2019 NY/NJ Pediatric Board Review Course
General Pediatrics

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Disclosure
I have a bucket full of money and a house in Malibu just don’t tell my wife

I actually have nothing

Practice Question
The following is true of today’s speaker?
1. He has a bucket of money
2. He is the Chairman of Surgery
3. He thinks tie-dye is fashion
4. He loves white chocolate
Outline

• Immunizations
• Growth, Breastfeeding, Nutrition
• Injury Prevention and Anticipatory Guidance
• Screening and Statistics
• Ethical Terms
• QI and Patient Safety
• Child Abuse

Immunizations
Why Vaccinate?

<table>
<thead>
<tr>
<th>Disease</th>
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<tbody>
<tr>
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<tr>
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<tr>
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<tr>
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<td>Mumps</td>
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They Work!!!
Vigilance!!

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<tr>
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<td>47K</td>
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<tr>
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<td>1,196</td>
<td>1,329</td>
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Case #1

A 12 year old girl presents to your office for a regular checkup for school entry. She is a recent immigrant from Columbia. Her mother states that she does not have an immunization record. She denies any significant past medical history or history of allergies. Physical exam is unremarkable.

Question 1:
Which immunizations would give her at this time?

1. Td, IPV, MMR, VZ, Hep B, MCV
2. Td, IPV, MMR, VZ, Hep B, MPSV
3. Td, IPV, MMR, VZ, Hep B, Hep A, HPV
4. Tdap, IPV, MMR, VZ, MPSV
5. Tdap, IPV MMR, VZ, Hep B, Hep A, MCV, HPV
Question 2: Before you give the Tdap, the patient asks you what is a true contraindication for the vaccine?

1. Temperature >105 F within 48 hours of a previous DTP/DTaP
2. Collapse or shock like state within 48 hours of a previous DTP/DTaP
3. History of encephalopathy within 7 days of previous DTP/DTaP
4. Latex allergy
5. Pregnancy

Common Side Effects

- Fever
- Local redness and swelling
- Rash 1-2 weeks after MMR
- Rash 1-4 weeks after Varicella
Pertussis Containing Vaccines

**True Contraindications**

- Anaphylaxis to vaccine component
- Encephalopathy within 7 days after dose

**Precautions**

- Seizure within 3 days of vaccine
- Crying for 3 or more hours within 48 hours of vaccine
- Collapse or shock-like state within 48 hours of vaccine
- Temp $\geq 40.5^\circ C/105^\circ F$ unexplained within 48 hours of vaccine
- Progressive neurologic disorders

Tdap Vaccines

- Boostrix and Adacel
  - Approved for 10-64 years of age
- Indications
  - 11-12 year old booster
  - Adolescents who received Td, can receive Tdap regardless of interval after Td
  - Single dose in primary catch up series if $>7$ years old.
  - Pregnancy 27-36 weeks regardless of prior dose
- Contraindications – same as DTaP
- Precautions – Guillain-Barré within 6 weeks of tetanus containing vaccine, progressive neuro disorder, Arthus hypersensitivity reaction, moderate to severe acute illness
Case #1

The patient heard that there are different types of meningococcal vaccines. What’s the difference?

Question 3: Which of the following is a true statement?

1. The MCV vaccine is indicated only in high risk patients
2. The MenB vaccine should be given to all healthy children
3. Children with asplenia should not be vaccinated against meningococcal disease
4. The MenB vaccine is indicated for patients with sickle cell disease
5. The two different MenB vaccines can be interchanged

MCV Conjugate Vaccines

- T-cell dependent response, long lasting memory
- Booster response
- Eradication of nasopharyngeal carriage which contributes to herd immunity
- Routinely recommended at 11-12 years old with a booster at 16 y/o
- Hi risk can vaccinate with Hib-MenCY starting at 6 weeks, MenACWY starting at 2 mo, MCV4 can be starting at 9mo. CHECK THE SCHEDULE
- History of Guillain-Barré is only a precaution!
Meningococcal Type B Vaccine
• Trumenba first licensed October 2014
  – Licensed for 10-25 y/o
  – 3 dose series if high risk otherwise 2 dose series
• Bexsero
  – Licensed for 10-25 y/o
  – 2 dose series
• Currently recommended to high risk patients
  – Complement deficiency, asplenia
• Well children-clinical discretion
• Not interchangeable

Human Papilloma Virus Vaccine
• Gardasil – HPV 9
  – Recommended for all 11-12 year olds
  – Up to 26 year old girls
  – Up to 21 year old boys (26 if having if immunocompromised or having sex with men)
  – ≥ 15 y/o-2 dose series
  – ≥15 y/o-3 dose series
  – Contraindicated in yeast allergy

Case #1
You ask your 12 year old patient to return in 4 weeks to continue the catch up schedule of vaccination.
Question 4: At that visit you will administer?

1. Td, IPV, MMR, Hep B
2. Td, IPV, MMR, Hep B, VZ
3. Tdap, IPV, MMR, Hep B, MCV
4. Tdap, IPV, MMR, Hep B, VZ
5. Tdap, IPV, MMR, Hep B, VZ, MCV

Catch-up Schedule

- Tdap is for only one dose in primary series.
  Td is used for remainder of doses
- Varicella: Two doses - 2nd dose in 3 mo. <13 years old and 4 weeks in ≥13 years old
- MMR – Two doses 4 weeks apart
- MCV – next dose at 16y/o.

MORE VACCINE STUFF!!!!
Polio Vaccines

- IPV - no serious adverse effects
  - contains trace amounts of neomycin/streptomycin/polymyxin B
  - 4 dose series except if dose 3 after 4 years old
- OPV – No longer available in US due to vaccine associated paralytic polio

MMR

Contraindications

- Pregnancy
- Anaphylaxis to first dose of vaccine/neomycin/gelatin
- Immunodeficiency (asymptomatic HIV is NOT contraindication)
- Anaphylaxis to egg is NOT contraindication and skin testing not recommended

Precautions

- Recent Immunoglobulin (IG) administration
- History of ITP
- TB or (+) PPD
MMR
Side Effects
• Redness, swelling, fever
• Rash
• Joint pain
• Increased risk of febrile seizure if use MMRV

Varicella
Contraindications
• Anaphylaxis to neomycin/gelatin
• Pregnancy
• Immunodeficiency (T-cell)
• HIV +/- (CD4 >15% is OK)
• High dose steroid use (wait 1 mo.)

Varicella
Precautions
• Recent Immunoglobulin (IG)
• Salicylate use
• Moderate to severe acute illness with or without fever
Influenza-inactivated
• Indicated for all children >6mo
• Close contacts of high risk – YOU!
• Contraindicated in egg anaphylaxis
• Guillain-Barré within 6 weeks is precaution
• Requires 2 doses if not previously vaccinated and less than 9 years old
• Multi-dose vial still with thimerosal
• Recombinant vaccine licensed for >18 y/o

Influenza-Live
• Healthy 2 to 49 years old
  – not in high risk groups
• Contraindicated in egg anaphylaxis, salicylate therapy, history of Guillain-Barré

Hepatitis B
• Universal immunization of all newborns
• Preterm infant > 2kgs or > 1mo old in hospital, < 1mo old but going home
• 3 dose except Recombivax 11-15 year olds – 2 doses
• Do not give in buttocks
• Does not cause SIDS, DM, MS
Hepatitis B

<table>
<thead>
<tr>
<th>Maternal HBsAg</th>
<th>HBV</th>
<th>HBV 1-30 days or D/C</th>
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<tbody>
<tr>
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<td>HBV within 12 hours</td>
<td>HBV within 12 hours</td>
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<tr>
<td>unknown</td>
<td>HBIG within 7 days</td>
<td>HBIG within 12 hours</td>
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<tr>
<td>positive</td>
<td>HBV and HBIG within 12 hours</td>
<td>HBV and HBIG within 12 hours</td>
</tr>
<tr>
<td></td>
<td>Follow-up testing 9-18 mo.</td>
<td>Follow-up testing 9-18 mo.</td>
</tr>
</tbody>
</table>

Hepatitis A

- 12-23 mo. universal immunization (>6 mo if traveling)
- 2 doses - 6 mo. apart, double dose ≥19 yr
- High risk
  - Int'l travel, chronic liver, homo/bisexual, drug abuse, clotting factor def., job related, homeless
- IG for pre and post exposure prophylaxis dependent on age (<12 mo and >41 y/o)

Pneumococcal Vaccines

- PCV13 – routine 2m to 23m complicated 4 dose schedule
- PCV13 -1 dose to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.
- PPV23 - > 2 years old high risk group 8 weeks after PCV13, repeat in 5 years
- High risk: immunocompromised, HIV, asplenia, Hgb SS, cochlear implant, CSF leak, DM, chronic liver, renal, heart and lung dz
H. Influenza type B

- Routine schedules require booster at 12-15 mo.
- Can be given up to 59 mo.
- One dose to sickle cell/asplenia or HIV 5-18 y/o if not fully immunized

Rotavirus

- Two formulations
- Administer 2, 4, +/- 6 mo.
- Start at 6 to 14 weeks+6days
- Final dose no later than 8mo+0 days

Question 5

A 7 year old was bitten by a raccoon. What should you do?

A. Administer RIG
B. Administer rabies vaccine
C. Administer rabies vaccine and RIG
D. Treat with amoxicillin/clavulanic acid
Rabies

- Bats, skunks, raccoons, foxes, woodchucks are high risk animals
- Post exposure prophylaxis is recommended
  - Wash wound with soap and water
  - Rabies vaccine (HDCV) 4 dose series
  - RIG into the wound
  - Check tetanus status, consider abx as part of wound care
BMI

- Body mass index (BMI) = \( \frac{\text{weight (kg)}}{\text{height (m)}^2} \)
- BMI is an effective screening tool; it is not a diagnostic tool
- For children, BMI is age and gender specific, so BMI-for-age is the measure used
- 85%–95% = overweight
- >95% = obese

BMI

- BMI-for-age relates to health risks
  - Correlates with clinical risk factors for cardiovascular disease including hyperlipidemia, elevated insulin, and high blood pressure
  - BMI-for-age during pubescence is related to lipid levels and high blood pressure in middle age

Can you see risk?

- This girl is 4 years old.
- Is her BMI-for-age \( \geq 85^{th} \) to <95\(^{th} \) percentile?
- Is she overweight?
Measurements:
Age=4 y
Height=99.2 cm (39.2 in)
Weight=17.55 kg (38.6 lb)
BMI=17.8
BMI-for-age= between 90th–95th percentile
Overweight

5 1/2 year old boy
Weight: 41.5 lb
Height: 43 in
BMI= 15.8
BMI-for-age=50th %tile
Inaccurate height measurement: 42.25
BMI=16.3
BMI-for-age=75th %tile

Failure to Thrive

Fast Facts
• Majority of FTT is non-organic.
• Inadequate intake is most common etiology
• Role of formula preparation in evaluation.
• Extensive lab evaluation should be deferred until outpatient dietary management tried.
Breast Feeding

A female infant presents for her two week check-up. She was born after a 38 week uncomplicated pregnancy via spontaneous vaginal delivery at a birth weight of 3 kg. Her mother is breastfeeding and asks whether breast milk alone is sufficient for her baby. What advice should you give her?

Case # 2

A female infant presents for her two week check-up. She was born after a 38 week uncomplicated pregnancy via spontaneous vaginal delivery at a birth weight of 3 kg. Her mother is breastfeeding and asks whether breast milk alone is sufficient for her baby. What advice should you give her?
Question 6: The baby should receive oral iron supplements for the first 4 months of life.

1. True?
2. False?

Iron

• Iron stores at birth are proportional to birth weight or size.
• Iron stores for term infants are sufficient to meet needs for the first 4 months of life.
• Breast milk contains <0.1 mg/100cc of iron but it is in a highly bio-available form (50% of it is absorbed compared to 4% of iron in iron-fortified formulas).

Question 7: The baby does not need vitamin K after birth so long as the mother is taking oral vitamin K.

1. True?
2. False?
Vitamin K
Vitamin K is a fat soluble vitamin necessary for the posttranslational carboxylation of glutamic acid residues of coagulation proteins Factors II, VII, IX and X.

[lpi.oregonstate.edu/infocenter/vitamins/vitamink/kcycle.html]

Vitamin K
- Breast milk has inadequate amounts of vitamin K to satisfy infant requirements.
- All infants should receive 1.0 mg of vitamin K IM at birth to reduce risk of hemorrhagic disease of the newborn
- Oral vitamin K may not provide the stores necessary to prevent hemorrhage in later infancy and is not recommended at this time.

Question 8: The baby will need 400IU of vitamin D daily.

1. True?
2. False?
Vitamin D

- Vitamin D (calciferol) is available from certain dietary sources and can be synthesized in skin upon exposure to UV light.
- Adequate intake of vitamin D for infants is 400 IU per day.
- Vitamin D content of human milk is low (22 IU/L).

Vitamin D

- Exclusively breastfed and partially breastfed infants should receive supplements of 400 IU of vitamin D per day.
- The recommended routine use of sunscreen in infancy decreases vitamin D production in skin.

Question 9: Compared to formula fed infants, the weight gain of breast fed infants is?

1. Less rapid during the first 3-4 months but then catches up
2. More rapid during the first 3-4 months but then slows down
3. Generally results in a slightly heavier infant by 12 months of age
4. Does not differ at all
Breastfeeding

By the end of the first year of life, breast fed infants who had solids introduced at 4-6 months of age tend to be slightly leaner than formula fed infants.

Breast Feeding Cautions

- HIV and HTLV infections
- HSV (on nipple)
- Radioisotopes, anti-metabolites, immuno-suppressives, ergotamine, lithium, bromocriptine

Vitamin A

- Excess
  - dry skin, alopecia, liver/spleen enlargement, bone pain, increased ICP
- Deficiency
  - photophobia, keratomalacia leading to blindness, defective tooth enamel, impaired resistance to infection
Vitamin C

- Excess
  - Osmotic diarrhea

- Deficiency
  - Scurvy, bleeding gums, petechiae, ecchymoses, poor wound healing, arthralgia, ddx child abuse

Vitamin D

- Excess
  - Symptoms due to hypercalcemia
  - Vomiting, constipation, hypertension, decreased QT and arrhythmias, hypotonia, confusion, impaired renal concentrating function, nephrocalcinosis/lithiasis

- Deficiency
  - Rickets if growth plates
  - Osteopenia if mature

Growth and Nutrition

Fast Facts

- Cow's milk and Fe deficiency
- Goat's milk and folate deficiency
- Zinc deficiency and acrodermatitis enteropathica
- Vegan diet and B₁₂ deficiency
- Full-term infants regain BW by 2 weeks, triple BW by 12 mo.
- Normal HC at birth ~35cm
- Bone age only indicates catch-up
## Injury Prevention Anticipatory Guidance

A 6 month old boy is at your office with his father for a routine health care maintenance visit. In discussing injury prevention for his infant, the father wants to know what he should be most concerned about with respect to his infant’s safety. What should you tell him?

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<th>Formula</th>
<th>Protein</th>
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<th>Fat</th>
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<tbody>
<tr>
<td>BM</td>
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<td>LCT</td>
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<tr>
<td>Similac</td>
<td>Cow</td>
<td>Lactose</td>
<td>LCT</td>
</tr>
<tr>
<td>Isomil</td>
<td>Sheep</td>
<td>Glucose polymer aka corn syrup/sucrose</td>
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Leading Causes of Death
2017

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<tr>
<th>Age Group</th>
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<th>1-4y/o</th>
<th>5-9y/o</th>
<th>10-14y/o</th>
<th>15-24y/o</th>
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<tbody>
<tr>
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<td>Unintentional injury</td>
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<tr>
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<td>Suicide</td>
<td>Suicide</td>
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<tr>
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Leading Cause of Unintentional Injury Deaths
2017

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<th>10-14y/o</th>
<th>15-24y/o</th>
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<tbody>
<tr>
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<td>MVA</td>
<td>MVA</td>
</tr>
<tr>
<td>2</td>
<td>Homicide - unspecified</td>
<td>MVA</td>
<td>Drowning</td>
<td>Suicide - suffocation</td>
<td>Unintentional poisoning</td>
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<tr>
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<td>MVA</td>
<td>Homicide - unspecified</td>
<td>Burns</td>
<td>Suicide - firearm</td>
<td>Homicide - firearm</td>
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<tr>
<td>4</td>
<td>Homicide - unspecified</td>
<td>Suffocation</td>
<td>Homicide - firearm</td>
<td>Homicide - firearm</td>
<td>Suicide - firearm</td>
</tr>
</tbody>
</table>

Deaths Due to Injury

- Unintentional injury is the leading cause of death in children from 1 to 24 years of age.
- Motor vehicle incidents, drowning and deaths from burns taken together account for over 75% of all deaths from injury in children.
Question 10: when counseling a parent with respect to infant car seat safety, all of the following are true except?

1. Children should face the rear of the vehicle until they are at least 2 y/o or out grow the car seat
2. Convertible safety seats positioned upright and facing forward should be used for children >2 y/o until they out grow the safety seat
3. Front facing convertible safety seats should be placed in the front seat if the car has an air bag
4. Booster seats are recommended typically until child is 57 inches between 4-12 y/o

Motor Vehicle Injury Prevention

No rear facing seats should be placed in the front passenger seat of a car equipped with air bags: and any child less than 13 should preferentially sit in the rear seat to avoid injury from inflating air bags.

Drowning Injury

The father of that 6 month old infant also has a 4 year old boy at home.
Question 11: A true statement about childhood drowning is?

1. Drowning is the leading cause of death due to injury
2. Pool alarms have eliminated the need for fencing
3. Residential pools are the most common drowning site for 1-4 y/o
4. The ratio of male:female drowning deaths is 1:1

Drowning

- Drowning is the leading cause of unintentional injury death in the 1-4 y/o age group.
- Residential pools are the most common site of drowning for children 1-4 y/o.
- Infants drown in bathtubs most often
- Adolescents in fresh water lakes and rivers.

Drowning Injury

- Pools - Four sided fences 5 ft high with self-closing self-locking gates are the most effective enclosures.
- Pool alarms, pool covers, swimming lessons for young children and floatation devices are not as effective as proper enclosures.
- Male to female ratio is 3:1
- 50% of submersion victims are declared dead at the site.
- 6:1 ED visit to fatality for drowning events
Injury Prevention: Burns

You are approaching the end of a health care maintenance visit for a 2 year old girl. The mother explains that the family recently moved into a private house having lived previously in an apartment. What four concrete pieces of advice can you give her about how she might make her new home safe from the standpoint of preventing burn injuries to her toddler?

1. **Don’t smoke in the home.**
   - Home fires cause three fourths of all fire deaths
   - Children < 5 are at highest risk.
   - Adults who smoke carelessly or who fall asleep while smoking are responsible for the largest percentage of home fires that kill or injure children.

2. **Install smoke detectors on each floor in the house and test them every 6 months.**
   Smoke detectors provide the best protection should a home fire begin since:
   a) most fires start in the early morning hours;
   b) most fires burn for a long time before discovery;
   c) deaths are usually due to CO poisoning so early alerts can help prevent injury and death.
Injury Prevention: Burns

3. Prepare emergency escape plans for use in the event of a fire.

Even children as young as 3 can be taught how to safely get out of the house in the event of a fire. If fire extinguishers are available in the home (and they should be) children should always be taught to leave the house rather than try to put out a fire themselves.

4. Set hot water heaters at no higher than 120°F.

Tap water at 160°F can produce a full-thickness scald burn in less than 1 second. At 120°F the scalding time is increased to between 2 and 10 minutes.

### Hot Water

<table>
<thead>
<tr>
<th>Temp</th>
<th>First/Second Degree Burn</th>
</tr>
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<tbody>
<tr>
<td>132 degree</td>
<td>14 sec</td>
</tr>
<tr>
<td>136 degree</td>
<td>6 sec</td>
</tr>
<tr>
<td>140 degree</td>
<td>3 sec</td>
</tr>
<tr>
<td>143 degree</td>
<td>1.6 sec</td>
</tr>
<tr>
<td>147 degree</td>
<td>1 sec</td>
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</table>
Anticipatory Guidance
Television

You are seeing a set of parents with their 8 year old boy for a health care maintenance visit. The mother asks you whether allowing her son to watch TV when he comes home from school is a bad idea.

Question 12: the most accurate statement you can make about television viewing is?

1. AAP recommends children < 2y/o should be encouraged to have screen time to accelerate gaming skills
2. Nearly 2/3 of programming includes violence and children’s programming contains the most
3. AAP recommends screen time >2 hours/day to be educational
4. Parents report they always watch TV with their children to monitor content

TV

About one third of parents of 2-7 year olds report that their children have a television in their room.

Less than half of all parents state that they always watch television with their children to monitor the content of what is being seen.
TV

The 3 year National Television Violence Study reported that:
- Nearly 2/3 of all programming contains violence;
- That children’s shows contain the most violence;
- That portrayals of violence are usually glamorized; and
- Perpetrators often go unpunished.

Difficult behaviors

- Eating, sleeping, toileting
  - You can't win
  - Encourage/reward (aka bribe) positive behaviors
  - Biggest reward is parental attention – do not buy a car for pooping!
Words to Know

- Surveillance – recognition of risk without use of validated tools
- Screening – use of a sensitive, standardized tool to determine who needs further evaluation
- Evaluation – diagnostic, specific tools
- Validity – tool is accurate to the problem screened for
- Reliability – tool produces consistent results
Screening Tools

- M-CHAT-autism
- Vanderbilt- ADHD
- ASQ-ages and stages - development
- Edinburgh-maternal depression
- CRAFFT-substance abuse
- HEADSS-adolescents

Screening

- Look for disease in asymptomatic people
- Disease should have significant morbidity and mortality
- Therapy exists that will alter the course of illness
- Test is reliable, valid and cost effective

Oh No, Not Statistics!!!!!
Data

1. Nominal-category data
   Single, married or divorced
2. Ordinal-ordered or ranked
   Low, middle or upper income
3. Interval/ratio data
   Temperature, blood pressure, lab values
Types of Statistics

1. Describe the data
   - Means, medians, ranges, pie charts, bar graph
2. Compares groups
   - Chi square, t-test, F-test
3. Relationship is sought
   - Pearson r, regression analysis (prediction)

Study Designs

- Descriptive
- Cross Sectional
- Longitudinal
  - Retrospective
  - Prospective
    - Observational or clinical trial

Descriptive Study

- Example: case report
  - Records events, observations or activities
  - Does not provide explanations, offer causes or provide evidence
  - No control group
  - Cannot prove causality
Cross Sectional Study

• All observations: “cause” and “outcome” studied at same time
• Advantages
  • Cheap, data is readily available through current records
• Disadvantages
  • Causality cannot be determined
  • Does presumed cause precede the effect or do subjects with the effect acquire the cause

Longitudinal Retrospective

• Goes back in time
• Can be controlled or uncontrolled
• Advantages
  • Cheap, efficient, quick, good for rare disease
• Disadvantages
  • Recall bias, inadequate data, subtleties in data may not be identified

Longitudinal Prospective-Observational

• Observational study-forward in time
  • Can be controlled or uncontrolled
  • Can be concurrent or non-concurrent
• Advantages
  • Uniform data collection, no recall bias, rigid entry criteria and definitions, easier to prove causality
• Disadvantages
  • Expensive in time and money, patient numbers and attrition
Longitudinal Prospective-Clinical Trial

• Clinical Trials
  • Can be controlled or uncontrolled
  • Randomized or non-randomized

• Advantages
  • Randomization and methodology reduce biases
  • Best method for causality

• Disadvantages
  • Expensive in time and money, patient numbers and attrition, compliance, bias, co-interventions
  • Ethical considerations

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Question 13: Of the following tests to diagnose pancreatitis, which would be the most useful in ruling out the disease?

<table>
<thead>
<tr>
<th>TEST</th>
<th>SENSITIVITY</th>
<th>SPECIFICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trypsinogen</td>
<td>97%</td>
<td>83%</td>
</tr>
<tr>
<td>Lipase</td>
<td>86%</td>
<td>99%</td>
</tr>
<tr>
<td>Amylase</td>
<td>95%</td>
<td>86%</td>
</tr>
<tr>
<td>Pancreatic Isoamylase</td>
<td>92%</td>
<td>85%</td>
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</tbody>
</table>

A. Trypsinogen  
B. Lipase      
C. Amylase     
D. Pancreatic Isoamylase
Like Noah
Everything is 2 by 2

<table>
<thead>
<tr>
<th>Disease Present</th>
<th>Disease Absent</th>
</tr>
</thead>
<tbody>
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You’re so sensitive

<table>
<thead>
<tr>
<th>Test positive</th>
<th>Test negative</th>
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<tbody>
<tr>
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<tr>
<td>Test negative</td>
<td>False negative</td>
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</tbody>
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<td>True negative</td>
</tr>
<tr>
<td></td>
<td>Disease Present</td>
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<td>--------</td>
<td>-----------------</td>
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Sensitivity

Specificity
<table>
<thead>
<tr>
<th>Test outcome</th>
<th>Disease Present</th>
<th>Disease Absent</th>
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<tbody>
<tr>
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Positive Predictive Value

Negative Predictive Value
<table>
<thead>
<tr>
<th>UTI Disease Present</th>
<th>UTI Disease Absent</th>
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</thead>
<tbody>
<tr>
<td>Urine dip positive (LE or nitrite)</td>
<td>Urine dip positive (LE or nitrite)</td>
</tr>
<tr>
<td>Urine dip negative</td>
<td>Urine dip negative</td>
</tr>
</tbody>
</table>

Prevalence of UTI girls 1–2 y/o = 8.1%

AAP Practice Parameter 1999

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<thead>
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<th>UTI Disease Present</th>
<th>UTI Disease Absent</th>
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</thead>
<tbody>
<tr>
<td>n=8</td>
<td>n=92</td>
</tr>
<tr>
<td>Urine dip positive (LE or nitrite)</td>
<td>No UTI</td>
</tr>
<tr>
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Prevalence of UTI girls 1–2 y/o = 8.1%

Sensitivity = 93% Specificity = 72%

AAP Practice Parameter 1999

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AAP Practice Parameter 1999
UTI

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<td>n=8</td>
<td>n=92</td>
</tr>
</tbody>
</table>

| Urine dip positive (LE or nitrite) | 7 | 26 |
| Urine dip negative                | 1 | 66 |

Prevalence of UTI girls 1 – 2 y/o = 8.1%
Sensitivity = 93% Specificity = 72%
PPV = 21% NPV = 98%
AAP Practice Parameter 1998

Risky Business
Prospective randomized study

<table>
<thead>
<tr>
<th>Disease Present</th>
<th>Disease Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk present</td>
<td>a</td>
</tr>
<tr>
<td>Risk absent</td>
<td>c</td>
</tr>
<tr>
<td>Risk present</td>
<td>b</td>
</tr>
<tr>
<td>Risk absent</td>
<td>d</td>
</tr>
</tbody>
</table>

Absolute risk = a/b
Relative risk = a/c/b/d/e
Attributable risk = absolute risk – risk in control/absolute risk

Must be prospective randomized study

What are the odds?
Retrospective or Cross Sectional

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<td>c</td>
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<td>Risk present</td>
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</tr>
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<td>d</td>
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</table>

Odds ratio = a/c/b/d

Retrospective or cross sectional study
Confidence Limits

- Two standard deviations above and below the calculated risk or odds ratio
- If the limits include one, there may be no association
- Need to put a clinical perspective to risk

It’s not my fault!
Clinical Trials

<table>
<thead>
<tr>
<th>G-d says effect exists</th>
<th>G-d says no effect exists</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

Researcher says effect exists
Researcher says no effect exists

It’s not my fault!
Clinical Trials
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<th>G-d says effect exists</th>
<th>G-d says no effect exists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher says</td>
<td>Correct decision</td>
<td>Correct decision</td>
</tr>
<tr>
<td>effect exists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Researcher says</td>
<td>Correct decision</td>
<td>Type I error = ( \alpha )</td>
</tr>
<tr>
<td>no effect exists</td>
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It’s not my fault!
It's not my fault!

Clinical Trials

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<tbody>
<tr>
<td>Researcher says effect exists</td>
<td>Correct decision</td>
</tr>
<tr>
<td>Researcher says no effect exists</td>
<td>Type II error = β</td>
</tr>
</tbody>
</table>

Power = 1 – β (traditionally = 80%)

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Question 14. A competent adult can make a decision to accept or reject a physician's recommendation regardless of the impact on his or her health. A parent must make decisions about a child's health care based on a physician's recommendations. Of the following, which is the most important factor for a pediatrician to consider when evaluating a parent's decision about the health care for a 7 yr old child?

A. The expressed wishes of the child
B. What a reasonable parent would do in that situation
C. The pediatric clinician's independent professional obligation to act in a child's best interest
D. The ability of the parent to pay for the recommended medical care
E. The opinions of other pediatric clinicians
Ethical Terms

- Autonomy
  - the right to make the decision
- Beneficence/parentalism
  - decision made for someone else's best interest
- Assent
  - Affirmative agreement
- Non-malefeasance
  - do no harm, issue of futility
- Justice
  - sense of fairness
- Altruism
  - unselfish regard

IOM Report
Six Aims for Quality Care

- safe
- timely
- effective
- efficient
- equitable
- patient-focused
QI and Patient Safety

• QI – application of scientific method to improve human systems eg fish bone diagram, pareto charts, flow chart, histogram
• LEAN, Six Sigma
• P plan
• D do
• S study
• A act

Child Abuse

*No, you're not. Daddy just loves you the least.*
Physical Abuse - Definition
An act that results in a significant inflicted physical injury or the risk of such injury

Neglect - Definition
• Failure to provide for a child's basic needs
  – physical/medical
  – emotional
  – educational

Child Abuse - 2017
• Neglect – 75%
• Physical – 18%
• Sexual – 8%
• Emotional/other – 6%
Scope of the Problem – National

- 2017 data
  - 674,000 substantiated cases
  - 1,688 deaths/yr
  - 4-5 deaths per day!

Risk Factors

- Substance abuse
- Lack of support
- Poverty
- Lack of parenting/discipline skills
- Lack of knowledge of age appropriate behavior
- Domestic violence

Risk Factors

- Child disability/chronic illness
- Trigger events
- Parent with history of abuse as child
- Depression
- Single parent
- Multiple children
Who does it?

- 78% by a parent
- 54% female, 45% male
- Age – accounts for 83%
  - 18-24 y/o #3
  - 25-34 y/o #1
  - 35-44 y/o #2

Evaluation – What is the history?

- Discrepancies
- Delay in seeking care
- Crisis in the family or trigger events

Evaluation – What is the injury/physical?

- Shape
- Pattern
- Age of injury
- Burns
- Retinal exam
- Suspicious fracture
Imaging

Plain radiographs
• Specificity of fractures of abuse
• Skeletal survey in all children < 3 years when abuse is suspected
• Healing time for fractures
  – Periosteal rxn 5-10 days
  – Soft callus 10-14 days
  – Hard callus 14-21 days

Imaging

• CT
• MRI later
• Bone scan as supplement to skeletal survey in selected cases
• Ultrasonography

Laboratory Testing

• CBC, urinalysis
• Chem 20
• Liver, pancreatic, muscle enzymes
• Cultures of blood, urine, CSF if indicated
• Coagulation studies
• Arterial blood gases
• Stool for blood
Bruises

- Suspicious
  - Cheeks
  - Neck
  - Trunk
  - Genitalia
  - Upper legs

Bruises - Age

<table>
<thead>
<tr>
<th>Day</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Red/blue</td>
</tr>
<tr>
<td>3-5</td>
<td>Blue/purple</td>
</tr>
<tr>
<td>6-7</td>
<td>Green</td>
</tr>
<tr>
<td>8-10</td>
<td>Yellow/brown</td>
</tr>
<tr>
<td>13-28</td>
<td>Resolved</td>
</tr>
</tbody>
</table>

Look-a-likes

- Mongolian spots
- Folk practice
  - Coining, cupping
- Phytophotodermatitis
- Impetigo
- Ehlers-Danlos
- Vasculitis - HSP
Look-a-likes

- Coagulopathy
- Erythema Multiforme
- Staphylococcal scalded skin
- Vit C deficiency
- Vit K deficiency
Fractures

- Suspicious
  - Posterior rib
  - Metaphyseal – bucket handle/corner fx
  - Spiral in a non-walking infant
  - Sternum
  - Scapular
  - Skull – multiple, depressed
  - Compression fx vertebral body
Fractures - Pathologic

- Osteogenesis Imperfecta
- Rickets
- Blounts
- Congenital Syphilis
- Caffey's Disease
- CP with osteopenia
- Scurvy
Burns

- Accidental
- Intentional/inflicted

Accidental Burn

- History – compatible with injury, one event
- Front of body, random and injury specific
- Associated splash burn, partial thickness, asymmetric

Inflicted

- History - changes or discrepant, delay in Rx, attribute to sibling
- Buttocks, ankles, wrists, palms, soles
- Demarcated, stocking glove, full thickness, symmetric
- Instrument mark
<table>
<thead>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>136 degree</td>
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Head Trauma

- Extracranial
- Intracranial

Extracranial Injuries

- Bruises (visible externally)
- Intra- and subcutaneous bruises (invisible)
- Lacerations
- Abrasions
- Subgaleal hematomas
- Alopecia
Intracranial Injuries

- Epidural hematoma
- Subdural hematoma
- Subarachnoid hematoma
- Parenchymal contusion/laceration
- Intraventricular
Retinal Hemorrhage

• Suggestive of Shaken Baby
• Also seen in:
  – Coagulopathy
  – Endocarditis
  – CPR/resuscitation
  – Vasculitis

Visceral Trauma

• Abdomen > Chest – blunt trauma
  – Duodenal hematoma
  – Pancreatic trauma
  – Hepatic/splenic/renal trauma
  – Biliary
  – Retroperitoneal hematoma
  – Chylous Ascites
  – Hemothorax

Evaluation

• Does it all fit?
  – "Criminal Minds" approach
Discipline - AAP

• Fair, consistent
• Realistic, age appropriate rules
• Catch them good
• Disapprove action not child
• Communicate with child and discipline at time of infraction

THANK YOU and Good Luck!