

# Health implications of children in child care centres

## Part A: Canadian trends in child care, behaviour and developmental outcomes



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### INTRODUCTION AND OBJECTIVES

Between 1967 and 1995, the number of children in paid child care in Canada tripled from 357,000 to 1.36 million (1). With so many children now receiving some form of non-guardian care, this statement aims to:

- describe the characteristics of Canadian children and families using child care;
- describe the factors that promote a high-quality child care centre;
- report the evidence for developmental and behavioural outcomes of preschool children in child care;
- discuss the health implications of child care (covered in “Health implications of children in child care centres. Part B: Injuries and infections”, which will be published in the January 2009 issue of *Paediatrics & Child Health*);
- discuss the cost implications of child care options; and
- provide recommendations on how to develop and maintain a quality child care system that could be available and affordable to all Canadians.

This statement will focus on child care centres, defined as care provided outside the child’s home, by at least one non-family member, and in which there are usually several children younger than six years of age.

### 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 ‘child development’ or ‘costs and cost analysis/or cost allocation/or health care costs’. The literature search was limited to human studies and English language articles. In addition, representatives from the Government of Canada and Statistics Canada were contacted for additional information.

### Limitations

Although the impact of nonguardian child care is important for all children, those with disabilities (physical and/or mental) were beyond the scope of this statement. Most child care studies were longitudinal or cross-sectional in design; randomization

and blinding are difficult to achieve in child care research. Regression models were often used, resulting in correlational data that did not provide cause and effect answers. This should be considered when reading this report. Furthermore, it is nearly impossible to control for all confounding variables in child care research, making it often even more difficult to draw firm conclusions (2).

### CANADIAN TRENDS IN CHILD CARE PROGRAMS

According to the 2001 Canadian Census, there were approximately 8.4 million families in Canada, of whom 5.3 million had children at home and 1.3 million were single parents (mainly women). Data from the National Longitudinal Survey of Children and Youth (NLSCY) – a biannual survey of cohorts of Canadian children, averaging 2000 children at each sampled age (survey period 1994/1995 to 2002/2003) – have shown that the proportion of children, six months to five years of age, in child care has steadily increased, both in urban and rural communities. Some of the options for nonparental care include in-home care with a relative or nonrelative (eg, nanny), or out-of-home care via preschool (children older than three years of age), daycare or child care centre, or onsite care at the parent’s place of employment (3). The latter is not widely available, but where used can reduce absenteeism and improve staff retention (4). Surveys (5) have suggested that working mothers would also be interested in an infirmary at their worksite where their sick children could be safely monitored.

For children whose parents are at the lowest income levels, the proportion receiving nonparental care was directly proportional to the household income. Compared with the 1994/1995 data, daycare use nearly tripled in 2002/2003 for infants six to 12 months of age (3). In 2002/2003, most children (73%) had only one child care arrangement, 21% had two and 6% had three or more. Most Canadian child care is privately operated, and is mainly (79%) on a non-profit basis (6). In 2006, 811,262 regulated child care spaces were available in Canada, and most (45%) of them were in Quebec (6).

Use of child care centres and daycares is increasing in Canada. Understanding the possible benefits and harms of this care choice is, therefore, important for children and family health.

**TABLE 1**  
**Child care centre quality assessment tools**

Assessment tool	Number of items assessed	Domains assessed	Reference
ECCOS	87	Staff-child interactions, curriculum, staff-parent interactions, staff training, management, staffing, physical environment, health and safety, nutrition and evaluation	< <a href="http://www.cckm.ca/ChildCare/ToolsQuality.htm">http://www.cckm.ca/ChildCare/ToolsQuality.htm</a> > (14)
ECERS	37	Space/furnishings, personal care routines, language-reasoning, activities, interaction, program structure and parents/staff	< <a href="http://www.fpg.unc.edu/~ecers/">http://www.fpg.unc.edu/~ecers/</a> > (14)
ITERS (birth to 30 months of age)	35	Furnishings/displays, personal care routines, listening/talking activities, play learning activities, interactions (observation of gross motor skills plus staff-child interactions), program structure and adult needs	< <a href="http://www.fpg.unc.edu/~ecers/">http://www.fpg.unc.edu/~ecers/</a> > (9)

*The Early Childhood Classroom Observation Scale (ECCOS) ranks each item 1 to 3; the Early Childhood Environment Rating Scale (ECERS) and the Infant/Toddler Environment Rating Scale (ITERS) are scored on a 7-point scale, in which 1 is considered 'inadequate', 3 is 'minimal', 5 is 'good' and 7 is 'excellent quality' (14). Alternatively, for the ECERS, others have used global scores in which ranges of 37-92 was considered 'inadequate', 93-148 was 'minimal', 149-203 was 'good' and 204-259 was 'excellent quality' (9). Web sites current at October 23, 2008*

### ASSESSMENT OF CHILD CARE QUALITY

Table 1 describes some of the common quality assessment tools of child care centres. In a widely distributed 1998 Canadian child care questionnaire study (7), the overall quality for 325 child care classrooms was 60.1% (the authors converted global scores of the Infant/Toddler Environment Rating Scale and the ECERS into percentages). Nonprofit centres had significantly better quality scores (62%) than for-profit centres (55.4%). However, the authors suggested that a quality score of at least 67% may be needed to promote child development (based on the scoring system described in Table 1). The non-profit centres scored significantly higher in specific domains on the quality questionnaires – parents and staff (staff development and parent-staff communication), personal care, language reasoning and interaction (child-staff) (7).

Quality child care is often also just defined by child to caregiver ratios, and caregiver training and experience. Both the American Public Health Association and the American Academy of Pediatrics have recommended ratios (child to adult) of 3:1 for children younger than 24 months of age, 4:1 for children between 24 and 30 months of age, 5:1 or less for children between 31 and 36 months of age and 7:1 or less for children older than 36 months of age (8). Such ratios are believed to promote more child-to-caregiver interactions, thus facilitating a child's responsiveness to people and objects (9).

The Canadian Child Care Federation's national statement on quality child care suggests that quality child care requires the following integrative elements:

- respect for the child;
- a collaborative partnership with families;
- quality indoor and outdoor physical and learning environments;
- a purposeful learning program;
- a supported workforce;
- leadership at the program level;
- effective administrative practices at the program level;

- an effective infrastructure that includes a vision of an early learning and child care system;
- government policies and processes based on evidence, system-wide planning and resources;
- public funding for operating and capital costs;
- adequate wages and parent fees;
- research and evaluation, and communication of the research; and
- skilled and knowledgeable child care practitioners, with some formal postsecondary training in early learning and child care (10).

Formal training of caregivers has been cited in a number of studies as contributing to quality child care (9). The National Association for the Education of Young Children (United States) has recommended that teachers (in child care centres) have at least an associate of art degree in early childhood education (ECE) or a child development associate degree (9) (in the United States, an associate degree is usually obtained after two years of training at a postsecondary institution). The proportion of Canadian caregivers with training in ECE ranged from 30% (working within child's own home) to 36% (outside the home); data from the NLSCY did not determine ECE rates for child care centre workers (3) or the type of ECE.

### BEHAVIOUR AND DEVELOPMENTAL OUTCOMES OF CHILD CARE CENTRES

There are few high-quality evidence-based studies on the effects of child care centres on preschool children. A Cochrane Collaboration review (11), which included seven randomized and one quasi-randomized controlled trial, found a positive effect on children's IQ, school achievement, behaviour and even long-term benefits on employment (one trial), decreased criminal behaviour and lower teenage pregnancy rates. The children in the trials (all American) were from lower socioeconomic backgrounds, except for two trials that included middle-class families; the duration of daycare ranged from 2 h per week for eight months, to 7 h per day, five days per week for five years. The child to staff ratios were very low (not more than 6:1 for older children

and 1:1 for infants); the latter ratio is particularly uncommon for most child care centres and should be considered when interpreting the results. Some of the included trials (four of eight) also had some form of parent training, potentially confounding the results. In reply to this criticism, the authors indicated that the outcomes for the children whose parents did not have any training were still 'convincingly positive'; these data, however, were not shown (11). Thus, while Cochrane systematic reviews of randomized controlled trials usually provide the best quality evidence, these results should be interpreted cautiously.

Other evidence for developmental and behavioural outcomes comes from observational studies. A large (n=1300) longitudinal (five years) American study was performed that controlled for family demographics and quality of child care (The National Institute of Child Health and Human Development [NICHD] study of early child care). In their first 18 months of life, 19% of these children spent some time in a child care centre (mean 31 h per week), which had increased to 79% for children 36 to 54 months of age (mean 22 h per week). Their academic achievement (Woodcock-Johnson Achievement Battery test) at five years of age was negatively related to child care centre hours in infancy. However, there was a positive relation of centre hours in the toddler age group (18 to 35 months of age) to language skills (Preschool Language Scale) at five years of age (12). For children between 36 and 54 months of age, the amount of time they spent in child care centres was not related to academic achievement or language skills at five years of age (12).

Data from two of the largest American child care studies (the cost, quality and outcomes [CQO] study, and the NICHD study of early child care) suggest that staff-child interactions may have effects on cognitive outcomes. In the CQO study, preschool children who had been in full-time care for at least 11 months had better receptive language comprehension (Peabody Picture Vocabulary Test – Revised), better prereading and premath skills (Woodcock-Johnson Tests of Achievement) when caregivers were sensitive and stimulating. Prosocial skills or behaviour problems (Classroom Behavior Inventory) were not related to these caregivers' traits (13). In the NICHD study of early child care, three-year-old children who had been in child care for at least 10 h per week had better school readiness scores (Bracken School Readiness Scale) and language comprehension (Reynell Developmental Language Comprehension Scale), prosocial skills (Adaptive Social Behavior Inventory) and fewer behavioural problems (Child Behavior Checklist 2/3) if they experienced positive caregiving (13). For both the CQO and the NICHD studies, the correlational data were controlled for maternal education, child sex and ethnicity, but not for socioeconomic status, which the authors acknowledged as potential bias (13).

In a cross-sectional Montreal (Quebec)-based survey (14) of 155 families (mean social class of 3.18 on the Blisshen scale of 1 to 6), children four to five years of age who were in low-quality centres (assessed via the ECERS and the Early Childhood Classroom Observation Scale) were significantly more likely to come from lower socioeconomic status families. Socioeconomic status, however, had no significant correlations with behaviour outcomes. Early age of entry to a low-quality child care facility was significantly correlated with

anger-defiance behaviour, especially in boys or if there was parent or child stress. A high-quality child care centre negated this effect on anger-defiance and was beneficial to some children in the study, independent of the child's sex and the family structure (14). Other studies (15) have found that children who had attended a high-quality daycare within the first year of life had better school skills, fewer behaviour problems and had good peer social relationships. The quality of daycare was a better predictor of behaviour outcome than age of starting daycare or percentage of time spent in daycare. These results suggest that the age of entry to child care may be less critical than the quality of the child-care facility.

A longitudinal study (9) of 89 African-American children six to 36 months of age demonstrated that a low child-to-caregiver ratio was associated with significantly higher cognitive and language scores. These results were independent of some family characteristics including socioeconomic status, maternal education level, child's sex or gestational age (9). However, children with more stimulating and rewarding home environments scored higher on receptive language and overall communication scores. Maternal age was negatively correlated with cognitive skills for children at 12 months of age, and maternal education was positively correlated with receptive language skills at 12 months of age (9). A larger American longitudinal study (n=1364) (16) found that a higher parenting quality predicted better achievement scores in grade 5 reading, math and vocabulary skills, as well as higher social skills.

A large American longitudinal study (n=1364) reported an increase in aggression in grades 1 and 2 children who had been in daycare before 12 months of age (16). The more time spent in centre-based care in life was significantly associated with problem behaviour that continued through to grade 6 (end of study period). This behavior was not due to parenting or attachment issues (16). One possible explanation suggested by the authors was that primary school teachers may not have the time nor the training to manage behaviour problems (16). Importantly, the early aggression identified in some studies did not lead to later aggressive criminal acts (15). Although there may be some negative behavioural effects of long-term nonparental child care, children may gain social skills including peer play, self-confidence and managing new situations (17). In a review (15) of nine studies conducted between 1975 and 1990, some found that boys in daycare were more aggressive, others found no difference and some found that girls were more aggressive.

Gender may influence the cognitive effects of daycare (15). In a longitudinal study (9) of 89 African-American children, caregiver training (bachelor's degree) or experience (14 years or more) had no effect on boys' language or cognitive development, but had a positive effect on girls in both domains (9). The authors suggested that this sex difference may be because preschool girls tend to seek out attention from adults (caregivers) compared with boys, thus engaging in more adult-child conversation (9).

Better vocabulary scores were seen in Canadian children in regulated or nonregulated care, compared with those cared for by a relative or not receiving any formal care. In an American longitudinal study (16), better vocabulary scores were maintained in grade 5 children who had experienced high-quality

child care as an infant and/or toddler. While reading scores in kindergarten were higher in children exposed to high-quality child care, this difference was no longer seen by grade 1. However, Canadian children in kindergarten or in grade 1 who had child care or ECE programs two years previously had statistically significant teacher ratings of language, learning and math skills, independent of socioeconomic status. This analysis, however, was confounded by other variables including other types of programs to which these children were exposed (eg, play groups) (18).

There may be an association between the time in nonparental care and poor peer interactions and adjustment problems (17). Some small studies (19) have suggested that children enrolled in full-time child care early in life are at an increased risk of attachment insecurity. However, in a large prospective longitudinal study (Study of Early Child Care) (17), in which factors such as quality and type of care and family background were controlled, attachment insecurity was only seen if the mothers were highly insensitive. Data from the 1994/1995 NLSCY data set have suggested that children who attend a child care centre and whose mothers are depressed may be at an increased risk of poor development (20).

In 1997, the Quebec Family Policy introduced \$5/day child care to all four-year-old children; by 2000, this fee had extended to all children – ‘universal daycare’. Data from the NLSCY collected before (1994/1995 to 1996/1997) and after (2000/2001 to 2002/2003) the introduction of this policy suggested that parent-reported measures of hyperactivity, inattention, aggressiveness, motor/social skills and child health status were worse with the introduction of universal child care in Quebec (21). The data were obtained through parent self-reporting on a number of questions and from scores on the Peabody Picture Vocabulary Test for children four to five years of age. The authors chose to look only at data from children of two-parent households, which they acknowledged as a potential limitation. The authors concluded that children in Quebec were “worse off in a variety of behavioural and health dimensions”. However, the graphical data indicated similar trends in behaviour responses for both Quebec and the rest of Canada; statistical data were not provided, making the authors’ conclusions questionable. Further statistical analysis on these data would be invaluable to our understanding of the health outcomes of universal child care.

### CHILD CARE COSTS

From 1994/1995 to 2002/2003, all provinces except Alberta saw an increase in the proportion of children using child care, especially in Quebec where the proportion more than doubled. This is likely because of the low-cost child care program developed between 1997 and 2003 by Quebec (by November 2003, the price was \$7 per day per child younger than four years of age) (3). Quebec and Manitoba are the only provinces that have fees set by the provincial government; Manitoba has maximum fees of \$376 per month for children two to five years of age, and \$560 per month for infants (6).

In 2002, 61% of Canadian households with at least one child five years of age or younger spent \$2.3 billion on child care expenses (data from the Survey of Household Spending – a Canadian survey for the 10 provinces). The national average

annual child care expenditure was \$2500 per household in 2002, down slightly from \$2700 in 1998, reflecting regional variations. While there was an increase in child care costs for the Atlantic provinces, Ontario and British Columbia (highest at \$3200 per year) during this time period, costs decreased in Quebec (lowest at \$1400 per year) and the Prairie provinces (3). Based on simulation data analysis from the Canadian National Child Care Survey, child care subsidization could increase employment of single mothers (1).

In 2004, \$5 billion over five years was allocated by the federal Liberal government to “ensure that children have access to high-quality, government-regulated spaces at affordable cost to parents” (6). However, the subsequent Conservative government cancelled this program in 2006 in favour of the Universal Child Care Benefit, which provided a \$100 per month taxable payment to parents of all children zero to six years of age, with the goal of encouraging parents to choose their own care. In 2006, the same federal government committed \$250 million per year in transfer payments to the provinces and territories for ECE and care, and added a tax credit to businesses for new child care spaces in the workplace (6). According to a 2008 report by the Canadian Labour Congress, only 16% of Canadians have access to regulated child care, and 50% of them are in Quebec. Overall, the Canadian Labour Congress believed that the federal government made a small improvement in accessibility (spaces increased by 2% to 3%) and in quality (even though there is substantial variability in wages between provinces); although affordability remained a concern (22).

### SUMMARY

Research on behaviour and developmental outcomes of child care centres is fraught with methodological difficulties. Positive, negative and neutral results can be found for most outcomes. However, using the best quality studies to date (trial data, observational studies with large n values and accounting of confounding variables), the data suggest that high-quality child care centres may have a positive effect on both behaviour and cognitive domains.

### CONCLUSIONS

Canadian children spend a significant amount of time in nonparental child care, including in child care facilities. Some children may improve their cognitive and behavioural skills, particularly if the child care facility is of high quality. Child care is expensive and may be unaffordable for many Canadians. A number of recommendations were made in the 2003 review of Canada’s early childhood policies and services conducted by the Organization of Economic Co-operation and Development’s Directorate for Education, including devising a universal early childhood service for children one to six years of age (23). Partnerships among families, employers, health care providers and the provincial/territorial and federal governments are needed to provide high-quality child care to all Canadians. Future research in child care should also address the need for uniformity in child care terminology and attempt to control for the many confounders including provincial/program variability, parenting style, education, health and socioeconomic status.

## RECOMMENDATIONS

The levels of evidence reported in the recommendations has been described using the evaluation of evidence criteria outlined by the Canadian Task Force on Preventive Health Care (24).

- Child care centres should be designed to deliver and maintain high-quality care because there is some evidence that high-quality child care improves some cognitive and behaviour outcomes (level I, grade A) (11).
- To optimize the quality of child care centres (level III, grade A), staff ratios should be in keeping with the recommendations of the American Academy of Pediatrics and the American Public Health Association (3:1 for children younger than two years of age, 4:1 for children 24 to 30 months of age and 5:1 for children 31 to 36 months of age).
- To further improve child care centre quality, child care staff should have some training in ECE (level III, grade A). To minimize staff turnover, staff should be appropriately remunerated.
- Child care can be expensive and a barrier to employment of single mothers (level III, grade B). Health care providers, government and nongovernment organizations and families should collaborate to further develop affordable, accessible, high-quality child care.
- Institutions with a high number of employees may want to consider creating an onsite child care facility (level II-2, grade B).
- Quality research studies (randomized, controlled and minimizing/accounting for confounding variables) are needed to more clearly understand the health outcomes of nonparental care.

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