

THE AMERICAN BOARD OF PEDIATRICS®

CONTENT OUTLINE

Child Abuse Pediatrics

**Subspecialty In-Training, Certification, and
Maintenance of Certification (MOC) Examinations**

INTRODUCTION

This document was prepared by the American Board of Pediatrics Subboard of Pediatric Child Abuse for the purpose of developing in-training, certification, and maintenance of certification examinations. The outline defines the body of knowledge from which the Subboard samples to prepare its examinations. The content specification statements located under each category of the outline are used by item writers to develop questions for the examinations; they broadly address the specific elements of knowledge within each section of the outline.

Child Abuse Pediatrics

Each Child Abuse Pediatrics exam is built to the same specifications, also known as the blueprint. This blueprint is used to ensure that, for the initial certification and in-training exams, each exam measures the same depth and breadth of content knowledge. Similarly, the blueprint ensures that the same is true for each Maintenance of Certification exam form. The table below shows the percentage of questions from each of the content domains that will appear on an exam. Please note that the percentages are approximate; actual content may vary.

	Content Categories	Initial Certification and In-Training	Maintenance of Certification (MOC)
1.	Epidemiology and social/cultural contexts of child abuse	5%	5%
2.	Abusive head trauma	10%	10%
3.	Cutaneous	10%	10%
4.	Musculoskeletal injuries	8%	8%
5.	Visceral injury	3%	3%
6.	Ear, nose, throat, neck, mouth, and face injuries	2%	3%
7.	Ophthalmologic findings and eye injuries	2%	2%
8.	Sexual abuse	8%	8%
9.	Genital assessment	9%	9%
10.	Anal characteristics	2%	2%
11.	Sexually transmitted infections (STIs)	6%	6%
12.	Neglect	8%	8%
13.	Prenatal and perinatal abuse	1%	2%
14.	Child abuse in the medical setting	2%	3%
15.	Child fatalities	4%	4%
16.	Psychological maltreatment	2%	2%
17.	Drug-endangered children	2%	2%
18.	Intimate partner violence (IPV)	2%	2%

19.	Societal response	5%	5%
20.	Ethical issues	2%	2%
21.	Neurobiological effects and evidence-based treatment	2%	2%
22.	Core knowledge in scholarly activities	5%	2%

Child Abuse Pediatrics

1. Epidemiology and social/cultural contexts of child abuse

A. Epidemiology

1. Incidence and prevalence
 - a. Know the NCANDS data system and sources of its information
 - b. Know the approximate numbers and distribution frequencies of sexual abuse, physical abuse, and neglect cases reported annually in the US
 - c. Compare various alternative explanations for the changes in reports of child maltreatment
 - d. Compare various alternative explanations for the changes in reports of intimate partner violence
 - e. Know other federal data sources such as the National Incidence Surveys (NIS) and their information sources for child maltreatment and family violence statistics
 - f. Compare and contrast the strengths and weaknesses of administrative and clinical data sources for ascertaining the incidence and prevalence of child abuse and neglect
2. Risk and protective factors
 - a. Child
 1. Understand how various types of disabilities affect risk of child abuse and neglect
 2. Understand the child maltreatment risk to twins and multiples with child abuse and neglect
 3. Understand the association of gender differences in child maltreatment risk
 - b. Caregiver
 1. Understand the influence of caregiver characteristics on child maltreatment risk (eg, single parents, caregiver gender, unrelated caregivers, young parental age, military service, mental illnesses, substance abuse)
 - c. Family
 1. Estimate the role of family poverty as a risk for child maltreatment
 2. Estimate the role of family race and ethnicity as a risk for child maltreatment
 - d. Community
 1. Understand the potential protective effects of social capital on children
 - e. Prevention
 1. Distinguish amongst primary (population), secondary (targeted), and tertiary prevention (treatment)
 2. Compare the strength of the evidence supporting universal versus targeted home visiting in preventing child maltreatment
 3. Understand the components of programs and the strength of the evidence used in shaken baby syndrome prevention programs
 4. Recognize the elements of effective programs designed to prevent child maltreatment

B. Cultural diversity issues

1. Recognize cultural diversity in disciplinary practices
2. Recognize cultural differences in defining child maltreatment

3. Recognize the cultural practices that are abusive and contrary to U.S. and Canadian law, such as scarification and female genital mutilation
 - C. International issues
 1. Recognize the components of the UN Convention on the Rights of the Child
 2. Compare and contrast the reported rates of child abuse and neglect in developing and developed countries
 - D. Medical services, training, recognition and diagnosis
 1. Recognize that a significant proportion of primary care physicians are unable to recognize normal genital structures
 2. Recognize that many physicians are reluctant to report to child protective services when they suspect abuse
 3. Understand practice characteristics of physicians who are more or less likely to report maltreatment
 4. Know the reasons commonly given by physicians for not reporting suspected child maltreatment to the proper authorities
2. **Abusive head trauma**
- A. Unique epidemiologic features
 1. Incidence and prevalence
 - a. Identify current obstacles to accurate estimates of abusive head trauma incidence and prevalence
 - b. Compare the incidence and prevalence of fatal abusive head trauma to other causes of fatal child maltreatment
 - c. Characterize the median age of victims of abusive head trauma most frequently reported in the medical literature
 2. Family risk factors
 - a. Identify family characteristics linked to abusive head trauma in children
 - b. Identify adult characteristics linked to perpetration of abusive head trauma
 - c. Identify child characteristics linked to abusive head trauma victimization
 - d. Identify child behaviors that can trigger adult actions resulting in abusive head trauma
 - B. Neuroanatomy of head and spine
 1. Identify the major structures that comprise the mature and immature human skull
 2. Differentiate between skull fracture(s) and suture(s) on skull radiographs of young children
 3. Identify the major structures that comprise the immature human cervical spine
 4. Characterize the material properties of the tissues that comprise the immature human skull and cervical spine
 5. Identify the tissue layers that cover the human brain
 6. Characterize the structure and functions of the tissue layers that cover the human brain
 7. Identify the major reflections of dura mater that divide intracerebral contents into compartments
 8. Characterize the structural relationships between the superior sagittal sinus, the dura mater and the inner table of the immature human skull
 9. Characterize the interface between cerebral veins and the superior sagittal sinus
 10. Identify the major branches of arterial circulation to the human brain
 11. Identify the major structures that facilitate venous drainage in the human brain

12. Identify the major structures that are involved in the production, circulation, and resorption of cerebrospinal fluid
 13. Identify the major lobes and structures that comprise the human brain
 14. Differentiate between gray and white matter regions of the human brain
 15. Describe the major processes involved in human brain maturation
 16. Explain how the material and anatomic properties of the immature human skull influence its susceptibility to traumatic injury
 17. Explain how the material and anatomic properties of the immature human spine influence its susceptibility to traumatic injury
- C. Biomechanics
1. General biomechanical principles
 - a. Differentiate between primary and secondary traumatic brain injuries in young children
 - b. Differentiate between contact and noncontact mechanisms for primary head injuries in young children
 - c. Recognize specific examples of primary traumatic head and brain injuries in young children that result principally from contact mechanisms of injury, non-contact mechanisms of injury, or both
 - d. Understand the influence of factors in the generation of head and brain injuries in infants and young children, including surface area of head contact, anatomic location of impact site, type of surface contacted, height of the fall, freedom of restriction of head motion, stairway falls, falls from a caregiver's arms, and walker falls
 - e. Understand that the absence of external evidence of impact does not exclude impact of the cranium
 - f. Understand the pathophysiology of secondary traumatic cranial injuries in infants and young children
 - g. Interpret acute clinical presentations to identify the required mechanism(s) of primary injury involving the head
 - h. Interpret cranial imaging studies to identify the required mechanism(s) of primary injury
- D. Presenting signs and symptoms
1. Range of initial symptoms
 - a. Know the spectrum of acute clinical signs linked to primary traumatic head and brain injuries in infants and young children
 - b. Know the spectrum of clinical signs linked to secondary traumatic head and brain injuries in infants and young children
 - c. Understand the clinical presentation of cerebral edema in infants and young children
 - d. Understand the clinical presentation of chronic increased intracranial pressure in infants and young children
 2. Evolution of symptoms
 - a. Know the progression of clinical signs and symptoms resulting from traumatic head and brain injuries in infants and young children
 - b. Understand the pathophysiology of delayed clinical deterioration after pediatric head trauma

3. Missed abusive head trauma
 - a. Understand why abusive head trauma in young children is frequently missed, misdiagnosed, and/or unreported
 - b. Recognize examples of clinical presentations of abusive head trauma that are frequently missed, or misdiagnosed
 - c. Characterize the risk of subsequent abuse in cases of missed, misdiagnosed and/or unreported abusive head trauma
- E. Associated skin, visceral, and skeletal trauma
 1. Characterize the spectrum of associated injuries to other organ systems that have been associated with abusive head trauma in young children
- F. Diagnostic evaluation
 1. General
 - a. Formulate a diagnostic plan to evaluate suspected abusive head trauma in an infant or young child
 - b. Know the indications for requesting an evaluation of a sibling of a child who has been diagnosed with abusive head trauma
 2. History and clinical time line
 - a. Interpret historical information to identify primary and secondary traumatic head injuries
 - b. Evaluate caregiver explanations for a child's clinical presentation of abusive head trauma (eg, inconsistent history or lack of history, inconsistent histories between historians, history of previous injuries in infants, the child's developmental abilities, the child's progression of symptoms over time, and delay in seeking appropriate care for the child's symptoms)
 3. Physical examination
 - a. Know the limitations of neurologic examination as a screening tool for detection of traumatic head injuries during infancy
 - b. Know the essential components of the physical examination in cases of suspected abusive head trauma
 - c. Interpret physician and neurological examination findings in the context of abusive head trauma
 4. Imaging studies
 - a. Types
 1. Computed tomography (CT)
 - a. Characterize the strengths and limitations of CT head imaging as a diagnostic tool in the evaluation of suspected abusive head trauma
 - b. Recognize appropriate diagnostic indications for CT head imaging in cases of suspected abusive head trauma
 2. Magnetic Resonance Imaging (MRI)
 - a. Characterize the strengths and limitations of MRI of the head and spine as a diagnostic tool in the evaluation of suspected abusive head trauma
 - b. Recognize appropriate diagnostic indications for MRI of the head and spine in cases of suspected abusive head trauma
 - c. Identify the specific MRI sequences (eg, T1, T2, gradient echo, diffusion weighted, ADC map, STIR, and others) specific brain and spine injuries seen in abusive head trauma

- d. Identify the use of magnetic resonance angiography (MRA), magnetic resonance venography (MRV) in the evaluation of AHT
- 3. Ultrasonography
 - a. Characterize the strengths and limitations of ultrasonography as a diagnostic tool in the evaluation of suspected abusive head trauma
 - b. Recognize appropriate diagnostic indications for ultrasonography in cases of suspected abusive head trauma
- 4. Skull radiographs
 - a. Characterize the strengths and limitations of skull radiographs as a diagnostic tool in the evaluation of suspected abusive head trauma
 - b. Recognize appropriate diagnostic indications for skull radiographs in cases of suspected abusive head trauma
- 5. Be familiar with the ALARA (As Low As Reasonably Achievable) principle
- b. Interpretation
 - 1. General
 - a. Interpret a child's head, brain, and spine imaging studies to identify primary or secondary traumatic injuries
 - b. Interpret head imaging studies to identify potential mechanism(s) of injury
 - c. Interpret a child's clinical presentation in light of the findings from head imaging studies
 - d. Interpret a caregiver's explanation for a child's traumatic cranial injuries in light of the findings from the child's head imaging studies
 - 2. Timing
 - a. Recognize the limitations of timing of injury based upon CT or MRI appearance of fluid and blood collections in the evaluation of AHT
 - b. Understand the limitations of the use of CT and MR imaging in determining the age of head injuries in infants and young children
 - 3. Evolution of lesions
 - a. Recognize the changes over time in the CT and MRI appearance of soft tissue swelling or scalp injury
 - b. Recognize the changes over time in the CT and MRI appearance of subdural hematoma
 - c. Recognize the changes over time in the CT and MRI appearance of parenchymal injury
 - d. Recognize the changes over time in the CT and MRI appearance of cerebral edema
 - e. Recognize the changes over time in the CT and MRI appearance of hypoxic ischemic injury
 - f. Recognize the changes over time in the CT and MRI appearance of brain atrophy and encephalomalacia
 - c. Compare and contrast expected radiation exposures in head CT, abdominal CT, skeletal survey, chest x-rays and other radiological studies
- 5. Laboratory evaluation
 - a. Serum markers of head trauma
 - 1. Know the limitations of biomarkers in the evaluation of traumatic brain injuries in children

- b. Hematologic findings
 - 1. Interpret the results of coagulation testing in children with traumatic head or brain injuries
 - 2. Formulate an appropriate plan to confirm or exclude preexisting coagulation abnormalities in a child with traumatic head or brain injuries
 - 3. Understand why secondary clotting abnormalities and activated coagulation are frequent complications of head trauma in children
 - 4. Know the treatment of secondary clotting abnormalities and activated coagulation in a child with traumatic head or brain injuries
- 6. CSF findings
 - a. Interpret the results of cerebrospinal fluid (CSF) testing in children with traumatic brain injuries
- G. Specific Head and Brain injuries
 - 1. Interpret the clinical, radiologic, or pathologic findings of subgaleal hematoma to identify the potential mechanism(s) of injury
 - 2. Interpret the clinical, radiologic, or pathologic findings of skull fracture to identify the potential mechanism(s) of injury
 - 3. Interpret the clinical, radiologic, or pathologic findings of epidural hematoma to identify the potential mechanism(s) of injury
 - 4. Interpret the clinical, radiologic, or pathologic findings of subdural hematoma to identify the potential mechanism(s) of injury
 - 5. Interpret the clinical, radiologic, or pathologic findings of subarachnoid hemorrhage to identify the potential mechanism(s) of injury
 - 6. Interpret the clinical, radiologic, or pathologic findings of intraventricular hemorrhage to identify the potential mechanism(s) of injury
 - 7. Interpret the clinical, radiologic, or pathologic findings of parenchymal injury (contusion, shear injury, traumatic axonal injury) to identify the potential mechanism(s) of injury
 - 8. Interpret the clinical, radiologic, or pathologic findings of spine and spinal cord injuries to identify the potential mechanism(s) of injury
 - 9. Interpret the clinical and radiological findings that result from hypoxic ischemic injury of the brain
 - 10. Understand the pathophysiology of diffuse hypoxic ischemic injury
 - 11. Recognize the contribution of hypoxic injury in axonal damage
 - 12. Understand the relationship between primary traumatic injuries in the region of the craniocervical junction and diffuse hypoxic-ischemic encephalopathy
- H. Differential diagnosis of abusive head trauma
 - 1. Know the differential diagnosis and appropriate evaluation for subgaleal hematoma
 - 2. Know the differential diagnosis and appropriate evaluation for skull fracture
 - 3. Know the differential diagnosis and appropriate evaluation for epidural hematoma
 - 4. Know the differential diagnosis and appropriate evaluation for subdural hematoma, acute and chronic
 - 5. Know the differential diagnosis and appropriate evaluation for subarachnoid hemorrhage, including benign expansion of the subarachnoid space
 - 6. Know the differential diagnosis and appropriate evaluation for intraventricular hemorrhage

7. Know the differential diagnosis and appropriate evaluation for parenchymal hemorrhage
 8. Know the differential diagnosis and appropriate evaluation for spine and spinal cord lesions
- I. Accidental trauma
 1. Interpret history, physical examination, radiologic, and laboratory findings in a child with head injuries to differentiate accidental from inflicted etiologies
 - J. Genetic and metabolic diseases
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of genetic or metabolic diseases that can be misinterpreted as abusive head trauma
 - K. Hematologic disorders
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of congenital or acquired hematologic disorders that can be misinterpreted as abusive head trauma
 - L. Congenital malformations
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of clinical malformations that can be misinterpreted as abusive head trauma
 - M. Infectious diseases
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of infectious diseases that can be misinterpreted as abusive head trauma
 - N. Birth trauma
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of birth injuries that can be misinterpreted as abusive head trauma
 2. Know the characteristics of labor and delivery that are associated with an increased risk of subdural hemorrhages resulting from birth
 - O. Autoimmune disorders
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of autoimmune disorders that can be interpreted as abusive head trauma
 - P. Toxins and poisonings
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of toxins and poisons that can be misinterpreted as abusive head trauma
 - Q. Malignancies
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of malignancies that can be misinterpreted as abusive head trauma
 - R. Medical/surgical complications
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of medical or surgical complications that can be misinterpreted as abusive head trauma
 - S. Neurologic diseases
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of neurologic diseases that can be misinterpreted as abusive head trauma
 - T. Gastrointestinal disorders
 1. Recognize the clinical, laboratory, radiologic and/or pathologic features of gastrointestinal disorders that can be misinterpreted as abusive head trauma
 - U. Unique causal hypothesis
 1. Recognize examples and limitations of unproven causal theories for pediatric head injuries
 - V. Intervention and treatment

1. Know the conventional therapies for primary and secondary traumatic head and brain injuries in children
2. Know the indications for rehabilitation in the treatment of head trauma

W. Rebleeding of preexisting subdural hematomas

1. Recognize the clinical, laboratory, radiologic and/or pathologic features of rebleeding into a preexisting subdural hematoma that can be misinterpreted as repetitive, abusive head trauma
2. Understand the pathophysiologic processes that can transform an acute, post-traumatic, subdural hematoma into a chronic subdural hematoma
3. Formulate a differential diagnosis for abnormal extra-axial collections of mixed density on cranial computed tomography and magnetic resonance imaging

X. Outcomes

1. Recognize risk factors linked to poor neurodevelopmental and functional outcomes from traumatic head injury
2. Understand the strengths and limitations of current outcome studies regarding abusive head trauma
3. Understand the spectrum of long-term deficits linked to abusive head trauma
4. Formulate an appropriate diagnostic referral plan to evaluate a victim of abusive head trauma for short and long-term deficits
5. Understand the need to screen for panhypopituitarism in victims of abusive head trauma

3. **Cutaneous**

A. Unique epidemiological features

1. Incidence and prevalence
 - a. Know the relative frequency of bruising as a manifestation of abusive injury compared to other types of injury
 - b. Know the risk factors associated with inflicted bruising in children

B. Cutaneous pathophysiology

1. Understand the pathophysiology of bruising
2. Compare the essential differences between the skin of adults and the skin of children
3. Know the medical conditions or causes that may deter or delay cutaneous healing
4. Understand the mechanisms of various skin injuries

C. Bruises

1. Mechanisms
 - a. Understand how the location of a bruise may affect the appearance and presentation of the bruise
 - b. Recognize injuries caused by hands
 - c. Recognize injuries caused by inflexible objects
 - d. Recognize injuries caused by flexible objects
 - e. Recognize injuries caused by patterned objects
 - f. Recognize injuries caused by striking of the buttocks
2. Appearance
 - a. Know the limitations of dating bruises by their appearance
 - b. Know the normal progression of bruise resolution and factors that may influence the process
 - c. Know the spectrum of bruise appearance, including variations by site and severity

3. Diagnostic evaluations
 - a. General
 1. Interpret history, physical examination, radiologic, and/or laboratory findings in a child with bruising to differentiate accidental from inflicted etiologies and other medical causes
 - b. History
 1. Use essential components of past medical history when evaluating children with bruising
 2. Know the significance of a child's development when differentiating accidental from inflicted bruises.
 3. Interpret a report of a child's easy bruising in the context of the family medical history
 - c. Physical examination
 1. Recognize the significance of bruises to specific locations of the body
 - d. Laboratory evaluation
 1. Formulate an appropriate plan to confirm or exclude coagulation abnormalities in a child with bruising
 2. Interpret the laboratory tests in a child with unexplained bruising
 3. Understand the indications for additional laboratory studies such as assessment for myoglobinuria, creatinine kinase, LFTs and others in the evaluation of suspicious bruising
 - e. Radiographic evaluation
 1. Characterize the strengths and limitations of different imaging modalities as diagnostic tools in the evaluation of a child with bruising due to suspected abuse
 2. Formulate an appropriate plan for radiographic evaluation of a child with suspicious bruising
 4. Differential diagnosis
 - a. Recognize the medical diseases and other conditions that can be confused with inflicted bruises (eg. infection; systemic inflammatory diseases; inherited and acquired bleeding disorders; allergic and contact dermatitis; drug reactions; self-inflicted injury; factitious bruising; birthmarks, nevi, and hemangiomas; striae of rapid growth)
 5. Photographic documentation
 - a. Know the requirements for good photo documentation of skin findings
 - b. Know the advantages and disadvantages of various photographic technologies in the context of an evaluation of skin findings
- D. Bites
1. Identification
 - a. Recognize human bite marks
 - b. Understand the evolution and healing of bite marks
 - c. Plan the evaluation of a suspected human bite
 - d. Understand the appropriate collection of forensic material when a human bite is identified
 - e. Know the method to photograph a human bite
 2. Differential diagnosis

- a. Differentiate bites from other skin conditions
- b. Know how to distinguish between adult and child bites
- c. Differentiate a human bite from an animal bite
- 3. Treatment
 - a. Describe the indications for medical treatment of a human bite
- E. Burns
 - 1. Age at presentation
 - a. Know the developmental and behavioral factors that place a child at risk for sustaining abusive burns
 - b. Understand the epidemiology of abusive burns compared to accidental burns
 - 2. Mechanisms of injury
 - a. General
 - 1. Know how time of exposure, temperature of exposure, type of exposure, thickness of skin in the affected area, and vascularity of the affected area determine the severity of a burn
 - 2. Distinguish between the clinical presentation of thermal, chemical, radiant and electrical burns
 - b. Thermal
 - 1. Liquid
 - a. Recognize burn characteristics that differentiate accidental from inflicted immersion burns
 - b. Recognize common immersion burn distributions
 - c. Recognize the skin sparing patterns of immersion burns
 - d. Differentiate between burns caused by viscous and non-viscous liquids
 - 2. Contact
 - a. Recognize burn characteristics that differentiate accidental from inflicted contact burns
 - b. Recognize burns caused by contact with a hot object
 - c. Radiant
 - 1. Recognize sunburn
 - 2. Know the effects of microwave burns
 - d. Chemical
 - 1. Recognize burns from caustic substances
 - e. Electrical
 - 1. Know the injuries caused by electrical energy
 - 2. Recognize burns from electrical burns
 - 3. Signs and symptoms
 - a. Characterize the range of behavioral and pain responses of children to burns
 - b. Differentiate the examination findings of burns of various depths and ages
 - c. Recognize adverse outcomes due to neglectful care of burns
 - 4. Diagnostic evaluation
 - a. General
 - 1. Interpret history, physical examination, radiologic, and/or laboratory findings in a child with burns to differentiate accidental from inflicted etiologies
 - b. Physical examination
 - 1. Estimate the total body surface area of a burn for children of different ages

- c. Scene investigation
 - 1. Know the elements of the scene investigation for a household burn
- d. Water temperature
 - 1. Know the association between different water temperatures and length of time needed to burn skin
- e. Laboratory/radiographic findings
 - 1. Plan the laboratory/radiographic evaluation of a burn victim
- 5. Differential diagnosis
 - a. Recognize the medical diseases and other conditions that can be confused with inflicted burns (eg, cultural practices, infections, drug reactions, systemic disease, dermatitis, insect bites, cold injury, fat necrosis)
- 6. Intervention, protection, treatment of burns
 - a. Know the indications for hospitalization of children with burns
 - b. Know the appropriate medical management of minor burns
- 7. Outcomes
 - a. Know the features of burns associated with poor outcome
- F. Other skin trauma
 - 1. Recognize the clinical and pathophysiological features of lacerations, abrasions, and incisions, as well as injuries to the nail
- 4. **Musculoskeletal injuries**
 - A. Epidemiology
 - 1. Know the risk factors for abusive fractures in children
 - 2. Know the fracture types that are considered highly specific, moderately specific or non-specific for child abuse
 - B. Long bone skeletal development and injuries
 - 1. Bone development
 - a. Understand the process of bone growth from fetal through childhood
 - b. Recognize how fetal development affects postnatal bone health
 - c. Understand the differences in characteristics of the periosteum of infant bone and mature bone
 - d. Know the difference between cortical bone and trabecular bone
 - e. Know the difference between endochondral and membranous bones
 - 2. Anatomy of long bones
 - a. Know the anatomic parts of long bones including the epiphysis, metaphysis, and diaphysis of the developing bone
 - b. Explain the descriptive elements that define fracture morphology, including the name of the affected bone, the location of bone failure, the line of fracture propagation, and fracture segment relationships
 - C. Biomechanics of long bone injuries
 - 1. Know the definitions of force, moment, load, yield point (elastic limit), ultimate failure point, dynamic load, and static load
 - 2. Understand the differences between various types of bone loading, including compression, bending (shear), distraction (tensile), torque, and combined loading
 - 3. Know the types of biomechanical loading that produce torus or buckle fractures, transverse fractures, spiral fractures, oblique fractures, and metaphyseal fractures of the long bone

4. Know the physical properties of infant and toddler long bones that make them vulnerable to injury
 5. Know that immature long bones fail first in compression and later in tension when subjected to two-point bending
 6. Understand how the failure of bone (fracture) depends on the rate of mechanical loading
 7. Understand how the amount of mechanical stress created by a force is related to the size of the area over which the force is spread
 8. Know the types of long bone fractures usually associated with high-energy events, such as comminuted fractures, transverse fractures, displaced fractures, and femoral neck fractures
 9. Define the differences in biomechanical characteristics and location of trabecular and cortical bone
 10. Understand the differences of elasticity and stiffness in the long bones of children and adults
 11. Describe the fall characteristics that should be considered when analyzing the probability of specific fracture(s) attributed to a fall
- D. Diagnostic evaluation of musculoskeletal injuries
1. Know the essential elements of the patient's history and physical examination when evaluating a suspicious childhood fracture
 2. Understand the advantages and disadvantages of the various radiologic modalities in the evaluation of skeletal injuries
 3. Know the indications for skeletal surveys in cases of suspected abuse
 4. Understand the value of repeating the skeletal survey after an initial skeletal survey in cases of suspected physical abuse
 5. Interpret history, physical examination, radiologic, and laboratory findings in a child with one or more fractures to differentiate accidental from abusive etiologies
 6. Know the benefits and limitations of various laboratory tests that may be utilized in the evaluation of a child with a suspicious fracture(s)
 7. Know the common signs and symptoms of children who present with fractures
- E. Appendicular skeletal injuries
1. Subperiosteal elevation and periosteal new bone formation
 - a. Describe the location and morphology of subperiosteal elevation and periosteal new bone formation
 - b. Describe the characteristics of infant bones that make them vulnerable to subperiosteal elevation and periosteal new bone formation
 - c. Describe the evolution of the acute periosteal elevation to periosteal new bone formation to remodeling
 - d. Know the types of mechanisms that lead to periosteal elevation and periosteal new bone formation
 - e. Describe the radiologic characteristics that differentiate periosteal new bone formation from physiological periosteal elevation
 2. Classic metaphyseal lesions
 - a. Define the fracture location, morphology and histology of the classic metaphyseal lesion of the long bone
 - b. Understand the types of mechanisms that can result in classic metaphyseal lesions

- c. Recognize classic metaphyseal lesion on a radiograph
- d. Recognize that normal metaphyseal variants and disease mimics can be confused with classical metaphyseal lesions
- 3. Spiral fractures
 - a. Understand the fracture morphology and radiographic appearance of a spiral fracture
 - b. Understand the type of injury events that can result in a spiral fracture of a long bone
- 4. Oblique fractures
 - a. Understand the fracture morphology and radiographic appearance of an oblique fracture
 - b. Understand the type of injury events that can result in an oblique fracture
 - c. Assess and recognize a "toddler's fracture"
- 5. Transverse fractures
 - a. Understand the fracture morphology and radiographic appearance of a transverse fracture
 - b. Understand the type of injury events that result in a transverse fracture
- 6. Torus (buckle) fractures
 - a. Understand the fracture morphology and radiographic appearance of a torus fracture
 - b. Understand the type of injury events that result in a torus fracture
 - c. Know the most likely location of a torus fracture resulting from axial loading on the long bone
- 7. Growth plate fractures
 - a. Know the Salter-Harris classifications for growth plate fractures
- 8. Greenstick fractures
 - a. Understand the fracture morphology and radiographic appearance of a greenstick fracture
- F. Axial skeleton
 - 1. Bone development and anatomy
 - a. Know the anatomy and development of ribs, spine, scapula, sternum, pelvis and clavicle
 - 2. Biomechanical considerations
 - a. Interpret the relationship between compression of the rib cage and the development of posterior and lateral rib fractures
 - b. Understand the differences in the material properties of infant ribs compared to adult ribs
 - c. Understand the biomechanical loading of the spine that results in compression fractures of the vertebral bodies
 - d. Understand the types of biomechanical loading that result in fractures of the clavicle, acromion process and pelvis
 - 3. Specific fractures
 - a. Rib fractures
 - 1. Recognize the appearance of acute and healing rib fractures on radiographs
 - 2. Understand that acute rib fractures in a young child may not be visible on initial radiographs

3. Describe the range of signs and symptoms of rib fractures in infants and children, including pain, respiratory distress, flail chest and the radiographic findings of hemothorax, pneumothorax, and chylothorax
 4. Explain the relationship between rib fractures and resuscitation techniques in infants
- b. Spine fractures and ligamentous spinal injuries
 1. Recognize the appearance of injuries to the spine on imaging
 2. Understand the role of hyperextension and hyperflexion in the development of compression fractures of the infant spine
 3. Understand spinal cord injury without radiographic abnormality (SCIWORA) in children
 4. Recognize the signs and symptoms of spinal cord injury
 - c. Skull fractures
 1. Recognize skull fractures on radiographs and CT scans
 2. Know the types of injury events that cause linear, diastatic, depressed, basilar, multiple, and complex skull fractures
 3. Describe the signs and symptoms of skull fractures in children
 4. Understand the pathophysiology of leptomeningeal cysts and growing skull fractures in infants and young children
 - d. Other fractures
 1. Recognize fractures of the sternum, clavicle, acromion, scapula, hands, feet and pelvis on radiographs
 2. Recognize acromion pseudoepiphyses and normal variants of acromion ossification that can be confused with fractures
- G. Healing and dating of fractures
1. Understand the healing process that occurs after long bone shaft fractures and rib fractures
 2. Understand the healing process that occurs after metaphyseal fractures of the long bones
 3. Understand the changes in the radiographic appearance of fractures as healing progresses, including changes in soft tissue, periosteum, fracture lines, and callus formation
 4. Understand that the limitations in estimating age of fractures based on their radiographic appearance
 5. Recognize the factors that affect the rate of healing of fractures including child's age, repeated injury, lack of immobilization, underlying bone diseases and systemic diseases
- H. Differential diagnosis of inflicted fractures
1. Nutritional deficiencies
 - a. Understand the role of Vitamins D, C, and K in the growth and development of bones
 - b. Understand the role of calcium, phosphorus, zinc, copper, manganese, and fluoride in the development of bones
 - c. Recognize the signs and symptoms of vitamin and mineral deficiencies in children and infants

- d. Understand the risk factors for vitamin and mineral deficiency diseases in children and infants
- e. Recognize the radiographic appearance of common vitamin and mineral deficiencies in children
2. Hormonal diseases
 - a. Understand the effects of growth hormone, parathyroid hormone, calcitonin, thyroid hormone, insulin, estrogen, and testosterone on bone growth and development
 - b. Recognize the signs and symptoms of diseases caused by excess or deficient hormones that influence bone development
3. Renal and other systemic diseases
 - a. Understand the effect of chronic kidney disease on bone metabolism
 - b. Recognize the effects of Fanconi syndrome, hypophosphatasia, hyperparathyroidism, and renal tubular acidosis on bone metabolism and bone health
4. Infectious diseases
 - a. Recognize the signs, symptoms, and radiographic features of congenital syphilis
 - b. Recognize the signs, symptoms, and radiographic features of osteomyelitis in children
5. Neoplasms
 - a. Recognize that neoplastic diseases and cancer treatment can predispose to pathological fractures in children
6. Medications
 - a. Understand that some medications, including chemotherapeutic agents and anti-epileptic agents, interfere with bone metabolism leading to subperiosteal new bone formation and increased fracture risk
 - b. Know that hypervitaminosis A can cause subperiosteal elevation and subperiosteal new bone formation
7. Skeletal dysplasias
 - a. Recognize the clinical and radiologic features of skeletal dysplasias (including osteodysplasias, chondrodysplasias, and dysostoses) that might be confused with child abuse
8. Infantile cortical hyperostosis (Caffey disease)
 - a. Recognize the signs and symptoms of infantile cortical hyperostosis
 - b. Recognize infantile cortical hyperostosis on radiographs
9. Birth trauma
 - a. Know obstetrical factors and perinatal events associated with birth fractures
 - b. Know the most common fractures occurring during the birth process
10. Prematurity
 - a. Understand the clinical factors associated with osteopenia of prematurity
 - b. Understand the process of accretion of calcium and phosphorus during fetal life
11. Osteogenesis imperfecta
 - a. Understand the biological process of production of collagen in human cells
 - b. Understand the genetics of osteogenesis imperfecta, including the variation of disease presentation associated with various gene mutations

- c. Know the major clinical phenotypical categories of osteogenesis imperfecta (Types I-VIII)
 - d. Recognize the range of presenting signs and symptoms in osteogenesis imperfecta
 - e. Know the sensitivity and specificity of available tests used for the laboratory diagnosis of osteogenesis imperfecta
 - f. Recognize indications and appropriate laboratory testing to diagnose or rule out osteogenesis imperfecta
- 12. Immobility and neuromuscular diseases
 - a. Recognize that immobility and neuromuscular diseases can lead to bone demineralization and increased fracturability
- I. Muscle and soft tissue injuries
 - 1. Compartment syndromes
 - a. Understand that ischemic contractures and muscle injury can result from impaired circulation to muscles and soft tissue
 - b. Recognize the signs and symptoms of compartment syndromes
 - 2. Myoglobinuria
 - a. Understand the pathophysiology of myoglobinuria resulting from extensive muscle trauma and its effect on kidney function
 - b. Formulate a plan to confirm or exclude myoglobinuria secondary to muscle trauma
 - c. Recognize the possibility of severe anemia occurring in battered children secondary to blood loss into injured muscles and soft tissue
- 5. **Visceral injury**
 - A. Epidemiology
 - 1. Incidence and prevalence
 - a. Know the incidence of abusive visceral injury in infants, children, and adolescents
 - 2. Risk factors
 - a. Identify age-specific characteristics and other risk factors for occult visceral injury from child abuse
 - b. Describe the anatomic characteristics that make children vulnerable to intraabdominal injury
 - B. Presenting signs and symptoms
 - 1. Range of initial symptoms
 - a. Recognize the range of initial symptoms among children and infants with visceral injury
 - 2. Evolution of symptoms
 - a. Understand challenges in determination of the possible time interval from injury to clinical signs in various visceral injuries
 - b. Recognize the range and progression of symptoms among children and infants with various types and severities of visceral injuries
 - 3. Occult trauma
 - a. Screening indications
 - 1. Know the indications for occult visceral injury screening
 - 2. Know the test characteristics (sensitivity, specificity, predictive values) of serologic markers for occult visceral injury screening
 - C. Diagnostic evaluation
 - 1. History and clinical events

- a. Recognize the mechanisms that cause accidental and abusive visceral injuries
- b. Compare the types of visceral injuries seen in accidental and abusive injury
2. Physical examination
 - a. Describe the range of physical examination findings in a child with visceral injury
3. Laboratory evaluation
 - a. Plan the laboratory studies to screen for occult visceral injury
4. Imaging studies
 - a. General
 1. Know the imaging studies used to evaluate for visceral injury in an abused child
 - b. Plain films
 1. Know the sensitivity of plain films in the diagnosis of visceral organ injury
 2. Recognize pneumoperitoneum, pulmonary contusion, pneumothorax, pneumomediastinum on plain films
 - c. CT/MRI
 1. Recognize liver, splenic, renal, and pancreatic injury on CT/MRI scan
 2. Recognize additional CT/MRI findings that may indicate visceral injury
 - d. Ultrasound
 1. Know the indications for ordering an ultrasound in the identification of abdominal trauma
 - e. Diagnostic evaluation
 1. Plan the forensic evaluation of visceral injuries that may be caused by abuse
 2. Recognize that children with significant visceral injuries may have additional injuries (ie head) that need evaluation
5. Pathological findings
 - a. Hollow organ injury
 1. Describe the clinical course of hollow organ injury
 - b. Solid organ injury
 1. Understand the clinical course of solid organ injury based upon type, location, and severity of injury
 - c. Pancreatic injury
 1. Recognize the causes and clinical presentation of traumatic injury to the pancreas
 2. Understand the pathogenesis and evolution of pancreatic pseudocyst
 - d. Cardiac injury
 1. Recognize the clinical presentation of traumatic injury to the heart
 2. Know the use and limitations of serologic tests for cardiac injury (I troponin, CK, cardiac enzymes)
 - e. Pulmonary injury
 1. Recognize the clinical presentation of traumatic injury to the lung
6. Differential diagnosis
 - a. Sexual assault
 1. Recognize visceral injuries that may be caused by sexual assault
 2. Plan the forensic evaluation of visceral injuries that may be caused by sexual assault
 - b. Mimics
 1. Recognize other medical conditions that may be confused with visceral trauma

7. Treatment
 - a. Identify appropriate treatment plans for a child with visceral trauma
8. Outcome
 - a. Understand the relationship between timely diagnosis and outcome in the child with visceral trauma
 - b. Recognize that the outcome in the child with visceral trauma may be impacted by other injuries (i.e. neurologic)
6. **Ear, nose, throat, neck, mouth, and face injuries**
 - A. Evaluating injuries to the ear, nose, throat, neck, mouth, and face
 1. Know the elements of the patient's history that should be obtained when evaluating a suspicious injury to the ear, nose, throat, neck, mouth, or face
 2. Know the elements of a complete physical examination that should be documented when evaluating a suspicious injury to the ear, nose, throat, mouth, or face
 3. Interpret history, physical examination, radiologic, and laboratory findings in a child with injury to the ear, nose, throat, neck, mouth, or face to differentiate accidental from inflicted etiologies
 4. Recognize the frequency of abusive injuries to the head, neck, face, mouth and ears
 - B. Area-specific injuries
 1. Ear
 - a. Know the external anatomy of the ear, including detailed anatomic descriptors of landmarks
 - b. Understand that injuries to the ear raise the suspicion of an abusive injury
 - c. Recognize the association of ear injuries and abusive head trauma
 - d. Know the appearance of inflicted bruises on the ear
 - e. Understand the pathophysiology of "cauliflower ear" and its relationship to auricular hematomas
 - f. Recognize the Battle sign as a sign of a basilar skull fracture
 2. External acoustic meatus and the tympanic membrane
 - a. Know the anatomy of the acoustic meatus and the tympanic membrane
 - b. Recognize mechanisms of injury to the tympanic membrane
 - c. Diagnose cerebral spinal fluid otorrhea
 3. The midface
 - a. Know the anatomy of the midface to include the upper lip, maxilla, and nose
 - b. Recognize acute trauma and sequelae of trauma affecting the midfacial structures in children
 - c. Understand that post-traumatic septal hematomas and abscesses can lead to destruction of the nasal cartilage
 - d. Recognize blood from the nose after an acute life-threatening event as a possible sign of suffocation
 - e. Diagnose and understand the implications of cerebrospinal fluid rhinorrhea
 4. Mouth and pharynx
 - a. Know the anatomy of the mouth, teeth, tongue, and pharynx
 - b. Recognize trauma to the labial and lingual frenula, buccal mucosa, lips, alveolar gingival margin, and tongue
 - c. Understand the various mechanisms that can cause injury to the labial and lingual frenula, buccal mucosa, alveolar gingival margin, and tongue

- d. Distinguish between tooth concussion, subluxation, luxation, intrusion, and avulsion
 - e. Understand the potential effects of tooth and jaw trauma on the development of the immature mouth and dentition
 - f. Recognize the lesions on the lips and mouth that can be caused by gags to the mouth
 - g. Understand the association of posterior pharyngeal trauma to retropharyngeal abscess
 - h. Know the signs and symptoms of purposeful or accidental obstruction of the airway leading to suffocation
 - i. Recognize dental caries on physical examination of children
 - j. Know the definition of early childhood caries and their causes
 - k. Know the American Academy of Pediatric Dentistry/American Academy of Pediatrics' definition of dental neglect
5. Lower jaw
- a. Understand the types of trauma that cause mandibular fractures
 - b. Know the most useful imaging methods when assessing possible mandibular fractures in infants and young children
6. Neck
- a. Know the anatomy of the major internal and external structures in the neck
 - b. Know the mechanisms of strangulation injury
 - c. Know the signs and symptoms that can result from strangulation
 - d. Know the indications for the diagnostic tests and procedures after a suspected strangulation injury
 - e. Know the signs and symptoms that can result from blunt injuries to the neck
 - f. Know the indications for diagnostic tests and procedures after blunt injury to the neck, including x-ray studies of the neck and/or chest, CT, or MRI of the neck structures, magnetic resonance angiography, and laryngoscopy
 - g. Recognize the causes and appearance of subcutaneous emphysema in the neck and thoracic outlet
 - h. Know the differential diagnosis of subcutaneous emphysema of the face, neck, and chest
7. **Ophthalmologic findings and eye injuries**
- A. Anatomy
- 1. Know the anatomy of the orbit, globe, and adnexal structures
 - 2. Know the general anatomy of the retina and the retinal vessels in superficial layers of the retina
- B. Orbital Injuries
- 1. Presenting signs and symptoms
 - a. Recognize the presenting signs of non-globe eye injuries
 - b. Know the most common serious external eye injuries are eyelid contusions and lacerations
 - c. Know that trauma forces severe enough to cause a "black eye" (periocular ecchymosis and edema) may be severe enough to also cause intraocular trauma
 - d. Recognize frontal head trauma as a cause of periorbital ecchymosis

- e. Know that the most common orbital fractures involve the floor and medial wall of the orbit
- 2. Imaging findings
 - a. Identify the most appropriate radiologic imaging method for diagnosing orbital fractures
- 3. Diagnosis
 - a. Recognize that blunt cranial trauma may result in cranial nerve paresis
 - b. Interpret orbital injuries caused by inflicted trauma
 - c. Know the differential diagnosis of orbital bruising and swelling in children
 - d. Know the mechanisms and pathophysiology of subconjunctival hemorrhages
- C. Injuries to the globe
 - 1. Know that acute avulsion of the vitreous base from its retinal attachment is associated with trauma
 - 2. Recognize trauma as a cause of optic nerve atrophy
 - 3. Recognize signs and symptoms of globe injury associated with blunt head trauma
 - 4. Recognize traumatic hyphema
 - 5. Know the treatment of a corneal abrasion or laceration
 - 6. Recognize that a cataract can be a consequence of trauma to the globe
- D. Retinal and vitreous hemorrhages
 - 1. Epidemiology
 - a. Know that retinal hemorrhages associated with abusive head trauma may be unilateral or bilateral
 - b. Know that retinal hemorrhages associated with abusive head trauma may vary in size and in distribution between the two eyes
 - c. Recognize the features of retinal hemorrhages that indicate abusive head trauma as the most likely etiology of the eye pathology
 - d. Know the differential diagnosis of retinal hemorrhages in children
 - e. Recognize the specific features of the retinal findings that have been associated with birth
 - 2. Mechanisms of injury
 - a. Know the factors that contribute to the development of retinal hemorrhage, retinal schisis, and vitreous hemorrhage in abusive head trauma
 - b. Know the pathophysiology of Terson syndrome and its epidemiology in infants and children
 - c. Know the pathophysiology of Purtscher retinopathy and its epidemiology in infants and children
 - 3. Morphology and distribution of retinal hemorrhages
 - a. General
 - 1. Know how to identify the location of hemorrhages within the retina and/or vitreous
 - 2. Know the location within the retina of dot, blot, and flame hemorrhages
 - b. Distribution
 - 1. Recognize the significance of retinal hemorrhages that extend to the ora serrata
 - 2. Understand the significance of retinal hemorrhages confined to the posterior pole
 - c. Quantity and size

1. Know that retinal hemorrhage quantity and size alone cannot determine the likelihood of abusive head trauma
4. Diagnostic evaluation
 - a. Know the limits of direct ophthalmoscopy in the diagnosis of retinal and vitreous hemorrhages
 - b. Recognize the value of a dilated retinal examination in the diagnosis of retinal and vitreous hemorrhages
 - c. Know the advantages of indirect ophthalmoscopy in the diagnosis of retinal and vitreous hemorrhages
 - d. Know the indications for obtaining an ophthalmology consultation in child maltreatment
 - e. Interpret documentation describing ophthalmologic findings.
5. Outcomes
 - a. Understand the long-term consequences of retinal injuries of varying severity
 - b. Know that cortical injury is a more common cause of blindness than are retinal hemorrhages
- E. Optic nerve injuries
 1. Mechanisms of injury
 - a. Understand mechanisms of injury to the optic nerve
 2. Pathology
 - a. Recognize the gross pathology of optic nerve sheath hemorrhages
 - b. Know the most useful method for autopsy examination of the eye and associated structures
- F. Central nervous system visual injury
 1. Recognize that soft tissue swelling and orbital hematoma as causes of limited ocular motility can be confused with CNS injury
 2. Recognize poor eye abduction and diplopia may be signs of increased intracranial pressure
 3. Recognize the difficulties of ophthalmologic evaluation in the presence of CNS injury
8. **Sexual abuse**
 - A. Epidemiology and risk factors
 1. General
 - a. Understand the commonly used definitions of child sexual abuse
 - b. Know the overall incidence and prevalence of sexual abuse of children and adolescents
 - c. Know risk factors for sexual abuse by the age and development of the child
 - d. Understand family dynamics that may place a child at risk for sexual abuse
 - e. Describe societal and cultural factors that may place a child at risk for sexual abuse
 2. Cultural factors
 - a. Know that the World Health Organization and US Federal law ban the practice of female genital mutilation
 - b. Recognize the different types of female genital mutilation that may be encountered
 - c. Recognize parts of the world/religious sects that practice female genital mutilation
 - B. Psychosexual development
 1. Know the stages of psychosexual development of children

2. Differentiate between normative sexual behaviors and sexual behavior problems in children
 3. Know the social and behavioral factors (for example sexual abuse, IPV, mental illness, exposure to sexually explicit materials, conduct disorders) that can be associated with sexual behavior problems in children
- C. Psychological aspects of victimization
1. Disclosure process
 - a. Recognize family and social factors that facilitate or discourage a disclosure of sexual abuse
 - b. Recognize family and social factors that may lead to recantation of reported sexual abuse
 - c. Recognize a partial disclosure and the implication for medical assessment
 - d. Know the forensic interview techniques that may assist in expanding on partial disclosures of sexual abuse
 - e. Understand the potential causes for false allegations of sexual abuse
 - f. Recognize features in a disclosure of sexual abuse that affect the credibility of the disclosure
 - g. Understand the importance of safety planning to minimize the risk of recantation of sexual abuse
 2. Outcomes
 - a. Psychological/behavioral outcomes
 1. Know the potential psychological outcomes for victims of sexual abuse
 2. Recognize post-traumatic stress disorder in victims of sexual abuse
 3. Compare psychological outcomes of sexual abuse in boys and girls
 - b. Treatment issues
 1. Understand the role of effective therapy in the prevention of long-term mental health and physical consequences in sexual abuse victims
 2. Know the most effective mental health treatment modalities for victims of sexual abuse
 3. Know the appropriate time frame for initiating therapy in sexual abuse victims
 4. Know that a sexual abuse counselor must have proper qualifications and experience in evidence-based treatment for sexual abuse
- D. Perpetrator characteristics
1. Relationship to victim
 - a. Understand the dynamics and risk factors of intrafamilial and extrafamilial sexual abuse
 2. Gender issues (same sex perpetrators)
 - a. Compare the relative incidence of sexual abuse perpetrated by homosexuals with that perpetrated by heterosexuals
 3. Adolescent issues
 - a. Understand the unique dynamics of sexual abuse/assault within adolescent relationships
 4. Online solicitation
 - a. Understand the dynamics of online solicitation in the perpetration of sexual abuse
 - b. Know the characteristics of victims in online solicitation
 5. Pornography

- a. Discuss the role of pornography and child pornography in the perpetration of sexual abuse
- E. Medical assessment
 - 1. General issues
 - a. Medical diagnosis
 - 1. Describe the medical professional's role in the evaluation of suspected victims of child sexual abuse/assault
 - 2. Understand the strengths and limitations of the medical evaluation of child sexual abuse/assault
 - b. Legal/investigative
 - 1. Understand how the medical evaluation of suspected sexual abuse/assault is utilized by legal and child protection professionals
 - 2. Know how to communicate medical issues effectively to law enforcement/investigative authorities
 - 2. History
 - a. Medical interview
 - 1. Understand how the sexual abuse medical history from the child is different from a forensic interview
 - 2. Know that the sexual abuse medical history may be an exception to the hearsay rule in legal proceedings
 - 3. Understand the reasons for separating parent from child during key portions of the sexual abuse medical history taking
 - 4. Understand the important components of the medical history in the evaluation of a suspected victim of sexual abuse
 - b. Child interview
 - 1. Language development
 - a. Understand why assessing language development is important in evaluating a child's history of sexual abuse
 - 2. Types of questions
 - a. Recognize the difference between leading and non-leading questions in taking a history of sexual abuse
 - b. Recognize examples of open-ended questions in taking a history of suspected abuse from a child or adolescent
 - c. Understand how cognitive development may affect a child's disclosure of abuse
 - d. Recognize interview techniques that are appropriate for different developmental levels in taking a history of suspected abuse from a child or adolescent
 - e. Understand the importance of using a child's terminology in taking a history of suspected abuse
 - f. Understand why questions requiring purely "yes" and "no" answers may be problematic in taking a history of suspected abuse in a child or adolescent
 - g. Recognize examples of appropriate clarifying or follow-up questions in the taking of a history of suspected abuse in a child or adolescent
 - h. Define a narrative response in taking a history of suspected abuse from a child or adolescent

- i. Understand how to elicit a narrative response when taking a history of suspected abuse in a child or adolescent
- 3. Adolescent issues
 - a. Ethics and consent
 - 1. Recognize that adolescents have the right to consent to or refuse medical examinations in cases of suspected sexual abuse/assault
 - 2. Recognize ethical issues that may arise in cases of suspected sexual abuse/assault where an adolescent is unable to give consent (eg, drug testing, sexually transmitted diseases, pregnancy, genital examinations)
 - b. Self-injurious thoughts and behaviors
 - 1. Identify an adolescent at risk for suicide because of sexual abuse/assault
 - 2. Recognize signs of self-injury in an adolescent who has been sexually abused
 - c. Health risky behaviors
 - 1. Evaluate sexually abused adolescents for possible drug abuse
 - 2. Recognize when sexually abused adolescents may be engaged in high risk or criminal activities (eg, prostitution, drug dealing, theft, etc)
 - d. Pregnancy
 - 1. Diagnose pregnancy in adolescent sexual abuse victims
 - 2. Make forensic recommendations regarding products of conception in a terminated pregnancy
 - 3. Make forensic recommendations regarding the paternity/DNA testing of an infant conceived as a result of sexual abuse/assault
 - e. Sexuality and confidentiality
 - 1. Understand legal issues of confidentiality in adolescents, in regard to reproductive health care, sexually transmitted diseases, and pregnancy
- 4. Physical examination
 - a. General
 - 1. Overall evaluation
 - a. Recognize why a complete physical examination is an important part of the medical evaluation of a child for sexual abuse/assault
 - b. Assess a child sexual abuse/assault victim for extragenital injuries
 - 2. Suction hematomas
 - a. Know common sites for suction hematomas found in sexual assault
 - b. Plan the forensic evaluation of a suction hematoma
 - 3. Defensive injuries
 - a. Recognize patterns of defensive injuries in sexual assault
 - 4. Oral injuries
 - a. Know the types of oral injuries that may be encountered in a sexual assault victim
 - 5. Drug-facilitated assault
 - a. Know the clinical presentations and diagnosis of drug and alcohol intoxication in sexual assault victims
 - b. Recognize the features of a drug-facilitated sexual assault
 - c. Know the common drugs used in drug-facilitated sexual assault
 - b. Demeanor/emotional state

1. Understand that the emotional and behavioral response to sexual assault varies among individuals
 - c. Growth and development
 1. Assess sexual maturation stages in a sexual abuse victim
 - d. Assessment for unmet medical needs
 1. General
 - a. Recognize common unmet medical needs of sexual abuse victims
 2. Immunizations (HBV, HPV)
 - a. Know how to assess for pertinent vaccination status in a sexual abuse victim
 - e. Behavior/findings
 1. Assess for symptoms of depression and suicidal ideation in a victim of sexual abuse
5. Written documentation
 - a. Know how to formulate a written assessment in an abuse case
 - b. Interpret photodocumentation in child abuse cases
 - c. Know the importance of reporting a child's history verbatim in a case of abuse
 - d. Know that diagrams and drawings can be made to supplement photographs in suspected abuse cases
6. Photodocumentation
 - a. General
 1. Know the reasons for photodocumentation in a suspected abuse case
 2. Understand the role of photos in quality improvement in suspected abuse cases
 3. Know why peer and expert review of case images is important in suspected abuse cases
 4. Know how injury healing may be followed and documented in suspected child abuse cases
 5. Understand the legal/evidentiary purpose of images in cases of suspected abuse
 - b. Photodocumentation techniques
 1. Know different modalities used for photodocumentation in suspected child abuse cases
 2. Compare still imagery with video imagery in the evaluation of suspected child sexual abuse cases
 - c. Photodocumentation issues
 1. Storage
 - a. Develop appropriate storage protocols for photographs in suspected child abuse cases
 - b. Develop security guidelines for storage and access of digital images in cases of suspected abuse
 2. Technology/understanding equipment
 - a. Understand the technical aspects of imaging (light source, focus, macro) in the evaluation of suspected child abuse
 - b. Interpret the quality of genital images used for case review of child sexual abuse
7. Forensics
 - a. General

1. Demonstrate an understanding of chain of custody in collection of evidence following sexual assault
 2. Plan a forensic evaluation of a victim of acute sexual assault
 - b. Forensic evidence-collection kits, aka "Rape kits"
 1. Demonstrate an understanding of the differences in collection of specimens between adolescents and pre-adolescents in cases of sexual abuse
 2. Know the body fluid analyses performed in forensic laboratories in sexual assault cases
 3. Know the issues regarding timing of evidence collection based on age of child and type of assault
 - c. DNA
 1. Seminal fluid analysis
 - a. Know the components of seminal fluid that are analyzed by a crime lab in a case of sexual abuse
 - b. Know the technique for collecting potential seminal fluid during an examination of a suspected victim of sexual abuse or assault
 2. Saliva
 - a. Know the indications and procedures for swabbing for saliva in cases of child sexual abuse
 - b. Describe the appropriate technique for collecting victim salivary specimens during examination in a case of sexual abuse
 - c. Know what may be analyzed in a salivary specimen gathered during evaluation for sexual abuse
 - d. Drug screening
 1. Interpret the results of urine collection and serum collection for toxicologic analysis in the evaluation of sexual abuse
- F. Special topics
1. Commercial sexual exploitation of children (CSEC)
 - a. Understand that CSEC is a subset of human trafficking
 - b. Evaluate possible victims of CSEC
 - c. Screen for possible CSEC prostitution in adolescents
9. **Genital assessment**
- A. Examination techniques
1. Developmental assessment
 - a. Compare timing of maturation stages for males and females
 - b. Compare timing of breast maturation staging and genital maturation staging in females
 - c. Demonstrate understanding of the hormonal changes responsible for sexual maturation in girls and boys
 2. Techniques related to age/development
 - a. Prepubertal/Adolescent
 1. Know the advantages and disadvantages of various examination techniques (e.g., labial separation, traction, Foley catheter) and positions (e.g., supine lithotomy, supine knee chest, prone knee chest, lateral recumbent) used for the anogenital examination of the prepubertal child

2. Know the advantages and disadvantages of various examination techniques (e.g., labial separation, traction, Foley catheter) and positions (e.g., supine lithotomy, supine knee chest, prone knee chest, lateral recumbent) used for the anogenital examination of the adolescent
3. Understand the use and limitations of toluidine blue dye in the context of a sexual assault examination
4. Know the standard elements of a complete pelvic examination in an adolescent
5. Describe the indications for the use of sedation in the genital examination of children and adolescents

B. Genital findings

1. Genital anatomy

a. Male

1. General
 - a. Identify male genital structures
 - b. Describe a complete male genital examination in both circumcised and uncircumcised males
2. Developmental stages
 - a. Recognize the sexual maturation stages in males
3. Congenital variants
 - a. Diagnose and manage the variants of male genital anatomy (eg, undescended testicle, hydrocele, varicoceles, epispadias and hypospadias, and testicular torsion)
4. Medical findings caused by other conditions
 - a. Develop a differential diagnosis for penile erythema and/or edema

b. Female

1. Developmental stages
 - a. Identify female genital structures in newborn infants, prepubertal, and pubertal patients
 - b. Recognize the effects of maternal estrogens on newborn genital anatomy
2. Congenital variants
 - a. Hymen configurations
 1. Recognize normal variations of hymenal configurations in newborn infants, prepubertal, and postpubertal children (eg, crescentic, circumferential, septate, microperforate)
 - b. Introital, hymenal, and vaginal variations
 1. Recognize variations of the introital, hymenal, and vaginal anatomy (e.g., adhesions, mounds, notches, septate, vascular patterns, intravaginal ridges)
 2. Diagnose and manage genital anomalies, such as imperforate hymen, hymenal septum, vaginal septum, ambiguous genitalia
 3. Know the genital, reproductive, urinary tract, and other organ system anomalies that are associated with congenital vaginal anomalies
3. Trauma
 - a. General
 1. Recognize trauma to the external anogenital structures of males and females

2. Interpret history, physical examination, and/or laboratory findings in a child with genital injury(s) to differentiate accidental from inflicted etiologies
- b. Abusive trauma
 1. Understand the importance of history in distinguishing abusive from accidental injury to the genital area
 2. Understand the legal significance of the term “penetration” within the context of sexual abuse/assault
 3. Recognize and interpret acute and chronic findings to the hymenal tissue resulting from abusive trauma on female genital examination
 4. Recognize that injuries sustained in non-consensual intercourse can be identical to those sustained in consensual intercourse
 5. Recognize and interpret injuries to the male anogenital structures resulting from abusive trauma
- c. Accidental trauma
 1. Recognize and interpret accidental blunt injuries to the anogenital structures
 2. Recognize and interpret accidental penetrating injuries to the anogenital structures
4. Nontraumatic genital pathology
 - a. Evaluation and diagnosis of urogenital bleeding
 1. Evaluate and manage genital bleeding in a prepubertal child
 2. Evaluate and manage genital bleeding from a retained vaginal foreign body in a child
 3. Evaluate and manage bleeding from urinary tract origin in females
 4. Evaluate and manage urethral prolapse
 - b. Infectious
 1. Recognize the presentation, diagnostic approach, and treatment plan for the most common non-venereal bacterial, fungal, parasitic, and viral anogenital infections
 2. Evaluate and manage a child with genital secretions or discharge
 3. Evaluate and manage a child with ulcerative or vesicular genital lesions
 4. Evaluate and manage a child with papular or nodular genital lesions
 5. Evaluate and manage a child with molluscum contagiosum
 - c. Inflammatory/autoimmune
 1. Evaluate and manage autoimmune or inflammatory conditions that result in anogenital findings
 2. Evaluate and manage lichen sclerosus et atrophicus in male and female children
 - d. Cutaneous/dermatologic
 1. Evaluate and manage dermatitis of the anogenital area that includes contact and allergic causes, such as seborrhea, psoriasis, and eczema
 - e. Neoplastic
 1. Recognize neoplastic diseases of the anogenital area in the pediatric age group
 - f. Hematologic

1. Recognize and evaluate systemic hematologic disorders that may present as genital bleeding
- g. Gastrointestinal
 1. Evaluate and manage bleeding from the gastrointestinal tract in a child
5. Endocrine
 - a. Recognize and evaluate a child for isosexual precocious puberty
 - b. Understand the clinical presentation of isolated premenarchal menstruation
 - c. Evaluate and manage endocrinopathies that may present with vaginal bleeding

10. Anal characteristics

- A. Examination techniques
 1. Know the advantages and limitations of specific anal examination techniques and positions (supine knee chest, prone knee chest, and lateral recumbent)
- B. Normal anatomy
 1. Recognize normal anal anatomy
 2. Know the methods for determining anal tone
 3. Recognize physiologic anal dilatation
- C. Congenital
 1. Recognize the common congenital findings of the anus such as tags, failure of midline fusion, diastasis ani, anal atresia, anterior placed anus
- D. Anal pathology (non-abuse related)
 1. General
 - a. Recognize the physiology and anatomy of venous pooling or congestion
 - b. Recognize that the pectinate line can be confused with anal injury
 2. Pathologic anal dilatation
 - a. Recognize pathologic anal dilatation
 - b. Know that sedatives and anesthetics can cause significant anal dilatation
 - c. Know that neuromuscular and other disorders can be associated with anal dilatation
 - d. Know that anal dilatation can be a post-mortem finding in the absence of sexual abuse
 3. Fissures
 - a. Recognize, evaluate, and manage anal fissures on an anal exam
 4. Anal manifestation of systemic disease
 - a. Crohn disease
 1. Recognize that features of Crohn disease can be mistaken for the sequelae of child sexual abuse
 - b. Rectal prolapse
 1. Know the causes associated with rectal prolapse
 - c. Constipation
 1. Evaluate and manage constipation in a child
 2. Recognize the significance of stool in the anal vault when evaluating anal tone
 3. Understand the role of sexual abuse in the development of encopresis
 - d. Hemorrhoids
 1. Recognize and manage hemorrhoids
- E. Findings related to trauma

1. Interpret history and physical examination findings in a child with anal injuries to differentiate accidental from inflicted etiologies
2. Know that anal injuries typically heal without visible residual findings

11. Sexually transmitted infections (STIs)

A. Indications for testing

1. Clinical

a. Screening

1. Sexually active adolescents

- a. Understand the benefits of universal testing for STIs on adolescents who are sexually active

2. Non-sexually active adolescents and children

- a. Know the current recommendations for STI testing in children or non-sexually active adolescents who might have been sexually abused
- b. Make recommendations for perpetrator testing for STIs based upon a child's clinical presentation

3. Indications for types of tests (culture/NAAT)

- a. Know the indications for and limitations of non-culture techniques such as nucleic acid amplification tests (NAAT) for STIs in adolescents
- b. Know the indications for and limitations of non-culture techniques such as nucleic acid amplification tests (NAAT) for STIs in pre-adolescents
- c. Know the indications for and limitations of cultures for STI testing in adolescents
- d. Know the indications for and limitations of cultures for STI testing in pre-adolescents

2. Forensic

- a. Understand the forensic significance of STIs in sexually active and non-sexually active adolescents
- b. Understand the forensic significance of STIs in pre-adolescents
- c. Know that patients presenting with multiple STIs may be victims of commercial sexual exploitation/human trafficking

B. Neisseria gonorrhoea

1. Epidemiology

- a. Understand the epidemiology of gonorrhoea infections in adolescents and prepubertal children
- b. Know the risk factors for acquisition of *N. gonorrhoeae* in adolescents and prepubertal children

2. Pathogenesis

- a. Compare and contrast the pathogenesis of *N. gonorrhoeae* in adolescents and prepubertal children
- b. Understand the difference in physiology between a child and an adolescent that place an adolescent at risk for ascending infections in *N. gonorrhoeae*

3. Clinical presentation

- a. Know the difficulty in applying information on incubation period to time of acquisition of infection for *N. gonorrhoeae*
- b. Describe the clinical presentation of *N. gonorrhoeae* infections in adolescent females

- c. Recognize that adolescents infected with *N. gonorrhoeae* can be asymptomatic
 - d. Know the clinical presentation of *N. gonorrhoeae* infections in prepubertal girls
 - e. Know the clinical presentation of *N. gonorrhoeae* infections in adolescent and prepubertal males
 - f. Recognize that children are often symptomatic with *N. gonorrhoeae* but can be asymptomatic in certain circumstances
 - g. Know the possible medical complications and outcomes of untreated *N. gonorrhoeae* in males and females
 - h. Recognize the signs and symptoms of disseminated disease due to *N. gonorrhoeae*
 - i. Develop an evaluation plan to test for *N. gonorrhoeae* infections based on timing of sexual assault(s), type of sexual contact, and patient age and gender
4. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC recommended diagnostic procedures for the isolation of *N. gonorrhoeae* in children
 - b. Describe the confirmation tests recommended to confirm a presumptive diagnosis of *N. gonorrhoeae* infection
 5. Treatment
 - a. Know recommended treatment options for children and adolescents diagnosed with *N. gonorrhoeae*
 - b. Know the public health and reporting requirements for a child and/or adolescent with *N. gonorrhoeae*
 - c. Know the indications and recommended regimen for post-assault prophylaxis of *N. gonorrhoeae* in children and adolescents
 6. Forensic interpretation
 - a. Interpret the forensic significance of a positive nucleic acid amplification test (NAAT) for *N. gonorrhoeae* in a child sexual abuse case for sexually active adolescents, pre-pubertal patients, and post-pubertal patients who have not otherwise been sexually active
 - b. Recognize other species of *Neisseria* that are not sexually transmitted
- C. *Chlamydia trachomatis*
1. Epidemiology
 - a. Understand the epidemiology of genital chlamydia infections in adolescents and prepubertal children
 - b. Know the risk factors for acquisition of chlamydia infections in adolescents and prepubertal children
 2. Pathogenesis
 - a. Describe the pathogenesis of chlamydia infections in adolescents and prepubertal children
 3. Clinical presentation
 - a. Describe the clinical presentation of chlamydia in adolescents and prepubertal children by site of infection
 - b. Know the difficulty in applying information on the incubation period to time of acquisition for anogenital chlamydia infections
 - c. List the sequelae of untreated chlamydia infections in adolescents and adults
 4. Diagnostic techniques

- a. Know the indications for testing for chlamydia infections in sexually abused children and adolescents
 - b. Demonstrate knowledge of current CDC recommended diagnostic procedures for the isolation of *C. trachomatis* in children and adolescents
 - c. Know which anatomic sites in males, females, children, and adolescents to test for *C. trachomatis* infections
5. Treatment
- a. Know recommended treatment options for children and adolescents diagnosed with chlamydia infections
 - b. Know the public health and reporting requirements for a child and/or adolescent with *C. trachomatis*
 - c. Know the indications and recommended regimen for post-assault prophylaxis of *C. trachomatis* in children and adolescents
6. Forensic interpretation
- a. Interpret the forensic significance of a positive test result for *C. trachomatis* in a child or adolescent based upon age, likely mode of transmission, and type of test used for diagnosis
 - b. Recognize that other chlamydia species may be confused with *C. trachomatis*
- D. *Treponema pallidum* (syphilis)
1. Epidemiology
- a. Know the risk factors for acquisition of *T. pallidum* in newborns, children, and adolescents
2. Pathogenesis
- a. Know the pathogenesis of *T. pallidum* infections
3. Clinical presentation
- a. Describe the clinical presentation and incubation periods for primary, secondary, and tertiary syphilis
 - b. Differentiate acquired from congenital syphilis
 - c. Know the clinical presentation of congenital syphilis
4. Diagnostic techniques
- a. Demonstrate knowledge of current CDC recommended diagnostic procedures for the isolation of *T. pallidum*
 - b. Know the difference between non-treponemal and treponemal tests for syphilis
 - c. List non-syphilitic conditions that cause non-treponemal tests to be positive (ie, false-positive test for syphilis)
5. Treatment
- a. Know recommended treatment options for children and adolescents diagnosed with syphilis
 - b. Recognize that in a minority of patients, non-treponemal tests will remain positive for life, even when effectively treated
 - c. Know that the majority of patients with positive treponemal tests will remain positive for the rest of their lives
6. Forensic interpretation
- a. Interpret the forensic significance of a positive test result for syphilis in a child or adolescent based upon age, likely mode of transmission, and type of test used for diagnosis

E. Herpes simplex virus (HSV) 1 and 2

1. Epidemiology
 - a. Know the risk factors for acquisition of HSV in newborns, children and adolescents
 - b. Know that most cases of anogenital herpes infections are acquired from asymptomatic individuals
2. Pathogenesis
 - a. Understand the pathogenesis of HSV 1 and 2
3. Clinical presentation
 - a. Describe the clinical presentation of HSV infections in prepubertal children and adolescents
 - b. Compare and contrast the clinical presentation of primary and recurrent HSV 1 and HSV 2
4. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC recommended diagnostic procedures for the isolation of HSV
 - b. Interpret a positive laboratory result (culture, PCR, type-specific serology) for HSV types 1 and 2
 - c. Know the sensitivity of viral culture for HSV based upon presence and stage of lesions
 - d. Understand that the diagnosis of HSV 1 or HSV 2 based on clinical examination is neither sensitive nor specific
5. Treatment
 - a. Know the recommended treatment options for children and adolescents with primary and recurrent HSV 1 and 2 infections
 - b. Know how to counsel the patient and/or family of someone diagnosed with HSV 1 or 2 infections
6. Forensic interpretation
 - a. Interpret the forensic significance of a positive test for HSV 1 or 2 in a child or adolescent in the context of history, clinical presentation, and clinical course of infection
 - b. Know the limitations of serologic testing of alleged perpetrators for HSV when the victim child has infection from HSV 1 or 2

F. *Trichomonas vaginalis* (TV)

1. Epidemiology
 - a. Know the risk factors for acquiring TV in children and adolescents
2. Pathogenesis
 - a. Know the pathogenesis of TV infections including increased risk for acquisition of infection with HIV
 - b. Know sites commonly infected with TV in adolescents and children
3. Clinical presentation
 - a. Describe the clinical presentation of TV in children and adolescents
4. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC-recommended diagnostic procedures for the isolation of TV in children and adolescents
 - b. Know the organisms that can be mistakenly identified as TV

5. Treatment
 - a. Know recommended treatment options for children and adolescents diagnosed with TV
 - b. Know the indications and recommended regimen for post-assault prophylaxis of TV in children and adolescents
 6. Forensic interpretation
 - a. Interpret the forensic significance of a positive test for TV in a child or an adolescent
 - b. Recognize other species of Trichomonas that are not sexually transmitted
- G. HIV
1. Epidemiology
 - a. Know the risk factors for acquiring HIV in children and adolescents
 - b. Know the perpetrator risk factors for HIV transmission
 2. Pathogenesis
 - a. Understand the current theories of pathogenesis of HIV infections in humans
 3. Clinical presentation
 - a. Describe the clinical presentation of HIV infections in children and adolescents
 4. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC-recommended diagnostic procedures for the isolation of HIV in children and adolescents
 5. Treatment
 - a. Prophylaxis in acute sexual assault
 1. Understand indications for providing post-exposure prophylaxis for HIV following sexual assault
 2. Apply treatment guidelines for post-exposure prophylaxis of non-occupational exposure to HIV
 3. Know the factors that limit compliance in children and adolescents prescribed HIV PEP
 6. Forensic interpretation
 - a. Interpret the forensic significance of HIV infection in children and adolescents
- H. Hepatitis A, Hepatitis B, and Hepatitis C
1. Epidemiology
 - a. Know the risk factors for acquisition of hepatitis A, B, and C viruses in adolescents and prepubertal children
 - b. Know the relative risks of acquiring hepatitis A, B, and C virus from sexual assault in children and adolescents
 2. Pathogenesis
 - a. Know the pathogenesis and primary mode of transmission of acute hepatitis A, B, and C viruses
 3. Clinical presentation
 - a. Know the clinical presentation of hepatitis A, B, and C viruses
 4. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC-recommended diagnostic procedures for the isolation of hepatitis A, B and C in children and adolescents
 5. Treatment
 - a. Prophylaxis

1. Understand the indications for use of hepatitis B immune globulin, and hepatitis B vaccine in the prophylaxis of hepatitis B virus in the acute sexual assault patient
6. Forensic interpretation
 - a. Interpret the forensic significance of acute or chronic hepatitis A, B, and C virus infections in children and adolescents
- I. Human papilloma virus (HPV)
 1. Epidemiology
 - a. Know the risk factors for acquisition of HPV infection in children and adolescents
 - b. Know the prevalence of HPV in the general population
 2. Pathogenesis
 - a. Know the pathogenesis of HPV, including vertical transmission, non-sexual horizontal transmission, auto-inoculation, and sexual transmission
 - b. Discuss what is currently known about the latency period between infection with, and clinical manifestations of, HPV
 3. Clinical presentation
 - a. Recognize anogenital cutaneous lesions that are caused by HPV (Condyloma acuminatum)
 - b. Develop a differential diagnosis for lesions that look like HPV
 4. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC-recommended diagnostic procedures for diagnosis of HPV in children and adolescents
 - b. Know the indications for biopsy of HPV lesions
 - c. Know the limitations in utilizing pathology sub-typing in determining the mode of transmission of HPV infection
 5. Treatment
 - a. Know recommended treatment options for children and adolescents diagnosed with HPV
 - b. Understand the limitations of all treatment modalities for anogenital warts
 - c. Develop a plan to counsel a patient and/or family of a patient who has been diagnosed with anogenital HPV
 6. Forensic interpretation
 - a. Interpret the forensic significance of HPV infection in children and adolescents
 - b. Understand that the absence of visible condylomatous lesions in perpetrators does not preclude sexual transmission of HPV to a child
 7. Vaccination
 - a. Know the recommended guidelines for administration of HPV vaccine
- J. Bacterial vaginosis
 1. General
 - a. Know the criteria for the diagnosis of bacterial vaginosis
 - b. Know the microbiology of bacterial vaginosis
 2. Epidemiology
 - a. Know risk factors for bacterial vaginosis in adolescents
 - b. Understand limitations for diagnosis of bacterial vaginosis in preadolescents
 3. Pathogenesis
 - a. Know the pathogenesis for the development of bacterial vaginosis

4. Clinical presentation
 - a. Recognize clinical symptoms of bacterial vaginosis
 5. Diagnostic techniques
 - a. Demonstrate knowledge of current CDC-recommended diagnostic procedures for diagnosis of bacterial vaginosis in adolescents
 6. Treatment
 - a. Know the recommended treatment options for adolescents with bacterial vaginosis
 7. Forensic interpretation
 - a. Interpret the forensic significance of bacterial vaginosis in the context of sexual assault/abuse of both pubertal and pre-pubertal girls
 - K. Rare sexually transmitted infections
 1. Recognize that some sexually transmitted infections (eg, lymphogranuloma venereum, donovanosis, chancroid) are exceedingly rare in the United States, but must be considered in certain clinical circumstances
 - L. Pelvic inflammatory disease
 1. Understand the microbiology of PID in adolescents
 2. Know the clinical criteria for the diagnosis of PID
 3. Formulate a treatment plan for an adolescent with PID
 4. Interpret the forensic significance of PID in a patient who has been sexually assaulted or abused
 - M. Genital mycoplasmas
 1. Know the genital symptomatology associated with mycoplasma infections
 2. Interpret the forensic significance of genital mycoplasmas
 3. Recognize that genital mycoplasmas are a common cause of non-gonococcal urethritis in males
 - N. Acute sexual assault and STIs
 1. Know the risk factors for acquisition of STIs following an acute sexual assault
 2. Demonstrate knowledge of current CDC recommendations for STI screening following acute sexual assault in children and adolescents
 3. Know CDC guidelines for follow-up STI testing for STIs in children and adolescents following an acute sexual assault
 4. Demonstrate knowledge of current CDC recommendations for STI prophylaxis following acute sexual assault in children and adolescents
- 12. Neglect**
- A. Unique epidemiological aspects
 1. Incidence/prevalence
 - a. Know the rates and types of neglect reported in the US
 2. Risk factors
 - a. Know the risk factors for the various forms of neglect
 - b. Recognize cultural differences in child-rearing practices that impact the diagnosis of neglect
 - c. Recognize clinical presentations of various types of child neglect
 - d. Assess child development in the context of various forms of child neglect
 - e. Develop interventional plans for various types of child neglect, based on severity and immediacy of harm to the child
 - f. Recognize the long-term outcomes for various forms of child neglect

B. Types of neglect

1. Physical Neglect

a. Nutritional neglect (FTT)

1. Failure to thrive (FTT)

- a. Know the definition of FTT
- b. Know the differential diagnosis of FTT
- c. Identify the risk factors for FTT
- d. Recognize neglect presenting as FTT
- e. Interpret growth patterns to determine the etiology of various growth disorders
- f. Recognize psychosocial dwarfism
- g. Know when a child presenting with FTT represents a medical emergency
- h. Plan an appropriate medical evaluation for a child with FTT
- i. Plan a treatment protocol for a family with a child presenting with FTT from neglect

2. Obesity

- a. Recognize neglect presenting as childhood obesity
- b. Know the indications for child protective services involvement for obese children

3. Shelter and safety

- a. Know the epidemiology and documented health needs of homeless children
- b. Recognize the risk of supervisory neglect based on the age and development of the child

4. Clothing and hygiene

- a. Know the indicators for referral to child protective services for clothing and hygiene concerns

5. Abandonment

- a. Understand Safe Haven laws

6. Supervisory neglect

- a. Know the definition of "supervisory neglect"
- b. Identify factors to be considered during the clinical evaluation of a case of possible supervisory neglect

7. Educational neglect

- a. Identify risk factors for child truancy and educational neglect
- b. Differentiate between appropriate home schooling and educational neglect
- c. Recognize long-term outcomes for educational neglect

8. Medical neglect

- a. Recognize factors necessary for the diagnosis of medical neglect
- b. Recognize patient, parent, and physician factors that contribute to medical neglect
- c. Understand the broad range of interventions available to address medical neglect, based on severity and immediacy of harm to the child
- d. Differentiate between a child with poor health status from medical neglect and a child with a chronic condition refractory to treatment
- e. Recognize the difference between religious objections to medical care and medical neglect
- f. Identify dental neglect

9. Emotional Neglect

- a. Recognize patient, parent, and family factors that contribute to emotional neglect
- b. Recognize parental behaviors that differentiate emotional neglect from emotional abuse
- c. Recognize child manifestations of emotional neglect

13. Prenatal and perinatal abuse

A. Risk factors

1. Know maternal behaviors that may place the fetus at risk for premature birth, still birth, growth retardation, perinatal complications and neonatal death
2. Understand the impact of mental health disease and interpersonal violence on substance use in pregnant women
3. Recognize classes of drugs that adversely impact fetal and infant growth and development

B. Clinical and diagnostic considerations

1. Recognize clinical signs of neonatal abstinence syndrome
2. Know assessment components utilized for the evaluation of neonatal abstinence
3. Understand how to interpret blood, urine, meconium, umbilical cord and hair toxicology in the infant in relationship to timing and duration of drug exposure during pregnancy
4. Know the importance of confirmatory testing of positive drug tests in mothers and infants in the nursery setting
5. Recognize the names and significance of metabolites of common drugs of abuse which may be encountered on a drug test result in the nursery setting
6. Understand the limitations of toxicology screening to detect fetal exposure to drugs of abuse
7. Recognize requirements for CPS involvement in neonatal drug exposure

C. Outcomes on infants

1. Understand how prenatal drug exposure can affect short and long-term neurodevelopment in infants and children
2. Understand the effect of maternal alcohol use on a developing fetus
3. Understand the effects of maternal nicotine use on a developing fetus
4. List appropriate components of hospital discharge planning for newborns exposed to drugs in-utero

14. Child abuse in the medical setting

A. Definitions

1. Know the current definition of medical child abuse
2. Understand that medical child abuse occurs along a spectrum of severity
3. Compare and contrast examples of illness exaggeration, illness fabrication, and illness induction in a child
4. Compare and contrast medical child abuse and vulnerable child syndrome

B. Clinical presentations

1. Know the common presenting medical complaints and clinical presentations in medically abused children
2. Understand that a child with an underlying illness can also be abused in the medical setting

C. Evaluation

1. Plan an evaluation for suspected medical child abuse

2. Know the importance of multidisciplinary consensus in the evaluation of medical child abuse
3. Know that a diagnosis of medical child abuse does not rely on parental motivation
4. Understand the importance of verifying the reported signs and symptoms in a child who is a suspected victim of medical child abuse
5. Know the benefits and risks of covert video surveillance

D. Management

1. Understand the importance of reaching multidisciplinary consensus in the management of medical child abuse
2. Develop a management plan for a case of medical child abuse
3. Understand the range of interventions available depending upon the severity and risks to the child in cases of medical child abuse
4. Recognize indications for reporting suspected medical child abuse to child protective services
5. Recognize the importance of medical gate keepers in management of medical child abuse
6. Understand why the motivation of a caregiver should be considered in planning for a child's safety in cases of medical child abuse
7. Recognize that individual and family therapy to change the caregiver's behavior can sometimes reduce the risk for a medically abused child

E. Outcomes

1. Recognize the range of outcomes of medical child abuse, based on severity and chronicity of harm to the child
2. Recognize the factors that predict success or failure of family reunification in cases of medical child abuse

15. Child fatalities

A. Sudden infant death syndrome (SIDS)

1. Epidemiology and risk factors
 - a. Know the incidence of SIDS in the general population
 - b. Know the impact of the Back to Sleep campaign on the incidence of SIDS
 - c. Know the diagnostic criteria for SIDS
 - d. Know the risk factors for SIDS
 - e. Compare the demographic characteristics of victims of SIDS and victims of suffocation
 - f. Formulate a differential diagnosis for multiple, sudden unexpected infant deaths (SUIDs) in a family
2. Scene investigation
 - a. Describe the important elements of a scene investigation in an apparent sudden infant death
 - b. Understand the role of the scene investigation in the definition of SIDS
3. Pathology
 - a. Recognize the pathologic features of SIDS on autopsy
 - b. Compare the pathologic features of SIDS to those of suffocation and/or fatal child abuse
 - c. Understand the role of the autopsy in the definition of SIDS

B. Accidental suffocation

1. Epidemiology and risk factors
 - a. Know the risk factors for accidental suffocation
 - b. Describe how bed sharing contributes to the risk of suffocation
 2. Scene investigation
 - a. Know the likely elements of a death scene in a case of accidental suffocation
 3. Pathology
 - a. Identify autopsy features that distinguish between accidental and non-accidental suffocation
- C. Fatal child maltreatment
1. Epidemiology and risk factors
 - a. Know the types of child maltreatment that most commonly result in death
 - b. Know the risk factors for fatal child maltreatment
 2. Autopsy and investigation
 - a. Characterize the components and findings of a forensic pediatric autopsy that assist in the assessment of a potential child homicide
 - b. Understand the role of autopsy in the diagnosis of fatal child maltreatment
 - c. Understand the role of toxicology in the autopsy of suspected fatal maltreatment
 - d. Recognize the importance of collaborating with the medical examiner/coroner's office in evaluating child death
 - e. Interpret scene investigation findings to confirm or exclude child abuse
 - f. Interpret autopsy findings to confirm or exclude child abuse
 - g. Interpret cause and manner of death in an autopsy report
 - h. Recognize the issues surrounding organ donation following fatal child abuse
 3. Child fatalities resulting from neglect
 - a. Recognize risk factors for fatal neglect
- D. Child fatality review
1. Laws pertaining to child fatality review
 - a. Know that child fatality review laws vary by jurisdiction and state
 - b. Know the goals of the child fatality review process
 2. Models of child fatality review
 - a. Identify various models of child fatality review teams
 - b. Recognize the role of the physician in child fatality review
- 16. Psychological maltreatment**
- A. Types
1. Define child psychological maltreatment
 2. Know the criteria for making a diagnosis of psychological maltreatment
- B. Diagnosis/assessment
1. Recognize parental/adult behaviors of rejection, isolation, ignoring, denying emotional responsiveness, terrorizing, corrupting, or degrading that constitute child psychological maltreatment
 2. Recognize parental/adult characteristics that have been linked to child psychological maltreatment
 3. Recognize child and family risk factors for psychological maltreatment
 4. Understand the relationship between domestic violence and child psychological maltreatment

5. Formulate a plan for the evaluation and diagnosis of suspected child psychological maltreatment
- C. Treatment
 1. Recognize evidence-based treatments for child victims of psychological maltreatment
- D. Outcomes
 1. Recognize the potential short- and long-term consequences of child psychological maltreatment
- 17. Drug-endangered children**
 - A. Epidemiology and risk factors
 1. Know the risk factors for adult substance abuse
 2. Know the common drugs and substances of abuse that affect children
 3. Recognize that substance abuse is associated with various forms of violence in the home
 4. Recognize how adult drug abuse/intoxication can result in neglect of children
 - B. Exposure to drugs
 1. Understand the various ways in which children can be exposed to drugs in the home
 2. Differentiate between intentional provision of drugs to children and accidental ingestion of drugs by children
 3. Know that illicit drugs, over-the-counter medications and prescription medications can be administered to a child as a form of abuse
 4. Know the various ways that children can be injured in a drug manufacturing environment
 - C. Diagnosis
 1. Physical examination, history, and scene investigation
 - a. Recognize signs and symptoms of acute drug exposure in children
 - b. Know the toxic components of methamphetamine manufacture
 - c. Know the byproducts of cocaine metabolism
 - d. Know that some drug exposures may require decontamination procedures for children coming from the environment
 2. General laboratory studies and drug testing
 - a. Formulate a plan for drug testing in children removed acutely from environments where they are exposed to drugs or the manufacturing of drugs
 - b. Plan for laboratory and drug testing in children who may be removed from chronic exposure to illicit drugs
 - c. Understand the limitations of interpretation of drugs and drug byproducts in hair, urine, nails, saliva, and serum
 - d. Understand the difference between drug screening and confirmatory testing
 - e. Formulate a plan for drug-testing when misuse of a synthetic substance, over-the-counter or prescription medication is suspected
 - D. Interventions
 1. Know indications for the use of naloxone
 - E. Outcomes
 1. Recognize the psychological and developmental outcomes of children exposed postnatally to drugs of abuse
- 18. Intimate partner violence (IPV)**
 - A. Epidemiology

1. Know that IPV has been defined historically in various ways, and how this variation may affect the estimated incidence and prevalence of IPV
2. Know the current estimated incidence and prevalence of IPV
- B. Risk factors
 1. Know the risk factors for IPV
 2. Understand the relationship between IPV and child abuse
- C. Dynamics
 1. Understand the principle dynamics in a violent relationship between intimate partners
 2. Recognize common barriers preventing both male and female adult victims from disclosing IPV
 3. Understand the primary barrier to disclosure of IPV in a same-sex relationship
- D. IPV Screening
 1. Understand the benefits and barriers to screening for IPV in the pediatric office setting
 2. Develop a plan to address child exposure to domestic violence in the home
 3. Understand that pediatricians in the office setting should attempt to recognize evidence of family or interpersonal violence
- E. Sentinel signs and symptoms in adult victims
 1. Recognize common physical and emotional presentations among adult victims of IPV
 2. Respond to a child's disclosure of IPV in the home
- F. Legal Implications
 1. Reporting adult victims
 - a. Understand controversies regarding mandatory reporting of adult IPV
 2. Reporting child victims
 - a. Understand how a child's witnessing of IPV may be considered an example of child abuse
- G. Outcomes of IPV on children
 1. Know the outcomes associated with exposure to IPV in children
- H. Intervention
 1. Develop a plan for intervention in a case of IPV recognized in an office setting
 2. Plan an assessment of IPV in the evaluation of suspected child abuse
- 19. Societal response**
 - A. Child welfare
 1. Child protective services (CPS)
 - a. Purpose
 1. Understand the role of child protective services in cases of suspected child abuse
 2. Understand the rationale for mandated reporter statutes
 - b. Process
 1. Explain the definition of a mandated reporter
 2. Understand the differences between child protective services investigation and long-term CPS case-management
 3. Understand the reporting process to child protective services
 4. Plan a collaborative investigation with a child protective services agency
 5. Understand the responsibilities and authorities of child protective services
 6. Understand due process in the context of child protective services investigation
 - c. Outcomes

1. Termination of parental rights
 - a. Understand the role of child protective services in the termination of parental rights
 - b. Explain the role of child protective services in the reunification of families
2. Foster care
 - a. Purpose
 1. Understand the role that foster care has in child protection
 - b. Medical and mental health needs of children in foster care
 1. Characterize the unmet medical needs of children entering foster care
 2. Estimate the prevalence of mental illness among children in foster care
 3. List the barriers to medical and mental health care faced by children in foster care
 4. Plan an initial medical assessment of a child placed into foster care
 - c. Process
 1. Understand guardianship and ability of foster parents to provide consent
 2. Recognize that the process of placing children into foster care varies by jurisdiction and state
 3. Understand what is involved in the reunification of a child with his/her parents
 4. Compare and contrast the outcomes for children after kinship and non-kinship foster care
 - d. Outcomes
 1. Know the educational, health, and mental health outcomes of children in foster care
 2. Understand the meaning of "aging out" of the foster care system and outcomes for adults who age out of foster care
- B. Law enforcement
 1. Purpose
 - a. Understand the role of law enforcement in cases of suspected child abuse
 2. Process
 - a. Compare and contrast the investigative processes, interactions and outcomes for law enforcement and child protective services investigations
 - b. Understand how law enforcement outcome and process affects child safety decisions
- C. Legal
 1. Juvenile or family courts
 - a. Purpose
 1. Understand the role of the juvenile or family court within the multidisciplinary response to child maltreatment
 2. Understand the role of juvenile or family court proceedings in the development of safety plans for maltreated children
 - b. Burden of proof
 1. Understand the meaning of the legal phrase "a preponderance of the evidence"
 2. Understand the meaning of the legal phrase "clear and convincing evidence"
 - c. Process
 1. Understand the different types of proceedings in juvenile or family court

2. Guardian or attorney ad litem
 - a. Characterize the role of the guardian or attorney ad litem within the multidisciplinary response to child maltreatment
 3. Court-appointed special advocates
 - a. Characterize the role of court-appointed special advocates within the multidisciplinary response to child maltreatment
 4. Criminal courts
 - a. Purpose
 1. Characterize the role of criminal courts within the multidisciplinary response to child maltreatment
 - b. Burden of proof
 1. Understand the legal implication of the phrase "to a reasonable degree of medical certainty"
 2. Understand the legal implication of the phrase "beyond a reasonable doubt"
 3. Describe why the burden of proof in criminal courts is "beyond a reasonable doubt"
 - c. Process
 1. Recognize the various legal proceedings involved in the criminal court process
 2. Recognize potential outcomes of criminal court proceedings in cases of suspected child maltreatment
 5. Civil Tort Laws
 - a. Understand the concept of medical malpractice within the context of child abuse pediatrics
 - b. Characterize a physician's duty to report suspected child maltreatment
 - c. Characterize a physician's duty to provide objective and unbiased expert medical testimony in cases of suspected child maltreatment
- D. Office of the Medical Examiner or Coroner
1. Jurisdiction
 - a. Describe the circumstances which allow the medical examiner or coroner to have jurisdiction in a death
 - b. Understand the differences between a medical examiner system and a coroner system
 - c. Understand the hospital processes that follow when a child's death is suspected to be from child abuse
 2. Cause and manner of death
 - a. Understand the indications for notifying the medical examiner/coroner in child deaths
 - b. Understand principles of evidence preservation and collection in cooperation with the authorities following a death when there is a suspicion of abuse
 - c. Understand that laws give jurisdiction of the body to the medical examiner immediately upon death
 3. Death certificate coding
 - a. Describe how death certificates are completed
 - b. Know how to interpret information regarding cause of death
 - c. Describe the different manners of death that are documented on a death certificate
- E. Confidentiality

1. Understand HIPAA requirements in the context of child abuse investigations
- F. Children's advocacy centers
 1. Purpose
 - a. Compare the advantages and disadvantages of a children's advocacy center
 2. Process
 - a. Describe the children's advocacy center processes that can reduce child and family trauma
 - b. Understand the protocols for a child abuse evaluation within a children's advocacy center
 - c. Know what is meant by a "memorandum of understanding"
 3. Disciplines
 - a. List the disciplines that must participate in a children's advocacy center, according to NCA standards
 - b. List the disciplines that may participate in a children's advocacy center
 - c. Describe the options for medical involvement within a children's advocacy center
- G. The Healthcare Team
 1. General
 - a. Understand the role of the child abuse pediatrician in the assessment and management of suspected child abuse and neglect
 - b. Understand the role of the primary care physician in the assessment and management of suspected child abuse and neglect
 - c. Understand the role of the hospital social worker in the evaluation of suspected abuse and neglect
 - d. Understand the roles of pediatric specialists (neurosurgeons, radiologists, orthopedists, etc.) in the evaluation of suspected abuse and neglect
 2. Mandatory reporting
 - a. Understand the circumstances that require a mandated report of suspected child abuse
 3. Sharing confidential information
 - a. Understand how HIPAA affects disclosure of medical data in child abuse cases
 - b. Understand who is able to provide authorization to share medical information in reported child abuse cases
 4. Expert testimony
 - a. Understand the role of an expert witness
 - b. Understand the qualifications of an expert witness
 - c. Assess potential conflicts of interest and ethical considerations regarding providing expert testimony
 - d. Understand the professional considerations regarding payment for expert testimony
 - e. Understand reasonable indications for refusal to testify as an expert witness
 - f. Compare and contrast the roles of "fact witness" and "expert witness"

20. Ethical issues

- A. Confidentiality
 1. Understand the requirements for maintaining patient confidentiality in child abuse cases involving the news media
- B. Objectivity

1. Understand the need for objectivity in a child abuse diagnosis and advocacy for the maltreated child
 2. Recognize situations of non-objective medical decision-making and conflict of interest
 3. Understand the difference between skepticism and denialism in medicine
- C. Beneficence and non-maleficence
1. Understand the implications of the Belmont report
- D. Research
1. With children
 - a. List members of a population considered vulnerable in regards to participation in research studies
 - b. Understand the ethical issues regarding enrollment of children in research studies when child abuse is a diagnostic concern
 - c. Understand who is able to give consent for an abused child to participate in a research study or to share case information for teaching purposes
 2. Unethical legal acts
 - a. Recognize unethical or illegal research activities
 - b. Understand that there are legal and professional consequences of unethical research practices
 3. Compliance with human subject protections
 - a. Understand the protections afforded all patients who are subjects in human research projects
 - b. Know that federal human research regulations allow for waiver of informed consent in areas involving child abuse

21. **Neurobiological effects and evidence-based treatment**

- A. Adverse childhood experiences
1. Define adverse childhood experiences, based upon the current literature
 2. Describe well recognized adult health consequences of adverse childhood experiences
 3. Recognize the biological basis of how adverse childhood experiences impact pediatric and adult health
- B. Toxic stress
1. Compare childhood experiences that constitute tolerable stress versus toxic stress
 2. Recognize how toxic stress can manifest in a child
- C. Neurodevelopment
1. Understand the changes in brain anatomy and physiology that result from toxic stress
- D. Epigenetics
1. Describe what is known about the effects of toxic stress on DNA
 2. Understand what interventions improve or mitigate the effects of toxic stress on DNA
- E. Evidence-based mental health interventions
1. Recognize which mental health interventions are based in evidence, such as randomized controlled trials, or well-designed studies
 2. Know which parent child interventions have demonstrated improvements in parenting skills
 3. Understand the importance of referring children to mental health services

22. **Core Knowledge in Scholarly Activities**

- A. Principles of Use of Biostatistics in Research
1. Types of variables

- a. Distinguish types of variables (eg, continuous, categorical, ordinal, nominal)
- b. Understand how the type of variable (eg, continuous, categorical, nominal) affects the choice of statistical test
2. Distribution of data
 - a. Understand how distribution of data affects the choice of statistical test
 - b. Differentiate normal from skewed distribution of data
 - c. Understand the appropriate use of the mean, median, and mode
 - d. Understand the appropriate use of standard deviation
 - e. Understand the appropriate use of standard error of the mean
3. Hypothesis testing
 - a. Distinguish the null hypothesis from an alternative hypothesis
 - b. Interpret the results of hypothesis testing
4. Statistical tests
 - a. Understand when to use and how to interpret the chi square test
 - b. Understand when to use and how to interpret tests comparing continuous variables between two groups (eg, t test, Mann Whitney U)
 - c. Understand when to use and how to interpret tests comparing continuous variables between three or more groups (eg, ANOVA, Kruskal-Wallis)
 - d. Understand when to use paired tests
 - e. Understand the appropriate use of parametric versus nonparametric tests
 - f. Interpret a p value
 - g. Interpret a p value when multiple comparisons have been made
 - h. Interpret a confidence interval
 - i. Identify a type I error
 - j. Identify a type II error
5. Measurement of association and effect
 - a. Understand how to interpret relative risk and absolute risk
 - b. Understand how to interpret odds ratio
 - c. Understand how to interpret number needed to treat or harm
 - d. Understand how to interpret hazard ratio
 - e. Understand when to use and how to interpret correlation coefficient
6. Regression
 - a. Understand when to use and how to interpret regression analysis (eg, linear, logistic)
 - b. Understand when to use and how to interpret survival analysis (eg, Kaplan Meier)
7. Diagnostic tests
 - a. Recognize the importance of an independent "gold standard" in evaluating a diagnostic test
 - b. Interpret sensitivity and specificity
 - c. Interpret positive and negative predictive values
 - d. Understand how disease prevalence affects the positive and negative predictive value of a test
 - e. Interpret a receiver operating characteristic curve
8. Systematic reviews and meta-analysis
 - a. Understand the purpose of a systematic review
 - b. Understand the advantages of adding a meta-analysis to a systematic review

- c. Interpret the results of a meta-analysis
- B. Principles of Epidemiology and Clinical Research Design
 1. Assessment of study design, performance and analysis (internal validity)
 - a. Recognize and understand the strengths and limitations of a cohort study, case control study, and randomized controlled clinical trial
 - b. Recognize the use and limitations of surrogate endpoints
 - c. Understand the use of intent-to-treat analysis
 - d. Understand how sample size affects the power of a study
 2. Assessment of generalizability (external validity)
 - a. Understand how nonrepresentative samples can bias results
 - b. Assess how the data source (eg, diaries, billing data, discharge diagnostic code) may affect study results
 3. Bias and confounding
 - a. Identify common strategies in study design to avoid or reduce bias
 - b. Identify common strategies in study design to avoid or reduce confounding
 4. Causation
 - a. Understand the difference between association and causation
 5. Incidence and prevalence
 - a. Distinguish disease incidence from disease prevalence
 6. Screening
 - a. Understand factors that affect the rationale for screening for a condition or disease (eg, prevalence, test accuracy, risk benefit, disease burden, presence of a presymptomatic state)
 7. Cost benefit, cost effectiveness, and outcomes
 - a. Interpret cost-effectiveness ratios
 - b. Distinguish costs from charges
 - c. Understand quality-adjusted life years
 8. Measurement
 - a. Understand the types of validity that relate to measurement (eg, face, construct, criterion, predictive, content)
 - b. Distinguish accuracy from precision
 - c. Understand when to use and how to interpret a kappa coefficient
- C. Ethics in Research
 1. Professionalism and misconduct in research
 - a. Identify and manage potential conflicts of interest in the funding, design, and/or execution of a research study
 - b. Identify various forms of research misconduct (eg, plagiarism, fabrication, falsification)
 - c. Know how, and to whom, to report concerns of research misconduct
 2. Principles of research with human subjects
 - a. Understand and contrast the functions of an Institutional Review Board and a Data Safety Monitoring Board
 - b. Recognize the types of protections in designing research that might be afforded to children and other vulnerable populations
 - c. Understand the federal regulatory definitions regarding which activities are considered research and what constitutes human subjects research

- d. Understand the federal regulatory definition of minimal risk and apply this to research involving children
- e. Understand the ethical considerations of study design (eg, placebo, harm of intervention, deception, flawed design)
- 3. Principles of consent and assent
 - a. Understand what constitutes informed consent in research
 - b. Distinguish between consent and assent in research involving children
- D. Quality Improvement
 - 1. Design of a Project
 - a. Understand various models of quality improvement and recognize that all utilize a data-informed, iterative process using tests of change to achieve a stated aim
 - b. Understand that the aim of any quality improvement project should be specific, measurable, achievable, realistic, and time-limited
 - c. Understand strategies to optimize identification of key drivers and interventions to achieve a specific aim
 - d. Understand tools to facilitate completion of quality improvement work, including key driver diagrams and process maps
 - e. Understand each phase of a Plan-Do-Study-Act (PDSA) cycle
 - 2. Data and Measurement
 - a. Differentiate between process, outcome, and balancing measures
 - b. Interpret a run chart and identify shifts, trends, and outliers in data
 - c. Differentiate between a run chart and a control chart
 - d. Differentiate between common cause and special cause variation