

Factors Associated with Persistent Wheeze without a Cold at Age One: The Cincinnati Childhood Allergy and Air Pollution Study (CCAAPS)

James Lockey,¹ Grace LeMasters,¹ Kimberly Wilson,¹ Linda Levin,¹ David I. Bernstein,^{2,3} Tiina Reponen,¹ Manuel Villareal,⁴ Sherry Stanford,³ Stephanie Maier⁴

¹Environmental Health, University of Cincinnati, Cincinnati, OH, ²Internal Medicine, University of Cincinnati, Cincinnati, OH, ³Bernstein Allergy Group and Clinical Research Center, Cincinnati, OH, ⁴Frage Allergy and Asthma Clinic, Florence, KY



Abstract - Updated

Rationale: This analysis examines environmental exposures associated with persistent wheeze without a cold in infants in order to identify risk factors and interventions.

Methods: CCAAPS is following infants born to atopic parents that includes yearly SPT to 15 aeroallergens, milk and egg, physical exam and environmental exposure assessment. Exposed to truck and bus traffic was defined as home residence <100 meters from bus route and/or <100 meters of state route with speed limits \leq 50mph. Persistent wheeze was defined as parent reporting infant's wheezing two or more times in the first year of life. A multivariate logistic regression analysis reported adjusted odds ratios (aORs) and 95% confidence intervals (CI).

Results: A total of 570 infants were assessed, 45 (8%) were persistent wheezers without a cold. Factors associated with being a persistent wheezer without a cold were other lower respiratory conditions aOR 2.8 (95%CI 1.5 - 2.4) and living near stop and go diesel traffic aOR 2.7 (95%CI 1.3 - 5.7).

Conclusion: Living within 100 meters of stop and go bus and truck traffic and lower respiratory conditions are associated with persistent wheeze without a cold. There was no association with allergen sensitization (SPT+) at age one.

Eligibility Criteria

- Families selected from birth records
- Living various distances from roadways
- Parent allergy symptom positive
- Parent skin prick test (SPT) positive to 1 of 15 aeroallergens (definitive criteria)
- Clinic visit at age one (11-15 months old):
 - SPT to 15 aeroallergens, milk and egg
 - Medical evaluation
 - Parent report of child symptoms since birth

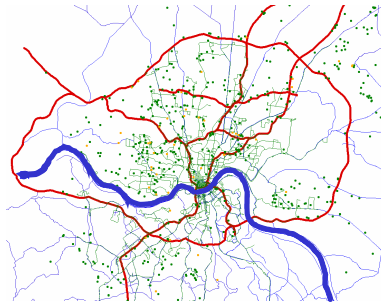
Definitions

Persistent Wheeze without a Cold: Parent's report of infant wheeze \geq 2x/12 months without a cold

Diesel Exposure from Stop/Go Bus/Truck Traffic:

- Subjects and traffic data compiled in a geographic information system (ArcView® GIS3.2)
- Ohio Department of Transportation (ODOT), Kentucky Cabinet of Transportation, Cincinnati Area Geographic Information System (CAGIS), Southern Ohio Regional Transport Authority (SORTA), Northern Kentucky Area Planning Commission (NKAPC)
- Child's home <100 meters from bus route and/or <100 meters of state route with speed limits \leq 50mph

Figure 1. Subjects, Bus and State Routes, and Highways



CCAAPS Study Team

Results

Demographic Characteristics of Infants (n=570)

Mean age (months) at SPT	13 months
Skin prick test positive	29%
Caucasian	80%
Income <\$20,000	14%
Male	55%
Attend daycare	9%
Mother smokes	15%
Two or more siblings	27%
Persistent wheezers	8%

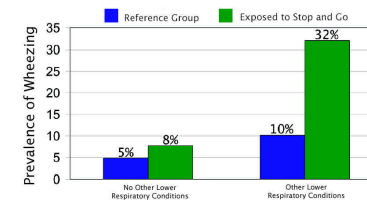
Factors Associated with Persistent Wheeze without a Cold in Infants at Age One

	aOR	(95%CI)
Live near stop/go diesel traffic	2.7	(1.3 - 5.7)
Other lower respiratory conditions*	2.8	(1.5 - 5.4)
Income \leq \$20,000	1.5	(0.7 - 3.4)
Two or more siblings	1.4	(0.6 - 3.2)
Mother smokes	1.0	(1.0 - 1.1)
Either parent asthmatic	1.5	(0.8 - 2.8)
Attends daycare	1.6	(0.6 - 4.2)

*Other lower respiratory conditions included: whooping cough, croup, viral infection, bronchitis/bronchiolitis, flu, and pneumonia

Other non-significant factors evaluated: allergen sensitization, race, endotoxin, dog ownership, mold, gender

Figure 2. Prevalence of persistent wheezing without a cold, with and without other lower respiratory conditions by diesel traffic exposure status



Conclusions

- Infants living within 100 meters of stop/go bus and truck traffic are 3 times more likely to have persistent wheeze without a cold
- Other lower respiratory conditions are similarly associated with persistent wheeze without a cold
- Allergen sensitization at age one was not associated with persistent wheeze without a cold
- Infants living near stop/go bus and truck traffic and having other lower respiratory conditions are 3 times more likely to be persistent wheezers (32%) than those living elsewhere (10%)

Future Directions

- Follow children to examine expression of allergic inflammation manifested by nasal eosinophils and exhaled nitric oxide
- Model diesel exposure incorporating measurements from 18 monitoring stations
- Examine gene-environment interactions



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