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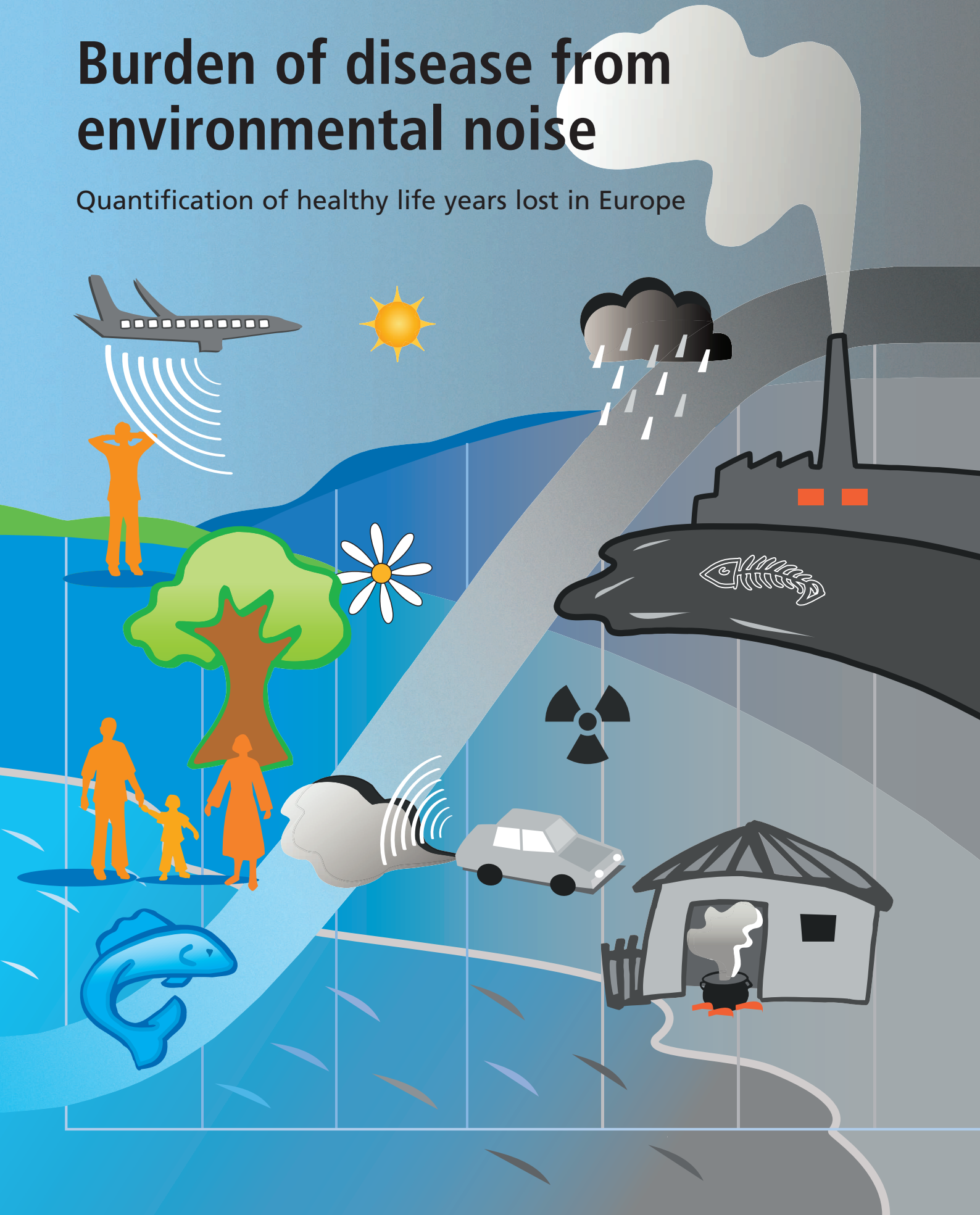


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EUROPEAN COMMISSION

Burden of disease from environmental noise

Quantification of healthy life years lost in Europe



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ABSTRACT

The health impacts of environmental noise are a growing concern among both the general public and policy-makers in Europe. This publication was prepared by experts in working groups convened by the WHO Regional Office for Europe to provide technical support to policy-makers and their advisers in the quantitative risk assessment of environmental noise, using evidence and data available in Europe. The chapters contain the summary of synthesized reviews of evidence on the relationship between environmental noise and specific health effects, including cardiovascular disease, cognitive impairment, sleep disturbance and tinnitus. A chapter on annoyance is also included. For each outcome, the environmental burden of disease methodology, based on exposure–response relationship, exposure distribution, background prevalence of disease and disability weights of the outcome, is applied to calculate the burden of disease in terms of disability-adjusted life-years (DALYs). With conservative assumptions applied to the calculation methods, it is estimated that DALYs lost from environmental noise are 61 000 years for ischaemic heart disease, 45 000 years for cognitive impairment of children, 903 000 years for sleep disturbance, 22 000 years for tinnitus and 587 000 years for annoyance in the European Union Member States and other western European countries. These results indicate that at least one million healthy life years are lost every year from traffic-related noise in the western part of Europe. Sleep disturbance and annoyance, mostly related to road traffic noise, comprise the main burden of environmental noise. Owing to a lack of exposure data in south-east Europe and the newly independent states, it was not possible to estimate the disease burden in the whole of the WHO European Region. The procedure of estimating burdens related to environmental noise exposure presented here can be used by international, national and local authorities as long as the assumptions, limitations and uncertainties reported in this publication are carefully taken into account.

LIST OF ACRONYMS AND ABBREVIATIONS

ADL	Activity of daily life
AF	Attributable fraction
AR	Attributable risk
CI	Confidence interval
CLAMES	Classification and Measurement System of Functional Health
DALY	Disability-adjusted life year
DEN	Day-evening-night equivalent level
DW	Disability weight
EBD	Environmental burden of disease
EEA	European Environment Agency
EEG	Electroencephalogram
EMG	Electromyogram
END	Environmental noise directive (2002/49/EC)
EOG	Electrooculogram
ETC LUSI	European Topic Centre on Land Use and Spatial Information
EU	European Union
EUR-A	WHO epidemiological subregion in Europe: Andorra, Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, the Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland and the United Kingdom
GBD	Global burden of disease
HA	Highly annoyed people
HSD	Highly sleep disturbed people
ICD-9	International Statistical Classification of Diseases and Related Health Problems, ninth revision
ICD-10	International Statistical Classification of Diseases and Related Health Problems, tenth revision
$L_{Aeq,th}$ or $L_{eq,th}$	A-weighted equivalent sound pressure level over t hours
L_{den}	Day-evening-night equivalent sound level
L_{dn}	Day-night equivalent sound level
L_{night}	Night equivalent sound level
NIHL	Noise-induced hearing loss

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