PROTOCOL FOR DETERMINING IF AN INJURY IS A RESULT OF CHILD ABUSE OR NEGLECT

by
The Task Force for the Study
of Non-Accidental Injuries
and
Child Deaths

Convened by

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COOK COUNTY
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FOREWORD

In recognition of the number of suspicious child injuries and deaths, the Illinois Department of Children and Family Services and the Cook County Medical Examiner jointly formed a statewide task force to develop professional guidelines on child death autopsies and child injuries.

We believe that concerned professionals should continuously improve their skills, develop new tools, and standardize and share those advancements with others in the professions.

With the excellent help of the task force experts, these guidelines have been prepared for your use. We hope you will find the contents helpful.

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Appreciation is expressed to the Taylor Institute, who through its convenor, Dr. Larry Hall, and staff person, Dr. Marshall Rosman, kept the work of the Task Force running.

With the tremendous commitment to the work of the Task Force and the time so freely given to the effort by all its members, a special thanks is expressed to each and every member of the Task Force. It is our expressed hope that the working relationships of so many agencies will proceed into the future and continue to develop more effective tools such as the protocols on child death and accidental injury. Such efforts will enable professionals to more effectively deal with problems resulting from child abuse.

Finally, we want to acknowledge the assistance of the Illinois State Medical Society and G. Marie Leaner in producing and distributing this protocol on behalf of the Illinois Department of Children and Family Services.

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INTRODUCTION

Because children are fragile and their well-being depends in large part on those around them, they are susceptible to abuse and neglect. Unfortunately, child abuse and neglect are not uncommon. It has been estimated that a million or more U.S. children are abused each year, and that several thousand die as a consequence of abuse or neglect. Abused and neglected children require specialized treatment and protection.

Because of these facts, the question often arises whether an injury or condition that results in medical care being sought for a child is the result of child abuse or neglect. The question must be answered relatively quickly, because a judgment that abuse or neglect is present requires timely reporting to the state child abuse reporting agency and provision for the safety of the affected child and his/her siblings.

In some cases, it is obvious that a child has been abused or neglected, e.g., when a child is brought to an emergency room with a broken arm and badly bruised, accompanied by someone who rescued the child from a beating by an intoxicated parent. In other cases, it may be difficult to decide whether a child's condition is a result of maltreatment.

This protocol is intended to assist those confronted with both straightforward and confusing cases. It is intended for use in the variety of medical settings to which children may be brought for medical care (offices, emergency departments, clinics, etc.). It can be used best by those with some familiarity with child abuse.

It is recognized that many institutions which serve children do not have experience identifying and dealing with abused children. Yet acquiring the necessary knowledge and skills to do so is imperative if health care providers are to meet both the needs of their patients and their legal obligations. Hospitals and other institutions have a responsibility to assure that their staffs are well trained in this area using inservice education, regular conferences, medical audits and other means.

The following protocol is primarily intended to identify injuries sustained due to physical or sexual abuse. Recurrent injuries not due to abuse may raise the possibility of neglect.

Because this protocol is intended to assist the variety of providers and others who become involved with children who may have been abused or neglected, those consulting it may find that only some parts are relevant or useful.

Finally, it must be remembered that a protocol is a guide, and cannot substitute for the judgment that comes from experience dealing with injured children on a routine basis. Consultation with physicians and others experienced in evaluating children who are suspected victims of abuse or neglect is therefore strongly encouraged for clinicians without such experience, particularly for confusing cases.

I. INITIAL EXAMINATION OF CHILD

A. *Examiner.* All medical personnel who have occasion to examine children should be familiar with the range of findings which can reflect child abuse or neglect. Any examiner without such knowledge should immediately correct this. Courses are often given for CME credit in this area. Alternatively, there are commercially available tape/slide shows covering such topics as: medical indicators of child abuse and neglect; skin trauma; internal injuries; skeletal injuries; and sexual abuse. These can be purchased from the National Audio Visual Center, General Services Administration, Washington, D.C. 20409.

B. *Laboratory and radiology examinations* must be done by labs able to deal with children (e.g., to process small amounts of blood, to use low radiation doses, to gently but adequately restrain children for proper examination). Further, the study results must be interpreted according to age-specific pediatric norms. Radiographic studies must be read by a pediatric radiologist or by a radiologist with training and experience in interpreting studies of children, with particular attention to the possibility of abuse. Properly done lab and radiologic exams can be referred for interpretation by experts at another site (see resource list, Appendix G).

C. *Physical findings* which may suggest abuse or neglect are listed in Appendix A. Any such findings should be described in complete and correct detail (see Appendix B).

D. If any *physical finding* leads the examiner to consider abuse or neglect (or both), the examiner should:

1. Refer the child for further evaluation to a physician or center with expertise concerning child abuse and neglect

   AND/OR

   Report his considered suspicion to the Illinois Department of Children and Family Services (DCFS) (1-800-25-ABUSE) for further investigation.
2. If the child is referred to another physician or institutions for evaluation, the referring physician *must* assure that the evaluation does, in fact, occur. This may be done by a call to the consulting physician or to DCFS (if the referral is not completed).

3. The family should be informed of the referral or report in a straightforward and nonaccusatory manner e.g., "I am concerned about your child because _____ _____ _____ may indicate that someone has hurt him/her. I am required to look into this (or report this) and so am referring you to _____ (or have reported it to the state agency). People there will explore this with you."

E. *Social characteristics* which may suggest abuse or neglect are listed in Appendix C.

If any social characteristics of the child's family suggests abuse, neglect or both, the examining physician:

1. Should call an appropriately trained hospital social worker to evaluate the family
   AND/OR
   Report the suspicion to DCFS (1-800-25-ABUSE) for further investigation.
2. Inform the family of the referral or report in a straightforward and nonaccusatory manner. e.g., "I am concerned that you may be having difficulties which affect your child. I am required to look into this. Therefore I am calling our social worker (or notifying the state social workers) to see how we can help."

F. If after hospital based medical and social investigation it is decided that there is reason to *suspect* abuse or neglect, the *suspicion* must be reported to DCFS (1-800-25-ABUSE).

G. A thorough medical evaluation will be necessary for an informed decision about a child's need for protection. This can be done by the initial examining medical personnel. Alternatively, the child may be referred to a physician with expertise in this area for more thorough evaluation.

II. DISPOSITION OF CHILD SUSPECTED TO HAVE BEEN ABUSED OR NEGLECTED

A. *If the child's condition requires in-hospital care,* hospital admission at an appropriate facility should be arranged. If the parents resist admission and the child's condition warrants, the physician may take custody of the child (see Appendix J).

B. *If the child is well enough to go home, but there is clear danger if (s)he does,* another disposition must be arranged. This is best accomplished by reporting the suspicion of abuse or neglect to DCFS (1-800-25-ABUSE) and working out a plan with the worker who is assigned for urgent involvement. If such consultation is not available on an urgent basis or if the child's family attempts to take the child home, the physician may take custody (see Appendix J).

C. *If the child is well enough to go home, danger in the home appears slight, but necessary medical follow-up is uncertain* (e.g., due to difficulties in transportation, past record of medical appointment failure, episodic parental substance abuse), a sound plan for medical follow-up must be made prior to discharge. This may involve a visiting nurse, hospitalization or other measures. The social worker and/or DCFS can assist the physician in making this plan.

D. *If the child is well enough to go home but his/her guardian is not present or available for discharge planning,* DCFS should be involved in working out the plan for discharge and follow-up care. A child cannot legally be released to a nonguardian without the guardian's permission. Of course, DCFS should be involved only after a reasonably diligent attempt is made to contact the child's parent or guardian.

III. COMPONENTS OF A THOROUGH MEDICAL EVALUATION.

A. *Presenting problem(s).* Usually one or a few specific injuries or aspects of a child's condition give rise to consideration of the possibility of abuse or neglect. Those factors should be explored in detail before undertaking a fuller evaluation, as careful delineation of the problem of concern may eliminate the suspicion entirely. For example, if abuse is considered because of the presence of bruising and careful history and physical examination make it evident that the "bruising" is due to meningococcemia, further attention to the possibility of abuse is not needed.

B. *Current evidence of other maltreatment.* The history is often not adequate by itself to rule out child abuse or neglect, as it may be erroneous, incomplete, or distorted. Objective evidence is needed to assess whether or not there is reason to believe that the child has suffered maltreatment other than that which leads to the evaluation. Such information is crucial in situations in which the child's condition can be explained in several ways. For

example, if a nine-month-old presents with a femur fracture and the history is that her leg got caught in between two crib slats, the assessment as to whether this uncommon mechanism of injury is indeed the expanation will depend in part on other information that is gathered about the child and her family.

Evaluation of the child should include:

1. nude physical examination by qualified medical personnel
2. measurement and plotting on standard growth charts of: length/height; weight; weight for height; head circumference (under age 3)
3. radiologic imaging of the skeleton (x-ray skeletal survey and/or bone scan and skull x-ray) (detailed guidelines are included in Appendix D).
4. complete blood count (CBC)
5. platelet count and clotting studies (prothrombin time, partial thromboplastin time, and bleeding time)if bruising is present
6. albumin determination if growth is poor
7. formal developmental evaluation (in most cases)
8. assessment of any bite marks (detailed guidelines are included in Appendix E.)
9. Photographs of areas suspicious of abuse (see Appendix F)

C. Evaluation of *past history* of the child should include:

1. obtaining and plotting of growth parameters;
2. documentation of past medical care, including perinatal history, immunization status, development, hospitalization, past injuries (as evidenced in medical records and/or physical exam) and compliance with prescribed appointments and therapies.

D. Evaluation of the child's *family dynamics and environment* should be done by a pediatric social worker who has had protective service experience or someone with equivalent knowledge and skills. Interviews should be conducted with children and parents together and separately.

Information sought will include at a minimum:

1. injury history
2. family constellation and relationships
3. perinatal history
4. parental attitudes toward the child and his/her condition
5. cultural beliefs and practices concerning discipline
6. access to basic necessities (i.e., food and food supplementation, shelter, clothes, hygiene).

See Appendix C for more detail.

IV. JUDGING THE LIKELIHOOD THAT ABUSE OR NEGLECT OCCURRED:

A. The following indicate that abuse or neglect is probable (i.e., more likely than not):

1. the child states that abuse has occurred (i.e., gives a clear history of actions which constitute abuse or neglect)
2. unreported injuries on physical exam, particularly if outside the usual distribution (see reference norms, Appendix H)
3. history of medical problems exacerbated by noncompliance with medically prescribed therapies
4. occult bone injury or evidence of deprivation dwarfism on radiographic examination (see Appendix D)
5. history of frequent injuries, especially if treated in a variety of institutions;
6. malnutrition or deterioration of growth parameters without medical cause or adequate explanation
7. developmental delay or immaturity which reverse quickly *or* were unrecognized by the family
8. disfiguring physical punishment (including transient disfigurement such as loop marks)
9. other findings listed in Appendix A

B. Abuse or neglect is possible if the following are found (i.e., abuse or neglect should be considered):

1. repeated poisonings or poisoning in child over 3 years of age;
2. drowning or near drowning;
3. scald burns (see Appendix H);

C. The following factors increase the probability that child abuse or neglect has occurred:

1. substantial social disorganization (which may reduce adults' ability to provide needed care)

2. a rejecting attitude toward the child
3. parental psychosis, addiction, or other incompetence
4. the child appears fearful (of parents, all adults, everything)
5. also see Appendix C

V. RESPONSIBILITIES OF THE DCFS INVESTIGATOR IN COMPILING THE MEDICAL EVALUATION. (These responsibilities are in addition to those specified by DCFS investigation procedures.)

A. Whenever physical findings may be critical in ascertaining whether child abuse or neglect has occurred, a competent medical evaluation is necessary. Such evaluation may be obtained at times in physician offices, clinics, emergency departments (ERs) and other health care service settings.

B. A thorough evaluation must be documented as described in Section III above. If such documentation is not available, it should be obtained by DCFS.

C. The adequacy of the medical exam and report must be considered. If inadequate or uncertain, expert consultation should be sought (see Appendix G).

D. Care should be taken to avoid vagueness. Diagrams, photos, growth charts and precise descriptions and objective evaluations are required (see Appendix B).

E. In all cases, a visit to the home is highly desirable. In many cases, assessment of the plausability of the history obtained concerning an injury can only be made after a visit to the injury scene.

F. Collaboration of agencies is critical (see Appendix K).

APPENDIX A

PHYSICAL FINDINGS WHICH MAY SUGGEST CHILD ABUSE OR NEGLECT

1) Dead on arrival to a medical facility (see Child Autopsy Protocol).
2) Victim of unexpected death (i.e., death unrelated to known medical problems, occurring after the first month of life and within 10 days of presenting for care; see Child Autopsy Protocol).
3) Severe or multiple injuries unexplained by known unintentional (accidental) trauma.
4) Multiple or moderately severe injuries that are unexplained or incompatible with the history given.
5) Multiple or moderately severe injuries that are explained by a variety of conflicting histories.
6) One or more injuries (of any degree of severity) which the child or another party states are inflicted.
7) A condition known to be characteristic of abuse without other plausible explanation (e.g., sports injury). Such conditions include but are not limited to:
   a. Central Nervous System
      —eggshell fractures
      —subdural hematomas
      —retinal hemmorhages
      —unexplained coma
   b. Skin
      —whip or loop marks (from beatings)
      —immersion burns, particularly if symmetrical
      —cigarette burns
      —symmetrical abrasions or lacerations (as from bondage)
      —tattoos
      —slap marks (bruises with shape of fingers)
      —bruises in different stages of healing and/or outside normal distribution (e.g., bruises on back, buttocks, perineum, inner thighs, face, neck, ear lobes) (see Appendix H)
   c. GI/Abdomen
      —ruptured viscus
      —duodenal hematoma
      —intra-abdominal hematoma
      —lacerated or contused organ (liver, kidney, spleen)
   d. Skeleton (see also Appendix D)
      —torus fracture(s) of humerus or femur
      —metaphyseal chip fracture(s)
      —any fracture in a child too young to walk
      —multiple fractures in various stages of healing
   e. Sexual abuse
      —sexually transmitted disease in prepubertal child (gonorrhea, syphilis, condyloma accuminata, genital herpes, chlamydia, trichomonas)
      —unexplained vaginal laceration
      —unexplained rectal laceration
      —unexplained penile or perineal trauma
      —sperm/semen in vagina, throat or anus (or any other part) of child
      —labia minora >4mm apart in position of rest
      —lacerated hymen (fresh or healed) in prepubertal child

f. newborns with fetal alcohol syndrome, and/or neonatal drug addiction (other than methadone).

8) Malnutrition or slow growth unexplained by medical illness.
9) Severe illness due to delay in medical care.
10) Conditions which are unusual or difficult to explain.

APPENDIX B
DOCUMENTATION

1) Anatomic descriptions should be precise: "1 cm red-blue hematoma (or bruise) on the distal phalanx of the right forefinger without swelling and without involvement of the nail" is much better than "small bruise on the right hand."
2) Each discrete injury should be described separately.
3) If the factor of concern is developmental status or growth, these should be assessed and described in objective terms: "development at the 9 month level in all areas on the Denver Developmental Screening Test" is more precise than "retarded"; "weight well below the 5th percentile for height" is more precise than "tiny" or "scrawny." The precise statements can replace or amplify the vague descriptions.
4) Verbal documentation should be accompanied by photos and a careful diagram of injuries (on the DCFS bodychart form or equivalent).

APPENDIX C
PSYCHO-SOCIAL FACTORS WHICH MAY SUGGEST CHILD ABUSE AND/OR NEGLECT

I. *Overall Questions to be Answered*
   A. Is there evidence to lead one to suspect child abuse/neglect?
   B. What is the degree of probability that the child will be abused/neglected again if he remains in the same environment?
   C. To what extent will environmental manipulation (short of foster placement) reduce the probability of repeated abuse/neglect?

II. *Information Needed To answer Questions A, B, and C*

A. Family constellation, relationships, and living conditions

B. Age of the child

C. Seriousness of injuries/neglect

D. Evidence of previous abuse/neglect (Is there a chronic pattern of abuse/neglect or is it situational?)

E. The Child
   1. Was the child born with (or did the child later develop) a chronic illness which may put stress on family functioning, or interfere with bonding? Was there an unusual separation from the caretaking adults after birth?
   2. Is there a delay in the child's physical, cognitive, emotional, or social development?
   3. Does the child cry frequently; is (s)he difficult to comfort?
   4. Is the child passive and withdrawn, or active and aggressive?
   5. Does the child avoid interpersonal contact, specifically or generally, or does (s)he cling indiscriminately to strangers?
   6. Is there an indication of excessive self-stimulatory behavior in the child?

F. Psychological Status of the Parents
   1. Perinatal History
      a. Was the pregnancy planned, wanted, problematic?
      b. Were labor, delivery, and the postnatal period difficult?
      c. Who provided support (emotional, logistical, financial) to mother during this time?
   2. Perception of the Child
      a. Are the expectations of the child's age appropriate?
      b. Is there any evidence of role reversal? Does parent expect the child to act like a parent to the parent?
      c. Is there any blurring of ego boundaries between parent and child? Does parent confuse own feelings and motives with those of the child?
      d. Is there parental empathy towards the child? Is parent able to see things from the child's point of view?
      e. How do the parents view the child, his behavior? What distortions exist?
   3. Parental Capacities
      a. Can the parents meet the child's developmental needs (social, emotional, financial) or only struggle to fulfill their own needs?
      b. Is abusive or neglectful parental behavior toward the child disturbing to the parent?

c. What are the manifestations of anxiety? The degree of anxiety? The appropriateness of the anxiety?

d. What is the parents' affect? Is it appropriate?

e. What are the limitations in fulfilling the parental role? Are they amenable to correction?

f. What do the parents feel about themselves (level of self-esteem)?

4. Parental Attitudes

a. Do the parents understand the seriousness of the child's injuries? Do they deny or ignore the seriousness?

b. How plausible is the parents' explanation of injuries? Are they unable or unwilling to give an explanation? Are multiple explanations given?

c. Is there strong evidence of denial, projection of blame, hostility or protection on the parents' part?

d. In relation to the worker, are the parents defensive? Is the defensiveness inappropriate?

G. Parents' Present Situation

1. Relationships

a. Is the (marriage) relationship relatively stable and supportive? What are its strengths and weaknesses?

b. Are there other supportive relationships outside the (marriage)?

c. What is the degree of social, emotional isolation?

2. Stresses

a. Are they environmental and/or emotional?

b. Are they situational and/or chronic?

H. Parents' History

1. Were the parents themselves abused—physically, emotionally or sexually—as children?

2. To what degree was the parenting function imparted? Did they feel themselves loved, admired, respected, cared for as children?

3. Is there any indication of specific developmental stage difficulty in the parents' lives?

J. Treatment Potential (to be assessed by a mental health professional)

1. Mode of Ego Defense

a. What defenses have been mobilized?

b. What is the degree of resistance?

c. To what degree can the parent form a therapeutic relationship?

2. Availability For Treatment

a. Does the parent want help?

b. What kind of help does (s)he think (s)he needs? Is it appropriate?

c. How does she use help that is offered?

APPENDIX D

RADIOGRAPHIC GUIDELINES FOR SUSPECTED CHILD ABUSE

I. GUIDELINES FOR SKELETAL SURVEYS

A*. Routine complete skeletal surveys are needed only for patients under 2 years of age (and older children who are unable to communicate) who are suspected of having been victims of physical abuse.

B*. Routine radiographic skeletal surveys are unnecessary in isolated cases of sexual abuse and in the siblings of abused children who themselves have no clinical evidence of physical abuse.

C*. Children over 2 years of age (and others able to communicate) should have radiographs of only the areas that appear to have been injured. Unsuspected fractures in those over 2 years are very uncommon (4% of those with skeletal surveys); and a more careful clinical examination might have revealed the presence of fractures even in those cases.

D. Technical details

1. Cranial CT is useful in showing extensive suspected brain damage. It should be performed in patients with symptoms and signs of central nervous system injury, especially in those under 2 years of age.

2. AP torso, to include chest, abdomen and pelvis with penetration adequate to visualize the posterior ribs.

For these anatomical areas, a single film is used. Usually a single 14 x 17 accommodates these areas. Occasionally multiple films may be needed.

*Radkowski, MA, Merten, DF, Leonides, IC. The Abused Child: Criteria for radiologic diagnosis. Radio Graphics 3:262-97, 1983.

Decubitus views of the chest may be helpful when there is the possibility of pneumothorax.

The decubitus view and/or crosstable view of the chest, are additional views useful for diagnosing pneunomediastinum and pneumothorax.

In cases of possible perforated viscus, free air in the abdominal cavity can be detected with a 10 minute abdominal film in the upright position or left lateral abdominal decubitus film.

3. AP OF THE UPPER AND LOWER EXTREMITIES

   Arms and forearms should be done individually.

4. EXTREMITY JOINTS

   Right and left shoulder, elbow, wrist, hip, knee and ankle. Individual AP views of these joints with centering over each joint.

5. LATERAL VIEW OF THE ENTIRE SPINE

   Individual views of the cervical, thoracic and lumbar spine are best for detail. Multiple exposures on a single 14 x 17 film can be done. A cone down view of the cervical spine may be necessary.

II. DIAGNOSIS OF SKELETAL INJURIES DUE TO MALTREATMENT

A. Age:
   1. Usually not immediate neonatal period
   2. Majority under 2 years

B. 50% fail to show skeletal evidence; but show evidence of soft tissue injury: bruise, scars, and burns, etc.

C. Fractures:
   1. Epiphyseal-Metaphyseal (E-M) injuries
      a. Typical Salter-Harris I and II
      b. Bone architecture and mineralization usually normal and this differentiates it from dysplastic, metabolic and hematologic fractures.
   2. Diaphyseal Fractures: Transverse or Oblique
      a. As common and as typical as E-M fractures
   3. Rib Fractures
      a. Common
      b. Difficult for children to obtain other than abuse. Be very suspicious without documented evidence of direct blow or crush injury i.e., auto accident.
      c. Location: posterior, lateral or anterior
         1) Posterior and lateral fractures show abundant callus
         2) Anterior fractures show exaggerated cuffing of costal chondral junction
   4. Skull Fractures
      a. Etiology: direct blow
      b. Type
         1) Linear
         2) Diastatic (split suture) secondary to intracranial bleeding or subdural hematoma
   5. Highly suspicious injuries:
      a. Fracture of distal end of clavicle
      b. Fracture of anterior ribs (see above)
      c. Fracture of the scapula

D. Dating Injuries:
   1. Less than 10-14 days: soft tissue changes only. Minimal or no signs of healing.
   2. 2-4 weeks: callus and periosteal new bone deposition is evident. Periphery calcifies, center lucent. Radiolucent space between bone and callus.
   3. 4-12 weeks:
      a. May still see underlying fracture
      b. Callus mature, smooth and uniformly dense
   4. More than 12 weeks
      a. May see only thickened cortex
      b. Fracture line disappears

E. Intrauterine Abnormalities
   1. Bowing: prenatal
      a. Etiology: abnormal fetal position
      b. Oligohydramnios
      c. Soft bones
         1. Osteogenesis imperfecta
         2. Hypophosphatasia
      d. Camptodwarfism
   2. Congenital Dislocated Knee
      a. Etiology: faulty intrauterine position

F. Birth Trauma: Most fractures in newborn occur during delivery.

1. Clavicle
   a. Most frequently fractured
   b. Location:
      1. Most common mid clavicle but can occur at either end
      2. Also ends
2. Long bones: next most common
   a. Location:
      1. Diaphysis of epiphyseal-metaphyseal junction (Salter-Harris I and II)
      2. Ends of humerus and proximal femur
   b. X-ray: initially soft tissue swelling; can't see epiphysis as epiphysis not ossified.
      1. Dislocated joint in neonate rare. Think epiphyseal fracture.
      2. Corner fracture
3. Rib Fractures
   a. Premature prone to rib fractures 4-8 weeks postparturition; often secondary to calcium deficiency and rickets

G. Differential Diagnosis—Birth Injury vs. Abuse

1. Birth injuries show callus between 7-11 days
2. Fracture visible after 11 days without signs of callus or subperiosteal bone deposition should *not* be considered related to birth.
3. Osteogenesis imperfectatarda may be present in newborn period.
4. Fractures caused by birth trauma
   a. skull fracture
   b. midclavicular fracture
   c. humeral fracture

III. DEPRIVATION DWARFISM

Deprivation or psychosocial dwarfism is a temporary nutritional and/or situational disorder resulting in a state that simulates pituitary dwarfism. When a child begins taking nutrition, there is rapid growth of the body. The rapid growth of the brain may result in split sutures simulating increased intracranial pressure. These children usually do not have fractures. There are many growth arrest lines which help differentiate them from pituitary dwarfism.

IV. SPECIFIC INJURIES

A. INJURIES HIGHLY SUGGESTIVE OF ABUSE†

Isolated long-bone fracture*
Corner fracture
Acromial fracture
Scapular fracture
Sternal fracture*
Multiple rib fractures
Multiple costovertebral fractures
Multiple costochondral fractures
Incidental compression fracture of the spine*
Pancreatic pseudocyst*
Duodenal hematoma*
Hepatic laceration of hematoma*
Mesenteric laceration*
Bowel rupture*
Cerebral contusion*

*In absence of convincing history of accidental trauma

B. INJURIES THAT ARE WORRISOME BUT ARE NOT DIAGNOSTIC OF ABUSE†

Isolated fracture-separation of distal humeral epiphysis
Distal clavicular fracture
Single rib fracture
Metatarsal or metacarpal fracture
Unexplained cerebral atrophy or hydrocephalus

C. MOST COMMON FRACTURES CAUSED BY BIRTH TRAUMA†

Skull fracture
Midclavicular fracture
Humeral fracture
Femoral fracture
Femoral epiphyseal fracture-separation

D. COMMON ACCIDENTAL TRAUMA†

Midclavicular fracture
Distal radial torus fracture
Skull fracture
Spiral tibial fracture (toddler's fracture)
Amputation or crush injury of distal phalanges

†Hilton, SVW, Edwards, DK. Radiographic diagnosis of non-accidental trauma (child abuse). Applied Radiology 14:13-24, 1985.

APPENDIX E

CHILD ABUSE BITE MARK GUIDELINES

IDENTIFICATION OF A BITE MARK

Teeth are essentially a tool. As such, because of their

individual morphologic characteristics, and relationships with each other in the dental arch, they can leave a unique mark on the victim that sometimes can be traced to the perpetrator.

A bite mark will appear as a semicircular (one arch) or oval (both arches) mark on the body. Generally, no more than the anterior six or eight teeth in an arch will mark. Frequently, because of the interspersing of clothing, or nature of the bite, only a few of the teeth may make a mark. Because of the nature of a child's skin, bite marks can be very distinct. There may be more than one mark on the body, of the same age, or in a partial state of healing, indicating repetitive attacks.

LOCATION OF BITE MARKS

Bite marks occurring in child abuse are usually found on the chest, abdomen, face or extremeties.

RECOVERY OF EVIDENCE

Usually bite marks are present on victims who have sustained other trauma. Since they may be covered with dried blood or debris, a careful examination of the body after removal of the clothing is necessary to preclude loss of serological evidence from the saliva of the perpetrator when the body is being medically treated.

CALL FORENSIC ODONTOLOGIST

Ideally, a trained forensic odontologist should be called to process the evidence PRIOR to any further disruption of the bite mark so that proper procedures may be followed and all possible evidence presented. In lieu of this, photographs of the injury should be taken with and without a mm scale in place. A suggested means is a Polaroid "SONAR ONE STEP" camera that focuses automatically, and allows the photographer to see the result immediately. After the evidence is photographed, saliva swabs should be taken from the injury. Moisten the swab in sterile saline and swab the area of the bite from the center outward. Allow the swab to air dry, and place it into an envelope. DO NOT LICK THE ENVELOPE TO SEAL IT! USE TAP WATER ON A GAUZE PAD. Take a second swab in the same fashion from the other side of the body as a control.

PHOTOGRAPHY

If a medical photographer is immediately available, the following should be done:

I. Photograph of the undisturbed injury
   A. Black and white high contrast
   B. Color negative film (ASA 100)
      - A KODAK color scale or a gray card along with a mm scale should be used in the frame of the photo
      - All shots should be duplicated without scale and case identification numbers in place
      - Long orienting shot of the body
      - Orienting shot of each bite mark
      - Close up of each arch of bite with scale and circular standard in place (a nickel or dime does nicely)
      - Shot of entire bite in one frame with scales in place
      - Scale used in photo MUST become part of patient file

II. Photographs as above after the injury has been cleaned.

All of the above procedures must be done with consideration for other injuries the child may have suffered, as well as the child's emotional state.

IMPRESSIONS OF BITE MARK

Impressions of the bite should be made by an odontologist using accepted forensic techniques. Impressions of the victim's own teeth will also be taken as a matter of course to insure a legally complete procedure.

Police investigators should be advised that bite mark evidence is available, so that if a suspect is located, the State's Attorney may prepare a search warrant, court order, etc., to allow impressions to be made of the suspected abuser. Recognition and processing of such evidence may be a critical link to the perpetrator of the abuse.

APPENDIX F

PHOTOGRAPHY

1. Photographic documentation of injuries and condition is often clearer than verbal description and can be invaluable in court. Each health provider and institution must weigh the advantages and disadvantages of the available means of obtaining photographs, and develop one or more methods for use in documenting instances of suspected child abuse and neglect.
2. The best quality photographs are obtained in standardized lighting conditions, using color charts for comparison and a close up lens on a 35mm single lens reflex camera or equivalent. Such photos can be obtained by police crime labs or by hospital audiovisual services when available and appropriate.

3. Sophisticated photography may be unavailable or unreimburseable. Such photography may also be impractical, e.g., when police involvement is not wanted and/or if many parties with varying skills will be taking pictures. If pictures are taken infrequently, needed photos may be tied up in the camera unless film is developed when only partially exposed. The equipment needed can be expensive, and storage and access can, consequently, pose problems.

4. Photographs taken with self-developing film (e.g., Polaroid) have several advantages: the cameras are relatively inexpensive, picture quality is apparent immediately, quality is usually fair even when photographer skill is minimal. On the other hand, the prints are often of mediocre quality in terms of color and close detail, enlargements and slides prepared from the instant pictures are often of poor quality, and the cameras need to be replaced quite often.

APPENDIX G

INSTITUTIONAL RESOURCES

Resources

University of Chicago Hospitals and Clinics
Wyler Children's Hospital
Division of Biological Sciences
Pritzker School of Medicine
5841 S. Maryland Avenue
Chicago, IL 60637
312/702-6500

LaRabida Children's Hospital and Research Center
East 65th Street at Lake Michigan
Chicago, IL 60649
312/363-6700

University of Health Sciences
Chicago Medical School
3333 Green Bay Road
North Chicago, IL 60034
312/578-3000

University of Illinois
College of Medicine at Chicago
1853 West Polk Street
Chicago, IL 60612
312/996-3500

University of Illinois
College of Medicine at Peoria
P.O. Box 1649
Peoria, IL 61656
309/671-3000

University of Illinois
College of Medicine at Rockford
1601 Parkview Avenue
Rockford, IL 61107
815/987-7610

University of Illinois
College of Medicine at Urbana-Champaign
506 South Mathews
Urbana, IL 61801
217/333-9284

Loyola University of Chicago
Stritch School of Medicine
2160 S. First Avenue
Maywood, IL 60153
312/531-3000

Mount Sinai Hospital Medical Center
1500 South Fairfield
Chicago, IL 60611
312/542-2000

Northwestern University Medical School
303 East Chicago Avenue
Chicago, IL 60611
312/908-8649

Children's Memorial Hospital
2300 Children's Plaza
Chicago, IL 60614
312/880-4500

Rush Medical College of Rush University
600 South Paulina Street
Chicago, IL 60612
312/942-6913

Southern Illinois University
School of Medicine
801 North Rutledge
P.O. Box 3926
Springfield, IL 62708
217/782-3318

Cook County Hospital
1825 West Harrison Street
Chicago, IL 60612
312/663-6000

Cook County Children's Hospital
700 South Wood
Chicago, IL 60612
312/663-6530

Cook County Medical Examiner's Office
2121 West Harrison
Chicago, IL 60612
312/666-0500

American Academy of Forensic Sciences
225 South Academy Boulevard
Colorado Springs, CO 80910
303/596-6003

APPENDIX H

REFERENCE NORMS

1. Normal scratch/bruise location

Age	*Location*	*Lesions*	*Mechanism*
Young infant	Face	Scratches	Scratches self
Toddler	Forehead	Bruise	Falls when learning to walk
School Age	Shins & body prominences	Bruise	Sustained in play
Any age	Back, neck, head and varied	Linear or circular bruise	Ethnic healing[1,2]

2. Normal bruise evaluation[3]

Time after bruise	*Color*
Red-blue/purple/black	Less than a few hours
Blue/blue-brown	Day 1-3
Green/green-yellow	Day 5-7
Yellow/brown	Day 8-14
Return to normal	Up to 4 weeks

3. Suspicious bruises

—outside usual distribution for age and culture

—varying stages of healing

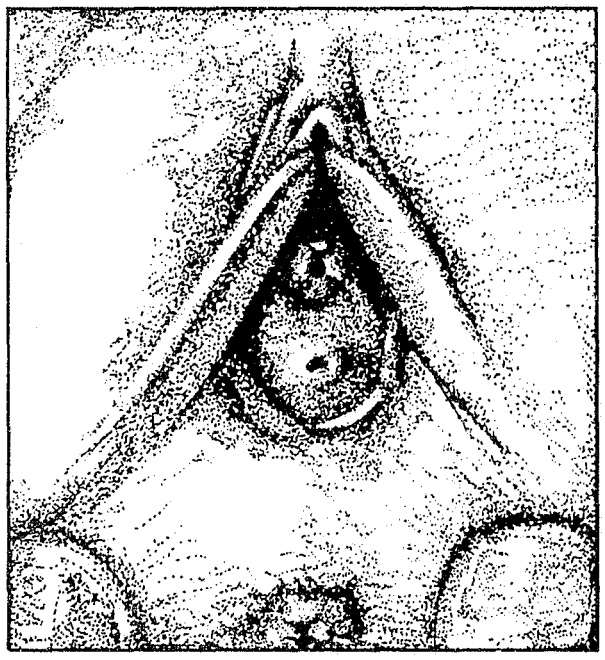
—bear shape of weapon (e.g., loop: belt or cord; linear: belt, cord or switch; hand)

4. Temperatures required to induce skin burns[4]

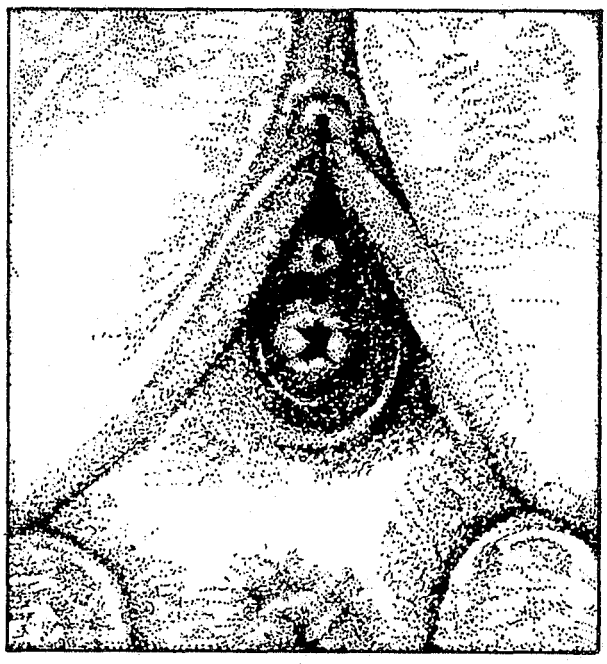
Temperature	*Time to burn*
49°C (120F)	10 minutes
53°C (127F)	1 minute
57°C (137F)	10 seconds
70°C (158F)	1 second

1. Asnes, RS and Wisotsky, DH, Cupping Lesions Simulating Child Abuse, *J. Pediatr* 1981;99:267-268.
2. Yeatnman, GW, VanDang, V, Cao Gio (Coin Rubbing), *JAMA* 180:224:2748-2749.
3. Adapted from Wilson, EF, Estimated of the Age of Cutaneous Contusions in Child Abuse, *Pediatrics* 1977;10:750-752.
4. Adapted from Feldman KW et al, Tap Water Scald Burns in Children, *Pediatrics* 1978;62:1-7.

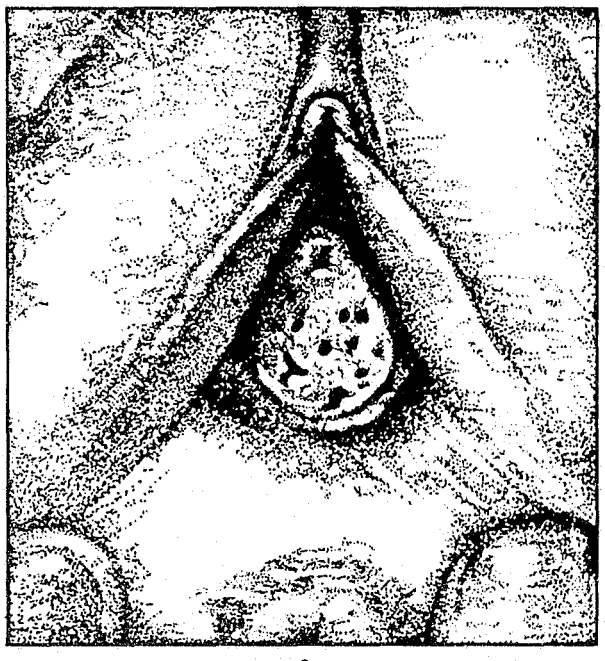
5. Types of Hymen in Prepubescent Girls—Variations Without Trauma Seen



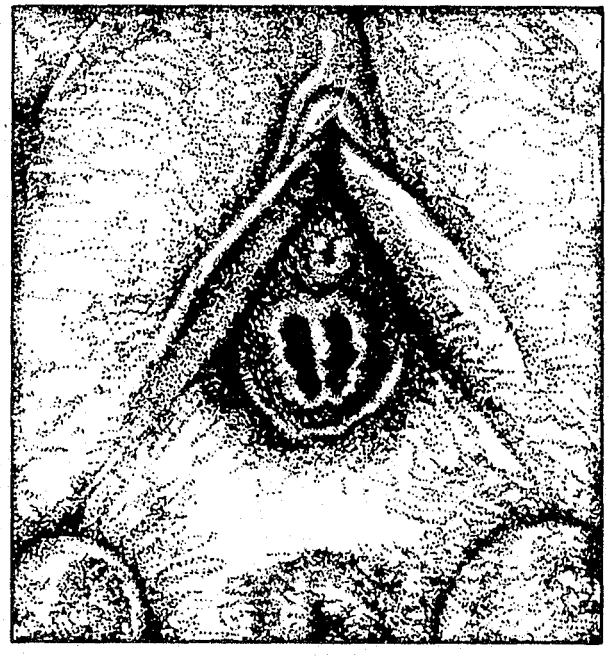
1
Punctate



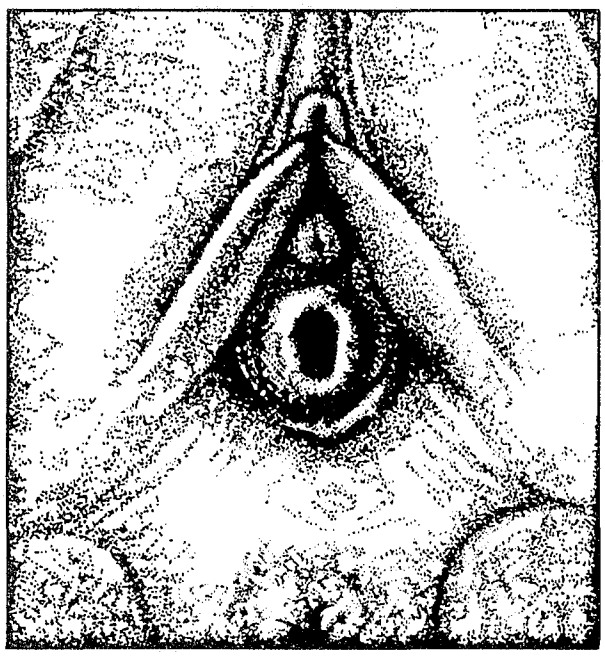
2
Normal



3
Cribriform



4
Septate



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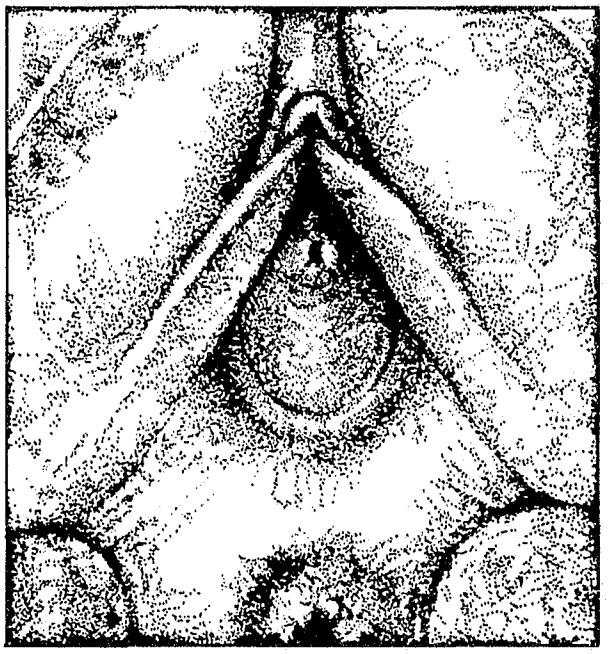
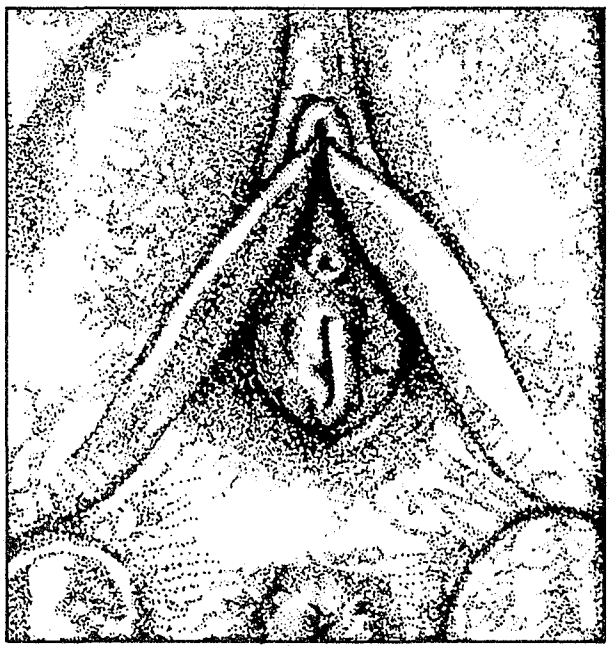
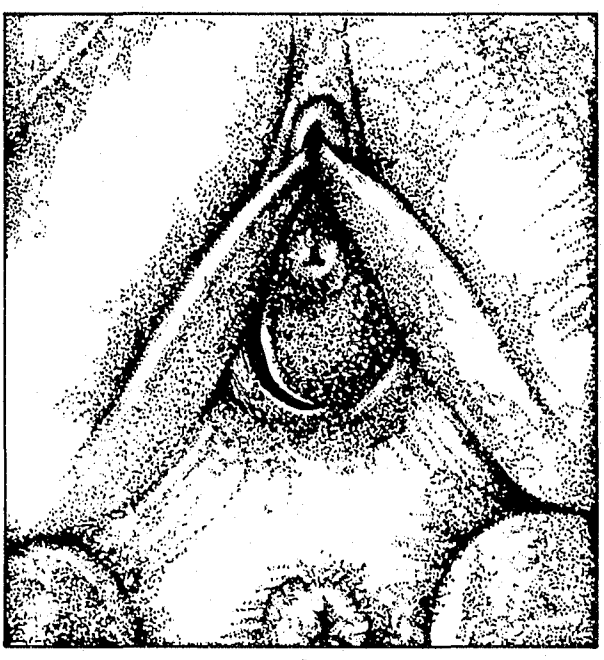


6
Imperforate



7
Slitlike



8
Eccentric to Right

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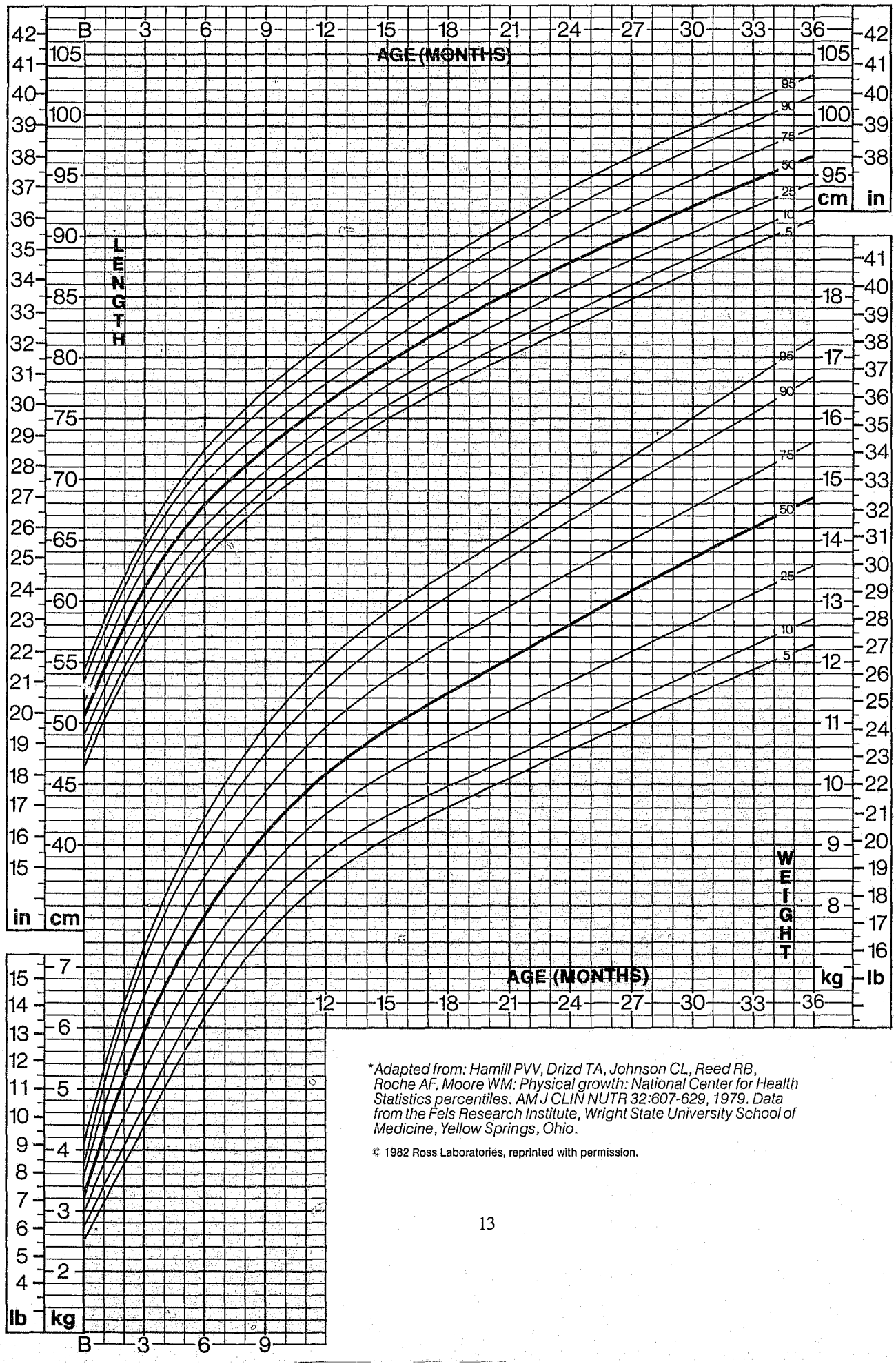
BOYS: BIRTH TO 36 MONTHS
PHYSICAL GROWTH
NCHS PERCENTILES*



Adapted from: Hamill PVV, Drizd TA, Johnson CL, Reed RB, Roche AF, Moore WM: Physical growth: National Center for Health Statistics percentiles. AM J CLIN NUTR 32:607-629, 1979. Data from the Fels Research Institute, Wright State University School of Medicine, Yellow Springs, Ohio.

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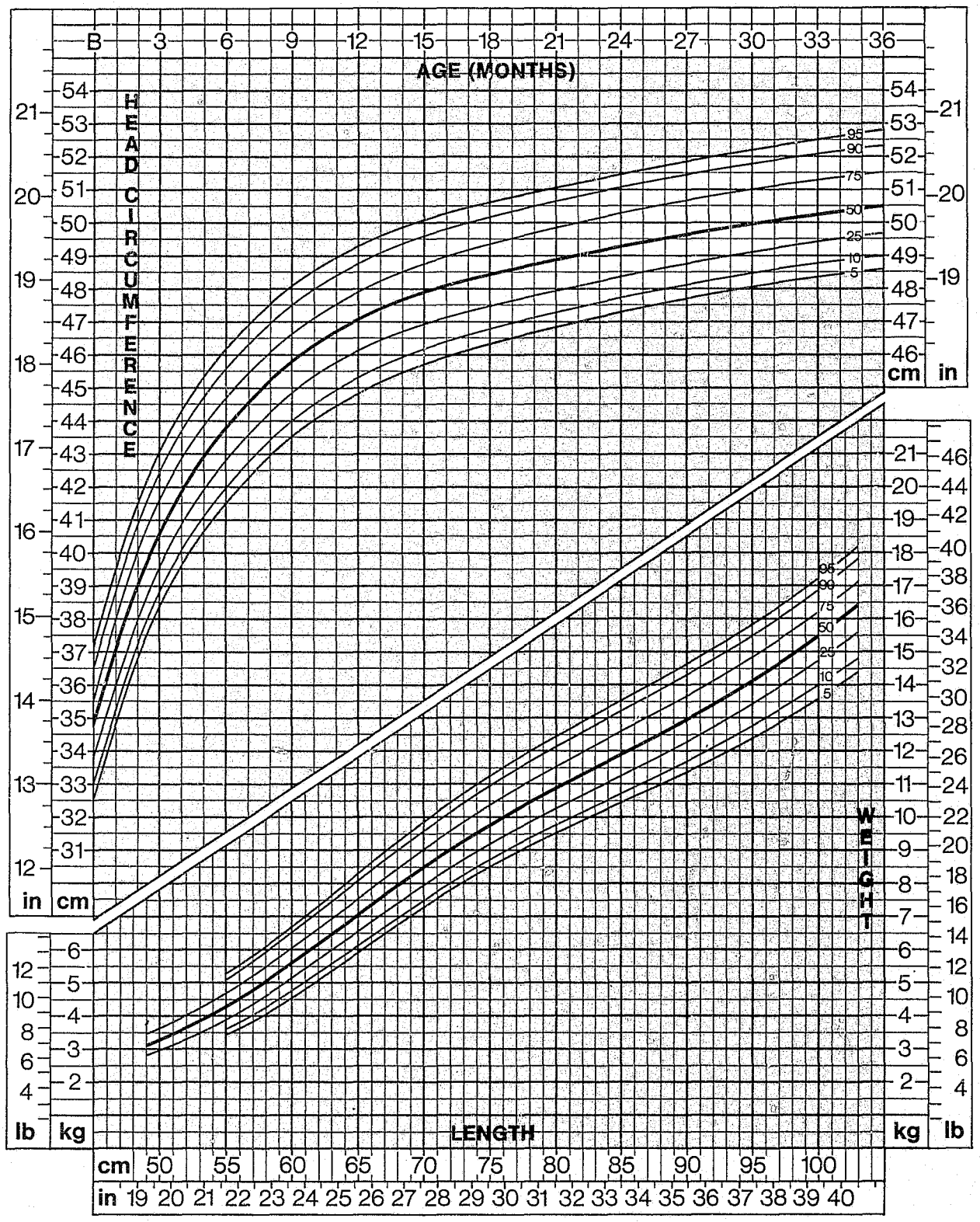

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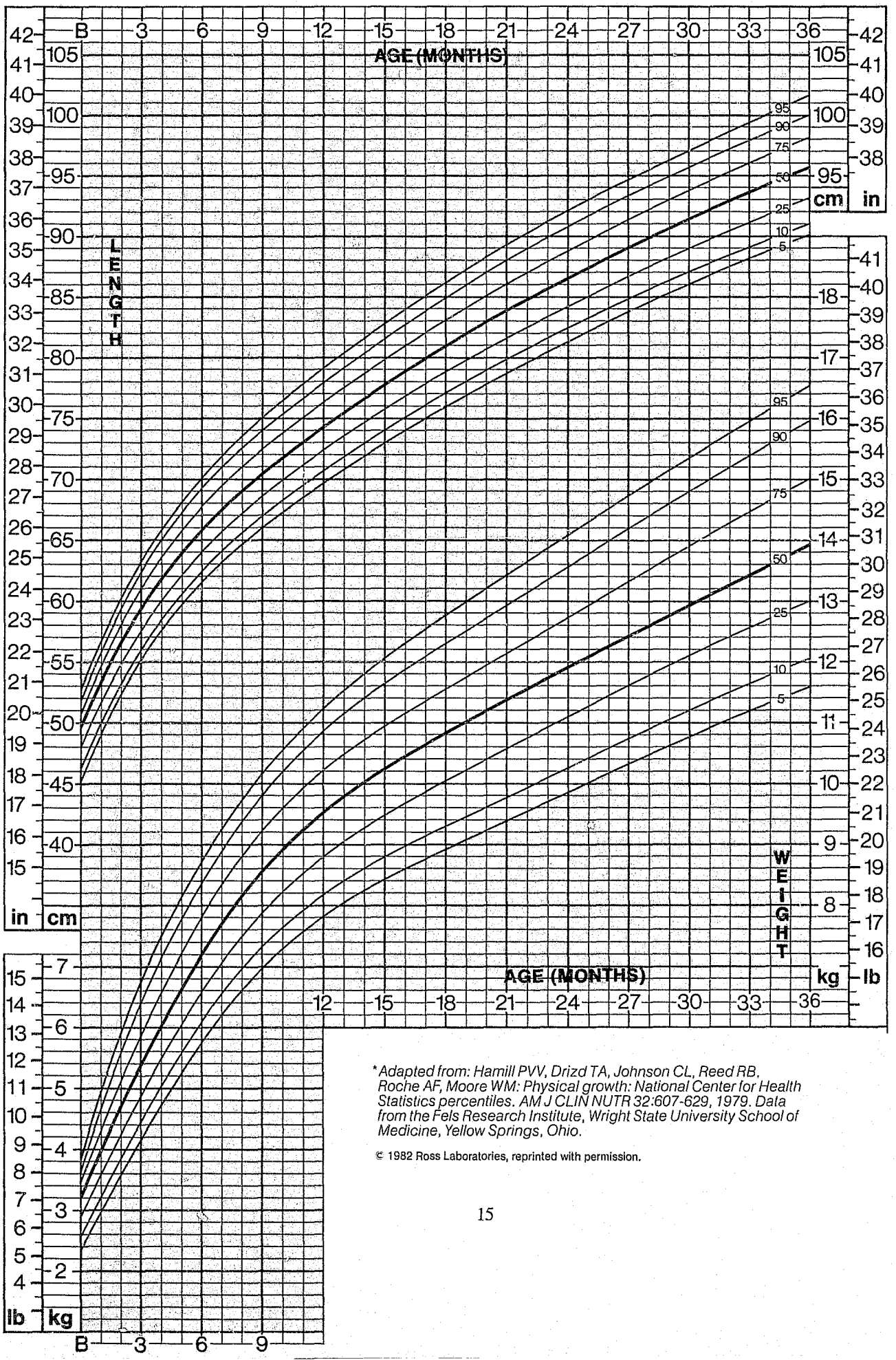
GIRLS: BIRTH TO 36 MONTHS
PHYSICAL GROWTH
NCHS PERCENTILES*



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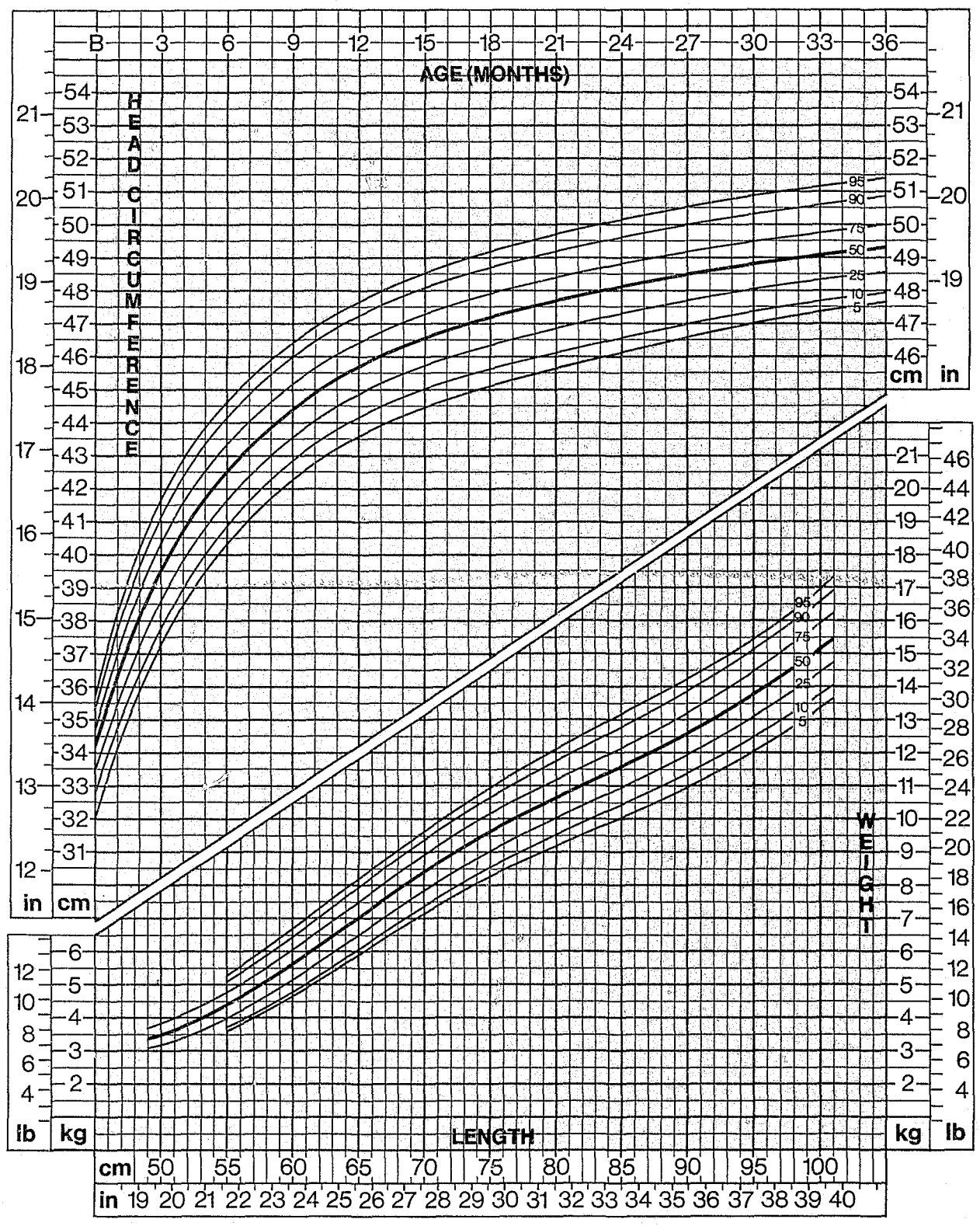
GIRLS: BIRTH TO 36 MONTHS
PHYSICAL GROWTH
NCHS PERCENTILES*



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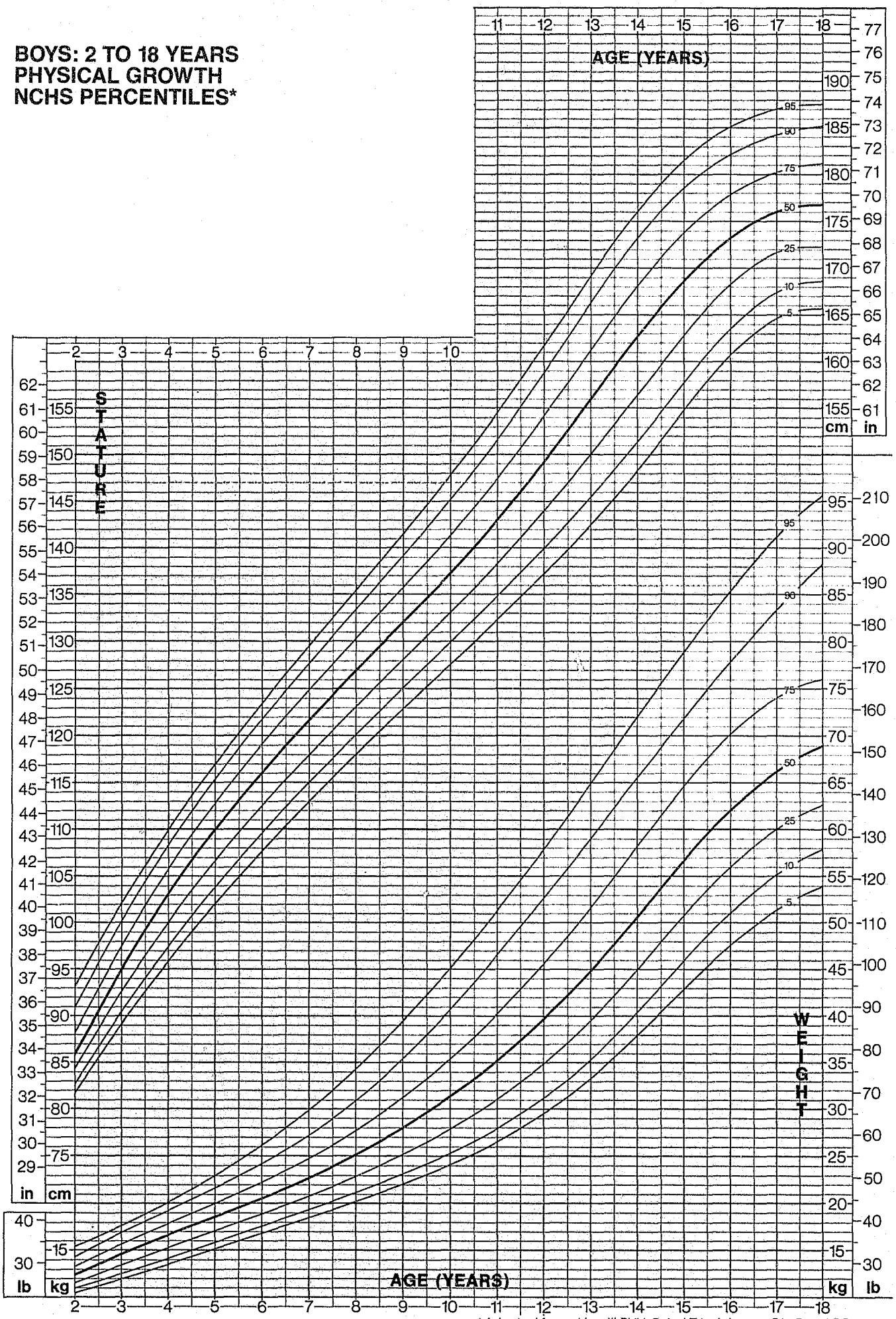
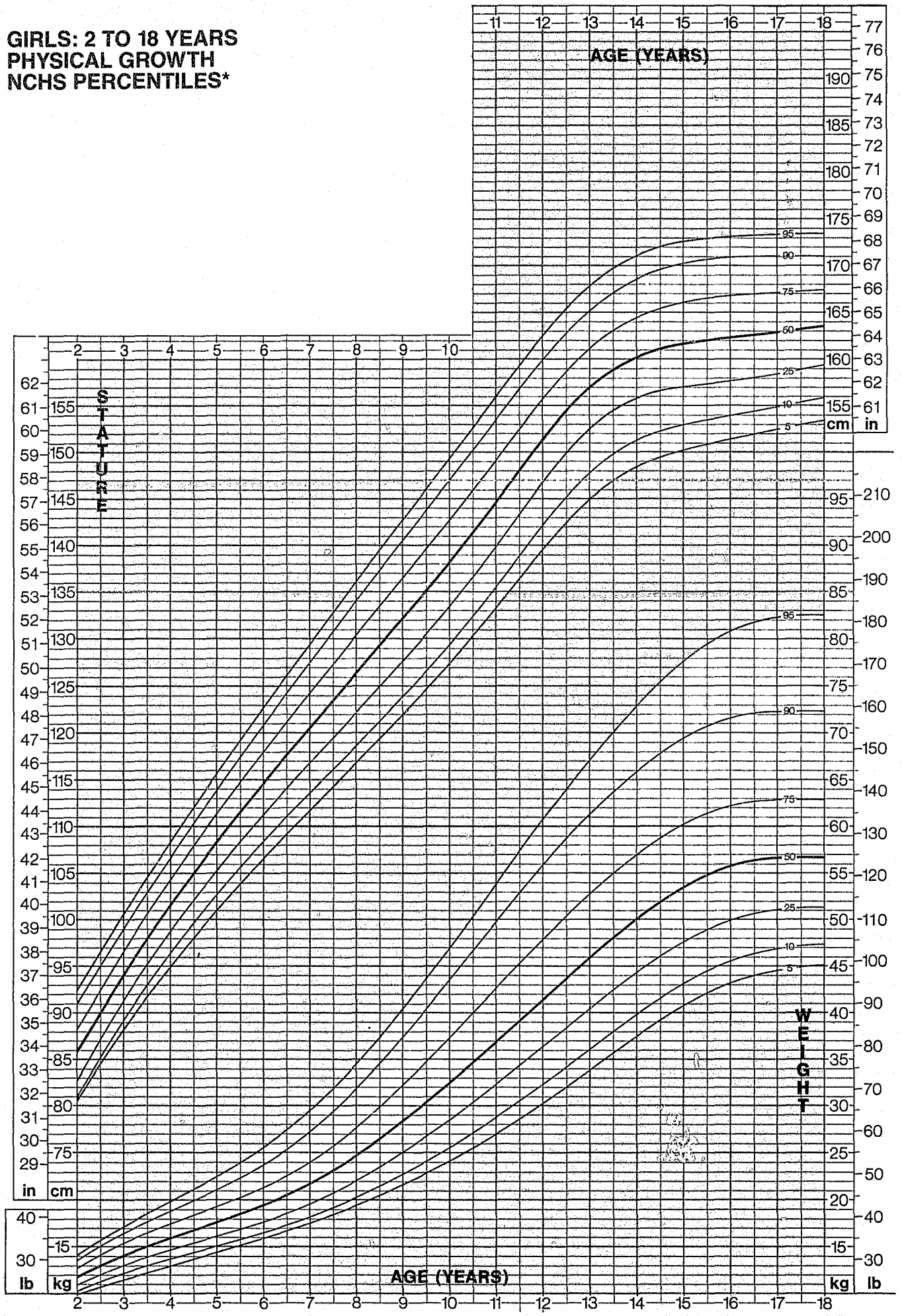
BOYS: 2 TO 18 YEARS
PHYSICAL GROWTH
NCHS PERCENTILES*



*Adapted from: Hamill PVV, Drizd TA, Johnson CL, Reed RB, Roche AF, Moore WM: Physical growth: National Center for Health Statistics percentiles. AM J CLIN NUTR 32:607-629, 1979. Data from the National Center for Health Statistics (NCHS), Hyattsville, Maryland.

GIRLS: 2 TO 18 YEARS
PHYSICAL GROWTH
NCHS PERCENTILES*



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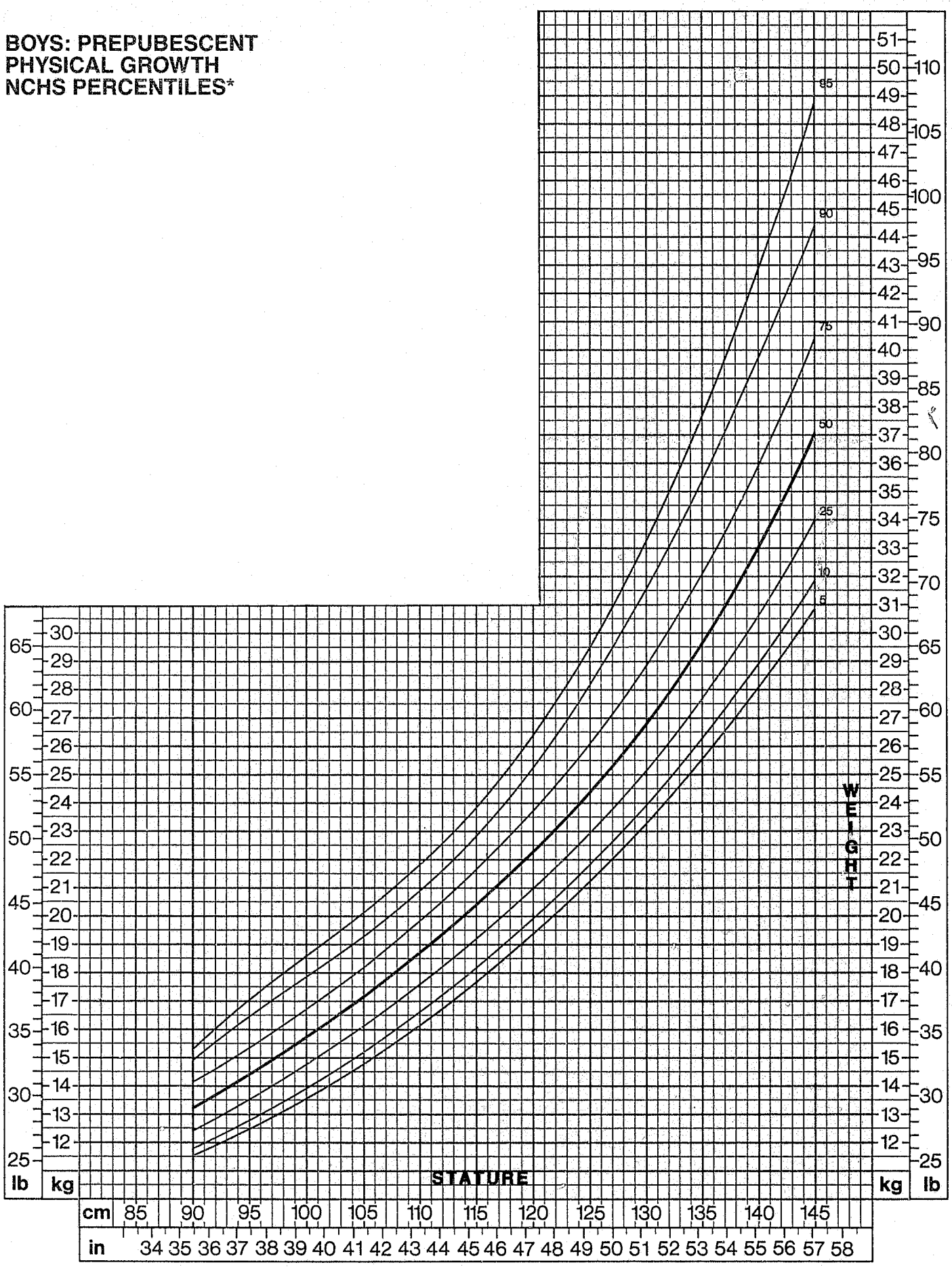
BOYS: PREPUBESCENT PHYSICAL GROWTH NCHS PERCENTILES*



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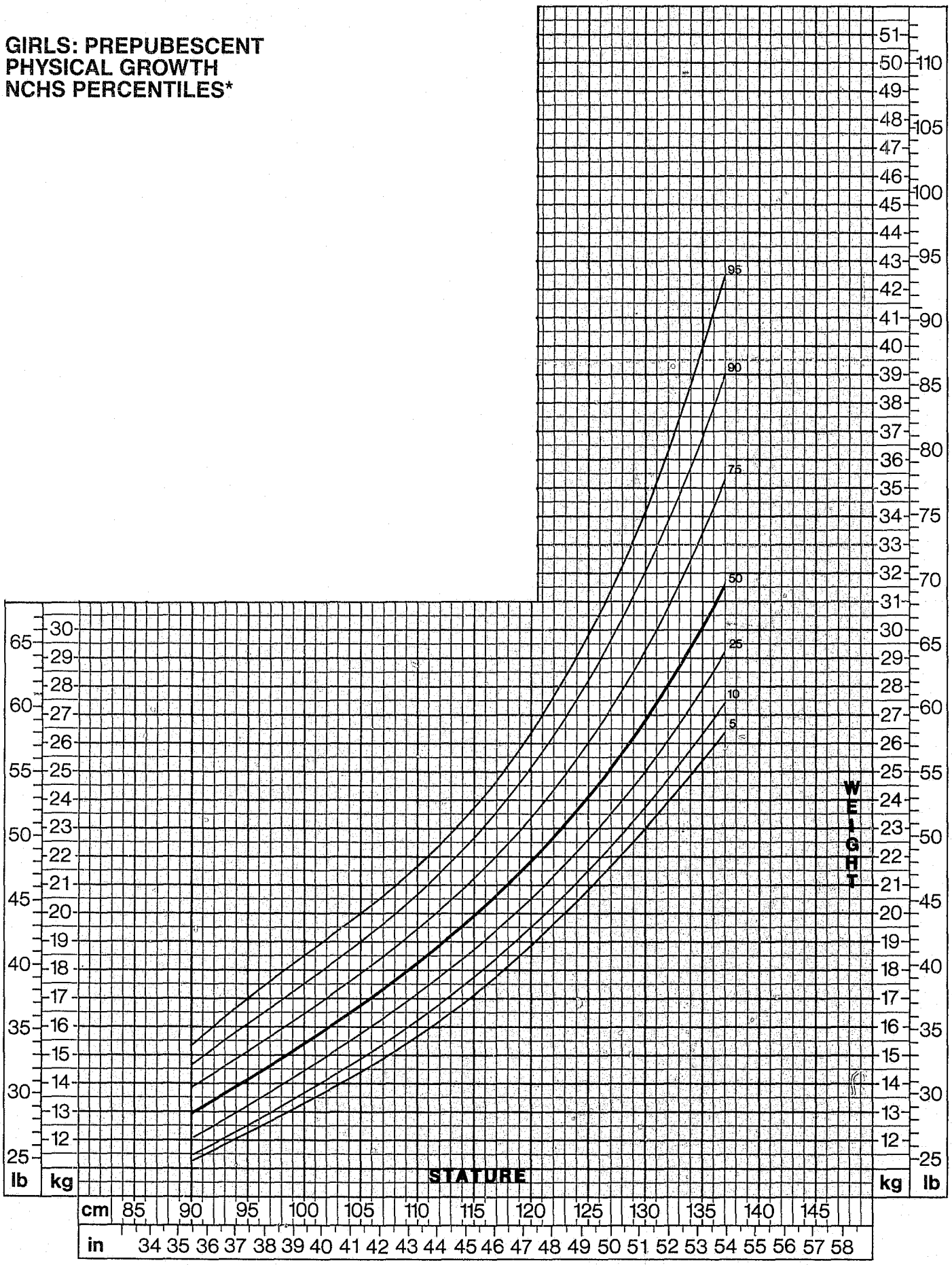
GIRLS: PREPUBESCENT PHYSICAL GROWTH NCHS PERCENTILES*



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APPENDIX J

TAKING CUSTODY

1. Custody may be taken by a physician if a child is in imminent danger of harm.
2. The physician taking custody records this in the medical record and notifies the Illinois Department of Children and Family Services hot line that this has occurred. (1-800-25-ABUSE).
3. The parents must be notified that custody has been taken.
4. Enforcement of custody is by the police, who should be called for any parental attempt to remove the child while in physician custody. If resistance is anticipated, it is wise to have hospital security or the police at hand when the parents are notified of the change in custody.
5. A court hearing concerning the need for DCFS to take protective custody will occur on the next working day. If the judge denies authority of DCFS to take temporary custody at the emergency hearing (e.g., due to incomplete information), a later court hearing (with more complete information) is made less likely.

APPENDIX K

AGENCY COLLABORATION

ROLES AND DECISIONS OF PRINCIPAL AGENCIES

Interagency Collaboration:
Developing good working relationships with personnel in principal agencies is critical to the investigation process as well as to the effectiveness of the roles performed by each of the participating agencies. Important interacting agencies include local law enforcement, the Department of Children and Family Services and the Coroner or Medical Examiner's Office. Smooth working relationships among so many agencies do not come about easily, but rather as a result of sustained effort, which is likely to proceed as outlined here.

1. Key agencies within each locale should be identified as the "principals" involved in most child abuse cases.
2. Agency personnel must develop an understanding of the unique roles and functions of the other agencies. This can take place informally or by means of structured mechanisms.
3. The Department of Children and Family Services has appointed several regional multidisciplinary committees throughout the State of Illinois to assist the Department in dealing with complex cases of abuse and neglect. These committees can become vehicles for education concerning the roles and functions involved in death investigations as well as cases of non-accidental injuries.
4. It is recommended that every child death case reported as a homicide by a Medical Examiner or Coroner and every case of severe injury to a child reported by a medical facility go to a case conference involving all principal agencies when the Department's (DCFS) own investigation has not produced sufficient "credible evidence" to warrant "indicating" the case.
5. Case conference among principal agencies is also recommended in rare instances when the perpetrator of death or severe injury is a child.
6. Where feasible and appropriate, the safety of surviving and future siblings can be enhanced by notifying and/or involving the family's primary care physician.

Roles And Decisions Of Principal Agencies
Any child injury thought to have resulted from abuse or neglect, must be reported to appropriate legal authorities:

- Department of Children and Family Services and/or local police departments

For some counties within the State of Illinois, reciprocal agreements regarding notification procedures have been specified, e.g., when a suspected case of abuse is reported to the abuse hotline, the local police department is notified by the worker at the Central Registry. In other instances, the police department immediately notifies the central registry when they are called in on a case involving suspected abuse.

During the investigative process, police collect data, take photographs and have the responsibility for ensuring "continuity or chain of custody of evidence."

In the DCFS"Child Abuse and Neglect Investigation Decisions Handbook," in a section on roles and responsibilities, ". . . a child abuse/neglect investigation is defined as a fact-finding process the purpose of which are (in order of importance):

- to assure the safety and well-being of children (e.g., surviving siblings) suspected to be abused and/or neglected;
- to determine the validity of reported allegations;
- to obtain sufficient information to support Department decisions in court (if necessary);
- to give service delivery staff adequate information on "indicated" reports to determine if services are appropriate or necessary to ameliorate family dysfunction."

In instance of *serious* injury, the local police department and the Department of Children and Family Services notify the State's Attorney's Office. In that office, the decision is made as to whether to

prosecute individuals suspected of inflicting serious injury in nonfatal cases.

An important issue exists regarding the completeness of information gathered by the principal agencies already identified and the importance of their data to the decision-making process. While the number of sources for gathering potentially relevant information about a family appears to be infinite and realistically could neither be covered by present levels of personnel and/or within reasonable time frames, three important areas need to be highlighted because of their direct bearing on the success of child injury investigations.

The areas include information from paramedics and private ambulance companies, and any other pre-hospital care emergency medical service agencies and/or services; data from other medical professionals, e.g., emergency room hospital records and other out-patient medical personnel; and finally an examination of historical records kept on file by local police departments and the Illinois Department of Children and Family Services.

Each of the above are important resources. Paramedics and pre-hospital emergency medical services (EMS) personnel are often the first professional staff on the scene. Their observations and reports can be critical to the investigation process contributing not only information about the injured but the conditions of surrounding environmental factors as well as any preliminary verbal exchanges among family members, witnesses or others. Any form of treatment administered by paramedics during transport is reported and monitored. The nature of the treatment is important to the examining physician in reaching a decision about the cause of the injuries. Special areas that should be investigated are pre-hospital drug and advanced life support care and services performed by paramedics and/or emergency medical services (EMS) pre-hospital personnel.

The gathering of information pertinent to diagnosis and treatment conducted in hospital emergency rooms also provides important facts that aid in reaching a conclusion about the cause of the injury.

With regard to requesting information from paramedics, emergency room personnel and other hospital professionals, it is important for the investigator to specifically request *all* documents relevant to the case.

It has been shown that requesting information about a case from the medical records department of a hospital may not result in delivery of data covering paramedic or emergency room treatment. Paramedic records may also be subpoenaed from the local fire department or ambulance company.

Finally, obtaining information covering the police history of a suspected perpetrator and whether social or psychotherapeutic services are being received by the family as a result of previous contact with the Department of Children and Family Services may be critical in the decision-making process regarding prevention of harm to other family members.

APPENDIX L

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