Preschoolers With Syphilis

Cindy W. Christian, MD*; Jane Lavelle, MD‡; and Louis M. Bell, MD‡§

ABSTRACT. Syphilis in preschoolers is rarely described in current medical literature, despite the rise in syphilis in both the adult and the pediatric populations during the past decade. Since that time, 3 children between 3 and 4 years of age have been diagnosed with syphilis at the Children's Hospital of Philadelphia. The presentations and clinical manifestations of syphilis in these 3 children are described, and the difficulty in identifying the source of infection is discussed. The presentations of these children included nephrosis and secondary syphilis, the corymbiform and palmar rash of syphilis, and subtle signs of late congenital infection in an otherwise asymptomatic child. One child had documented congenital infection, 1 had probable congenital infection that went untreated, and 1 did not have appropriate neonatal testing documented. None of the children gave a verbal history of sexual abuse, although it is likely that all three cases resulted from sexual abuse. The evaluation of preschool children with syphilis is confounded by the interpretation of acquired infection in consideration of a history of possible or documented congenital disease. The assessment is complicated further by problems with recognition of clinical disease, the inability of young children to provide a history, prenatal and neonatal testing methods used, changes in treatment recommendations made during the past decade, and inadequate follow-up to document cure of congenitally infected infants. With the increase in syphilis seen in recent years, physicians are more likely to encounter preschoolers with syphilis. Our ability to document acquired infection, however, is hampered by the difficulties encountered in following recommended guidelines for evaluation and follow-up and by limitations in interviewing young victims of sexual abuse, which may impair our ability to protect children from additional harm. Understanding the pathophysiology and progression of this disease remains challenging even in this modern era. *Pediatrics* **1999;103(1). URL: http://www.pediatrics.org/cgi/content/full/103/1/e4; *syphilis, child abuse.***

ABBREVIATIONS. RPR, rapid plasma reagin; CSF, cerebrospinal fluid; VDRL, venereal disease research laboratory (test); HIV, human immunodeficiency virus; FTA, fluorescent treponemal antibody absorption; MHA-TP, microassay for antibodies to *Treponema pallidum*.

From the Divisions of *General Pediatrics, ‡Emergency Medicine, and §Immunologic and Infectious Diseases, Children's Hospital of Philadelphia, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania.
Received for publication Aug 25, 1997; accepted Jul 29, 1998.
Address correspondence to Cindy W. Christian, MD, Division of General Pediatrics, Children's Hospital of Philadelphia, Rm 2416, 34th St at Civic Center Blvd, Philadelphia, PA 19104.

The incidence of both acquired and congenital syphilis has risen significantly during the last decade.[1,2] Since that time, 3 children between 3 and 4 years of age have been diagnosed with syphilis at the Children's Hospital of Philadelphia. Determining the etiology of their infection has proven challenging. Because of the social and legal implications of syphilis in a child, identifying the mode of infection is of utmost importance. These cases illustrate the manifestations of syphilis in preschool children, which have been described infrequently in current medical literature. In addition, the dilemmas encountered in evaluating young children with syphilis are presented.

CASE 1

A 3-year-old girl was referred to our hospital for evaluation of nephrosis. She was born at 25 weeks' gestation to a 24-year-old woman who received no prenatal care. Maternal and infant rapid plasma reagin (RPR) testing was not obtained at the time of delivery. Five months before referral, the child developed a red and white papular lesion on the labia majora. The child was evaluated by her primary care physician, and the lesion resolved after 1 week. Four months later this lesion returned. Subsequently, the child developed progressive edema, diarrhea, cough, and fever. Urinalysis performed by her primary care physician was consistent with nephrosis. The child lived with her mother, grandmother, grandmother's boyfriend, older sister, and a few family friends. Because the mother was drug-addicted, the child's primary caregiver was her grandmother. There were no behavioral changes or concerns identified by the family.

Physical examination at the time of referral revealed a mildly ill-appearing child. She had generalized edema, cervical adenopathy, bilateral rales, and ascites. She had no hepatosplenomegaly. Her genital examination revealed a 1 × 1.5-cm painless, slightly erythematous papule of the right posterior labia majora with surrounding hyperpigmentation (Fig 1). There was no vaginal discharge. The hymen was annular, without transections or notching. Two small synechiae were present from the hymen to vestibule at the 2 and 4 o'clock positions. The anal rugae were slightly edematous, but no injuries were identified. Urinalysis revealed hematuria and proteinuria and a 12-hour urine collection demonstrated 1.4 g/M^2/d of protein. Dark-field examination of the labial lesion was negative for *Treponema pallidum*. RPR results were positive at 1:32 and microhemagglutination assay for antibodies to *T pallidum* (MHA-TP) was reactive. The cerebrospinal fluid (CSF) profile was normal, and the CSF venereal disease research laboratory (VDRL) test result was negative. Cultures for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* from the vagina and rectum were negative. Results of human immunodeficiency virus (HIV) serology studies were negative at the time of admission and 4 months later. After consideration of the clinical findings and laboratory data, acquired secondary syphilis with associated glomerulonephritis was diagnosed. Treatment with 3 weekly doses of benzathine penicillin, 50 000 U/kg, was completed, and her nephrosis resolved. The mother and child were interviewed by the physician and social worker on the hospital's child protection team. The mother reported a history of gonorrhea and syphilis, both of which were treated previously. The mother's RPR finding at the time of her daughter's infection was not documented. The child gave no history of sexual abuse, in part because her verbal

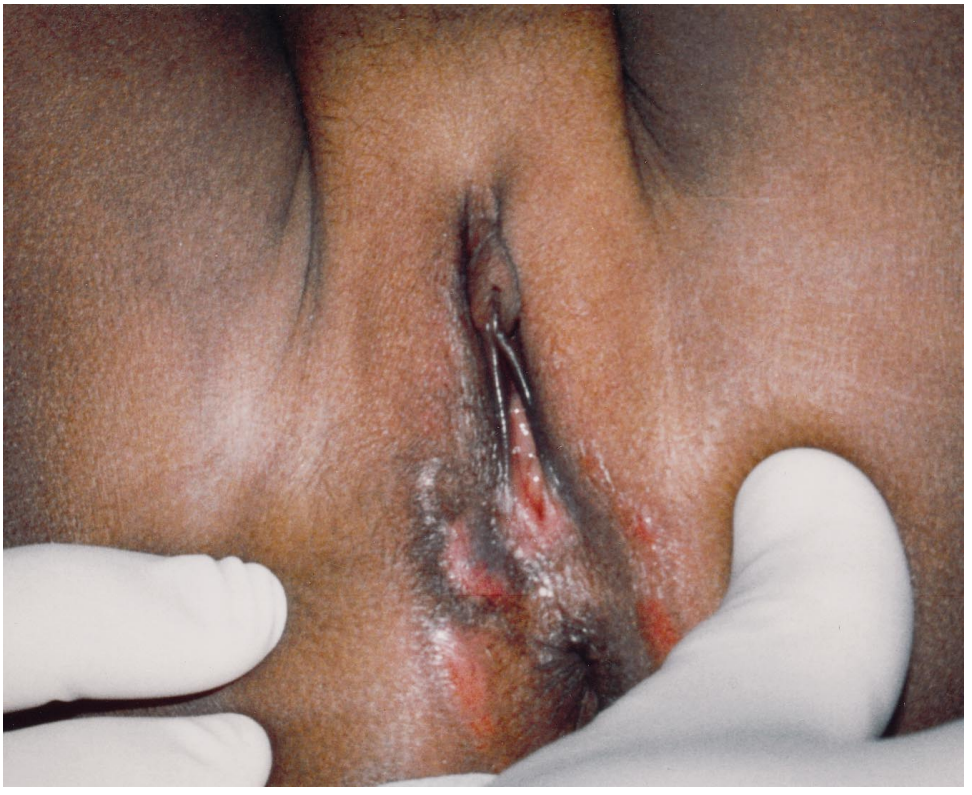

Fig 1. Three-year-old girl with resolving condyloma lata.

skills were not well-developed. A report of suspected child abuse was made to the county child welfare agency. Because the identity of the perpetrator was not known at the time of diagnosis, the child was discharged into foster care. Additional interviews were conducted by county social workers, none of which revealed the identity of a perpetrator. The child was returned to her mother's care within weeks of discharge from the hospital. The identity of the perpetrator was never known.

CASE 2

A 3½-year-old boy was referred to our emergency department by his primary care physician for additional evaluation of a rash. The child had been well until 1 week before, when he developed a mildly pruritic rash on his feet that spread to his extremities and trunk. He was otherwise well. His physical examination was notable for red–brown papules, 3 to 10 mm in diameter, which were scattered on the trunk and concentrated on the palms, soles, lower legs, and groin (Fig 2). There also was a 2.5-cm oval, slightly erythematous plaque on the child's back. There was no hepatosplenomegaly or adenopathy. His genital examination revealed the rash on his penis and scrotum, but no signs of injury. The RPR finding was positive at 1:256 and fluorescent treponemal antibody absorption (FTA-Ab) was reactive, and the family was asked to return for treatment. On return, both mother and child denied a history of abuse or a previous genital rash. However, the mother revealed that she had been treated for syphilis at the time of this child's birth. The child was referred to the hospital's child protection team for additional evaluation and treatment. The child lived with his mother, her boyfriend, the maternal grandmother, and his siblings. There were no behavioral concerns noted by the mother. The child was interviewed alone by the protection team's social worker. He did not reveal a history of sexual abuse. A review of the mother's medical records revealed that she was RPR-negative in 1985 and 1989, but at the time of the patient's birth in 1990, she had a positive RPR titer of 1:2 with a reactive FTA-Ab. This infant had a negative RPR result by cord blood study at the time of his birth and received no treatment. Documentation of the mother's outpatient treatment was not found. Interestingly, the mother's RPR titer again was positive at 1:16 1 year preceding this child's presentation, at which time she was treated with three doses of benzathine penicillin. The mother's RPR titer was not documented at the time of the child's diagnosis.

A search for late manifestations of congenital syphilis, including long bone films; CSF analysis; and ophthalmologic, dental, and audiologic evaluations, was conducted. The lumbar puncture was normal, and the CSF VDRL was negative. Long bone radiographs and a panorex of the mouth were normal. Cultures for *N gonorrhoeae* and *C trachomatis* were negative. HIV serology was negative. Treatment with three weekly doses of 50 000 U/kg of intramuscular benzathine penicillin was completed. A report of suspected sexual abuse was made to the county's child welfare agency. The child was interviewed again by the county social workers and, again, did not reveal a history of abuse. The investigation failed to identify additional evidence of sexual abuse and was determined unfounded. The etiology of the infection was never understood clearly. Although the maternal history of syphilis at the time of the child's birth makes latent congenital syphilis an (unlikely) possibility, it was felt that this case most probably represented secondary acquired syphilis and sexual abuse.

CASE 3

A 4-year-old was referred to our hospital for evaluation and treatment of syphilis. She had been born at term to a 26-year-old woman with no prenatal care and a history of cocaine and alcohol abuse. The mother was treated for syphilis 1 year before the birth of this child. At birth, both the mother and the infant had a negative RPR titers. At this time, the mother was treated for fever with 10 days of intravenous antibiotics. At 5 weeks of age, the infant developed nasal congestion, tachypnea, and a protuberant abdomen. Her physical examination was significant for cervical and axillary adenopathy, hepatosplenomegaly, and palmar rash. An RPR titer was positive at 1:252. CSF profile was normal, with a positive VDRL finding. The child was diagnosed with congenital neurosyphilis and was treated with a 10-day course of 50 000 U/kg/d of intravenous penicillin G. The child was discharged from the hospital after treatment and was lost to follow-up.

Four years later, an RPR was obtained during a well-child examination, after a caregiver revealed a possible history of congenital syphilis. The RPR titer was positive at 1:512, and the child was admitted for treatment. The physical examination was notable for mild frontal bossing and mild hepatomegaly. The genital examination was normal. CSF profile was normal, and the result of CSF VDRL tests was negative. The hospital's child protection team was consulted. There was no known history of sexual abuse, and the child failed to reveal a history of abuse during hospital interviews. Genital cultures for *N gonorrhoeae* and *C trachomatis*, hepa-

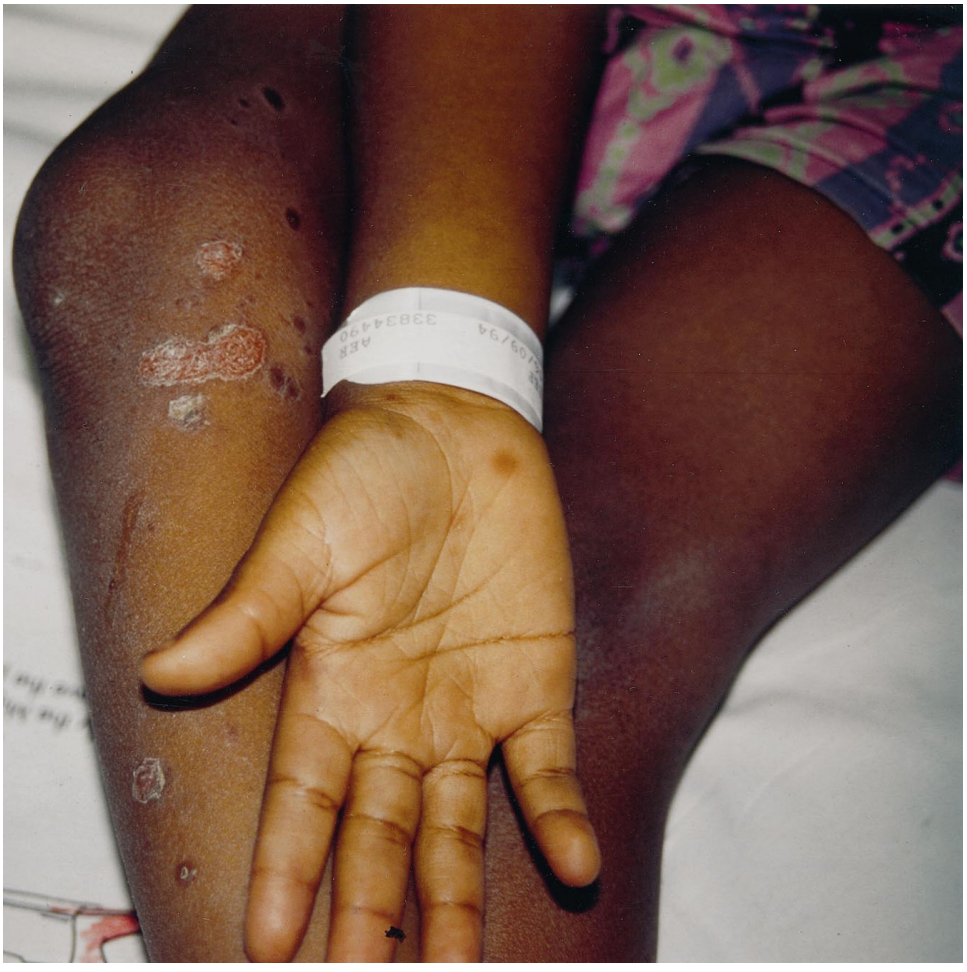

Fig 2. Three-year-old boy with the corymbiform and palmar rash of syphilis.

titis B, and HIV serologies were negative. Results of eye and hearing examinations and long-bone films were normal. A panorex revealed mild tapering of the incisors, suggestive of Hutchinson teeth. Because of her history of syphilis and her previous loss to follow-up, the child was treated with a 10-day course of intravenous penicillin G at 300 000/U/kg/d. The diagnosis of suspected sexual abuse resulted in a report to the county child welfare agency. The child never revealed a source of infection, and the diagnosis of sexual abuse was never confirmed. On follow-up, the child remained well with declining RPR titers.

DISCUSSION

Syphilis in preschoolers is rarely described in modern medical literature. These three cases represent the difficulty in identifying the source of infection in young children whose verbal skills are immature and whose medical history includes or may include congenital infection.

The diagnosis of acquired syphilis and sexual abuse in the first case was based on the clinical history, results of physical examination, and natural history of syphilitic nephropathy. The child was seen with a syphilitic chancre and again with resolving condyloma lata that initially went undiagnosed. Because syphilis is an uncommon infection in prepubertal children, physicians may fail to consider the diagnosis in a young child even when the manifestations are classic for the disease.[3] Glomerulonephritis is an uncommon but well-described manifestation of both congenital and acquired syphilis,[4,5] and results from the deposition of treponemal antigen-antitreponemal antibody complexes in the glomerulus.[6] In congenital syphilis, nephrosis develops as a manifestation of early disease, usually presenting in the first few months of life. Conversely, nephropathy is a manifestation of secondary syphilis in older patients with acquired syphilis. Although rare in prepubertal children, syphilitic nephropathy has been reported in a 10-year-old child with acquired syphilis.[7] Our patient had a history of a recurrent genital lesion that was consistent both in appearance and in timing with a primary syphilitic chancre followed by condyloma lata. The nephrotic syndrome was related temporally to the recurrence of the genital rash, consistent with acquired secondary syphilis.

Syphilis remains an uncommon complication of child abuse.[8,9] Ingram et al[8] tested 1263 prepubertal children being evaluated for sexual abuse for syphilis and found disease in 1 patient. This was an asymptomatic 1-year-old child whose parents both tested positive for syphilis. Horowitz and Chadwick[9] reported secondary syphilis in only two 5-year-old children of >6000 children evaluated for sexual abuse. In these reported cases and in our preschool children, a history of sexual abuse was not obtained. The diagnosis of child sexual abuse usually relies on a clear history of sexual contact provided by the child. This can prove difficult when the victim is quite young. Although the finding of genital trauma or a sexually transmitted disease at times can be

diagnostic of sexual abuse, identifying the source of the abuse and protecting the child from additional molestation can prove difficult without a history of sexual contact.[9] The American Professional Society on the Abuse of Children has published practice guidelines for the psychosocial evaluation of suspected sexual abuse in young children.[10] These guidelines recommend that a series of forensic interviews be conducted by experienced evaluators who have advanced training in child development and child sexual abuse. Although additional forensic interviewing may have revealed a history of abuse, lower rates of disclosure have been reported for children younger than 5 years of age.[11,12]

The source of infection in case 2 was never understood clearly. This child was 3½ years old when he presented with the papulosquamous rash of syphilis. This rash is typically seen in early congenital syphilis or in acquired secondary syphilis. The year before this child's birth, the mother's RPR finding was negative. At the time of delivery, the mother had a reactive RPR and FTA-Ab and was in either primary or secondary syphilis. Vertical transmission rates are extremely high (70%–100%) in the first 4 years after maternal acquisition of disease.[13] Furthermore, for mothers with untreated secondary syphilis, virtually all newborns are infected.[13] Cord blood was used to screen this infant for disease. This method is associated with false-negative results[14] and is not recommended by the American Academy of Pediatrics.[15] However, regardless of the infant's serologic findings, the child had met criteria for a diagnosis of presumed congenital syphilis in that he was born to a mother who had evidence of syphilis and who had not received adequate treatment. Thus, it is probable that congenital infection went undiagnosed and untreated.

A search for late manifestations of congenital syphilis was negative. Late manifestations of congenital infection, however, are found in only 40% of untreated patients,[16] and some, such as keratitis and joint disease, typically appear in later childhood.[15] The child was never treated for presumed congenital infection. Although untreated congenital syphilis offers some protection against subsequent infection, the protection is not complete and also may moderate the symptoms of subsequent exposure.[17] If the child's illness had progressed to latent congenital infection before diagnosis, the prolonged asymptomatic period before onset of dermal findings would be difficult to explain. It has been postulated by others that antibiotic treatment for common childhood illnesses may result in inadvertent partial treatment of congenital syphilis, greatly altering the manifestations of late disease.[18] The possibility of acquired secondary syphilis was strongly considered. Again, however, the child failed to disclose a source of infection, both during the medical evaluation and during subsequent interviews with child welfare social workers. Despite efforts to understand this child's presentation, the case remains an enigma.

The third case highlights the difficulty in identifying the source of infection when response to treatment of congenital disease is documented inadequately. Although recommendations for follow-up are widely available,[15] little is written about follow-up rates and the natural course of disease in the pediatric population. The infant originally presented at 5 weeks of age with the classic stigmata of early congenital syphilis. She received the standard antibiotic therapy for congenital neurosyphilis at that time.[19] That year, the Centers for Disease Control amended the set of treatment guidelines for congenital syphilis, recommending the current higher dose of 100 000 to 150 000 U/kg/d with aqueous crystalline penicillin G.[20] The central nervous system may harbor the organism and serve as a source of relapse because of inadequate CSF penicillin levels achieved when lower-dose penicillin is used.[21] The child in this case had a positive CSF VDRL result as a neonate and was treated with lower-dose penicillin. Although it is possible that her treatment was incomplete, the fact that the central nervous system had been cleared of infection supports adequate neonatal therapy. Although the findings of frontal bossing and possible Hutchinson teeth support a diagnosis of late congenital disease, treatment of congenital infection does not protect against the development of Hutchinson teeth completely.[22] Once again, efforts to understand the etiology of the child's infection failed. The possibility of acquired disease and sexual abuse was considered, but interviews by the child protection physician and child welfare agency staff did not reveal a history of sexual abuse.

In conclusion, the evaluation of the preschool child with syphilis is confounded by the interpretation of acquired infection in consideration of a previous history of possible or documented congenital disease. The evaluation is complicated further by problems with recognition of clinical disease, the inability of young children to provide a history, prenatal and neonatal testing methods used, changes in treatment recommendations, and inadequate follow-up to document cure of congenitally infected infants. With the increase in syphilis seen in recent years, physicians are more likely to encounter preschoolers with syphilis. It is likely that these three cases resulted from sexual abuse. Our ability to document acquired infection, however, is hampered by the difficulties encountered in following recommended guidelines for evaluation and follow-up and by limitations in interviewing young victims of sexual abuse, which may impair our ability to protect children from additional harm. Understanding the pathophysiology and progression of this disease remains challenging even in this modern era.

REFERENCES

1. Berry MC, Dajani AS. Resurgence of congenital syphilis. *Infect Dis Clin North Am.* 1992;6:19–29
2. Centers for Disease Control. Primary and secondary syphilis—US, 1981–1990. *MMWR.* 1991;40:314–315, 321–323
3. Ginsburg CM. Acquired syphilis in prepubertal children. *Pediatr Infect Dis J.* 1983;2:232–234
4. Hill LL, Singer DB, Falletta J, Stasney R. The nephrotic syndrome in congenital syphilis: an immunopathy. *Pediatrics.* 1972;49:260–266
5. Herrmann G, Marr WL. Clinical syphilitic nephropathies. *Am J Syphilis Neurol.* 1935;19:1–29
6. Gamble CN, Reardan JB. Immunopathogenesis of syphilitic glomerulonephritis. Elution of antitreponemal antibody from glomerular im-

mune-complex deposits. *N Engl J Med.* 1975;292:449–454
7. Loghman-Adam M, Heredia LR, Levy H. Syphilitic nephropathy in a 10-year-old boy? *Hosp Pract.* 1984;19:84JJ, 84NN. Office edition
8. Ingram DL, Everett VD, Lyna PR, White ST, Rockwell LA. Epidemiology of adult sexually transmitted disease agents in children being evaluated for sexual abuse. *Pediatr Infect Dis J.* 1992;11:945–950
9. Horowitz S, Chadwick DL. Syphilis as a sole indicator of sexual abuse: two cases with no intervention. *Child Abuse Negl.* 1990;14:129–132
10. American Professional Society on the Abuse of Children. *Psychosocial Evaluation of Suspected Sexual Abuse in Young Children*. Chicago, IL: American Professional Society on the Abuse of Children; 1995
11. Cantlon J, Payne G, Erbaugh C. Outcome-based practice: disclosure rates of child sexual abuse comparing allegation blind and allegation informed structured interviews. *Child Abuse Negl.* 1996;20:1113–1120
12. Gordon S, Jaudes PK. Sexual abuse evaluations in the emergency department: is the history reliable? *Child Abuse Negl.* 1996;20:315–322
13. Zenker PN, Berman SM. Congenital syphilis: trends and recommendations for evaluation and management. *Pediatr Infect Dis J.* 1991;10:516–522
14. Chhabra RS, Brion LP, Castro M, Freundlich L, Glaser J. Comparison of maternal sera, cord blood, and neonatal sera for detecting presumptive congenital syphilis: relationship with maternal treatment. *Pediatrics.* 1993;91:88–91
15. American Academy of Pediatrics. Syphilis. In: Peter G, ed. *1997 Red Book. Report of the Committee on Infectious Diseases*. 24th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997:507
16. Gutman LT. Syphilis. In: Feigin RD, Cherry JD, eds. *Textbook of Pediatric Infectious Diseases.* 4th ed. Philadelphia, PA: WB Saunders Co; 1998;2:1549
17. Fiumara NJ. Acquired syphilis in three patients with congenital syphilis. *N Engl J Med.* 1974;290:1119–1120
18. Schulz KF, Murphy FK, Patamasucon P, Meheus AZ. Congenital syphilis. In: Holmes KK et al, eds. *Sexually Transmitted Diseases.* New York, NY: McGraw-Hill; 1990;821–842
19. American Academy of Pediatrics. Syphilis. In: Peter G, ed. *1988 Red Book. Report of the Committee on Infectious Diseases*. 21st ed. Elk Grove Village, IL: American Academy of Pediatrics; 1988:403
20. Centers for Disease Control. 1989 Sexually transmitted diseases treatment guidelines. *MMWR.* 1989;38(S-8):1–43
21. Azimi PH, Janner D, Berne P, et al. Concentrations of procaine and aqueous penicillin in the cerebrospinal fluid of infants treated for congenital syphilis. *J Pediatr.* 1994;124:649–653
22. Putkonen T. Does early treatment prevent dental changes in congenital syphilis? *Acta Dermato-Venereologica.* 1963;43:240–249

Preschoolers With Syphilis

Cindy W. Christian, Jane Lavelle and Louis M. Bell

Pediatrics 1999;103;e4
DOI: 10.1542/peds.103.1.e4

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Preschoolers With Syphilis

Cindy W. Christian, Jane Lavelle and Louis M. Bell

Pediatrics 1999;103;e4
DOI: 10.1542/peds.103.1.e4