Objective: To determine whether child care center (CCC) providers contribute to unnecessary physician referrals and antibiotic prescriptions in young children with upper respiratory tract infections.


Participants: Child care center providers from randomly selected licensed Ontario CCCs accepting diapered children.

Main Outcome Measures: Knowledge, attitudes, and practices concerning physician referral; exclusion; and antibiotic use for children with upper respiratory tract infections. Indications for exclusion were compared with published Canadian guidelines.

Results: Contact was made with 42 eligible CCCs to obtain the requisite number of 36 participants (participation rate, 86%). Of the 36 centers, staff reported advising that children visit a physician for colored nasal discharge in 28 (78%), for productive cough in 23 (64%), and for unusual behavior in 9 (25%). Also of the 36 centers, staff reported excluding children for colored nasal discharge in 20 (56%), for productive cough in 16 (44%), and for unusual behavior in 15 (42%). Antibiotics were thought useful for nonspecific upper respiratory tract infections to prevent the spread of infection in 9 (26%), to speed up recovery in 7 (21%), and to prevent bacterial infection in 13 (38%) of 34 centers. In the previous 6 months, 25 (69%) of 36 staff members reported making an exception to exclusion because a child had an antibiotic prescription.

Conclusions: Many children are referred by CCC staff to physicians contrary to established guidelines. As staff must act on behalf of parents, a low threshold for referral is not unreasonable. However, this survey confirms that CCC staff recommend children to receive antibiotics and exclude children inappropriately. These practices are based on incomplete knowledge. Research on appropriate management of upper respiratory tract infections by CCC staff is needed. Education to correct specific knowledge deficits should be initiated.


STRATEGIES ARE needed to reduce unnecessary antibiotic prescription, the major contributor to the escalating problem of antibiotic-resistant bacteria.1 Childhood upper respiratory tract infection (URI) is the most common illness for which antibiotics are prescribed.2 While antibiotic therapy is considered appropriate for acute otitis media, proved rhinosinusitis, and proved bacterial pharyngitis, it is not advised for bronchitis or nonspecific URIs.3,7 An inordinately high proportion of preschool-aged children receive antibiotics8,9 and have infections due to bacteria, in particular *Streptococcus pneumoniae*, that demonstrate decreased antibiotic susceptibility.10 Child care center (CCC) attendance is a risk factor for carriage and is associated with infection with such agents.9,11,12 In a study published in 1996, Arnold et al9 found that approximately half of all children younger than 6 years carried *S pneumoniae* and that 59% of these isolates were not susceptible to at least 1 antibiotic.

Pressure from CCC staff has been implicated as a cause of inappropriate physician referral and increased antibiotic prescribing.13 However, no primary data have been obtained from CCC staff for these practices. Collection of such data is war-
PARTICIPANTS AND METHODS

STUDY DESIGN AND SETTING

A telephone survey was conducted between May 3, 1998, and July 27, 1998, to collect information on CCC provider knowledge, attitudes, and practice toward exclusion, physician referral, and use of antibiotics for children with URIs. In Ontario, CCC directors usually have the overall responsibility for the management and exclusion of sick children, in consultation with other child care providers where appropriate and with parents. Although it is not compulsory for CCCs to have a policy for the management of sick children, Canadian guidelines are readily available.¹³

A single trained interviewer conducted interviews with the CCC provider who was primarily responsible for the decision to send children home at each center. In each case, this happened to be the CCC director, and all were directly involved in child care. A standardized questionnaire was used with each interview, lasting approximately 15 minutes. The interviewer identified herself as a research assistant from the Clinical Epidemiology Unit at The Hospital for Sick Children, Toronto, Ontario. The purpose of the research was explained as examining “thoughts about exclusion from child care, referral to doctors, and use of antibiotics in children with URI.” The questionnaire was pretested for clarity and comprehensiveness on parents who work in the hospital and on educators and policy makers from the professional child care community. The study was approved by the Research Ethics Board of The Hospital for Sick Children.

SAMPLING OF CENTERS

As there are no published data on this study question, sample size requirements were based on a 95% confidence interval of ±20% and around an expected frequency of 50% for binary responses, resulting in a sample size of 36 (α = .05, β = .80). Using a table of random numbers, CCCs were selected from all 295 licensed centers caring for diapered children in the province of Ontario (Ministry of Community and Social Services, unpublished data, November 1997). Child care centers were telephoned consecutively until directors from the first 36 centers had agreed to participate. When CCCs were first contacted, a mutually convenient time for questionnaire administration was determined.

QUESTIONNAIRE

Child care center directors were asked their reasons for excluding diapered children with URIs and their criteria for physician referral or antibiotic use. Factors influencing these decisions were explored, including pressure from parents, inability of the child to participate in activities, and resources available to provide care to an ill child. Attitudes toward antibiotic use in children with URIs were also examined. Initial questions inquired about details of the most recent occasion at which staff had excluded a child with a URI. Staff practices were compared with existing practice guidelines.¹⁴ These questions were then followed by questions on knowledge and attitudes about URIs in general. This approach was used to avoid the possibility of staff interpreting certain responses as being correct and using these to respond to questions concerning their actual practice. Unusual behavior was defined as “behaviour unusual for that child, for example, lethargy or irritability.”

DATA ANALYSIS

Data from close-ended questions (yes or no) were used for the analysis and were transferred from data forms into a database.¹⁵ Statistical calculations were also performed using the database, and 95% confidence intervals were calculated for relative risks.

EXCLUSION AND PHYSICIAN REFERRAL

Most centers reported having a written policy for the management of children with URIs (25 [69%] of the 36 centers). Staff of the 36 centers believed that a diapered child with a URI should be excluded if the child was unable to participate in CCC activities (33 [92%]), to prevent the spread of infection (24 [67%]), or if there were insufficient staff to provide adequate care (22 [61%]). Ear pain, green or yellow nasal discharge, and cough with phlegm were the most common symptoms associated with a URI prompting staff to exclude children or advise physician referral in the preceding 6 months (Table 1). Unusual behavior was acted on less often (Table 1). Having a written policy for the management of a URI was not associated with differences in usual staff practice to either exclude a child with a URI or refer a child to a physician for particular symptoms (Table 1). The size of a CCC (<40 or ≥40 full-time children) was also not associated with differences in exclusion or referral practices. In the last 6 months, 4 (11%) of 36 staff members reported excluding children...
because of pressure from other parents who did not want their child exposed.

Exceptions to exclusions were also reported. Staff at the 36 centers kept children at the CCC who they believed needed home care because the child had a prescription for antibiotics (25 [69%]) or because the parent could not stay home from work (5 [14%]). Twenty-three (64%) of 36 staff members reported experiencing difficulties at some time with parents who did not want their child with a URI excluded. On the last occasion that a staff member reported sending home a diapered child with a URI, 21 (62%) of 34 advised that the child visit a physician and 14 (41%) of 34 required a period of exclusion.

**ANTIBIOTIC USE**

Of the 36 CCC directors, antibiotics were most often believed necessary for streptococcal sore throat (n = 35 or 97%), ear infection (n = 34 or 94%), and sinus infection (n = 30 or 83%). However, antibiotics were also believed necessary by some for bronchitis (n = 30 or 83%), cough (n = 14 or 39%), nonstreptococcal sore throat (n = 12 or 33%), colds (n = 7 or 19%), and “flu” (n = 6 or 17%). Of 34 staff members, 13 (38%) believed antibiotics were required in a child with a nonspecific URI to prevent bacterial infection, 9 (26%) to prevent the spread of infection, and 7 (21%) to hasten recovery. Holding these beliefs was significantly more likely to be associated with requesting commencement of antibiotic therapy before return to the CCC on the last occasion a child had been sent home with a URI (Table 2). In total, 6 (18%) of 34 CCC providers had required that antibiotic therapy be commenced before return.

**COMMENT**

This study confirms that CCC staff frequently advise referral of children for examination by their physicians. This finding is not unexpected given that societal changes have led to a shift in child care responsibilities from parents toward CCC staff and that a high frequency of URIs occurs with CCC attendance. It is not unreasonable that as the child’s advocate, staff should have a low threshold for referral. However, while CCC staff should not be expected to make a diagnosis for sick children in their care, they should recognize which symptoms require referral to a physician. Symptoms such as cough or nasal discharge were usually referred, while others of more concern such as unusual behavior were frequently overlooked, contrary to existing guidelines.

The false belief that excluding children with URIs may prevent spread of infection also resulted in inappropriate exclusions for common symptoms such as cough and nasal discharge. This supports speculation by Landis et al, whose survey found a higher proportion of CCC staff in favor of exclusion of children with fever than either parents or pediatricians. Canadian guidelines for the management of illness in CCCs list only 2 types of children with URIs who should be excluded by staff: those unable to participate in usual activities and those requiring a level of care that compromises that of other children. The remaining 4 excludable conditions associated with URI symptoms require input from a physician (chest infection or unusual behavior assessed as requiring home care and streptococcal pharyngitis or purulent conjunctivitis treated with antibiotics for less than 24 hours). However, well-designed studies to support this advice are yet to be conducted. Furthermore, other factors, such as pressure from parents to remain at work or from parents of other children to exclude those who are ill, are also demonstrated. Employment policies that allow parents to care for sick children as necessary are key to addressing this issue. Because of incorrect beliefs that antibiotics may treat viral infection, hasten recovery, prevent transmission of infection, and prevent bacterial infection, CCC directors also suggest that children should receive antibiotics. This may occur either directly, by suggesting to parents that children commence receiving antibiotics, or indirectly, by accepting children into CCCs who would have otherwise been excluded had they not already commenced receiving antibiotics. The decision for a child to commence receiving antibiotics should be made by a physician, and there are few URIs that necessitate exclusion on the grounds of failing to commence antibiotic therapy. It is important that this message be reinforced given the potential for current behaviors to

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Table 1. Child Care Center Provider Practices for Children by Upper Respiratory Tract Symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Who Usually or Always Advised Physician Referral</th>
<th>Who Usually or Always Excluded From Child Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ear pain</td>
<td>30 (83)</td>
<td>23 (64)</td>
</tr>
<tr>
<td>Green or yellow nasal discharge</td>
<td>28 (78)</td>
<td>20 (56)</td>
</tr>
<tr>
<td>Cough with phlegm</td>
<td>23 (64)</td>
<td>16 (44)</td>
</tr>
<tr>
<td>Unusual behavior</td>
<td>9 (25)</td>
<td>15 (42)</td>
</tr>
<tr>
<td>Sore throat</td>
<td>20 (56)</td>
<td>11 (31)</td>
</tr>
<tr>
<td>Runny nose</td>
<td>7 (19)</td>
<td>7 (19)</td>
</tr>
<tr>
<td>Dry cough</td>
<td>15 (42)</td>
<td>5 (14)</td>
</tr>
</tbody>
</table>

Table 2. Child Care Center (CCC) Provider Beliefs on Antibiotic Effects by Practice of Requesting Antibiotics for Children With URIs

<table>
<thead>
<tr>
<th>Belief</th>
<th>No. of CCC Directors Requesting Antibiotic Therapy for Return to the CCC†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (n = 6)</td>
</tr>
<tr>
<td>Antibiotics prevent bacterial infection</td>
<td>5</td>
</tr>
<tr>
<td>Antibiotics prevent the spread of infection</td>
<td>5</td>
</tr>
<tr>
<td>Antibiotics hasten recovery</td>
<td>4</td>
</tr>
</tbody>
</table>

*URI indicates upper respiratory tract infection; RR, relative risk; and CI, confidence interval.
†Of 36 CCC directors, 34 responded.
contribute to antibiotic resistance among bacteria carried by children in CCCs.

A potential limitation of this study is the small number of CCCs that were surveyed. Confidence intervals for some estimates were large. However, sample size was estimated a priori, random selection was used, there was a low refusal rate, and characteristics of included centers did not differ significantly from all CCCs for which enrollment was attempted (although the ability to detect such a difference is unlikely). The timing of the survey during the end of the CCC year was also not ideal. Of 42 centers contacted, 6 (14%) declined to participate because they were too busy and the study period did not include the peak season for URIs. Finally, the survey only summarizes CCC directors’ reported practices. No attempt was made to confirm the validity of their responses. While these biases could lead to underestimation of inappropriate behaviors, it is also possible that staff members may have overreported interventional behaviors if they anticipated this was the correct response. It would be prudent for a future survey to include winter months and to validate the responses obtained.

In summary, this study confirms that CCC staff contribute to inappropriate physician referral, exclusion, and requests for antibiotic therapy for children with URIs. More research is needed to examine features of illness that may help guide CCC workers in the management and referral of children. Education to correct specific knowledge deficits should be initiated. Specifically, the lack of efficacy of antibiotics in hastening recovery and in preventing the spread and the initiation of bacterial infection with viral URIs should be emphasized.

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