

**ABSTRACT** (UPDATED)

- ❑ **RATIONALE:** Mold is known to cause respiratory symptoms and diseases, but very few studies have investigated the effect of mold exposure among infants.
- ❑ **METHODS:** As a part of the Cincinnati Childhood Allergy and Air Pollution study (CCAAPS), we studied the effect of presence of mold damage and exposure to house dust mite in the home on wheezing in infants at age one. The presence of mold was investigated during onsite home evaluation, which included questions on history of water/mold damage, observation of moldy odor, and measurement of the area of the visible water/mold damage. Floor dust sample was taken at the same time for the allergen analysis. The homes were classified into three categories: no water/mold damage (class 0), minor water/mold damage (class 1), and major mold damage (>0.2 m<sup>2</sup>) (class 2). Skin prick test (SPT) to aeroallergens, milk and egg, and a respiratory symptom questionnaire were administered during clinic visit.
- ❑ **RESULTS:** There were 628 infants included in the analysis that had an onsite home evaluation, a symptom questionnaire, and a SPT test. Among the homes, 43% were found to belong to class 0, 52% to class 1, and 5% to class 2. A positive SPT result was observed in 29% of infants with 18% positive to any aeroallergen and 7% positive to mold. Children who lived in mold-damaged homes (class 2) had increased odds of atopic wheezing (wheezing at least twice with SPT+), especially for non-African American (AA) (OR [95% CI] = 4.15 [2.4, 7.3] for entire cohort and 7.1 [3.6, 13.9] for non-AA). House dust mite allergen was associated with wheezing and SPT positivity only in AA infants.
- ❑ **CONCLUSION:** Mold exposure is associated with wheezing in atopic infants regardless race. However, house dust mite is more likely to be a risk factor in AA infants.

**PURPOSE OF THE STUDY**

- ❑ To investigate the relation of mold damage in homes and exposure to house dust mite with persistent wheezing and sensitization to aeroallergens in infants.

**METHODS**

- ❑ **Study location**
  - Cincinnati and Northern Kentucky
- ❑ **Study cohort**
  - 778 eligible families visited in the "Cincinnati Childhood Allergy and Air Pollution Study"
  - 628 infants analyzed
  - At least one parent with SPT(+) for aeroallergens (pollen and mold)
- ❑ **Child's skin prick test**
  - Clinic visit at the age about 12 months
  - Food (milk and egg) and aeroallergens (pollen and mold)
- ❑ **Symptom report**
  - Persistent wheezing: at least 2 times of wheezing episode
  - Atopic persistent wheezing: persistent wheezing and SPT(+) for aeroallergen, food, or animal

**METHODS** (CONT'D)

- ❑ **Onsite home visit and exposure assessment**
  - Home visit at the age 6 months
  - Questionnaires
    - History of water damage
    - Existence of visible mold
  - Exposure assessment
    - Observation of visible mold/water damage inside home (moldy odor, damaged surface material, and size)
    - Floor dust sampling in the child's primary activity room
    - Analysis of house dust mite allergen (Der f1) by ELISA
- ❑ **Development of mold classification**
  - Class 0 (no damage): must not have any of the following:
    - Water damage
    - Visible mold
    - Moldy odor
    - Water/mold damage history
  - Class 1 (minor damage): must have at least one indication above (visible mold ≤ 0.2 m<sup>2</sup>)
  - Class 2 (major damage): must have visible mold
    - Mold alone in the entire room ≥ 0.2 m<sup>2</sup> or
    - Combined area of visible mold + water damage on the same surface ≥ 0.2 m<sup>2</sup>
- ❑ **Statistical analysis**
  - Spearman correlation: the association between wheezing and SPT positivity and mold class and Der f1.
  - Multiple logistic regression: the relative risk of mold class and Der f1 on wheezing and SPT positivity.

**RESULTS**

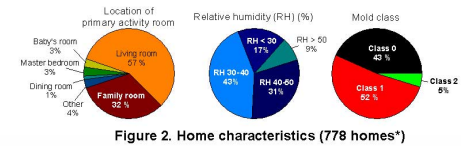


Table 1. Prevalence of wheezing and SPT positivity in infants (628 infants\*)

Type (%)	Any persistent wheezing	Atopic wheezing	SPT food+aero	SPT aero	SPT mold
	20	7	29	18	7

\* All parents did not bring their child for SPT

Table 2. Measured mold damage in homes and house dust mite exposures and their relation to wheezing and SPT positivity for aeroallergens in infants of different races

	OR†	Any persistent wheezing			Atopic wheezing			SPT aero (+)**		
		Total (n=628)†	Non-AA (n=520)	AA‡ (n=103)	Total (n=380)†	Non-AA (n=311)	AA‡ (n=64)	Total (n=628)†	Non-AA (n=520)	AA‡ (n=103)
Mold (0 vs 2)	2.16 (1.53-3.04)	3.12 (2.13-4.58)	1.04§ (0.42-2.57)	4.15 (2.37-7.27)	7.11 (3.63-13.81)	4.77§ (1.40-16.30)	1.04 (0.73-1.48)	0.93 (0.63-1.36)	3.30§ (1.21-9.02)	
Der f1 (low vs ≥ 200µg)	1.13 (0.88-1.46)	0.86 (0.64-1.15)	2.84 (1.65-4.88)	1.30 (0.88-1.93)	1.01 (0.63-1.62)	3.17 (1.45-6.91)	1.07 (0.82-1.39)	0.96 (0.72-1.29)	2.24 (1.20-4.19)	

† Five infants with missing information for race. § Only 1 AA home was identified to have major mold damage in home.  
 ‡ AA, African American. † Group 1 house dust mite allergen (< lower detection limit vs ≥ 2µg/g).  
 † OR, odds ratio; CI, confidence interval. \*\* SPT positive for pollen and mold.



Figure 1. Onsite home visit and exposure assessment

**CONCLUSIONS**

- ❑ More than half of families in the study had visible mold or water damage.
- ❑ Mold damage was found to be highly associated with persistent wheezing.
- ❑ Mold damage was associated with a significant 4-fold risk (OR=4.15) for atopic wheezing.
- ❑ In African American infants, exposure to house dust mite was significantly associated with risk of wheezing (OR=2.84), atopic wheezing (OR=3.17), and sensitization to aeroallergens (OR=2.24).

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