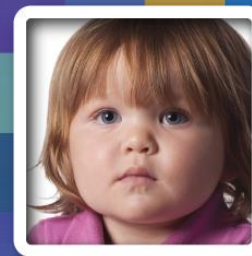






SENTINEL EVENTS



ARNE GRAFF MN
DIVISION CHILD ABUSE PEDIATRICS

CONTACT INFORMATION:

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- 507-266-0443

DISCLOSURES:

- TESTIFY
 - PROSECUTOR
 - DEFENSE

DISCLOSURE:

- ALL CHILDREN IN PHOTOS ARE IN SAFE HOMES
- PICTURES OF INJURIES- YOUR COMFORT ?

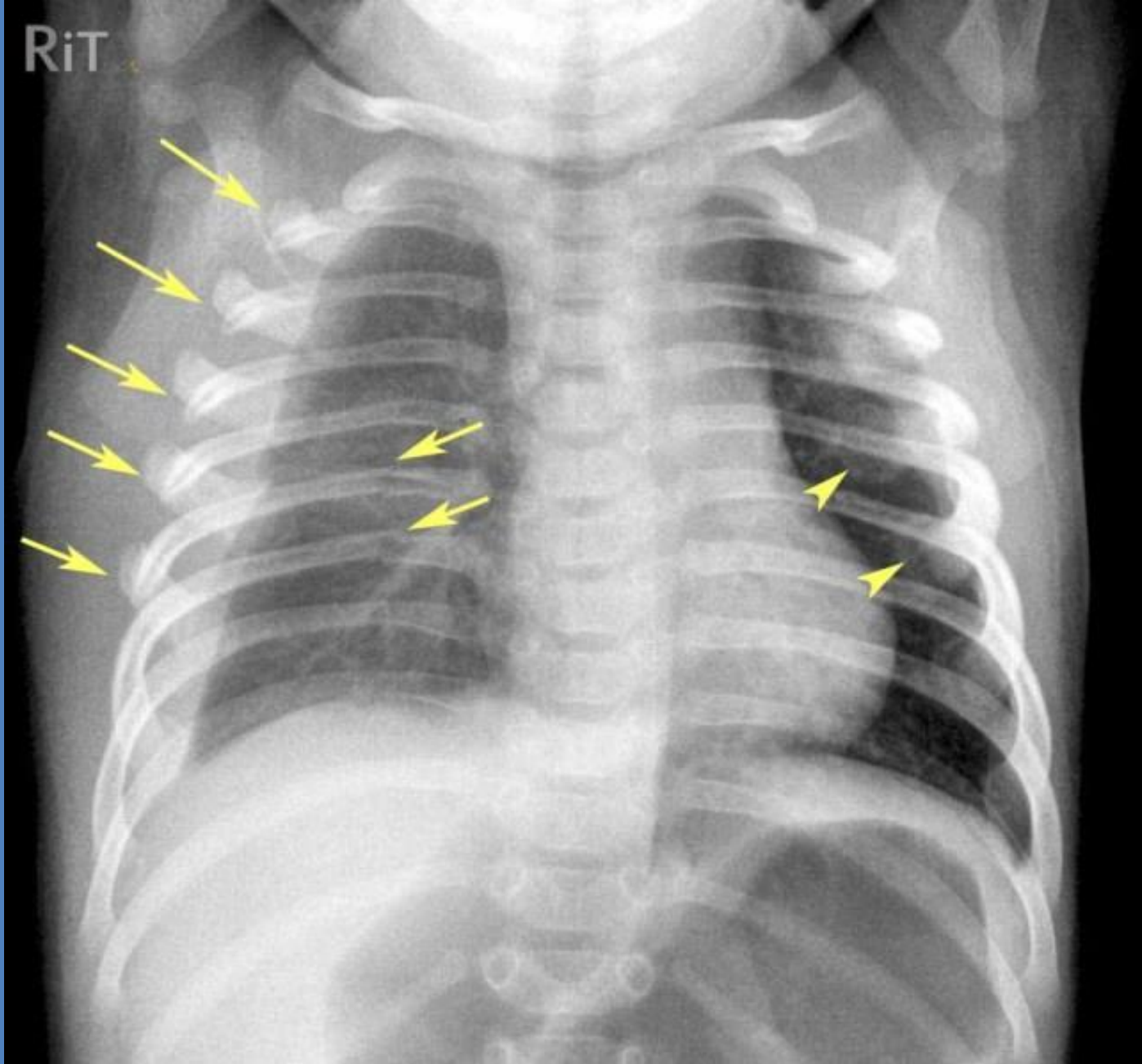
OBJECTIVES:

- DISCUSS THE “BARRIERS”
- REVIEW WHAT IS A “SENTINEL EVENT”
- REVIEW THE EVALUATION FOR SENTINEL EVENT

OUR JOB

- IT'S NOT OUR JOB TO PROVE IT'S ABUSE
- IT IS OUR JOB TO PROVE IT'S NOT ABUSE
- IT'S OUR JOB TO INSIST ON SAFETY DURING WORK UP

RiT



STATISTICS:

- 3,000,000 REPORTED CASES/YR
- 900,000 CONFIRMED CASES
- 1500 “IDENTIFIED” DEATHS

Graph 2: Proportion of children by age group who died as a result of maltreatment

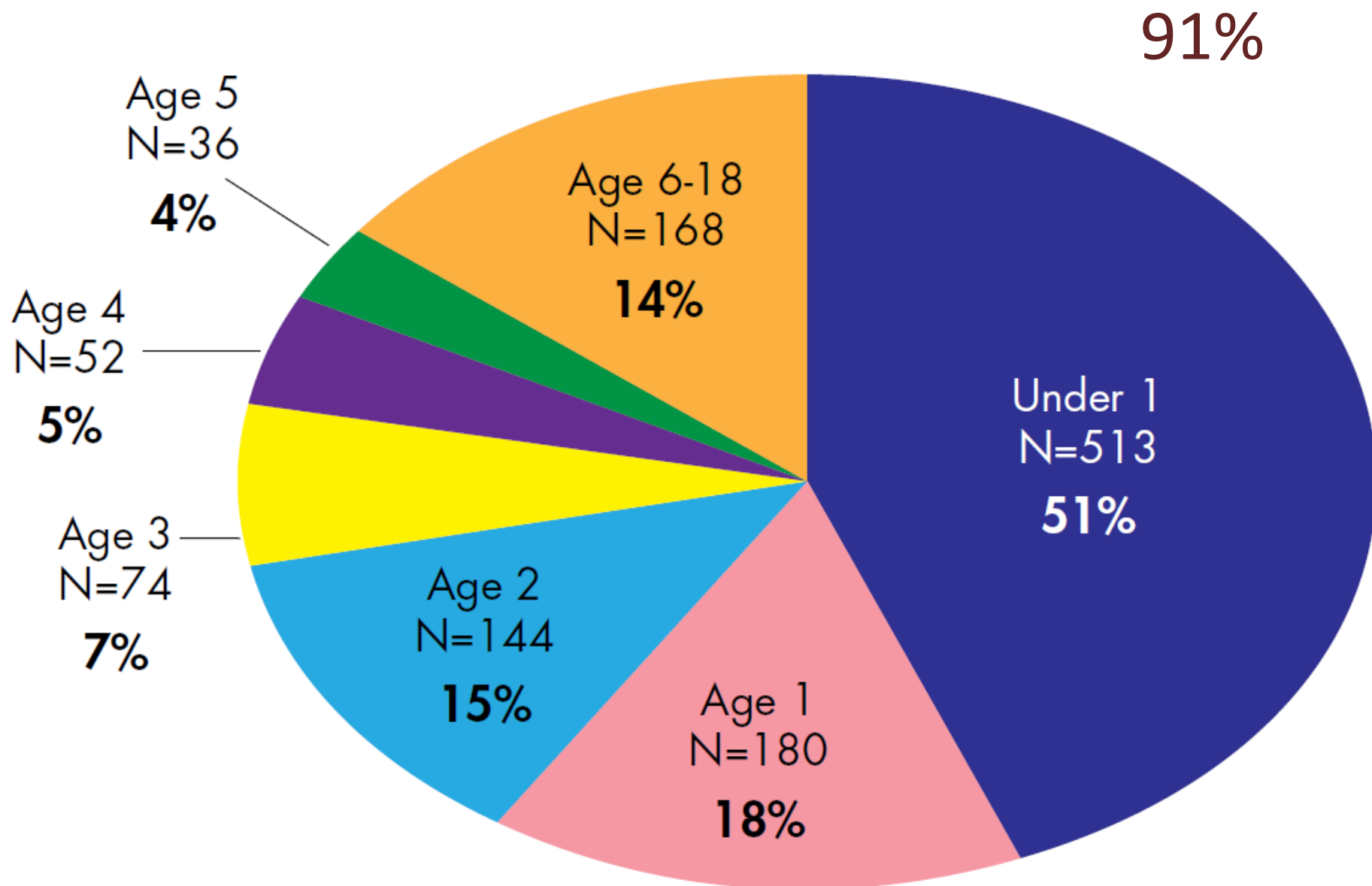
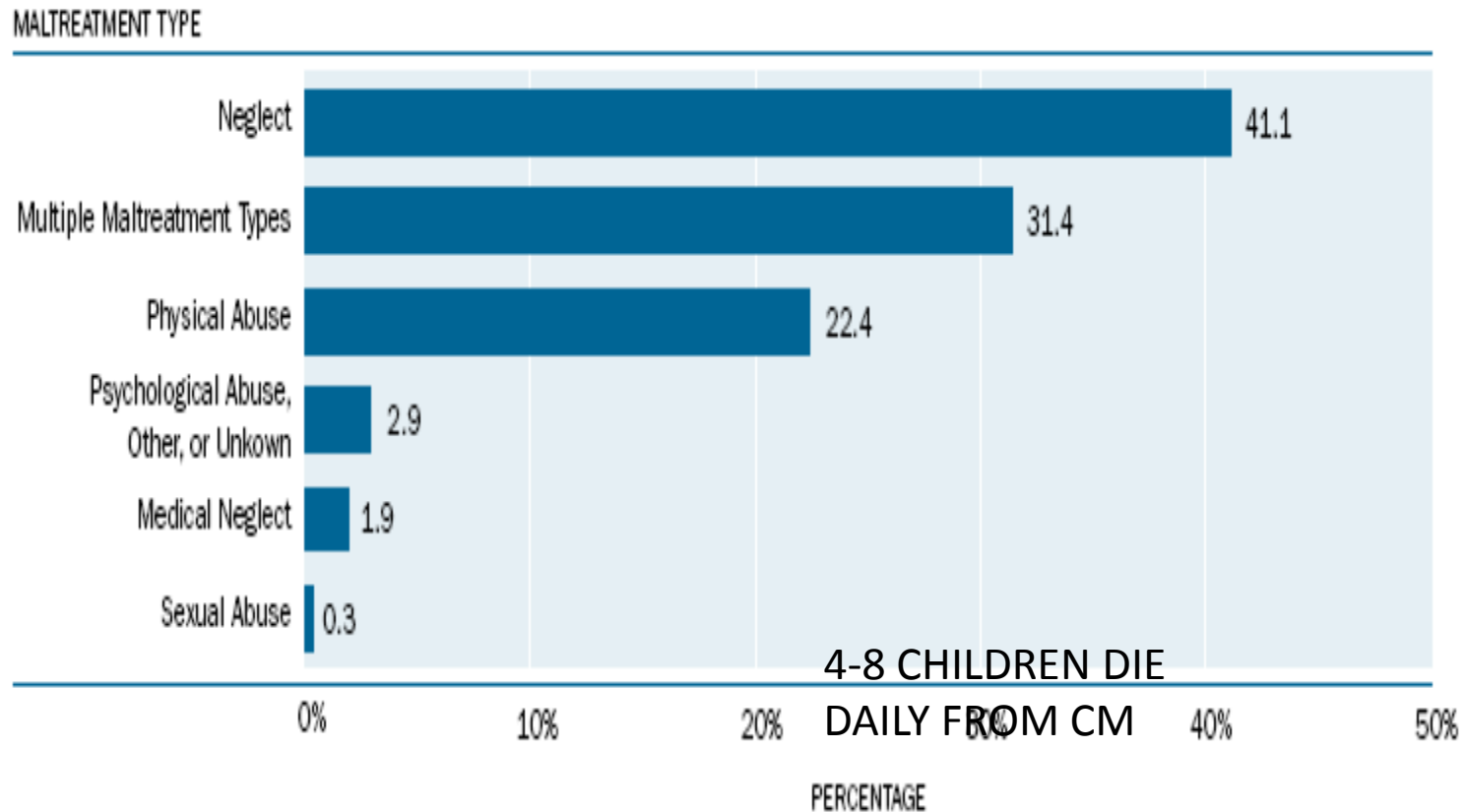


Figure 4-3 Maltreatment Types of Child Fatalities, 2006

69%



Based on data in table 4-6.

PREMOBILE CHILD NONMOBILE INFANTS:

- HIGH RISK GROUP FOR MALTREATMENT
- MINOR INJURIES ARE UNCOMMON,
EXCEPT FOR SUPERFICIAL ABRASIONS

PREMOBILE CHILD

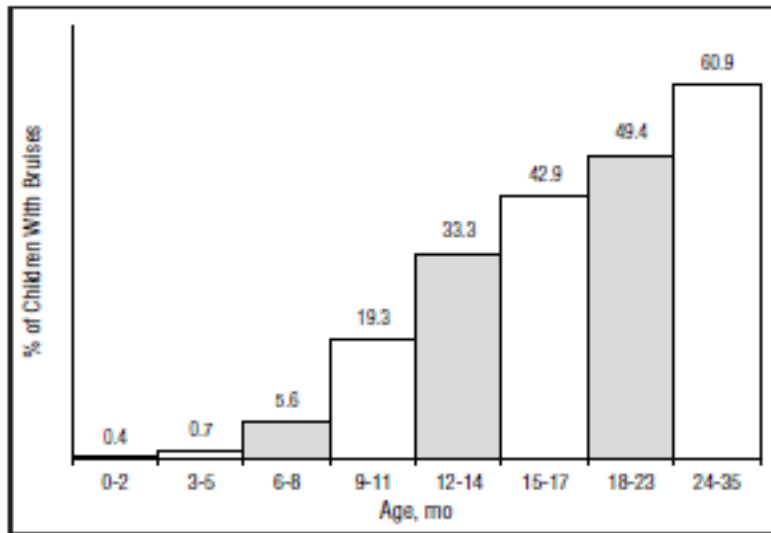


Figure 1. Percentage of children with bruises by age (N=930).

Table 1. Bruises by Age and Developmental Stage of Child*

Age, mo	Precruiser	Cruiser	Walker
0-2	1/225 (0.4)	...	...
3-5	1/141 (0.7)	...	...
6-8	4/99 (4.0)	2/8 (25)	...
9-11	4/38 (10.5)	12/63 (19.0)	7/18 (38.9)
12-14	1/8 (12.5)	3/24 (12.5)	23/49 (46.9)
15-17	...	1/6 (16.7)	26/57 (45.9)
18-23	...	...	39/79 (49.4)
24-35	...	...	70/115 (60.9)
Total†	11/511 (2.2)	18/101 (17.8)	165/318 (51.9)

*Data are presented as the number of children with bruises/total number of children (percentage). Precruiser indicates a child who is not walking; cruiser, one who walks with support; walker, one who walks independently; ellipses, not applicable.

†P<.001.

NAOMI SUGAR STUDY

RISKS:

- <6 MOS 2X INCREASED RISK (OVER 1-3 YR OLD)
- 8-31% PA VICTIMS SEEN RECENTLY BY PROVIDER
- 27% OF PA CHILDREN HAVE SENTINAL INJURY

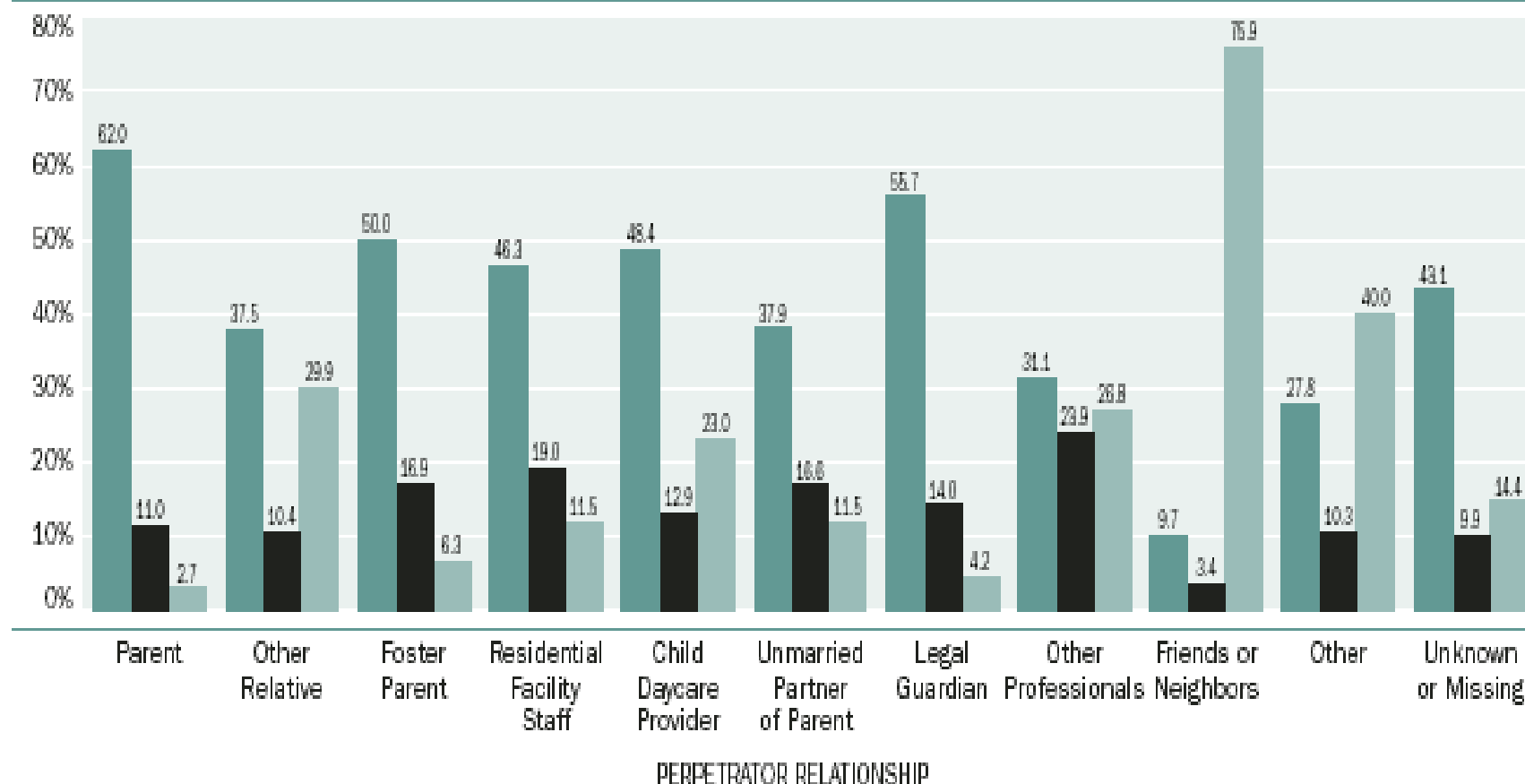
CONCERNS:

- ACE

- DV

Figure 5-3 Perpetrators by Relationship to Victims and Selected Types of Maltreatment, 2003

PERCENTAGE ■ Neglect ■ Physical Abuse ■ Sexual Abuse



Based on data from table 5-3. N=38 States.

OFFENDERS

- PEOPLE WHO HAVE ACCESS TO INFANT
- IN GENERAL, NICE PEOPLE; WHO HAVE SIGNIFICANT STRESS AND “REACT”
- MAY BE THE PERSON SITTING WITH THE CHILD!!!

BARRIERS:

- WHITE
- INFANT UNDER 6 MONTHS
- NICE FAMILY; 2 PARENT HOME

BARRIERS:

- PROVIDER'S GESTALT
- NON-MEDICAL
 - BASED ON TRAINING
 - BASED ON EXPERIENCE
 - BASED ON BIAS

BARRIERS:

- CHILDREN HOSPITAL VS NON-CHILD HOSPITAL
 - 2X MORE RECOGNIZED INJURIES (HIGH RISK PT)
 - ABUSIVE FX 7X MORE MISSED IN NON-CHILD
 - ANY HOSPITAL: OTHER NEEDED TESTS
 - TESTING: 40-90% WHEN HIGH RISK

CONCERNS:

- CAROLE JENNY JAMA STUDY:
 - 37%
- FRACTURE STUDY:
 - THORPE STUDY 38%
 - STUDY: 20% ABN FX MISSED FIRST VISIT

- NO DISCLOSURES!

SENTINAL INJURY:

- DEF:
 - A VISIBLE MINOR INJURY IN A PRECRUISING INFANT THAT IS POORLY EXPLAINED AND CONCERNING FOR PA
 - WITNESSED BY AT LEAST ONE CAREGIVER

SENTINAL INJURY:

- COMMON INJURIES:

BRUISE

ORAL INJURY

SUBCONJUNCTIVAL
HEMORRHAGE

SENTINAL INJURY:

- INCIDENCE: DIFFICULT TO KNOW
 - CAREGIVER DOES NOT SEEK CARE
 - CAREGIVER INTERPRETS AS NORMAL/MINOR
 - 42% NOT ACTED ON

SENTINEL EVENTS:

PHYSICAL ABUSED CHILD:

FACIAL AND INTRAORAL TRAUMA

INFANTS: 49%

TODDLERS: 38%

SENTINEL INJURIES:

- HEAD:

- MOST COMMON BODY PART INJURED

- 43% OF ABUSIVE INJURIES

NOT SENTINEL:

- SKIN INJURIES THAT ARE
SUPERFICIAL ABRASIONS THAT
COULD OCCUR IN THE ROUTINE
CARE OF AN INFANT

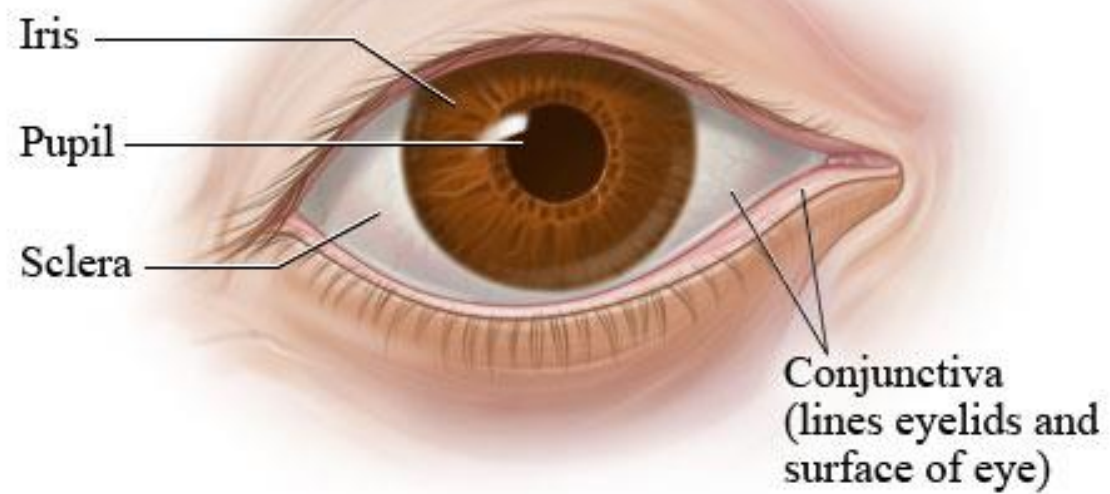
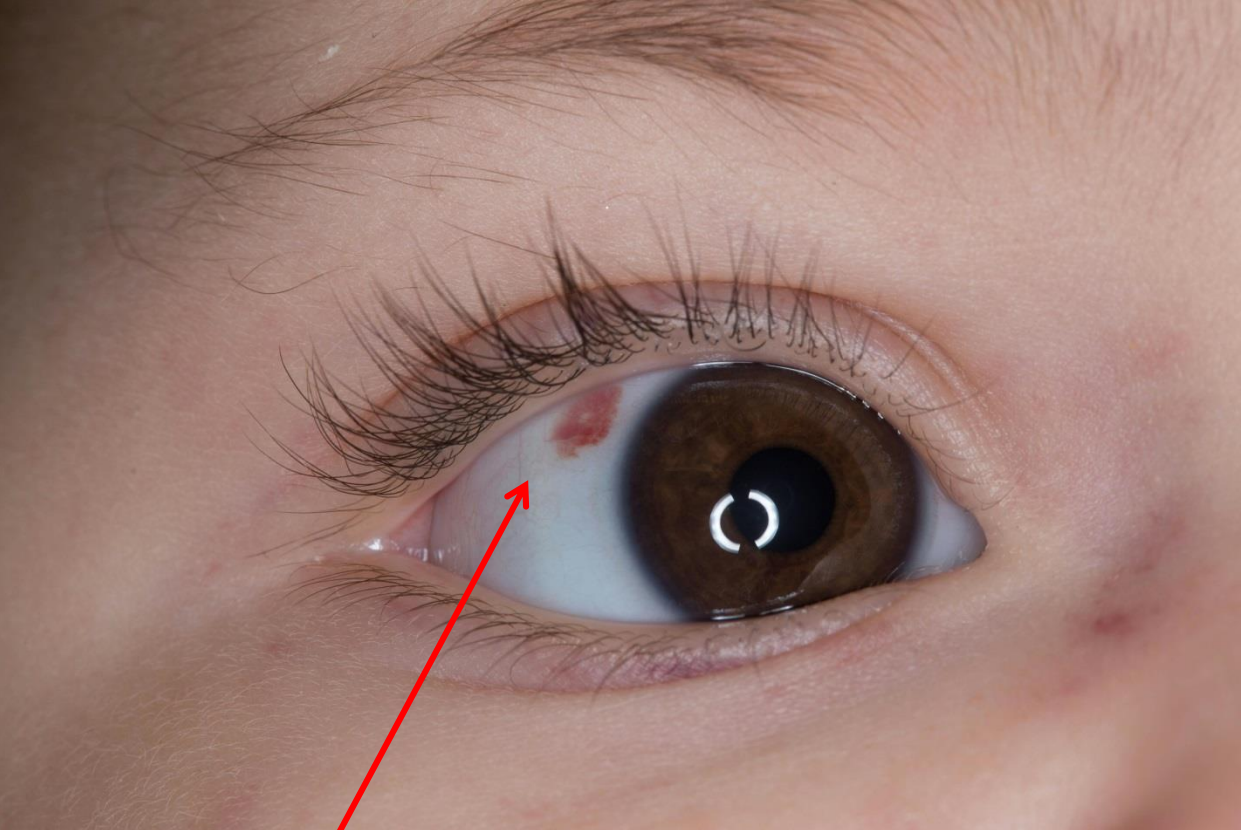
FUTURE RISK:

- LYNN SHEETS STUDY:

- 27.5% WILL HAVE RISK OF REPEAT
AND MORE SIGNIFICANT VIOLENCE

CASE #1

- 3 MONTH OLD
- WELL CHILD VISIT
- NO CONCERNS
- PARENTS BOTH PRESENT
 - DAD: TEACHER
 - MOM: ATTORNEY



SUBCONJUNCTIVAL HEMORRHAGES

- BLOOD IN “WHITE” PART OF EYE
- AFTER NEONATE WINDOW
- MUST CONSIDER MEDICAL CAUSES
- NOTED IN 22-46% OF NAT VICTIMS

SUBCONJUNCTIVAL HEMORRHAGES:

- PRESENTING COMPLAINT IN
6% OF SUSPECTED CHILD
ABUSE PATIENT!

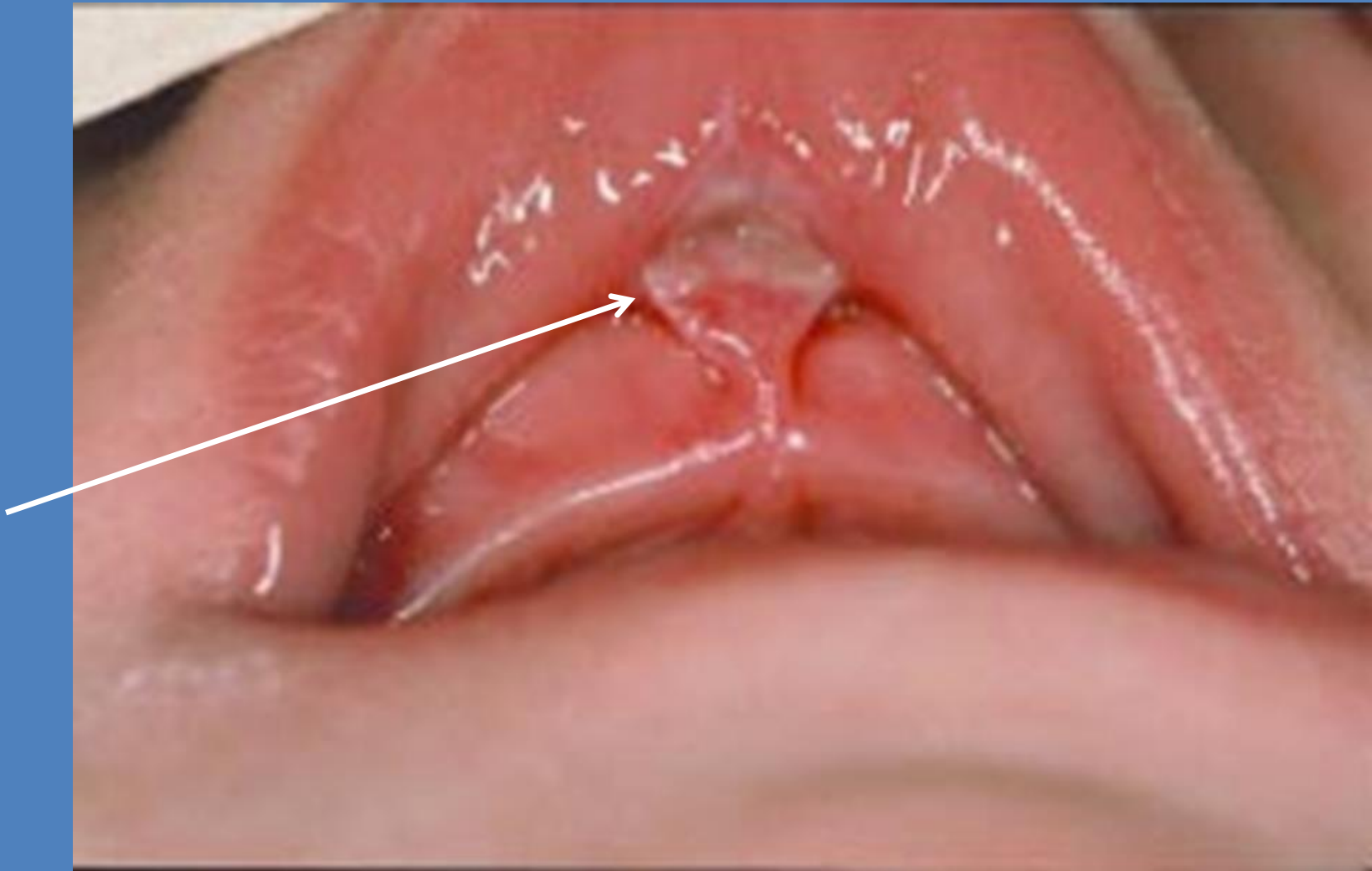
SUBCONJUNCTIVAL HEMORRHAGE:

- CAN BE RELATED TO TRAUMATIC ASPHYXIA SYNDROME
- STRANGULATION/SUFFICATION
- BLUNT TRAUMA**
- “SPONTANEOUS” UNLIKELY!!

CASE 2

- 4 MONTH OLD AT DAY CARE
- MOTHER REPORTS MOUTH BLEEDING AT TIME OF PICKING INFANT UP
- NO CAUSE REPORTED BY DAYCARE STAFF

CASE 2



ORAL INJURIES:

- MAY BE A SITE OF INCREASED RISK
- UNCOMMON INJURY SITE 1ST YEAR OF LIFE
- INCLUDES:
 - LIPS, TONGUE, BUCCAL MUCOSA, GINGIVA, FRENULUM, PALATE, OROPHARYNX, TEETH, BONE

ORAL INJURIES:

- TYPICAL INJURIES:
 - BURN, BRUISE, LACERATION
 - 54 % OF INJURIES: LIPS
- OTHER INJURIES:
 - gag: Lichenification, scar to corner of mouth





MECHANICS OF INJURY

- FEEDING
- DIRECT BLOW
- ACCIDENT

ORAL INJURIES:

- INSTRUMENTS OF INJURY:
 - UTENSILS
 - FINGERS
 - FORCED FOOD /HOT FOOD
 - CAUSTIC SUBSTANCE
 - OTHER OBJECT(PASCIFIER)

ORAL INJURIES:

- FRENULUM:
 - INJURY MORE COMMON AFTER 15 MONTHS OF AGE

INTRAORAL INJURIES

- DENTAL:
 - AGES 1-6: 30% DENTAL TRAUMA
 - PEAK AGE 3 YR OLD

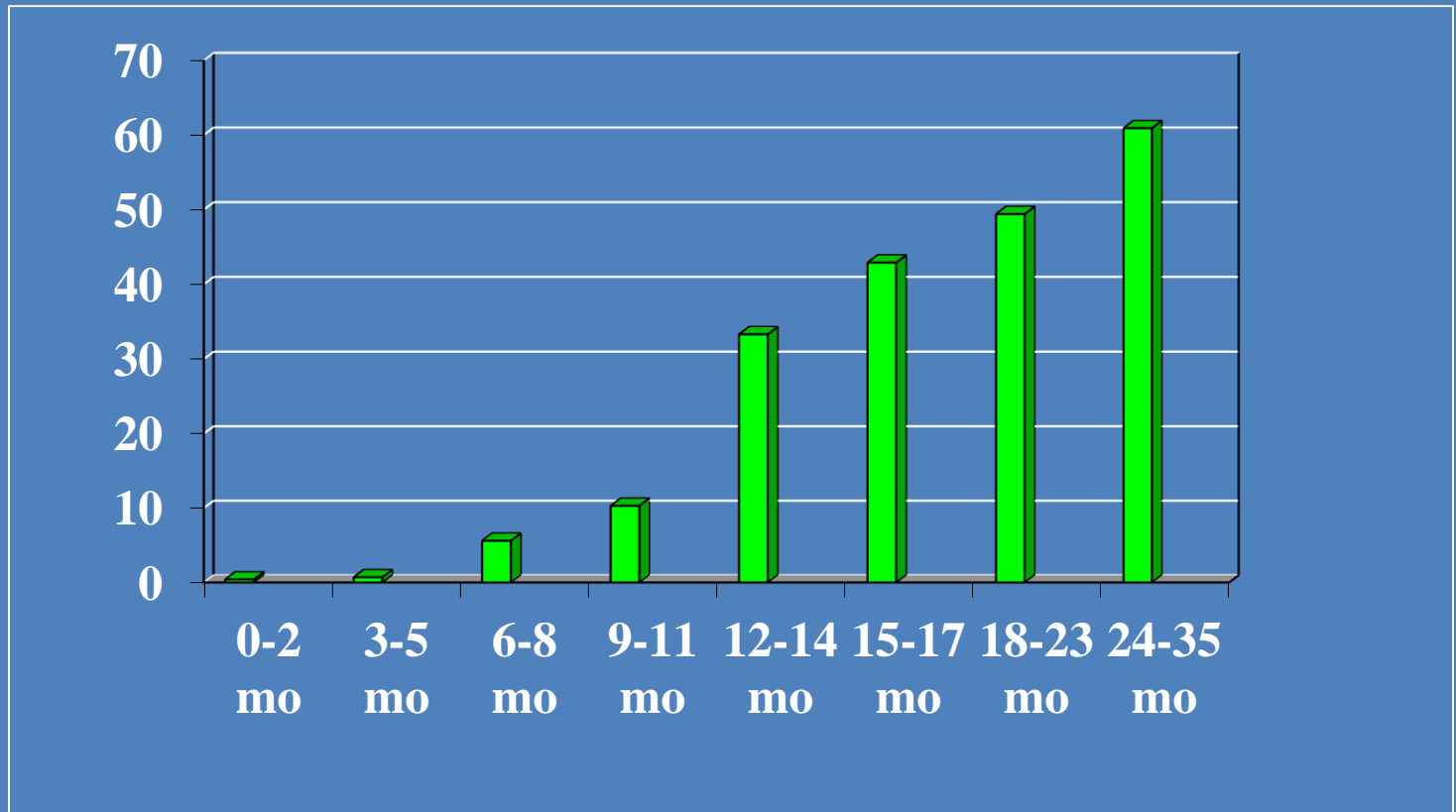
CASE #4

- 4 MONTH OLD
- SEEN FOR WELL CHILD VISIT
- MOM: ER DOC ; DAD: TRUCK DRIVER
- NO CONCERNS; NO DAY CARE

BRUISES:

- MOST COMMON
PRESENTATION OF CM

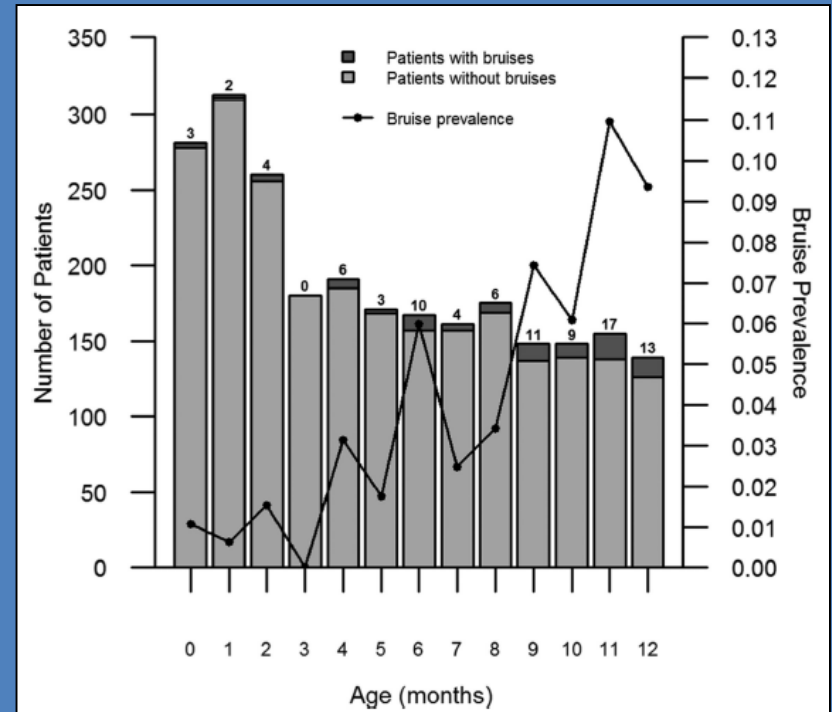
“Those who don’t cruise don’t bruise”



- N = 930
- < 1% of infants under 6 months have bruises

Bruising Prevalence in Infants

- Pierce et al (2016) conducted prospective observational study of bruise prevalence in infants seen in 3 Pediatric EDs
 - 2488 infants seen
 - Median age 5 months
- Bruising prevalence 1.3% and 6.4% for infants ≤ 5 months & >5 months



Pierce MC et al. The prevalence of bruising among infants in pediatric emergency departments. Ann Emerg Med 2016;67:1-8

Bruising and Bleeding Disorders

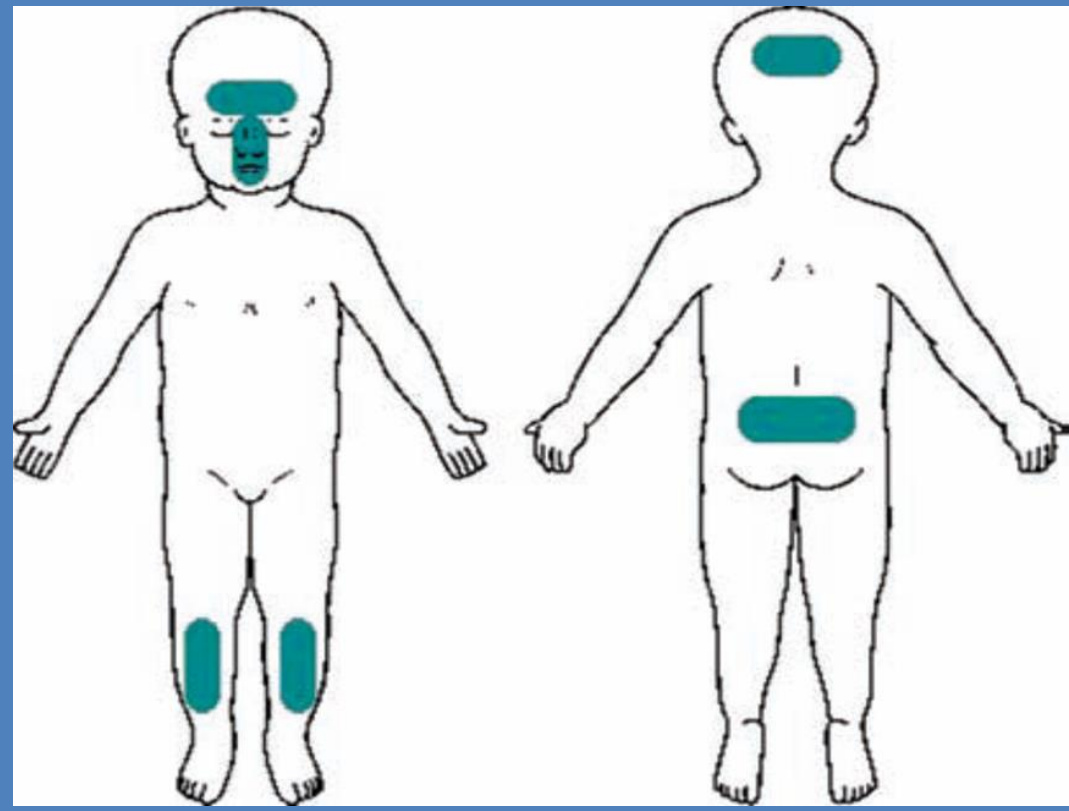
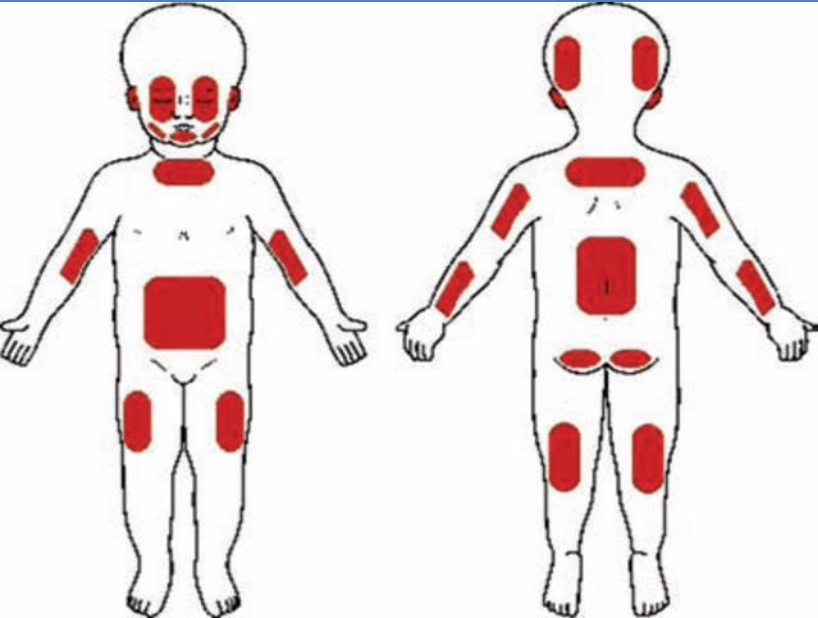
- Bruises on cheeks, ears, neck, buttocks, eyes and genitalia absent or extremely rare (<0.5% of collections) in pre-mobile children** with bleeding disorders, regardless of severity and absent in children without bleeding disorder
- Among children without bleeding disorder and with mild/moderate bleeding disorders, $\leq 1\%$ and 3% of collections, respectively, had bruise in any other location
- Children with severe bleeding disorders had substantially more collections with bruises (>10% of collections) predominantly on upper arms, feet, rear trunk, front of thighs and below knee

** Pre-mobile: not crawling, cruising or walking

Collins PW, et al. Patterns of bruising in preschool children with inherited bleeding disorders. Arch Dis Child 2017; 102:1110–1117

ACCIDENTAL BRUISES:

- SKIN OVERLYING BONE AREA
- LEADING SURFACE
- HISTORY OF PLAUSIBLE ACCIDENT LIKE A DROP, ETC



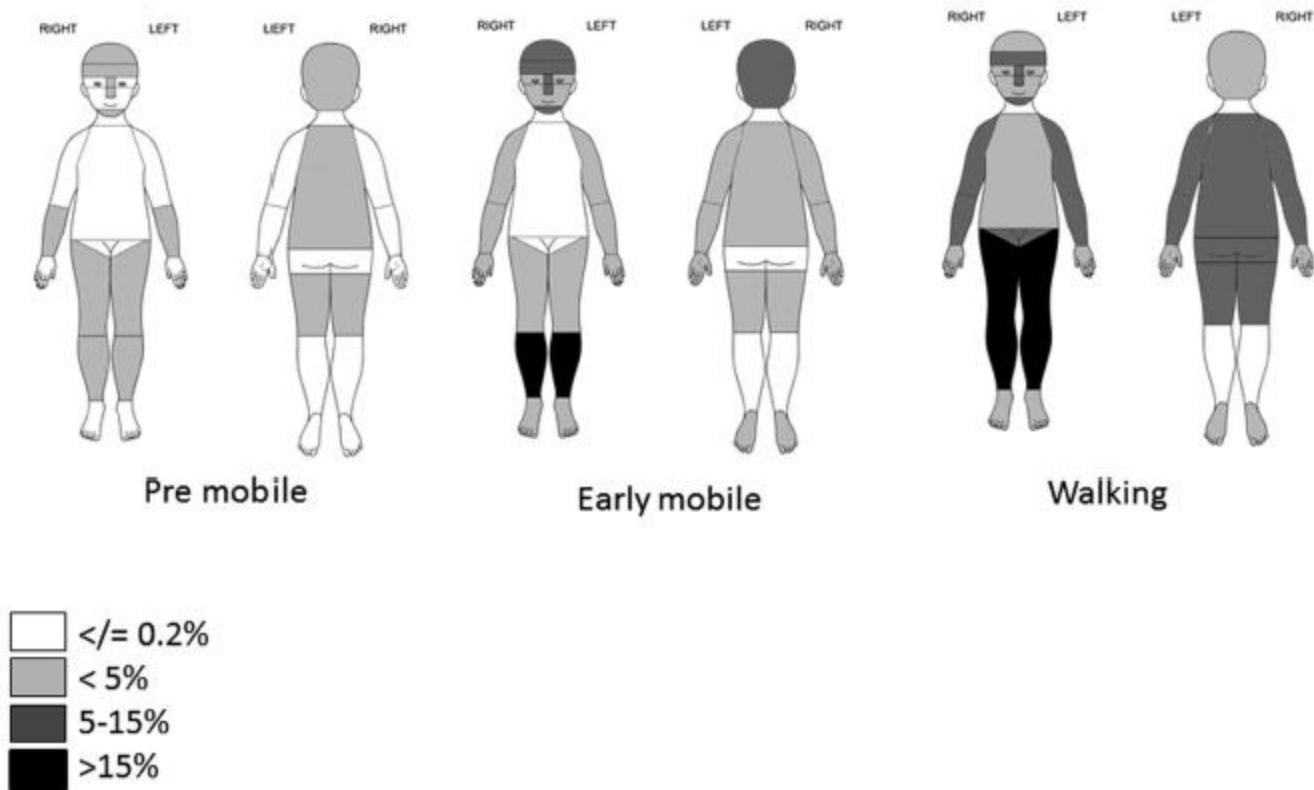


Figure 2 Distribution of percentage of 2570 collections from 328 children with at least one bruise by location and development stage.

Why are sentinel injuries important not to miss

Multiple studies show that the presence of even a single sentinel injury is a marker for more serious concurrent underlying injury

- Harper et al found a 50% rate of unexpected new injuries (skeletal, brain, abdominal) among 146 infants < 6 months of age evaluated for abuse after presenting with isolated bruising¹

Characteristics for study cohort, total = 146 infants	Any new injury identified, total = 73 infants, n (%)
Number of bruises	
1, n = 50	30 (60.0)
2-5, n = 76	32 (42.1)
6-10, n = 12	7 (58.3)
>10, n = 8	4 (50.0)
Location [†]	
Face/head, n = 110	59 (53.6)
Trunk, n = 46	22 (47.8)
Extremities, n = 39	21 (53.8)
Patterned bruises, n = 30	9 (30.0)



¹ Harper NS et al. J Pediatr 2014;165:383-8.

Differential Diagnosis of Bruises

- Mongolian Spots
- Ehlers Danlos Syndrome
- Erythema Multiforme
- Allergic “shiners”
- Phytophotodermatitis
- ITP
- Leukemia
- Hemophilias
- VW Disease
- HSP
- Cao Gio
- Cupping
- Ink, dye on body
- Meningococccemia
- Urticaria pigmentosa
- Popsicle panniculitis
- Pediculosis
- Accidental Injury
- DIC
- Hemangiomas

DIFFERENTIAL DIAGNOSIS

(Burns, bruises, fractures, head injuries, neglect, FTT)

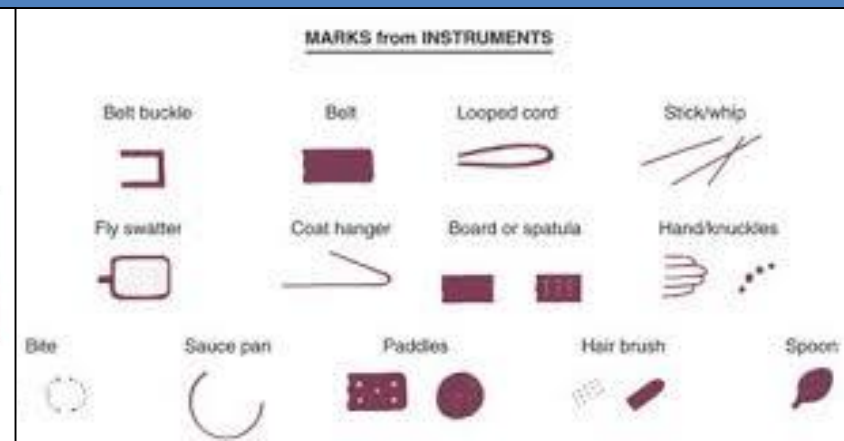
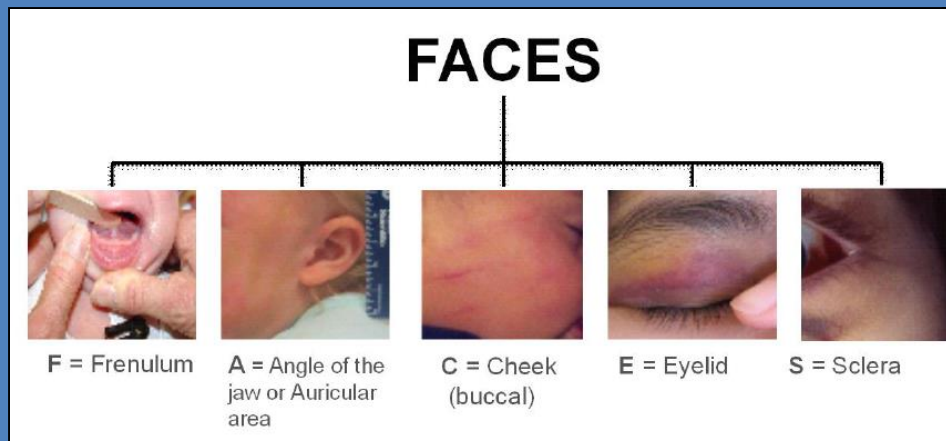
INFECTIOUS	METABOLIC	COAG DEFECT	ACCIDENTAL
NON- ACCIDENTAL	CONGENITAL	ENDOCRINE	CONNECTIVE TISSUE
ENVIRONMENT	POISONING	MEDICATION	VASCULAR
RENAL	PULMONARY	CARDIAC	OTHER

HIGH RISK BRUISING

- PREMOBILE CHILD: ANY LOCATION
- FACE, EARS: ANY CHILD
- MOBILE CHILD: PATTERN, LOCATION, MANY
- DIAPER AREA

Characteristics of abusive bruising in children

- **TEN-4 FACES-P:**
 - **TEN:** Torso, Ear, Neck in child < 5 years
 - **ANY** bruising in infant < 4 months (*4.99 mo*)
 - **FACES:** Frenulum, Angle of Jaw/Auricle, Cheek, Eyelids, Sclera
 - **Patterned** bruising



TEN-4 DECISION RULE

- Any bruise in child < 4.99 months of age

OR

- Bruising present in TEN (torso, ears, neck) in child < 4 years
 - Torso = chest, abdomen, back, buttocks, GU, hips

AND

- No confirmed accident in a public setting that accounts for above bruising
- Sensitivity of 97% and specificity of 84% for predicting abuse

Pierce MC, Kaczor K, et al. Bruising characteristics discriminating physical child abuse from accidental trauma. *Pediatrics* 2010;125(67)

DESCRIBE BRUISE:

- COLOR
- SHAPE
- SIZE
- LOCATION
 - SOFT TISSUE; OVER BONY PROMINENCE
- TENDER
- SWOLLEN
- ABSENCE OF BRUISES (SHINS, ETC)

MIMICS





WORKUP

WORKUP

- BE AWARE OF SENTINEL EVENTS

STARTING POINTS

- CONSIDER IT: INCLUDE IT OR DISMISS IT
- DOCUMENT, DOCUMENT, DOCUMENT

MECHANICS FOR ALL EVALS:

- MEDICAL REASON?
- ACCIDENT REPORTED?
- CAN CHILD CAUSE TO SELF
- NONACCIDENTAL CAUSE CONSIDERED?

HISTORY

- INCIDENT
- PAST MEDICAL HISTORY
- SOCIAL HISTORY
- DEVELOPMENTAL HISTORY
- SOCIAL SERVICE HISTORY
- PARENT MEDICAL HISTORY
- DIET
- MEDICATIONS
- CPS OR LE HISTORY
- ALL OLD RECORDS***: LOOK FOR PATTERNS



SENTINEL EVENT VS SEPSIS

NEGATIVE SEPSIS WORKUP

NOT THE SAME AS

NEGATIVE CM WORKUP WITH
ISOLATED INJURY

EXAM:

- HEAD TO TOES
- DOCUMENT NOT ONLY
WHAT YOU SEE BUT ALSO
WHAT YOU DO NOT SEE

WORKUP:

- CT HEAD (? MRI HEAD)
- DILATED EYE EXAM (WITHIN 48 HR)
- SKEL SURVEY; REPEAT SKEL SURVEY (3 WK)
- LABS
- SAFETY PLAN
- “CONTACT CHILDREN” EVAL

SKELETAL SURVEY:

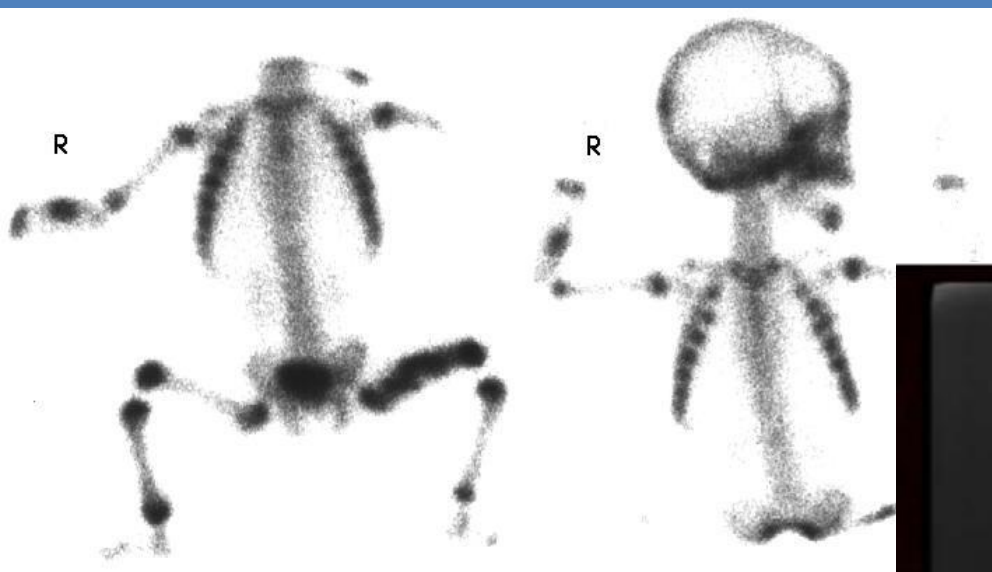
- AP OR PA OF CHEST
- 2 OBLIQUES OF CHEST
- COMPLETE SPINE
- 2 VIEWS SKULL
- PELVIS
- INDIVIDUAL ARM/LEG SEGMENTS
- HANDS
- FEET

Skeletal Survey

- <2: all physical abuse victims
- neglect and drug on case by case
- 2-5: if victim has disabilities
 - severe injury
 - otherwise specific bones
- >5: rarely needed; do specific bones

REPEAT Skeletal Survey

- 2-3 WEEK recheck
- (in PA 28% positive on recheck)
- May exclude skull series unless injury



HEAD EVALUATION

- CT HEAD

- IF AGE >9MOS AND NO TEN-4-FACE-P INJURY AND NORMAL NEURO EXAM; NO MRI OF HEAD OR NECK
- IF ABNORMAL CT: DO MRI OF HEAD/C-SPINE
- IF NORMAL BUT NEURO ABN DO MRI HEAD

LABS:

- BRUISING:

- CBC, PT, PTT, PLT COUNT, VW PROFILE

- ? D-DIMER, FIBRINOGEN, FAC 13

- PHYSICAL ABUSE:

- ALT, AST, LIPASE, UA, AMYLASE

NO PARTIAL
WORKUPS!

MUST ALWAYS CONSIDER OTHER CO-EXISTING ABUSE:

SEXUAL

PHYSICAL

NEGLECT

MEDICAL NEGLECT

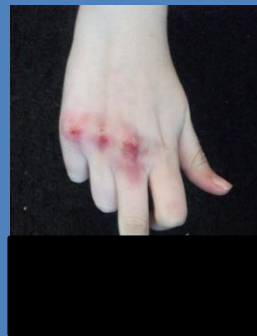
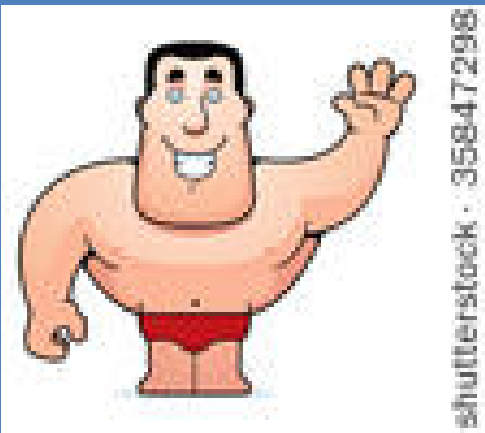
MEDICAL CHILD ABUSE

EMOTIONAL

DENTAL

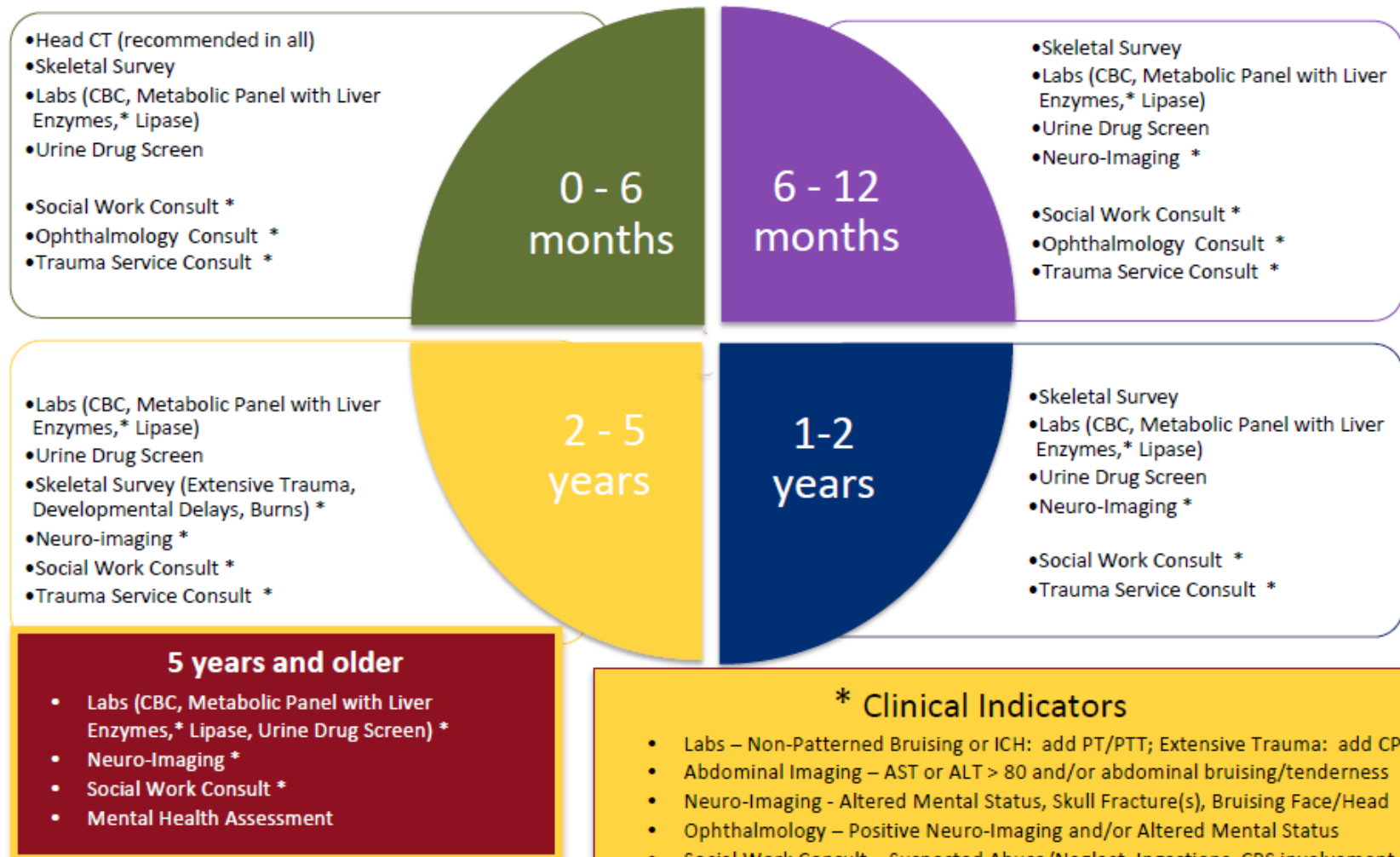
PHOTOGRAPHS:

- BLUE BACKGROUND BEST
- BIG PICTURE, THEN CLOSE-UP
- TAKE LOTS OF PICTURES
 - MANY VIEWS



Minnesota Child Abuse Network

ASSESSMENT FOR PHYSICAL ABUSE



Assessment for Physical Abuse: Injury Patterns, "Red Flags" & Child Abuse Programs

When the following injuries are present,

ADDITIONAL MEDICAL EVALUATION IS ALWAYS INDICATED:

Rib Fractures
Metaphyseal Fractures
Longbone Fracture (non-ambulatory)
Oral or Pharyngeal Injury (non-ambulatory)
Abdominal Injury (non-MVC under 5 yrs)
Head Injury (unwitnessed, unexplained)

Patterned Skin Injuries & Unusual Locations of Injury

TEN-4 FACES

TEN

Torso (trunk)
Ear
Neck

FACES

Frenulum (mouth)
Auricular area (ear)
Cheek
Eyelids (bruising)
Scleral Hemorrhage (eye)

4: Bruises in the TEN distribution in a child under 4 years of age, or **ANY** bruise in an infant less than 4-6 months of age

Contact a Child Abuse Physician:

Univ. of Minnesota Masonic Children's Hospital
Minneapolis MN
Center for Safe & Healthy Children
(612) 273-SAFE (7233) or (612) 365-1000

Hennepin County Medical Center
Minneapolis MN
Center for Safe & Healthy Children
(800) 424-4262 Hennepin Connect

Children's Hospitals and Clinics of Minnesota
Minneapolis and St. Paul MN
Midwest Children's Resource Center (MCRC)
(651) 220-6750

Mayo Clinic
Rochester MN
Mayo Child and Family Advocacy Program
(507) 266-0443 daytime or (507) 284-2511

Essentia Health
Duluth MN (218) 786-8364

Gundersen Health System
La Crosse WI 1-800-362-9567

Sanford Health
Sioux Falls SD
Child's Voice Child Advocacy Center
(605) 333-2226

Sanford Health
Fargo ND
Child & Adolescent Maltreatment Service
(CAMS) (701) 234-2000 or (877) 647-1225

MOST CHILD FATALITIES:

- i. Occur in children under 4 years of age (80%)
- ii. Occur at the instigation of a caregiver (80%)
- iv. Involve head (leading cause) and/or abdominal (second cause) Injury

What Is An Unexplained Injury:

- i. Injury that is not consistent w/ child's age, developmental abilities, or injury type
- ii. History that is vague or changes w/ time, repetition, or caregiver
- iii. Delay in seeking medical care

Signs of Head Injury*:

- i. Bulging fontanelle (soft spot) in an infant
- ii. Rapidly increasing head circumference
- iii. Bruising/Swelling to Face/Head
- iv. Vomiting or fussiness
- v. Unresponsive, "altered mental status"
- vi. Apnea or change in breathing

*Simple household falls rarely result in serious injury.

Signs of Abdominal Injury*:

- i. Abdominal pain or distention
- ii. Abdominal bruising
- iii. Vomiting
- iv. Lethargic, "altered mental status"
- v. Rectal bleeding
- vi. Presents in shock, low blood pressure

*Simple household falls rarely result in serious injury.

These recommendations are not a substitute for expert medical evaluation. It should also not take the place of medical decision-making. Injuries that are suspicious for abuse require careful assessment by a physician or medical provider with expertise in child abuse.

KNOW THE LIMITS:

MECHANICS:

KIDS ARE

NOT LITTLE ADULTS!!!!

SKIN IS DIFFERENT

RESPONSE IS DIFFERENT

HEALING IS DIFFERENT

ABILITY IS DIFFERENT

LIMITS:

- CANNOT RULE OUT INTRACRANIAL BLEED
- CANNOT RULE OUT 20 FRACTURES
- CANNOT RULE OUT ABDOMINAL INJURY
- CANNOT RULE OUT SEXUAL ABUSE

MANDATED REPORTING

- KNOW YOUR STATE LAWS
- OFTEN: “SUSPECT” , NOT PROVEN!
- IT’S NOT ABOUT PROSECUTION; IT’S ABOUT SAFETY

WORKUP

- CONTACT CHILDREN ?
- WORKUP: 12% fx

TAKE HOME POINTS:

- PREMOBILE INFANT AT INCREASED RISK OF PA
- SENTINAL EVENTS/FINDINGS MUST BE EVALUATED (COMPLETELY)
- A HAPPY BABY DOES NOT MEAN “NO INJURY”

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