

**PINCHE Policy
Recommendations on Noise**

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Child Health and the Environment:
Results from EU Framework 5 PINCHE, Children
Genonetwork & Plutocracy Projects



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Methods

- Objective:
 - Policy recommendations for children's health and the environment based upon completed scientific research
- Literature Review of EU funded studies and existing research
 - Exposure assessment (WP1)
 - Epidemiology (WP2) – discuss and interpret findings
 - Health impact and risk assessment (WP4)
 - Science-policy interface (WP6) refining the recommendations

Outline

- Noise sources for children
- Evidence of noise effects on health
- Policy recommendations by source or setting

Noise Sources for Children

- Neonatal Intensive Care Units
- Noisy Toys
- Firecrackers
- Personal Audio Equipment
- Schools
- Discotheques and Entertainments
- Transportation (Road Traffic, Aircraft Noise)

Types of Health Effect

- Hearing impairment:
 - Temporary threshold shift/Acoustic trauma
 - Temporary or permanent threshold shift
 - Temporary or permanent tinnitus
- Non-auditory effects:
 - Elevation of stress hormones
 - Annoyance
 - Impairment of reading and episodic memory

Neonatal intensive care units

- Distribution
 - A small number of babies go through neonatal intensive care units but these are increasing due to better survival of pre-term babies
- Risk to Health
 - Hearing impairment
 - Somatic effects (hypoxemia)
 - Impact on the developing brain

Neonatal intensive care units

- Policy recommendations
 - Legislation:
 - Reduce noise levels in neonatal intensive care units (incubators and room acoustics)
 - Legislation/Market Driven:
 - Label noise levels produced by equipment and incubators
 - Monitoring:
 - Assess development of children's hearing using Oto-acoustic emissions. Assess long-term effects of noise exposure on hearing, health and development

Noisy Toys

- Distribution
 - Noisy toys are widespread and increasing. While there are some legislative limits on noise these are insufficient
- Risk to Health
 - Repeated exposure may lead to permanent impairment
 - Impulse noise can cause acoustic trauma
 - Temporary or permanent tinnitus

Noisy Toys

- Policy recommendations
 - Legislation:
 - Reduce the maximum noise level of toys (peak <120dB(A))
 - Education:
 - Inform parents about the harmful effects of noisy toys
 - Legislation/Market Driven:
 - Label the noise level of products
 - Monitoring:
 - Temporal assessment of children's hearing to assess impact of interventions

Firecrackers

- Distribution
 - Use of firecrackers is increasing and often young people are at close range
- Risk to Health
 - Acoustic trauma from short term exposure
 - Temporary and permanent tinnitus
 - Permanent hearing impairment

Firecrackers

- Policy recommendations
 - Legislation:
 - Limit maximum noise of firecrackers (peak <120dB(A))
 - Education:
 - Inform young people about acute and harmful effects of impulse noise
 - Education on noise hygiene to be taught in schools
 - Legislation/Market Driven:
 - Label the noise levels of products

Personal Audio Equipment

- Distribution
 - Use of personal audio equipment by young people has increased exponentially
- Risk to Health
 - Permanent hearing impairment due to repeated exposure through headphones
 - Temporary or permanent tinnitus

Personal Audio Equipment

- Policy recommendations
 - Legislation:
 - Reduce maximum permissible noise levels of personal audio equipment to less than 100 dB(A)
 - Education:
 - Inform young people and parents about the harmful effects of loud music through headphones
 - Legislation/Market Driven:
 - Label the maximum possible sound level passing through headphones

Discotheques and entertainments

- Distribution
 - Young people regularly frequent clubs, discotheques, rock concerts, cinemas, sports arenas, games arcades and aerobic and fitness centres that have high levels of sound
- Risk to Health
 - Temporary threshold shift and permanent hearing impairment related to long-term exposure to high sound levels
 - Temporary and permanent tinnitus

Discotheques and entertainments

- Policy recommendations
 - Legislation:
 - Reduce leisure noise levels at discotheques and rock concerts (<93-100dB(A), may be < 90 dB(A))
 - Education:
 - Inform young people about harmful effects of loud music and individual measures to reduce exposure
 - Change children's behaviour
 - Inform the public about harmful and annoying effects of loud and unwanted sound at entertainments
 - Establish and implement education on noise hygiene at school
 - Legislation/Market Driven:
 - Reduce noise levels in sports arenas, aerobic centres and cinemas
 - Infrastructure:
 - Install sound level meters in discotheques and concert halls

Transportation

- Distribution
 - 80 million people (20%) of Western Europe suffer from unacceptably high noise levels
 - 32% of the EU population are exposed to road traffic noise levels above 55 dB(A) outside their houses
 - 37 million people (10%) of the EU population are exposed to rail noise above 55 dB(A)
- Risk to Health
 - Some evidence of raised stress hormones (catecholamine and cortisol) in relation to night time noise exposure
 - Annoyance in relation to excessive noise

Transportation

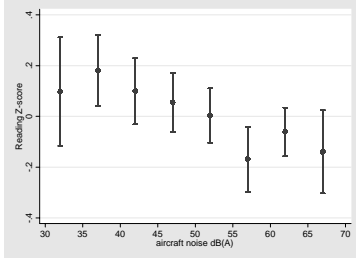
- Policy recommendations
 - Legislation:
 - Restriction of night time road and aircraft noise levels in residential areas
 - Use Lden rather Ldn to take account of evening exposure
 - Monitoring:
 - Further research into the effects of noise on children's sleep, hormonal responses and cardiovascular health

Schools

- Distribution
 - 440,000 people are exposed to noise levels above 55 dB(A) around Heathrow
 - 120,000 around Charles de Gaulle in France
 - 69,000 around Schiphol in Amsterdam
 - 33,000 around Barajas in Madrid
- Risk to Health
 - Aircraft noise exposure has been related to impairment of reading and recognition memory in a linear exposure effect association (RANCH Study)
 - These findings have been less consistent for road traffic noise exposure
 - Poor acoustic conditions in classroom can result in interference with communication

CHILD HEALTH AND THE ENVIRONMENT: RESULTS FROM EU FRAMEWORK 5

Exposure effect relationship between aircraft noise at school and reading comprehension for the pooled data: RANCH Study



Schools

- Policy recommendations
 - Planning/Legislation:
 - Noise exposure should be considered with other environmental aspects in the planning process
 - New Schools should not be built close to existing airports where noise exposure exceeds WHO 2000 recommended levels for external levels
 - Legislation:
 - Sound insulation should be undertaken in those schools exposed to potentially harmful levels of aircraft noise
 - Children chronically exposed to loud noise should have quiet relaxing areas for psychological restoration
 - Similar health based guidelines setting aircraft noise limits for children can be achieved across Europe
 - Adequate acoustic treatment of classrooms and kindergartens should be applied across European countries

Schools II

- Research/Monitoring:
 - Further research is needed into the effects of classroom sound insulation on children's learning

Final questions

- Many of the levels of these sound sources are increasing – what should be prioritised for attention?
- How much can we control/legislate for leisure noise/personal audio equipment?
- What are the priorities for future research?