

# The Cincinnati Childhood Allergy and Air Pollution Study (CCAAPS): Evaluation of atopy at age one

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## Abstract - Updated

**Rationale:** Atopy during infancy is not well understood or recognized. Atopic status of infants in the CCAAPS birth cohort was evaluated at age one.

**Methods:** CCAAPS enrollment criteria required at least one parent to have one or more positive skin prick tests (SPT) to a panel of common aeroallergens (meadow fescue, timothy, white oak, American elm, red cedar, maple mix, short ragweed, alternaria, aspergillus fumigatus, cladosporium, penicillium mix, dust mite mix, German cockroach, cat and dog). Follow up SPTs of the infants occurred at age one with the same allergen panel plus milk and egg.

**Results:** There were 697 parent and infant pairs having completed the SPT. At age one, 196 infants (28.1%) had a positive SPT, 95 (13.6%) of the 697 to aeroallergen only, 72 (10.3%) to food only and 28 (4.2%) to both. By aeroallergen subcategory 9.8% tested positive to pollen, 7.5% to mold, 4.2% to dust mite or cockroach and 3.4% to cat or dog. Neither the individual aeroallergen nor allergen subcategory of the parent's SPT was correlated with the child's response. The top three most frequent positive SPT in the atopic parents (n=697) were ragweed (59.8%), timothy (53.7%) and meadow fescue (51.6%) and the top four in the atopic children (n=196) were dust mite (10.7%), timothy (10.2%), cladosporium (9.2%) and maple mix (9.2%).

**Conclusion:** Pediatricians should be aware of parental atopy as a predictive risk factor of atopy in children as early as age one. Atopy to both indoor and outdoor allergens was present in this group of infants contrary to what is commonly assumed.

## Methods

- 1134 parents of newborns were identified through birth records, screened by symptom questionnaire and presented at the clinic for a SPT
- 710 children with at least one parent SPT+ were tested at age one
- 697 parent/infant pairs available for analysis

## Results

Table 1. Prevalence Rates of Atopy by Aeroallergen for Parent / Infant Pairs

Category	Individual Allergens	Parents (n=697)		Tested Infants (n=196)	
		%	%	%	%
Pollen	Meadow fescue	51.6	1.4	5.1	
	Timothy	53.7	2.9	10.2	
	White oak	32.2	1.7	6.1	
	Maple mix	32.6	2.6	9.2	
	American elm	23.4	1.0	3.6	
	Red cedar	15.4	1.9	6.6	
Mold	Short ragweed	59.8	1.1	4.1	
	Alternaria	26.3	2.4	8.7	
	Aspergillus fumigatus	11.2	2.2	7.7	
	Penicillium	7.3	1.6	5.6	
Dust	Cladosporium	22.5	2.6	9.2	
	Dust mite	41.8	3.0	10.7	
	German cockroach	11.2	1.7	6.1	
Animal	Cat	29.4	2.4	8.7	
	Dog	12.3	1.3	4.6	
Food	Milk	-	4.6	16.3	
	Egg	-	12.1	42.9	

Allergens by Category	Parents	Tested Infants
Pollen	95.1	34.7
Pollen only	4.4	15.8
Mold	49.5	25.5
Mold only	2.6	9.2
Dust	47.2	14.8
Dust only	1.3	4.6
Animal	34.7	12.2
Animal only	0.7	2.6
Food only	-	35.7
Aeroallergen only	-	48.5
Positive to Any	100.0	100.0

Table 2. Symptoms with Highest Positive Predictive Values (PPV) by SPT Category

SPT category (% of total 1134 tested parents)	Parent Symptom	PPV	SENS	SPEC
Any one or more	Shortness of breath near animals	89.8	14.6	95.4
	Itchy or stuffy nose or sneezing when near animals	89.1	45.2	84.9
Pollen (42.3%)	Itchy or stuffy nose or sneezing when near grass, trees, or flowers	90.1	85.7	56.6
	Shortness of breath near animals	79.6	15.4	95.5
Animal (28.0%)	Itchy or stuffy nose or sneezing when near animals	70.5	45.6	76.9
	Itchy or stuffy nose or sneezing when near grass, trees, or flowers	70.3	67.7	52.8
Mold (17.0%)	Shortness of breath near animals	61.3	29.7	93.8
	Itchy or stuffy nose or sneezing when near animals	43.7	65.0	72.2
Dust (25.7%)	Itchy or stuffy nose or sneezing when near animals	50.5	33.6	80.6
	Itchy or stuffy nose or sneezing when near animals	46.8	47.0	60.7
Mold (17.0%)	Shortness of breath near animals	46.0	15.0	89.7
	Itchy or stuffy nose or sneezing when near grass, trees, or flowers	41.2	66.6	44.1
Dust (25.7%)	Itchy or stuffy nose or sneezing when near animals	46.3	48.1	69.0
	Shortness of breath near animals	46.0	15.6	89.8
	Asthma	39.2	25.2	78.3

Table 3. Percent of Tested Parents (n=1134) with Reported Symptom

Reported Symptom	% Reported Symptom
Do you or your baby's other biological parent have problems with any of the following?	
Itchy/watery eyes?	69.3
Itchy ears?	43.5
Problems with sneezing or a runny or stuffy nose without a cold or flu during the past six or eight?	62.8
An itchy or stuffy nose or sneezing during summer months?	71.6
An itchy or stuffy nose or sneezing when near grass, trees, or flowers?	60.0
An itchy or stuffy nose or sneezing near animals?	37.1
Shortness of breath when near grass, trees, or flowers?	13.7
Shortness of breath near animals?	12.1
Shortness of breath when cleaning rooms, making beds, or when in bed?	23.4
Shortness of breath when hurrying on level ground or walking up slight hills?	39.1
Ever been diagnosed with eczema?	13.8
Ever been diagnosed with asthma?	22.9

Figure 1. Positive Predictive Value, Sensitivity, and Specificity of Parent Allergy Symptoms as Compared to Positive Skin Prick Test

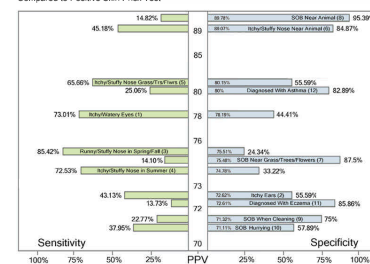


Table 4. Demographics of Tested Parents n=1134

Self-Reported Symptoms	911 (80.3%)
Mother Tested	889 (78.4%)
Caucasian	871 (77.1%)
Mother's Mean Age	29.5

## Conclusions

- If the child has at least one atopic parent they have a 28% chance of being atopic by age one
- Children as young as age one can be sensitized to both indoor and outdoor aeroallergens
- Clinicians can quickly identify parents who may be atopic by asking the following 4 questions:

• Do you or your baby's other biological parent have problems with any of the following:

- "shortness of breath near animals?"
- "an itchy or stuffy nose or sneezing when near animals?"
- "an itchy or stuffy nose or sneezing when near grass, trees, or flowers?"
- "asthma?"

