

# Descriptive study of cough, wheeze and school absence in childhood

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## Abstract

**Background** – Respiratory symptoms such as cough and wheeze are associated with significant morbidity, including school absenteeism.

**Methods** – A respiratory questionnaire was sent to the parents of all 5727 children aged 7–9 years of age registered with 95 general practitioners in the Southampton area to determine (a) the prevalence of asthma, cough and wheeze, (b) the effects of respiratory symptoms on school absenteeism, and (c) the use of anti-asthma medication.

**Results** – A total of 4830 parents replied (response rate 86%). The 12 month prevalence of wheeze in the absence of cough was 5.5%, cough in the absence of wheeze was 10.0%, and 7.6% reported cough and wheeze; 15.2% of children had been diagnosed as asthmatic by their general practitioner. Of the 4830 who replied, 12.7% were receiving bronchodilators, 0.6% xanthine derivatives, 1.7% sodium cromoglycate, and 4.1% inhaled corticosteroids. In all, 348 (7.2%) children had missed more than five days of schooling in the preceding year for respiratory symptoms, while 43 children (0.9%) had missed more than 20 days of schooling in the preceding year. Of the children who had missed more than five days of schooling, 43% reported cough and wheeze, 33% cough alone, and 16% wheeze alone in the preceding year. Compared with children who coughed, those who wheezed were significantly more likely to be diagnosed as asthmatic and to be receiving bronchodilators or inhaled corticosteroids.

**Conclusions** – In this study, cough was the most frequently reported symptom amongst children missing more than five days of schooling per year.

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Underdiagnosis and undertreatment of respiratory illness has profound consequences in childhood leading to significant morbidity.<sup>1</sup> Cross sectional studies in the early 1980s demonstrated the pernicious effect of undertreatment of respiratory symptoms, especially on school attendance.<sup>1-3</sup> School absenteeism is associated with significantly impaired social, psychological, and educational adjustment.<sup>2</sup>

Reported wheeze has frequently been used as a surrogate marker for asthma.<sup>1</sup> In some children, however, the only manifestation of asthma is chronic cough in the absence of

wheeze.<sup>4</sup> These children show similar abnormalities of lung function and bronchial responsiveness to those children who manifest asthma in the form of wheeze, and show a similar response to anti-asthma medication.<sup>4</sup> At present the nature of chronic cough in relation to the diagnosis of asthma and its appropriate treatment remains unclear.<sup>5</sup>

The aims of this study were threefold: to measure the population prevalence of reported asthma, cough and wheeze in 7–9 year old children; to estimate school absenteeism attributable to respiratory symptoms; and to record the use of anti-asthma medication.

## Methods

The parents of all children aged between 7 and 9 years of age registered with 95 general practitioners located across the Southampton area were sent a questionnaire based on questions employed in previous cross sectional studies. The questionnaire was simple and enquired about respiratory symptoms, school absence, diagnosis of asthma, and anti-asthma treatment in the child. Wheeze was assessed by the question: "In the last 12 months has your child ever had an attack of wheezing (by wheezing I mean noisy breathing with a whistling sound coming from the chest, not the throat)", and parents were asked to quantify the frequency. Cough was assessed by the question: "In the last 12 months has your child seemed to cough more (or get more coughs) compared with other children". Parents were asked to quantify "In the last 12 months how many days has your child had off school with any chest symptom (e.g. cough, wheeze, breathlessness, chest tightness)?" into 0 days, 1–5 days, 6–20 days, and more than 20 days. Finally, parents were asked whether "a doctor has ever said your child has asthma", and asked to select from a list of proprietary and generic names of anti-asthma medication that their child had received in the preceding 12 months. Questionnaires were sent in May 1991 and, if there was no reply within four weeks, a reminder was sent.

Group comparisons utilised the  $\chi^2$  test with Yates' correction or Fisher's exact test for small groups. The study was approved by the Southampton Hospitals joint ethics committee.

## Results

Questionnaires were sent to the parents of 5727 children. Eighty five were returned unanswered as the family had moved out of the area; 3586 (63.6% response) replies were received within four weeks with a further 1244 replies after the

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Number of days of schooling missed in previous 12 months due to chest problems

No. of days	No. of children	% of total	% diagnosed asthmatic	% reporting cough	% reporting wheeze
0	3381	70.0	7.4	5.6	4.3
1-5	1028	21.3	30	38.2	27.9
6-20	305	6.3	49	72.5	55.7
>20	43	0.9	51	91.0	65.1

reminder, giving a total of 4830 replies (85.6% response).

Of the 4830 replies, 2508 were for boys (52.2%) and 2293 (47.8%) for girls, with 29 unclassified. The mean (SD) age of all the children was 8.04 (0.86) years. 5.5% of the children were reported to have had a wheezing attack but had not coughed more than others in the previous 12 months, 10.0% coughed more than others but had no history of wheeze in the previous 12 months, and 7.6% reported both cough and wheeze in the last 12 months. Of those who wheezed 69% had been diagnosed as asthmatic by their general practitioners, while 46% of those who coughed had been diagnosed asthmatic. In all, 15.2% of children had received a diagnosis of asthma from their general practitioner.

Of the 4830 replies, 12.7% of the children were receiving bronchodilators, 0.6% xanthine derivatives, 1.7% sodium cromoglycate, and 4.1% inhaled corticosteroids. A total of 348 (7.2%) children were reported to have missed more than five days of schooling because of chest problems in the preceding year, of whom 49% had been diagnosed as asthmatic. Forty three children (0.9%) missed more than 20 days of schooling in the preceding year, of whom 22 (51%) were diagnosed asthmatic. The frequency of school absence due to chest illness and the pattern of symptoms is shown in the table. Of the children who had missed more than five days of schooling, 43% reported cough and wheeze, 33% cough alone, and 16% wheeze alone in the preceding year. In this group of children 51% were receiving bronchodilators and 20% were receiving inhaled corticosteroids.

Although a greater proportion of children who reported cough missed more than five days of schooling than children who reported wheeze, the difference was not significant (24% versus 19%,  $\chi^2 = 1.75$ ,  $p = \text{NS}$ ). Compared with children who reported cough, those who reported wheeze were significantly more likely to be diagnosed asthmatic ( $\chi^2 = 94$ ,  $p < 0.00001$ ), and to be receiving bronchodilators ( $\chi^2 = 76$ ,  $p < 0.00001$ ), cromoglycate ( $\chi^2 = 14$ ,  $p < 0.001$ ), xanthines ( $\chi^2 = 9.8$ ,  $p < 0.01$ ), and inhaled corticosteroids ( $\chi^2 = 35$ ,  $p < 0.00001$ ).

Of the small group of 43 children who missed more than 20 days of schooling per year, 58% reported cough and wheeze, 33% cough alone,

and 7% wheeze alone in the preceding year. Of these children, 49% were receiving bronchodilators and 16% were receiving inhaled corticosteroids. The probability of receiving inhaled corticosteroids was significantly greater if the child reported wheeze compared with cough (Fisher's two tailed,  $p = 0.002$ ).

## Discussion

In those children who missed more than five days of schooling per year, cough was the most common symptom. Children were more likely to be labelled asthmatic, to be receiving bronchodilators, or to be receiving prophylactic treatment if their major symptom was wheeze. Cough may be a manifestation of asthma<sup>4</sup> but lacks specificity and may be due to other conditions. Neither atopic history nor bronchial hyperresponsiveness are helpful in distinguishing asthma in children with recurrent cough.<sup>5</sup> The current paediatric consensus statement on asthma defines "a syndrome consisting of chronic or recurrent wheezing and/or coughing in a setting where asthma is likely".<sup>6</sup> Without detailed assessment and possibly therapeutic intervention, we cannot be certain that the children with recurrent cough and school absence had asthma.

Although school absenteeism is a crude index of morbidity, it has been used as an index of undertreatment and response to treatment.<sup>1</sup> The asthma consensus statement recommends that there "should not be excessive school absences".<sup>6</sup> We cannot know whether anti-asthma medication would have benefited those children missing school due to either cough or wheeze. Nevertheless, only half of those children who missed more than five days of schooling per year to respiratory symptoms were receiving bronchodilators, while a fifth were receiving inhaled corticosteroids. Treatment patterns were similar in the small number of children who missed more than 20 days of schooling per year. Our findings suggest that children who report cough are less likely to be diagnosed asthmatic or to receive treatment than those who report wheeze, and suffer substantial morbidity. Cough in childhood warrants greater attention and is a potential subject for therapeutic intervention.

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