

## **MOST HOUSE DUST MITE AEROALLERGEN EXPOSURE OCCURS DURING THE DAY, NOT IN BED**

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### **Background**

The bed is frequently regarded as the main site of house dust mite (HDM) exposure, despite a lack of explicit data measuring continuous exposure. We measured the patterns of personal airborne HDM exposure and physical activity over 24 hour periods.

### **Methods**

12 adult subjects each collected nine (8x2 hrs + 1x8 hrs) samples of inhalable aeroallergen over 24 hours using a shoulder-mounted IOM filter and 2L/minute air pump carried in a back-pack. HDM allergen Der p 1 was measured using amplified ELISA. Location and activity were recorded by diary and using automated still camera in the day and by motion detection web camera at night. Particle counts were also made in the breathing zone overnight. Fourteen distinct categories of activities were identified. Differences in exposure between these activities were estimated by mixed model regression in which subjects were assigned random intercepts.

### **Results**

Exposure (pg Der p 1 / m<sup>3</sup>) varied widely during the day and between subjects. Compared to the 24 hour geometric mean, exposure was lower in bed overnight (relative ratio (RR) = 0.17, 95% CIs 0.07 to 0.45, p<0.001), and higher on public transport (RR = 5.80, 95% CIs 1.50 to 22.48, p>0.01). Most of the aeroallergen exposure occurred during the day and was associated with being active in domestic and crowded public situations. Overnight exposure to >5µm particles was transiently high around the time of bed entry, with additional small peaks associated with sporadic movement during sleep.

### **Conclusions**

Contrary to conventional belief, the bed may not be the main site or source of most HDM allergen exposure. Future interventions should address other sources of exposure, and measure exposure in ways other than sampling bed reservoirs.

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