UNECE Air Convention (LRTAP)

Air Pollution and Urban Health: WHO Work on AirQ+ (and other tools)

Pier Mudu

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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

Presentation outline

1. Introduce to AirQ+ the tool produce by WHO-EURO for the **health risk assessment** of air pollution;
2. Learn the other tools available or under development by WHO-EURO.

1.
AirQ+

What is AirQ+? 1

A user-friendly software

to estimate the magnitude

of the most important and best recognized

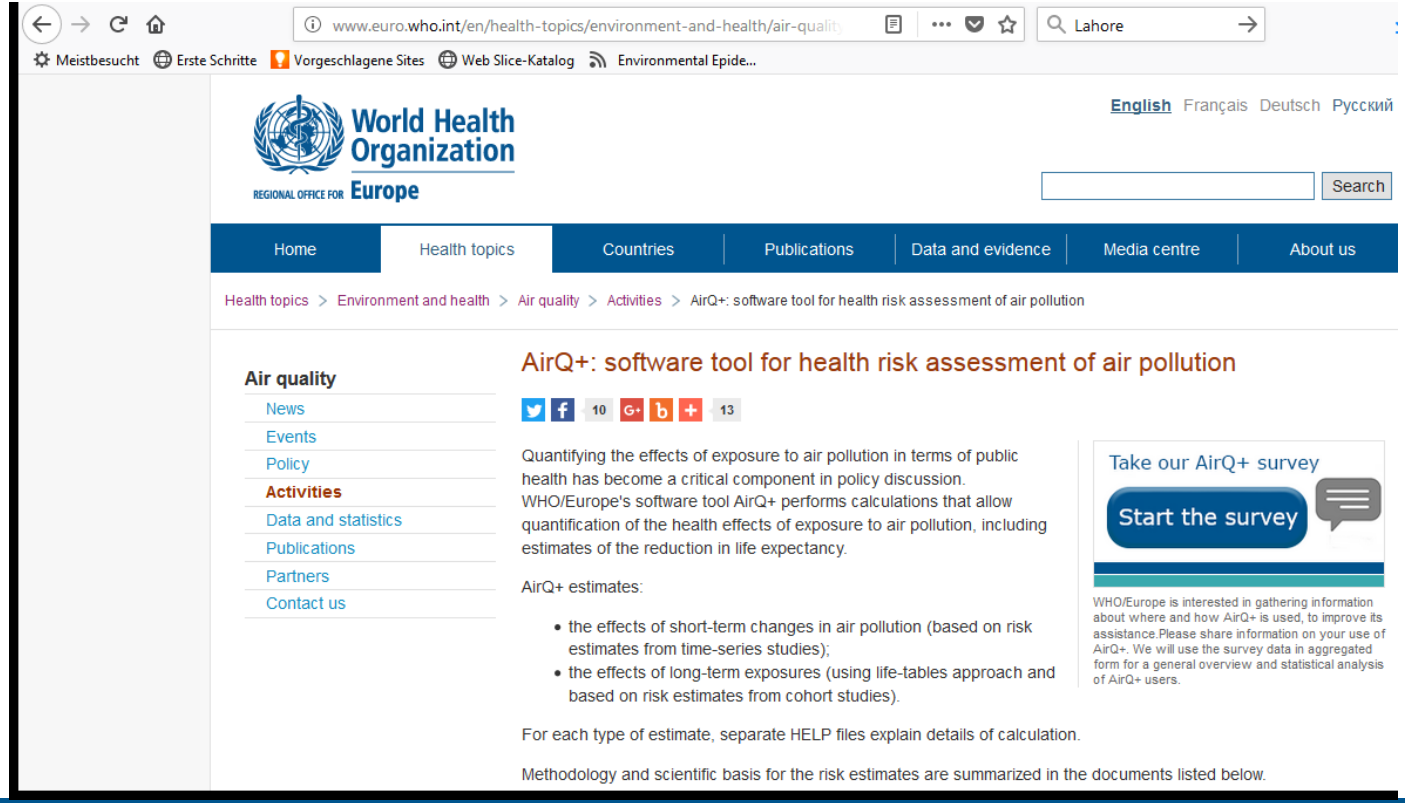
effects of air pollution in a given population

What is AirQ+? 2

- Developed by WHO/Europe with support from German government
- Updated and improved version of the WHO AirQ software (used for more than fifteen years)
- Can also be used for supporting educational and training activities related to environment and health

Downloading AirQ+ software
(Current version: AirQ+2.0, December 2020)

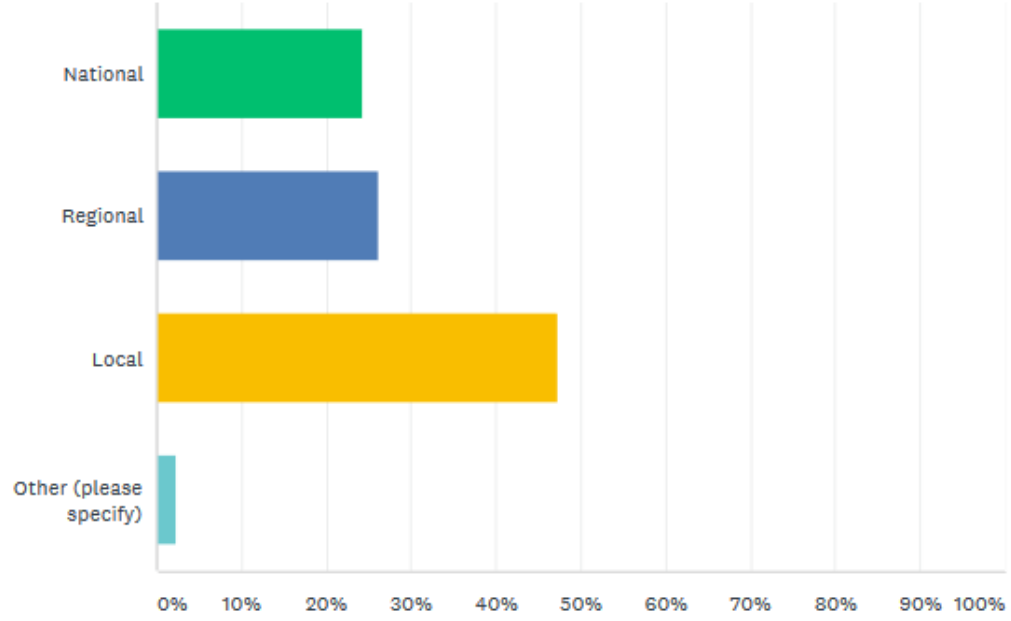
http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/activities/airq-software-tool-for-health-risk-assessment-of-air-pollution



AirQ+ Survey monkey 6

What is the geographical level of your analysis?

Answered: 351 Skipped: 13



2016-2020

National		24.22%	85
Regional		26.21%	92
Local		47.29%	166
Other (please specify)	Responses	2.28%	8
TOTAL			351

2016-2019

National		23.58%	58
Regional		24.80%	61
Local		49.19%	121
Other (please specify)	Responses	2.44%	6
TOTAL			246

2016-2018

National		19.50%	31
Regional		25.16%	40
Local		52.83%	84
Other (please specify)	Responses	2.52%	4
TOTAL			159

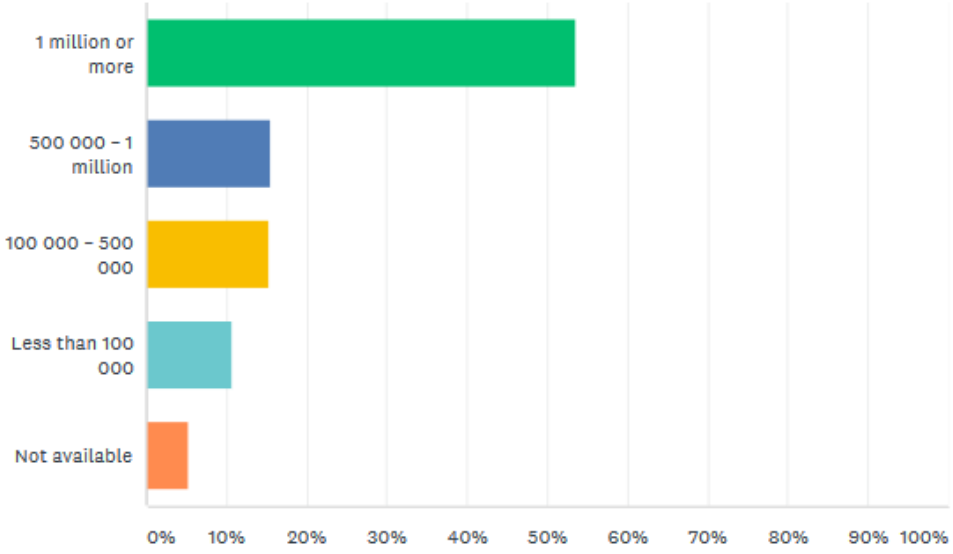
2016-2017

National		18.67%	14
Regional		21.33%	16
Local		57.33%	43
Other (please specify)	Responses	2.67%	2
Total			75

AirQ+ Survey monkey 7

How many people live in the area you intend to analyse?

Answered: 349 Skipped: 15



2016-2020

1 million or more	53.58%	187
500 000 – 1 million	15.47%	54
100 000 – 500 000	15.19%	53
Less than 100 000	10.60%	37
Not available	5.16%	18
TOTAL		349

2016-2019

1 million or more	55.51%	136
500 000 – 1 million	17.55%	43
100 000 – 500 000	12.24%	30
Less than 100 000	10.20%	25
Not available	4.49%	11
TOTAL		245

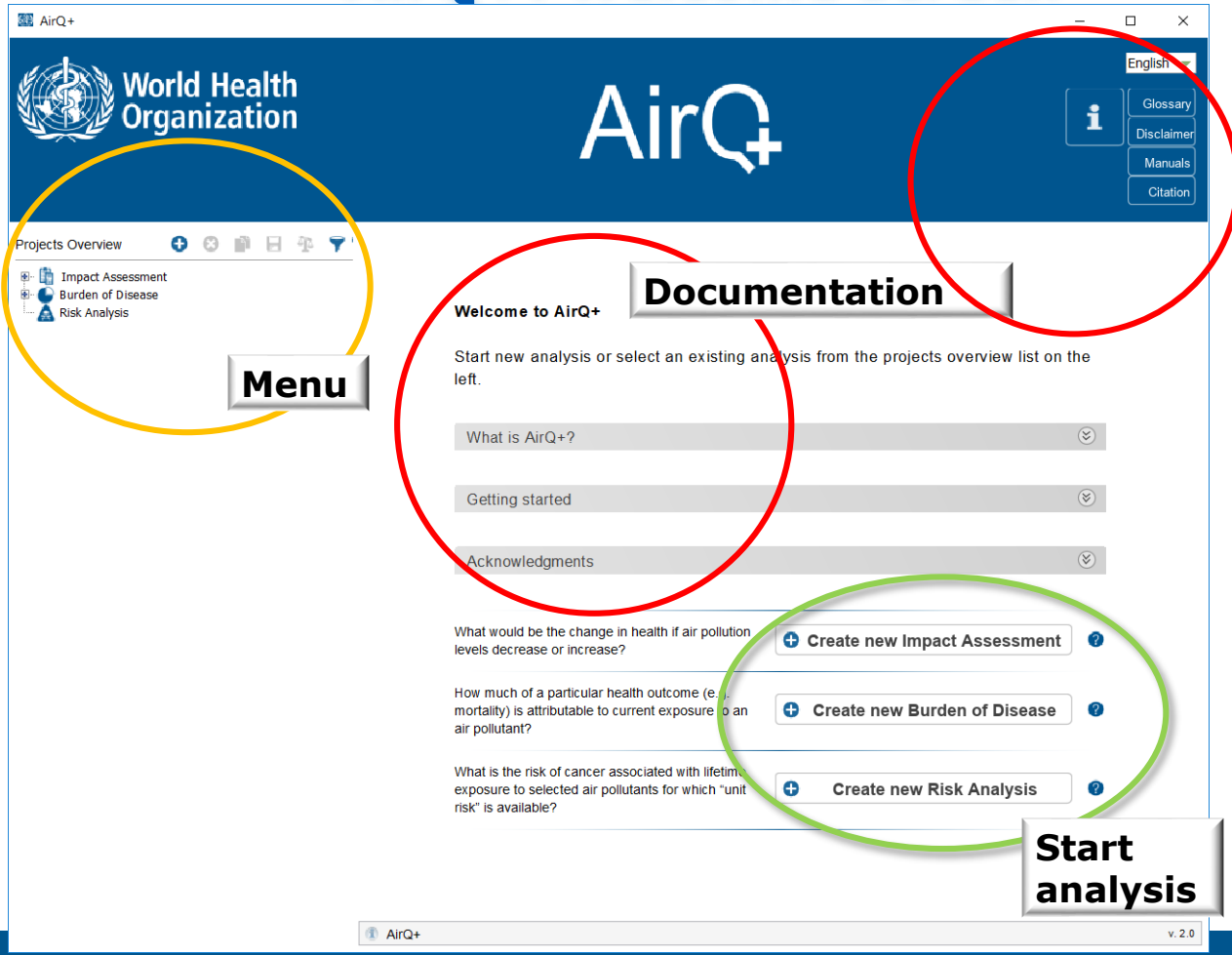
2016-2018

1 million or more	57.59%	91
500 000 – 1 million	16.46%	26
100 000 – 500 000	12.66%	20
Less than 100 000	10.13%	16
Not available	3.16%	5
TOTAL		158

2016-2017

1 million or more	52.70%	39
500 000 – 1 million	18.92%	14
100 000 – 500 000	13.51%	10
Less than 100 000	9.46%	7
Not available	5.41%	4
Total		74

AirQ+: welcome screen



Current work

Please note that the published cover of the manuals may be different from the ones shown here

- Review of methods used for estimating burden of disease attributable to air pollution
- Technical discussion is on-going on the new features
- New economic module
- Online training activities

Next steps

- Spanish translation also on-going
- Implementation of additional modules (Economic module and manual)
- AirQ+ 2.2 (English, Russian, French, Russian and Spanish)
- AirQ+ 2.3 (Economic module, only in English)
- Identification of priority updates and improvements with a variety of experts
  - Update based on the new AQG
- Production of additional supporting documentation
- Dissemination activities (testing and getting comments is a fundamental activity)
- Harmonization and “dialogue” with other WHO tools

2.
Other WHO tools

AirQ+/BenMAP

Analysis parameters

- Pollutants
- Air Quality
- Population
- Baseline Rate of Deaths and Illnesses
- ß Coefficient
- Health Impact Function (HIF) Functional Form
- Distributions that can be Specified for Uncertainty Calculations
- Economic Values
- Additional Features

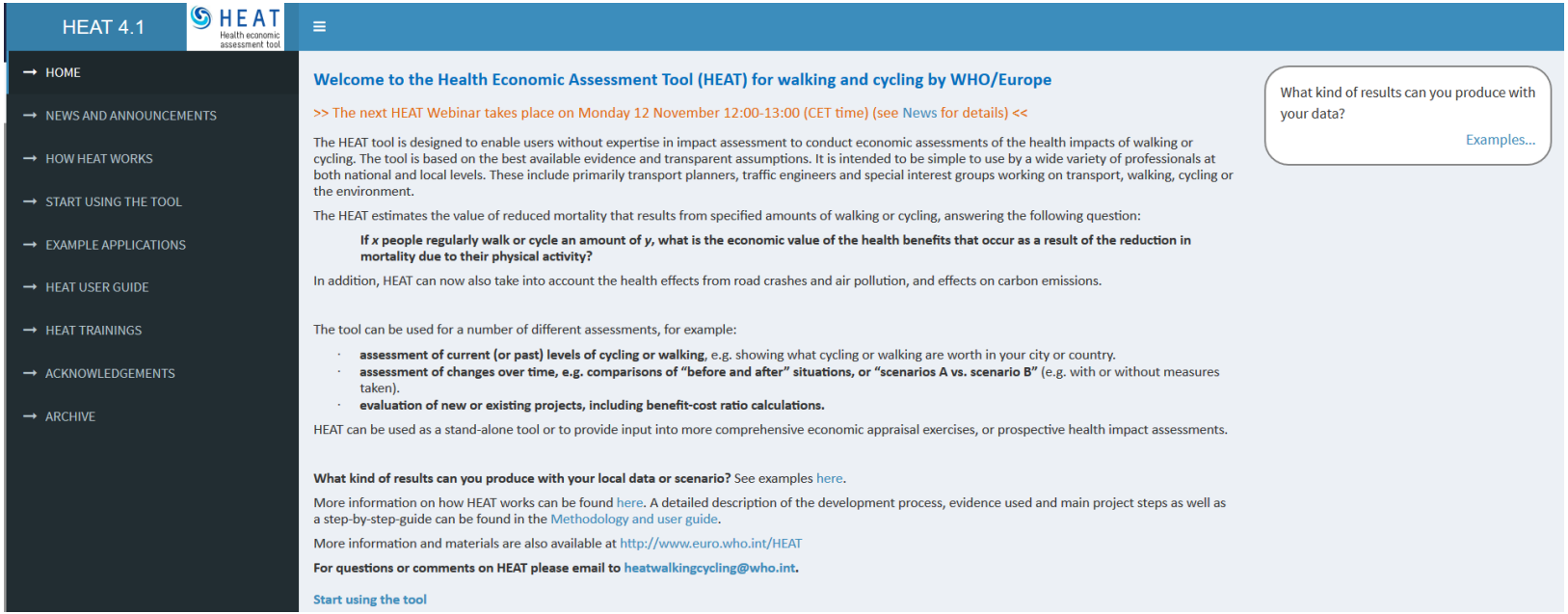
Analysis Parameters	BenMAP—CE		AirQ+	
	Preloaded Data	User Provided Data	Preloaded Data	User Provided Data
Pollutants[1]	• $PM_{2.5}$ • Ozone	• User can conduct analyses for	• $PM_{2.5}$ • PM_{10}	• User can conduct analyses
Air Quality	• Year 2000–2 monitoring U.S.			
Population	• U.S. popula 2000 to 205(stratified by at 12 km gri			
Baseline Rate of Deaths and Illnesses	• Cause-speci rates projec five-year in • Hospital an department county- and			
β Coefficient	• Over 100 PI impact func and Canadi include mo admissions, visits, exace respiratory loss days			

Analysis Parameters	BenMAP—CE		AirQ+	
	Preloaded Data	User Provided Data	Preloaded Data	User Provided Data
Health Impact Function (HIF) Functional Form	• Log-linear • Logistic • Global Burden of Disease (GBD) Integrated Exposure-Response (IER) Function	• User can select various operators, variables, and population variables to define unique functions, including specifying different functions for different parts of an air quality distribution	• Log-linear • Linear-log • Global Burden of Disease (GBD) Integrated Exposure-Response (IER) Function	n.a.
Distributions that can be Specified for Uncertainty Calculations	• Normal • Triangular • Poisson • Binomial • Log Normal • Uniform • Exponential • Geometric • Weibull • Gamma • Logistic • Beta • Pareto • Cauchy	• Users can select a non-parametric custom distribution	n.a.	n.a.
Economic Values	• Multiple cost-of-illness (COI) and willingness-to-pay (WTP) studies for each health endpoint quantified by health impact function	• Import .csv or .xlsx file specifying COI or WTP function(s), including health endpoint and unit value	n.a.	n.a.
Additional Features	• Global Burden of Disease (GBD) Rollback tool allows estimation of $PM_{2.5}$ health impacts worldwide based on data from GBD study.	n.a.	• Cancer Unit Risk Values for arsenic, benzene, benzo[a]pyrene, chromium (VI), nickel, and vinyl chloride	• User can modify coefficients

Source: Sacks, J. D., Fann, N., Gumy, S., Kim, I., Ruggeri, G., & Mudu, P. (2020). Quantifying the Public Health Benefits of Reducing Air Pollution: Critically Assessing the Features and Capabilities of WHO's AirQ+ and US EPA's Environmental Benefits Mapping and Analysis Program—Community Edition (BenMAP—CE). *Atmosphere*, *11*(5), 516.

HEAT (available online)

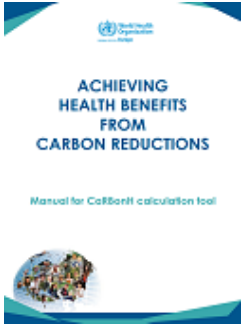
Tools to evaluate the impact of air pollution due to specific activities



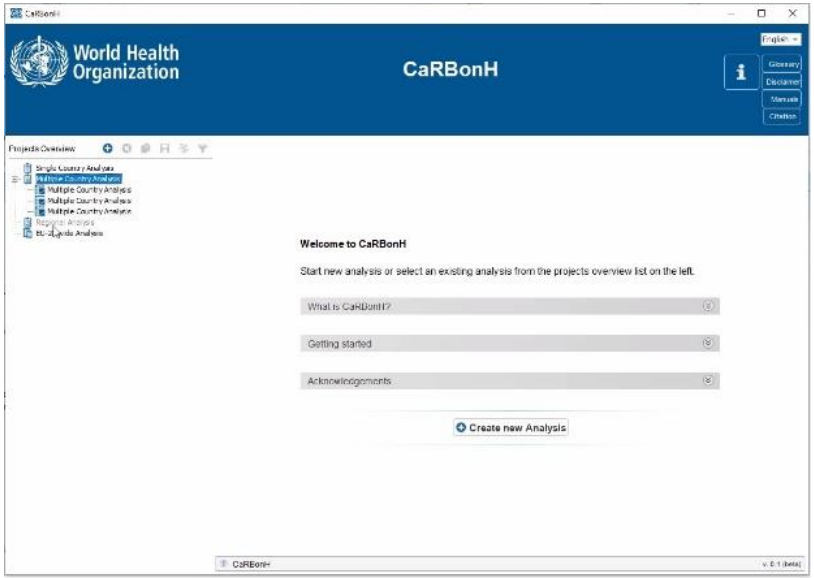
https://www.heatwalkingcycling.org/#homepage

CaRBonH (available online for download)

CaRBonH - quantify the effects on health and economy of the improvement of air quality due to CO_2 reduction related to National Determined Contributions (NDC) at the country level.



New interface under development



https://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/publications/2018/achieving-health-benefits-from-carbon-reductions-manual-for-carbonh-calculation-tool-2018

GreenUR (under testing)

Tools to evaluate the impact of air pollution due to land-use

GreenUr – quantify the impact on health of Green spaces. The results from several research projects converge towards a quantifiable association of the effects of green spaces on health, in different populations and for a variety of spatial and temporal scales.

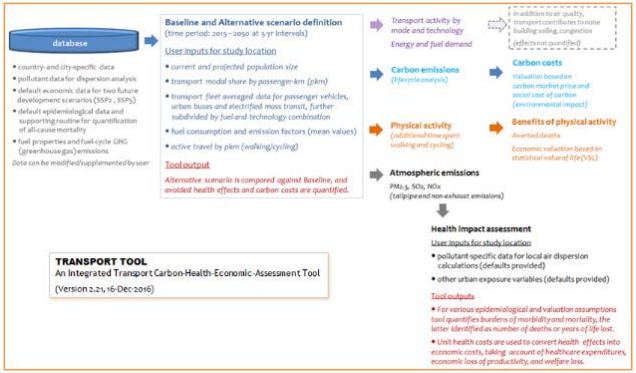
New interface under development

https://www.euro.who.int/en/health-topics/environment-and-health/urban-health/activities/greenur-the-green-urban-spaces-and-health-tool

iSTHAT (under development)

Tools to evaluate the impact of air pollution due to specific activities

iSTHAT - (Integrated Sustainable Transport & Health Assessment Tool) has been designed and developed to provide a simplified methodological framework and corresponding tool for the assessment of health and economic benefits of carbon-related measures in the context of urban transport. It is a user-friendly, interactive Excel-based tool that assesses carbon mitigation alternatives in surface transport for information and education purposes.



https://www.euro.who.int/en/health-topics/environment-and-health/urban-health/activities/isthat-the-integrated-sustainable-transport-and-health-assessment-tool

Main challenges

- Data availability
- Sources of uncertainty affecting quantification of environment-related health impacts
- Communicating Air Pollution and Health Risks

Conclusions

- HRA provides an important process to understand the impacts of air pollution
- Estimating health impacts of policies are important to orient decision-making
- The health sector is empowered with tools that allow collaboration with other sectors
- WHO provides AirQ+ that is a tool that is simple to use to estimates adverse health risks and impacts of air pollution
- WHO is also providing (or developing) other tools that quantify the adverse health risks and impacts of air pollution but related to particular activities and land-use

Thank you for your attention

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WHO web sites

Air pollution http://www.who.int/topics/air_pollution/en/

Air quality and health: **euro.who.int/air**

AirQ+ is co-funded by the German Ministry of Environment (BMUB)