ARTICLE

Short- and Long-term Risk of Infections as a Function of Group Child Care Attendance

An 8-Year Population-Based Study

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Objective: To determine whether the frequency of infections during the first 8 years of life varies according to age at initiation and type of group child care (GCC).

Design: Eight-year (1998-2006) prospective cohort study.

Setting: Families with a newborn living in Quebec in 1998.

Participants: A representative sample of families (n=1238) selected through birth registries.

Main Exposure: Home care compared with small or large GCC during the early (ie, before 2½ years old) or late (3½-4½ years old) preschool period.

Main Outcome Measures: Maternal reports of children's respiratory tract, ear, and gastrointestinal tract infections during the early preschool, late preschool, and early elementary school (5-8 years old) periods.

Results: Compared with children cared for at home, those who started large GCC in the early preschool period had higher rates of respiratory tract infections (incidence rate ratio [IRR], 1.61; 95% confidence interval [CI], 1.27-2.03) and ear infections (IRR, 1.62; 95% CI, 1.19-2.20) during that period but lower rates of respiratory tract infections (IRR, 0.79; 95% CI, 0.66-0.96) and ear infections (IRR, 0.57; 95% CI, 0.37-0.88) during the elementary school years.

Conclusions: Children contract infections around the time they initiate large structured group activities. Participation in large GCC before 2½ years old, although associated with increased infections at that time, seems to protect against infections during the elementary school years. Physicians may reassure parents that infections during the first child care years do not lead to a higher overall burden of infections.

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PRESCHOOL CHILDREN IN GROUP child care (GCC) experience more frequent infections than do children cared for primarily at home,[1-3] and the risk seems greater when children attend larger GCC.[1,4,5] These findings have created concerns that GCC may compromise the health of young children and their community.[6] However, few studies have examined the impact of GCC on infections beyond the

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preschool years. Because GCC services are widely used, studies assessing their effect on children's short- and long-term health are needed. The present study investigates the frequency of different types of infections according to GCC use in a large (n=1238) birth cohort followed from 5 months (1998) to 8 years (2006) of age.

Several studies have shown that children attending GCC are at increased risk for infections, but results are inconsistent regarding the extent to which the risk is a persistent one. Some studies[4,7-9] reported risks limited to the infancy and toddlerhood years, whereas others[1,10] reported risks extending until school enrollment. However, none of these studies examined the risk of infections beyond school enrollment. This is an important limitation given that school enrollment marks a point where all children come in regular contact with large numbers of children.

To date, the only study[4] that examined risk of infections beyond school entry focused on the common cold. Results confirmed that children in large GCC (>6 children) not only had more common colds during the preschool years but also indicated that they were less at risk for contracting colds during the elementary school years.[4] The protective effect was more pronounced for children who attended large GCC for longer than 2 years compared with those who attended for 1 year or less.

Thus, there is evidence for the common cold that longer GCC attendance provides greater long-term immunity. However, the evidence is insufficient at this point to of-

fer guidance to parents and public health agencies regarding the relative risks and benefits of different types of child care arrangements across different developmental periods and for different types of infectious diseases.

Results from previous studies raise 3 specific research questions. First, does the long-term protective effect of large GCC observed for the common cold apply to more serious types of infections, such as respiratory tract infections (RTIs) with fever, ear infections, and gastrointestinal tract infections? Second, is there a sensitive period in the preschool years during which exposure to infections via GCC provides increased long-term immunity?[11,12] Third, how do the risks and protective effects of GCC attendance combine to affect the child's overall frequency of infections until mid-elementary school?

The present study examines the short- and long-term risks of infections associated with GCC attendance in a large population sample of children assessed annually from age 5 months to 8 years. It extends previous investigations because it tests for different patterns of GCC attendance based on age at entry and size of GCC and their relationships with 3 types of infections (RTIs accompanied by fever, ear infections, and gastrointestinal tract infections) across 3 periods of development (early and late preschool years and elementary school years).

METHODS

PARTICIPANTS

The Quebec Longitudinal Study of Child Development randomly selected, through birth registries, 2023 newborns representative of Quebec (Canada) children. Yearly home interviews were conducted with the mother when the target child was aged 5 months (in 1998) to 8 years (in 2006). Written informed consent was obtained from all participating parents. Confidentiality was ensured by using an identification number in the coding of the data instead of the nominative information. Ethical approval for the study was obtained from the Québec Institute of Statistics' Internal Review Board. Before school enrollment, assessments were conducted as close as possible to the child's birthday. After school enrollment, assessments were conducted in the spring of each year. Sensitivity analyses on the season of assessment are presented in the analyses section. Analyses were conducted on children who completed the 8-year assessment (61.25% of the sample). Differential attrition occurred on the basis of the following 4 socioeconomic variables: maternal education, maternal immigration status, family income, and number of siblings.[13] To ensure the representativeness of the sample, all the analyses were weighted. Weights were calculated on the basis of the 4 socioeconomic variables using the inverse probability weighting method. The weight procedure ensured that the analysis sample was similar to the initial representative sample and resulted in the absence of difference on all the variables included in the analyses. **Table 1** presents the demographic characteristics of the sample.

MEASURES

Outcome Variable: Children's Infections

Mothers reported the frequency of infections in the past 3 months at every data collection between age 1½ and 8 years. Mothers were asked, "In the past 3 months, how many times did your

Table 1. Descriptive Information About the 1238 Participants

Variable	Value
Child sex, No. (%)	
Male	595 (48.0)
Child's ethnicity, No. (%)	
Non-Western	145 (11.7)
Young mother, aged ≤21 y at birth of first child, No. (%)	202 (16.3)
Low birth weight, <2500 g, No. (%)	46 (3.7)
Breastfed <6 mo, No. (%)	868 (70.1)
Low maternal education, No. (%)	
No high school diploma	226 (18.2)
Family structure at 5 mo, No. (%)[a]	
Intact	994 (80.4)
Blended family	135 (10.9)
Single parent	107 (8.7)
Insufficient income, based on Statistics Canada's low-income cutoff value, No. (%)	311 (25.1)
Poor maternal health, self-reported poor to fair vs good to excellent, No. (%)	287 (23.2)
Other children in household, No. (%)	
1½-2½ y of age	880 (71.1)
3½-4½ y of age	1020 (82.3)
In elementary school	1068 (86.2)
Mother smoked cigarettes during child's preschool years, No. (%)	464 (37.5)
Presence of a pet in the household during preschool, No. (%)	605 (48.8)
Child has allergies, No. (%)	
At age 1½ y	82 (6.6)
At age 3½ y	122 (9.9)
Child has allergies, asthma, or eczema, No. (%)	
During elementary school	476 (38.4)
Assessed in cold and flu season, November through May vs June through October, No. (%)	
At age 1½ y	783 (63.2)
At age 2½ y	769 (62.1)
At age 3½ y	703 (56.7)
At age 4½ y	1182 (95.4)
GCC categories, No. (%)[b]	
1: Home care	244 (19.7)
2: Started small or large GCC late	170 (13.7)
3: Started small GCC early, never large GCC	402 (32.4)
4: Started small GCC early, large GCC late	175 (14.1)
5: Started large GCC early	249 (20.1)
Respiratory tract infections, mean (SD), No.[c]	
From 1½ to 2½ y of age	0.60 (0.68)
From 3½ to 4½ y of age	0.63 (0.62)
During elementary school	0.99 (0.57)
Overall	0.80 (0.43)
Ear infections, mean (SD), No.[c]	
1½-2½ y of age	0.35 (0.54)
3½-4½ y of age	0.26 (0.46)
During elementary school	0.19 (0.33)
Overall	0.25 (0.29)
Gastrointestinal tract infections, mean (SD), No.[c]	
1½-2½ y of age	0.25 (0.38)
3½ -4½ y of age	0.24 (0.39)
During elementary school	0.31 (0.31)
Overall	0.28 (0.23)

Abbreviation: GCC, group child care.
[a] Data are missing for 3 participants.
[b] Large GCC includes centers where professional educators provide care for up to 10 groups of 8 to 12 children in the same setting. Small GCC consists of home-based facilities where a caretaker provides care for 3 to 8 children in her home. *Early* refers to early preschool (1½-2½ years old); *late* refers to late preschool (3½-4½ years old).
[c] During the past 3 months as reported by the mother.

child experience the 3 following types of infection? (1) RTI with fever (eg, influenza), (2) ear infection (eg, otitis media), and (3) gastrointestinal tract infection with more than 1 day of diarrhea or vomiting." The frequency of infection was coded as 0 (none), 1 (once), 2 (twice), 3 (3 times), or 4 (≥4 times). The mean number of infections for 4 developmental periods was computed: (1) early preschool (age 1½-2½ years), based on data collected at age 1½ and 2½ years; (2) late preschool (age 3½-4½ years), based on data collected at age 3½ and 4½ years; (3) early elementary school years (ages 5-8 years), based on data collected at ages 5, 6, 7, and 8 years; and (4) the entire childhood period (age 1½-8 years). Table 1 presents the mean (SD) values for the sample.

Predictor Variables

GCC Variables. Mothers were asked every year about their use of regular child care for the target child (ie, ≥10 hours per week) since the last interview. We aimed to test the role of size of GCC and age at entry. *Large GCC* (L-GCC) includes centers where professional educators provide care for up to 10 groups of 8 to 12 children in the same setting. Typically, children in L-GCC have little contact with children of the other classrooms, although they may, at times, comingle, such as during transitions periods (eg, when children arrive, depart, change rooms, or have special activities). *Small GCC* (S-GCC) consists of home-based facilities where a caretaker provides care for 3 to 8 children in his or her home. *Early start* represented initiation before age 2½ years, and *late start* represented initiation after age 2½ years.

We created a 5-group variable that varied on age at enrollment and type of GCC dimensions. The groups ranged from no exposure to GCC to extensive exposure to L-GCC. Group 1 (home care) was the comparison group and included children who were cared for at home throughout the preschool years. Group 2 (S-GCC or L-GCC late) included children who were cared for at home during early preschool and started S-GCC or L-GCC after age 2½ years. Group 3 (S-GCC early, never in L-GCC) included children who started S-GCC before age 2½ years and never attended an L-GCC. At ages 3½ and 4½ years, at least 75% of these children were still regularly attending S-GCC. Group 4 (S-GCC early, L-GCC late) included children who started S-GCC before age 2½ years and entered an L-GCC between ages 2½ and 4½ years. Finally, group 5 (L-GCC early) included children who started an L-GCC before age 2½ years. At ages 3½ and 4½ years, more than 75% of these children were still in L-GCC. Table 1 presents the proportion of children in each GCC category.

Potential Confounding Factors. Variables previously found to be associated with the use of child care or conceptually relevant to child care or infections were considered as covariates. These variables were coded to reflect the presence of a potential risk of infections (coded as 1) vs the absence of risk (coded as 0). Table 1 presents the prevalence of the risk factors. All the variables were assessed via the mother's report except for the child's birth weight. All questionnaires are available online.[14]

ANALYSES

First, Poisson regression analyses were conducted (using STATA [StataCorp LP, College Station, Texas]) to predict the frequency of each of type of infection by GCC type. Poisson regressions are best suited to model associations with a count variable, such as the number of infections. Four models were conducted separately for 4 developmental periods: early preschool, late preschool, elementary school, and the entire childhood period (ie, early preschool to elementary school).

Among the potential confounding variables listed in Table 1, bivariate analyses (correlations or χ^2 tests) identified the following as being associated with infections and with GCC attendance patterns (using $P < .10$): maternal education, maternal health, number of siblings, breastfeeding, ethnic minority, presence of a domestic animal, allergies, and low birth weight. These variables were included as controls in all analyses, along with a dummy variable reflecting whether preschool infections were assessed during the cold and flu season (November through May). Controlling for season was not necessary during the elementary school years because data for all children were collected at the same time (in the spring).

RESULTS

ASSOCIATIONS BETWEEN GCC ATTENDANCE AND THE FREQUENCY OF INFECTIONS FOR EACH DEVELOPMENTAL PERIOD

Table 2 presents the results of Poisson regression analyses linking GCC type to RTIs, ear infections, and gastrointestinal tract infections, respectively. Compared with home-cared children, children who started L-GCC in the early preschool period had higher rates of RTIs (incidence rate ratio [IRR], 1.61; 95% confidence interval [CI], 1.27-2.03) and ear infections (1.62; 1.19-2.20) during that period. They did not have a higher risk of infection in the late preschool period (3½-4½ years old). They had lower risks of contracting RTIs (IRR, 0.79; 95% CI, 0.66-0.96) and ear infections (0.57; 0.37-0.88) during the elementary school years.

Children who started L-GCC in the late preschool period had higher rates of RTIs (IRR, 1.47; 95% CI, 1.15-1.88) and ear infections (2.36; 1.59-3.48) during that period but did not differ from home-cared children at other times. Children who started S-GCC in the early preschool period and never went into L-GCC did not differ from home-cared children at any developmental period. Children who were first cared for at home during early preschool and started S-GCC or L-GCC during the late preschool period exhibited a higher risk of ear infections during the late preschool period (IRR, 1.83; 95% CI, 1.23-2.72) but did not differ from home-cared children at other times or for other types of infections. Finally, children who started S-GCC during the early preschool period and were never in L-GCC exhibited a higher risk of ear infections during the late preschool period (IRR, 1.47; 95% CI, 1.03-2.11) but did not differ from home-cared children at other times or for other types of infections. Group child care was not associated with gastrointestinal infections at any developmental period.

Among the control variables, low maternal education, the presence of a pet in the house, allergies, the child's low birth weight, poor maternal health, and the cold and flu season were associated with more infections, whereas non-Western ethnicity was associated with fewer infections. None of these relationships were observed systematically for a given type of infection or for a given developmental period. Sensitivity analyses were conducted and showed that the results were similar across season of assessment.

Table 2. Adjusted IRRs of Respiratory Tract, Ear, and Gastrointestinal Tract Infections for Children in GCC at Different Periods During the Preschool and Elementary School Years

Variable	Early Preschool (Aged 1½-2½ y)		Late Preschool (Aged 3½-4½ y)		Elementary School (Aged 5-8 y)	
	IRR (95% CI)	*P* Value	IRR (95% CI)	*P* Value	IRR (95% CI)	*P* Value
Respiratory Tract Infections						
GCC enrollment age and size[a]						
Started S-GCC or L-GCC late	1.21 (0.93-1.58)	.16	1.20 (0.93-1.54)	.16	1.02 (0.84-1.24)	.82
S-GCC early, never in L-GCC	1.15 (0.91-1.44)	.24	1.13 (0.92-1.40)	.25	0.97 (0.82-1.14)	.70
S-GCC early, L-GCC late	1.28 (0.98-1.69)	.07	1.47 (1.15-1.88)	.002	0.91 (0.74-1.11)	.35
L-GCC early	1.61 (1.27-2.03)	<.001	1.02 (0.80-1.30)	.90	0.79 (0.66-0.96)	.02
Low maternal education	1.07 (0.88-1.30)	.49	1.22 (1.02-1.47)	.03	1.01 (0.86-1.17)	.94
Other children in household[b]	1.09 (0.93-1.29)	.29	1.02 (0.84-1.23)	.86	1.00 (0.85-1.18)	>.99
Breastfed <6 mo	1.17 (0.99-1.38)	.07	1.02 (0.87-1.19)	.82	0.96 (0.85-1.09)	.56
Non-Western ethnicity	0.91 (0.71-1.16)	.45	0.77 (0.60-1.00)	.05	0.76 (0.62-0.94)	.01
Pet in household	1.06 (0.92-1.24)	.42	1.19 (1.03-1.38)	.02	1.06 (0.94-1.19)	.34
Low birth weight	1.32 (0.93-1.87)	.12	1.43 (1.04-1.96)	.03	1.20 (0.91-1.58)	.19
Poor maternal health	1.03 (0.87-1.23)	.73	1.14 (0.97-1.34)	.12	1.08 (0.95-1.23)	.26
Allergies/asthma/eczema[b,c]	1.16 (0.89-1.52)	.28	1.00 (0.78-1.30)	.98	1.08 (0.96-1.21)	.18
First data collection in winter[b]	1.28 (0.82-2.00)	.27	1.11 (0.96-1.29)	.15	NA	NA
Second data collection in winter[b]	1.36 (0.88-2.12)	.17	1.41 (0.94-2.13)	.10	NA	NA
Ear Infections						
GCC enrollment age and size[a]						
Started S-GCC or L-GCC late	1.21 (0.86-1.70)	.28	1.83 (1.23-2.72)	.003	0.79 (0.51-1.22)	.28
S-GCC early, never in L-GCC	1.20 (0.89-1.62)	.22	1.47 (1.03-2.11)	.04	0.82 (0.57-1.16)	.26
S-GCC early, L-GCC late	1.12 (0.78-1.62)	.54	2.36 (1.59-3.48)	<.001	0.90 (0.58-1.38)	.62
L-GCC early	1.62 (1.19-2.20)	.002	1.20 (0.80-1.82)	.38	0.57 (0.37-0.88)	.01
Low maternal education	1.18 (0.92-1.50)	.19	1.34 (1.01-1.77)	.04	1.42 (1.04-1.94)	.03
Other children in household[b]	1.04 (0.84-1.29)	.71	1.00 (0.75-1.33)	.99	0.80 (0.56-1.13)	.21
Breastfed <6 mo	1.00 (0.81-1.24)	.99	0.86 (0.67-1.09)	.21	1.04 (0.78-1.40)	.77
Non-Western ethnicity	1.38 (1.04-1.83)	.03	0.80 (0.55-1.17)	.26	0.94 (0.61-1.47)	.80
Pet in household	1.16 (0.95-1.42)	.14	1.11 (0.88-1.39)	.38	1.06 (0.81-1.38)	.66
Low birth weight	1.61 (1.05-2.45)	.03	1.10 (0.64-1.89)	.74	1.06 (0.57-1.95)	.86
Poor maternal health	1.08 (0.87-1.35)	.49	1.18 (0.91-1.52)	.22	0.99 (0.73-1.34)	.93
Allergies/asthma/eczema[b,c]	1.25 (0.89-1.76)	.19	1.36 (0.96-1.93)	.09	1.24 (0.96-1.61)	.10
First data collection in winter[b]	1.69 (0.91-3.12)	.09	1.41 (1.12-1.78)	.004	NA	NA
Second data collection in winter[b]	1.50 (0.82-2.73)	.19	1.96 (0.92-4.19)	.08	NA	NA
Gastrointestinal Tract Infections						
GCC enrollment age and size[a]						
Started S-GCC or L-GCC late	1.05 (0.70-1.59)	.80	0.91 (0.59-1.41)	.68	0.93 (0.66-1.31)	.70
S-GCC early, never in L-GCC	1.12 (0.79-1.57)	.53	1.07 (0.76-1.51)	.70	0.83 (0.63-1.11)	.21
S-GCC early, L-GCC late	1.08 (0.71-1.65)	.72	1.43 (0.97-2.12)	.07	0.85 (0.60-1.21)	.38
L-GCC early	1.39 (0.97-1.99)	.08	1.16 (0.80-1.69)	.43	0.73 (0.52-1.01)	.06
Low maternal education	0.91 (0.67-1.24)	.56	1.03 (0.76-1.41)	.84	0.97 (0.74-1.27)	.83
Other children in household[b]	1.33 (1.01-1.74)	.04	1.10 (0.81-1.50)	.54	1.23 (0.89-1.70)	.20
Breastfed <6 mo	0.95 (0.74-1.22)	.70	1.11 (0.85-1.43)	.45	1.13 (0.89-1.42)	.32
Non-Western ethnicity	0.67 (0.43-1.03)	.07	0.63 (0.41-0.99)	.04	0.63 (0.42-0.94)	.03
Pet in household	1.11 (0.88-1.40)	.37	1.04 (0.82-1.32)	.72	1.08 (0.87-1.32)	.49
Low birth weight	0.95 (0.50-1.80)	.88	0.90 (0.48-1.70)	.75	0.98 (0.56-1.69)	.94
Poor maternal health	1.07 (0.82-1.40)	.62	1.35 (1.04-1.75)	.02	0.92 (0.72-1.18)	.52
Allergies/asthma/eczema[b,c]	1.08 (0.69-1.68)	.73	0.77 (0.48-1.24)	.29	1.05 (0.86-1.30)	.61
First data collection in winter[b]	1.30 (0.66-2.56)	.45	0.96 (0.76-1.21)	.74	NA	NA
Second data collection in winter[b]	1.32 (0.67-2.59)	.42	1.04 (0.60-1.82)	.89	NA	NA

Abbreviations: CI, confidence interval; GCC, group child care; IRR, incidence rate ratio; L-GCC, large GCC; NA, not applicable; S-GCC, small GCC.
[a]Reference category is home care.
[b]Coded for each age period (see details in Table 1).
[c]Allergies for the early and late preschool periods; allergies, asthma, or eczema for the elementary school years.

ASSOCIATIONS BETWEEN GCC AND THE FREQUENCY OF INFECTIONS ACROSS ALL DEVELOPMENTAL PERIODS

In the last series of Poisson regression models testing the association between GCC and the mean number of infections across the entire study period (age 1½-8 years), we found no differences between the GCC groups and the home care group in their frequency of infections (data not shown).

COMMENT

To our knowledge, this is the first prospective population-based study to examine the associations between differ-

ent GCC experiences and 3 different types of serious infections, throughout preschool and up to mid-elementary school. These results demonstrate that although children generally developed more infections around the time they started L-GCC, those who started before age 2½ years had fewer RTIs with fever and ear infections during the elementary school years. These results are in line with previous studies showing an increased risk of infections in GCC children during the preschool years[1,4,7-10] and with those reporting a long-term protective effect of GCC for common colds,[4] wheezing, and atopy.[15] The results extend previous findings and provide data to the 3 unanswered questions that we set out to examine.

First, these results demonstrate that the long-term protective effect of L-GCC observed for the common cold also applies to more serious types of infections. Participation in S-GCC did not confer any protective effect for future infections, replicating the results of Ball et al,[4] who suggested that large GCC provides exposure to a larger number of serotypes (and infectious agents) and that this wider exposure is necessary for preschoolers to acquire immunity.[15] By replicating the results of Ball and colleagues in a different context of child care service provision (ie, mostly public child care in the Canadian province of Quebec vs mostly private child care in Tucson, Arizona), which may involve different selection factors for child care use and type of child care, the present results lend robustness to findings linking L-GCC and RTIs.

Second, the present results lend some support to the possible existence of a sensitive period during the preschool years (ie, before age 2½ years) when being exposed to large groups of children may protect against future infections. Children who initiated L-GCC after age 2½ years did not benefit from a protection during elementary school years, and they exhibited increased risk of ear infection at the time they initiated L-GCC (ie, after age 2½ years). We cannot exclude, however, the possibility that a protective effect arises after a longer delay and that it was not detected during this study.

Third, we found no significant differences between children with different GCC experiences in overall frequency of infections from age 1½ to 8 years. The increased risk of infections for children attending L-GCC seemed limited to the period surrounding the age at enrollment and was compensated for by lower subsequent rates of infections. Similarly, the long-term protective effect observed for children who initiated L-GCC early was insufficient to offset the initial increased risk and to translate into an overall protective effect for the child's first 8 years of life.

The present study did not investigate mechanisms responsible for the long-term reduction in serious infections but provided details about the patterns they should account for. First, the protective effect occurred only in children exposed to L-GCC before age 2½ years, suggesting a role for developmental processes. Second, the protective effect became significant only at elementary school entry, indicating that it may require a 3-year delay or a sudden increase in exposure to other children. One possible mechanism that has received empirical support in the context of long-term protection against asthma involves an increased repeated stimulation of the immature immune system by early and mild infections.[16] Future studies are necessary to investigate this and other mechanisms that may account for the results.

STRENGTHS AND LIMITATIONS

The present study took advantage of an 8-year follow-up of a large population-based birth cohort with extensive prospective family assessments and yearly information about child care and infections of different types. These considerable strengths, together with the study's replication of previous results, support the reliability of the findings. Nevertheless, some limitations should be noted.

First, as in all longitudinal studies, differential attrition could have biased the results and limited generalization to the population. However, the use of weights that accounted for sample selection and attrition eliminated the differences between the analysis sample and the initial representative population sample. Second, it is possible that the findings were affected by the selection of healthier or more resourceful families into L-GCC settings.[17] To minimize this selection bias, we paid careful attention to the identification and control of several potentially confounding variables (ie, maternal education, maternal health, low birth weight, breastfeeding, ethnicity, and family size). Yet, only randomized controlled experiments could ascertain that participation in L-GCC exerts a causal effect in reducing long-term risk of infections. Third, the assessment of frequency of infections via maternal reports may have introduced some bias. However, the most likely bias would be one of underreporting (eg, symptoms going unnoticed) and would decrease the probability of finding significant associations. Furthermore, recall bias was minimized by asking mothers to report infections that occurred only up to 3 months before the interview. Importantly, the pattern of results, with opposite effects of early entry into L-GCC at 2 developmental periods, is not consistent with selection or reporting biases. That is, parents may be more likely to report illnesses that affected day care attendance. However, although the type of GCC could have affected parental recall during the preschool years, it is unlikely to have affected it during the elementary school years.

CLINICAL IMPLICATIONS

This study provides reassuring evidence for parents that their choices regarding child care (group size and age at enrollment) should not have a major effect on the health of their children from a long-term (8-year) perspective, at least regarding RTIs with fever, gastrointestinal tract infections, and ear infections. Although children exposed to L-GCC are likely to experience an increased frequency of infections compared with children cared for at home, this increase should be limited to the period around enrollment into GCC. Children who initiate L-GCC early (ie, before age 2½ years) may even gain protection against infections during the elementary school years, when absenteeism carries more important consequences for school adaptation and performance. Physicians may reassure parents whose children initiate large GCC early that their child's experiencing infections is temporary and is likely to provide them with greater immunity during the elementary school years.

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You are worried about seeing him spend his early years in doing nothing. What! Is it nothing to be happy? Nothing to skip, play, and run around all day long? Never in his life will he be so busy again.
—Jean-Jacques Rousseau, *Emile*, 1762