

AMERICAN ACADEMY OF PEDIATRICS

Committee on Pediatric AIDS and Committee on Infectious Diseases

Issues Related to Human Immunodeficiency Virus Transmission in Schools, Child Care, Medical Settings, the Home, and Community

ABSTRACT. Current recommendations of the American Academy of Pediatrics (AAP) for infection control practices to prevent transmission of blood-borne pathogens, including human immunodeficiency virus (HIV) in hospitals, other medical settings, schools, and child care facilities, are reviewed and explained. Hand-washing is essential, whether or not gloves are used, and gloves should be used when contact with blood or blood-containing body fluids may occur. In hospitalized children, the 1996 recommendations of the Centers for Disease Control and Prevention (CDC) should be implemented as modified in the 1997 *Red Book*. The generic principles of Standard Precautions in the CDC guidelines generally are applicable to children in all health care settings, schools, child care facilities, and the home. However, gloves are not required for routine changing of diapers or for wiping nasal secretions of children in most circumstances. This AAP recommendation differs from that in the CDC guidelines.

Current US Public Health Service guidelines for the management of potential occupational exposures of health care workers to HIV are summarized. As previously recommended by the AAP, HIV-infected children should be admitted without restriction to child care centers and schools and allowed to participate in all activities to the extent that their health and other recommendations for management of contagious diseases permit. Because it is not required that the school be notified of HIV infection, it may be helpful if the pediatrician notify the school that he or she is operating under a policy of nondisclosure of infection with blood-borne pathogens. Thus, it is possible that the pediatrician will not report the presence of such infections on the form. Because HIV infection occurs in persons throughout the United States, these recommendations for prevention of HIV transmission should be applied universally.

ABBREVIATIONS. HIV, human immunodeficiency virus; AIDS, acquired immunodeficiency syndrome; CDC, Centers for Disease Control and Prevention; AAP, American Academy of Pediatrics; CI, confidence interval.

The geographic occurrence of human immunodeficiency virus (HIV) infection has expanded to involve the entire United States. The numbers of HIV-infected children have paralleled the reported cases of HIV infection and acquired immunodeficiency syndrome (AIDS) in women. Of infected women, 80% are of childbearing age, and more than 25% of women with AIDS are from smaller cities or rural areas of the United States.^{1,2} Therefore, infection control recommen-

dations based on the regional prevalence of HIV are no longer appropriate, and recommendations are applicable universally.

In 1996, the Centers for Disease Control and Prevention (CDC) issued revised recommendations for infection control practices and isolation precautions for hospitalized patients.³ The American Academy of Pediatrics (AAP) has explicit exceptions to the CDC guidelines for the care of children both within and out of the hospital.

In the United States, 90% of pediatric HIV infection has been acquired by maternal-to-infant transmission. Currently, almost all cases of HIV infection in children younger than 13 years are acquired perinatally. The HIV-exposed and HIV-infected infants and children are nurtured at home or in foster homes, cared for in child care centers, educated in schools, and participate in community activities. The education of children and their caregivers about HIV should include a discussion of the potential risk and means of transmission of HIV. Education should promote understanding about the importance of maintaining confidentiality associated with HIV infection and compassion for families with HIV infection. All persons responsible for the care of children need to understand appropriate infection control practices to protect HIV-infected children, as well as their caregivers, family members, and playmates, from acquiring transmissible infections.

A better understanding of the longitudinal course of HIV infection has developed in the almost 2 decades since the beginning of the HIV epidemic. Although symptoms commonly develop in HIV-infected children during the first 2 years, the symptoms may be nonspecific, and the child's HIV infection may not be appreciated.⁴ The spectrum of disease includes 10% to 20% of infected children likely to die by 4 years of age and a continuum of children, the remaining 80% to 90%, whose median survival will exceed 9 years of age.^{5,6} The majority of HIV-infected children will attend child care and school, a substantial number of these children will reach adolescence, and some will reach adulthood. In addition, adolescents are at risk of acquiring HIV infection through sexual intercourse and intravenous drug use; an estimated 20% of adults with AIDS were infected with HIV as teenagers. Hence, appropriate infection control practices in the care of children of all ages and settings are necessary to prevent transmission of blood-borne pathogens and other communicable diseases.

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

PEDIATRICS (ISSN 0031 4005). Copyright © 1999 by the American Academy of Pediatrics.

HIV TRANSMISSION

Understanding HIV transmission is fundamental to appropriate infection control practices. This virus preferentially infects and replicates in cells expressing CD4 and other coreceptors. These cells include the CD4 lymphocytes, monocytes, macrophages, and cells in many different tissues. The virus has been recovered from blood and other body fluids, including cerebrospinal fluid, human milk, semen, vaginal and cervical secretions, amniotic fluid, saliva, tears, and synovial, pleural, peritoneal, and pericardial fluids. Other body fluids and secretions that are visibly contaminated with blood may contain HIV and pose a risk of transmission.

All body fluids containing HIV pose a theoretical risk, but some (eg, tears, urine, and stool) have not been implicated in transmission of the virus. A sufficient quantity of virus and a portal of entry that permits infection of host cells are required for transmission. The three recognized settings in which HIV transmission occurs are as follows: 1) from a mother with HIV infection to her infant during pregnancy, delivery, or breastfeeding; 2) direct inoculation of infected blood or blood-containing tissues, including transfusion, transplantation of organs or tissues, and use of contaminated needles or penetrating injuries with needles or sharp objects contaminated with blood; and 3) between sex partners by contact with infected semen, vaginal or cervical secretions, or blood with mucosal surfaces.

Exposure to larger amounts of virus increases the likelihood of transmission. Therefore, the titer of HIV in the inoculated material, the volume of blood or inoculated fluid, and the route of exposure (intravenous vs skin or mucous membrane contact) may contribute to the risk of transmission. Varying degrees of risk are based on the type of exposure. The risk of acquiring infection after transfusion with infected blood has been estimated to be as high as 95%.⁷ The risk of transmission to a newborn from an infected mother who is not receiving antiretroviral therapy has been estimated to be between 15% and 30% in the United States and Europe.⁸⁻¹⁰ The risk of transmission after a single percutaneous exposure to HIV-infected blood has been calculated from multiple prospective studies to be 0.2% (95% confidence interval [CI], 0.1%–0.5%)¹¹⁻¹⁷ and after mucous membrane exposure, 0.10% (95% CI, 0.01%–0.50%).¹⁶

Transmission of HIV from infected children or infected adults to uninfected persons during routine daily activities, such as household care, is rare and likely to be related to unrecognized and unprotected exposure to blood or infectious body fluids.

STANDARD PRECAUTIONS IN ACUTE CARE HOSPITALS

Hospital infection control practices to protect patients and health care workers from acquiring pathogenic microorganisms have been revised in response to new developments, including information about the epidemiology of HIV infection. The occurrence of HIV infection in the 1980s led to inclusion of body fluids containing blood in a specific precaution cat-

egory for all patients (1985), termed *Universal Precautions*.^{3,18} Blood is the single most important source of HIV in the occupational setting. Other fluids, including semen and vaginal fluid, have been implicated in sexual transmission of HIV infection. The use of gloves and hand-washing were recommended for the prevention of exposure to all fluids implicated in transmission and for those such as amniotic and cerebrospinal fluid, for which the risk of transmission is unknown. Body fluids contaminated with blood are considered potentially infectious, and gloves were recommended. Feces, nasal secretions, sputum, sweat, tears, urine, and vomitus were not included in universal precautions unless visibly contaminated with blood.¹⁹⁻²¹

Recently, national guidelines for isolation precautions in hospitals have been revised by the CDC. Standard Precautions, which replace Universal Precautions, are designed to reduce the risk of transmission of all pathogens, including HIV, in hospitals. Hand-washing is fundamental to decreasing transmission of infection. The CDC guidelines recommend gloves to provide a protective barrier and to prevent gross contamination of the hands when touching blood, body fluids, secretions, excretions, mucous membranes, and the nonintact skin of all hospitalized patients. Gloves may reduce the contamination of the caregivers hands. If gloves are used, caregivers must remove the gloves and wash their hands after each child's diaper changing.

Healthy newborn infants born in a hospital and healthy infants and young children must have their excretions and secretions attended to by an adult. However, no data indicate that gloves are necessary for routine changing of diapers or for wiping the tears or noses of healthy infants or HIV-exposed or HIV-infected infants. The AAP, as a result, recommends that for children, including those exposed and infected with HIV, gloves are not mandatory when changing diapers, wiping tears, or blowing noses of children in the hospital.²² This recommendation differs from that in the CDC guidelines for hospitalized patients. Nevertheless, routine use of gloves for diaper changing in the hospital could minimize the potential transmission of enteric pathogens. When symptoms are present that indicate an illness caused by an agent transmitted by the fecal-oral route or when blood is present in stool or a body fluid, gloves should be used.

RECOMMENDATIONS IN OTHER SETTINGS

Appropriate infection control practices must be taught to all persons in health care settings, including hospitals, outpatient clinics, medical and dental offices, and clinical laboratories. Health care workers should adhere rigorously to infection control precautions to minimize the risk of exposure to blood and body fluids, including avoidance of accidental injury by needles and other sharp instruments. The general principles from which Standard Precautions were developed for hospitalized patients apply to children in all health care settings, as well as in schools, child care settings, and the home. When managing their blood or blood-containing secretions, health care

workers must regard all children as potentially HIV-infected because the infection status of children may not be disclosed by their caregivers.

The elements of these Standard Precautions to prevent transmission of HIV and other blood-borne pathogens as promulgated by the US Public Health Service are listed in the recommendations. The basic protection is hand-washing and fundamental barrier protection is the use of gloves when in contact with blood or other high-risk fluids.

The prevention of percutaneous exposures to blood-borne pathogens, including HIV, requires that injuries with needles or other sharp items contaminated with blood must be avoided. Education is essential for all health care workers to whom percutaneous exposure to sharp instruments can occur. Strategies to avoid such injuries include the substitution of routine needle-syringe combinations with retractable needles, use of retractable needle-butterfly combinations for intravenous infusions, safe handling of needles (eg, not recapping) and other sharp instruments, and providing puncture-resistant containers for the deposit and disposal of needles.

Prospective studies of exposed health care workers suggest that the risk of transmission of HIV by percutaneous exposure is greater than that after mucous membrane or skin exposure. Cutaneous, mucous membrane, or percutaneous blood contact was reported during 30% of vaginal deliveries, 43% of cesarean deliveries, 4% of emergency department procedures, and 30% of operating room procedures.²³⁻²⁵ Therefore, specific areas of the hospital where the potential for exposure to blood is increased include delivery rooms, emergency rooms, and operating rooms. As a general principle, attempts should be made to minimize or prevent emergency mouth-to-mouth resuscitation. Mouth pieces and appropriate resuscitation equipment for the unexpected delivery of a newborn infant regardless of gestational age should be readily available in the emergency department and intensive care units.

Appropriate barrier precautions for operating rooms and delivery rooms include masks, protective eyewear, gloves, and gowns. These precautions apply to persons who have contact with placentas or the blood and amniotic fluid on the skin of newborn infants. Mechanical suction should be used in the care of newborns, and gloves should be worn for umbilical cord care in the nursery. Infants born to known HIV-infected women do not need to be isolated from other infants in the newborn nursery.

In the United States, women who are HIV-infected should not breastfeed their infants because of the additional risk of HIV transmission from breastfeeding and safe alternative sources of nutrition are readily available. Only HIV-seronegative women who are not at high risk of HIV should donate human milk.²⁶ Gloves are not recommended for routine handling of expressed human milk, but should be worn by health care workers in situations in which heavy and repetitive exposures occur, such as in processing milk for milk banking.²⁶

Clinical Laboratories

Health care workers in clinical laboratories need to handle all blood and body fluids as though they are potentially infectious. Specimens of blood and body fluids need to be collected and transported in leak-proof containers for transport and contamination of the outside of the container or laboratory form avoided. Persons processing blood and body fluid specimens should wear gloves as should persons obtaining blood specimens. Masks and protective eyewear should be worn in anticipation of membrane contact with blood or body fluids. Histologic and pathologic or microbiologic culturing done routinely does not require a biological safety cabinet. A safety cabinet (class I or II) must be used for procedures that may generate droplets. Mechanical pipetting devices rather than mouth pipetting should be used. Needles and syringes should be used only when no alternative is available, with appropriate measures to prevent injuries with needles as previously described. Spills involving blood or other body fluids on laboratory work surfaces should be removed and the surface disinfected with a freshly prepared solution of 1:10 household bleach applied for at least 30 seconds, and wiped after the minimum contact time.^{3,20,27} The contaminated materials used in laboratory tests should be disinfected before reprocessing or placed in bags and discarded in accordance with institutional policies for the disposal of infected waste.²⁸ Scientific equipment that has been contaminated with blood or other body fluids should be disinfected and cleaned after use and before repair in the laboratory or transport to the manufacturer. All persons should wash their hands after completing laboratory activities and should remove protective clothing before leaving the laboratory.²¹

Standard sterilization and disinfection procedures for patient care equipment currently recommended for use in health care settings, including hospitals, medical and dental clinics and offices, hemodialysis centers, emergency care facilities, and long-term nursing care facilities, are adequate to sterilize or disinfect instruments, devices, or other items contaminated with other body fluids from persons infected with blood-borne pathogens, including HIV.^{19,29-32}

MANAGEMENT OF OCCUPATIONAL EXPOSURE TO HIV

An *occupational exposure* may place the worker at risk of acquiring HIV infection and is defined as a percutaneous injury or contact of mucous membranes or skin with blood, tissues, or body fluid to which Standard Precautions apply. A system for evaluation, counseling, and follow-up should be available to employees. Workers must be educated before such exposures so that appropriate interventions can be initiated promptly. The relevant information about such an exposure is recorded in the worker's confidential medical record. If the person who is the source of the blood or potentially contaminated material is HIV-seronegative, further follow-up of the exposed worker for HIV is unnecessary.

sary unless the source (or the worker) has recently been exposed to HIV or recently engaged in high-risk behavior. When the source cannot be identified, decisions about appropriate follow-up must be individualized. Serologic testing for HIV should be available to workers who are concerned about possible infection.

In 1998, the CDC issued revised provisional recommendations for chemoprophylaxis in health care workers with occupational exposure to blood from a source known to be HIV-positive, at high risk of HIV infection, or of unknown status.³³ These recommendations are based primarily on a retrospective case-control study of percutaneous exposure to HIV. The factors associated with transmission were demonstrated to be deep injury, visible contamination of the needle or device with blood, procedures for placing a device in a blood vessel, and terminal illness in the source patient.³⁴ Zidovudine given immediately after exposure may be protective for health care workers; the reduction of transmission has been reported to be 79% (95% CI, 43%–94%).³⁴ Despite the limitations inherent in a retrospective case-control study, health care workers should be informed of these data, including the potential to decrease transmission with zidovudine as postexposure prophylaxis. According to current recommendations for chemoprophylaxis, regimens of two or more antiretroviral agents after certain occupational exposure to HIV are indicated. The highest risk exposures include percutaneous exposure to larger quantities of blood, deep injury, and a source of the blood with a high titer of HIV.^{33,35}

HEALTH CARE WORKERS WITH HIV INFECTION

Several large investigations and risk estimates based on modeling techniques indicate that the risk for HIV transmission from an infected health care worker to a patient, even during an invasive procedure, is very low, but no precise estimate of the HIV transmission rate from infected health care workers to patients can be provided.^{36,37} Only one instance in the United States in which HIV was transmitted from an infected health care worker to patients has been substantiated. Transmission occurred in a dental practice, and the mode of virus transmission remains unknown.³⁸ To minimize the risk of HIV transmission, all health care workers should adhere to Standard Precautions. Health care workers with exudative lesions or weeping dermatitis should completely cover the lesion and refrain from direct patient care and from handling equipment used in patient care including devices used to perform invasive procedures. Currently available data provide the basis for the recommendation that in most circumstances, the practice of health care workers infected with HIV should not be restricted.³⁹ The risk to a health care worker of acquiring HIV infection from exposure to infected blood or body fluids is far greater than the risk to a patient of acquiring HIV from an infected health care worker. Universal testing of health care workers for HIV is therefore not recommended.

HOME, CHILD CARE, AND OUT-OF-HOME SETTINGS

Epidemiologic studies of persons with AIDS have identified the most common modes of transmission, ie, sexual, from blood or blood products, and perinatal. Laboratory techniques, such as genetic sequencing, can be used as molecular epidemiologic methods to determine the source of HIV transmission.

In the United States and Europe, studies evaluating the risk of transmission after household contact not involving sex or shared needles have demonstrated no transmission of HIV among 657 HIV-infected persons and more than 1100 uninfected persons, including more than 326 children, followed up for more than 1700 person years.⁴⁰ The 95% CI for the rate of transmission is 0 to 0.2 infections per 100 patient years.⁴⁰ Nevertheless, individual reports of household transmission have appeared.

Six of the eight reported instances of household transmission have involved children.^{41–45} Three of four children and adolescents who acquired the virus from an infected child living in the same household had viruses that were genetically similar to that of the source case.^{17,42,43} A child and adolescent had hemophilia and had received home intravenous therapy on multiple occasions at the same time as their HIV-infected siblings.^{17,43} The mode of transmission is unknown, but intravenous or percutaneous exposure to blood was possible. The third child-to-child household transmission with genetic confirmation was a child living in a household with an HIV-infected child, and unrecognized exposure to blood was possible.⁴² Little information is available about the fourth instance of transmission between siblings.⁴⁵

Two additional instances of household transmission to a child have occurred. In one case, virus from an infected mother was genetically related to that acquired by her 5-year-old child.⁴¹ Contact of the child with mother's bleeding skin and shared use of toothbrushes with known maternal gingival bleeding was reported. In the other, transmission of the virus occurred from child to caregiver, and the opportunity for blood contact existed but was unproven.⁴⁴

All persons who care for children, especially those who are in contact with HIV-infected persons must be educated about appropriate precautions. This recommendation applies to child care because child care facilities place varying numbers of children of different ages in contact in an environment that may be analogous to the home. Children who enter child care should not be required to be HIV tested⁴⁶ or to disclose their HIV status. Disclosure is a decision that should be made in the best interests of the child and is the responsibility of the parents who may want to include the child's pediatrician in the decision-making process. No need exists to restrict the placement of HIV-infected children in child care settings to protect personnel or other children. When medical personnel believe that the probability that the child will expose others to blood or contaminated fluids is

enhanced, an individual decision can be made. Biting is common in preschool and child care settings. Although biting theoretically is a possible mode of transmission of blood-borne illness, such as HIV infection, the risk of such transmission is believed to be extremely low. If a bite results in blood exposure to either person involved, the US Public Health Service recommends postexposure follow-up, including consideration of postexposure prophylaxis.³³

The guidelines, including barrier precautions, for preventing exposure to blood should be observed in households and other settings in which a person infected with HIV resides. Practices that increase the possibility of blood contact, including sharing of razors and toothbrushes, should be avoided. Routine changing of diapers or wiping of noses should be followed by careful hand-washing but does not require gloves unless blood is visible or the child has an infection with another respiratory or fecal pathogen that requires contact precautions. Hands and other parts of the body should be washed immediately after contact with blood even though gloves are used. When blood or blood-containing fluids are spilled, the contaminated surfaces should be cleaned, then disinfected with 30 seconds of contact with a freshly prepared 1:10 dilution of household bleach.

Children with HIV or other chronic illnesses may be immunodeficient, and, thus, their caregivers should be informed of exposure to readily communicable illnesses in child care settings that might compromise their health, such as pneumococcal infections, varicella, or measles.⁴⁷ The policy of child care programs should be to inform all families when such communicable diseases have been identified in any child. Prevention of measles and varicella in any exposed susceptible child is prudent; appropriate preventive measures are recommended in the 1997 *Red Book*^{46,48} and in the 1998 AAP statement.⁴⁹ Exposure of children to tuberculosis, irrespective of HIV infection status, requires notification of families, appropriate evaluation for infection, and prophylaxis or, if infected, treatment.

Schools

Knowledge of a child's HIV status is unnecessary for school entry. Disclosure of a child's HIV status to the school should not be required. The decision to disclose HIV infection status should be made in the best interests of the child and is the responsibility of the parents, who may want to include the child's pediatrician in the decision-making. When a decision is made to notify the school that a child is HIV-positive, the number of persons aware of the child's infection can be limited so that the information is disclosed only to those who need such knowledge to care for the child. This recommendation does not imply that the classroom teacher must be notified.

Discussions about children with HIV infection attending schools have disclosed that discrimination has occurred and that erroneous information, ie, HIV is likely to be transmitted in the school setting, has been given. These situations create unnecessary hardships for children and their families and illustrate the continuing need for community educational

programs about HIV transmission. No cases in the school setting of HIV transmission have been reported, and no epidemiologic data justify excluding children with HIV infection from school or isolating them in school to protect other children. Children who are infected with HIV should be encouraged to participate in all school activities as long as they are able to do so.⁵⁰ Appropriate barrier precautions for blood should be implemented for all children in schools.

The AAP recommends that athletes with HIV infection be permitted to participate in all competitive sports.⁵¹ The confidentiality and the right to privacy of families should be protected. Routine testing of athletes is not indicated. Because it is not recommended that the school be notified of HIV infection, it may be helpful if the pediatrician notifies the school that he or she is operating under a policy of nondisclosure of infection with blood-borne pathogens. Thus, it is possible that the pediatrician will not report the presence of such infections on the form.

Because school personnel will have contact with blood and body fluids, the Occupational Safety and Health Administration Hazard Communication Standard encourages schools to institute employee education as well as routine procedures for handling blood or other body fluids.⁵² Health care workers, teachers, administrators, and other school employees, including maintenance personnel, need to be educated about routine precautions for the prevention of HIV infection and other blood-borne precautions.⁵³ Gloves should be readily available in the event an injury occurs with bleeding that requires intervention. Disinfection of soiled surfaces with a freshly prepared 1:10 dilution of household bleach is recommended.

RECOMMENDATIONS

1. Persons in homes, schools, and child care facilities who may have contact with blood or body fluids containing blood should be educated about Standard Precautions to prevent transmission of HIV and other blood-borne pathogens (see "Home, Child Care, and Out-of-Home Settings"). HIV-infected children and adults should be educated about appropriate precautions.
2. In all settings, blood or blood-containing materials from all children should be handled routinely using Standard Precautions (see "Standard Precautions in Acute Care Hospitals" and "Recommendations in Other Health Care Settings").
3. In health care facilities, hand-washing should be performed immediately before and after patient contact and after glove removal.
4. Standard Precautions for routine use in hospitals are as follows: 1) In addition to gloves, the routine use of gowns and masks to prevent skin and mucous membrane exposure to blood or other body fluids containing blood is recommended. 2) Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood or other body fluids. 3) Hands should be washed immediately after gloves are removed. 4) Blood and blood-containing fluids

- spilled on environmental surfaces should be carefully removed and the surfaces cleaned then disinfected with a freshly prepared 1:10 dilution of household bleach. 5) Gloves should be worn during cleaning and disinfecting procedures.^{19,20}
5. Children known to be HIV-infected should be managed the same as healthy children. Gloves are not required for routine changing of diapers or wiping of nasal secretions.²² This recommendation differs from that in the 1996 CDC guidelines for precautions for hospitalized patients. However, for all hospitalized infants and children with symptoms of an infection that requires contact precautions or with blood in their stool or body fluid, Standard Precautions and gloves always should be used. When gloves are worn for patient contact, the gloves should be removed and hands washed before contact with other patients.
 6. In the delivery room, newborn infants should be handled with gloves until blood and amniotic fluid have been removed from the infants' skin. Resuscitation of an infant requires the additional use of masks and goggles. Personnel handling placentas and umbilical cords also should use gloves. Mechanical suction and other appropriate equipment should be available and used for resuscitation, obviating the need for mouth-to-mouth resuscitation. In other areas of the hospital (eg, emergency department or adult intensive care unit) where a delivery may occur inadvertently, neonatal resuscitation equipment should be available.
 7. Hospitalized children with HIV infection do not require separate waiting rooms or isolation in single hospital rooms unless they have other conditions requiring such isolation.
 8. Needles should never be recapped. Personnel should dispose of syringes, needles, and other sharp instruments in puncture-resistant containers.
 9. Instruments that are contaminated with blood or body fluids should be cleaned according to established methods for sterilization and disinfection or appropriately discarded.
 10. Routine screening of health care workers for HIV is not recommended. No obligation exists to inform patients of a worker's HIV status.
 11. HIV-infected children should be admitted without restriction to child care facilities and schools and allowed to participate in all activities, including competitive sports, to the extent that their health permits and in compliance with recommendations for other infections, such as tuberculosis.
 12. Informing child care and school personnel of a child's HIV status is not required. Because all HIV-infected children will not be identified, policies and procedures should be established to manage potential exposures to blood or blood-containing materials.
 13. These recommendations should be applied universally in the United States. Infection control recommendations based on regional prevalence of HIV are inappropriate.

COMMITTEE ON PEDIATRIC AIDS, 1998–1999

Catherine M. Wilfert, MD, Chairperson
 Jane Ellen Aronson, MD
 Donna T. Beck, MD
 Alan R. Fleischman, MD
 Mark W. Kline, MD
 Lynne M. Mofenson, MD
 Gwendolyn B. Scott, MD
 Diane W. Wara, MD
 Patricia N. Whitley-Williams, MD

LIAISON REPRESENTATIVE

Mary Lou Lindegren, MD
 Centers for Disease Control and Prevention

COMMITTEE ON INFECTIOUS DISEASES, 1998–1999

Neal A. Halsey, MD, Chairperson
 Jon S. Abramson, MD
 P. Joan Chesney, MD
 Margaret C. Fisher, MD
 Michael A. Gerber, MD
 S. Michael Marcy, MD
 Dennis L. Murray, MD
 Gary D. Overturf, MD
 Charles G. Prober, MD
 Thomas N. Saari, MD
 Leonard B. Weiner, MD
 Richard J. Whitley, MD

EX-OFFICIO

Carol J. Baker, MD
 Georges Peter, MD
 Larry K. Pickering, MD

LIAISON REPRESENTATIVES

Anthony Hirsch, MD
 AAP Council on Pediatric Practice
 Richard F. Jacobs, MD
 American Thoracic Society
 Noni E. MacDonald, MD
 Canadian Paediatric Society
 Martin G. Myers, MD
 National Vaccine Program Office
 Walter A. Orenstein, MD
 Centers for Disease Control and Prevention
 Peter A. Patriarca, MD
 Food and Drug Administration
 N. Regina Rabinovich, MD
 National Institutes of Health
 Ben Schwartz, MD
 Centers for Disease Control and Prevention

REFERENCES

1. Centers for Disease Control and Prevention. Update: acquired immunodeficiency syndrome: United States, 1992. *MMWR Morb Mortal Wkly Rep.* 1993;42:547–551, 557
2. Wortley PM, Fleming PL. AIDS in women in the United States: recent trends. *JAMA.* 1997;278:911–916
3. Garner JS. Guidelines for isolation precautions in hospitals. *Infect Control Hosp Epidemiol.* 1996;17:53–80
4. Pizzo PA, Wilfert CM, and the Pediatric AIDS Siena Workshop II. Markers and determinants of disease progression in children with HIV infection. *J Acquir Immune Defic Syndr Hum Retrovirol.* 1995;8:30–44
5. Barnhart HX, Caldwell MB, Thomas P, et al. The natural history of human immunodeficiency virus disease in perinatally infected children: an analysis from the Pediatric Spectrum of Disease Project. *Pediatrics.* 1996;97:710–716
6. Byers B, Caldwell B, Oxtoby M. Pediatric Spectrum of Disease Project: survival of children with perinatal HIV infection: evidence for two distinct populations [abstract]. Presented at the Ninth International Conference on AIDS; June 1993; Berlin, Germany. Abstract WS-C10–6
7. Donegan E, Stuart M, Niland JC, et al. Infection with human immunodeficiency virus type I (HIV-1) among recipients of antibody-positive blood donations. *Ann Intern Med.* 1990;113:733–739

8. Hutto C, Parks WP, Lai S, et al. A hospital-based prospective study of perinatal infection with human immunodeficiency virus type 1. *J Pediatr*. 1991;118:347-353
9. Thomas PA, Weedon J. NY City Perinatal HIV Transmission Collaborative Study Group. Maternal predictors of perinatal HIV transmission [abstract]. Eighth International Conference on AIDS, July 1992; Amsterdam, The Netherlands. Abstract WeC 1059
10. European Collaborative Study. Risk factors for mother to child transmission of HIV-1. *Lancet*. 1992;339:1007-1012
11. Gerberding JL, Bryant-LeBlanc CE, Nelson K, et al. Risk of transmitting the human immunodeficiency virus, cytomegalovirus, and hepatitis B virus to health care workers exposed to patients with AIDS and AIDS related conditions. *J Infect Dis*. 1987;156:1-8
12. Gerberding JL. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus, and cytomegalovirus among health care personnel at risk for blood exposure: final report from a longitudinal study. *J Infect Dis*. 1994;170:1410-1417
13. Henderson DK, Fahey BJ, Willy M, et al. Risk for occupational transmission of human immunodeficiency virus type 1 (HIV-1) associated with clinical exposure: a prospective evaluation. *Ann Intern Med*. 1990;113:740-746
14. Marcus R. Surveillance of health care workers exposed to blood from patients infected with the human immunodeficiency virus. *N Engl J Med*. 1988;319:1118-1123
15. Tokars JL, Marcus R, Culver DH, et al. Surveillance of HIV infection and zidovudine use among health care workers after occupational exposure to HIV-infected blood: the CDC Cooperative Needle Stick Surveillance Group. *Ann Intern Med*. 1993;118:913-919
16. Ippolito G, Puro V, De Carli G. The risk of occupational human immunodeficiency virus infection in health care workers: Italian multicenter study: Italian study group on occupational risk of HIV infection. *Arch Intern Med*. 1993;153:1451-1458
17. Centers for Disease Control and Prevention. HIV infection in two brothers receiving intravenous therapy for hemophilia. *MMWR Morb Mortal Wkly Rep*. 1992;41:228-231
18. Centers for Disease Control and Prevention. Recommendations for preventing transmission of infection with human T-lymphotropic virus type III/lymphadenopathy-associated virus in the workplace. *MMWR Morb Mortal Wkly Rep*. 1985;34:681-686, 691-695
19. Centers for Disease Control and Prevention. Recommendations for prevention of HIV transmission in health-care settings. *MMWR Morb Mortal Wkly Rep*. 1987;36(suppl 2):15-18S
20. Centers for Disease Control and Prevention. Update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other bloodborne pathogens in health-care settings. *MMWR Morb Mortal Wkly Rep*. 1988;37:377-382, 387-388
21. Centers for Disease Control and Prevention. Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. *MMWR Morb Mortal Wkly Rep*. 1989;38(suppl 6):1-37
22. American Academy of Pediatrics. Infection control for hospitalized children. In: Peter G, ed. 1997 *Red Book: Report of the Committee on Infectious Diseases*. 24th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997:104
23. Marcus R, Culver DM, Bell DM, et al. Risk of human immunodeficiency virus infection among emergency department workers. *Am J Med*. 1993; 94:363-370
24. Panlilio AL, Foy DR, Edwards JR, et al. Blood contacts during surgical procedures. *JAMA*. 1991;265:1533-1537
25. Panlilio AL, Welch BA, Bell DM, et al. Blood and amniotic fluid contact sustained by obstetrical personnel during deliveries. *Am J Obstet Gynecol*. 1992;167:703-708
26. American Academy of Pediatrics, Committee on Pediatric AIDS. Human milk, breastfeeding, and transmission of human immunodeficiency virus in the United States. *Pediatrics*. 1995;96:977-979
27. Weber DJ, Barbee SL, Sobsey MD, Rutala WA. The effect of blood on the antiviral activity of sodium hypochlorite, a phenolic, and a quaternary ammonium compound. *Infect Control Hosp Epidemiol*. In press
28. Bauer S. *Protection of Laboratory Workers From Infectious Disease Transmitted by Blood, Body Fluids, and Tissue*. 2nd ed. Villanova, PA: National Committee for Clinical Laboratory Standards; 1991
29. Favero MS. Dialysis-associated diseases and their control. In: Bennett JV, Brachman PS, eds. *Hospital Infections*. 2nd ed. Boston, MA: Little, Brown and Co; 1986:267-284
30. Centers for Disease Control and Prevention. Human T-lymphotropic virus type III/lymphadenopathy-associated virus: agent summary statement. *MMWR Morb Mortal Wkly Rep*. 1986;35:540-542, 547-549
31. Favero MS. Sterilization, disinfection, and antiseptics in the hospital. In: Lennette EH, editor-in-chief; Balows A, Hausler WJ Jr, Shadomy HJ, eds. *Manual of Clinical Microbiology*. 4th ed. Washington, DC: American Society for Microbiology; 1985:129-137
32. Garner JS, Favero MS. *Guideline for Handwashing and Hospital Environmental Control: 1985*. Washington, DC: Centers for Disease Control; 1985
33. Centers for Disease Control and Prevention. Public Health Service guidelines for management of health care worker exposure to HIV and recommendations for postexposure prophylaxis. *MMWR Morb Mortal Wkly Rep*. 1998;147(RR-7):1-33
34. Centers for Disease Control and Prevention. Case-control study of HIV seroconversion in health-care workers after percutaneous exposure to HIV-infected blood: France, UK, and United States: January 1988-August 1994. *MMWR Morb Mortal Wkly Rep*. 1995;44:929-933
35. American Academy of Pediatrics. HIV infection. In: Peter G, ed. 1997 *Red Book: Report of the Committee on Infectious Diseases*. 24th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997:303
36. Chamberland ME. HIV transmission from health care worker to patient: what is the risk? *Ann Intern Med*. 1992;116:871-873
37. Robert LM, Chamberland ME, Cleveland JL, et al. Investigations of patients of health care workers infected with HIV: the Centers for Disease Control and Prevention database. *Ann Intern Med*. 1995;122:653-657
38. Centers for Disease Control and Prevention. Update: transmission of HIV infection during an invasive dental procedure: Florida. *MMWR Morb Mortal Wkly Rep*. 1991;40:21-27, 33
39. Centers for Disease Control and Prevention. Recommendations for preventing transmission of human immunodeficiency virus and hepatitis B virus to patients during exposure-prone invasive procedures. *MMWR Morb Mortal Wkly Rep*. 1991;40(RR-8):1-9
40. Simonds RJ, Chanock S. Medical issues related to caring for human immunodeficiency virus-infected children in and out of the home. *Pediatr Infect Dis J*. 1993;12:845-852
41. Centers for Disease Control and Prevention. Human immunodeficiency virus transmission in household settings: United States. *MMWR Morb Mortal Wkly Rep*. 1994;43:347, 353-356
42. Fitzgibbon JE, Gaur S, Frenkel LD, Laraque F, Edlin BR, Dubin DT. Transmission from one child to another of human immunodeficiency virus type 1 with a zidovudine-resistance mutation. *N Engl J Med*. 1993;329:1835-1841
43. Centers for Disease Control and Prevention. HIV transmission between two adolescent brothers with hemophilia. *MMWR Morb Mortal Wkly Rep*. 1993;42:948-951
44. Centers for Disease Control and Prevention. Apparent transmission of human T-lymphotropic virus type III/lymphadenopathy-associated virus from a child to a mother providing health care. *MMWR Morb Mortal Wkly Rep*. 1986;35:76-79
45. Wahn V, Kramer HH, Voit T, Bruster HT, Scrampical B, Scheid A. Horizontal transmission of HIV infection between two siblings. *Lancet*. 1986;2:694. Letter
46. American Academy of Pediatrics. Measles. In: Peter G, ed. 1997 *Red Book: Report of the Committee on Infectious Diseases*. 24th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997:344-357
47. Centers for Disease Control and Prevention. Guidelines for effective school health education to prevent the spread of AIDS. *MMWR Morb Mortal Wkly Rep*. 1988;37(suppl 2):1-14
48. American Academy of Pediatrics. Varicella-zoster infections. In: Peter G, ed. 1997 *Red Book: Report of the Committee on Infectious Diseases*. 24th ed. Elk Grove Village, IL: American Academy of Pediatrics; 1997:573-585
49. American Academy of Pediatrics, Committee on Infectious Diseases and Committee on Hospital Care. The revised CDC guidelines for isolation precautions in hospitals: implications for pediatrics. *Pediatrics*. 1998;101(3). URL: <http://www.pediatrics.org/cgi/content/full/101/3/e13>
50. American Academy of Pediatrics, Task Force on Pediatric AIDS. Education of children with human immunodeficiency virus infection. *Pediatrics*. 1991;88:645-648
51. American Academy of Pediatrics, Committee on Sports Medicine and Fitness. Human immunodeficiency virus (acquired immunodeficiency syndrome [AIDS] virus) in the athletic setting. *Pediatrics*. 1991;88:640-641
52. American Academy of Pediatrics, Committee on Practice and Ambulatory Medicine. [OSHA Hazard Communication Standard. 1910:1200 as cited in] OSHA. *Materials to Assist the Pediatric Office in Implementing the Bloodborne Pathogen, Hazard Communication, and Other OSHA Standards*. 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics; 1994
53. American Academy of Pediatrics, Committee on Pediatric AIDS. Human immunodeficiency virus/acquired immunodeficiency syndrome education in schools. *Pediatrics*. 1998;101:933-935

**Issues Related to Human Immunodeficiency Virus Transmission in Schools,
Child Care, Medical Settings, the Home, and Community**

Committee on Pediatric AIDS and Committee on Infectious Diseases

Pediatrics 1999;104;318

DOI: 10.1542/peds.104.2.318

**Updated Information &
Services**

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/104/2/318>

References

This article cites 32 articles, 5 of which you can access for free at:
<http://pediatrics.aappublications.org/content/104/2/318#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Infectious Disease
http://www.aappublications.org/cgi/collection/infectious_diseases_sub
HIV/AIDS
http://www.aappublications.org/cgi/collection/hiv/aids_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

**Issues Related to Human Immunodeficiency Virus Transmission in Schools,
Child Care, Medical Settings, the Home, and Community**

Committee on Pediatric AIDS and Committee on Infectious Diseases

Pediatrics 1999;104:318

DOI: 10.1542/peds.104.2.318

The online version of this article, along with updated information and services, is
located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/104/2/318>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 1999 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

