UNIVERSITY of WASHINGTON

Challenging Cases involving Child Abuse: Burns, Bruises and Fractures

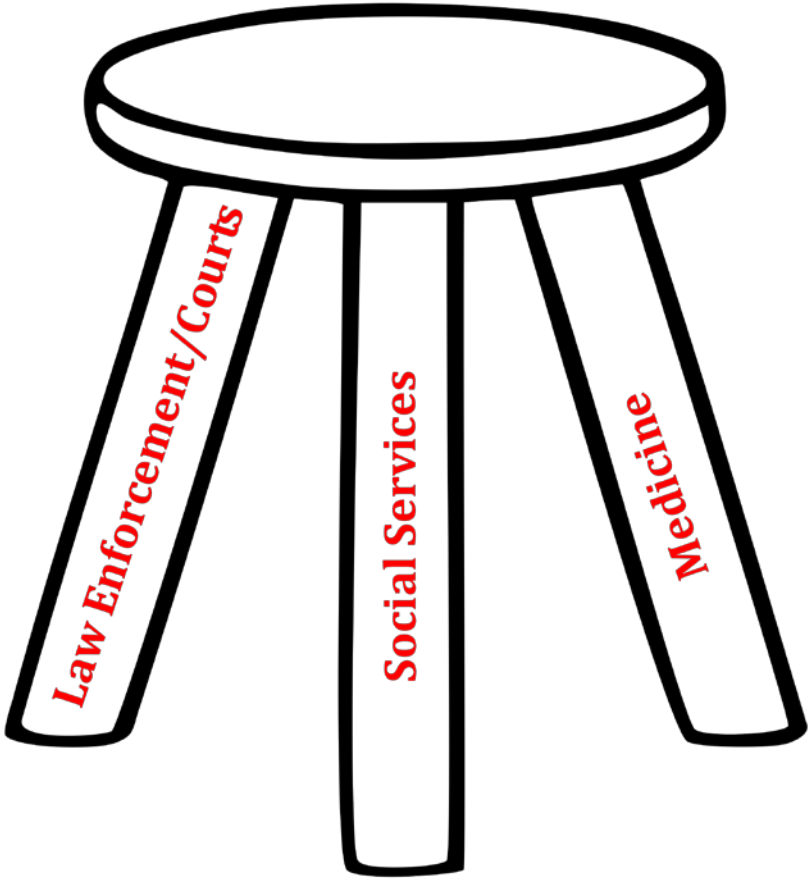
Carole Jenny, MD, MBA
Professor of Pediatrics
University of Washington
School of Medicine

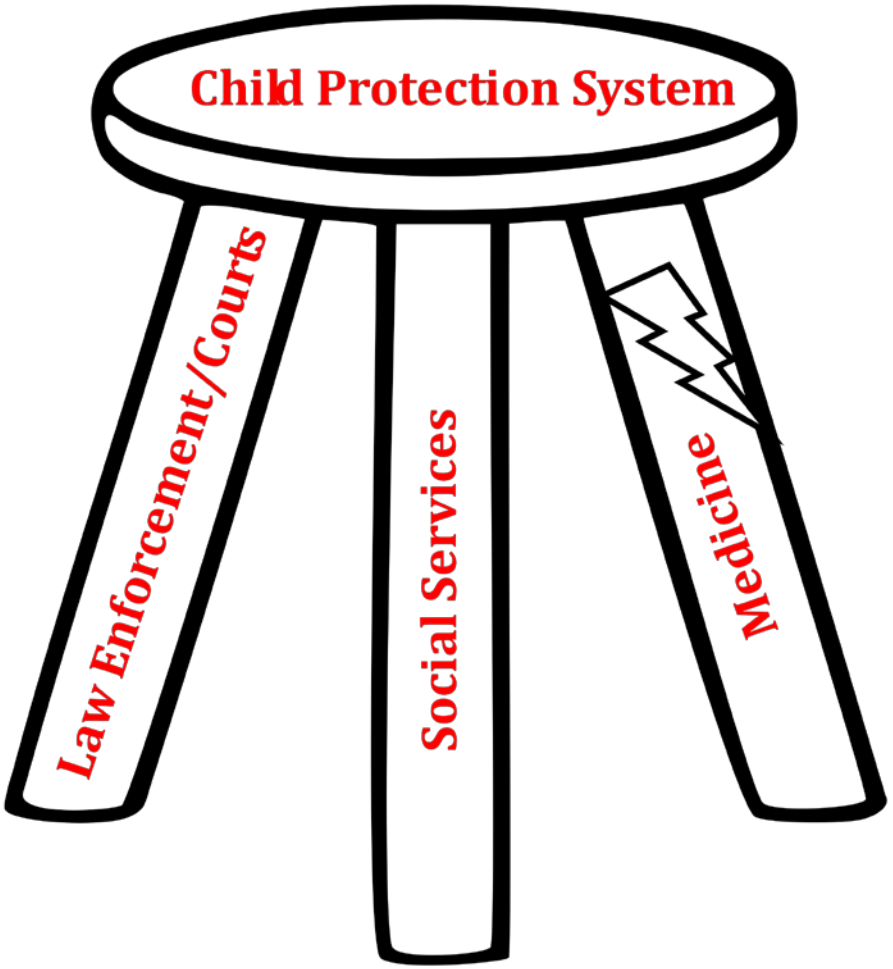
Seattle Children's®
HOSPITAL • RESEARCH • FOUNDATION

cjenny@uw.edu

- Conflict of interest statement: Dr. Jenny has served as an expert witness in criminal trials, family court trials, civil trials, and military courts marshal for prosecution, plaintiffs, and defendants. She has also published a book on child abuse: Child Abuse and Neglect: Diagnosis, Treatment and Evidence. Elsevier, Philadelphia.

The ‘Three-Legged Stool’




Child Protection System
Law Enforcement/Courts
Social Services
Medicine

In medicine, we're doing better at holding up our end of the system.

- The American Board of Pediatrics has established "Child Abuse Pediatrics" as a subspecialty. Pediatrician take an extra three years of training to become experts in child maltreatment diagnosis, treatment and prevention.
- We're working harder through our residencies and professional societies to teach young physicians about child maltreatment.

- We’re going to look at cases where one leg of the stool didn’t hold up and then at one where the three legs were strong.

BURNS

CASE 1.

4 year-old boy presents to clinic for an acute febrile illness. He was diagnosed with otitis media. The physician noticed odd skin lesions. His mother didn't speak English, and the physician did not have access to a translator.

The physician was concerned about possible burns. He reported to law enforcement and CPS.

What the physician really needed was more information--

A. Where did family come from?
B. Child's past medical history?
C. Result of child's last PPD?
D. Is the child infected with HIV?

Scrofula (Tuberculous adenitis)

Caused by Mycobacteria—usually *Mycobacterium tuberculosis* in adults; more commonly non-tubercular Mycobacteria in children (*Mycobacterium scrofulaceum* or *Mycobacterium avium)*.

Can be seen in kids with HIV infection.

Common in Southeast Asians.

“Systems Issues”

- The increasing “internationality” of our population
- The need for interpreter services, even in rural areas
- Physician awareness of cultural/geographic health problems of immigrants in their communities

Case 2.

- 3-year-old boy presents with his grandmother with a history of “a horrible rash on his bottom” and sudden onset of diarrhea. He is spending the weekend with his grandparents. He woke up with the rash. He wears pull-ups at night. No other medical problems reported.

The physician asked about bathing and grandmother stated she bathed the child the night before and he did not have any rash or diarrhea then. He was not in any discomfort until she changed his diaper this morning.

Before reporting to child protective services, she gathered history regarding:

A. Medications, including laxatives, that may have been accessible to the child.

B. Whether the grandfather's history is consistent with the grandmother's history.

C. She reviewed his past medical history.

Diaper dermatitis caused by senna-containing laxatives

- Symmetrical kidney-bean or diamond shaped second degree burns; usually gluteal folds are spared
- History of copious diarrhea (witnessed in hospital) in a diapered child
- No other stigmata of abuse

Burn caused by Senna-containing laxatives

Inflicted immersion burn

Case 3.

- 6 week old
- Placed in mom's bed for nap
- Mother used hair dryer for white noise
  - Placed it behind baby
  - Baby was recently changed and not wearing clothes
- Mother went to get dinner (4-5 min)

- Mother came to threshold of door
- Heard baby crying
- Baby is severely burned
- Mother said to police “maybe there was a 5 yr old in the room”

- Stressors
  - 18 yo mother
  - FOB not involved
  - C/S scar dehissed
- Mother had wanted to use the vacuum cleaner but was told by her stepfather that the clearner would explode if it was left on and unused

Case proceeds

- Mother later admitted she lied about 5 year old
- Eye witnesses corroborated story
  - Mother, stepfather, twin brother and his girlfriend
- Said she was a good mother, never left baby's side

- Police took hairdryer to test
- Found it to be high wattage dryer used to melt plastic at florist shop
- $T_{max} = 200^{o}$ F within 2 minutes

Case Conclusion

- Is this abuse?
- Is this neglect?
  - Child was placed in foster care
- Is this a crime?
  - Mother convicted on 2nd degree child abuse
- CPT physician reviewed DVD of soothing techniques and spoke with baby's pediatrician.

System Issues

- Medical providers should be well-acquainted with the content of prevention materials used.
- Was it the mom's fault or the doctor's fault?

BRUISES

- Case 4
  - 2 week-old girl seen in ED for odd mark on her cheek and swelling and marks on both feet.
  - Appeared “bruise-like”, but no history of trauma. No photos were taken.
  - Platelet count was 8,700/μL
  - Skin marks were attributed to low platelet count.
  - Child discharged home with parents, to be followed by family physician.

- **4 WEEKS LATER**
  - 911 called because baby rolled off the couch to a carpeted floor during a diaper change.
  - Infant had multiple skin injuries, head injuries, and fractures, and died within hours.

- Follow-up—father admitted to biting hands and face of infant. Did not admit to any other injuries.

- Father convicted and imprisoned.

What can be learned?

- **Infants who don't cruise can't bruise!!!**
- Evaluate non-mobile infants with bruises for bleeding disorders **and** abuse.

- Sugar NF, et al. Bruises in infants and toddlers: Those who don't cruise rarely bruise. *Archives of Pediatrics and Adolescent Medicine* 1999; 153(4):399-403.

Helpful bruising guides

- BRUISES MORE LIKELY TO BE FROM ABUSE—"TEN-FOUR RULE":
  - Bruises on the torso, ear or neck in children less than 4 years of age
  - *ANY* bruising in an infant less than 4 months of age
- Pierce MC, et al. Bruising characteristics discriminating physical child abuse from accidental trauma. *Pediatrics* 2010; 125(1):67-74.

Case 5.

- A 4-month-old girl was being babysat by her father. He called mother at work to say she had put a “baby wipe” in her mouth and choked on it. Dad said when he swept her mouth with his finger to remove it, a small amount of bleeding occurred.
- Child continued to refuse to swallow, so was taken to the ED several hours earlier.
- A strep culture was obtained, diagnosis was “diaper rash, a bruise on face, and pharyngitis”
- Bruise was attributed to rolling over on a toy in her crib.

- Next day, she still fed poorly. Mom took her to NP with c/o poor feeding and ‘vaginal discharge’.
- NP attempted to catheterize her for a urine culture, and noted a “cut” on her genitals.
- She reported it to CPS and sent the child home.
- CPS went to the home and brought the child to our ED.

What can we learn from this case?

1. Cruise/bruise connection
2. NO ONE THOUGHT ABOUT THE POSSIBILITY OF ABUSE BECAUSE THE PARENTS WERE SUCH NICE PEOPLE (married, committed, perfectly lovely with the baby, college-educated)!
3. Don’t forget genital/anal exams in clinic and ED, especially if Mom mentions “discharge”.

Case 6.

- Parents brought their 6-week-old baby to the ED because of unexplained bruising.
- Work up for abuse was negative.

- MDs wanted to admit child to hospital till morning when a dermatologist could be consulted.
- Parents refused.
- Police and CPS were called and child was admitted to the hospital on a hold.

- Next morning dermatologist diagnosed cutis marmarata telangiectasia congenital—a skin disease that often shows up in the first few months of life.
- Capillaries close to the skin become dialated.
- Parents of the child were not happy.
- Sometimes bruises have an alternative explanation.

Case 7.

- Child abuse pediatrician noticed a bruise on his month old baby's arm.

FRACTURES

CASE 8.

- An 8 month-old African-American female presented to the ER with pain in her leg and inability to bear weight.
- History is that she pulled to standing next to a toy box, she took a step, and then fell.
- Because of the unusual history, child was placed in state custody while investigation was done. Family was quite poor and "chaotic".

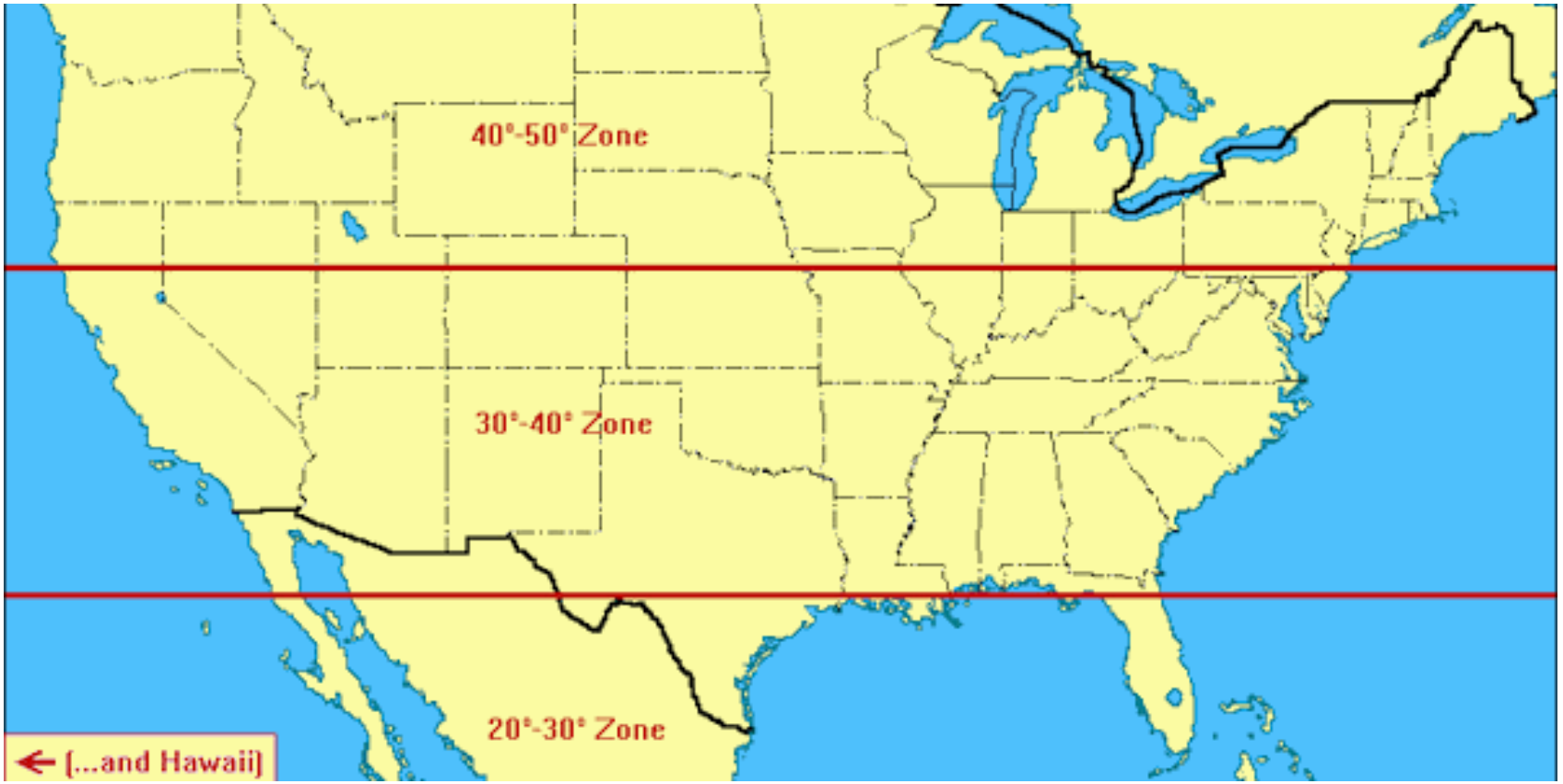
Because of the unexplained fracture, child and sibs were put in foster case. Case was then referred to a child abuse pediatrician for review.

Consultant obtained other tests and more history

- Skeletal survey normal
- Diet history—only breast milk
- Calcium 7.4 mg/DL (9.0-11.0)
- Phosphorus 4.6 mg/DL (4.5-9.0)
- Alk. Phos. 680 U/L (150-420)
- Serum parathyroid hormone level 360 pg/ml (10-55)
- Serum vitamin (OH)D_3 level 2 ng/ml (20-40)

Risk factors in this child for rickets

- Lived in New England (not much sun)
- Seen in ER in March (just went through winter)
- Very dark black skin
- Mother had no exposure to sun
- Solely breast fed (no formula, no solids)


40°-50° Zone
30°-40° Zone
20°-30° Zone
← [...and Hawaii]

Risk factors in this child for rickets

- Lived above 30^{o} latitude (not much sun)
- Seen in ER in March (just went through winter)
- Very dark black skin
- Mother had no exposure to sun
- Solely breast fed (no formula, no solids)

BE CAREFUL ABOUT ACCEPTING “RICKETS” AS CAUSE OF MULTIPLE FRACTURES IN YOUNG INFANTS.

Case 9.

- A 6-week-old infant is brought to the hospital by mom and dad. He is not moving his arm.

Case 7.

- A 6-week-old infant is brought to the hospital by mom and dad. He is not moving his arm.
- Dad was caring for child when he stopped using the arm.
- Child has a spiral fracture of the humerus.
- Dad says it happened when he “swaddled” the child too firmly.

Case 7.

- Case was referred to CPS and law enforcement.
- Two physicians thought the mechanism did not explain the fracture. One physician thought it was plausible.
- Parents lived with paternal grandparents. CPS thought they were very responsible.
- Child was sent home with family with case plan for parenting classes, visiting nurse, and supervision by CPS case worker.

- One month later child is admitted to hospital with a devastating head injury. He is left in a vegetative state, requiring constant care.
- Father was convicted of child abuse and imprisoned.

What went wrong?

- Conflicting physician opinions put CPS in a difficult position.
- Initial history for arm fracture not consistent with the type of injury.
- At initial hospitalization, investigators interviewed parents together—mom was afraid to reveal DV history.
- After one month, overwhelmed busy case worker had not yet put and services in place or visited the home.
- Nice grandparents both worked full time.

Case 10.

- 8 year old comes to ED when his arm starts hurting after he threw a football.
- Boy has a spiral fracture of the humerus.
- ED staff thinks this is a suspicious story and consults the Child Protection Team.

- Diagnosis is fibrous dysplasia.
- Portions of the bone are replaced by fibrous connective tissue and poorly formed bone.
- The bone cysts are vulnerable to fracture.
- This was not abuse.

Clinical Evaluation

- Evaluate for systemic symptoms - osteomyelitis
- Pain relieved with NSAID – more likely osteoid osteoma
- Café-au-lait macules may indicate polyostotic fibrous dysplasia (McCune Albright syndrome)

Treatment

- Usually observation
- Deformity may progress with skeletal growth, may need curettage and bone grafting
- Bisphosphonate therapy

Finally, an example of how to do cases as a team—the three legged stool was sound!!

History of 20-month-old boy

09:30 He was fine. Mom left for the store. Left boy with Mom's boyfriend.

10:15 Mom returns from the store. Boy is very irritable. Boyfriend says boy pulled a vase of flowers off table and hit himself in the head.

10:45 Boy has a seizure.

11:00 Mom brings his to the hospital

Physical Findings at Hospital

- He was awake and alert but cranky.
- Had bruises on front, back, and side of head.
- Had tiny bruises and scratches on his neck.
- Bruises on his back and arms.

CT scan of the head:

- Brain was normal. No subdural hematoma or brain injury.
- Large occipital skull fracture that tracked to the foramen magnum.

The Team gets to work:

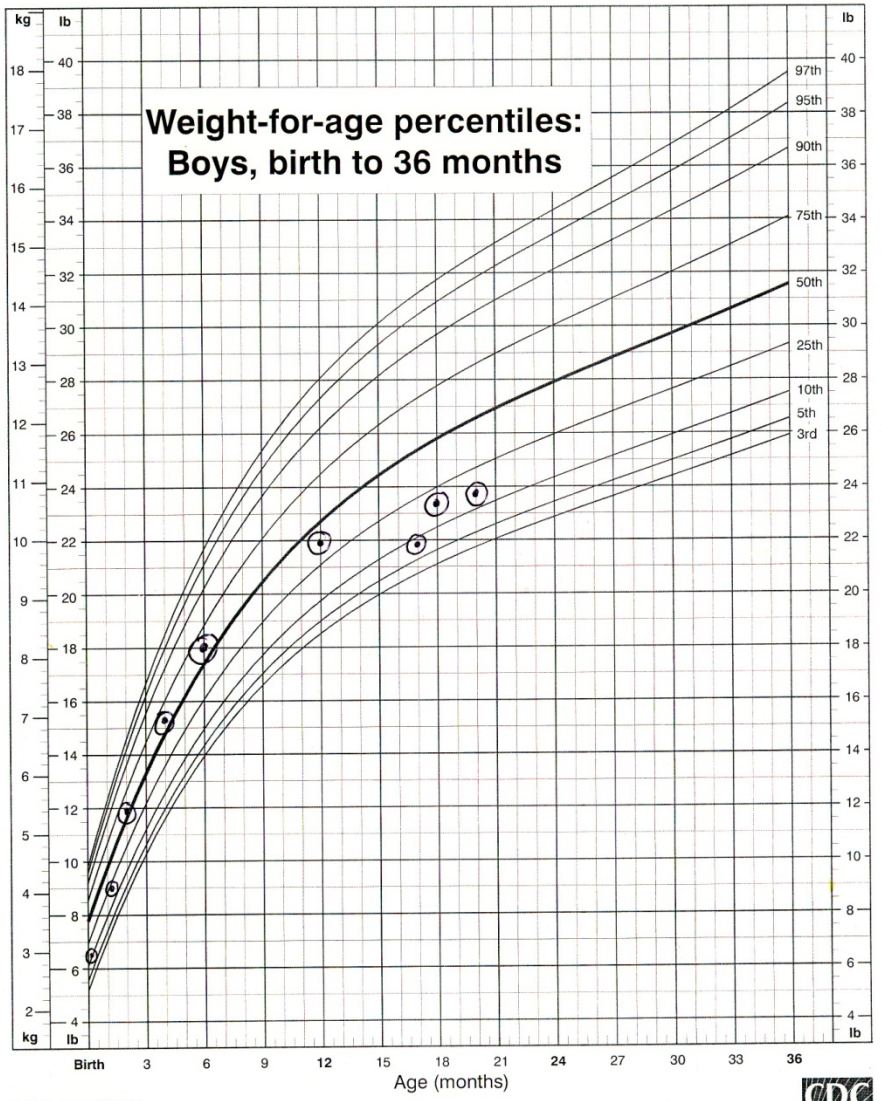
- Social services: No history of abuse. Mom appropriate.
- Police: Interviews Mom's boyfriend. He denies abuse.
- Police do a crime scene investigation. They note that the carpet where the vase of flowers fell is dry.
- Police find boyfriend has a history of criminal assault and drug use.

The Team gets to work:

- Social services interview the child's regular pediatricians. He has been concerned about the child having poor weight gain.

- Child Abuse pediatricians work child up for other injuries
  - Skeletal survey shows no other fractures.
  - Rest of work up for injury completely normal except for extremely low pre-albumin level, indicating he was malnourished.

CDC Growth Charts: United States



Published May 30, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).

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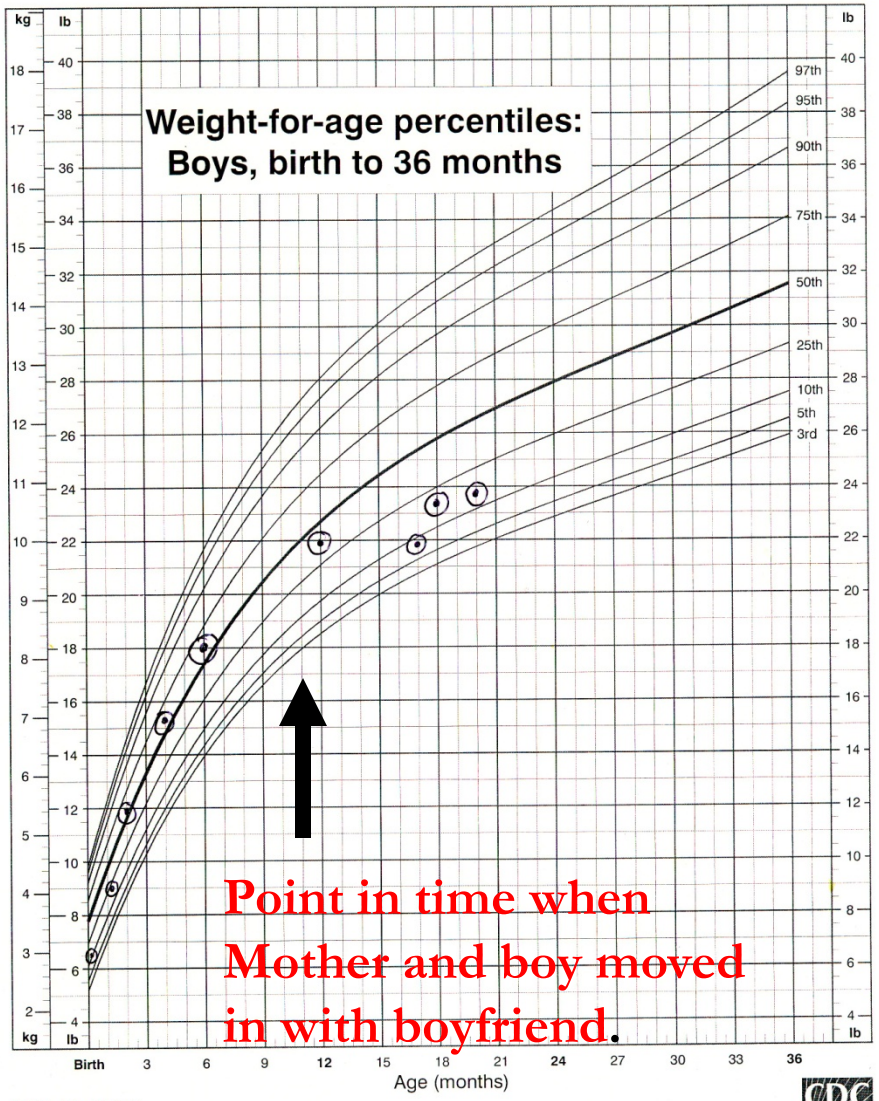

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Further work-up

- MRI—MUCH BETTER FOR PARENCHYMAL INJURY

- Total body STIR (short tau inverse recovery) MRI—We have found it useful for finding other occult injuries. Shows edema and inflammation in bones and soft tissues.

Lessons learned--

- We do better work when we work together across disciplines.
- Multidisciplinary teams are powerful.
- Access to medical experts with special training in child maltreatment is important.
- We need to learn from our mistakes!

Thank you for listening!