Update on the development of the WHO Environmental noise guidelines for the European Region

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1 – Context

WHO guidelines on noise

- WHO Guidelines for Community Noise (1999)
- WHO Environmental Noise Guidelines for the European Region (in development)
  - New sources of noise?
  - New evidence on health outcomes?
1 - Results of WHO report on disease burden (2011)

Every year in the EU cities, at least:

- 903,000 DALYs for sleep disturbance
- 654,000 DALYs for annoyance
- 61,000 DALYs for ischaemic heart disease
- 45,000 DALYs for cognitive impairment
- 22,000 DALYs for tinnitus

1-1.6 million healthy life years are lost every year from transport noise in the EU cities.

Sleep disturbance and annoyance related to road transport noise comprise the main burden.
1 – European Context

• The Guidelines will focus on the WHO European Region (53 Member States):

• Commitment to Act from European Ministers of Environment and Health to reduce children’s exposure to noise, and urges WHO to produce appropriate noise guidelines (Parma Declaration, 2010)

• European Union Directive relating to the assessment and management of environmental noise requires Members States to map noise exposure and establish action plans to control and reduce the harmful effects of noise exposure

• *In particular, Annex III on “dose effect relations”*
2 - WHO Guidelines

- Represent the most widely accepted set of public health recommendations, intended to assist policy-makers, health-care providers, and other relevant stakeholders to make informed decisions for the protection of public health.

- Based on a comprehensive and objective assessment of the available evidence.

- Generally intended for worldwide use, and therefore recognize the heterogeneity on technological feasibility, economic development and other political and economical factors.

- In 2007, WHO adopted internationally recognized standards and methods to ensure that guidelines are free from biases and meet public health needs.
2 - Developing WHO Guidelines


- It covers the methods, processes and procedures for producing a document that meets WHO standards.
2 - WHO process for guideline development

- **WHO Guidelines Review Committee** reviews and approves guideline proposals and final set of recommendations
- **Declaration of potential personal, financial and academic interests** of all experts involved
- **Establishment of Guidelines Development Group**
  - Leading experts and end-users responsible for the process of developing the health-based recommendations
- **External peer-review by experts and separate consultation with stakeholders** and end-users
2 - Groups involved in WHO guideline development

- Guideline Development Group (WHO Temporary Advisors)
- Systematic Review Team (WHO Temporary Advisors)
- WHO Steering Group (WHO Staff)
- External Review group (1. Experts and end-users 2. Stakeholders)

Development of WHO guidelines
3 – Scope of the guidelines

Scoping questions:

1. **Exposure-response relationships:**
   In the *general population* exposed to environmental noise, what is the *exposure-response relationship* between exposure to *environmental noise* (reported as various indicators) and the proportion of persons with a *validated measure of health outcome* when adjusted for confounders?

2. **Effectiveness of interventions:**
   In the *general population* exposed to environmental noise, what is the effect of *interventions* to reduce exposure to environmental noise on *adverse health outcomes*?
3 - Noise sources and settings included

- **Noise sources:**
  - Aircraft noise
  - Railroad noise
  - Road noise
  - Wind turbine noise
  - Leisure noise (including personal listening devices)

- **Combine noise sources:**
  - Occupational noise?
  - Vibration from railway traffic?
  - Air pollution?
  - Visual aspects of wind turbines?

- **Noise settings:**
  - Residences
  - Hospitals?
  - Educational settings?
  - Public venues?
3 - Health outcomes included in the review

WHO definition of health:

State of complete physical, mental, and social well-being and not merely the absence of disease or infirmity

Health outcomes included:

- effects on sleep (subjectively and objectively reported)
- annoyance
- cognitive impairment, mental health and wellbeing
- cardiovascular diseases (ischemic heart disease, stroke, hypertension), diabetes and metabolic diseases
- hearing impairment and tinnitus
- adverse birth outcomes (pre-term delivery, low birth weight, birth defects)
3 - Interventions

Review of evidence on interventions and their effect on change in population exposure and on adverse health outcomes

Interventions can be defined as:

- Source interventions
- Path interventions
- Infrastructure change interventions
- Indirect interventions
- Change in behaviour interventions
4 – Grading the evidence

- Assessment of the overall quality of evidence for relationship between environmental noise and a certain health outcome / effectiveness of intervention:

  • Study limitations
  • Inconsistency of results
  • Indirectness of evidence
  • Imprecision
  • Publication bias
  • Magnitude of effect
  • Plausible confounding
  • Dose-response gradient

OVERALL QUALITY OF EVIDENCE:
  • High quality
  • Moderate quality
  • Low quality
  • Very low quality
4 – Developing recommendations

- Recommendations are developed considering:
  - Quality of evidence (high / moderate / low / very low)
  - Balance of benefits and harms (when implementing the recommendation)
  - Values and preferences (of general population and/or specific groups)
  - Resource use (more or less resource-intensive to implement a recommendations?)
## 4 - Guideline development process:

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<tr>
<th>Stage/primary contributor</th>
<th>Step</th>
<th>Chapter</th>
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<tr>
<td><strong>Planning</strong></td>
<td>Request guidance on a topic</td>
<td>1</td>
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<tr>
<td>WHO Member State; WHO country office or public/private entity</td>
<td>Determine if a guideline is needed; review existing WHO and external guidelines</td>
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<tr>
<td>WHO technical unit</td>
<td>Obtain approval for guideline development from the director of the relevant technical unit at WHO</td>
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<td>Discuss the process with the GRC Secretariat and with other WHO staff with experience in developing guidelines</td>
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<tr>
<td>WHO guideline steering group</td>
<td>Form the WHO guideline steering group</td>
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<td>Identify potential members of the GDG and its chair</td>
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<tr>
<td>WHO guideline steering group and GDG</td>
<td>Obtain declaration of interests and manage any conflicts of interest among potential GDG members</td>
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<tr>
<td>WHO guideline steering group and GDG</td>
<td>Formulate key questions in PCDO format; prioritize outcomes</td>
<td>5, 2</td>
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<td>WHO guideline steering group and GDG</td>
<td>Finalize the planning proposal and submit it to the GRC for review</td>
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<tr>
<td>WHO guideline steering group and GDG</td>
<td>Review and approve the planning proposal</td>
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<tr>
<td>WHO guideline steering group and GDG</td>
<td>Conduct external peer review</td>
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<tr>
<td>WHO guideline steering group and GDG</td>
<td>Publish online and in print as appropriate</td>
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<tr>
<td>WHO technical unit and programme manager</td>
<td>Disseminate, adapt, implement, evaluate</td>
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<tr>
<td>WHO technical unit</td>
<td>Update</td>
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**Table 1.1. The guideline development process at WHO**

5 - Conclusion

- Environmental noise is an important public health concern
  - Only second to air pollution in terms of disease burden
- New scientific evidence in the field of environmental noise and public health
- WHO will develop the *WHO Environmental Noise Guidelines for the European Region*
  - Updated exposure-response functions for noise sources / health outcomes
  - Recommendations on effectiveness of interventions
- The Guidelines will provide evidence-based recommendations in order to support WHO European Member States in their efforts to prevent and control exposure to excessive noise.
- The Guidelines development is ongoing with a view of completion in mid-2016.