



Prevalence and characteristics of wheezing disorders in the community from age 1 to 9 years

Presenting author : Claudia KUEHNI

Authors : C.E. Kuehni, MP. F. Strippoli, B.D. Spycher, M. Silverman (Bern, Switzerland; Leicester, United Kingdom)

INTRODUCTION: It is well known that clinical presentation of many illnesses changes depending on the age of the children. This is certainly also the case for childhood wheeze. However, published data on prevalence, phenotypes and natural history of childhood wheeze often stem from selected samples, such as children of atopic parents, or from narrow age groups. This makes it difficult to compare prevalence of wheeze between different age groups, or to compare characteristics of children with current wheeze across age groups.

AIMS: Using a large and representative dataset, which includes both cross-sectional and longitudinal information from a community-based study in Leicestershire, UK we aimed to describe prevalence and characteristics of wheeze throughout childhood (e.g. from age 1 to 9 years). In particular, we wanted to answer the following questions:

a) Does prevalence of current wheeze change with age?

b) Does the relative contribution of the phenotypes "viral wheeze" and "multiple-trigger wheeze" change with age?

c) Do clinical characteristics of children with current wheeze change with age?

METHODS

Study population: We used data from the **Second Leicester Respiratory Cohort Study**.¹ This is a comprehensive dataset of a population-based random sample of 8700 unselected children living in Leicestershire, UK. Children were aged between 1 and 4 years at recruitment in 1998, and were followed-up in 1999, 2001 and 2003.

Questionnaires: In each survey (1998, 1999, 2001 and 2003), parents completed a postal questionnaire² asking information on a large number of upper and lower respiratory symptoms during the past 12 months, and on a number of environmental exposures. Additional demographic, perinatal, developmental and healthcare data were available from the local NHS database.

Wheeze phenotypes: We defined "viral wheeze" as wheeze triggered exclusively by viral infections and "multiple-trigger wheeze" as wheeze occurring also with other triggers.^{3,4}

Analysis: We calculated **a)** prevalence of any current wheeze, and **b)** prevalence of the two phenotypes "viral wheeze" and "multiple-trigger wheeze" with respective 95% confidence intervals for each age from 1 through 9.

c) In the four age-groups, 1-year olds, 2-year olds, 3-5 year olds and 6-7-year olds (including 4229, 3230, 5653 and 4461 children respectively), we determined the proportion of wheezing children who reported accompanying symptoms such as night cough or chronic rhinitis.

RESULTS - Prevalence of a) current wheeze and b) phenotypes of wheeze, by age

a) Prevalence of current wheeze decreased between ages 1 and 9 years from 34% in one-year olds, to 11% in 9-year olds (**Figure 1**).

b) Prevalence of viral wheeze decreased between ages 1 and 9 years (from 23% to 3%), while prevalence of multiple-trigger wheeze remained relatively stable affecting about 8% of children (**Figure 2**).

RESULTS - c) Characteristics of wheeze

Table 1 compares characteristics of children with current wheeze between four age-groups. Clinical presentation changes considerably with increasing age. Particularly, triggers other than colds, shortness of breath, disturbed activities, night cough and chronic rhinitis become more common as children become older. In contrast, frequency of upper respiratory infections is more common in one-year old wheezers.

CONCLUSION

a) Prevalence of current wheeze declines steadily between ages 1 and 9 years.

b) This decline is entirely explained by a decline in the viral wheeze phenotype, while the proportion of children reporting multiple-trigger wheeze remains relatively stable during childhood.

c) Clinical characteristics of children with current wheeze change during childhood. The typical symptoms associated with childhood asthma (such as night cough, chronic rhinitis, shortness of breath, exacerbations induced by exercise, pollen or pets) are infrequent in infants and only become more important in later childhood. Thus several items asked for instance in the ISAAC key questionnaire⁵ are mainly relevant for school children, for whom they were developed. This needs to be taken into account in questionnaire design, and in the analysis of epidemiological data for different age groups.

REFERENCES

- 1 Kuehni CE *et al.* Cohort profile: The Leicester Respiratory Cohorts. *Int J Epidemiol* 2007; 36:977-985
- 2 Strippoli M-PF *et al.* A parent-completed respiratory questionnaire for one-year olds: repeatability. *Arch Dis Child* 2007; 92:861-865
- 3 Silverman M *et al.* Virus-induced wheeze in young children - A separate disease? In: Johnston S, Papadopoulos N, eds. *Respiratory infections in allergy and asthma*. New York: Marcel Dekker, 2002; 427-471
- 4 Kuehni CE *et al.* Are all wheezing disorders in very young (preschool) children increasing in prevalence? *Lancet* 2001; 357:1821-1825
- 5 Asher MI *et al.* International study of asthma and allergies in childhood (ISAAC): rationale and methods. *Eur Respir J* 1995; 8:483-491

Figure 1: Prevalence of wheeze between ages 1 and 9 years

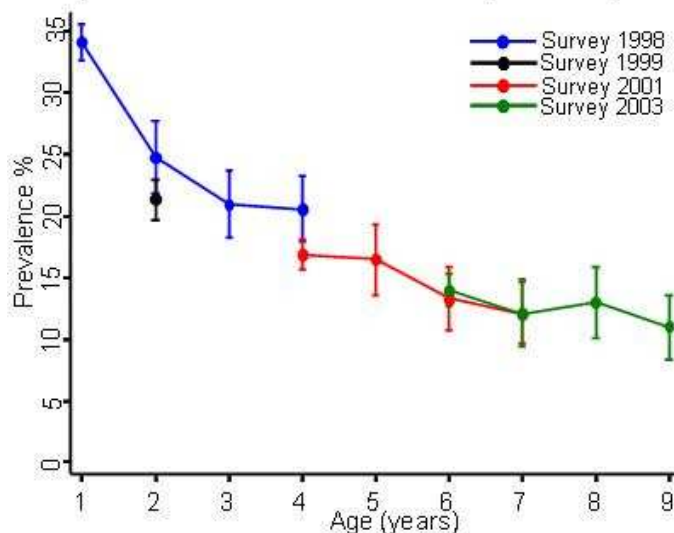


Figure 2: Prevalence of viral and multiple-trigger wheeze between ages 1 and 9 years

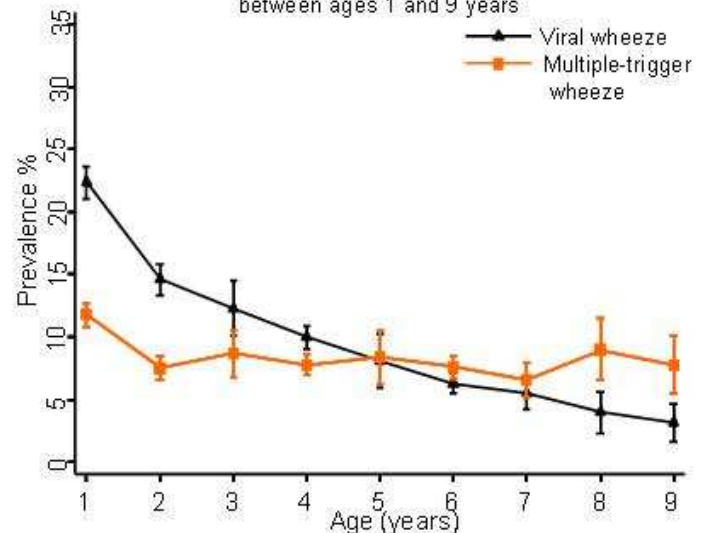


Table 1: Characterization of wheeze at different age groups

	Wheezers aged 1 yr (N=1444)			Wheezers aged 2 yrs (N=719)			Wheezers aged 3-5 yrs (N=1023)			Wheezers aged 6-7 yrs (N=598)		
	n	%	[95CI]	n	%	[95CI]	n	%	[95CI]	n	%	[95CI]
Wheeze Symptoms												
3 and more attacks (vs. 0-3)	518	35.9	[33.4-38.3]	249	34.6	[31.1-38.1]	422	41.3	[38.2-44.3]	254	42.5	[38.5-46.4]
Activities disturbance	839	58.1	[55.6-60.7]	423	58.8	[55.2-62.4]	707	69.1	[66.3-71.9]	433	72.4	[68.8-76.0]
Shortness of breath	762	52.8	[50.2-55.3]	583	81.1	[78.2-84.0]	420	74.1	[70.5-77.7]	240	78.7	[74.1-83.3]
Sleep disturbance due to wheeze	841	58.2	[55.7-60.8]	418	58.1	[54.5-61.8]	658	64.3	[61.4-67.3]	362	60.5	[56.6-64.5]
Trigger wheeze - exercise	336	23.3	[21.1-25.5]	246	34.2	[30.7-37.7]	415	40.6	[37.6-43.6]	288	48.2	[44.1-52.2]
Trigger wheeze - food	105	7.3	[5.9-8.6]	43	6.0	[4.2-7.7]	71	6.9	[5.4-8.5]	61	10.2	[7.8-12.6]
Trigger wheeze - pets	60	4.2	[3.1-5.2]	59	8.2	[6.2-10.2]	119	11.6	[9.7-13.6]	100	16.7	[13.7-19.7]
Trigger wheeze - pollen	7	2.7	[0.7-4.7]	19	9.3	[5.3-13.3]	200	19.6	[17.1-22.0]	185	30.9	[27.2-34.7]
Other respiratory symptoms												
3 and more colds (vs. 0-3)	1022	70.8	[68.4-73.1]	467	65.0	[61.5-68.4]	582	56.9	[53.9-59.9]	270	45.2	[41.2-49.2]
Chronic rhinitis	605	41.9	[39.3-44.4]	342	47.6	[43.9-51.2]	572	55.9	[52.9-59.0]	353	59.0	[55.1-63.0]
Cough at night	523	36.2	[33.7-38.7]	314	43.7	[40.0-47.3]	561	54.8	[51.8-57.9]	322	53.8	[49.8-57.9]
Current eczema	597	41.3	[38.8-43.9]	340	47.3	[43.6-50.9]	502	49.1	[46.0-52.1]	283	47.3	[43.3-51.3]