

# ROAD TRAFFIC AND AIRCRAFT NOISE EXPOSURE AND CHILDREN'S BLOOD PRESSURE

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**Introduction** The evidence for a causal relation between noise and blood pressure is still inconclusive (1), and no dose-response relations for noise and blood pressure are available at this moment. This is partly due to the complexity with in the relation between noise and health, limitations in exposure characterisation, blood pressure measurement and, the impossibility of adjusting for important confounders. Several previous studies on noise and blood pressure in children investigated the effects of air traffic, road traffic and rail traffic noise exposure on the blood pressure in children aged 3-16 years. Noise exposure levels, often assessed by means of sound level meters and expressed in different measures were not comparable. Six studies found blood pressure elevations associated with noise exposure. However, most of the time, these elevations were only small.

In the framework of the European Commission project "Road Traffic and Aircraft Noise Exposure and Children's cognition and Health" (RANCH) the influence of community noise exposure on children's health and cognition was studied. One of the aims of the project was to derive exposure effect relationships in children between chronic noise exposure and health and cognition. This paper focuses on the relationship between noise exposure and blood pressure.

**Methods** In this multi-center study the blood pressure levels of children attending primary schools with different levels of road traffic and aircraft noise ( $L_{Aeq, 7-23 \text{ hrs}}$ ) around Schiphol Airport and Heathrow Airport were compared cross-sectionally. In both samples, the schools were chosen according to the noise exposure of the school area and such that children were matched on SES and ethnicity.

Participants were 735 children attending 33 primary school in the area around Schiphol Airport and 653 children attending 29 primary schools in the area of Heathrow Airport.

Blood pressure measurements were taken in the afternoon in a quiet room in the school building using automatic blood pressure meters (OMRON 711) with cuff-sizes of 15-22 cm and/or 22-32 cm, respectively. The cuff was placed on the right arm. While the child was seated, blood pressure was measured three times by one of the researchers, following a five minutes rest. At the beginning of each session, room temperature was recorded.

The parents of the children completed a questionnaire on annoyance, social support, environmental attitudes, perceived health and behaviour of their child. The data will be analysed with the SAS statistical software package. Multi-level modelling and two-stage regression will be applied.

**Results** The participants eligible for data-analysis were 1158 children (48 % boys and 52% girls) and their parents. The children visited schools with air traffic noise levels ranging from 34 to 68 dB(A) and road traffic noise levels ranging from 32 to 67 dB(A) ( $L_{Aeq, 7-23 \text{ h}}$ ). The

parents' questionnaire was mainly filled in by the child's mother. Measured blood pressure ranged from 69.0 to 142.7 mmHg and 23 to 105.7 mmHg for systolic and diastolic blood pressure, respectively. The mean systolic blood pressure was 106.6 mmHg (sd = 10.4); the mean diastolic blood pressure was 66.3 mmHg (sd = 8.3). Table 1 presents some characteristics per centre.

*Table 1 Characteristics per centre*

Characteristics	The Netherlands (N=617)				United Kingdom (N=541)			
	%	Mean $\pm$ s.d.	Minimum	Maximum	%	Mean $\pm$ s.d.	Minimum	Maximum
Blood pressure (mmHg)								
Systole		105.1 $\pm$ 10.8	69.0	142.7		108.3 $\pm$ 9.6	81.3	140.7
Diastole		65.5 $\pm$ 8.8	23.0	94.0		67.3 $\pm$ 7.6	46.0	105.7
Heart rate (beats/min)		80.6 $\pm$ 11.0	51.7	125.0		90.0 $\pm$ 11.4	62.7	127.0
L <sub>Aeq, 7-23 h</sub> (dB(A)) in school								
Air traffic		58.7	41	68		60.2	34	68
Road traffic		57.7	32	66		56.7	37	67
Gender								
Boy	50				46			
Girl	50				54			
Ponderal Index (weight/height <sup>3</sup> )		12.1 $\pm$ 1.7	9.0	23.8		13.2 $\pm$ 2.2	8.8	23.3
Relation to child								
Mother	91				89			
Other	9				11			
Main language spoken at home								
English	80				97			
Dutch					3			
Other	20							

Further analysis of blood pressure by noise exposure will be presented at the ICBEN conference.

**Keywords:** air traffic noise, road traffic noise, children, blood pressure

## References

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