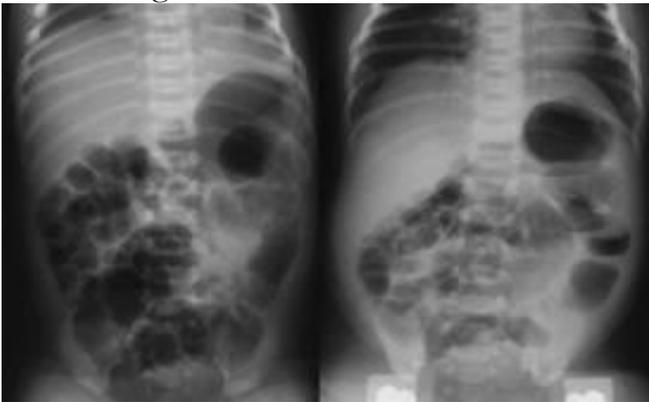


What is the most likely diagnosis?

- a. Bullous impetigo
  - b. Shingles
  - c. Eczema herpeticum
  - d. Granuloma annulare
  - e. Ecthyma
- 66) A 1400-g infant, born at 35 weeks' gestation is 42 cm in length and has a head circumference of 28 cm. One day after birth, she becomes very irritable and tremulous with an inconsolable high-pitched cry. Her pulse is 174/min. She doesn't appear dysmorphic. To which of the following substances was this newborn most likely exposed in utero?
- a. Alcohol
  - b. Barbiturates

- c. Cocaine
- d. Marijuana
- e. Opiates

67) The abdominal x-rays below of a 2 week old infant are consistent with which of the following



- a. Necrotizing enterocolitis
  - b. Constipation
  - c. Hirschsprungs disease
  - d. Malrotation
  - e. Lymphoid hyperplasia
- 68) When treating a child with acute asthma exacerbation in the emergency room, using MDI with a spacer has been shown to result in which of the following compared to the use of nebulizer
- a. Higher hospitalization rate
  - b. Shorter stay in emergency room
  - c. Higher relapse rate
  - d. Less improvement in peak flow rate
  - e. Increase in total dose of albuterol delivered
- 69) Which of the following is affected the least in a girl going through puberty?
- a. Red blood cell mass
  - b. High density lipoprotein

- c. Triglycerides
- d. Blood pressure
- e. Serum aldosterone

70) Refer to picture below

What is the diagnosis?



- a. Cornelia de lange
  - b. Noonan's syndrome
  - c. Williams syndrome
  - d. Prader Willi syndrome
  - e. Smith Lemli opitz syndrome
- 71) The mother of a 35 week preterm infant is concerned about vitamin D supplementation. She plans to breast feed exclusively. When is the best time to supplement with vitamin D?
- a. At birth
  - b. At 6 weeks
  - c. At 2 months,
  - d. At 4months
  - e. No supplementation is necessary

For questions 72-76, match the medications listed with their withdrawal symptoms. Each answer may be used once, more than once or not at all.

- 72) Alcohol
- 73) Phenobarbital

- 74) Heroin
- 75) Cocaine
- 76) Amphetamine
- a. Jitteriness, Seizure, opisthotonus and hyperactivity
  - b. Poor feeding, seizures, persistent suck and hypertonia
  - c. Poor feeding, poor cry, irritability and hyperactivity
  - d. Jitteriness, high pitched cry, alertness and excessive suck
  - e. No abstinence symptoms
- 77) A nine-year old female is at your clinic for evaluation of her asthma. She had an exacerbation of her symptoms 5-weeks ago that was successfully treated with a five day course of prednisone and albuterol metered dose inhaler. In the past 4-weeks, her mother reports shortness of breath and wheezing 3 times per week which improves with the use of her albuterol. She doesn't awake at night due to symptom and as long as she has her inhaler with her, she doesn't feel her activities are limited by her symptoms. Prior to her recent steroid therapy, she last used steroids about 12 months ago. Based on her symptoms, you classify her asthma as
- a. Mild persistent
  - b. Mild intermittent
  - c. Intermittent
  - d. Moderate persistent
  - e. Hard to tell without a peak flow test
- 78) Which of the following confirmed findings in a 3 year old female is diagnostic of sexual abuse?
- a. Bacterial vaginosis
  - b. Genital herpes
  - c. Anogenital warts
  - d. Hepatitis B
  - e. Gonorrhea
- 79) Refer to the Image below



Which of the following is consistent with the diagnosis?

- a. Long arm span
- b. Inability to oppose fingers voluntarily
- c. Inability to flex index finger
- d. Long fingers
- e. Clenched fist



80) The lesion above is likely a result of

- a. Improper hygiene and mixed flora infection of the glans
- b. Prolonged and improper retraction of foreskin
- c. Improper hygiene and mixed flora infection of the foreskin and glans
- d. Frequent retraction of the foreskin by parents to clean the glans
- e. B and D

81) Refer to picture below of a 21 month old male



What is the mode of inheritance of his condition?

- a. Autosomal recessive
  - b. X-linked recessive
  - c. Polygenic and multifactorial
  - d. X-linked dominant
  - e. Autosomal dominant
- 82) A five year old boy is brought to your clinic accompanied by his older sister with complaints of staple pin injury. He was playing barefoot with an open box of rusted industrial staple pins when he accidentally spilled them and one got stuck in his right heel. Bleeding is minimal but the pin is deeply embedded. His immunization history reveals his 4<sup>th</sup> DTaP was given at the age of 18 months. You remove the pin and after appropriate wound dressing, you tell his sister
- a. DTaP is indicated because it's a dirty wound
  - b. Tetanus immune globulin and Pseudomonas prophylaxis are indicated
  - c. Tetanus Immunoglobulin is indicated
  - d. DTaP and Tetanus Immunoglobulin are indicated
  - e. Return if wound looks infected

83) Refer to table below

	<b>No disease X develops</b>	<b>Disease X develops</b>
<b>Exposed</b>	<b>A</b>	<b>B</b>
<b>Not exposed</b>	<b>C</b>	<b>D</b>

The prevalence of disease X above is

- a.  $A+B/(A+C) + (A+B)$
  - b.  $B+D/(A+B) + (B+D)$
  - c.  $A+B/A+C$
  - d.  $A+C/(A+B) + (A+C)$
  - e.  $B+A/(B+D) + (B+A)$
- 84) You are called to evaluate a 23 hour old term infant with non-bilious vomiting. The infant was born at term via NSVD with low birth weight. Prenatal ultrasound revealed Polyhydramnios. The most likely cause of his symptom/s is
- a. Pyloric stenosis
  - b. Duodenal atresia
  - c. Antral web
  - d. Annular pancreas
  - e. Vascular ring
- 85) You prescribe ibuprofen for presumed viral pharyngitis to a nine year old girl with fever and sore throat. Following three days of therapy, she returns for evaluation of a rash that began on her face and spreads to her trunk, back and extremities. You suspect fixed drug eruption. Consistent with your suspicion are
- a. Erythematous macules on soles and palms with blistering sores on the tongue and posterior pharynx
  - b. Erythematous patches and plaques on the back that fade with residual hyperpigmentation
  - c. Conjunctival erosions and buccal mucosa blistering
  - d. Red itchy wheals with edematous bullae and crusting
  - e. Blisters and vesicles on an erythematous base
- 86) A six year old girl is brought to your office for evaluation of swelling of her eyes and legs. Three weeks ago, she had a fever, bloody diarrhea and abdominal pain that resolved spontaneously. Laboratory studies revealed anemia, mild thrombocytopenia, normal electrolytes, elevated BUN and creatinine concentrations with proteinuria. A peripheral smear of this patient's blood is likely to reveal

- a. Giant platelets
  - b. Howell jolly bodies
  - c. Acanthocytes and burr cells
  - d. Bite cells and heinz bodies
  - e. Fragmented red blood cells
- 87) A 4.3 kg newborn is noted to be jaundiced when examined on postnatal day 14. Total bilirubin is 16.0mg/dl and a direct fraction is 0.8mg/dl. Hematocrit is 52 percent. The infant has been breast fed exclusively since birth. Mom denies any history of surgeries or procedures and says this was her first pregnancy. Your records show mom's blood type is O negative and the baby is A positive. A coombs test is negative. The most likely cause of jaundice in this newborn is
- a. Rhesus incompatibility
  - b. ABO incompatibility
  - c. Breast milk jaundice
  - d. Polycythemia
  - e. Breast feeding jaundice causing exaggerated physiologic jaundice
- 88) You are evaluating a child for a routine physical. You note she walks independently and follows one step commands without gesture. You inform her mother that during her next visit, she should be able to
- a. Stack two blocks
  - b. Knows sex and name of a friend
  - c. Imitate speech
  - d. Play board games
  - e. Name five body parts
- 89) A 3year old child is found in a garage drinking an unknown liquid from an open paint can. Mom describes dad as a "chemical guru". Upon evaluation in the ED, the child is coughing, appears irritable and has difficulty swallowing liquids with slight drooling. Examination of his oral cavity reveals no evidence of burns or ulcerations. The ED attending informs your about the child and asks for your advice on what to do next. You advice

- a. Passing a NG tube to decompress stomach
  - b. Giving supplemental oxygen before getting a chest x-ray
  - c. Esophagoscopy as soon as possible
  - d. Supportive care with instructions on home oral therapy
  - e. Copious irrigation of the stomach
- 90) Which of the following reimbursement payment methodologies poses the least risk to a general pediatrician?
- a. Discounted fee for service
  - b. Capitation plus withholds
  - c. Negotiated fee schedule
  - d. Global fees/package price per episode
  - e. Full capitation
- 91) A school aged boy is brought in by his father who says “he tires out easily” in the afternoons. In the mornings especially on weekends, he is active and playful. His afternoon tiredness is sometimes associated with inability to open his eyes. His father admits he eats a lot of honey and was out in the woods camping recently. He sometimes wets his bed but has no fecal incontinence. On examination you note bilateral ptosis, weakness and normal deep tendon reflexes. Which of the following will best establish a diagnosis?
- a. A thorough search for a tick on his body
  - b. Edrophonium test
  - c. Stool for botulinum toxin assay
  - d. Lymes serology
  - e. MRI spine

- 92) Refer to diagram below



The tympanogram finding above is consistent with

- a. Tympanic perforation
- b. Cholesteatoma
- c. Middle ear effusion
- d. Intact mobile TM with poor ET tube function
- e. Normal TM with excessive negative pressure

Match the following anticonvulsant medications with their side effect/s in the options below. Each answer may be used only once or not at all.

- 93) Valproic acid
- 94) Ethosuximide
- 95) Levetiracetam
- 96) Felbamate
- 97) Topiramate

- a. Hiccups and stomach upset
- b. Weight loss, glaucoma and metabolic acidosis
- c. Pancreatitis and tremors
- d. Toxic epidermal necrolysis
- e. Irritability and aggression
- f. Hirsutism and gingival hyperplasia
- g. Sleep disturbance and aplastic anemia
- h. Weight gain and tremors

- 98) A 26 month old female with muscle spasms is found to have a serum potassium level of 7.2. Of note is a past medical history of asthma. Your best initial action is to

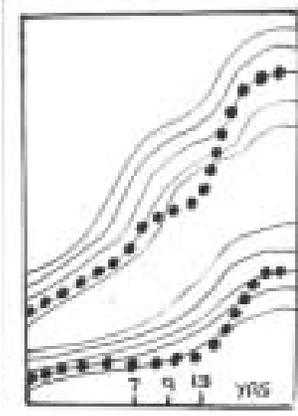
- a. Obtain a repeat serum potassium
- b. Obtain an EKG
- c. Administer potassium binding resins
- d. Administer albuterol immediately
- e. Obtain urinalysis

- 99) Refer to picture below



What is the most likely diagnosis?

- a. Congenital melanocytic nevus
  - b. Pyogenic granuloma
  - c. Hemangioma
  - d. Angiofibroma
  - e. Nevus Sebaceous
- 100) A 37 week newborn is cyanotic and requires intubation for respiratory distress. Findings include heart rate 175, BP 60/30, increased right ventricular activity, single s2, short systolic murmur and equal arm and leg pulses. CXR shows normal size heart and pulmonary congestion. ABG (right radial artery on 100% fio2): ph 7.31, Pao2-143, PaCO2 48. Of the following, the most likely diagnosis is
- a. TAPVR
  - b. Hyaline membrane disease
  - c. Hypoplastic left heart
  - d. Intrauterine constriction of the ductus arteriosus
  - e. Tetralogy of fallot
- 101) Below is a growth chart of a 17 year old.

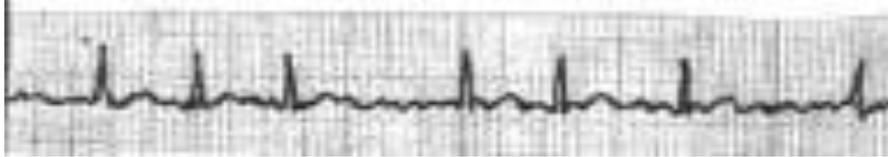


This patient is likely to have or have had

- a. Short parents
  - b. Delayed bone age
  - c. Abnormal karyotype
  - d. Elevated ESR
  - e. Frontal bossing and short fifth digit
- 102) A frantic mom brings in her three year old son for “trouble breathing” and somnolence. She states he was active and playful an hour ago. You note the child is wheezing and has retractions with profuse sweating. You ask his mom about a possible exposure to
- a. Kerosene
  - b. Castor bean spore
  - c. Marijuana smoke
  - d. Carbon monoxide
  - e. Malathion spray
- 103) The above 3 year old patient is likely to have which additional finding
- a. Decrease blood pressure
  - b. Mydriasis
  - c. Increased heart rate
  - d. Buccal mucosa ulcers and erosions
  - e. Crystals in urine

- 104) The risk of impaired intellectual function and neuropsychological development is increased in patients with congenital hypothyroidism if diagnosis or treatment initiation is delayed beyond
- 2 weeks of age
  - 1 month of age
  - 3 months of age
  - 6 months of age
  - 2 years old
- 105) An 11 year old girl presents with low grade fever, a sore throat and dark urine. She denies pain with urination and no abdominal pain or swelling. Her blood pressure is normal and you note no edema on physical examination. Her urinalysis is positive for blood and protein. Which of the following statements is true of her diagnosis?
- Prognosis is worse in adults compared to children
  - Serum complement (c3) is low
  - About 50% of children progress to end stage renal disease
  - A history of hepatitis B is commonly associated
  - Prompt treatment of the sore throat reduces her chance of getting acute rheumatic fever
- 106) On the average, what percentage of pediatricians practice revenues are derived from managed care contracts
- 20 percent
  - 40 percent
  - 60 percent
  - 80 percent
  - 100 percent
- 107) A lethargic 9 month old ex-premie is brought to the ED. He had been very irritable and was crying a lot. Physical examination reveals tachycardia, decreased blood pressure, a bulging fontanelle and bilateral posterior auricular ecchymosis. You immediately
- Perform a lumbar puncture

- b. Obtain a head CT
- c. Obtain a coagulation panel
- d. Dial 911 and get a social work consult
- e. Obtain a head MRI



- 108) The EKG finding above is consistent with a patient who ingested a lot of
- a. Water melon
  - b. St johns wort
  - c. Fava beans
  - d. Energy drink
  - e. Carica papaya
- 109) A 5 month old girl has just been diagnosed with her first urinary tract infection. An ultrasound of her bladder and kidneys reveals left sided hydronephrosis in a portion of the left kidney and a follow up VCUG shows a filling defect within the bladder. Her Urinary tract infection is most likely secondary to
- a. Ureterocele
  - b. Bladder diverticulum
  - c. Posterior urethral valve
  - d. Vesicoureteral reflux grade 2
  - e. UPJ obstruction
- 110) You are suspect a rash to be erythema chronicum migrans. Within 2 weeks of onset of the rash, the patient is likely to have
- a. Progressive arthritis
  - b. Swollen hands and feet with desquamation in extremities.
  - c. Multiple red macules that become oval and are along cleavage lines
  - d. Flu-like illness, joint pain and fatigue
  - e. Bell's palsy

- 111) A 2 year old found outside his yard by his father is brought to you and upon arrival at your clinic, the child is sweating profusely. He has copious secretions and is in some respiratory distress. Other findings on physical examination include miotic pupils, wheezing and hyperactive bowel sounds. The most appropriate treatment is
- IM naloxone
  - IV atropine
  - IM epinephrine
  - IV physostigmine
  - Continuous albuterol nebulization therapy
- 112) You are evaluating a near term newborn with persistent bradycardia. Mom had no prenatal care. You note several erythematous macules and ring shaped lesions on his trunk and arms. No petechiae, no cataract and no hepatosplenomegaly. Your best initial screening test includes obtaining
- EKG, CBCD, long bone x-rays, Lumbar puncture
  - EKG, CBCD, LFT
  - EKG, CBCD, LFT and Urinalysis
  - EKG, CBCD, Urinalysis and Creatine kinase
  - EKG, CBCD, LFT and anti Ro antibody serology.
- 113) A 3 year old boy is being evaluated for a routine physical by you. His height and weight are at the 75<sup>th</sup> percentile for age on the growth chart. His blood pressure is 100/60. You note he can copy a circle but not a triangle. He follows two step commands and although he uses only 2 word sentences, his mom says strangers understand 75 percent of what he says. Your nurse tells you she noted he alternated his feet climbing the stairs a while ago but he wouldn't walk backwards when you instruct him to. You,
- Reassure mom that his milestones are normal for his age
  - Express concerns about his blood pressure
  - Express concerns about his fine motor skills
  - Express concerns about his gross motor skills
  - Express concerns about his speech

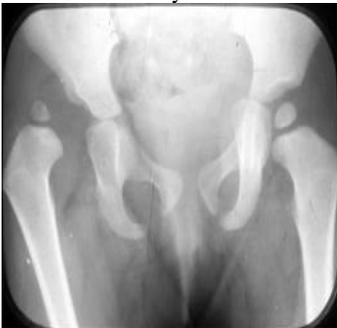
114) Refer to table below

	No Disease	Disease present
Positive test	A	B
Negative test	C	D

The specificity of the above test is

- a.  $A/A+C$
  - b.  $C/A+C$
  - c.  $D/B+D$
  - d.  $A/A+B$
  - e.  $B/B+D$
- 115) The following are true of hepatitis A viral infection except.
- a. Transmission is usually via contact but may occur sexually
  - b. Contagiousness is highest about 1 week prior to onset of symptoms
  - c. The incubation period ranges from about 2weeks to 2 months
  - d. Poor sanitation and crowded areas increase the risk of acquisition
  - e. The infection typically is symptomatic in children less than 6 years compared to those older

116) Refer to x-ray below

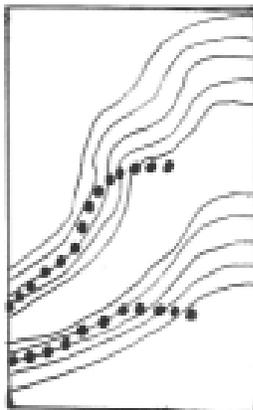


This 24 month old patient would benefit best from

- a. Pavlik harness
- b. Surgical pinning

- c. Traction and closed reduction
  - d. Serial casting
  - e. Reassurance
- 117) A 3 year old girl who has a large abdominal mass has just been diagnosed with burkitts lymphoma. She is started on chemotherapy. Of the following, the most likely cause of death in the first week of therapy is
- a. Intracranial hemorrhage
  - b. Congestive heart failure
  - c. Hyperkalemia
  - d. Hypercalcemia
  - e. Overwhelming sepsis
- 118) A 5 year old boy presents to the ED with generalized seizures. His vital signs are normal. Lab results show creatinine of 0.5mg/dl, BUN 10mg/dl, glucose 90mg/dl, sodium 120meq/l, potassium of 4 meq/l, chloride of 95 meq/l, bicarb 20meq/l; urine sodium 50meq/l, urine potassium 20meq/l and urine osmolality of 500mosmo/kg H<sub>2</sub>O. Which of the following best explains her electrolyte abnormality?
- a. Acute renal failure
  - b. Addison disease
  - c. Congestive heart failure
  - d. Diarrhea with severe dehydration
  - e. SIADH
- 119) Your clinic has a shortage of influenza vaccine. You plan to prioritize patients to receive the vaccine. Who amongst the following needs it the most
- a. 5year old with recent history of allergy to yellow fever vaccine
  - b. 5 year old with recent admission for Kawasaki disease
  - c. 5 month old with history of bronchiolitis
  - d. 4 year old with moderate persistent asthma
  - e. 2 year old with history of recent travel

120) Refer to the growth chart below



The growth chart is consistent with

- a. Celiac disease
  - b. Low caloric intake
  - c. Craniopharyngioma
  - d. Hypothyroidism
  - e. Untreated growth hormone deficiency
- 121) A concerned mom brings her 42 month old son to you for his toe walking habit. She notes he walked independently at 15 months, never had problems feeding self and can write his name. She understands 100 % of his words. She recalls his apgar's score were 6 at 1 minute but doesn't remember the fifth minute score. His physical examination revealed no obvious deformities or limb length discrepancy. Although he appeared stiff as he resisted your passive movement of his lower extremities, his tone, muscle bulk and DTR are normal. You tell the mom that
- a. Her sons milestones are normal but he will need evaluation for tight heel cord
  - b. Cerebral palsy is a concern
  - c. Her son's toe walking is normal for his age but a hip x-ray is indicated
  - d. Her son's toe walking is abnormal for his age and serial casting is indicated for six months
  - e. Her child's toe walking is normal for his age and no further evaluation is needed at this time

122) Which of the following deficiencies is likely to happen the earliest in a patient receiving TPN with no vitamins or mineral supplements added

- a. Vitamin K
- b. Selenium
- c. Magnesium
- d. Copper
- e. Vitamin D

For questions 123 through 130, Match the following conditions with the lab results listed in the options below. Each answer may be used only once or not at all.

123) Diarrhea

124) Lab error

125) Cerebral salt wasting

126) Water intoxication

127) Congenital adrenal hyperplasia

128) Cystic fibrosis

129) Pseudohyponatremia

130) SIADH

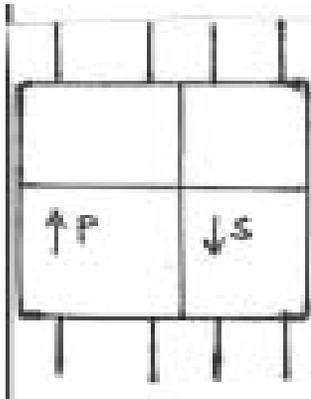
- a. Hyponatremia, Hypochloremia, alkalosis, normal glucose
- b. Hyponatremia, Hypochloremia, Hyperglycemia, acidosis
- c. Hyponatremia, high urine sodium, low urine osmo
- d. Hyponatremia, low urine sodium, low urine osmo
- e. Hyponatremia, high urine sodium, high urine osmo
- f. Low sodium, normal chloride, normal PH, low glucose
- g. Normal anion gap, low PH, urine anion gap positive
- h. Normal anion gap, acidosis, urine anion gap negative
- i. High potassium, low bicarb, high urine sodium

131) A 12 month old infant is being seen by you for her routine well child check up. She received her 6 month shots at the age of 7 months otherwise she is up to date for this visit. She has a history of egg allergy. Recommended shots for this visit are

- a. MMR#1, Varicella #1, hepatitis A #1 and DtaP #4
- b. Varicella #1, Hib #4, hepatitis A #1 and DTaP #4

- c. Varicella#1, hepatitis A#1 and DTaP #4
  - d. MMR#1, Varicella#1 and hepatitis A#1
  - e. MMR, Varicella#1, hepatitis A#1 PCV#4 and DTaP #4
- 132) A 9 year old boy is brought to you by his concerned mom for repetitive nose twitching for 13months. She describes him as occasionally inattentive with no impulsivity, no hyperactivity and no defiant behaviors. He most likely has
- a. Attention deficit disorder
  - b. Tourettes syndrome
  - c. Transient tic disorder
  - d. Complex partial seizures
  - e. Chronic tic disorder
- 133) A 15-month old- boy presents to your office with a history of diarrhea, according to his mother, for “his whole life”. A review of his chart reveals two prior infections with Gardia and one episode of campylobacter jejuni infection. His weight is 8kg and his physical examination reveals shotty cervical adenopathy but no other abnormalities. Which of the following is the most likely diagnosis in this toddler?
- a. Selective IgA deficiency
  - b. Human Immunodeficiency viral infection
  - c. Severe combined immunodeficiency syndrome
  - d. Common variable immunodeficiency
  - e. Chronic nonspecific diarrhea
- 134) You ask your residents during rounds for the topical steroid amongst the list below with the highest potency. A resident rightly says
- a. Bethamethasone dipropionate ointment 0.05%
  - b. Hydrocortisone butyrate ointment 0.1%
  - c. Triamcenolone acetonide ointment 0.1%
  - d. Triamcenolone acetonide cream 0.1%
  - e. Bethamethasone valerate cream 0.1%

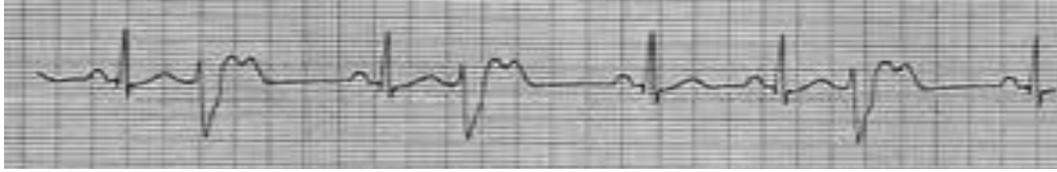
- 135) The cardiac cath of a 4 month old with irritability and cyanosis is shown below. Pressure is increased in the right ventricle and saturation is decreased in the left ventricle



The underlying etiology of this patient's condition is

- a. Stenosis of the pulmonary valve
  - b. Underdevelopment of the pulmonary infundibulum
  - c. Total anomalous pulmonary venous return
  - d. Transposition of great arteries
  - e. Patent ductus arteriosus
- 136) You are called to the labor and delivery room for a vaginal delivery complicated by abruptio placenta. The fetus is limp and apneic with a heart rate of 80. You initiate positive pressure ventilation but the infant remains apneic with a heart rate of 30. You begin chest compression while continuing positive pressure ventilation. The infant's heart rate is unchanged after a minute of positive pressure. What is the most appropriate next step in resuscitation?
- a. Continue positive pressure ventilation for another minute
  - b. Intubate the baby
  - c. Administer epinephrine 1:10,000 solution via umbilical vein
  - d. Administer 0.9% NS via umbilical vein at 10cc/kg bolus
  - e. Transfuse baby with O-negative blood emergently.

- 137) Refer to EKG below



What is the most likely diagnosis?

- a. Second degree AV block
- b. Third degree AV block
- c. Premature Atrial Contractions
- d. Wolf Parkinson white syndrome
- e. Premature Ventricular Contractions

138) Refer to picture below



What is the most appropriate next step in management?

- a. Apply warm compresses twice daily
- b. Oral cephalexin for 10 days
- c. Reassurance with appropriate follow up
- d. Refer to ophthalmology
- e. Biopsy of the lesion

139) A five year old boy is brought to your clinic with a 2-week history of bruising. He has had no other complaints. He has mild bruising but no petechiae and no mucosal bleeding. His physical examination findings are otherwise normal. Laboratory results include a white blood cell count of  $8.7 \times 10^3$  /ul, hemoglobin of 13.2g/dl and platelet of  $31 \times 10^3$  /ul. The most appropriate management is

- a. High-dose intravenous corticosteroids
- b. Oral corticosteroids
- c. Intravenous anti-D
- d. Observation

e. Intravenous gamma globulin

140) A five year old male is seen for a kindergarten physical and is noted to be less than the third percentile for height. A review of his chart shows that his height curve has progressively fallen below third percentile over the past two years. He was previously at the 5<sup>th</sup> percentile for height. The physical exam is otherwise normal but a work up shows that his bone age is delayed. Which of the following is the most likely diagnosis?

- a. Constitutional growth delay
- b. Growth hormone deficiency
- c. Familial Short Stature
- d. Skeletal dysplasia
- e. Low caloric intake

141) A 3 year old male is rushed to the emergency room because he swallowed a hand full of adult ibuprofen 20 minutes ago. He is asymptomatic. What is the most appropriate next step in management?

- a. Administer syrup of ipecac
- b. Administer activated charcoal
- c. Perform whole bowel irrigation
- d. Perform gastric lavage
- e. Close observation

142) Refer to the picture below of 4 year old female with hair loss



Which of the following is most likely associated with her diagnosis?

- a. Fever
  - b. Habitual hair twirling
  - c. Thyroid disease
  - d. Chemotherapy
  - e. Tinea corporis
- 143) A 14-year-old boy is brought to the emergency room because of persistent mid epigastric pain for two days. The pain is getting no better, yet it is no worse, and radiates to his back. The boy also has had fever, as well as nausea and vomiting that is worse when his temperature rises in the afternoon. On examination, his temperature is 39.2 C (102.5 F) and there is marked upper abdominal tenderness with guarding. Mild abdominal distention is present with no audible bowel sounds. A complete blood count reveals an elevated leukocyte count and a normal serum amylase. Which of the following is the most likely diagnosis?
- a. Mesenteric adenitis
  - b. Intussusception
  - c. Peptic ulcer disease
  - d. Pancreatitis
  - e. Viral gastroenteritis with hypokalemic ileus
- 144) A baby is born at 34 weeks gestation. The amniotic fluid is brown and murky. The baby has low APGAR scores and appears to be septic, with lethargy, apnea, bradycardia, and temperature instability. The mother lives on a farm and gives a history of a flu-like illness one month before delivery. Gram's stain of a smear from the mother's cervix demonstrates abundant, pleomorphic, gram-variable coccobacillary forms. You are thinking neonatal listeriosis. What precautions should be ordered?
- a. Contact precautions
  - b. Contact and droplet precautions
  - c. Standard precautions
  - d. Droplet precautions
  - e. No precautions required
- 145) A 7-year-old boy presents to the physician's office with a 4-week history of left-sided anterior cervical lymph nodes enlargement. The enlarged nodes are firm but not tender to palpation. A few papules were noted on the left and right

forearm at the onset of the lymph nodes swelling. The boy has a rabbit, two parakeets and a kitten as pets at home. A CBC and ESR done are normal. Which of the following is the most likely organism causing his lymph nodes swelling?

- a. *Actinomyces israelii*
- b. *Mycobacterium avium intracellulare*
- c. *Bartonella henselae*
- d. *Francisella tularensis*
- e. *Staphylococcus aureus*

146) A 4-year-old boy is brought to the emergency department for a painful and swollen right forearm. He was bitten and scratched by a family cat 2 days ago in the affected area. His temperature is 39.6 C (103.2 F). The right forearm is erythematous, edematous, and tender to touch. Which of the following is the antibiotic of choice for this patient?

- a. Ampicillin
- b. Amoxicillin-clavulanate
- c. Clindamycin
- d. Tetracycline
- e. Trimethoprim-sulfamethoxazole

147) A 6-year-old boy is brought to the pediatrician because of a 3-day history of skin lesions. On physical examination, he has multiple yellow, crusted erosions below the nares and on the cheeks, chin, and upper extremities. The rest of the examination is normal. Which of the following is the most appropriate treatment for his condition?

- a. Oral acyclovir
- b. Oral cephalexin
- c. Oral Trimethoprim-sulfamethoxazole
- d. Oral valacyclovir
- e. Topical mupirocin ointment

148) The mother of a pre-pubescent girl brings her to your clinic because a social worker received an anonymous tip that the girl is being abused by her step father. Her physical examination is unremarkable. Her step father arrives as you examine the patient. She begins to cry when she sees him. Her mother becomes

very quiet all of a sudden after she introduces him as her husband. What is the most appropriate statement to make at this point?

- a. Can you excuse us sir? And then ask the mother to join him outside
- b. Is she crying because of you sir? And then dial 911
- c. Why are you crying? And then provide her with tissue paper
- d. Ignore her crying and continue with your examination
- e. Are you alright? And then ask the father to leave the room politely

149) A mother brings her 4-year old son to see you. She is very concerned about her child's bedwetting habit. As you explore the history, the mother tells you that she started his toilet training when he was 2-years old. The child responded to his mother's efforts and slowly was able to reduce the frequency of bedwetting. However, he did not completely succeed and still occasionally wets his bed. She has become so concerned that she demands you to order tests and prescribe some drugs to resolve the problem. What is your best next step in the management of this boy?

- a. Obtain a urinalysis
- b. Advice on behavioral modification techniques and prescribe DDAVP for sleepovers
- c. Obtain a KUB to rule out constipation
- d. Reassure the mother that everything is normal after obtaining a baseline urinalysis
- e. Tell the mother no work up is indicated

150) In the United States, What percentage of 5 year olds with nocturnal enuresis spontaneously resolves their symptoms at 7 years of age?

- a. 1%
- b. 5%
- c. 10%
- d. 20%
- e. 50%

- 151) You are rounding with a group of residents discussing conditions that are caused by spontaneous mutation. You tell the residents that spontaneous mutation usually originates as an error in which of the following
- DNA transcription
  - DNA replication
  - Reverse transcription
  - Translation
  - DNA translocation
- 152) You are evaluating a 15 month old boy in the hospital who has had watery and sometimes bloody diarrhea that usually resolves when the patient is admitted. His mother says he appears to have lost some weight. Besides from a diaper rash, he appears well hydrated with normal vitals. A basic metabolic panel reveals hypokalemia with alkalosis, BUN of 11 and creatinine of 0.9. A CBC reveals hemoglobin of 11.9 g/dl and platelets of 151,000. Stool WBCs, reducing substance, fecal fat, ova and parasite are negative but stool occult blood is 1+. He is on maintenance IVF with D5W with  $\frac{1}{4}$  NS. What is the most likely diagnosis?
- Chronic Nonspecific Diarrhea
  - Factitious Diarrhea
  - Hemolytic Uremic Syndrome
  - Acrodermatitis Enterohepatica
  - Tufted Enteropathy
- 153) A 16 year old male presents to you with breast enlargement. He says they have increased in size over the past 1 year to a point it is now embarrassing. He has a past medical history of asthma which he outgrew 7 years ago and oppositional defiant disorder which he undergoes weekly counseling for. His weight and height are at the 75<sup>th</sup> percentile for age. He appears eunuchoid but admits he would like to develop his muscles in order to “fit in”. He denies any medication use but admits to smoking marijuana every now and then. His blood pressure is 96/64 mm Hg and pulse is 72 beats per minute. He has 4-5 cm breast tissue that extends from the areolas, absent facial and axillary hair and thick pubic hair around the mons and base of his penis but not on the thighs. His testes are descended bilaterally and measure approximately 2.3 cm in size; the phallus size is 5 cm. He has no scoliosis or murmurs. Serum LH is normal. What is the most likely diagnosis?

- a. Idiopathic hypogonadotropic hypogonadism.
  - b. Klinefelter's syndrome
  - c. Idiopathic gynecomastia
  - d. Anabolic steroid induced gynecomastia
  - e. Marijuana induced gynecomastia
- 154) A 2 week-old boy develops focal seizures, lethargy and vomiting. He was delivered via normal spontaneous vaginal delivery to a 16 year old mother with no pre-natal care. Examination shows a bulging fontanelle. Lumbar puncture reveals pleocytosis with increased protein, decreased glucose and gram positive rods. Which of the following organisms will most likely be isolated from C.S.F?
- a. *Streptococcus pneumoniae*
  - b. *Klebsiella pneumoniae*
  - c. *Streptococcus agalactiae*
  - d. *Escherichia coli*
  - e. *Listeria monocytogenes*
- 155) A 16 year old high school student and several of his classmates ate lunch at a local Mexican restaurant. They all were served the daily luncheon special, which consisted of chicken, sour pork, spinach and rice. They all drank boiled stream water. All of the boys developed nausea, vomiting and diarrhea with severe abdominal cramps within 4 hours of eating. Which of the following is the most likely cause of their symptoms?
- a. Enterohemorrhagic *Escherichia coli*
  - b. *Clostridium perfringens*
  - c. *Bacillus cereus*
  - d. *Vibrio cholerae*
  - e. *Campylobacter jejuni*
- 156) A neonate develops marked unconjugated hyperbilirubinemia. No hemolysis can be demonstrated and a liver function test is normal. No bilirubin is found in the urine. Despite triple phototherapy and intravenous fluid therapy, his condition continues to deteriorate and he dies at 2 weeks of age. What is the most likely diagnosis?
- a. Biliary atresia

- b. Crigler-Najjar syndrome
  - c. Rotor syndrome
  - d. Dublin-johnson syndrome
  - e. Kalazar syndrome
- 157) A three-year old patient with short stature has hepatosplenomegaly, skeletal abnormalities, mental retardation and corneal clouding. Electron microscopy of lysosomes reveals laminated structures. Which of the following substances would accumulate in this patient?
- a. Glucocerrbroside
  - b. GM2 ganglioside
  - c. Heparan sulfate
  - d. Sphingomyelin
  - e. Galactocerebroside
- 158) A mother of a child with cystic fibrosis is concerned about its co-morbidities. She has read that “these kids” are prone to bleeding diasthesis. Her child’s increased risk of bleeding will be most likely a result of what deficiency?
- a. Labile factor
  - b. Prothrombin
  - c. Protein C
  - d. Hageman factor
  - e. Factor VIII
- 159) A 9 year old girl presents to the emergency room with a 2 day history of coke colored urine. She reports no dysuria, urgency, frequency or abdominal or flank pain. Her vital signs include; temperature, 98.7<sup>f</sup>, BP150/91mm hg, heart rate, 80bpm and respiratory rate of 20breaths/min. On physical examination, moderate periorbital edema is evident. Urinalysis reveals moderate blood and 2+ protein. The serum complement 3 (C3) concentration is low and the C4 concentration is normal. What is the most likely cause of her findings?
- a. IgA nephropathy
  - b. Focal segmental glomerulonephritis
  - c. Postinfectious acute glomerulonephritis

- d. Lupus nephritis
- e. Membranoproliferative glomerulonephritis

160) Which of the following is most concerning of a 2 year olds' behavior

- a. Avoiding eye contact with a maternal uncle
- b. Ignoring his 6 month old sister as if she doesn't exist
- c. Playing with a toy car but making it fly like a plane
- d. Refusing to eat his favorite meal and spilling his cup of water on the ground clumsily sometimes
- e. Banging his head on his bed before he goes to sleep

For questions 161-163, match the types of rickets with their laboratory abnormalities listed in the options below. Each answer may be used once, more than once or not at all.

161) Vitamin D dependent type 1 ricket

162) Vitamin D dependent type 2 ricket

163) Familial hypophosphatemic ricket

- a. Increase alkaline phosphatase, low calcium, high phosphorus and low parathyroid hormone
- b. Increase alkaline phosphatase, low calcium, low phosphorus, increase parathyroid hormone
- c. Increase alkaline phosphatase, normal calcium, high phosphorus and high parathyroid hormone
- d. Decrease alkaline phosphatase, low calcium, low phosphorus and high parathyroid hormone
- e. Increase alkaline phosphatase, normal calcium, decrease phosphorus and normal parathyroid hormone

TAKE A BREAK BEFORE YOU BEGIN VOLUME 2

## **A List of 10s**

Get a pen and a paper and attempt to write out the differences between each of the conditions listed. When you are done, read about them and know the subtle differences between them. It is not good enough to narrow down to two options. It is time for the details.

### **Neonatology**

1. Meconium ileus and meconium plug
2. IUGR and SGA
3. Caput and Cephalhematoma
4. Pneumothorax and Pulmonary Interstitial Emphysema
5. Congenital toxo and congenital CMV and rubella
6. Pulmonary hypoplasia and congenital cystic adenomatoid malformation
7. Chemical conjunctivitis and gono conjunctivitis and chlamydial conjunctivitis
8. Fanconi anemia and Thrombocytopenia absent radii syndrome
9. ALTE and SIDs
10. The differentials of hypoplastic nail

### **Adolescent**

1. Tanner or SMR stage 2 and 3 in males and females
2. Anovulatory DUB and other causes of DUB
3. Primary and secondary dysmenorrhea
4. Non malignant ovarian cyst and malignant ovarian cyst
5. Physiologic gynecomastia and non physiologic gynecomastia
6. Cystosarcoma phyllodes and Breast adenocarcinoma
7. Testicular torsion and Torsion of testicular appendix
8. Epididymitis and Orchitis
9. Retractable testis and Undescended testis
10. Idiopathic and Non idiopathic scoliosis

### **Genetics**

1. Marfans and Homocystinuria
2. Crouzon and Apert
3. Turner and Noonan
4. Urea cycle defects and Organic acidemias
5. Tay sach and Niemann pick
6. Hurler and Hunters
7. Gaucher and Fabry
8. Menkey kinky and Wilson

9. Von Gierke and Galactosemia
10. NF 1 and NF 2 and MENs

### **Pulmonology**

1. Diaphragmatic paralysis and diaphragmatic hernia
2. Hypocalcemic laryngospasm and croup
3. Sinusitis and Reactive airway disease and psychogenic cough
4. Retropharyngeal abscess and peritonsillar abscess without imaging
5. Bacterial tracheitis and epiglottitis
6. Vocal cord paralysis and vocal cord dysfunction
7. Mild persistent and Moderate persistent asthma
8. Restrictive causes of respiratory distress and obstructive causes PFT
9. Transudate and Exudate
10. Laryngomalacia and Tracheomalacia

### **Cardiology**

1. Admix lesions versus left to right lesions
2. 2nd degree heart block type 1 and 2
3. TAPVR and Hypoplastic left heart
4. TOF and TGA
- 5 ASD murmur and AS murmur
6. Hypertrophic Obstr CM and Aortic stenosis in syncope or sudden death
7. PVCs and Heart blocks
8. SVT and sinus tachycardia
9. HOCM and athlete's heart in chest pain
10. Pericarditis and myocarditis

### **Endocrinology/Metabolic**

1. Growth hormone deficiency less than 2 yrs and low caloric intake and celiac disease growth charts
2. Untreated growth hormone deficiency after age 2 and low caloric intake and celiac disease
3. Klinefelter and Kallman syndrome and high caloric intake kid
4. Acromegaly and Soto
5. Clinically euthyroid hashimoto and clinically euthyroid thyroid binding glob deficiency
6. DI and SIADH and Cerebral salt wast and Water intox
7. Follicular and medullary thyroid cancer
8. Pseudohypoparathyroidism and primary hypoparathyroidism
- 9 Vitamin D dependent ricket type 1 and 2
10. Adrenoleukodystrophy and Addison

## **Allergy and Immunology**

1. Brutons and common variable ID
2. Selective IgA and Hyper IgE
3. SCID and Digeorge
4. Myeloperoxidase deficiency and Mucocutaneous candidiasis
5. IgE mediated allergies and Non IgE mediated allergies
6. Seasonal and Perennial allergic rhinitis
7. Serum sickness versus anaphylaxis
8. Poison IVY versus Incontinentia pigmenti (photos)
9. Phagocyte issue in LAD and CGD
10. Hereditary angioedema and non hereditary angioedema

## **Gastrointestinal System**

1. Mild, moderate and severe dehydration findings
2. Vitamin B1, B2 and B3 deficiencies
3. Selenium, copper and vitamin E deficiency
4. Zinc and essential fatty acid deficiency
5. Premie and term formulas. Breast milk versus formula
6. Kwashiorkor and marasmus
7. Gardiasis and Amoebiasis
8. Pyloric stenosis and Antral web
9. Crohns and UC
10. Auto immune hepatitis and viral hepatitis

## **Infectious Disease**

1. SSSS versus TEN
2. B. cereus or staph food poisoning versus clostridium perfringens
3. Contaminant staph epi versus non contaminant staph epi
4. Erysipelas and cellulitis
5. Ecthyma and Impetigo
6. B. henselae lymphadenitis and Mycobact avium Inter lymphadenitis
7. Group A strep lymphadenitis versus staph aureus lymphadenitis
8. Lymes versys Ehrlichiosis
9. Congenital varicella and perinatal varicella
10. cryptosporidium and Isospora infections

## **Dermatology**

1. RMSF and meningococemia rash
2. Granuloma anulare and herald patch and nummular eczema
3. chicken pox and small pox

4. Roseola and enteroviral rash
5. measles and rubella rash
6. Scabies and papular urticaria
7. Bed bug versus flea versus mosquito bites
8. Trichotillomania and telogen effluvium
9. Ichthyosis vulgaris and X-linked ichthyosis
10. inflammatory and non inflammatory acne

### **HEMONC**

1. Hereditary spherocytosis and Autoimmune hemolytic anemia
2. Moderate and severe neutropenia
3. Von willbrand and hemophilia
4. Transient erythroblastopenia of childhood and diamond blackfan
5. Factor 5 leyden and antithrombin 3 deficiency
6. ALL and AML
7. Leukemia lymphoma syndrome and lymphoblastic leukemia
8. Neuroblastoma and WILMs
9. Infratentorial and supratentorial brain tumors
- 10 Benign versus malignant liver tumors

### **Growth/Development/Behavior**

1. TORCH'S microcephaly versus craniosynostosis
2. Nursing bottle decay versus decay from too much candy
3. 2 versus 3year old fine motor skills and speech
4. Mental retardation versus learning disorder screening tests
5. Dyslexia versus Nonverbal learning disorder on WISC
6. Nocturnal versus Diurnal enuresis
7. Oppositional versus conduct disorder versus temperamental variation
8. Overweight versus at risk for overweight
9. Night terror versus Night mare
10. Manhausen syndrome by proxy and vulnerable child syndrome

### **Orthopedics/Rheumatology**

1. Intoeing and clubfoot
2. Rickets bow leg versus Blounts disease
3. Plantar faciitis versus calcaneal apophysitis
4. Legg calve Perthes versus SCFE
5. Spondylolysis versus spondylolisthesis
6. Oligo versus polyarticular JRA

7. SLE versus Dermatomyositis
8. Ehler danlos hypermobility versus Marfans
9. Familial Mediterranean fever versus PFAPA
10. Typical versus Atypical Kawasaki

## **RENAL**

1. Bartters syndrome versus Gittleman syndrome
2. Renal tubular acidosis types 2 and 4
3. HSP versus HUS
4. Grade 3 versus grade 4 Vesicoureteral Reflux
5. Ureterocele versus bladder diverticulum
6. Prune belly syndrome versus posterior urethral valve
7. Pre-renal versus renal Acute renal failure
8. IgA nephropathy versus Post strep GN
9. Nephronophthisis versus senior loken syndrome
10. Renal osteodystrophy and vitamin D dependent type 2 rickets

## **Neurology**

1. Dystonia versus myoclonus
2. Sydenhams chorea versus Huntington's
3. Tourette's syndrome versus chronic Tic disorder
4. Duchennes versus myotonic muscular dystrophy
5. Juvenile myesthemia gravis versus botulism
6. Gullain barre versus Tick paralysis
7. Lis versus holopros versus schiz-encephaly
8. Dystonic versus spastic diplegic cerebral palsy
9. Absence versus complex partial seizures
10. Grade 1 versus grade 2 concussion

## **HEENT**

1. Bacterial sialadenitis versus mumps
2. Labrynthitis and Perilymphatic fistula
3. Recurrent URIs versus sinusitis
4. Cat scratch lymphadenitis versus mycobacterium avium's
5. Aphthous ulcers versus gingivostomatitis
6. Styte versus chalazion
7. Preseptal versus orbital cellulitis
8. Papillitis versus Papilledema

9. Tympanogram of middle ear effusion versus TM perforation
10. Marfans versus homocystinuria lens subluxation

## **Your Intraining Pediatric Manual Simulated Examination Volume 2**

1. A 12-year-old boy has a seven day history of fever and fatigue. His temperature is 101.4<sup>0</sup>f and his heart rate is 120 beats/min. He appears acutely ill. Physical examination findings are unremarkable except for a grade III/VI systolic ejection murmur and mild splenomegaly. You suspect infective endocarditis. Of the following, which is most indicative of infective endocarditis?
  - a. New Murmur
  - b. Unexplained high grade fever
  - c. Mycotic aneurysm
  - d. Osler nodes
  - e. Serologic evidence of active infection with an organism consistent with infective endocarditis
  
2. The patient above is admitted to the cardiac ICU step down unit. He is worked up appropriately and echocardiograph findings do not reveal vegetations on the mitral valve or supporting structures. He is started on empiric triple antibiotics as you await the blood culture result. Which of the following is true regarding blood cultures in patients with infective endocarditis?
  - a. At least 3ml of blood is required in an older child to increase your likelihood of a positive culture
  - b. It is best and necessary to draw the blood at the height of the fever
  - c. Two culture samples drawn 10 minutes apart is best and appropriate for an ill child
  - d. Blood cultures may be persistently negative in up to 80 percent of patients with infective endocarditis
  - e. None of the above

3. A nine year old boy is at your clinic for a routine physical. He is accompanied by his school nurse. He has no complaints and his physical examination is unremarkable. His school nurse alerts you to a lesion on the left side of his torso (see photograph below). When asked, he says “my dad caught me with a light because he was mad at me”.



Which of the following is a clear protective factor against child abuse?

- a. Having an older female sibling
  - b. A non engaging female child
  - c. Living in a quiet neighborhood
  - d. Having extended family support
  - e. Presence of law enforcement in the neighborhood
4. A 12-year-old girl is having difficulty in school. Her parents and teachers say she is very intelligent and diligent in completing assignments. A recent intelligence testing documented a full-scale intelligence quotient of 127 using the Wechsler Intelligence Scale for Children. There are no new family stresses. The girl has friends and is active in extracurricular activities. Physical examination results are normal. Her mother would like to know why she is having difficulty in school. Of the following, the MOST appropriate next step to assist this family is to:
- a. Screen for depression
  - b. Request alternative educational placement
  - c. Request a subtest profile of scores
  - d. Refer for behavioral testing and counseling
  - e. Suggest that they restrict her extracurricular activities in a way she has more time to address her school difficulties

5. A father is at your clinic with his 7-year-old son who just had a cardiology evaluation and clearance to start stimulant for his ADHD. You attempt to start him on non stimulants but his father refuses and insists you use stimulants instead. Which of the following statements about stimulants is false?
- There is a higher risk of sudden death in children who are on stimulants compared to children with known cardiac disease
  - Amphetamine is more potent than methylphenidate
  - Initiating treatments with methylphenidate has been shown to be as successful as amphetamine trials as it pertains to symptom relief
  - Methylphenidate acts by interfering with the re-uptake of dopamine at the pre-synaptic level
  - Headaches, stomach aches and problems initiating sleep are common side effects of stimulant therapy
6. The mother of one of your patients' calls you to ask about the significance of a non stress test about to be performed on her 18 year old daughter. Her pregnant daughter is currently in the labor ward at 36 weeks' gestation. She had presented to the antenatal clinic with a complaint of decreased fetal movement over the past 24 hours. Her obstetrician just ordered a nonstress test which is scheduled for the next 10 minutes. You tell her the nonstress test is helpful in determining which of the following:
- Amniotic fluid volume
  - Fetal maturity
  - Fetal tolerance of labor
  - Integrity of the fetal autonomic nervous system
  - Uteroplacental insufficiency
7. A 14-year-old Hispanic girl is brought in by mom for a follow up visit. She was seen last week by a nurse practitioner you work with for obesity and hypertension. A lipid panel and complete metabolic panel results are within normal limits. Her blood pressure today is 140/90 mmhg. Which of the following statements is true regarding hypertension in children?
- Readings between the 85<sup>th</sup> and 90<sup>th</sup> percentile for age defines borderline hypertension

- b. Systolic and diastolic reading greater than the 95<sup>th</sup> percentile defines severe hypertension
- c. An appropriate cuff size should be at least 30% of the mid-arm circumference
- d. Inappropriate large cuff will give an aberrantly high reading
- e. None of the above

8. Refer to photograph below



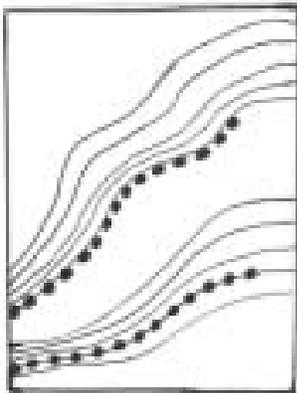
What is the most likely diagnosis?

- a) Granuloma annulare
  - b) Herald patch
  - c) Tinea Corporis
  - d) Nummular eczema
  - e) Salmon patch
9. You are evaluating a 2 year old girl who is new to your clinic. Her mother is worried that she seems small. Her mother reports no history of recurrent infections and that her daughter's appetite is good. The mother appears petite and says she is 5 feet 1 inch tall. The child weighs 9kg (below the 3<sup>rd</sup> percentile), and her height is 78cm (3<sup>rd</sup> percentile). She is appropriately interactive with her mother and shows no obvious behavioral abnormalities. Findings on her physical examination are normal except for very little subcutaneous fat. Her bone age is 12 months. Of the following, the most likely cause of her weight and height findings is:
- a. Celiac disease
  - b. Familial short stature
  - c. Growth hormone deficiency
  - d. Psychological dwarfism

- e. Psychosocial growth delay
10. A term infant is exposed to her 19 year old mother who developed chicken pox 2 days after delivery. What is the most appropriate next step in management?
- a. No intervention
  - b. Varicella Zoster Immune Globulin to baby
  - c. Isolate baby
  - d. Acyclovir to baby
  - e. Varicella vaccine to baby
11. The parents of one of your patients' plans to travel to Venezuela with their 8 year old son. They tell you he is healthy and excited about the trip. They have questions about malarial prophylaxis. Of the following, your antimalarial of choice for prophylaxis is:
- a. Mefloquine
  - b. Pyrimethamine
  - c. Sulfadoxine and pyrimethamine
  - d. Chloroquine
  - e. Atovaquine-Proguanil
12. Which of the following reimbursement payment methodologies poses the least risk to a general pediatrician?
- f. Fee-for-service
  - g. Discounted fee for service
  - h. Capitation plus withholds
  - i. Negotiated fee schedule
  - j. Full capitation
13. A Term newborn male delivered via cesarean section develops cyanosis at 24 hours of age. Routine newborn care was initiated and he has transitioned to an open crib without any problems. On day 3, his cyanosis worsens and is unresponsive to placement under the radiant warmer and oxygen therapy. He has mild respiratory distress. What most likely happened?

- a. Ductus closed
- b. Transient increase resistance of blood flow to lungs
- c. Methemoglobinemia
- d. Increase metabolic demand increase from hypoglycemia
- e. Persistent pulmonary hypertension

14. Refer to growth chart below of an 11 year old male with a normal physical examination.



Which of the following is a correct statement about this patient?

- a. He may have silver Russell syndrome
  - b. His weight in infancy must have been below the 3<sup>rd</sup> percentile along with his height
  - c. His adult height will be appropriate for parental height
  - d. He had delayed bone age
  - e. He's been exposed to excessive steroids
15. You are called to the delivery room to evaluate a term infant with respiratory distress. Delivery was via normal vaginal route. The infant weighs 3.6 kg and has some grunting respirations. You decide to observe her in the newborn intensive care unit. One hour later, you are notified that the infant is experiencing pronounced respiratory distress and oxygen saturations in the 70% range in the right hand and in the 50% range in the right foot. There is poor perfusion. There are no murmurs, but there is a pronounced precordial lift and a loud second heart sound. Of the following, the MOST likely diagnosis for this infant is:

- a. Congenital diaphragmatic hernia
- b. Coarctation of aorta
- c. Hypoplastic left heart syndrome
- d. Persistence of the fetal circulation
- e. Tricuspid atresia

16. Refer to lateral x-ray of a 4 year old boy with respiratory distress



What is the most likely diagnosis?

- a. Retropharyngeal abscess
  - b. Foreign body
  - c. Bacterial tracheitis
  - d. Acute epiglottitis
  - e. Mandibular hypoplasia
17. You see a 4-month-old breastfed girl for a health supervision visit. Her length and head circumference are at the 25th percentile, and her weight is at the 75th percentile. On physical examination, you note posterior occipital flattening. She briefly focuses on your face, but does not track. She also does not roll over. Of the following, the MOST appropriate next step is to:
- a. Advise her mother to place her in the prone position to sleep
  - b. Counsel her mother regarding diet and overfeeding
  - c. Refer her for ophthalmologic examination
  - d. Refer her for physical therapy evaluation
  - e. Tell her mother that she should begin tracking objects in the next 2 months

18. When applied to a population in which the prevalence of disease is low, a positive test result must be confirmed because
- The negative predictive value of the test is high
  - The sensitivity of the test is low
  - The specificity of the test is high
  - The positive predictive value of the test is low
  - The negative predictive value of the test is low
19. You examine a child during a routine age appropriate checkup visit and note that he throws a ball overhand. When you ask him to hop, he hops a few times. His mom is concerned because he doesn't know "opposites" yet. You reassure his mom and tell her that during his next visit in 12 months, he should/will be able to:
- Know opposites and comparisons in verbal analogy
  - Know his sex and age
  - Ride a tricycle using pedals
  - Draw a cross
  - Kick a ball forward
20. A 5-year-old girl was toilet trained at 4 years of age. She is brought to you with a 1-month history of nighttime bedwetting. Her mother does not relate any new family stresses. She denies dysuria, increase urinary frequency or urgency. Her vital signs and physical examination are normal. The MOST appropriate next step in the evaluation of this child is:
- Refer to behavioral specialist
  - Urinalysis
  - Abdominal x-ray
  - Obtain a BMP
  - Reassurance

21. A mother brings in her 1-week-old female infant, who has been vomiting for the past 3 hours. In the past hour, the baby has vomited a combination of undigested food and green material. The infant has been fed with cow milk formula. Physical examination demonstrates an alert but fussy infant who is afebrile. Her abdomen is soft and mildly distended without any organomegaly. Of the following, the BEST next step is to:
- Begin therapy with oral ranitidine
  - Change the feeding to a protein hydrolysate formula
  - Obtain emergent abdominal ultrasonography
  - Obtain emergent barium enema
  - Obtain emergent upper gastrointestinal radiographic series
22. ADHD has just been diagnosed in a 6 year old male. His mother is at your clinic discussing options for management. As you discuss psychostimulants and its effectiveness, she asks you about potential side effects while on stimulants. You rightly mention:
- Increased appetite
  - Jitteriness
  - Vocal tics
  - Rebound hyperactivity
  - Somnolence
23. A 30-week gestation 1,250-g infant is admitted to the neonatal intensive care unit. She exhibits no respiratory distress and has normal findings on physical examination. Of the following, the BEST type of intravenous fluid to administer to this infant is:
- Dextrose 10% in water with 0.45% sodium chloride
  - 0.9% sodium chloride
  - Dextrose 5% in water with 0.23% sodium chloride
  - Dextrose 10% in water
  - Ringer lactate solution

24. A 6 year old boy is being teased at school because he has a bad odor daily. His teacher noted he occasionally has stool in his underwear despite being toilet trained. Past medical history is significant for chronic constipation. You note stool impacted in his rectal vault. His parents have been educated about his condition and the boy receives demystification counseling. Your best next step in management after clearing the impaction with fleet enema will be to:
- a) Emphasize the need to establish regular bowel habit
  - b) Place on short term stool softeners for 3 months
  - c) Place on laxatives for a minimum of 6 months
  - d) Advice only high fiber diet for 6 months
  - e) Obtain further history about the possibility of a school bully that prevents him from using the rest room in school.
25. A 15 year old boy presents with a 10 day history of fever (maximum temperature at home 101<sup>0</sup>f), malaise, sore throat and poor oral intake. He denies any cough, congestion, runny nose or eye redness and discharge. He recently completed a 7 day course of amoxicillin which did not help according to his mother. Your triage nurse reports his vitals as temp 100.4, respiratory rate 28, pulse 120 and blood pressure 85/42. You note erythematous oropharynx and bilateral tonsils with exudates. He also has bilateral shotty anterior cervical lymphadenopathy and hepatosplenomegaly. The rest of his physical examination is normal. What is the most likely cause of his symptoms?
- a) Cytomegalovirus
  - b) HIV-2
  - c) Neisseria gonorrhoeae
  - d) Epstein Barr Virus
  - e) Group A beta Hemolytic Streptococcus

26. A 7-year-old boy has had worsening headaches and vomiting for 2 weeks. The vomiting is prominent in the mornings. He has had no fevers or diarrhea. On examination he has an unsteady gait, a positive Romberg sign, a negative brudzinski and kernig's sign. He also is noted to have papilledema and right sixth cranial nerve palsy. His visual fields and upward gaze are normal. The rest of his neurologic examination is normal. What is the most likely cause of his symptoms?
- a. Craniopharyngioma
  - b. Cerebellar astrocytoma
  - c. Optic nerve glioma
  - d. Prolactinoma
  - e. Glioblastoma Multiforme
27. You are called to see a seemingly healthy term infant delivered via cesarean section who has developed abdominal distention at 48 hours of age. He has been fed formula, and there has been no emesis. Physical examination findings are normal other than the abdominal distention; the anus is patent. An abdominal flat plate radiograph demonstrates large, dilated, stacked loops of bowel and an absence of air in the rectosigmoid area. Of the following, the BEST diagnostic imaging test to determine the cause of this infant's abdominal distention is a:
- a. Contrast enema
  - b. Fluoroscopic swallowing study
  - c. Meckel scan
  - d. Ultrasonography of the gastric outlet
  - e. Upper gastrointestinal radiographic series
28. Refer to photograph below of a 16 year old boy



What is the most likely associated finding?

- a. Glaucoma
- b. Café au lait macules
- c. Ash leaf macules
- d. Obesity
- e. Splinter hemorrhages

29. A concerned mother whose 13 year old son has ADHD has read that over the course of their lifetime, 45% of “these kids” have a lifetime risk of being diagnosed with substance abuse disorder. She wants to know what factors reduce this risk. You explain to her that a study has shown which of the following mitigates the risk

- a. Absence of a co morbidity
- b. Early diagnosis
- c. Early initiation of treatment
- d. Adherence to medication
- e. Use of non stimulants

30. A 16 year old girl with anorexia nervosa is hospitalized for severe malnutrition and placed on parenteral nutrition. Which of the following is likely to complicate refeeding in this patient?

- a. Hyperphosphatemia
- b. Hyperkalemia
- c. Hypermagnesemia
- d. Hypophosphatemia
- e. Hypocalcemia

For questions 31 and 32, refer to table below of a report on the prevalence of disease X by zip code in 10 districts around your practice location

Zip code	Number with disease X
57623	210, 000
57839	189, 000
57023	375, 000
57120	215, 000

57234	132,000
57111	236,000
58234	196,500
56412	192,000

31. What is the median number of people with disease X?
- a. 173,500
  - b. 203,250
  - c. 196,500
  - d. 215,000
  - e. 210,000
32. What is the mean number of people with disease X to the nearest whole number?
- a. 210,750
  - b. 215,763
  - c. 218,188
  - d. 199,452
  - e. 196,961
33. You are discussing neonatal hearing screening with medical students on rounds with you in the newborn nursery. Of the following, the statement that you are MOST likely to include in your discussion is that
- a. An infant should be tested while asleep
  - b. Intervention in children who have hearing impairment should begin at 12 months of age
  - c. Normal neonatal hearing screening results should be confirmed by repeat testing at 6 months of age
  - d. Otoacoustic emission is the definitive procedure for testing hearing in newborns
  - e. Visual reinforcement audiometry currently is used as a screening test in newborns

34. Gina is a 15-year-old white female who presents with a case manager to your office for a routine physical examination. She recently was placed in foster care because of physical and sexual abuse in her home. The case manager informs you that Gina performs poorly in school and gets into fights a lot with other students. She adds that Gina has had several sexual partners and also binge drinks and sporadically uses heroin. The case manager is concerned about her risk for suicide because she was hospitalized last year for a suicide attempt. Which of the following is likely to increase her risk of suicide the most?
- a. Aggressive behavior
  - b. Physical and sexual abuse
  - c. Prior suicide attempt
  - d. Substance abuse use at time of suicidal ideation
  - e. Depression with a tinge of hopelessness

35. Refer to photograph below



What is the most likely diagnosis?

- a. Wilsons disease
  - b. Waardenburg syndrome
  - c. Normal variant
  - d. Down syndrome
  - e. Retinoblastoma
36. A 5-month-old female infant is brought to you for failure to thrive. She is a product of an uncomplicated pregnancy and was born at term. On physical examination there is clitoral hypertrophy and poor skin turgor. The baby appears neurologically normal. Laboratory studies show serum sodium 116 mmol/L, potassium 6.2 mmol/L, chloride 83 mmol/L, and bicarb of 22 mmol/L. There is no history of diarrhea or vomiting. Which of the following inborn errors of metabolism is this infant most likely to have?

- a. 21 hydroxylase deficiency
- b. 11 beta hydroxylase deficiency
- c. 3 beta hydroxysteroid dehydrogenase deficiency
- d. 17 alpha hydroxylase deficiency
- e. 5 alpha reductase deficiency

37. A 14-year-old girl presents for a health supervision visit and has questions about her menstrual periods. Menarche was 18 months ago and her periods occur every 26 to 28 days. The first and all subsequent periods have been 7 or more days in duration with the heaviest flow on days 1 to 4. She often uses two tampons and a sanitary pad at the same time and still occasionally has overflow. She has not been sexually active and has no history of medication, drug, or herbal preparation use. Past medical history and review of systems are unremarkable, except for one memorable nose bleed that required nasal packing to stop the bleeding at the age of 9 years. Her mother's menstrual periods have never been a problem.

Her laboratory results include:

White blood cell count	10.4 x 10 <sup>3</sup> cells/mcL
Hemoglobin	11.8 g/dL
Platelet count	156 x 10 <sup>3</sup> cells/mcL
Prothrombin time (PT)	11 sec (10.2 to 12.0 sec)
Partial thromboplastin time (PTT)	36 ec (26 to 37 sec)

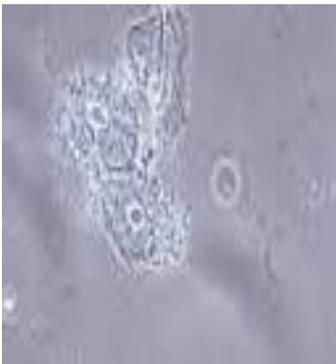
Of the following, the most appropriate next step in the evaluation is to obtain a:

- a. Bleeding time
- b. Measurement of protein C activity
- c. Ristocetin cofactor activity assay
- d. Test for antiphospholipid antibody
- e. Vitamin K assay

38. A term male infant is born to a woman who has known multiple drug abuse problems. Her urine drug screen is positive for barbiturates, benzodiazepines, and opioids upon admission to the labor and delivery unit. The infant is delivered vaginally without complications. Apgar scores are 8 and 9 at 1 and 5 minutes, respectively. His birth weight is 3,500 g. You are asked to evaluate the infant for early discharge at 36 hours of age. Findings on physical examination are normal with the exception of jitteriness. The BEST reason to keep this infant in the hospital is that:
- A negative urine drug screen for the infant is required
  - Breastfeeding failure requires a lactation consultation
  - Foster care placement must be arranged
  - Jitteriness is most likely due to hypoglycemia that requires treatment
  - Neonatal abstinence syndrome may not be fully evident for 5 days or more
39. While you are working in the Urgent Care Clinic, a 14-year-old girl is brought into the clinic by her mother. The mother, who lives minutes from the clinic, returned home from work and found her daughter acting drunk. Upon arrival to the clinic, the girl is acting euphoric and appears glassy-eyed. Her physical examination is unremarkable except for dilated pupils, an eczematous facial rash around her nose and mouth, an unusual chemical breath odor and slight ataxia. You have ordered a urine toxicology screen to determine a possible cause of her symptoms. What is the most appropriate next step in management?
- Blood toxicology screen
  - Cardiac monitoring
  - Chest x-ray
  - Oral administration of N-acetylcysteine
  - Oral administration of activated charcoal
40. For the patient in #39 above, which of the following is likely responsible for her symptoms?
- Air freshner
  - Benzodiazepine
  - Alcohol
  - Foxglove
  - Ectasy

41. An infant is delivered by cesarean section at 34 weeks' gestation. The infant requires assisted ventilation with a bag-mask device and 100% oxygen in the delivery room. His Apgar scores are 5 and 7 at 1 and 5 minutes, respectively. An umbilical cord arterial pH is 7.23 and base deficit is 3 mmol/L. Prenatal, labor and delivery history are unremarkable. He is admitted to the newborn nursery, but transferred to the neonatal intensive care unit (NICU) within an hour for respiratory distress. His arterial blood gas results (obtained on room air) upon admission to the NICU are: pH, 7.20; Pco<sub>2</sub>, 70 mm Hg; PO<sub>2</sub>, 50 mm Hg, and base deficit 10 mmol/L. The MOST likely cause for this infant's respiratory distress is:
- Aspiration of amniotic fluid
  - Congenital Pneumonia
  - Pneumopericardium
  - Pneumoperitoneum
  - Pneumothorax
42. A 30 weeks' gestation infant weighing 1,500 g experiences respiratory distress that requires assisted ventilation in the first 4 hours after birth. Some tachypnea with mild subcostal and intercostal retractions is evident on physical examination. Current ventilator parameters are: PEEP of 4 cm H<sub>2</sub>O, a PIP of 20 cm H<sub>2</sub>O, a rate of 40 breaths/min, and fraction of inspired oxygen of 0.8 to maintain a Pao<sub>2</sub> of 60 mm Hg. A chest radiograph reveals low lung volumes, diffuse microatelectasis, and dense ground-glass opacities. You order surfactant for intratracheal administration. The MOST expected event in the 4 hours following surfactant administration is:
- Decreased oxygen requirement
  - Decreased pulmonary compliance
  - Decreased respiratory drive
  - Increased inspiratory pressure
  - Increased clearance of Co<sub>2</sub>
43. You are seeing a 4-year-old boy for a health supervision visit. Physical examination findings are normal, but you notice that his speech pattern includes several utterances such as "tha tha that" and "b bu' bu' but." He seems anxious when you ask him a direct question, and his mother completes several sentences for him. The MOST appropriate next step for this child is:
- Referral for speech and language evaluation

- b. No intervention at this time
  - c. Refer to neuropsychologist for cognitive testing
  - d. Perform hearing screen
  - e. Recommend oro-motor coordination therapy
44. You suspect inflammatory bowel disease in an adolescent male with abdominal cramps, bloody diarrhea and weight loss. What is the most effective non invasive test to differentiate Ulcerative colitis from Crohn's disease?
- a. Serologic panel
  - b. Fecal calprotectin and lactoferrin assay
  - c. Serum albumin assay
  - d. Stool for occult blood
  - e. Erythrocyte sedimentation rate
45. Refer to slide below. A wet mount of vaginal fluid taken from a 15 year old girl with abdominal pain and vaginal discharge



What is the most likely cause of her discharge?

- a. Lactobacillus specie
- b. A facultative anaerobic gram-variable rod
- c. A gram negative diplococci
- d. A dimorphic fungi
- e. An anaerobic flagellated protozoan

46. A term infant is delivered vaginally following a pregnancy complicated by diabetes mellitus. His oral and nasal airways are suctioned and found to be patent and free of Meconium. He has cyanosis and respiratory distress immediately following birth that requires intubation and assisted ventilation with 100% oxygen. Because no improvement is apparent in the next 5 minutes, he is admitted to the neonatal intensive care unit. His birth weight is 4,500 g. A chest radiograph reveals findings consistent with decreased pulmonary blood flow. The most likely cause of respiratory distress in this infant is:
- Respiratory distress syndrome
  - Transient tachypnea of the newborn
  - Transposition of great arteries
  - Hypoglycemia
  - Persistent pulmonary hypertension
47. You are evaluating a 6-month-old infant who recently was adopted from China. Review of her immunization records show that she received two doses of oral poliovirus vaccine (OPV) prior to her adoption. The parents are concerned about the risk of vaccine-associated paralytic poliomyelitis (VAPP) in their child. An infant who is at high risk for developing VAPP is one who receives OPV and has which of the following?
- Hypogammaglobinemia
  - HIV
  - Selective IgA deficiency
  - Measles
  - Tuberculosis
48. A 24-month-old child presents to the emergency department with a 1-day history of pallor and lethargy. She had diarrhea 4 days ago that is still present but improving. The parents say that she is producing less urine because they are changing her diapers less often. On examination, the child is pale and listless, with a temperature of 37.2°C and blood pressure of 96/46 mm Hg. Her laboratory findings are as follows:

Laboratory Test	Patient Result (SI Values)
Sodium, mEq/L (mmol/L)	128 (128)

Potassium, mEq/L (mmol/L)	4.3 (4.3)
Chloride, mEq/L (mmol/L)	95 (95)
Bicarbonate, mEq/L (mmol/L)	14 (14)
Serum urea nitrogen, mg/dL (mmol/L)	67 (24)
Creatinine, mg/dL ( $\mu\text{mol/L}$ )	3.1 (274)
Hemoglobin, g/dL (g/L)	6.8 (68)
Hematocrit, % (absolute count)	20.1 (0.20)
White blood cell count, / $\mu\text{L}$ ( $\times 10^9/\text{L}$ )	20,500 (20)
Platelets, $\times 10^3/\mu\text{L}$ ( $\times 10^9/\text{L}$ )	72 (72)

Of the following, the key test to make the diagnosis in this child is:

- a. Stool culture
- b. Coagulation panel
- c. Peripheral blood smear
- d. Renal biopsy
- e. Serum complement C3 level

49. A 7 week-old infant presents with a 2-day history of vomiting and diarrhea. According to the parents, she has become sleepier and is not breastfeeding as well as usual. They are unsure of when she last voided due to the diarrhea. She has had a low-grade fever, with a maximum temperature of 100.8°F (38.3°C) at home. Her prenatal, labor and delivery history are unremarkable. She is exclusively breast fed except for 2 days ago when a family member gave her some water. On physical examination, the infant has a temperature of 99.3°F (37.4°C) rectally, a heart rate of 190 beats/min, a respiratory rate of 60 breaths/min, and a blood pressure of 70/42 mm Hg. Her weight is at the 10th percentile for age. She is alert but quiet and has cyanosis. Her pulse oximetry reading is 90% in room air. Neither the cyanosis nor the pulse oximetry reading improves with the administration of oxygen. Her mucous membranes are dry. There is no nasal congestion or rhinorrhea. Clear breath sounds are audible bilaterally, and there is no grunting, flaring, or retractions. She has a regular heart rate and rhythm without murmurs, her pulses are strong, and capillary refill is 3 to 4 seconds in her lower extremities. Her abdomen is scaphoid and soft, and there is no hepatosplenomegaly. A chest radiograph has a normal appearance. Which of the following is most likely responsible for her cyanosis?
- A contaminant in the family drinking water
  - A medication the mother is taking
  - A cyanotic congenital heart disease
  - Her gastroenteritis
  - Pneumonia that is not clinically apparent
50. During your initial evaluation of an 8-year-old girl who has autism, you learn that she receives chelators and eats a gluten-free diet. Her family is very pleased with this regimen and has noted marked improvement. Her parents ask your opinion of these and other alternative therapies and request hair analysis to look for mineral deficiency. Your BEST response is:
- You will assist them in identifying objective measures to follow response to treatments
  - They should find a physician who is more knowledgeable about these therapies
  - You will request the hair analysis
  - The efficacy of chelation is well documented and it should be continued
  - A gluten-free diet may lead to nutritional deficiency

51. A 14 year-old girl presents with a complaint of excessive vaginal bleeding. She had menarche at the age of 12 years and has had irregular periods since then. She occasionally does not have a period for 2 or 3 months and frequently bleeds for more than 1 week. She currently has been menstruating for 13 days, using 10 to 14 pads or tampons each day. She denies sexual activity, abdominal pain, vaginal discharge, urinary symptoms, light-headedness, or fatigue. On physical examination, her temperature is 99.7°F (37.6°C), respiratory rate is 16 breaths/min, heart rate is 70 beats/min, and blood pressure is 108/60 mm Hg with no orthostatic changes. Other findings are normal, except for ongoing vaginal bleeding noted on pelvic examination. There is no cervical motion tenderness, vaginal discharge, adnexal mass or tenderness, or evidence of trauma. Laboratory evaluation reveals a hemoglobin of 10.0 g/dL, hematocrit of 27%, platelet count of  $268.0 \times 10^3/\text{mL}$ , and negative urine pregnancy test. Of the following, the MOST appropriate next steps are:
- Administration of a tapering dose of an oral contraceptive and iron and close outpatient follow-up
  - Administration of ceftriaxone, azithromycin, and iron and outpatient follow-up
  - Administration of intravenous fluids, hospital admission, and treatment with intravenous estrogen
  - Quantitative beta-human chorionic gonadotropin measurement and transvaginal ultrasonography
  - Reassurance and follow-up in 3-6 months for a repeat hemoglobin measurement
52. A mother and her 6-year-old daughter are having an argument about when the six year old can sit in the front seat of a car. They ask you and you rightly say:
- At the age of 9 years
  - When she is at least 5 feet tall
  - It's ok for her to sit in front now as long as she uses a seat belt
  - At the age of 11
  - None of the above
53. A five year old is bitten by a spider. His mother brings the spider alive in a bottle. See photograph below



Of the following, which is true regarding a bite from this spider?

- a. It's usually painful
- b. Local symptoms are absent usually
- c. Antivenin may be required if systemic symptoms are present
- d. Antibiotic may be required if systemic symptoms are present
- e. Local wound care and supportive care are all that is required regardless of presence or absence of systemic symptoms

54. A 15 year-old boy presents to your clinic with a 4 day history of fever and worsening throat pain. His past medical history is unremarkable. His voice sounds muffled, although he is breathing comfortably, and he does not appear dehydrated. His temperature is 101.5°F (38.6°C). Despite mild trismus, you are able to examine the oropharynx and observe inflamed, asymmetrically enlarged tonsils with the left one abutting the uvula. The adjacent anterior tonsillar pillar is deviated anteroinferiorly. Intraoral palpation of the anterior pillar demonstrates a fluctuant mass. He has tender cervical lymphadenopathy bilaterally, but his neck is supple. The rest of the physical examination findings are normal. Of the following, the MOST appropriate next step is to:

- a. Administer an antibiotic only if a throat swab is positive for *Streptococcus pyogenes*
- b. Admit him to the hospital for administration of intravenous clindamycin and fluids and observation
- c. Admit him to the hospital for an emergent tonsillectomy
- d. Incise and drain the abscess
- e. Order plain radiographs of the soft tissues of the neck

55. A previously healthy 3 year-old boy presents to the emergency department with tachypnea and fatigue. His parents report that he has been less active than usual for the past few days. Physical examination reveals a child in mild respiratory distress whose oral temperature is 101.3°F (38.5°C), heart rate is 190 beats/min, blood pressure is 80/64 mm Hg, respiratory rate is 36 breaths/min, and pulse oximetry is 98% in room air. Although no wheezing is audible, fine rales can be heard at the lung bases. His liver is palpable 1 cm below the right costal margin. The rest of his physical examination is normal. Chest radiograph reveals cardiomegaly and pulmonary edema. Laboratory evaluation includes a white blood cell count of  $16.0 \times 10^3/\text{mcL}$ , hemoglobin of 14.0 g/dL, hematocrit of 45% and a platelet count of  $250.0 \times 10^3/\text{mcL}$ . Serum electrolytes values are within normal ranges. Of the following, the MOST likely cause of this child's signs and symptoms is:
- Mycoplasma Pneumoniae
  - Coxsackie Virus
  - Staphylococcus Aureus
  - Streptococcus Pneumoniae
  - Rhinovirus
56. The parents of a 7 year old boy scheduled a visit with you following a diagnosis of ADHD by a child psychologist. He has no comorbid conditions identified. He was seen by a nurse practitioner in your practice two weeks ago and was started on short acting methylphenidate tablets. He has tolerated this well with improvement of his symptoms but his mother is concerned about his refusal to go to the school nurse at lunch time for his lunch time dose. At this point, it is most appropriate and beneficial to
- Switch him to a non stimulant medication like clonidine
  - Add bupropion to his regimen for possible comorbid depression
  - Switch him to extended release guanfacine
  - Switch him to extended release methylphenidate capsules
  - Recommend behavioral therapy to help with medication adherence
57. Refer to photograph below.



What is the most likely diagnosis?

- a. Amniotic bands
  - b. Achondroplasia
  - c. Trisomy 13
  - d. Trisomy 18
  - e. Down Syndrome
58. A concerned mother brings her 8 month old infant to you for persistent spitting up of his formula “since birth”. He had an upper GI series at the age of 2 months for persistent spit ups and vomiting that was unremarkable. She has switched formula twice and says she even keeps him upright after feeds for 1 hour. His abdomen appears full but bowel sounds are present and normoactive. She is requesting you do something to find out the cause of his symptoms. Your best response is:
- a. Refer to gastroenterology
  - b. Acknowledge her frustrations and reassure her
  - c. Get an abdominal x-ray
  - d. Prescribe gas relief medications and schedule a follow up visit
  - e. Switch to a lactose free formula with added rice

59. A mother brings her 8 year old son to you on a Friday after school requesting you begin stimulants for ADHD. It is your first time seeing the boy. Over the past 10 months, he has been hyperactive, impulsive and inattentive, she says. He saw a nurse practitioner whom you supervise at your practice a week ago with these complaints. His mother hands you a sealed note she got from his school teacher yesterday that describes him as shy and not doing well in school. In the note, she states that he used to be active, outspoken and jovial but recently stopped playing because he is getting tired all the time and he now finds sports boring. You note he is obese, appears nonchalant and inattentive. The rest of his physical examination is normal. Your nurse practitioner had ordered a pre-stimulant CBCD, basic metabolic panel, thyroid function panel and a 12 lead-EKG which are all unremarkable except for a pending thyroid panel result. Of the following, your next best step is to:
- Begin low dose short acting stimulant and follow up in a week for medication adjustment
  - Screen for bi-polar disorder
  - Begin long acting stimulant and follow up in a week for medication adjustment
  - Screen for depression
  - Wait for the thyroid panel result, reschedule a follow up visit and speak to his teacher
60. Refer to chest x-ray below that belongs to a 16 year old immigrant with a 1 week history of coughing, high fevers and difficulty breathing.



What is the most likely causative organism?

- Mycoplasma Pneumonia
- Hemophilus Influenza B
- Mycobacterium Tuberculosis

- d. Chlamydia Pneumoniae
- e. Pneumocystis Carinii

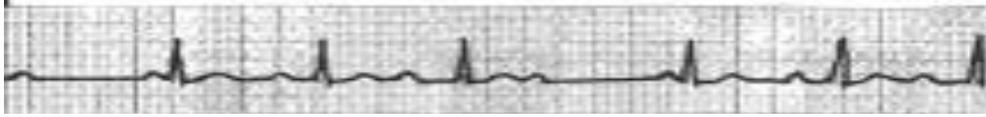
For questions 61 through 66, match the following presentations with the most likely causative organism in the options listed below. Each answer may be used once, more than once, or not at all

- 61. A 14 year old boy with fever, malaise, exudative pharyngitis, positive streptococcal screening test and hepatomegaly.
- 62. A 3 year old with gum swelling and papulo-vesicular lesions on an erythematous base in the mouth, anterior tongue and palms.
- 63. A 5 year old girl with whitish lesions and surrounding redness in mouth that appear discrete and also in inner lip and palate.
- 64. A 10 year old female with high fever, abdominal pain, exudative pharyngitis, palatal petechiae and a negative streptococcal screening test.
- 65. A sexually active 15 year old female with high fever, exudative pharyngitis, palatal petechiae and a positive streptococcal screening test.
- 66. A 6 year old male with headache, fever, non exudative pharyngitis and a maculopapular rash that follows the fever by 2 days.
  - a. Streptococcal pyogenes
  - b. Neisseria gonorrhoeae
  - c. Herpes simplex virus type 1
  - d. Herpes simplex virus type 2
  - e. Adenovirus
  - f. Enterovirus
  - g. Rhinovirus
  - h. Roseola (HHV 6) virus
  - i. haemophilus influenzae type b
  - j. EBV
  - k. CMV
  - l. None of the above

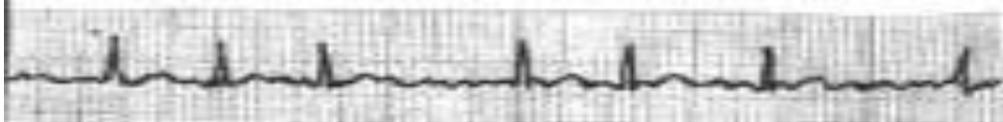
67. Your practice recently hired a new pediatrician and it is her first day at work. She brings her managed care contract to you and asks you to explain the term “capitation” as it pertains to physician payment. You tell her it means:
- Reimbursement to a physician or group of physicians through the payment of a fixed, periodic payment in exchange for delivering a defined set of services to a specific population of patients
  - A method of risk sharing used by managed care organizations in which payments are provided to physicians in addition to return of withhold funds as an incentive for physicians to manage utilization efficiently... this is bonus
  - A payment methodology whereby the physician agrees to provide services on a fee-for-service basis, but with reimbursement based on a discounted amount from the physician’s customary charges.. this is discounted fee for service
  - A system of payment for health care services whereby a health plan reimburses physicians for each individual service they provide, often on the basis of the amounts specified in a fee schedule.. this is fee for service
  - A provision in a providers contract with a health plan that prohibits the provider from contracting with any other managed care organization.. this is exclusivity clause
68. The parents of a 2 year old male who swallowed a coin are here with their son for a follow up visit from the emergency room. The boy was seen in the ER 1 week ago and worked up with a foreign body series which revealed the coin in the stomach. The parents were reassured that the coin would pass but the parents are concerned because they have vigilantly looked out for the coin in the stool and haven’t found it yet. The child is asymptomatic. What is the most appropriate statement to make?
- Could you have missed it?
  - Lets get another x-ray today to look for this elusive coin
  - Give it another week to pass at which time, if it doesn’t pass, I will get another x-ray
  - There is no need to worry, It poses no risk and will surely pass
  - I will refer you to the gastroenterologist for a non urgent endoscopy

For questions 69 through 73, match the following EKGs with their diagnosis listed below. Each answer may be used once, more than once, or not at all

69.



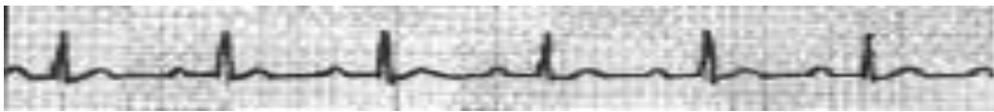
70.



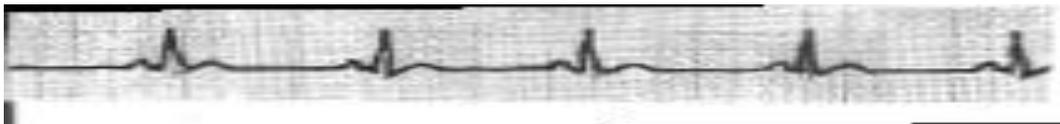
71.



72.



73.



- a. Wolff Parkinson white syndrome
- b. Sinus bradycardia
- c. First degree AV block
- d. Second degree AV block type 1
- e. Third degree AV block
- f. PVCs
- g. PACs
- h. Atrial fibrillation
- i. Atrial flutter
- j. Sinus tachycardia

74. Refer to image below of an infant's upper left extremity



What is a likely finding in this infant?

- a. Hyperextensible joints
  - b. Café au lait macules
  - c. Thrombocytopenia
  - d. Hypocalcemia
  - e. Spasticity
75. You are seeing a 12 year old boy for pre-participation sports physical. He has a history of ADHD and is on methylphenidate 54 mg tabs once daily. He plays football and basket ball and denies any prior history of concussions or injuries. His mother denies any family history of heart disease or sudden death. He is compliant with his medications and has no concerns today. His physical examination is unremarkable. Of the following, the most appropriate thing to do is:
- a. Advice that a pre-participation EKG is required
  - b. Clear for sports only after clearance by a cardiologist
  - c. Reduce the dose of his stimulant by half and clear for sports without restrictions
  - d. Advice he must take frequent water breaks each time he feels his heart beating fast
  - e. Do nothing and clear him without restrictions

76. An 8-year-old girl is at your clinic accompanied by her mother for sore throat. Her mother reports she's had a high fever and abdominal pain with her sore throat for the past 2 days. She denies any sick contacts or recent travels. Her physical examination reveals an erythematous oropharynx and palatal petechiae. You obtain a rapid strep test that comes back positive. You administer a single shot of intramuscular penicillin and send the patient home with instructions to change her tooth brush. The mother asks you when she should return to school. You rightly say:
- When symptoms resolve
  - Now, as long as she is up to it
  - After 24 hours
  - After 48 hours
  - In one week
77. A 2 month old Chinese infant is at your clinic for a routine well child check up. She is accompanied by her extended family members and father. For the second month running, you still haven't seen the infant's mom. You are aware of a Chinese tradition that prohibits mothers from getting out of bed for at least 3 months after delivery. What is the most appropriate statement to make to the father?
- How is the mother doing and does she have any questions
  - I guess we'll see mom next time, right?
  - Where is the mother? I hope she is alright
  - How is the mother doing and I hope she is bonding with the infant
  - How is the mother doing and when does she get out of bed?
78. In which of the following patients is the measles vaccine contraindicated?
- A 4 year old with history of egg allergy
  - A 12 year old asthmatic with history of allergies to amoxicillin
  - A 6 year old with history of flu-like illness after receiving the flu vaccine 12 months ago
  - A 3 year old treated for Kawasaki disease 3 weeks ago
  - A 10 year old female with history of up to 12 colds a year

79. The nursery nurse calls you to evaluate a lesion noted in the left lower extremity of a term newborn. See photograph below.



What is the most likely diagnosis?

- a) Klippel trenauay weber syndrome
  - b) Pseudocyanosis
  - c) Mongolian spot
  - d) Atypical sturge weber syndrome
  - e) Harlequin rash
80. An almost 5 month old male is brought in by his mother because she is concerned about his not rolling over from back to front. He was a full term baby with an unremarkable prenatal, labor and delivery history. You note his moro reflex is absent. What is the most appropriate next step in evaluation and management?
- a. Reassurance
  - b. X-ray of the clavicles
  - c. Express concern about a possible neurologic abnormality
  - d. Seek additional family history
  - e. Stool for botulinum toxin assay

81. A 1-month-old girl has had vomiting for the past 1 week. She is admitted from your clinic. She was born at term with no complications and had regained her birthweight by the second week after birth. She has been vomiting curdled milk intermittently for the past week and today is noted to have lost 4 oz in weight since her last check-up. On physical examination, she appears a bit lethargic with a sunken fontanelle otherwise the rest of her examination is unremarkable. Abdominal ultrasonography shows normal width and length of the pylorus. Of the following, which is best for diagnosing the cause of her vomiting?
- Upper gastrointestinal series
  - Esophageal manometry
  - Trial of formula change to a protein hydrolysate formula
  - Rectal biopsy
  - Serum ammonia assay
82. You are called to evaluate a 2 day old 35 week premature newborn that your nurse reports is having feeding intolerance with increased gastric residuals via orogastric tube feedings. A night shift nurse reports temperature instability that necessitated her transfer from an open crib to the isolette prior to the onset of feeding intolerance. She was born via cesarean section and weighed 4lbs 2 oz with a head circumference of 34cm and a length of 16 inches. Her prenatal, labor and delivery history are unremarkable except for fetal decelerations on the monitor. Her apgar's score were 7 and 9 at one and five minutes respectively. Her physical examination is remarkable for lethargy and poor suck with a distended abdomen. You order a CBCD, basic metabolic panel, stool occult blood and an abdominal x-ray as your initial work up. You initiate NPO status, begin IV fluids and IV antibiotics with broad coverage to cover anaerobes. Which of the following x-ray findings is an indication for surgical intervention?
- Dilated loops of bowel with bowel wall thickening
  - Presence of intramural air
  - Air under the diaphragm in a cross table lateral view
  - Air fluid level with bowel wall thickening
  - Isolated bowel loop
83. A 10 year old boy is being treated for congestive heart failure with digoxin, furosemide and captopril. He now complains of weakness and palpitations. Which of the following is responsible for his presentation?

- a. Hypocalcemia
  - b. Digitalis toxicity
  - c. Hypokalemia
  - d. Hypercalcemia
  - e. Hypophosphatemia
84. Which of the following decreases considerably in a boy going through puberty?
- f. Red blood cell mass
  - g. High density lipoprotein
  - h. Triglycerides
  - i. Blood pressure
  - j. Serum aldosterone
85. A 2 year old girl presents with a right upper quadrant mass. An ultrasound done reveals a large mass arising within the parenchyma of the left lobe of the liver. CT scan show no pulmonary nodules or abdominal adenopathy. Which of the following lab tests is most likely to be abnormal in this child?
- a. Serum ferritin
  - b. Serum copper
  - c. Serum B-HCG
  - d. Serum alpha-fetoprotein
  - e. Urinary homovanillic acid
86. A 9-month old presents with failure to thrive. Electrolytes reveal hyperchloremic metabolic acidosis. The serum phosphate is 2.0mg/dl. Urinalysis reveals a pH of 5.5 and glucosuria. What is the most likely diagnosis?
- a. Cystinosis
  - b. Cystinuria
  - c. Renal tubular acidosis type 1
  - d. Renal tubular acidosis type 4
  - e. Hartnup's disease
87. Which of the following is consistent with the rash of scabies?

- a. Lesions are usually non clustered
- b. The penis is spared usually
- c. It always involves the interdigital space
- d. The face is involved usually
- e. Lesions are recurring

88. Refer to photograph below of a 12 year old with abdominal pain



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A likely associated finding in this patient is

- a. Hypocalcemia
- b. High serum IgA
- c. Thrombocytopenia
- d. Absent factor VIII
- e. Hypercalcemia

For questions 89 through 91, match the diuretics with their site of action listed in the options below. An answer may be used only once or not used.

- 89. Furosemide
- 90. Hydrochlorothiazide
- 91. Acetazolamide PCT

- a. Proximal convoluted tubule
- b. Distal convoluted tubule
- c. Thick ascending loop
- d. Loop of Henle
- e. Collecting duct

92. A 17 year old female presents to the ER with generalized weakness associated with perioral numbness. She is on a weight loss diet. On physical exam, she has mild pallor. She denies use of any medications. BP 120/88 mmHg and physical exam is normal. Lab data: Cr 1.2mg/dL, BUN 15mg/dL, Na 136 , K 2.8 , Cl 88 , HCO<sub>3</sub> 38. Urine Na 45 meq/L, Urine K 35 meq/L, Urine Cl 8 meq/L, Urine specific gravity 1.010, Urine pH 7. What is the most likely diagnosis?
- f. Laxative Abuse
  - g. Surreptitious vomiting
  - h. Licorice abuse
  - i. Diuretic abuse
  - j. Hyporeninemic Hypoaldosteronism
93. An 11-year-old boy who is at the 90th percentile for weight complains of slight pain in the right thigh and knee for about a month. His complains are made worse by physical activity and he has a mild limp. He has no history of recent infections or trauma. Physical examination reveals a slight decrease in internal rotation of the right hip. There is mild right-sided metaphyseal osteopenia on radiograph. Of the following, which would be the MOST likely diagnosis in this boy?
- A) Transient synovitis
  - B) Overuse atrophic arthritis
  - C) Pathologic fracture
  - D) Slipped capital femoral epiphysis
  - E) Legg-Calve-Perthes disease
94. You are called to the term nursery to evaluate a term newborn because of a heart murmur. She is small for gestational age, has puffy swollen feet and webbed neck. What is the most likely cause of the murmur?
- a. AV canal defect
  - b. Coarctation of aorta
  - c. Pulmonic stenosis
  - d. Ventricular septal defect
  - e. Bicuspid aortic valve
95. A 10-year-old boy has been diagnosed with a language-based learning disability; he has significant difficulty with reading. His parents would like information on how to increase his chances of success in the classroom. Of the following, your BEST response is that they should:

- a. Arrange for a specialized ophthalmologic examination
  - b. Arrange for his texts to be available on tape
  - c. Requests that he be retained in his present grade for language-based classes
  - d. Request that his teacher increase his reading homework
  - e. Request transfer to a private school
96. You are seeing a 2-year-old boy who has Down syndrome for a health supervision visit. Physical examination reveals a moderately hypotonic boy who has typical facial stigmata of Down syndrome. His parents ask about his likely abilities and functioning as an adult. Of the following, your BEST answer is that their son likely will
- a. Attain an eighth-grade reading level
  - b. Be unable to live independently as an adult
  - c. Have an affinity for something he will become a genius at
  - d. Have mild-to-moderate mental retardation
  - e. Have significant difficulty with social skills
97. You are seeing an 8-year-old girl who is receiving special education services in the school system because of a diagnosis of mental retardation. Her teacher is concerned because she rocks in her chair when she is upset. On physical examination, she does not make eye contact with you or respond to questions. Her mother has been reading about autism and asks you whether her daughter has autism. Of the following, your BEST response is that:
- a. She sure does look like she's got something
  - b. It is highly possible because she wouldn't make eye contact
  - c. About 90 percent of autistic children score in the mentally retarded range on IQ tests.
  - d. She most likely doesn't but a formal screening is needed in order to tell you more
  - e. Social interaction is more impaired in children who have autism than in those who have mental retardation

98. Physical examination results are normal for a 2-year-old girl during a health supervision visit. She follows two-step commands, speaks 10 words, points to pictures that you name, and sorts objects by color. She uses a spoon well, but does not use a fork. She plays alongside other children but does not share toys and would not alternate her feet up the stairs. Her mother would like to know if she should be concerned about the girl's development. Of the following, your BEST response is that her daughter:
- a. Has age appropriate milestones
  - b. Has delayed fine motor skills
  - c. Has delayed gross motor skills
  - d. Has a delay in expressive language
  - e. Has impaired social skills
99. The mother of a 6-week-old breastfed girl reports that she has cried 3-4 hours every night for the last week. She is a product of a normal vaginal delivery. She was initially on cow milk based formula for the first four days of life but has been breast fed exclusively since then. The mother expresses concerns that she cannot afford "a good formula" for the crying or else she would try it and she has other children that need her attention as well. The infant regained her birth weight at her 2 week visit. Prenatal and labor history are unremarkable. Findings on physical examination are normal. Which of the following will be most beneficial to the mother?
- a. Providing monthly vouchers for protein hydrolysate formula
  - b. Advice and teach various soothing techniques
  - c. Hiring a caretaker
  - d. Taking a break from work
  - e. Adding cereal to expressed breast milk
100. A 2-year-old girl comes to you for evaluation of fever of several days' duration and upper respiratory tract symptoms. She sits quietly on the examining table and waves her hand in front of her face while you speak to her mother. The child looks down when you speak to her. She has no history of hospitalization, but has missed several health supervision visits and needs immunizations. Her mother states that the family is at risk of losing their home due to financial

difficulty. On physical examination, the girl is afebrile, appears thin, and has rhinorrhea. Of the following, the MOST urgent diagnostic consideration is:

- a. Autism
- b. Child neglect
- c. Developmental delay
- d. Immunologic disorder
- e. Pneumococcal bacteremia

101. An 11-year-old boy comes in with his mother for a health supervision visit. Physical examination findings are normal. The boy has average grades, but he always has struggled with math and continues to have trouble with math this year in fifth grade. You ask about extracurricular activities, and his mother states that he is not allowed to participate in activities outside of class because she is concerned that he will be distracted from his schoolwork. The boy expresses interest in playing baseball. Of the following, your BEST response is that:

- a. Extracurricular activities can facilitate improved classroom performance
- b. He should be allowed to participate if he can improve his math grades
- c. He should be directed toward extracurricular activities in chess to enhance his math skills
- d. He should be referred to a neuropsychologist for cognitive testing and math preparedness
- e. He should be encouraged to participate in summer sports activities only

102. Refer to the X-ray below.



What is the most likely syndrome associated with the finding/s in the x-ray?

- a. Rubeinstein Taybi Syndrome
- b. Marfan's Syndrome
- c. Turner's Syndrome
- d. Silver Russell syndrome
- e. Down Syndrome

For questions 103-105, match the following electrolyte abnormalities with their diagnosis in the options below. Each answer may be used once or not at all.

- 103. ICU patient with high urine output, high serum sodium, low urine sodium and high serum osmolarity.
- 104. ICU patient with high urine output, low serum sodium, low urine sodium and low serum osmolarity.
- 105. ICU patient with low urine output, low serum sodium, high urine sodium and low serum osmolarity.
  - a. Diabetes Insipidus
  - b. Syndrome of Inappropriate ADH secretion
  - c. Water Intoxication
  - d. Cerebral salt wasting
  - e. None of the above
- 106. You are rounding in the term nursery and discussing the physiology of lactation with a group of pediatric residents. Which of the following statements is true?
  - a. After delivery, the concentration of prolactin drops leading indirectly to increased milk let down
  - b. Prolactin increase causes the milk ejection reflex or letdown
  - c. The rate of milk synthesis after each breastfeeding is related to the degree of emptiness or fullness of the breast
  - d. The rate of milk ejection or letdown is unrelated to the degree of fullness of the breast.
  - e. Maternal type 1 diabetes does not interfere with lactogenesis

107. You are examining a 16 year old male athlete for chest pain. He describes it as central, non-radiating and worse at rest. It doesn't affect his running or other activities. He runs 7 miles a day. There is a family history of sudden death in an uncle at the age of 45 related to cardiovascular disease. He is afebrile with a pulse of 58 beats per minute, respiratory rate of 20/min and a blood pressure of 85/45. He weighs 141 lbs and he is 6 feet in height. You schedule him for an echocardiography. Which of the following echocardiographic findings will be most consistent with his diagnosis?
- Asymmetric biventricular hypertrophy
  - Right ventricular cavity enlargement
  - Left ventricular hypertrophy with symmetric septal hypertrophy
  - Aortic stenosis
  - Left ventricular hypertrophy with asymmetric septal hypertrophy
108. A 2month-old boy develops high fevers, focal seizures, lethargy and vomiting. He was delivered via normal spontaneous vaginal delivery to a 16 year old mother with no pre-natal care. His past medical history is significant for neonatal fever at 2 weeks of age. A full septic work up done then revealed leukocytosis with a predominance of lymphocytes but attempts at a lumbar puncture failed. He received meningitic doses of parenteral ampicillin and cefotaxime for 48 hours after which antibiotics was stopped because blood and urine cultures were negative. Today his examination shows a bulging fontanelle. Lumbar puncture reveals pleocytosis with increased protein, decreased glucose and gram positive bacilli. He is allergic to penicillins. What is the most appropriate combination parenteral antibiotic therapy to administer empirically?
- Cefotaxime and Vancomycin
  - Ceftriaxone and gentamycin
  - Clindamycin and gentamycin
  - Bactrim and gentamycin
  - Cefotaxime and gentamycin
109. A mother of a child with cystic fibrosis is concerned about its co-morbidities. She has read that "these kids" are prone to bleeding diathesis. Her child's increased risk of bleeding will be most likely a result of what deficiency?
- Labile factor

- g. Stuart-Prower factor
- h. Protein C
- i. Hageman factor
- j. Factor XII

110. A 15 year old high school student and several of her classmates ate lunch at a local chinese restaurant. They all were served the daily luncheon special, which consisted of chicken, sour pork, spinach and fried rice. They also had icecream and cold salad afterwards. All of the girls developed nausea, vomiting and diarrhea with severe abdominal cramps within 12-16 hours of eating. Which of the following is the most likely cause of their symptoms?

- f. Enteropathogenic escherichia coli
- g. Clostridium perfringens
- h. Bacillus cereus
- i. Staphylococcus aureus
- j. Campylobacter jejuni

111. Refer to the x-ray below.



What is the most likely diagnosis?

- a. Osteochondroma
- b. Hystiocytois X
- c. Chronic osteomyelitis
- d. Osteosarcoma
- e. Osteoid osteoma

For questions 112-115, match the serum HBV serologic markers with its correct interpretation in the options below. Each answer may be used only once or not at all.

112. HBs Antigen negative, Total H-core Antibody negative, IgM HBcAntibody negative and HBs Antibody positive.
113. HBs Antigen positive, Total H-core Antibody positive, IgM HB-core Antibody negative and HBs Antibody negative.
114. HBs Antigen negative, Total H-core Antibody positive, IgM HB-core Antibody negative and HBs Antibody positive.
115. HBs Antigen positive, Total H-core Antibody positive, IgM HB-core Antibody positive and HBs Antibody negative.
- a. No infection and no immunity
  - b. Immunity post immunization
  - c. Immunity post infection
  - d. Acute infection
  - e. Chronic infection
116. A 13 year old girl is at your clinic for a routine physical examination. She has no complaints or concerns today. She developed breast buds a year and a half ago and has not yet experienced menarche. Family history reveals her mother had delayed menarche and a history of acne even as an adult. Her growth parameters are at the 25<sup>th</sup> and 50<sup>th</sup> percentile for height and weight respectively. Her vision and hearing screen are normal. Her physical examination is normal including SMR 2 for pubic hair development. Routine hemoglobin via finger stick is 12.5 mg/dl, a lead screen is pending and a urinalysis screen via dip stick reveals 2+ proteinuria. What is the most appropriate next step in evaluation?
- a. Order a karyotype
  - b. Follow up in 48 hours with a repeat urinalysis with patient in a recumbent position
  - c. Obtain a TSH
  - d. Order an x-ray of the long bones to determine bone age
  - e. Obtain a urine protein to creatinine ratio

117. A concerned mother brings in her 12 month old daughter for a follow up emergency room visit. She had her first febrile seizure yesterday and has some questions about potential complications. In addressing her concerns, you rightly say:
- The risk of recurrence is about 65 percent after a second simple febrile seizure
  - The risk of recurrence is about 50 percent after a first febrile seizure
  - The risk of epilepsy is about 2 percent compared to 1 percent in the general population after a first simple febrile seizure
  - The risk of epilepsy after a first simple febrile seizure is equal to the risk in the general population
  - A structural but non progressive brain lesion is usually found in 50 percent of affected patients
118. An 8-year-old boy is brought to the office because of a 5-day history of fever, coryza and cough that coincides with an epidemic of influenza in the community. Today he is unable to walk because of pain in the calves. His mother has been giving him acetaminophen for fever and pain. Physical examination shows a temperature of 38.3°C (101.0°F). He is alert, interactive and appears well-hydrated. He has clear rhinorrhea, mild pharyngeal erythema and a clear chest. His calves are tender to palpation. Strength cannot be tested because of pain. Neurologic examination including deep tendon reflexes are normal. Which of the following is the most appropriate next step in management?
- Acetaminophen orally
  - Amantadine, orally
  - Immune globulin, intravenously
  - Acyclovir orally
  - Prednisone, orally
119. A 13 year-old female has complaints of tingling and numbness of her hands. She is a patient of your colleague who sees her for progressive loss of pigment on various parts of her body for the past year. She has no other medical problems and takes no medications. On physical examination, vital signs are normal. Her BMI is 23. Skin examination reveals hypopigmented lesions on her eyelids, chin and knees bilaterally. Similar skin findings are noted in the cleft between her buttocks. The remainder of the physical examination is normal. Laboratory testing reveals a normal complete blood count, serum electrolytes, and lipid panel. Which of the following tests will be most helpful in determining the cause of her hand numbness?

- a. Nerve conduction study
  - b. Measure of compartment pressures
  - c. Vitamin B12 assay
  - d. Thyroid-stimulating hormone assay
  - e. Vitamin B6 assay
120. An 18-year-old female gymnast lands her dismount from the balance beam awkwardly. She reports the knee buckling, hearing a pop and experiencing immediate right knee pain. She presents to your office 45 minutes after the injury. She is able to bear some weight on the leg but reports it is already swollen and feels loose. On exam there is a knee effusion present. The MOST likely isolated injury experienced by this athlete is:
- a. Medial meniscus tear.
  - b. Medial collateral ligament (MCL) sprain.
  - c. Distal quadriceps/patellar tendon rupture.
  - d. Anterior cruciate ligament (ACL) rupture.
  - e. None of the above
121. A 17 year old male gymnast presents to your office with a 1-week history of right facial weakness. He states that he “just woke up this way one morning.” He would have come in sooner but he was busy with his practice and he has felt fine. He has not noticed any other neurologic symptoms. He denies pain, fever, or upper respiratory symptoms. He reports being healthy and takes no medications. On examination, his vital signs are normal. You note that his right eyebrow sags, as does the right corner of his mouth. He cannot close the right eye completely or raise his right eyebrow, and the right nasolabial fold is less prominent than the left. The remainder of the neurologic examination is normal. You tell the patient that you suspect he has Bell palsy. He asks what causes this problem. Which of the following is the most likely cause of this patient’s Bell palsy?
- a. Herpes virus
  - b. Borrelia Burgdorferri
  - c. Rhinovirus
  - d. Adenovirus
  - e. A space occupying lesion

122. Which of the following treatments is most likely to benefit the patient above?
- Acyclovir
  - Prednisone
  - Artificial tears and eye patching at night.
  - B and C
  - A, B and C
123. For the patient in # 121 above, you can expect which of the following?
- Complete resolution (~100% likelihood) with nearly zero risk of recurrence
  - Likely resolution (>50% likelihood) with nearly zero risk of recurrence
  - Likely resolution (>50% likelihood) with ~10% risk of recurrence
  - High probability (~95% likelihood) of persistent paralysis
  - No resolution without treatment
124. A 16 year old boy is brought to the hospital with a depressed level of consciousness. He was found by the police beside a dumpster behind an automotive shop. He had no identification. On examination, his supine pulse rate is 108 beats per minute and supine blood pressure is 98/64 mm Hg; orthostatic changes cannot be determined because the patient cannot sit upright. His breath has a sweet, fruity odor. The optic fundi appear normal, and both pupils react briskly to light. Cardiovascular examination is unremarkable except for regular tachycardia. The abdomen is not tender. No peripheral edema is present. There are no suspicious skin marks or lesions. Laboratory evaluation showed the following:
- Plasma glucose, 96 mg/dl  
Blood urea nitrogen, 17 mg/dl  
Serum creatinine, 1.0 mg/dl  
Serum sodium, mEq/L 137  
Serum potassium, mEq/L 3.9  
Serum chloride, mEq/L 100  
Serum bicarbonate, mEq/L 10

Arterial blood Gas reveals  
PO<sub>2</sub>, 133 mm Hg  
PCO<sub>2</sub>, 28 mm Hg  
pH 7.27

Which of the following is the most likely diagnosis?

- a. Renal tubular acidosis type 4
- b. Crystal methamphetamine overdose
- c. Ethylene glycol intoxication
- d. Alcoholic ketoacidosis
- e. Diuretic overdose

125. A 16-year-old female is evaluated for acne on her face that has worsened over the past few weeks and includes inflammatory and small nodular lesions. The patient has a history of moderate-to-severe acne outbreaks occurring since she was age 12 years. She has tried every over the counter acne medication there is and has been using topical retinoid and antibiotic preparations with no improvement. She is otherwise healthy. She takes combined oral contraceptives for birth control and has regular menses. On physical examination, she has diffuse and some clustered papular lesions on her face. The lesions are tender, and some have pustules. Which of the following is the most appropriate next step in the management of this patient?

- a. Discontinue oral contraceptives and continue her current management
- b. Prescribe oral tetracycline
- c. Prescribe oral isotretinoin
- d. Prescribe accutane extended release
- e. Refer to dermatology

126. A 17 year old boy returns to your clinic for the fourth time in 2 months because he thinks he has ulcerative colitis. He is accompanied by his maternal grandfather. His recent evaluation by a gastroenterologist was unremarkable. Despite reassuring him, he insists you check his stool again for occult blood. His behavior is consistent with which of the following diagnosis?

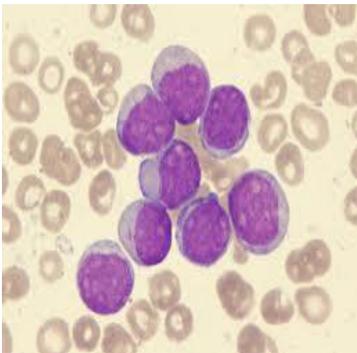
- a. Conversion disorder
- b. Hypochondriasis
- c. Anxiety disorder
- d. Somatization disorder

e. Non-specific phobia

127. An almost six month old infant hasn't rolled from front to back yet and his mom is frantic because she has read that this could be cerebral palsy. He was born at term via cesarean section and apgars score was 4 and 6 at one and five minutes respectively. He feeds well, she says and she has no other complaints at the moment. His physical examination is significant for hypotonia in his upper and lower extremities. Which of the following gross motor delays are diagnostically important in the infant with possible cerebral palsy?

- a. No volitional rolling by 4 months
- b. Head lag present in a 4 month old
- c. No hands and knees crawling by 9 months
- d. Inability to bring the hands together in midline while in a supine position by the age of 4 months
- e. Inability to independently sit by 6 months

128. Refer to slide below of a 5 year old boy



Of the following, which is true of this patient?

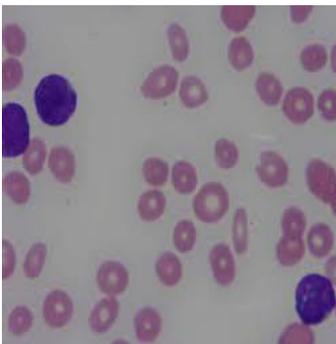
- a. Down syndrome is a good prognostic factor
- b. He is at high risk of testicular relapse
- c. Haploidy and immunophenotype B are poor prognostic factors
- d. Increase B12 and leukocyte alkaline phosphatase are consistent findings
- e. Organomegaly and pruritis are poor prognostic factors

129. An 8 year old girl is noted to be hypertensive on routine physical examination. Family history is positive for hypertension in her mother, maternal uncle and maternal grandfather. Laboratory evaluation reveals mild hypokalemia, suppressed plasma rennin activity and elevated serum and urinary aldosterone. Your next step in evaluation is
- f. Adrenal vein sampling
  - g. MRI of the adrenals
  - h. Renal arteriography
  - i. Dexamethasone suppression test
  - j. Urine cortisol
130. You are seeing a newborn in the nursery whose mother admits to abusing PCP during pregnancy. A likely manifestation of PCP exposure in this baby is:
- f. Poor attention
  - g. Hypertonicity
  - h. Prematurity
  - i. Low birth weight
  - j. Tachypnea
131. A mother is concerned her 3 year old son may have ingested a castor bean. He was playing in the backyard when she witnessed him chewing something next to a castor bean plant. What is the most likely symptom to expect in the next 2-6 hours?
- a. Vomiting
  - b. Tachycardia,
  - c. Rash,
  - d. Increased sleepiness
  - e. Agitation
132. Refer to photograph below of a 12 month old infant with a history of hypotonia.



Which of the following tests will best establish a diagnosis?

- a. Chromosomal analysis
  - b. Fluorescent In Situ Hybridization test
  - c. Methylation study
  - d. Dexamethasone suppression test
  - e. Diagnosis is clinical
133. The mother of a 35 week preterm infant is concerned about vitamin D supplementation. She does not plan to breast feed but instead use the premature formula suggested by the nursery nurse. When is the best time to supplement with vitamin D?
- f. At birth
  - g. At 2 weeks
  - h. At 1 months,
  - i. At 2months
  - j. No supplementation is necessary
134. Refer to slide below in a 5 year old boy with anemia



What is the most likely diagnosis?

- a. Hereditary spherocytosis
- b. Iron deficiency anemia
- c. Hemoglobin SC disease
- d. Hemoglobin SS disease
- e. Acute lymphoblastic leukemia

135. Refer to photograph below



What is the most likely cause of this lesion?

- a. Staphylococcal Aureus
- b. Group A Streptococcus
- c. Pasteurella multocida
- d. Endotoxin
- e. Clostridium perfringens

136. A 4 year old previously well child has been having a blank stare mostly in school over the past week intermittently. His mother says it occurred at home once yesterday and she noticed he also had some lip movement during stare. After the stare, he is a bit worn out. His past medical history is significant for breath holding spells as a toddler. What is the most likely diagnosis?

- a. Absence seizures
- b. Simple partial seizures
- c. Hypnagogic hallucinations
- d. Complex partial seizures

e. Rolandic Epilepsy

137. A 16 year old female presents to your office with a self palpated breast lump. After appropriate work up, you decide to proceed with fine-needle aspiration (FNA) of the lump. The results of the FNA returned negative but the girl is concerned about the possibility of breast cancer. She says it runs in her family. You reply that the probability of breast cancer is low because FNA has a high:
- a. Reliability
  - b. Specificity
  - c. Positive predictive value
  - d. Negative predictive value
  - e. Validity
138. Your nurse calls you to inform you about the death of one of your patients. He was a 12 year old male rushed to the emergency room that afternoon after he had collapsed in a school athletic event. EKG revealed pulseless ventricular tachycardia. Resuscitative efforts and all attempts at cardioversion failed . Which of the following is the most likely cause of sudden cardiac death in young athletes?
- a. Aortic stenosis
  - b. Hypertrophic cardiomyopathy
  - c. Athletes heart
  - d. Long QT syndrome
  - e. Atrioventricular block
139. Which of the following is true of adolescent smoking?
- a. Most are heavy smokers
  - b. Most wish and try to quit with the help of their parents
  - c. Programs that emphasize long term health effects are more effective
  - d. Scare tactic is not an effective quitting strategy
  - e. Unemployment increases the chances of quitting
140. You are concerned about pneumococcal meningitis in a 19 month old male with lethargy and high fevers. He is not immunized. What is the best empiric antibiotic/s to use pending culture and sensitivity result availability?

- a. Parenteral ceftriaxone
- b. Parenteral ceftriaxone and Gentamycin
- c. Parenteral cefotaxime and vancomycin
- d. Parenteral ampicillin and vancomycin
- e. Parenteral nafcillin and vancomycin

141. Refer to photograph below of a 3 year old female.



Which of the following is most consistent with her diagnosis?

- a. Trident hand
  - b. Hypercalcemia
  - c. Mental retardation
  - d. Rhizomelia
  - e. Conductive hearing loss
142. On the average, what percentage of pediatricians practice revenues are derived from managed care contracts
- f. 20 percent
  - g. 40 percent
  - h. 60 percent
  - i. 80 percent
  - j. 100 percent

143. A 6-month-old female is brought to you for a visit following hospitalization for gastroenteritis, hyponatremia and moderate dehydration 3 days ago. Her symptoms resolved and the electrolyte abnormality was corrected prior to discharge. The mother is upset because of a recurrence of diarrhea at home after re-introducing her regular formula, cereal and fruit juices. She denies fevers or vomiting and her physical examination is normal. What is the most appropriate next step in management?
- a. Continue her regular formula but stop fruit juices temporarily
  - b. Temporarily switch to a lactose free formula
  - c. Prescribe a probiotic pill for 1 week and instruct her to give patient any food or drink she wants
  - d. Check stool for ova and parasite
  - e. Order a stool for reducing substance
144. An 8 year old male sustained an injury to his right elbow after falling from a height with his hands outstretched. He was evaluated in the ED with a splint placed about six days ago. His x-ray is shown below.



What will be the earliest sign suggestive of compartment syndrome?

- a. Diminished radial pulse in involved extremity
- b. Loss of distal sensation to touch
- c. Pallor in distal digits
- d. Pain on passive extension of finger
- e. Prolonged capillary refill time

For question 145 through 147 match the following cases of stridor with the most likely diagnosis in the options listed below. Each answer may be used once, more than once or not at all.

145. A seven month old exclusively breast fed infant with a 2 week history of intermittent but worsening stridor unresponsive to change in position, cool mist therapy, nebulizer treatments or steroids. Laryngoscopy is normal.
146. A twelve month old exclusively breastfed infant with hoarseness associated with stridor “since birth” unresponsive to cool mist therapy, albuterol and steroid nebulizer treatments. Laryngoscopy reveals no motion of vocal cord during inspiration or expiration.
147. A three year old female with recurrent wheezing and stridor “since birth” unresponsive to albuterol or steroid nebulizer therapy. Laryngoscopy reveals paradoxical vocal cord motion or anterior cord adduction.
- a. Vocal cord paralysis
  - b. Laryngomalacia
  - c. Laryngospasm
  - d. Vocal cord dysfunction
  - e. Vocal cord nodules
  - f. Tracheomalacia
  - g. None of the above
148. Refer to x-ray below of a 56 hour old infant with no stool since birth. Pregnancy was complicated by pre-eclampsia, asthma and gestational diabetes.



What is the most likely diagnosis?

- a. Hirschsprung disease
- b. Meconium plug syndrome
- c. Meconium ileus
- d. Imperforate anus
- e. A or B

149. You are providing injury and prevention anticipatory guidance to the mother of a 15 month old female who weighs 24lbs. Her height is at the 75<sup>th</sup> percentile for age. Which of the following is an age appropriate statement or advice to give this mother?

- a. Remain in a convertible sit until she is above 25 pounds
- b. Child proof your home with stair gates and window guards
- c. Check window guards
- d. If you decide to get a pool, make sure there is a fence around it
- e. Ensure a helmet is worn when she rides her tricycle

150. Refer to x-ray below of a 4 year old boy



The findings in the x-ray above are consistent with:

- a. Left upper lobe pneumonia
- b. Viral pneumonitis
- c. Pneumothorax
- d. Child abuse
- e. Pneumomediastinum

151. Vertical transmission of hepatitis B from mother to baby is most likely to occur:
- In utero
  - During delivery
  - Through breast milk
  - Through contact with body secretions post delivery
  - None of the above
152. A cohort study was conducted to assess the relationship between a high fat diet and metabolic syndrome. The study showed that no association exists between exposure and the outcome after controlling for known risk factors (age, fiber consumption and a family history of type 2 diabetes): relative risk 1.25 ( $p=0.25$ ). The investigators also reported that 40% of the high fat group and 36% of the low fat group subjects were lost to follow up by the end of the study. According to this information, which of the following biases is most likely present?
- Observer's bias
  - Selection bias
  - Recall bias
  - Intervention bias
  - Measurement bias
153. A 9 year old boy is brought to you by his father because he lost consciousness while playing in the yard. He regained consciousness quickly and there was no confusion afterwards. His past medical history is significant for impaired hearing since birth. The family history is significant for sudden cardiac death in a maternal uncle who was 36 at the time of death. Physical examination is unremarkable. Blood pressure is 120/70. Heart rate is 70/min, regular. What is the most likely diagnosis?
- Pendred syndrome
  - Jarvell-Lange-Nielson syndrome
  - Landau Kleffner syndrome
  - Wolf Parkinson White syndrome
  - Epidural hematoma

154. A 9 year old boy is brought to your office by his mother with complaints of a rash on his legs. He describes it as itching, burning and oozing. His mother reports he has been spending time outdoors and that he just returned from a camping trip in the woods with his dad. Physical examination of his lower extremities reveals typical linear streaked vesicles with Erythema, edema and weepy-crusts lesions. The reaction type that best describes his lesion is:

- a. IgE mediated hypersensitivity reaction
- b. Antibody mediated hypersensitivity reaction
- c. Immune complex mediated hypersensitivity reaction
- d. Cell mediated hypersensitivity reaction
- e. Photosensitive reaction

155. A 15 month old female is brought to you for fever and facial rash. She is accompanied by her mother. Her past medical history is significant for atopic dermatitis, which was diagnosed at the age of 6 months. She drinks less than 24 ounce of whole milk a day in addition to her regular diet. Examination reveals numerous umbilicated vesicles over erythematous skin in both cheeks. Submandibular adenopathy is present. What is the most likely diagnosis?

- a. Atopic dermatitis with superimposed impetigo
- b. Fifth's disease with superimposed bacterial infection
- c. Contact dermatitis
- d. Eczema herpeticum
- e. Erysipelas

156. Refer to picture below



What is the most likely cause of these lesions?

- a. Mosquitoes
- b. Fleas
- c. Spiders
- d. Bed bugs
- e. Lice

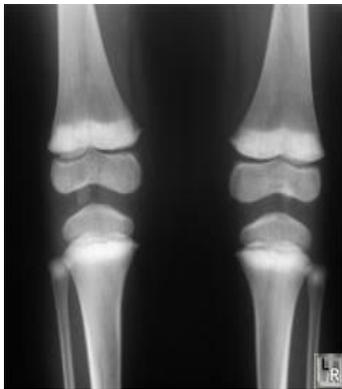
157. A 4 year old boy with bow legs is noted to have rachitic rosary and Harrison groove on physical examination. His family history is negative. A work up reveals;

Serum calcium	Normal
Serum phosphate	Decreased
Serum alkaline phosphatase	Increased
Serum parathyroid hormone	Normal
Plasma 25-OH vitamin D	Normal
Plasma 1, 25 dihydroxy vitamin D	Normal

What is the most likely diagnosis?

- a. Vitamin D dependent ricket type 1
- b. Vitamin D dependent ricket type 2
- c. Familial hypophosphatemic ricket
- d. Vitamin D deficient ricket
- e. None of the above

158. Refer to x-ray below of a patient 5 year old with lead toxicity



Lead lines are most likely a result of:

- a. Abnormal lead deposition in distal metaphysis
- b. Abnormal phosphate deposition in distal metaphysis
- c. Abnormal calcium deposition in distal metaphysis
- d. Increased resorption of calcium in distal metaphysis
- e. Increased deposition of lead in distal metaphysis

159. A 15 year old Caucasian male presents with complaints of nasal blockage and recurrent bleeding through the right nostril for the past 3 months. He has no other complaints. His vital signs are stable. On examination, there is a grayish swelling in the posterior nasopharynx and a bulging palate. His neck is supple. There is no adenopathy. What is the most likely diagnosis?

- a. Nasal polyps
- b. Angiofibroma
- c. Nasopharyngeal carcinoma
- d. Nasal chordoma
- e. Allergic rhinitis with hypertrophied turbinates

160. The mother of a 4 month old infant is asking questions about when to expect teething. You explain that the mandibular central incisors are the first to erupt and typically around:

- a. 5-7 months
- b. 6-8 months
- c. 8-10 months
- d. 10-12 months
- e. 12-15 months

161. A medical literature shows drug A to be statistically superior to drug B in treating ADHD with a p value of  $<0.10$ . What are the odds that the difference between drug A and drug B observed in the study were only a chance variation?

- a. Less than 1 in 10
- b. Less than 1 in 5
- c. less than 1 in 20
- d. less than 1 percent
- e. greater than 10

162. Who amongst the following may participate in the summer football season with the least restrictions?
- a. An asymptomatic 14 year old with mitral valve prolapse
  - b. An asymptomatic 16 year old with hypertrophic cardiomyopathy
  - c. An asymptomatic 15 year old with enlarged spleen
  - d. An asymptomatic 12 year old with a grade 3/6 systolic ejection murmur
  - e. An asymptomatic 13 year old with atlanto-axial instability
163. A 3 day old female infant presents with copious purulent discharge from both eyes. The discharge was noted by a nurse 24 hours ago. Lid edema and chemosis are also noted. She was born by normal vaginal delivery. Her mother is a 16 year old primigravida who had no prenatal care. Her vital signs are stable. There is bilateral conjunctival injection and discharge noted on examination. What is the most likely cause of her symptoms?
- a. Chlamydial conjunctivitis
  - b. Gonococcal conjunctivitis
  - c. Chemical conjunctivitis
  - d. Staphylococcus conjunctivitis
  - e. Viral conjunctivitis

## **THE END**

Score yourself when finished using the formula below.

$$\frac{\text{Total number of questions answered correctly}}{\text{Total number of questions}} \times 100\% = \text{your score (\%)}$$

- You may view the answers behind this manual now

### Intepretation

A passing score that will increase your chances of being above the percentile required to pass the general pediatric boards is 69 percent. You **MUST** complete both volumes for this score to be applicable. This score is applicable only if the score is gotten on one attempt.

# Picture Reference

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## **The THIRD Edition of YIPM**

Two major changes in addition to updating the content of this book will be made.

1. The must know picture list chapter will have the pictures with foot notes on highyield/mostlikely questions to follow the photographs, pictures or imaging shown
2. A list of 10s will have the subtle differences between the conditions listed per topic. It promises to be the most important chapter. A team has already been delegated to achieving this task for future examinees

Minor changes to expect

1. More mnemonics
2. Updated simulated questions
3. Updated picture list
4. Updated strategy and plan

Feedback request/suggestions for future editions: Please respond when prompted by amazon to give feedback on seller and product. Also, send any suggestions you have to [yourpocketcode@yahoo.com](mailto:yourpocketcode@yahoo.com).

## YIPM simulated Examination volume 1 ANSWERS

1 E	42 A	83 B	124 F
2 D	43 C	84 B	125 C
3 D	44 A	85 B	126 D
4 B	45 C	86 E	127 I
5 B	46 C	87 C	128 A
6 A	47 A	88 E	129 B
7 A	48 C	89 C	130 E
8 B	49 B	90 A	131 D
9 E	50 C	91 B	132 E
10 C	51 E	92 D	133 D
11 A	52 D	93 H	134 A
12 A	53 B	94 A	135 B
13 B	54 C	95 E	136 B
14 A	55 C	96 G	137 E
15 D	56 D	97 B	138 D
16 D	57 C	98 B	139 D
17 A	58 A	99 B	140 A
18 C	59 A	100 A	141 E
19 A	60 C	101 B	142 A
20 C	61 C	102 E	143 D
21 C	62 D	103 A	144 C
22 D	63 B	104 C	145 B
23 B	64 D	105 A	146 B
24 A	65 E	106 C	147 C
25 B	66 C	107 B	148 C
26 C	67 D	108 D	149 E
27 A	68 B	109 A	150 C
28 C	69 B	110 D	151 B
29 C	70 E	111 B	152 B
30 B	71 A	112 B	153 A
31 D	72 A	113 E	154 E
32 E	73 C	114 B	155 C
33 D	74 B	115 E	156 B
34 B	75 E	116 C	157 C
35 E	76 E	117 C	158 B
36 A	77 A	118 E	159 C
37 E	78 E	119 D	160 B
38 D	79 B	120 B	161 B
39 A	80 B	121 E	162 B
40 B	81 E	122 C	163 E
41 B	82 E	123 H	

## YIPM simulated Examination volume 2 ANSWERS

1 A	42 A	83 C	124 C
2 E	43 B	84 E	125 B
3 D	44 A	85 D	126 B
4 C	45 B	86 A	127 D
5 A	46 E	87 A	128 A
6 D	47 A	88 B	129 D
7 E	48 C	89 C	130 A
8 B	49 D	90 B	131 A
9 A	50 A	91 A	132 B
10 B	51 A	92 B	133 E
11 D	52 B	93 D	134 E
12 A	53 D	94 E	135 B
13 A	54 D	95 B	136 D
14 C	55 B	96 D	137 D
15 D	56 D	97 E	138 B
16 D	57 B	98 D	139 D
17 C	58 B	99 B	140 C
18 D	59 D	100 B	141 E
19 D	60 B	101 A	142 C
20 E	61 J	102 C	143 B
21 E	62 F	103 A	144 D
22 B	63 L	104 C	145 C
23 D	64 A	105 B	146 A
24 C	65 A	106 C	147 D
25 A	66 F	107 C	148 B
26 B	67 A	108 D	149 C
27 A	68 C	109 B	150 D
28 D	69 D	110 B	151 B
29 C	70 H	111 A	152 B
30 D	71 F	112 B	153 B
31 B	72 C	113 E	154 D
32 C	73 B	114 C	155 D
33 A	74 C	115 D	156 D
34 C	75 E	116 B	157 C
35 D	76 C	117 C	158 C
36 A	77 A	118 A	159 B
37 C	78 D	119 C	160 B
38 E	79 C	120 D	161 A
39 B	80 A	121 A	162 A
40 A	81 A	122 C	163 B
41 E	82 C	123 C	