Asthma is not enough: Continuation of smoking among parents with an asthmatic child

Joel J Liem MD1, Anita L Kozyrskyj PhD2,4, Cecilia M Benoit PhD3, Allan B Becker MD1,4

BACKGROUND: Ideally, on diagnosis of asthma in a child, parents are counselled to decrease environmental tobacco smoke exposure to their children.

OBJECTIVE: To determine whether a diagnosis of asthma in children altered parental smoking behaviour toward a reduction in environmental tobacco smoke exposure.

METHODS: In 2002/2003, a survey was sent to 12,556 households with children born in 1995 in Manitoba. Parents were asked whether their seven-year-old child had asthma, and whether smokers were present in the home in 1995 and/or currently. The likelihood (OR) of a change in parental smoking behaviour was determined according to the presence of asthma in their child, a family history of asthma, the location of residence (rural or urban) and their socioeconomic status.

RESULTS: A total of 3580 surveys (28.5%) were returned. The overall prevalence of parental smoking in 1995 and 2002/2003 was 32.2% and 23.4%, respectively (31.9%/23.2% and 32.3%/23.6% in rural and urban environments, respectively). In 2002/2003, the prevalence of parental smoking in homes with asthmatic children was 29.8%. Parents were not more likely to quit smoking (OR=1.01, 95% CI 0.96 to 1.04) or smoke outside (OR=1.02, 95% CI 0.96 to 1.03) if their child developed asthma. Parental smoking behaviour (quit smoking or smoked outside) did not change if there was a positive family history of asthma (OR=1.04, 95% CI 0.78 to 1.37), if they lived in a rural or urban location (OR=0.94, 95% CI 0.71 to 1.23), or if they were from a low- or high-income household (OR=1.12, 95% CI 0.85 to 1.47).

CONCLUSIONS: The likelihood of altering parental smoking behaviour occurred independently of a diagnosis of asthma in their child, a family history of asthma, the location of residence and their socioeconomic status.

Key Words: Asthma; Children; Environmental tobacco smoke; Parents; Smoking cessation

Exposure to environmental tobacco smoke (ETS) is associated with poor asthma control in children, frequent asthma exacerbations, increased rates of hospital use and reduced rates of recovery after asthma exacerbations. Passive smoke exposure has been shown to increase bronchial hyper-responsiveness in asthmatic children (1-8).

One would expect that parents, on learning that their child is asthmatic and given the knowledge that cigarette smoking exacerbates the illness, would give up smoking or at the very least smoke outside the home (9). Yet, existing research has not addressed this issue. Part of the difficulty is that the prevalence of smoking in the general population has decreased significantly over the past decade, but the reason for this decrease may have little or nothing to do with a specific child's diagnosis of asthma. Interventions to change parental smoking behaviour have largely been unsuccessful (9-16). In the present study, we asked whether parents would stop smoking once they knew their child had asthma.

METHODS

The present study was approved by the Health Information Policy Committee of Manitoba Health and by the Health Information Policy Committee of the University of Manitoba. The study received ethics approval from the University of Victoria. Parents were asked whether their seven-year-old child had asthma, and whether smokers were present in the home in 1995 and/ or currently. The likelihood (OR) of a change in parental smoking behaviour was determined according to the presence of asthma in their child, a family history of asthma, the location of residence (rural or urban) and their socioeconomic status.

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Key Words: Asthma; Children; Environmental tobacco smoke; Parents; Smoking cessation

CONTACTS: Dr Allan B Becker, Section of Allergy and Clinical Immunology, Department of Pediatrics and Child Health, Room AE101, 820 Sherbrook Street, Winnipeg, Manitoba R3A 1R9. Telephone 204-787-2537, fax 204-787-5040, e-mail becker@cc.umanitoba.ca

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TABLE 1
Demographics of survey participants

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total returned surveys</td>
<td>3580</td>
<td>100.0</td>
</tr>
<tr>
<td>Male/Female children</td>
<td>1791/1789</td>
<td>50.3/49.7</td>
</tr>
<tr>
<td>Urban/Rural</td>
<td>2138/1442</td>
<td>59.7/40.3</td>
</tr>
<tr>
<td>Has a family history of atopy</td>
<td>1501</td>
<td>41.9</td>
</tr>
<tr>
<td>Children born with asthma in 1995</td>
<td>439</td>
<td>12.3</td>
</tr>
<tr>
<td>Has a family history of asthma</td>
<td>855</td>
<td>23.9</td>
</tr>
<tr>
<td>Has a father with asthma</td>
<td>244</td>
<td>6.8</td>
</tr>
<tr>
<td>Has a mother with asthma</td>
<td>328</td>
<td>9.1</td>
</tr>
<tr>
<td>Has siblings with asthma</td>
<td>484</td>
<td>13.5</td>
</tr>
</tbody>
</table>

TABLE 2
Comparison of respondents to nonrespondents

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of respondents, %</th>
<th>Percentage of nonrespondents, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>50.3</td>
<td>51.1</td>
</tr>
<tr>
<td>Female</td>
<td>49.7</td>
<td>48.9</td>
</tr>
<tr>
<td>Current asthma diagnosis</td>
<td>12.1</td>
<td>11.1</td>
</tr>
<tr>
<td>Maternal asthma in 1995</td>
<td>5.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Location of residence in 1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>61.2</td>
<td>55.4</td>
</tr>
<tr>
<td>Rural south</td>
<td>34.9</td>
<td>32.2</td>
</tr>
<tr>
<td>Rural north</td>
<td>3.9</td>
<td>12.3</td>
</tr>
<tr>
<td>Location of residence in 2001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>59.0</td>
<td>40.2</td>
</tr>
<tr>
<td>Rural south</td>
<td>37.7</td>
<td>34.0</td>
</tr>
<tr>
<td>Rural north</td>
<td>3.3</td>
<td>12.1</td>
</tr>
</tbody>
</table>

Results are reported as OR with 95% CI.

The demographics of survey participants are shown in Table 1. The urban to rural ratio reflects the population distribution of Manitoba.

The second mailing of the survey increased the response rate by 12%, but the final response rate was limited by the 17% response rate to the first mailing and the 829 noncurrent mailing addresses. The fact that the survey participants were representative of the asthmatic population was reassuring. The overall prevalence of asthma was 12.3% per 100 children. Asthma was reported in 7.9% of children living in northern rural areas, 10.3% in southern rural areas and 13.9% in urban areas.

A comparison of respondents to nonrespondents is shown in Table 2.

A total of 16,384 children were born in the province of Manitoba in 1995. Of these, 13,980 children lived in the province in 2002. The surveys were sent to all of these families, except for those living in a First Nations community (‘reserves’, which will be studied separately) (n=12,556). The first and second mail-outs resulted in 2114 and 1725 returned surveys, respectively. A total of 3580 surveys (28.5%) were returned.
Parents of asthmatic children continue to smoke

The present study suggests that ETS exposure is a risk factor for the development and persistence of childhood asthma (Figure 2). It appears that many parents continue to smoke, in spite of having children with asthma. Results from the Childhood Asthma Management Program (CAMP) study (11) revealed that of the children who reported cigarette smoking causing asthma symptoms, 26% had at least one parent who continued to smoke cigarettes. Given a similar proportion of parents who smoked in our study, this suggests, even if smoking causes obvious symptoms in the child, that this relationship does not induce parents to stop smoking. Irvine et al (18) concluded that although environmental modification of asthmatic homes may occur, many children remain exposed to agents involving tobacco smoke that are known to trigger childhood asthma. It appears that the parents’ altruism toward the well-being of their children may not be sufficient to give them the ability to quit smoking.

Many social factors are likely to play a role in the overall decrease in smoking prevalence. Public pressure resulting in changes to governmental health policy appears to have a major impact (ie, increasing taxes for cigarettes and banning smoking in public settings). What, if anything, can be done to help the parents reduce or eliminate exposure of their asthmatic child to tobacco smoke? Most interventions have, to date, been ineffective in changing parental smoking behaviour even when parents are well aware that their asthmatic child’s health may improve (9-16,18). For example, Wakefield et al (10) attempted to provide feedback to low-income parents by using urinary cotinine levels and advice on home smoking restrictions to help decrease exposure. Unfortunately, the intervention proved to be unsuccessful (10).

In fact, some studies (18,19) suggest that counselling parents in smoking cessation may be detrimental. Irvine et al (18) found that a brief intervention to advise smoking parents about the risks of passive smoking to their asthmatic child may have made some parents less inclined to quit smoking. Their conclusion was that if a clinician believes that a child’s health is being affected by parental smoking, the parent’s smoking needs to be addressed by parental smoking, the parent’s smoking needs to be addressed as a separate issue from the child’s health. Continuing to ‘badger’ a family to quit smoking may even turn smoking parents away from using preventive health services due to the stigma that parents may feel because they are unable to stop the habit (19).

### DISCUSSION

Over the past decade, the prevalence of smoking has decreased. In Canada, there has been an 8.8% decrease in smokers aged 15 years or older from 1994/1995 to 2001 (most recent data available) (17). The results from our study indicate a similar downward trend – dropping from 32.2% in 1995 to 23.4% in 2002/2003.

The aim of our study was to determine whether a specific health factor, ie, a diagnosis of asthma in a child, could play a role in changing parental smoking behaviour. Our data suggested that this was not the case; rather, the parents participating in our study with a child diagnosed with asthma were not any more likely to alter their smoking behaviour than counterparts without an asthmatic child.

### TABLE 3

<table>
<thead>
<tr>
<th>Factor</th>
<th>Quit smoking*</th>
<th>Smoke outdoors*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma, OR (95% CI)</td>
<td>1.01 (0.66–1.54)</td>
<td>1.02 (0.56–1.83)</td>
</tr>
<tr>
<td>No asthma, OR</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Adjusted for family history of asthma, rural or urban location, and income

### TABLE 4

<table>
<thead>
<tr>
<th>Factor</th>
<th>OR*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family history of asthma</td>
<td>1.04</td>
<td>0.78–1.37</td>
</tr>
<tr>
<td>No family history of asthma</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Rural location</td>
<td>0.94</td>
<td>0.71–1.23</td>
</tr>
<tr>
<td>Urban location</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Low-income household</td>
<td>1.12</td>
<td>0.85–1.47</td>
</tr>
<tr>
<td>High-income household</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

*Logistic regression
In one of the few positive studies, Hovell et al (20) showed a significant decrease in second-hand smoke exposure among mothers of preschool asthmatic children after providing seven counselling sessions over a three-month period. The authors concluded that this intensive form of counselling service should be made available to all. However, the cost burden of this intervention can be enormous and likely unacceptable to most publicly funded health care systems. This study demonstrates the positive effect of social support for these mothers. They are likely isolated with their child for long periods of time each day, and social supports may be critical to help alter negative behaviours.

We hypothesized that there would be greater resistance to smoking cessation among parents who participated in the survey from a lower socioeconomic status or from rural locales; however, we found no differences when compared with participants from high-income and urban locales, respectively. What this seems to indicate is that a minority of parents, regardless of social class and geographical location, are highly addicted to cigarette smoking.

For a general health and population survey, our response rate of 28.5% is greater than a recent general population health survey of comparable size, in which a response rate of only 20% was achieved (21). This is often considered a low response rate but only when compared with specific population surveys or problem-specific surveys (22,23). Our survey demographic population reflects the overall population in the province of Manitoba (63% urban and 37% rural, according to Statistics Canada 2001 census) (24), although we had slightly more surveys returned from southern rural regions compared with northern rural regions. The male to female response rate coincided with the sex distribution of children born in the province in 1995, as expected. There was a slight over-representation of returned surveys from those in the higher income quintiles; however, there was good representation from each of the income groups. Finally, we were reassured by how representative our survey was of the asthmatic population. The overall prevalence of asthma was 12.3 per 100 children. Asthma was reported in 7.9% of children living in northern rural areas, 10.3% in southern rural areas and 13.9% in urban areas. This geographic distribution was virtually identical to the prevalence of health care prescriptions for asthma as defined by the Manitoba Health databases for the full 1995 birth cohort (7.9% in northern rural areas, 9.6% in southern rural areas and 13.8% in urban areas) (25). Thus, the survey results were a good reflection of the entire 1995 Manitoba birth cohort.

There may have been an under-reporting of smoking behaviour in our survey because parents may have associated the question of smoking with the question regarding asthma. However, the survey was sent out as a general ‘child health and environment’ questionnaire, and questions regarding the health of their child – ie, does your child have asthma? – were separated from the questions regarding participant’s smoking behaviour. The fact that a greater proportion of surveys indicated that smokers were present in the homes and that their child had asthma compared with homes without children with asthma suggests that participants likely did not associate the two questions. Furthermore, the prevalence of smokers in the survey were similar to Statistics Canada data of trends of smoking across the country (17).

The prevalence of smoking in the province of Manitoba, like elsewhere in Canada, has significantly decreased in the past decade or so. Public pressure and changes to health care policy are likely among the major factors behind this trend. Nevertheless, there is still a substantial minority of Canadian adults who appear to be unable to quit smoking, many of whom are parents with children living at home.

### CONCLUSIONS

Smoking is a major preventable cause of illness and death, even for those who are passively exposed. Advising parents that their asthmatic child’s condition is worsened by ETS is not enough to change behaviour. Innovative social policies need to be developed to help addicted individuals overcome their habit and deal with the underlying causes that promote smoking in the first place. Only then can the health burden for parents and their children be reduced if not completely eliminated.

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### CONFLICT OF INTEREST

There are no conflicts of interest for any of the authors. The funding agencies had no role in the design and conduct of the study; the collection, analysis and review of the data; or the preparation, review, or approval of the manuscript.

### APPENDIX

#### The Health of Children Survey

I have read the consent form and agree to participate in this survey □ yes □ no

**The Health of My Child and Family**

Does your 7 year old child or anyone in the immediate family (sisters, brothers and parents) have any of the following problems?

- **Diabetes**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no
  - Child’s Brothers/ Sisters (ANY) □ yes □ no

- **Requiring insulin**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

- **Food allergy**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

- **Controllable by diet/pills**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

- **Inflammatory bowel disease (colitis)**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

- **Asthma**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

- **Hayfever**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

- **Arthritis**
  - Child □ yes □ no
  - Mother □ yes □ no
  - Father □ yes □ no

**My Home Environment**

Was your 7 year old child born in the home where you live now? □ yes □ no

What is the age of your current home (where you live now)? □ years

How long have you lived in your current home? □ years

Is there mold/mildew in your current home? □ yes □ no

Did anyone living in your current home smoke (cigarettes or tobacco)? □ yes □ no

Do they smoke in the home? □ yes □ no

The number of pets in the current home: Cats □ □ □ Dogs □ □ □

What was the age of your 7 year old child’s birth home? □ years

Was there mold/mildew in your child’s birth home? □ yes □ no

Did anyone living in your child’s birth home smoke (cigarettes or tobacco)? □ yes □ no

Did they smoke in the home? □ yes □ no

The number of pets in the birth home: Cats □ □ □ Dogs □ □ □

Was your 7 year old child born on a First Nations community? □ yes □ no
Parents of asthmatic children continue to smoke

REFERENCES


