### Section 1: PROJECT IDENTIFICATION

Information to be provided for project identification

<table>
<thead>
<tr>
<th><strong>Title of the project</strong></th>
<th>Noise Pollution Health Effects Reduction</th>
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<tr>
<td><strong>Acronym of the project</strong></td>
<td>NOPHER</td>
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<tr>
<td><strong>Type of contract</strong></td>
<td>Concerted Action</td>
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<tr>
<td><strong>Total project cost</strong></td>
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<tr>
<td><strong>Contract number</strong></td>
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<tr>
<td><strong>Duration</strong></td>
<td>36 Months</td>
</tr>
<tr>
<td><strong>EU contribution</strong></td>
<td>€399,991</td>
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<tr>
<td><strong>Commencement date</strong></td>
<td>1 February 2000</td>
</tr>
<tr>
<td><strong>Period covered by the progress report</strong></td>
<td>1 February 2000 – 31 March 2003</td>
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### PROJECT COORDINATOR

<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>Deepak Prasher</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

### Key words

Noise Pollution, Hearing Loss, Environmental Health.

### World wide web address

[www.ucl.ac.uk/noiseandhealth](http://www.ucl.ac.uk/noiseandhealth)

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See List Below
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Dr Kajsa-Mia Holgers
FINAL PROGRESS REPORT

Objectives
1. Improve the effectiveness and quality of research on noise pollution and its impact on health through European collaboration.

2. Seek to develop Europe-wide consensus on the strengths of causal relationships between environmental noise and health effects and seek improvement of methodological standards.

3. Establish unified protocols and initiate field studies across East/West Europe to determine extent of auditory damage from exposure to industrial chemicals with and without noise.

4. Seek to develop a Europe-wide epidemiological evaluation of leisure noise induced tinnitus.

5. Set up an international register of children affected by noisy toys and a network of noise experts.

6. Seek to develop a multi-centre trial to determine the value of otoacoustic emissions as an early indicator of noise damage.

Description of work

• Through workshops and working parties the strengths of the causal relationships between road, rail, and aircraft noise and various health effects such as annoyance, sleep disturbance, interference with speech communication, performance and learning in children, cardiovascular, endocrine and immunological changes will be established.

• The methodological issues of noise exposure and health effects assessment will be evaluated to improve the quality of research and consequently the basis of environmental health policy decisions.

• Workgroup will establish protocols to evaluate auditory damage due to ototoxic chemicals alone and in combination with noise from diverse industries in East/West Europe offering different exposure levels.

• A multi-centre epidemiological study of leisure noise induced tinnitus in young people will be planned and executed by an all European workgroup pooling data for more robust measures of outcome. Noisy toys have led to acoustic trauma in children but there is a lack of sufficient evidence, therefore it is planned to set up an international register of case-studies to provide evidence of the hazards.

• This project will bring together experts to consider the feasibility of trials of novel pharmacological and other means of protecting against noise trauma and development of new strategies.

Early indication of noise induced hearing loss and identification of individuals at risk would greatly reduce the incidence, therefore a multi-centre trial of otoacoustic emissions test will be planned and conducted to determine its value as a predictor of hearing damage.
## Results and deliverables

### Proposed Milestones and Deliverables

<table>
<thead>
<tr>
<th>Time (Months)</th>
<th>Milestones/Deliverables</th>
</tr>
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| 0-6           | Workshop (W1): Protocols for Noise / Chemical (WP3)  
Workshop (W2): Environmental Health Effects (WP1)  
P1: Workshop Proceedings  
NL1: Newsletter |
| 6-12          | Conference (AC1): Noise Pollution and Health: Current State (WP1-6)  
P2: Conference Proceedings  
NL2: Newsletter  
Workshop (W3): Methodological issues (WP4) |
| 12-18         | Workshop (W4): Individual Sensitivity (WP5)  
P3: Workshop Proceedings  
NL3: Newsletter |
| 18-24         | Conference (AC2): Health Effects of Environmental Noise (WP1, WP4, WP5) |
| 24-36         | P3: Conference Proceedings  
NL4: Newsletter  
Workshops(W5): Pharmacological Protection (WP2)  
P4: Workshop Proceedings  
NL5: Newsletter  
Conference (AC3): Protection from Noise (WP3, WP6)  
P5: Conference Proceedings |

Annual Conference (AC); Proceedings Publication (P); Newsletter (NL); Workshop (W)
Results Achieved

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<th>Period</th>
<th>Event Description</th>
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<td>0-6</td>
<td>(W1): Noise/chemicals Effects; (W2): Environmental Health Effects, CP1, CP2, NL1</td>
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<tr>
<td>6-12</td>
<td>(C1): Noise pollution and Health - NOPHER 2000, CP3, NL2, S1</td>
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<td>12-18</td>
<td>(C2): INTERNATIONAL SYMPOSIUM on Noise pollution and Health</td>
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<td></td>
<td>- (WP1, WP2, WP4, WP5) Sessions on: Noise policy and mapping; Quantification and Characterisation of noise; Physiological effects; Annoyance reactions; Sleep disturbance; Psychological effects; Noise effects in children; Industrial and Urban noise environments</td>
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<td>(W3): INTERNATIONAL WORKSHOP: Current evidence for specific health outcomes in relation to particular noise sources (Road, Rail, Aircraft) – (WP1)</td>
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<td>NL4: NOPHER Newsletter: Journal of Noise and Health Volume 3 issue 12</td>
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<td>(W5): INTERNATIONAL WORKSHOP: Noise/chemicals Effects – (WP3)</td>
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<td>NL5: NOPHER Newsletter: Journal of Noise and Health Volume 4 issues 13</td>
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<td>NL6: NOPHER Newsletter: Journal of Noise and Health Volume 4 issues 14</td>
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<td>(W7): Environmental Noise Solutions, Cambridge - (WP1)</td>
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<td>(W8): Individual Susceptibility to Noise Damage, Novartis Foundation, London - (WP5)</td>
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<td>NL7: NOPHER Newsletter: Journal of Noise and Health Volume 4 issue 15</td>
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<td>NL8: NOPHER Newsletter: Journal of Noise and Health Volume 4 issue 16</td>
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<td>30-36</td>
<td>(W9): Noise Pollution: Health Effects on Children, Berlin - (WP4)</td>
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<td>(C3): NOPHER 2002 -Nordic Noise II - (WP1-6) Sessions on: Noise Induced Tinnitus; Epidemiology of Noise Induced Hearing Loss; Hearing loss without audiometric evidence; Noise and Chemicals; Stress and the Auditory System; Hair cell regeneration; Prevention of Hearing Loss; Genetical aspects of Hearing Loss; New Measurements of Hearing; Impulse Noise and Noise Measurements; Round Table Discussion on Experimental Models in NIHL</td>
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<td>(W10): NOPHER Co-ordinators Meeting – (WP1-6)</td>
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<td>(W11): WHO/NOPHER Meeting: Combined Environmental Pollutants and Health – (WP3)</td>
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<td>NL9: NOPHER Newsletter: Journal of Noise and Health Volume 5 issues 17</td>
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<td>NL10: NOPHER Newsletter: Journal of Noise and Health Volume 5 issues 18</td>
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</table>

C=Conference; W=Workshop; NL=Newsletter
Meetings

YEAR 1

(1) NOPHER 2000: INTERNATIONAL CONFERENCE: Noise Induced Hearing Loss. 7-9 July 2000, Cambridge, UK

1. INTERNATIONAL WORKSHOP: Development of an Environmental Noise Health Information System - 7th July 2000, Cambridge, UK

(2) INTERNATIONAL WORKSHOP: Effects of Combined Chemicals and Noise Exposures on Hearing and Balance - 9th July 2000, Cambridge, UK


YEAR 2

(4) NOPHER 2001: INTERNATIONAL CONFERENCE: Noise Pollution and Health. 6-8 April 2001, Cambridge, UK

2. INTERNATIONAL WORKSHOP: Current evidence for specific health outcomes in relation to particular noise sources (Road, Rail, Aircraft). 6 April 2001, Cambridge, UK

(5) INTERNATIONAL WORKSHOP: Noise/chemicals Effects. 27-28 April 2001, Nancy, France

(6) INTERNATIONAL WORKSHOP: Noise/chemicals Effects. 20-21 Sept 2001, Bordeaux, France


YEAR 3

(8) INTERNATIONAL WORKSHOP: Environmental Noise Solutions, 10 July 2002, Cambridge, UK


(10) INTERNATIONAL WORKSHOP: Noise Pollution: Health Effects on Children, 5-7 October 2002, Berlin, Germany


Publications

YEAR 1


(8) **Ann Christin Johnson; Thais Morata;** Per R Nylen; Eva B. Svensson Hearing loss in workers exposed to styrene and/or noise. Description of audiologic test battery and preliminary results. Abstracts of the 23st Midwinter meeting of the Association for Research in Otolaryngolgy, St. Petersburg, Florida, USA, February, 2000


1. INTERNATIONAL WORKSHOP: Development of an Environmental Noise Health Information System. Minutes of Meeting.

(22) INTERNATIONAL WORKSHOP: Effects of Combined Chemicals and Noise Exposures on Hearing and Balance. Minutes of Meeting.

(23) **NOPHER Brochure for general circulation.** www.ucl.ac.uk/noiseandhealth.


(25) **NOPHER Newsletter: Journal of Noise and Health Volume 2 issue7**

(26) **NOPHER Newsletter: Journal of Noise and Health Volume 2 issue 8**

(27) **NOPHER Newsletter: Journal of Noise and Health Volume 3 issues 9**

(28) **NOPHER Newsletter: Journal of Noise and Health Volume 3 issues 10**
Pan European Noise research aims to probe health effects. *Noise Management*. June 2000, issue 5. [www.ifi.co.uk](http://www.ifi.co.uk)


YEAR 2


(52) Pyykkö I, Starck J. Toppila E, Aalto H, Kentala E, Hirvonen T, Honkavaara P, Isotalo E. Visual-vestibular interaction in meniere's disease and in vestibular schwannoma when studied on linearly moving platform. International society for postural and gait research. Control of
posture and gait. Symposium of the international society for postural and gait research. ISPG 2001; 230-3.


(57) Suvorov G, Denisov E, Antipin V, Kharitonov V, **Starck J, Pyykkö I**, Toppila E. Effects of peak levels and number of impulses to hearing among forge hammering workers. Applied Occupational and Environmental Hygiene.2001;16(8):816-22


(60) **Morata, T.C.** (2002) Suggested guidelines to studying the combined effects of occupational exposure to noise and chemicals on hearing. Noise and Health 4(14); 73-87

(61) **Morata, T.C.** and **Campo, P.** (2002) Ototoxic effects of styrene alone or in concert with other agents: A review. Noise and Health 4(14); 15-24


YEAR 3


69. **Babisch W, Ising H**, Gallacher JEJ. Health status as a potential effect modifier of the relationship between noise annoyance and incidence of ischaemic heart disease. Occupational & Environmental Medicine; accepted for publication.


73. **Pyykkö I, Starck J, Toppila E, Ulfendahl M.** Noise Induced hearing loss, Clinical aspects of hearing and balance, Martin Dunitz publishers. *In Press*

74. **Starck J, Toppila E, Pyykkö I.** Do we have unnecessary hearing loss - can we improve the efficiency of hearing conservation programs, Noise induced hearing loss: mechanisms of damage and means of preventions, Whurr-publishers. *In Press*

75. **Pyykkö I, Starck J, Toppila E, Johnson AC.** Methodology and value of databases, Noise induced hearing loss: mechanisms of damage and means of preventions, Whurr-publishers. *In Press*

76. **Toppila E, Pyykkö I, Starck J, Johnson AC, Juhola M.** Methodology and value of databases and their use in individual hearing conservation program, Martin Dunitz publishers. *In Press*

77. **Starck J, Toppila E, Pyykkö I.** The role of risk factors in noise-induced hearing loss and the management of sophisticated hearing conservation program, Archives of Complex Environmental Studies. *In Press*


(84) INTERNATIONAL WORKSHOP: Environmental Noise Solutions, 10 July 2002, Cambridge, UK. Abstract Book


(90) NOPER Newsletter: Journal of Noise and Health Volume 4 issue 15

(91) NOPER Newsletter: Journal of Noise and Health Volume 4 issue 16

(92) NOPER Newsletter: Journal of Noise and Health Volume 5 issues 17

(93) NOPER Newsletter: Journal of Noise and Health Volume 5 issues 18