World Health Organization Guidelines on Community Noise

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Presentation
at the
TRB Session 391 "Setting an Agenda for Transportation Noise Management Policies in the United States"
10 January 2001, Washington DC, USA

Community Noise

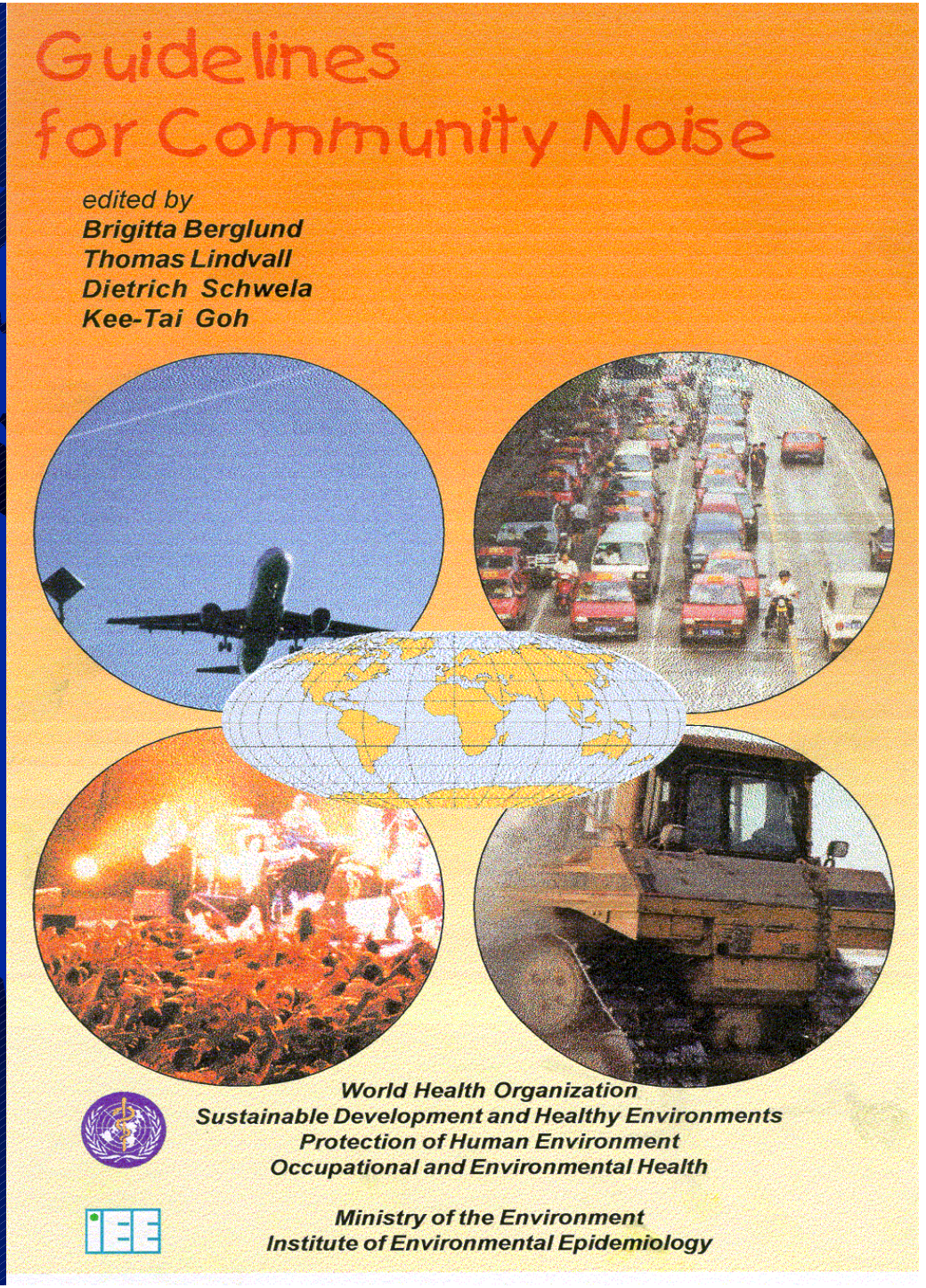
Noise EHC # 12, 1980
Recommendations

Task Group Meeting
24-28 November 1992
Düsseldorf

B. Berglund & T. Lindvall
Stockholm 1995
Guideline values

Revision and update:
April 1999
London

WHO/PHE/OEH



Guidelines for Community Noise

Introduction

Noise sources and their measurement

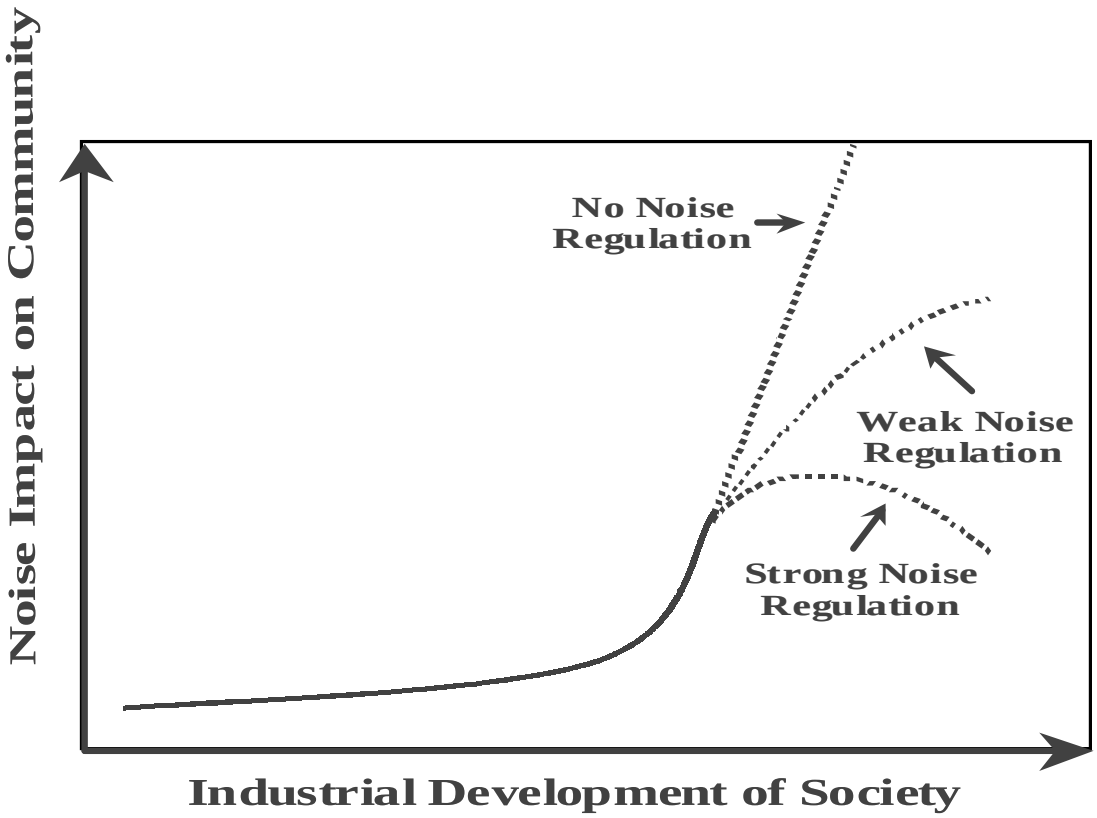
Adverse health effects of noise

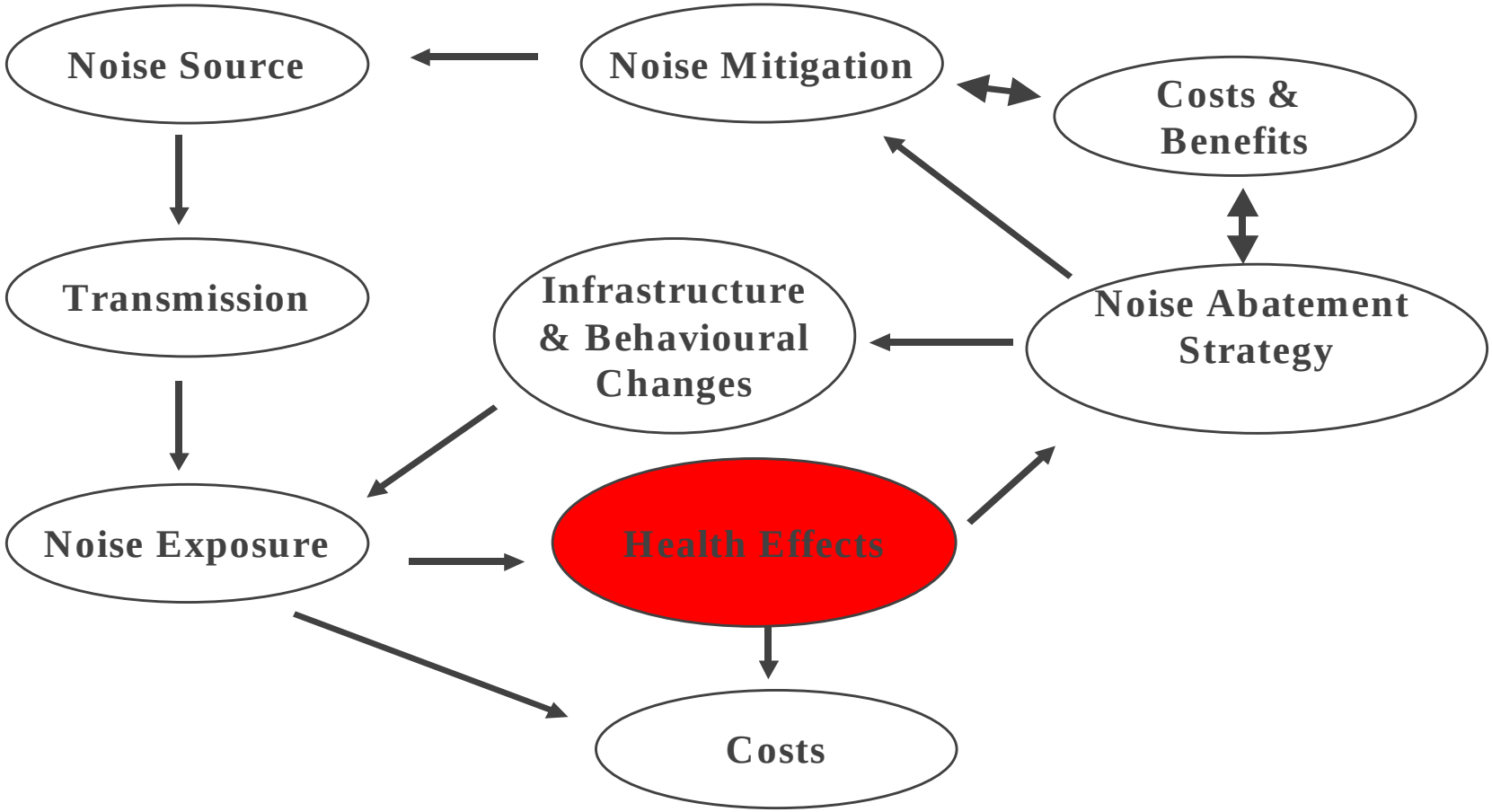
Guideline values

Noise management

Conclusions and recommendations

Noise management




Noise Source
Noise Mitigation
Costs & Benefits
Transmission
Infrastructure & Behavioural Changes
Noise Abatement Strategy
Noise Exposure
Health Effects
Costs

Exposure to noise in developed countries

About 20% of the population in the OECD countries are exposed to Environmental noise levels above 65 dBA from road traffic. Cause for complaints.

WHO, Concern for Europe's Tomorrow 1995

Exposure to noise in developing countries

Traffic noise about 100 dBA at kerbside in big cities of India, Pakistan, Argentina, Brazil and others

Extensive use of horns: exposure up to 90 dBA

Advertisements: exposure up to 100 dBA

Ceremonies and festivals: exposure up to 150 dBA

Hearing impairment due to Environmental noise

Karachi, Pakistan: 33% of rickshaw drivers
57% of shopkeepers in a busy bazar
83% of traffic cops at 90 dBA

Cities in India: 35% loss of bilateral neural hearing at 82 dBA in the population
2.5% show persistent sensory neural hearing loss due to exposure to toy weapons and fire crackers

Annoyance?

Adverse health effects of noise I

- **Physical effects (pathological effects)**
  Noise-induced hearing loss, hearing impairment, threshold shift;
- **Physiological effects**
  Startle and defense reaction leading to potential increase of blood pressure;
- **Sensory effects**
  Aural pain, ear discomfort, tinnitus
- **Interference with speech communication**
  Reduction in intelligibility of conversation, radio, music, television and others

Adverse health effects of noise II

- **Sleep disturbance**
  Difficulty in falling asleep, alterations in sleep rhythm, being woken up;
- **Psychological effects**
  Headaches, fatigue, irritability
- **Performance effects**
  Task performance, distraction, productivity
- **Annoyance**
  Feeling of displeasure; tolerances vary enormously; noise impulses more annoying than a steady noise;

Community Noise: Guideline values I

Environment	Critical effect	L_{eq} [dBA]	Time base [h]	L_{max} [dBA]
Bedroom	Sleep disturbance	30	8	45
Dwelling room	Annoyance Speech interference	50	16	-
Outdoor (day)	Serious annoyance	55	16	-
School classroom	Speech interference	35	6	-
School courtyard	Serious Annoyance	55	play-time	-

Community Noise: Guideline values II

Environment	Critical effect	L_{eq} [dBA]	Time base [h]	L_{max} [dBA]
Hospital Patient-/ Ward - rooms	Sleep disturbance/ Communication interference	30 30	8 16	45 40
Concert hall outdoor	Hearing impairment	100	4	110
Discos Headphones		85	1	110
Public addresses		85	1	110
Impulsive sounds	Hearing deficits	-	-	140

Comparison

WHO Guidelines – EC Directive

Objectives

Attainment by all people of the highest possible level of health, identifying noise impacts as "health" issues.

Practical response to the need for action on environmental noise at the local level, as well as the need for improved legislation, management and guidance at the national and regional levels.

Common approach to avoid, prevent or reduce harmful effects on human health by

- assessment of

- making available information on environmental noise.

To initiate action to be taken by EC Member States to reduce environmental noise and to maintain environmental noise quality.

Comparison

WHO Guidelines – EC Directive

Scope

To consolidate actual scientific knowledge on the health impacts of environmental noise.
To provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in non-industrial environments.

Applies to environmental noise perceived by humans in and near their house, in public parks, in relatively quiet areas, in and near schools, hospitals, and other sensitive buildings. Does not cover noise caused by exposed person, domestic activities, neighbours, work places, inside means of transport.

Comparison

WHO Guidelines – EC Directive

Definitions

Noise is unwanted sound. Environmental noise is noise emitted from all sources except noise at the industrial work-place.

Environmental noise is unwanted or harmful sound created by human activity outdoors (transport, industrial sites, industrial buildings).

Comparison

WHO Guidelines – EC Directive

Definitions

Adverse effects of noise = change in the morphology and physiology of an organism that results in impairment of functional capacity to compensate for additional stress, or increases in the susceptibility of of an organism to the harmful effects of other environmental influences. Includes any temporary or long-term lowering of the physical, psychological or social functioning of humans of human organs.

Harmful effects = negative effects on human health. Examples: Annoyance, sleep disturbance, interference with communication, negative effects on learning, hearing stress, hypertension.

Comparison

WHO Guidelines – EC Directive

Definitions

Annoyance = feeling of displeasure associated with any agent or as determined condition, known or believed by an individual or a group to adversely affect them.

Annoyance = degree of community noise annoyance by means of field surveys.

Exposure-response relationship = relationship between specified sound levels and health impacts.

Dose-effect relation = relationship between the value of a noise indicator and harmful effect.

Comparison

WHO Guidelines – EC Directive

Noise indicators

$L_{Aeq,T}$, L_{Amax}, SEL

L_{den}, L_{night}

Guidelines
Guideline values
Limit values

Limit values

Comparison

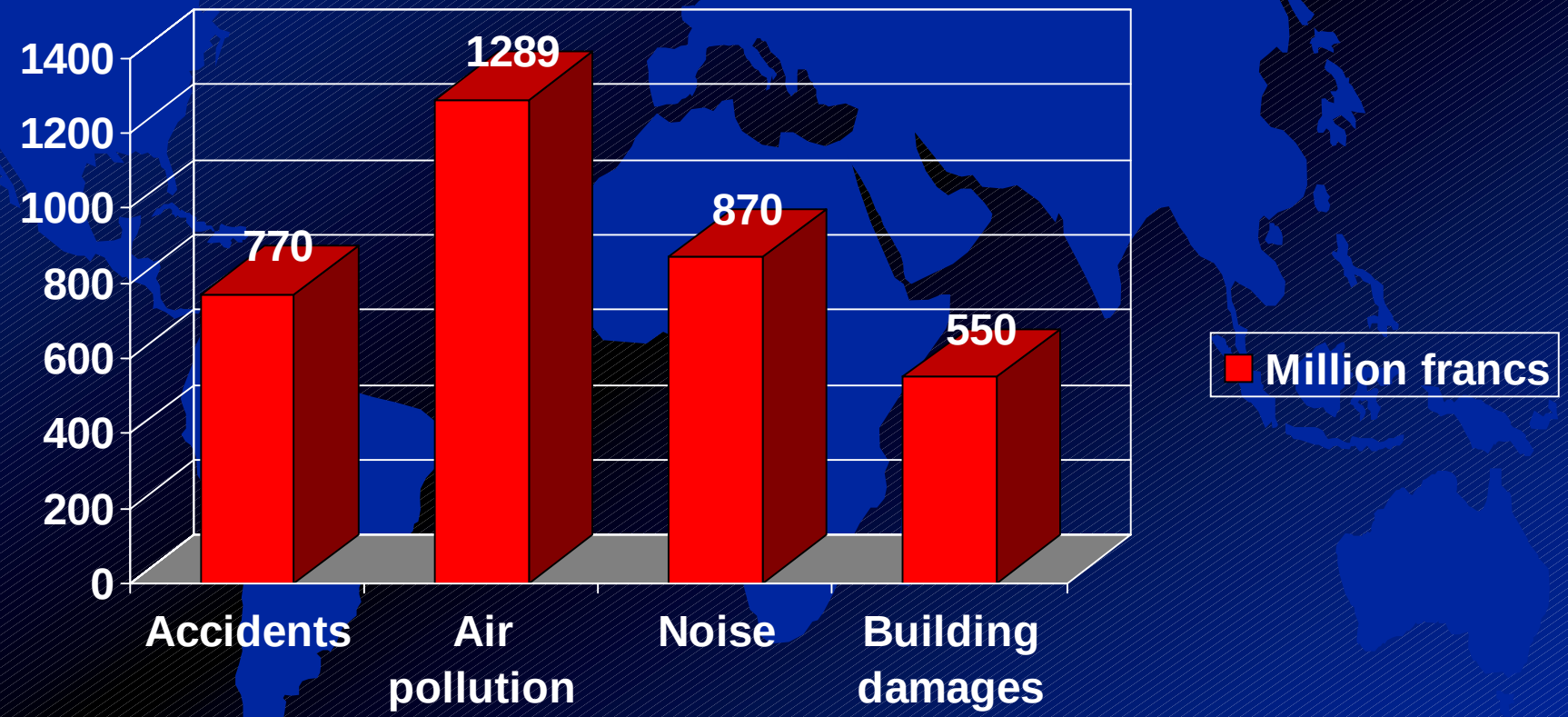
WHO Guidelines – EC Directive

Implementation

Framework for noise Management.
Recommended measures on noise management
- legal and engineering measures
- education and information
Noise exposure mapping
Mitigation and precautionary measures
Evaluation of control options
Cost-benefit analysis
Management of indoor noise.
Priority setting

Competent authorities in Member States responsible for
- making and approval of noise maps and action plans;
- ensuring accuracy of assessment - - methods;
- making information available to EC and the public.
Use of harmonised measurement methods.
Minimum requirement for noise maps and action plans.
Information dissemination.

Comparison of health costs of traffic induced air pollution with those of other external traffic related costs in Switzerland



Health impacts of noise

- Absenteeism from work due to sleep disturbance
- Absenteeism from school due to sleep disturbance
- Reduction of productivity or quality of work due to sleep disturbance or annoyance
- Accidents due to sleep disturbance

Such health impacts can be monetised

Internet address:
WHO Guidelines for Community Noise
www.who.int/peh/

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