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Français en page 44

## Health implications of children in child care centres Part B: Injuries and infections

### INTRODUCTION AND OBJECTIVES

As outlined in “Part A: Canadian trends in child care, behaviour and developmental outcomes (1),” daycare use is common and is increasing in Canada. It is important for families, health care workers and policy makers to understand these Canadian trends and the health implications of children in child care. This section was developed to describe the trends in injuries and infections among Canadian children in child care centres and to provide recommendations for prevention and health promotion.

### METHODS

MEDLINE (1950 to August 2008), EMBASE (1988 to August 2008), PsycInfo (1985 to 2008) and Cochrane Reviews were searched using the search index terms of ‘day care’ or ‘child day care centres’, and were combined with either ‘injuries’ or ‘infections’. The literature search was limited to human studies and English articles.

### DISCUSSION

#### Injuries

Injuries to children remain a significant cause of morbidity and mortality. Guardians are naturally concerned for their child’s safety, particularly when cared for outside of the home. However, children who spend more time in nonparental child care have a reduced risk of (unintentional) injury (2). This may be because child care centres and family day homes provide more supervision and/or safer play equipment (3). Nevertheless, injuries in child care settings remain a serious, but preventable, health care issue. Child care injuries can be classified into two categories: child factors (falls, collisions, compression pinches, pushed or hit, thrown objects and bites) and environmental factors (wet or slippery floors, equipment or furniture, objects on floor, sharp objects, and windows or doors) (4). In a survey (4) of four San Francisco Bay Area (USA) child care centres, 56% of the injuries were due to child factors, and 42.9% were due to child and environmental factors, while only 1.5% of the injuries were purely due to environmental factors. This suggests that while safe equipment and design are helpful in injury prevention, appropriate supervision of child behaviour is critical (4). Of the 112,000 records in the Canadian Hospitals Injury Reporting and Prevention Program database (1990 to March 1992), 1008 injuries occurred in a

daycare setting among children younger than five years of age (60.5% of injuries were in boys). There were significantly more cuts and bruises or abrasions in the daycare group, but statistically fewer burns, poisonings and foreign body insertions compared with the nondaycare (control) group. Most of the injuries in daycare were a result of falls from playground equipment, interaction with another child, or collisions or falls from furniture. Nevertheless, the only statistical difference in treatment between these groups was that more children (4.4%) in the control group needed hospital admission compared with 2.4% of children in the daycare group ( $P=0.003$ ) (5). Data from the Vancouver Island Health Authority (British Columbia) (1995 to 2005) (6) and from a large American study (7) reported similar patterns of injuries among children attending child care (highest among boys and on playground equipment). The British Columbia study also found that most injuries occurred 1 h before lunch (6). Because the demographics of child care injuries is relatively well documented, emphasis should be placed on injury prevention. *Well Beings: A Guide to Health in Child Care* (2) provides safety checklists that can be used on a weekly, monthly, seasonal and yearly basis as a safety audit for child care centres. In a 1994 survey (8), almost 50% of the child care centres in Toronto (Ontario) had hot water temperature settings at more than 43°C, and 23% had safety problems that could have resulted in potential serious harm to a child; however, only five centres used the *Well Beings* safety check forms regularly. Swedish daycare centres that implemented a regular staff education plan in child safety, including a safety checklist audit, had significantly fewer safety hazards (9). With the newly published third edition of *Well Beings*, hopefully more child care centres will be able to implement its guidelines. Whether through the use of its safety checklists, or the inherent increased supervision that comes from the use of such devices, there may be a reduction in child care-associated injuries. Furthermore, an injury-reporting procedure and form should be available in all child care centres, and all staff should be trained in basic first aid and cardiopulmonary resuscitation (2). To try and prevent injuries, adequate staff-child supervision should be maintained and play equipment should meet current Canadian Standards Association recommendations (2). Information on making playground equipment safe is provided by the Vancouver Island Health Authority (6).

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*Well Beings* provides a list of safety rules to teach children, and provides safety information on indoor and outdoor play structures, and safe and age-appropriate toys for use in a child-care setting (2).

### Infections

Many variables contribute to the risk of childhood infection. A Canadian (Prince Edward Island) prospective study (10) that attempted to control for these variables in preschool children found that for every 9 h of daycare per week, there was a 12% increase in respiratory illness days. Children without siblings at home had a threefold increase in the incidence of respiratory illness. Children older than one year of age had the greatest number of sick days, while no effect was seen on infants younger than three months of age, which the authors hypothesized could be due to a protective maternal antibody effect (10) or perhaps secondary to a developmentally less mobile infant coming in contact with fewer germs. In a different Canadian study (11), breastfed children in daycare had fewer antibiotic treatments. One study (12) suggested that after six months of day care, children have significantly fewer upper respiratory tract infections, otitis media and conjunctivitis compared with children who spend fewer than six months in daycare.

Gastrointestinal illnesses are another important contributor to daycare illnesses. In North America, the leading pathogen is rotavirus, which can cause significant infant and child morbidity and can contribute to parental stress, and school and work absenteeism. Health care workers should discuss with caregivers about the indications for rotavirus vaccine. Transmission of infectious diarrhea is reduced by educating care givers about proper hygiene and improving access to sinks (13). Access to hand sanitizers may be useful where sinks are not readily accessible.

In recent years, there have been outbreaks of vaccine-preventable illnesses in Canada including measles, mumps and varicella. Pertussis, in particular, is relatively common, and adults whose previous vaccine immunity has waned remain a primary source of infection to young infants. To minimize disease transmission, all children attending daycare should be vaccinated according to their provincial or territorial recommendations. Furthermore, caregivers should receive an annual influenza vaccine and ensure their tetanus and diphtheria vaccines are current. Consideration could be made for caregivers to receive the acellular pertussis vaccine when updating their tetanus and diphtheria booster. Some Canadian child care workers may be at risk of acquiring infection from hepatitis A. Screening and vaccination of daycare workers for hepatitis A may be warranted in endemic areas or at times of a local outbreak (14). One small study (15) suggested that the transmission of hepatitis B is rare in a child care setting. Some children do bite other children, although it rarely causes any health concern. If a child breaks the skin of another child, and either child has hepatitis B, there is a very small chance of hepatitis B transmission. If this happens, consultation with a physician is recommended, especially if neither child has

been immunized against hepatitis B. Transmission of HIV or hepatitis C is extremely unlikely through a child bite, and has never been reported (16,17). Other infections transmitted in child care centres include skin infections (impetigo and scabies [18]), cytomegalovirus (19) and *Helicobacter pylori* (20).

### When to exclude the sick child

Children with respiratory conditions may continue to attend child care provided they are well enough to participate fully in all activities (2). Children with streptococcal pharyngitis or bacterial conjunctivitis should have 24 h of antibiotic therapy before returning to child care. As well, children with diarrhea should be excluded if their stool cannot be contained in a diaper, cannot be controlled by a toilet-trained child or if there are signs of bacterial enteritis (fever, blood or mucus in the stool). These symptoms can also occur occasionally with viral gastroenteritis; therefore, consultations with a physician may be needed. Child care centres should contact the local public health authority because provincial or territorial regulations vary for exclusion of certain types of enteritis (eg, *Shigella*, *Escherichia coli* O157, *Giardia*, *Salmonella typhi* and *Campylobacter*) (2). *Well Beings* (2) describes a number of common infectious conditions, including detailed exclusion criteria for child care. A telephone survey of child care centre workers in Ontario found that an exception to exclude children with upper respiratory tract infection (URTI) symptoms was made if they had an antibiotic prescription (69% of staff), and if the parent could not stay home from work (14% of staff). Further pressure from parents to keep their sick child with a URTI in child care was experienced by 64% of the staff. Many staff members and child care centres requested that antibiotics be started for symptoms consistent with a viral URTI before the child returned to care (21). This may be one factor contributing to the increase in antibiotic resistance seen in children who attend child care (22) and may lead to drug side effects, such as diarrhea. In a qualitative survey (23) of Australian child care workers, some responders believed that it was difficult to maintain healthy staff when "parents constantly bring their sick and highly contagious child to day care". This attitude may influence parental behaviour in seeking medical advice and potentially unnecessary antibiotic use.

### IMPLEMENTATION OF SAFE CHILD CARE

To assess the use of the original (1992) *Well Beings* recommendations on child safety and on preventing and managing infections, a needs assessment was performed in the summer of 1994 on all 235 licensed child care centres in Toronto. Of almost 11,000 children attending these centres, 85% were preschool or school-age children, and 15% were infants or toddlers. Most (91%) surveyed centres had a written exclusion or readmission policy for sick children, but many (24%) did not record the reasons for absences. Fewer than two-thirds of the centres had adequate procedures or equipment for managing body fluid spills, and only 62% of supervisors had an

accurate understanding of universal precautions. Staff shortage was a frequently cited reason for why some equipment and toys were not cleaned as per the *Well Beings* recommendations. Furthermore, when children were involved in water activities such as a 'water-play table' (a required activity for toddlers and older children in Ontario child care centres), more supervision and better handwashing was identified as an area of need. Given the potential for high fecal coliforms in water-based activities, proper sanitization is critical for decreasing the number of diarrheal illnesses (8). It has been almost 15 years since this study and much has been learned since then about infection control; it may be worthwhile to perform a follow-up survey with the new *Well Beings* guidelines. Currently in Canada, it is not obligatory for child care centres to have a policy on the management of a sick child, but awareness of common and serious infections may be worthwhile.

### Potential cost impact

Between 1996 and 1997, a six-month questionnaire was performed in the autumn and winter among children 18 to 36 months of age who were attending 48 Quebec child care centres (24). The absentee rate was 2.7%, and the average percentages of time with a cold, diarrhea or vomiting was 23.4%, 2.3% and 0.9% respectively, with median durations of 8.4, two and one day, respectively. More than 90% of parents had to buy at least one medication for their sick child – 78% over-the-counter drugs and 67% prescription medications (78% of these were antibiotics, and 18% were asthma drugs). Additional estimates were that each child would receive two prescribed drugs per six-month period. Overall, the estimated cost was \$5.84 per month for medications. In addition, there were 2.4 visits per child to a physician during the six-month study for an estimated cost of \$8.18 per child per month. This represents a lower physician cost compared with American and international studies, which likely reflects the difference in the physician fee structure in Quebec and the rest of Canada. The average total cost of caring for a child was estimated at \$43.13 per child per URTI, and with an incidence of 6.1 URTIs, a total cost of \$260.96 for the six-month study period. In addition to medication costs and physician visits, it also accounted for missed employment and the need to hire additional caregivers. Further cost analysis suggested that province-wide (Quebec), the cost for all children 18 to 36 months of age with a URTI in child care centres would be just over \$1 million per six-month period in the autumn and winter seasons (24). It is not known how this cost would compare with the same children if they were to be cared for at home. It would depend on whether there was loss of parental income to stay at home with the sick child.

Consideration could be made to develop more sick-child care centres that are staffed by health care providers. In a 1998 survey (25), there were 323 sick-child care programs in the United States, and they were thought to promote greater parent satisfaction, less parental anxiety and decreased work absenteeism. It has been estimated that

working mothers need between 5.6 and 28.8 days off work per year to care for their sick children. In a survey (26) of licensed child care centres in North Carolina (USA), 70% of the 134 surveyed working mothers indicated an interest in sick child care options outside the home, including a sick room at the child's regular child care or at the parent's workplace. Not only could these options be potentially good for the mother's well-being, but based on the 1985 United States Census data, they could potentially save between \$2 and \$12 billion per year lost in workplace absenteeism (26). At present it is unknown how many such centres exist in Canada.

## RECOMMENDATIONS

- All child care centres should have a written policy (in accordance with provincial or territorial health policies) on the management of a sick child, which is reviewed with all staff. The policy should contain information on recognizing an emergent illness or injury and when to call for an ambulance, proper use of antibiotics, characteristics of common paediatric infections and procedures on childcare exclusion. To help control outbreaks, the reason for exclusion should be documented. There should be enough child care staff to allow at least one adult to stay with a sick child until they return home or until medical help arrives. The policy should be shared with parents.
- All staff should be trained in basic first aid and cardiopulmonary resuscitation (eg, basic cardiac life support certification).
- Handwashing, diapering and toileting instructions should include written and visual information, and should be reviewed with all staff. Ready access should be available to handwashing areas and/or hand sanitizer dispensers.
- Children and child care staff should receive all recommended immunizations as per their provincial or territorial area.
- Child care centres should be aware of the risk of injury and how to prevent the most serious and most common injuries. Compliance with supervision ratios and quality adult supervision are essential in preventing injuries.
- Child care centres should conduct routine safety audits on a weekly, monthly, seasonal and yearly basis, using the *Well Beings* recommendations as a point of safety reference.
- Play equipment and surfacing should comply with the Canadian Standards Association recommendations ([www.csa.ca](http://www.csa.ca)). Preschool-aged children should only use equipment that is designed for their age group.
- Employers should consider allowing their employees to take time off work, without penalty, to care for their sick children who need to be excluded from child care.

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