

Seasonal Variation in Concentrations of Mite Allergen (Der p 1) in the Mattress

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Key Words

Der p 1 · Season · Mattress · House structure

Introduction

We conducted a study to compare expert and family bed sampling using volunteer subjects in North Bristol (described in the parallel communication). An increase in Der p 1 concentration was observed between late autumn and summer in the same beds. The seasonal changes differed between the households studied.

We have related the changes to characteristics of the household environments to try to account for the differences.

Subjects and Methods

Twenty-six volunteer subjects from households in North Bristol were sampled initially between the end of August and November 1996. Beds were sampled by expert and family (parent) samplers, in random order, 2–3 weeks apart. Dust samples were analyzed in duplicate for Der p 1 by double antibody technique. The mean concentration was used here for analysis; a $\log_{10}$ transformation was used to remove skewness. Sixteen subjects agreed to repeat the study between May and July 1997. They were questioned about the household environment by telephone (table 1).

Results

There was no significant difference between samplers using a 3-way analysis of variance (sampler, season, household) on 10 households with complete data. There was,

Table 1. Telephone questionnaire

	Answers
Do you have central heating?	Yes/no
Do you have double glazing in the bedrooms?	Yes/no
How many windows are there in the investigated bedroom?	(State the number)
Are the windows opened regularly?	Yes/no
Do you have carpets in the bedroom?	Yes/no
Do you have the bedroom on the ground or top floor?	(Specify)
Do you or anybody else in the family smoke?	Yes/no

however, a marked seasonal change in Der p 1 concentration ($p < 0.001$); the geometric mean rose from 0.98 to 11.0 $\mu\text{g/g}$ dust. Furthermore, a significant season/family interaction ($p = 0.003$) indicated that the seasonal effect differed between households. Figure 1 illustrates all available data.

Expert duplicate samples were more complete and were used for most (14) households for the further analyses. There was a trend towards greater changes in ($\log_{10}$) Der p 1 in homes with highest average autumn/summer values ($r = 0.35$, $p = 0.20$). Homes without double-glazing had significantly lower Der p 1 concentrations than double-glazed ones; this difference was significant only for the autumn samples (Student's t test $p = 0.049$; table 2). Der p 1 was higher in the summer if the bedroom had more than 1 window ($p = 0.035$; table 2). Regular opening of the windows had no significant effect (table 2, fig. 2, 3).

Other groups were too small to segregate statistically. There were smokers in only 2 households. Only 1 household was not centrally heated. Only 1 bedroom was on the

Table 2. Der p 1 concentrations, double-glazing and windows in the bedroom

	Der p 1 in autumn	Der p 1 in summer	Change Der p 1
Double-glazing			
No	0.31 (0.23–0.79; 4)	7.41 (1.93–110.2; 4)	23.6 (8.51–139.6; 4)
Yes	1.43 (0.21–11.9; 11)	14.3 (1.95–192.3; 12)	8.85 (2.15–52.4; 11)
p value	= 0.049	NS (= 0.52)	NS (= 0.14)
Number of windows			
1	0.73 (0.21–3.67; 9)	5.60 (1.93–192.3; 9)	7.71 (2.15–52.4; 9)
2+	1.43 (0.23–11.9; 6)	32.8 (3.54–180.7; 7)	21.0 (7.33–139.6; 6)
p value	NS (= 0.36)	= 0.035	NS (= 0.093)
Window regularly opened			
No	0.99 (0.23–11.9; 8)	16.4 (2.25–192.3; 9)	14.1 (2.92–139.6; 8)
Yes	0.91 (0.21–11.9; 7)	8.26 (1.93–180.7; 7)	9.10 (2.15–30.5; 7)
p value	NS (= 0.90)	NS (= 0.45)	NS (= 0.47)

Figures represent geometric rmeans with ranges and number of results in parentheses. For the changes in Der p 1, these are ratios of summer: autumn values. NS = Nonsignificant.

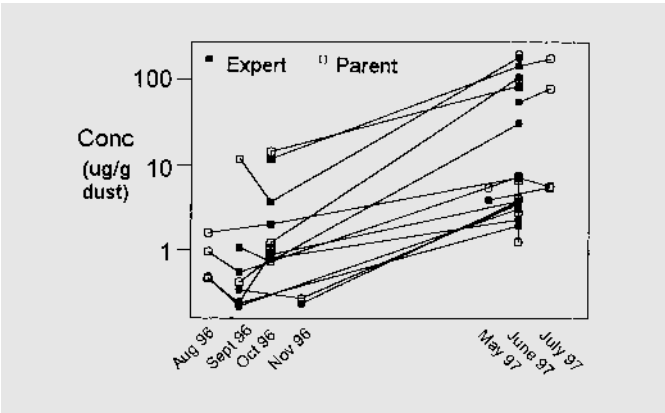


Fig. 1. Seasonal variation in Der p 1 concentrations in the same beds.

ground floor. Only 1 bedroom was uncarpeted. Results from these groups did not appear to be outlying on visual inspection, expect that the uncarpeted bedroom had the lowest summer Der p 1.

Conclusion

The seasonal change in Der p 1 that was observed differed amongst the families studied. Greater seasonal changes tended to be associated with higher annual average concentrations. The changes could not be strictly related to the environmental factors studied, but sample sizes were small. There was some evidence that non-double-glazed homes had lower Der p 1 in the autumn.



Fig. 2. Der p 1 in the autumn and double-glazing. Short horizontal bars represent geometric mean.

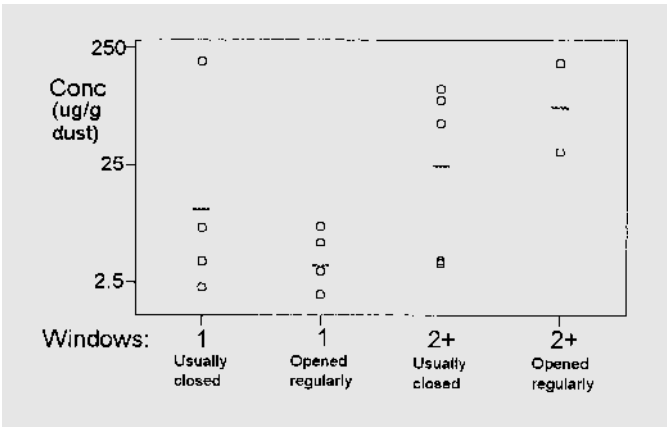


Fig. 3. Der p 1 in the summer and the number of windows in the bedroom. Short horizontal bars represent the geometric means.

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