

tion.<sup>4</sup> Retesting of three of the five subjects negative for antibody but positive by the polymerase chain reaction confirmed the reproducibility of this technique.

Susceptible patients must be at some risk of infection when given transfusions of blood from subjects such as these who carry the virus.<sup>5</sup> Thus the polymerase chain reaction clearly has an important role in screening blood products as well as being a powerful test in diagnostic virology.

- 1 Wilhelm JA, Matter L, Schopfer K. The risk of transmitting cytomegalovirus to patients receiving blood transfusions. *J Infect Dis* 1986;154:169-71.
- 2 Saiki RK, Gelfond DH, Stoffel S, et al. Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase. *Science* 1988;239:487-94.
- 3 Sternberg RM, Thomsen DR, Stinsky MF. Structural analysis of the major immediate early gene region of human cytomegalovirus. *J Virol* 1984;49:190-9.
- 4 Kwok S, Higuchi R. Avoiding false positives with PCR. *Nature* 1989;339:237-8.
- 5 Yeager AS, Grumet FC, Hafeigh EB, Arvin AM, Bradley JS, Prober CG. Prevention of transfusion-acquired cytomegalovirus infections in newborn infants. *J Pediatr* 1981;98:281-7.

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## Change in use of asthma as a diagnostic label for wheezing illness in schoolchildren

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The prevalence of asthma is reported to be rising in children and adults in the United Kingdom<sup>1,2</sup> and in children in New Zealand.<sup>3</sup> We previously argued that an important factor in this apparent increase may be an increase in the use of asthma as a diagnostic label for wheezing in children.<sup>4</sup> In this study we looked at the change in the reporting of diagnosed asthma by parents of primary school children in Nottingham between 1985 and 1988.

### Subjects, methods, and results

In 1985 we measured the prevalence of wheezing, reported asthma, and use of treatment for asthma in a questionnaire survey of the parents of all 4750 children in a random sample of 28 Nottingham primary schools.<sup>4</sup> In 1988 we administered the same questions to the parents of all 17 432 pupils in the 102 primary schools that had not been sampled in 1985. The age range of the children was 4 to 11 years in both studies. Completed questionnaires were received for 77% of the children in 1985 and 78% in 1988.

Between 1985 and 1988 the crude prevalence of "wheeze ever" and wheeze in the past year, the frequency of reported episodes of wheezing in the past year, and the proportion of children taking treatment for asthma showed little change (table), with only wheeze in the past year showing an absolute increase (1.3%). The crude prevalence of asthma, however, reported in response to the question "What have you been told is wrong with your child?" increased by more than twice this amount, from 6.0% to 8.9%. The increases in the prevalence of asthma, wheeze in the past year, and asthma in those with wheeze in the past

year among children aged 5-10 were significant after adjustment for differences in age and sex in a multiple logistic regression analysis.

### Comment

Most studies of trends in the prevalence of asthma in children over time have measured the prevalence of disease reported by patients, parents, or doctors. We studied the prevalence of the symptoms and diagnosis of asthma and treatment for the disease on two occasions by identical methods in directly comparable populations. Within three years the prevalence of a reported diagnosis of asthma increased by nearly half. The prevalence of wheeze in the past year also increased significantly, but the magnitude of this increase was less than half that of the increase in reported asthma, and the change was not supported by comparable changes in the prevalence of wheeze ever or use of treatment.

The finding that the prevalence of reported asthma increased by so much more than the prevalence of other markers of the disease strongly suggests that much of the increase is attributable to a change in diagnostic labelling. Whether this reflects an increased willingness by parents to volunteer a diagnosis of asthma in their child or whether general practitioners now use asthma as a diagnostic label more commonly is not clear, though probably both of these factors have contributed. The increased use of asthma as a diagnostic label is unlikely to be due to an increase in the severity of symptoms as the distribution of frequency of wheeze in the two studies was similar.

The main practical importance of our finding is that it casts considerable doubt on the validity of estimates of the prevalence of asthma and of changes in the prevalence that are based solely on reports of diagnosed asthma. The fact that the prevalence of reported asthma increased without any significant change in the proportion taking treatment for the disease suggests that in this population of children at least the diagnostic label of asthma is not a major determinant of prescribing.<sup>5</sup> Our findings indicate the need for objective measures in studies of the prevalence of asthma.

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Prevalence of wheeze or asthma, or both, in schoolchildren in Nottingham as reported by their parents in studies in 1985 and 1988

	No (%) of children		Change in prevalence (%)	Independent odds ratio† (confidence interval)
	1985 (n=3675)	1988 (n=13 544)		
Wheeze ever	651 (17.7)	2224 (16.4)	-1.3	0.91 (0.82 to 1.00)
Wheeze in past year	424 (11.5)	1738 (12.8)	+1.3	1.14 (1.01 to 1.28)*
Frequency:				
1-4 Episodes	263 (62)	1060 (61)	-1	
>4 Episodes	161 (38)	626 (36)	-2	
Unspecified	0	52 (3)	+3	
Currently taking treatment for asthma‡	253 (6.9)	837 (6.2)	-0.7	0.90 (0.78 to 1.05)
Asthma	222 (6.0)	1201 (8.9)	+2.9	1.54 (1.32 to 1.79)***
Asthma in those with wheeze in past year	198 (47)	1137 (65)	+18	2.10 (1.68 to 2.63)***

\*p<0.05, \*\*\*p<0.001.

†For change in prevalence.

‡Defined as β agonists, antimuscarinic agents, steroids, sodium cromoglycate, or methylxanthines.

- 1 Fleming DM, Crombie DL. Prevalence of asthma and hay fever in England and Wales. *Br Med J* 1987;294:279-83.
- 2 Morrison-Smith JM, Harding LK, Cumming G. The changing prevalence of asthma in schoolchildren. *Clin Allergy* 1971;1:57-61.
- 3 Mitchell EA. Increasing prevalence of asthma in children. *NZ Med J* 1983;96:463-4.
- 4 Hill RA, Standen PJ, Tattersfield AE. Asthma, wheezing and school absence in primary schools. *Arch Dis Child* 1989;64:246-51.
- 5 Anderson HR, Bailey PA, Cooper JS, Palmer JC. Influence of morbidity, illness label, and social, family and health service factors on drug treatment of childhood asthma. *Lancet* 1981;ii:1030-2.

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