

Road traffic and respiratory symptoms in pre-school children

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Background

1) Data on road traffic and respiratory morbidity in very young children are scarce and contradictory, although this age-group is likely to be the most vulnerable.

2) It has been suggested that reporting bias (exaggerated reporting of exposure by parents of symptomatic children) might explain positive study results, but this has never been demonstrated.

Questions:

1) Do preschool children living on busy roads have an increased prevalence of wheeze, chronic cough and chronic rhinitis?

2) If yes, could these findings be explained by reporting bias?

Methods

Study design: Cross-sectional population survey with parent-completed postal questionnaires in a random sample of 3410 children aged 1-5 yrs in Leicestershire (1998). Lancet 2001; 357: 1821-25

Questionnaire: standardised questions on the 12-months prevalence of respiratory symptoms (from ISAAC- and ATS questionnaires, adapted for preschool age). Questions on indoor environment and socio-demographic descriptors. Parents were not told of our interest in air pollution. **Exposure to road traffic** was assessed with the question:

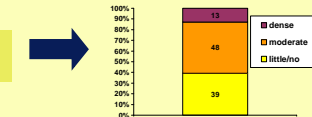
How would you describe the location of your house: a) in a street with very dense traffic (main road); b) in a street with moderate traffic (residential road); c) in a quiet street with little or no traffic.

Statistics: Unconditional logistic regression for the main analysis. Conditional logistic regression comparing cases and controls living at the same postcodes (16 houses) to test for reporting bias.

Results

Response rate: 80% (3410/4277).

Self-reported exposure to road traffic



1) Toddlers living on busy roads have an increased prevalence of respiratory symptoms

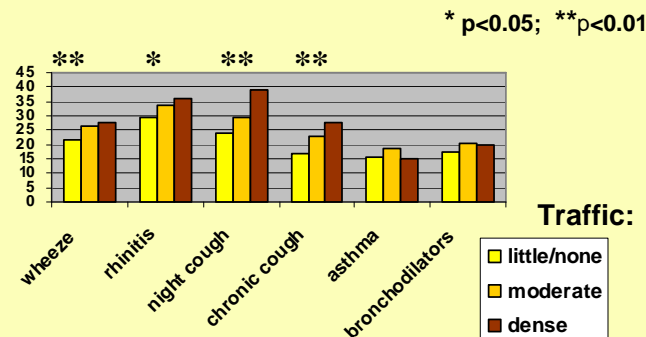


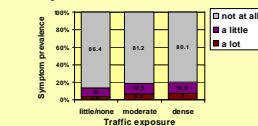
Table 1: Association between self-reported traffic exposure and 12 month prevalence of respiratory symptoms

Symptoms	traffic exposure	univariate analysis Odds ratio	p value	multivariate analysis Odds ratio	p value
wheeze	little	1	0.006	1	0.005
	moderate	1.28		1.44	
	dense	1.37		1.53	
rhinitis	little	1	0.015	1	0.06
	moderate	1.21		1.3	
	dense	1.33		1.23	
night cough*	little	1	0.001	1	0.01
	moderate	1.3		1.27	
	dense	2		1.93	
cough without colds*	little	1	0.002	1	0.04
	moderate	1.47		1.43	
	dense	1.92		1.65	
asthma	little	1	0.1	1	0.02
	moderate	1.21		1.47	
	dense	0.96		1.11	
bronchodilators	little	1	0.09	1	0.43
	moderate	1.24		1.18	
	dense	1.16		1.17	

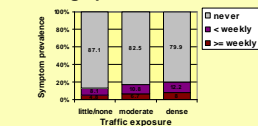
* results for cough are presented only for children living in rural areas as there was a significant effect modification by urban vs. rural residence (p=0.01). † adjusted for age, paternal education, pets, gas cooking, number of siblings, and overcrowding.

Evidence for a dose-response relationship

Daily activities restricted ...



Waking up with wheeze ...



2) Parents of wheezy children over-report traffic compared to parents of asymptomatic children living at the same postcodes

Table 2: Reported traffic exposure by parents of symptomatic and asymptomatic children living in the same postcode area (matched analysis)

OR: odds ratio for reporting "moderate" or "dense" traffic by parents of symptomatic children, compared to parents of asymptomatic children living at the same postcodes. LR: likelihood ratio

Symptoms	Sample (N)	postcode areas	OR moderate/little	OR dense/little	p value (LR test)
wheeze	489	202	1.45	2.03	0.15
rhinitis	607	251	1.09	1.43	0.57
night cough	581	231	0.91	1.11	0.78
cough without colds	556	224	0.93	0.99	0.94
asthma diagnosis	376	152	1.13	2.00	0.30
bronchodilator use	368	151	1.89	1.88	0.22

Conclusions

1) Our study supports the hypothesis that traffic-associated air pollution increases respiratory symptoms such as wheeze, chronic cough and chronic rhinitis in very young children. Similarly to other studies, our results suggest that the preschool age-group might be very sensitive to air pollution and needs increasingly to be included in research.

2) In the case of wheeze and diagnosed asthma, parental exaggeration of traffic exposure in symptomatic children is likely to play a role, and might in fact explain part or even all of the association, even though parents were not aware of our interest in air pollution. We showed a simple method to test for reporting bias which can easily be used in future studies.

3) Our results underline the need to use objective markers both for outcome as well as for exposure in future studies on air pollution and respiratory health.

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