

A bite in the playroom: Managing human bites in child care settings



Canadian
Paediatric
Society

Français en page 522

ABSTRACT

Young children bite each other frequently in child care settings, but the bites rarely break the skin and the risk of infection is minimal. Nevertheless, parents and child care personnel may be concerned about infection, especially with blood-borne viruses. The present document reviews the literature concerning infections following bites in child care settings, and provides recommendations for prevention and management of such incidents.

Key Words: *Bites; Blood-borne viruses; Child care; HBV; HIV*

INTRODUCTION

Young children often bite each other during play or while fighting. An area of concern to parents is the possible transmission of infections, such as viral hepatitis and HIV, from biting incidents in child care settings. Although the risk of infection is minimal, the level of parental anxiety may be high. Physicians need to be able to address these concerns, to counsel parents about biting behaviour and infection risk, and to provide appropriate care after a bite has occurred. The present document is an update of the Canadian Paediatric Society's position statement published in 1998 (1).

A biting incident may result in requests by parents, child care workers and physicians to know the blood-borne virus infection status of the children involved. The very low risk of infection after a bite does not justify breaches in confidentiality concerning medical information. Concern for the potentially exposed child must be balanced against the privacy rights and needs of the infected child. Only the parents or guardians, and those providing medical care for the child, have the right to confidential medical information. Children with blood-borne viruses have the right to attend child care without discrimination. Child care staff, physicians, and parents of other children who become aware of their diagnoses have an ethical obligation to respect the privacy of this information.

SCOPE OF THE PROBLEM

Bites occur frequently in child care settings. In a study (2) of child injuries in three Minneapolis (USA) centres, biting incidents were the most common injuries sustained by

children, comprising 35% of all reported injuries. A review of the literature revealed only two studies of the epidemiology of bites in child care settings. Garrard et al (3), and Solomons and Elardo (4), prospectively followed cohorts of children enrolled in child care, using injury logs maintained by the staff. Of 224 children followed in the Garrard et al study (3), 104 (46%) sustained 347 biting incidents over a one-year period. The total bite rate was 1.5 bites per 100 child-days of attendance. In the study by Solomons and Elardo (4), of 133 children followed, 66 (50%) suffered 224 bites over 3.5 years. The incidence rates were highest with toddlers. Most injuries were to the upper extremities and the face. Only four of 224 bites (2%) broke the skin (4), and no incident resulted in referral to a physician (3,4). Infections were not mentioned. These data suggest that the approximate incidence of biting in a child care setting, with a full-time enrollment of 60 children younger than three years of age, approaches one biting episode per day, of which approximately one every eight to 10 weeks would break the skin.

Frequent biters present a particular problem in child care centres. They should be managed on an individual basis, which may involve behavioural interventions and modifications to the child's environment. Consultation with specialists in behaviour modification may be indicated. A child with continued aggressive biting requiring an inappropriate amount of time from caregivers in a large centre may be better cared for in small family-oriented child care settings (4-6).

VIRAL INFECTIONS

Blood-borne viruses are very unlikely to be transmitted in child care settings. Children with chronic infections, such as hepatitis B virus (HBV), hepatitis C virus (HCV) or HIV who do not have behavioural or clinical risk factors for transmission cannot be excluded from child care facilities (6-8). Nevertheless, a study (9) in the United States reported that only 58% of child care centre directors would accept children with HIV infection, and only 23% would accept children with HBV infection. Children with blood-borne viruses in child care centres may also face discrimination from parents of other children at the centre if their diagnoses become known.

Cited potential risk factors for transmission of blood-borne viruses in child care centres include aggressive behaviour with frequent biting, oozing skin lesions and bleeding disorders (7,8). However, the risk remains theoretical because transmission has so rarely been documented. Most bites by children do not result in blood exposure. Care of children with frequent, severe, aggressive biting behaviour should be individualized according to their special needs. Regardless of blood-borne virus status, the child care setting may not be appropriate.

HBV

HBV is usually transmitted through contact of mucous membranes or open skin lesions with blood, saliva or genital secretions from actively infected individuals. The virus is not transmitted by simple contact of saliva or blood with intact skin. Only a bite resulting in a break in the skin has the potential to transmit the virus.

HBV transmission by bites from older children and adults has been described. There are rare reports (10-13) of HBV transmission in child care settings, in which bites may have been involved. A child with HBV infection who bites another child and breaks the skin can expose the bitten child to the virus. As well, a susceptible child who bites a child with HBV infection may be exposed if blood comes into contact with the oral mucosa of the biting child. In these situations, postexposure prophylaxis is indicated (8,14).

Overall, the risk of transmission of HBV from a biting child appears to be very low. HBV infection is rare in this age group in Canada (15); in provinces in which HBV vaccine is given in infancy, most children in child care are immune. Routine screening of children attending child care is not warranted, and exclusion based on HBV status is not acceptable. However, parents may wish to consider informing child care personnel if their child is a HBV carrier to allow timely implementation of prophylaxis if another child is exposed (6,7).

HIV

There has been no report of HIV transmission in child care. There have been rare reports of transmission of HIV by severe bites by adults in which considerable blood exchange occurred (16). Infectivity of saliva itself is low because saliva is inhibitory to HIV (17). Rare instances of possible transmission of HIV by bites between children in households have been reported, but no bites were actually observed; other potential routes of blood exposure may have been involved (18-20). Thus, transmission of HIV through biting incidents in the child care setting is extremely unlikely.

HIV infection in children in Canada is extremely rare (21). Routine screening of children is not warranted, and parents of HIV-positive children are not required to divulge their child's HIV status to child care personnel. The decision to inform the centre should be made by the parents or guardians in consultation with the child's physician, taking into consideration the child's immune status and

behaviour and the risk to the child of exposure to other pathogens at the child care centre. Exclusion on the basis of the child's HIV status is not acceptable. Postexposure anti-retroviral prophylaxis after a bite by a child is only very exceptionally indicated and should be undertaken only in consultation with paediatric infectious diseases experts (22,23).

HCV

Risk of transmission of HCV after blood exposure is generally estimated to be higher than HIV, but lower than HBV. There have been no reports of transmission in child care. HCV has occasionally been transmitted by adult bites (24); a study (25) in an endemic area identified bites by an infected household carrier as a risk factor for HCV seropositivity. Hepatitis C is uncommon in young children in Canada (26). There is no indication to screen for HCV, and exclusion on the basis of HCV infection is not acceptable. No prophylaxis is available at present.

BACTERIAL INFECTIONS

Bites from young children very rarely lead to bacterial infections. Severe bites arising from fighting incidents among adults may be associated with bacterial infections (27), but such bites are rare in a child care setting where most bites do not break the skin or result in superficial minor abrasions (28). Routine wound care should decrease the risk of infection to almost zero.

RECOMMENDATIONS (B-III)

In the absence of studies specific to child care, these recommendations are based on expert opinion, guidelines from other professional organizations and extrapolations based on virus transmission in other situations. They are given a level of evidence rating of B-III (29).

Administrative issues

- Each child care facility should have written policies for managing child and employee exposures to blood and body fluids, including bite wounds.
- Staff should be adequately trained and regularly updated in the proper care of bite wounds (5).
- First aid equipment for the care of wounds, including gloves, skin disinfectants and dressings, should be available on site and should be readily accessible.
- All parents and personnel should be given information about blood-borne viruses (including how these viruses are acquired, how acquisition can be prevented and the fact that the risk of acquisition in child care settings is extremely low) in a sensitive manner that will help them accept infected children and not reject them if their infection status becomes known (6).
- Parents should be proactively informed that if a serious bite resulting in significant blood exposure occurs,

parents of both children involved will need to be informed of the incident and the children may be referred for medical evaluation.

- Testing for HBV, HIV and HCV cannot be a prerequisite for admission to child care (6-8).
- Children cannot be excluded from child care because of HBV, HCV or HIV infection (6-8).
- Care of a child who is a known HBV carrier and who exhibits frequent aggressive biting should be assessed on an individual basis by the child's physician and the responsible public health authority (8), taking into consideration the needs of the child and the ability of the centre to safely provide the care required.

Prevention of bites

Measures that may help decrease biting incidents (4-7,30):

- Avoidance of stressful situations, frustrations and conflicts.
- Provision of age-appropriate small group activities.
- Observation of how, when and why a child bites, to help guide management.
- Paying attention first to the victim, not the biter.
- Firm statements to the biter that this is not acceptable behaviour and will not be tolerated.
- Directing the biter to appropriate activities.
- Positive reinforcement of appropriate behaviour.
- Collaboration with the family.

For continued frequent aggressive biting:

- Specialist advice in behaviour modification and therapy specifically tailored to the needs of the individual child may be indicated.
- Temporary exclusion from the centre or placement in an alternative type of centre may be required.

HBV

- All child care centre staff should be immunized against HBV (8,31).
- Parents of children attending child care should be encouraged to have their children immunized against HBV (14). In provinces where HBV vaccine is not routinely provided free of charge for infants, paediatricians may need to advocate for free vaccine for children attending child care.
- In a child care setting in which there is a known HBV carrier, all children and staff should be immunized against HBV (6,31). HBV vaccine may be offered to all children in the child care setting without revealing

the identity of the infected child. Public health authorities may be helpful in developing an appropriate strategy.

HIV

- Decisions about child care attendance for a child with HIV infection should be made on an individual basis by the parents in consultation with the child's physician (7,8). The physician should assist the parents in choosing the type of care best suited to the child's needs, taking into consideration the child's developmental status, behaviour, any specific care required, degree of immunodeficiency and risk that an infection acquired in the child care setting may result in serious disease.
- Parents are not obliged to disclose their child's HIV status to the child care centre. Only the parents and the child's physician have an absolute need to know the status (6,8).
- If parents choose to inform the child care centre of their child's HIV status, the number of persons aware of the diagnosis should be kept to the minimum needed to ensure proper care of the child. The information should be kept in strict confidence. Parents of other children should not be informed about the presence of a child with HIV infection in the child care facility.

When a bite occurs

- If the skin is not broken, the wound should be cleaned with soap and water, a cold compress should be applied and the child who was bitten should be gently soothed.
- If the skin is broken (5,6):
 - The wound should be allowed to bleed gently, without squeezing.
 - The wound should be cleaned carefully with soap and water, and a mild antiseptic should be applied.
 - An official report should be written and filed.
 - The parents of both the biter and the bitten child should be notified as soon as possible (preferably within 2 h of the incident).
 - The bite should be reported to local public health authorities, who may elect to refer both the bitten child and the biter to a physician for evaluation of risk of infection and possible need for postexposure prophylaxis.
 - The wound should be observed over the next few days and if redness or swelling develops, the child's parents should be advised to consult a health professional.
- Consult Table 1 for medical evaluation of a child referred for a bite which breaks the skin.

TABLE 1
Medical evaluation of a child referred for a bite which breaks the skin

- The child's tetanus immunization status should be reviewed and updated if necessary (32).
- Prophylactic use of antibiotics should only be considered for bites that cause moderate or severe tissue damage; deep puncture wounds; or bites to the face, hand, foot or genital area that are more than simple superficial abrasions (5,33). These situations are very unlikely to be encountered in a child care setting.
- Hepatitis B virus (HBV) exposure
 - If a child known to be a HBV carrier bites and breaks the skin of a nonimmune or incompletely immunized child, hepatitis B immunoglobulin (0.06 mL/kg intramuscularly [IM]) and HBV vaccine should be administered to the bitten child (8,14).
 - If a nonimmune or incompletely immunized child bites and breaks the skin of a known HBV carrier, hepatitis B immunoglobulin (0.06 mL/kg IM) and HBV vaccine should be administered to the biter (8,14).
 - If a bite breaks the skin of a nonimmune child and the HBV status of the biter is not known, or if a nonimmune child bites a child of unknown HBV status, low risk of infection does not justify HBV testing. The nonimmune child should be given HBV vaccine (8,14).
 - If the HBV status of both children is unknown, low risk of infection does not justify HBV testing. Both children should be given HBV vaccine, unless already fully immunized (7,8,15).
 - Follow-up should be arranged to complete HBV vaccine series as needed, and for HBV serology at six months after known HBV exposures.
- HIV exposure
 - If a child known to have HIV infection bites or is bitten by another child, in the absence of blood in the saliva or in the bite wound, postexposure prophylaxis with antiretroviral agents is not indicated, and there is no obligation to investigate or to disclose the child's HIV status. Confidentiality should be respected (6,22).
 - In the exceptional case in which a bite results in blood exchange by exposure of the buccal mucosa or broken skin to blood, and one of the children involved is known to have HIV infection, consult a specialist in the care of HIV-infected children immediately for advice. Postexposure prophylaxis should be considered only when there is exposure involving deep bloody wounds, which would be very unusual in the child care setting (22). If it is thought that postexposure prophylaxis is indicated, a paediatric infectious diseases or HIV specialist should be consulted. Prophylaxis should be started within a few hours of the exposure, and is not indicated if more than 72 h have elapsed since the bite (22,23,34). Appropriate follow-up should be arranged, including serology for HIV at six weeks, and at three and six months.
 - The rate of HIV seropositivity in children is extremely low in Canada. Given the fact that transmission of HIV by a bite from a known HIV-positive source is also extremely unlikely, screening of children for HIV after a biting incident in child care is not warranted.
- Hepatitis C virus exposure
 - If the blood exposure is considered to be significant, and one of the children involved in the biting incident is known to have hepatitis C virus infection, appropriate follow-up of the exposed child should be arranged, including serology at six months.

REFERENCES

1. Canadian Paediatric Society, Infectious Diseases and Immunization Committee [Principal author: F Boucher]. A bite in the playroom: Managing human bites in day care settings. *Paediatr Child Health* 1998;3:351-7.
2. Strauman-Raymond K, Lie L, Kempf-Berkseth J. Creating a safe environment for children in daycare. *J Sch Health* 1993;63:254-7.
3. Garrard J, Leland N, Smith DK. Epidemiology of human bites to children in a day-care center. *Am J Dis Child* 1988;142:643-50.
4. Solomons HC, Elardo R. Biting in day care centers: Incidence, prevention, and intervention. *J Pediatr Health Care* 1991;5:191-6.
5. Leung AK, Robson WL. Human bites in children. *Pediatr Emerg Care* 1992;8:255-7.
6. Ministère de la santé et des services sociaux du Québec, Comité de prévention des infections dans les centres de la petite enfance. Prévention et contrôle des infections dans les centres de la petite enfance: Guide d'intervention. Sainte-Foy: Les Publications du Québec, 2002:405-7.
7. American Academy of Pediatrics, American Public Health Association, National Resource Center for Health and Safety in Child Care and Early Education. Infectious diseases: Bloodborne infections. Caring for Our Children: National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs, 2nd edn. Elk Grove Village: American Academy of Pediatrics, 2002:300-5. <<http://nrc.uchsc.edu/CFOC/index.html>> (Version current at April 15, 2008).
8. American Academy of Pediatrics. Children in out-of-home care. In: Pickering LK, ed. Red Book 2006: Report of the Committee on Infectious Diseases, 27th edn. Elk Grove Village: American Academy of Pediatrics, 2006:130-44.
9. Juhn YJ, Shapiro ED, McCarthy P, Freudigman K. Willingness of directors of child care centers to care for children with chronic infections. *Pediatr Infect Dis J* 2001;20:77-9.
10. Hayashi J, Kashiwagi S, Nomura H, Kajiyama W, Ikematsu H. Hepatitis B virus transmission in nursery schools. *Am J Epidemiol* 1987;125:492-8.
11. Shapiro CN, McCaig LF, Gensheimer KF, et al. Hepatitis B virus transmission between children in day care. *Pediatr Infect Dis J* 1989;8:870-5.
12. Nigro G, Taliani G. Nursery-acquired asymptomatic B hepatitis. *Lancet* 1989;1:1451-2.
13. McIntosh ED, Bek MD, Cardona M, et al. Horizontal transmission of hepatitis B in a children's day-care centre: A preventable event. *Aust N Z J Public Health* 1997;21:791-2.
14. American Academy of Pediatrics. Hepatitis B. In: Pickering LK, ed. Red Book 2006: Report of the Committee on Infectious Diseases. 27th edn. Elk Grove Village: American Academy of Pediatrics, 2006:335-55.
15. Health Canada. Acute and chronic hepatitis B in Canada, 2001: Enhanced Hepatitis Strain Surveillance System (EHSSS). Bloodborne Pathogens Section, Health Care Acquired Infections Division, Health Canada. <http://www.phac-aspc.gc.ca/hcai-iamss/bbp-pts/pdf/hepb_2001_e.pdf> (Version current at April 15, 2008).
16. Bartholomew CF, Jones AM. Human bites: A rare risk factor for HIV transmission. *AIDS* 2006;20:631-2.
17. Kazmi SH, Naglik JR, Sweet SP, et al. Comparison of human immunodeficiency virus type 1-specific inhibitory activities in saliva and other human mucosal fluids. *Clin Vaccine Immunol* 2006;13:1111-8.
18. Wahn V, Kramer HH, Voit T, Brüster HT, Scrampical B, Scheid A. Horizontal transmission of HIV infection between two siblings. *Lancet* 1986;2:694.
19. Anonymous. Transmission of HIV by human bite. *Lancet* 1987;2:522.
20. 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;329:1835-41.
21. Public Health Agency of Canada. Perinatal transmission of HIV. HIV/AIDS Epi Updates, August 2006. <http://www.phac-aspc.gc.ca/publicat/epiu-aepi/epi-06/pdf/epi06_e.pdf> (Version current at April 15, 2008).
 22. Havens PL; American Academy of Pediatrics, Committee on Pediatric AIDS. Postexposure prophylaxis in children and adolescents for nonoccupational exposure to human immunodeficiency virus. *Pediatrics* 2003;111:1475-89.
 23. Centers for Disease Control and Prevention. Antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV in the United States: Recommendations from the U.S. Department of Health and Human Services. *MMWR* 2005;54:1-20. <<http://www.cdc.gov/mmwr/PDF/rr/rr5402.pdf>> (Version current at April 15, 2008).
 24. Figueiredo JF, Borges AS, Martínez R, et al. Transmission of hepatitis C virus but not human immunodeficiency virus type 1 by a human bite. *Clin Infect Dis* 1994;19:546-7.
 25. Akhtar S, Moatter T, Azam SI, Rahbar MH, Adil S. Prevalence and risk factors for intrafamilial transmission of hepatitis C virus in Karachi, Pakistan. *J Viral Hepat* 2002;9:309-14.
 26. Health Canada. Acute and chronic hepatitis C in Canada, 2001. Enhanced hepatitis strain surveillance system (EHSSS). Bloodborne Pathogens Section, Health Care Acquired Infections Division, Health Canada. <http://www.phac-aspc.gc.ca/hcai-iamss/bbp-pts/pdf/hepc_2001_e.pdf> (Version current at April 15, 2008).
 27. Talan DA, Abrahamian FM, Moran GJ, Citron DM, Tan JO, Goldstein EJ; Emergency Medicine Human Bite Infection Study Group. Clinical presentation and bacteriologic analysis of infected human bites in patients presenting to emergency departments. *Clin Infect Dis* 2003;37:1481-9.
 28. Baker MD, Moore SE. Human bites in children. A six-year experience. *Am J Dis Child* 1987;141:1285-90.
 29. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. *CMAJ* 2003;169:207-8.
 30. Ulione MS, Dooling M. Preschool injuries in child care center: Nursing strategies for prevention. *J Pediatr Health Care* 1997;11:111-6.
 31. Public Health Agency of Canada. Hepatitis B vaccine. 2006 Canadian Immunization Guide, 7th edn. <<http://www.phac-aspc.gc.ca/publicat/cig-gci/p04-hepb-eng.php>> (Version current at April 15, 2008).
 32. Public Health Agency of Canada. Tetanus toxoid. 2006 Canadian Immunization Guide, 7th edn. <<http://www.phac-aspc.gc.ca/publicat/cig-gci/p04-tet-eng.php>> (Version current at April 15, 2008).
 33. American Academy of Pediatrics. Bite Wounds. In: Pickering LK, ed. *Red Book 2006: Report of the Committee on Infectious Diseases*, 27th edn. Elk Grove Village: American Academy of Pediatrics, 2006:191-5.
 34. Working Group on Antiretroviral Therapy and Medical Management of HIV-Infected Children, François-Xavier Bagnoud Center, UMDNJ, The Health Resources and Services Administration, The National Institutes of Health. Guidelines for the use of antiretroviral agents in pediatric HIV infection. <<http://aidsinfo.nih.gov/ContentFiles/PediatricGuidelines.pdf>> (Version current at April 15, 2008).

INFECTIOUS DISEASES AND IMMUNIZATION COMMITTEE

Members: Drs Robert Bortolussi, IWK Health Centre, Halifax, Nova Scotia (chair); Jane Finlay, Richmond, British Columbia; Dorothy L Moore, The Montreal Children's Hospital, Montreal, Quebec; Joan Louise Robinson, Edmonton, Alberta; Élisabeth Rousseau-Harsany, Sainte-Justine UHC, Montreal, Quebec (board representative); Lindy Michelle Samson, Children's Hospital of Eastern Ontario, Ottawa, Ontario

Consultant: Dr Noni E MacDonald, IWK Health Centre, Halifax, Nova Scotia

Liaisons: Drs Upton Dilworth Allen, The Hospital for Sick Children, Toronto, Ontario (Canadian Pediatric AIDS Research Group); Charles PS Hui, Children's Hospital of Eastern Ontario, Ottawa, Ontario (CPS Liaison to Health Canada, Committee to Advise on Tropical Medicine and Travel); Nicole Le Saux, Children's Hospital of Eastern Ontario, Ottawa, Ontario (Immunization Program, ACTive); Larry Pickering, Elk Grove, Illinois, USA (American Academy of Pediatrics, Red Book Editor and ex-officio member of the Committee on Infectious Diseases); Marina Ines Salvadori, Children's Hospital of Western Ontario, Ottawa, Ontario (CPS Liaison to Health Canada, National Advisory Committee on Immunization)

Principal author: Dr Dorothy L Moore, The Montreal Children's Hospital, McGill University Health Centre, Montreal, Quebec

The recommendations in this statement do not indicate an exclusive course of treatment or procedure to be followed. Variations, taking into account individual circumstances, may be appropriate. *Internet addresses are current at time of publication.*