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INTRODUCTION: Early childhood infections are thought to protect against later development of allergic diseases and asthma (hygiene hypothesis¹). The mechanism is still debated, but it probably involves an imbalance between the T-helper 1 and T-helper 2 lymphocytes and the development of a strong or weak inflammatory network, depending on the exposure to pathogens.² Children who attend day-care early in life could therefore be at lower risk of developing asthma due to an increased exposure to infectious agents. Previous studies assessing the relationship between day-care attendance and wheeze are conflicting, reporting either a reduced risk,^{3,4} an increased risk^{4,5} or no association.^{5,6}

AIMS: Using a large longitudinal dataset from a community-based study in Leicestershire, UK, we aimed to assess the association between day-care attendance at the age of 1 year and risk of wheeze throughout childhood (1 to 8 years).

METHODS

Study population: We used data from the 1998 Leicester Respiratory Cohort Study.⁷ This is a population-based random sample of 8700 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 questionnaire asking detailed information on upper and lower respiratory symptoms during the previous 12 months, and on environmental exposures.⁸ Additional demographic, perinatal, developmental and healthcare data were available from the local NHS database.

Wheeze phenotypes: We defined "exclusive viral wheeze" as wheeze triggered exclusively by viral infections and "multiple-trigger wheeze" as wheeze occurring also with other triggers.^{9,10}

Analysis: We used

- a) a cross-sectional approach (multivariable logistic regression) and
 - b) a longitudinal approach (Cox regression),
- adjusting for several confounders (perinatal, socioeconomic and demographic factors, parental smoking, siblings and breastfeeding).

RESULTS – Prevalence of day-care attendance and of wheeze

Overall, 25% (1055/4246) of the children attended day-care during the first year of life. Prevalence of wheeze was 35%, 18% and 15% in children aged 1, 4 and 6 years respectively (**Figure 1**).

RESULTS – Association between day-care attendance and wheeze: cross-sectional approach

Adjusting for demographic and socioeconomic factors at age 1 (**Table 1**), day-care attendance at age 1 was associated with an increased risk of wheeze at age 1 and a decreased risk of wheeze at age 4. No evidence for an association was found at age 6.

Results were similar for exclusive viral wheeze and multiple-trigger wheeze.

RESULTS – Association between day-care attendance and wheeze: Longitudinal approach

Day-care attendance was associated with an earlier onset of wheeze, but by the age of 8 years, the cumulative proportion of children who had ever wheezed was similar in both groups (Figure 2). Using Cox regression, the adjusted hazard ratio comparing children who had attended day-care with those who had not was estimated at 1.11 (95CI 0.99-1.24).

DISCUSSION

Our study suggests that

- a) early day-care influences the timing of the first episode of wheeze,
- b) but does not influence the overall proportion of children having wheezed by age 8, and
- c) that the "protective" effect of day-care attendance might mainly be a shift of the prevalence peak of transient wheeze to a younger age.

Our findings are in agreement with another recent longitudinal study¹¹ showing that early daycare was associated increased airway symptoms until the age of 4, but fewer symptoms between 4 and 8 years of age.

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Figure 1: Prevalence of wheeze at different ages

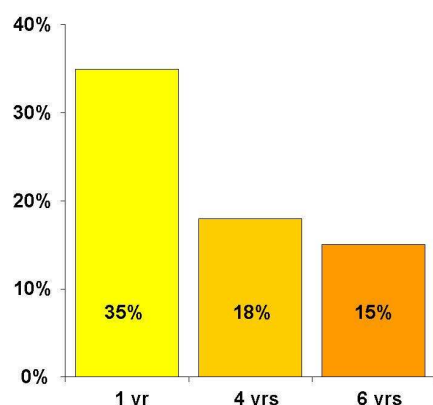


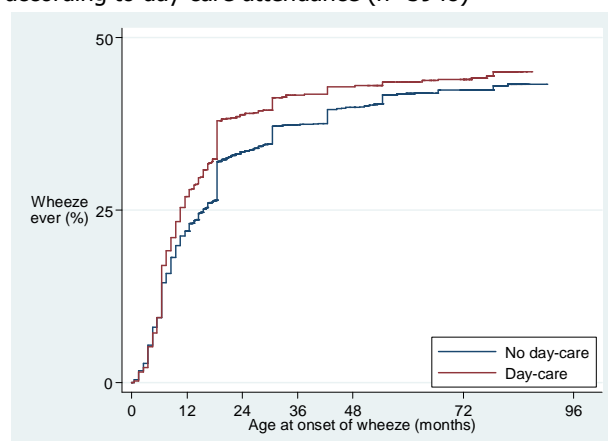
Table 1: Association between day-care attendance at age 1 yr and wheeze at different ages (cross-sectional approach)

	Wheeze at age 1 n=4246		Wheeze at age 4 n=2924		Wheeze at age 6 n=2410	
	OR*	95% CI	OR*	95% CI	OR*	95% CI
Day-care attendance	1.22	1.04-1.43	0.78	0.61-0.99	0.93	0.71-1.23
Viral wheeze						
Day-care attendance	1.31	1.10-1.57	0.83	0.62-1.13	0.93	0.65-1.34
Multiple wheeze						
Day-care attendance	1.20	0.93-1.54	0.75	0.51-1.09	0.91	0.61-1.35

*Adjusted for demographic and socioeconomic factors at age 1 (gender, ethnicity, Townsend score, maternal & paternal education, breastfeeding, maternal & paternal smoking, siblings) and birth characteristics (preterm, low birthweight)

OR odds ratio; CI confidence interval

Figure 2: Cumulative proportion of children with wheeze ever until age 8 years (adjusted* failure curves), according to day-care attendance (n=3948)



*Adjusted for demographic and socioeconomic factors at age 1 (gender, ethnicity, Townsend score, maternal & paternal education, breastfeeding, maternal & paternal smoking, siblings) and birth characteristics (preterm, low birthweight)