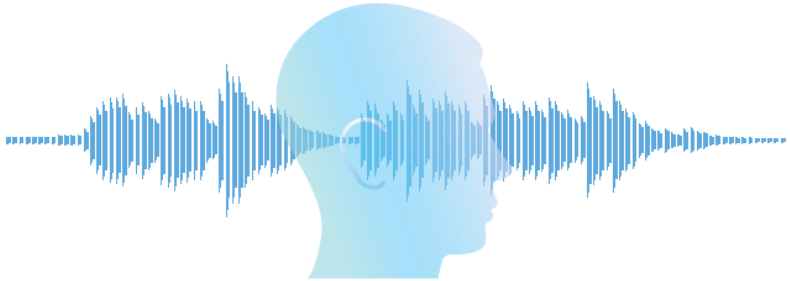
ENVIRONMENTAL NOISE GUIDELINES

for the European Region

Dr Dorota Jarosinska, WHO European Centre for Environment and Health



Fachtagung zur EU-Umgebungslärmkartierung Nationale Berechnungsmethoden
Berlin, 18 Spetember 2019

World Health Organization
REGIONAL OFFICE FOR Europe

Organisation mondiale de la Santé
BUREAU RÉGIONAL DE L' Europe

Weltgesundheitsorganisation
REGIONALBÜRO FÜR Europa

Всемирная организация здравоохранения
Европейское региональное бюро

Overview

Why the noise guidelines

Aim and scope

Guideline development process

Recommendations

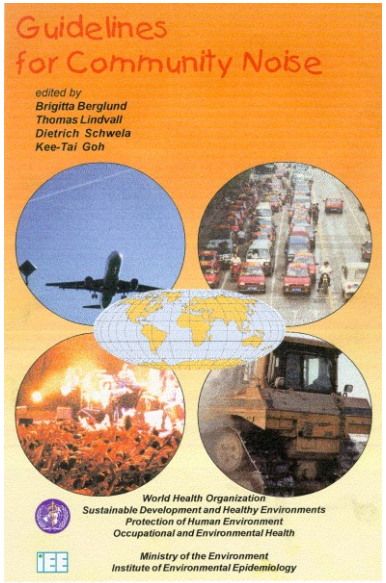
After the launch of the guidelines

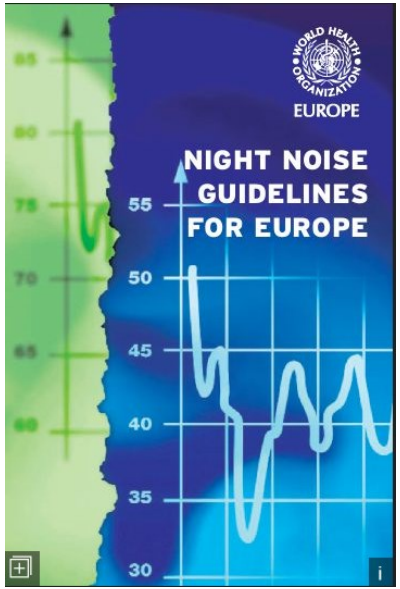
Burden of disease

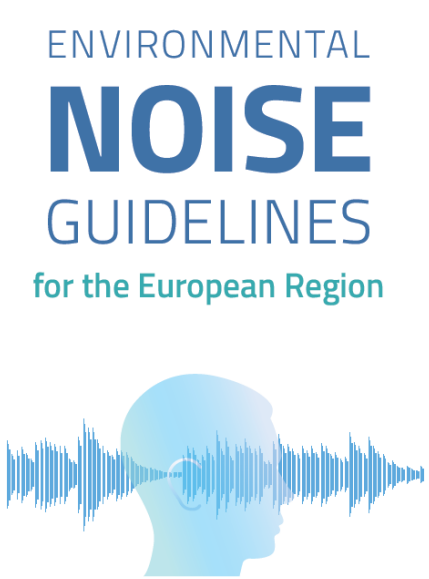
- At least **100 million people** in the EU are affected by road traffic noise above the assessment threshold specified in the END (55dB L_{den})
- Over **83 million** Europeans are exposed to harmful levels of noise from night-time road traffic (above 50 dB L_{night})
- At least **1.6 million** healthy years of life are lost due to road traffic noise in Western Europe

Source: WHO/JRC, 2011; EEA, 2017

WHO noise guidelines







1999 2009 2018

World Health Organization
REGIONAL OFFICE FOR Europe

Organisation mondiale de la Santé
BUREAU RÉGIONAL DE L' Europe

Weltgesundheitsorganisation
REGIONALBÜRO FÜR Europa

Всемирная организация здравоохранения
Европейское региональное бюро

Aim of the guidelines

Provide **evidence-based recommendations**

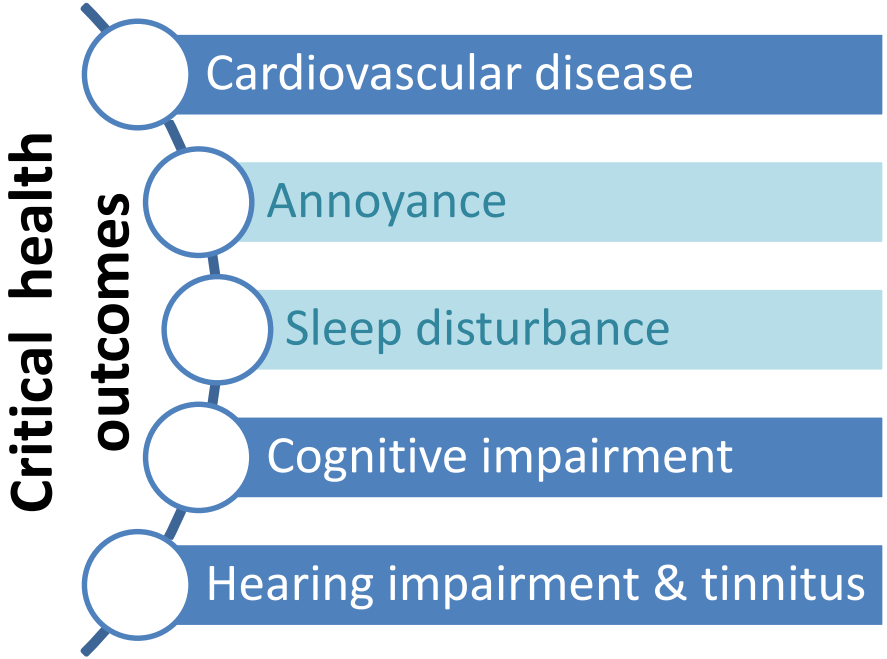
- Exposure - response relationships
- Effectiveness of interventions

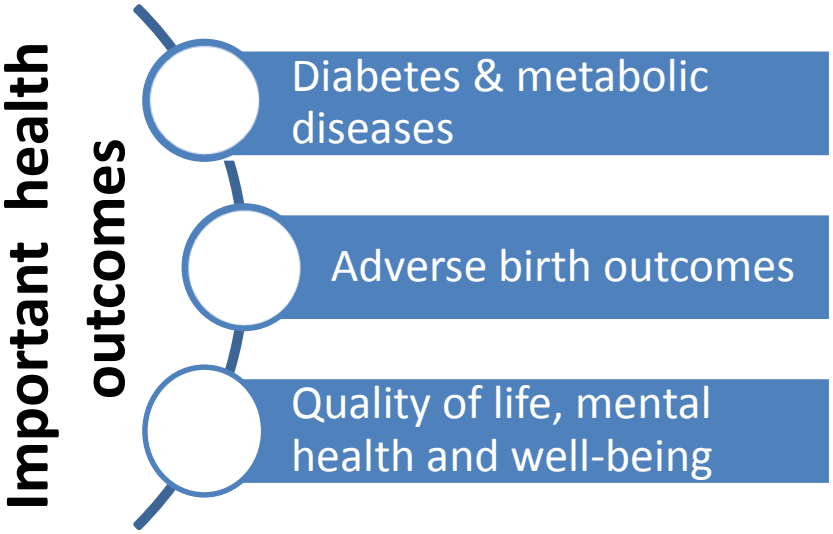
Based on:

Systematically **reviewed scientific evidence**

- Health effects of environmental noise
- Effectiveness of interventions to reduce exposure and improve health

Health outcomes considered



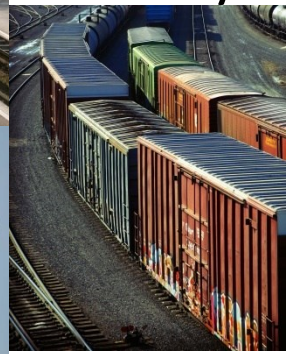


World Health Organization REGIONAL OFFICE FOR Europe
Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa
Всемирная организация здравоохранения Европейское региональное бюро

Noise sources considered

Road traffic

Railway



Aircraft

Wind turbines

Leisure

World Health Organization REGIONAL OFFICE FOR Europe

Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe

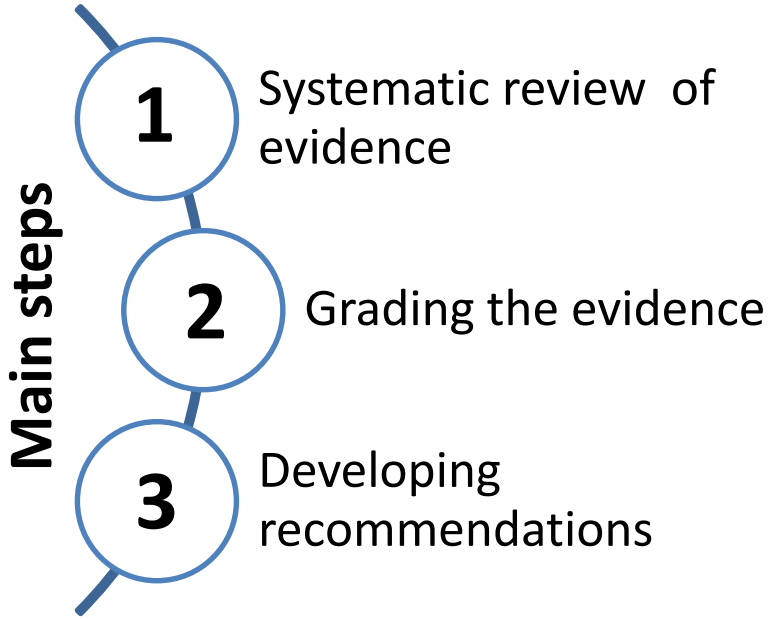
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa

Всемирная организация здравоохранения Европейское региональное бюро

Sources: Umweltbundesamt, BASt, dpa/Bernd von Jutrczenka, dpaheute

Development of the guidelines

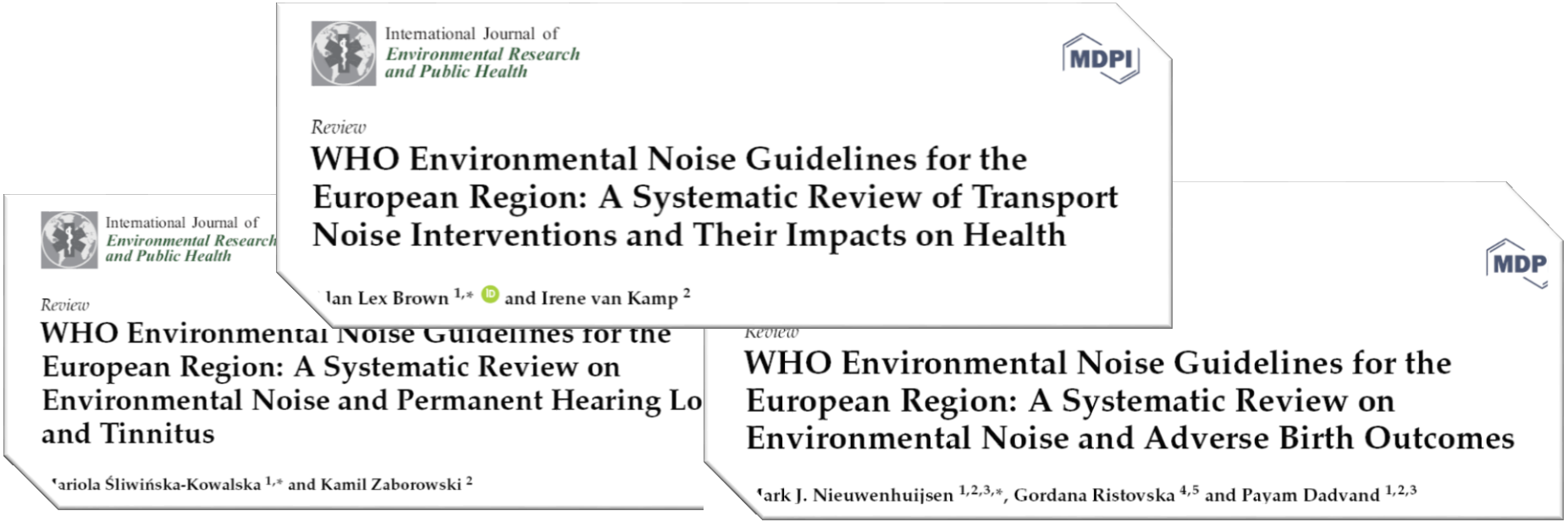
Guideline development process



Systematic reviews of evidence

- Cardiovascular disease and metabolic effects
- Annoyance
- Sleep disturbance
- Cognitive impairment
- Hearing impairment and tinnitus
- Adverse birth outcomes
- Quality of life, mental health and wellbeing
- Interventions to reduce noise and improve health

Systematic reviews of evidence



https://www.mdpi.com/journal/ijerph/special_issues/WHO_reviews

World Health Organization
REGIONAL OFFICE FOR Europe

Organisation mondiale de la Santé
BUREAU RÉGIONAL DE L' Europe

Weltgesundheitsorganisation
REGIONALBÜRO FÜR Europa

Всемирная организация здравоохранения
Европейское региональное бюро

Grading the evidence

Assessment of the overall quality of evidence by Systematic Review Team:

- 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

Developing recommendations

Factors to be considered

- Quality of evidence
- Balance of benefits and harms
- Values and preferences
- Resource use

Types of recommendations

- Strong recommendation
- Conditional recommendation

Developing recommendations

Definition: Noise exposure levels above which the GDG is confident there is an increased risk of adverse health effects

Priority health outcome measure (associated DW)	Relevant risk increase considered for setting of guideline level
Incidence of IHD (DW: 0.405)	5% RR increase
Incidence of hypertension (DW: 0.117)	10% RR increase
%HA (DW: 0.02)	10% absolute risk
%HSD (DW: 0.07)	3% absolute risk
Permanent hearing impairment (DW: 0.0150)	No risk increase due to environmental noise
Reading and oral comprehension (DW: 0.006)	One-month delay in terms of reading age

Developing recommendations

Definition: Noise exposure levels above which the GDG is confident there is an increased risk of adverse health effects

Priority health outcome measure (associated DW)	Relevant risk increase considered for setting of guideline level
Incidence of IHD (DW: 0.405)	5% RR increase
Incidence of hypertension (DW: 0.117)	10% RR increase
%HA (DW: 0.02)	10% absolute risk
%HSD (DW: 0.07)	3% absolute risk
Permanent hearing impairment (DW: 0.0150)	No risk increase due to environmental noise
Reading and oral comprehension (DW: 0.006)	One-month delay in terms of reading age

Benchmark values, not effect thresholds !

Recommendations

Road traffic noise

For average noise exposure, the GDG **strongly** recommends reducing noise levels produced by road traffic below **53 dB** L_{den}, as road traffic noise above this level is associated with adverse health effects.

For night noise exposure, the GDG **strongly** recommends reducing noise levels produced by road traffic during night time below **45 dB** L_{night}, as road traffic noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG **strongly** recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.

World Health Organization REGIONAL OFFICE FOR Europe
Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa
Всемирная организация здравоохранения Европейское региональное бюро

Railway noise

For average noise exposure, the GDG **strongly** recommends reducing noise levels produced by railway traffic below **54 dB** L_{den}, as railway noise above this level is associated with adverse health effects.

For night noise exposure, the GDG **strongly** recommends reducing noise levels produced by railway traffic during night time below **44 dB** L_{night}, as railway noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG **strongly** recommends that policy-makers implement suitable measures to reduce noise exposure from railways in the population exposed to levels above the guideline values for average and night noise exposure. There is, however, insufficient evidence to recommend one type of intervention over another.

World Health Organization REGIONAL OFFICE FOR Europe
Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa
Всемирная организация здравоохранения Европейское региональное бюро

Aircraft noise

For average noise exposure, the GDG **strongly** recommends reducing noise levels produced by aircraft below **45 dB** L_{den}, as aircraft noise above this level is associated with adverse health effects.

For night noise exposure, the GDG **strongly** recommends reducing noise levels produced by aircraft during night time below **40 dB** L_{night}, as aircraft noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from aircraft in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions the GDG recommends implementing suitable changes in infrastructure.

World Health Organization REGIONAL OFFICE FOR Europe
Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa
Всемирная организация здравоохранения Европейское региональное бюро

Wind turbine noise

For average noise exposure, the GDG **conditionally** recommends reducing noise levels produced by wind turbines below **45 dB** L_{den}, as wind turbine noise above this level is associated with adverse health effects.

To reduce health effects, the GDG **conditionally** recommends that policy-makers implement suitable measures to reduce noise exposure from wind turbines in the population exposed to levels above the guideline values for average noise exposure. No evidence is available, however, to facilitate the recommendation of one particular type of intervention over another.

World Health Organization REGIONAL OFFICE FOR Europe
Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa
Всемирная организация здравоохранения Европейское региональное бюро

Leisure noise

Rationale

- Low quality evidence for leisure noise and hearing loss
- No exposure response functions could be established
- Approach based on CNG and workplace prevention
- A detailed table for converting hourly and weekly exposure into yearly averages is provided
- Continue with CNG recommendations for single events for both children and adults

Leisure noise

For average noise exposure, the GDG **conditionally** recommends reducing the yearly average from all leisure noise sources combined to **70 dB** $L_{Aeq,24h}$, as leisure noise above this level is associated with adverse health effects. The equal energy principle[19] can be used to derive exposure limits for other time averages, which might be more practical in regulatory processes.

For single-event and impulse noise exposures, the GDG **conditionally** recommends following existing guidelines and legal regulations to limit the risk of increases in hearing impairment from leisure noise in both children and adults.

Following a precautionary approach, to reduce possible health effects, the GDG **strongly** recommends that policy-makers take action to prevent exposure above the guideline values for average noise and single-event and impulse noise exposures. This is particularly relevant as a large number of people may be exposed to and at risk of hearing impairment through the use of personal listening devices (PLDs). There is insufficient evidence, however, to recommend one type of intervention over another.

Launching the guidelines

The launch

- **Virtual press conference** held on 9 October 2018
- Technical **talking points** developed together with the GDG members to ensure consistent messaging
- **Executive summaries** available in four official languages of WHO Regional Office for Europe
- Official launch event held in Basel, Switzerland on 10 October, 2018

Media coverage - international

at least 56 news stories in 8 languages

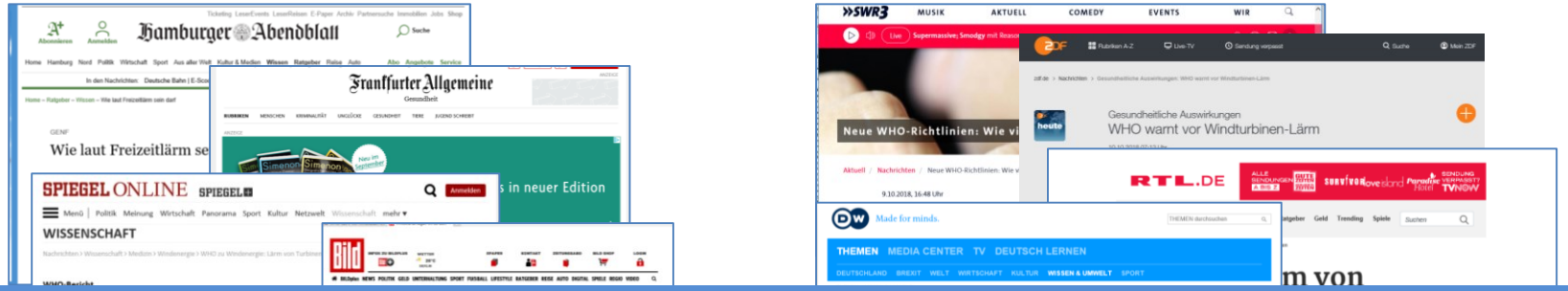
World Health Organization
REGIONAL OFFICE FOR Europe

Organisation mondiale de la Santé
BUREAU RÉGIONAL DE L' Europe

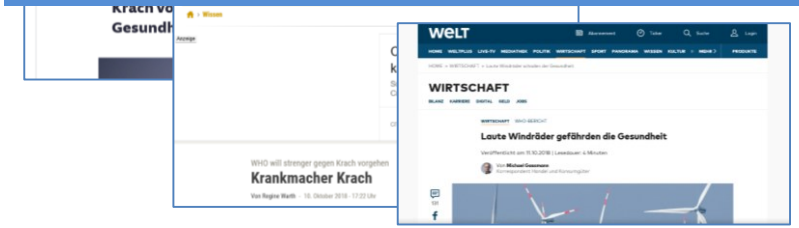
Weltgesundheitsorganisation
REGIONALBÜRO FÜR Europa

Всемирная организация здравоохранения
Европейское региональное бюро

Media coverage - Germany



at least 23 news stories



World Health Organization
REGIONAL OFFICE FOR Europe

Organisation mondiale de la Santé
BUREAU RÉGIONAL DE L' Europe

Weltgesundheitsorganisation
REGIONALBÜRO FÜR Europa

Всемирная организация здравоохранения
Европейское региональное бюро

After the launch

The EC context

- Uptake of the guidelines in the work on amending Annex III to END

The next steps

- Support Member States in the implementation process
- Facilitate coordination between state and non-state actors to support application of the guidelines and relevant public health action
- Frame noise and health in a broader Environment and Health agenda
  - the Ostrava Declaration
  - Sustainable Development Goals

Acknowledgements

Members of:
the Guideline development Group
the Systematic Review Team
the External Review Group
the WHO Steering Group

Financial and in kind support from Switzerland and Germany

Thank you for your attention

http://www.euro.who.int/en/health-topics/environment-and-health/noise

World Health Organization REGIONAL OFFICE FOR Europe
Organisation mondiale de la Santé BUREAU RÉGIONAL DE L' Europe
Weltgesundheitsorganisation REGIONALBÜRO FÜR Europa
Всемирная организация здравоохранения Европейское региональное бюро