# Use of Air Quality Data for policy-relevant Health Assessments: new WHO Global Air Quality Guidelines and related data requirements.

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Regional Training on air quality and emissions to air statistics and indicators, 4 May 20232

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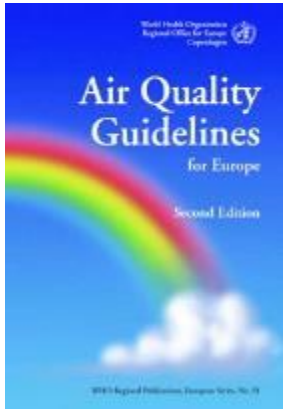
www.who.int/europe


- What are WHO Air Quality Guidelines (WHO AQG)?
- How were WHO AQG developed?
- How can WHO AQG be used?

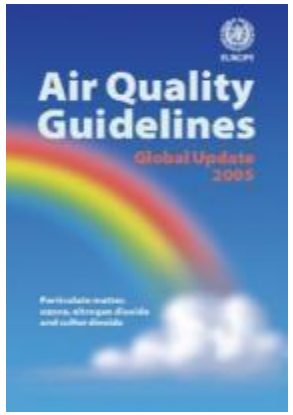

- What are WHO Air Quality Guidelines (WHO AQG)?

# WHO Air Quality Guidelines (WHO AQG)


1987

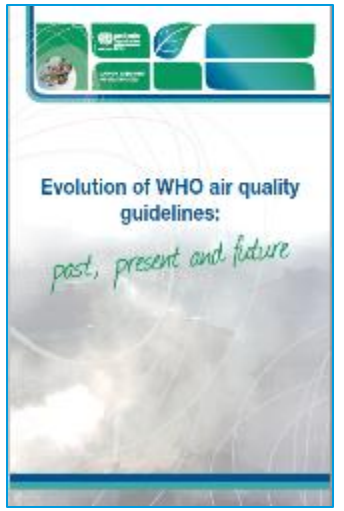



2000




2006


2021




- Robust public health recommendations
- Support informed decision-making
- Intended for worldwide use
- Comprehensive assessment of the evidence

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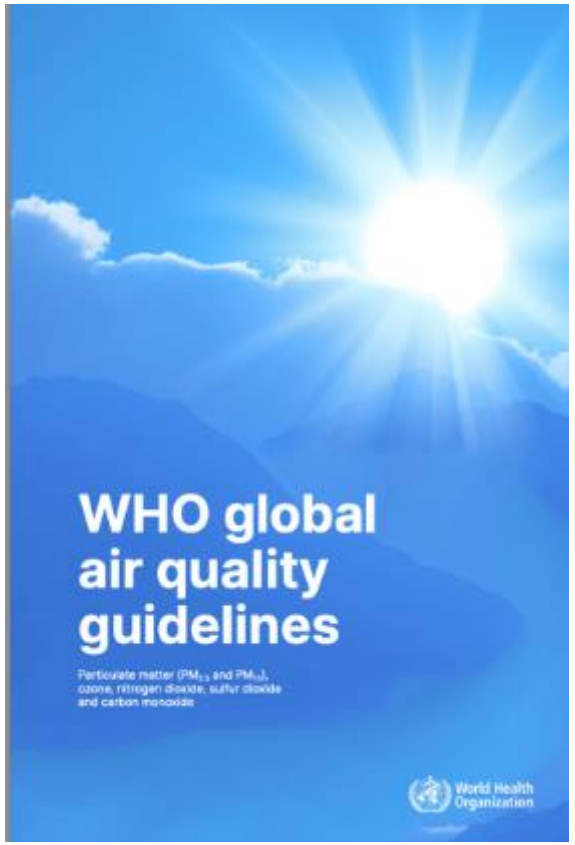
# Why the new WHO global AQG?




- Marked increase in the quality and quantity of **evidence** on the health effects of air pollution
- Better insight into global **concentrations** of some pollutants
- Insights into sources of emissions and the contribution of air pollution to the **global burden of disease**
- Importance of addressing health **inequities** related to air pollution
- Advances in the worldwide **adoption** of the 2005 air quality guidelines
- Mitigating air pollution has become more central in **WHO and UN activities**

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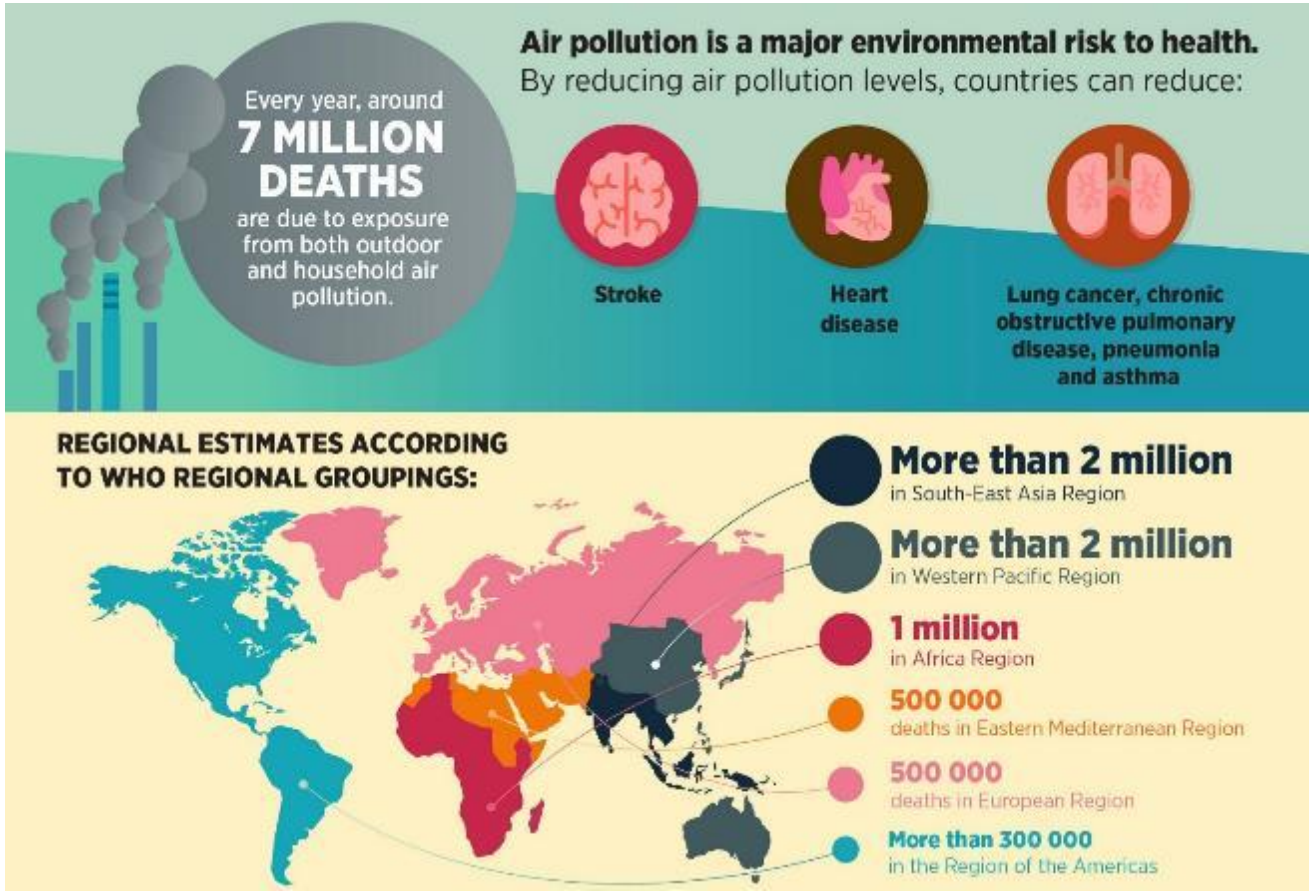
# Growing and inequitable burden of disease

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- Despite certain improvements in air quality in some regions over the past 30 years, **the global toll in deaths and healthy years of life lost is very high.**
- This burden of disease often disproportionately affects **the most vulnerable** and susceptible populations.

# Policy drivers

- World Health Assembly resolution (2015)
- UN Environment Assembly resolutions:
  - Promoting air quality (2014)
  - Coordinated approach to challenges of sand and dust storms (2016)
  - Actions across sectors (2018)


- UNECE Convention on Long-range Transboundary Air Pollution, including Joint Task Force on the Health Aspects of Air Pollution, chaired by WHO ECEH

- UN Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment – right to breathe clean air (2019)
- UN Sustainable Development Agenda:
  - 2030 Agenda for Sustainable Development (2015)
  - Strategic priorities for non-communicable diseases (2018)

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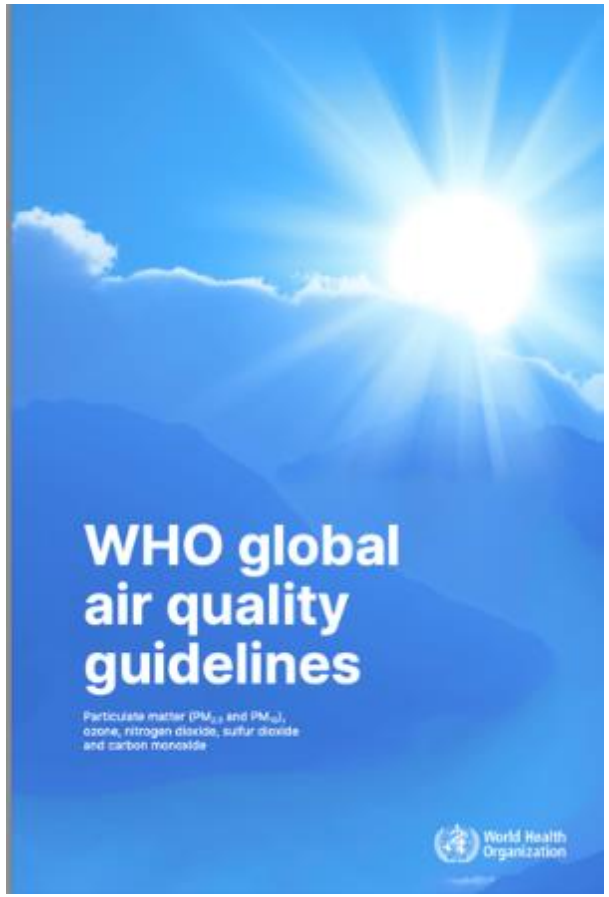
# What are the WHO global AQG?




- Based on the extensive evidence, they identify the levels of air quality necessary to protect public health worldwide
- Provide recommendations on air quality guideline levels for $PM_{2.5}$, $PM_{10}$, $O_3$, $NO_2$, $SO_2$ and CO
- Not legally binding, but serve as an evidence-informed reference for setting standards or policies
- An instrument to design effective measures to achieve reduction of air pollution and, therefore, protect human health
- Do not apply to occupational settings
- Do not address specific recommendations on policies and interventions

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# What do the WHO global AQG provide?

**Air quality guideline levels** for both long- and short-term exposure in relation to critical health outcomes

**Interim targets** to guide reduction efforts for the achievement of the air quality guideline levels

**Good practice statements** on the management of certain types of particulate matter for which evidence is insufficient to derive quantitative air quality guideline levels, but points to their health relevance

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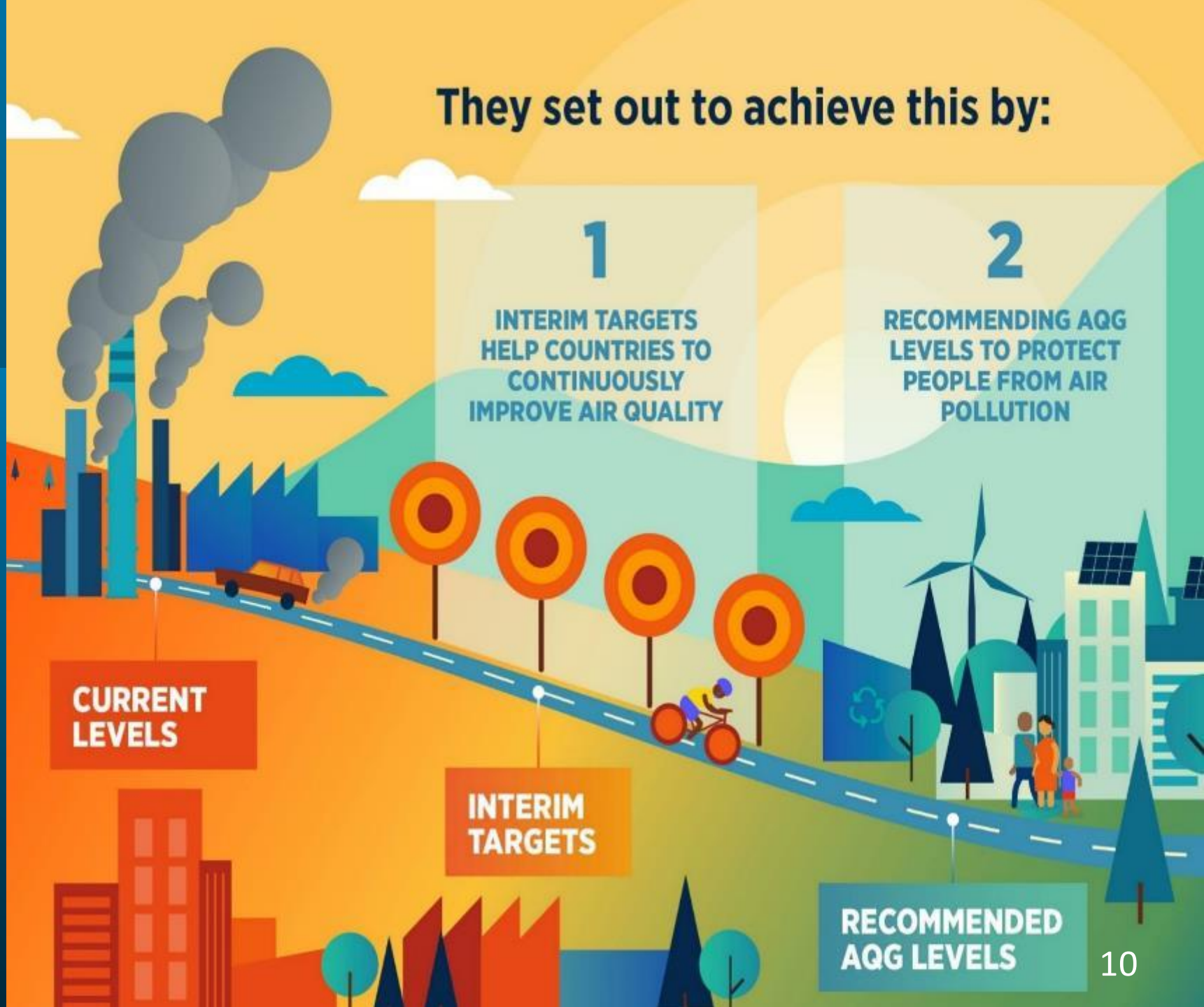
| Pollutant | Averaging time | IT1 | IT2 | IT3 | IT4 | AQG level |
|---|---|---|---|---|---|---|
| $PM_{2.5}$, μg/m³ | Annual | 35 | 25 | 15 | *10* | 5 |
| $PM_{2.5}$, μg/m³ | 24-hour[a] | 75 | 50 | 37.5 | *25* | 15 |
| $PM_{10}$, μg/m³ | Annual | 70 | 50 | 30 | *20* | 15 |
| $PM_{10}$, μg/m³ | 24-hour[a] | 150 | 100 | 75 | *50* | 45 |
| $O_3$, μg/m³ | Peak season[b] | 100 | 70 | – | – | 60 |
| $O_3$, μg/m³ | 8-hour[a] | 160 | 120 | – | – | 100 |
| $NO_2$, μg/m³ | Annual | *40* | 30 | 20 | – | 10 |
| $NO_2$, μg/m³ | 24-hour[a] | 120 | 50 | – | – | 25 |
| $SO_2$, μg/m³ | 24-hour[a] | 125 | 50 | – | – | 40 |
| CO, mg/m³ | 24-hour[a] | 7 | – | – | – | 4 |

# Interim targets to guide continuous improvement of air quality

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# Good practice statements on certain types of PM


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- How were WHO AQG developed?

# Main steps in the development of WHO guidelines

Meta-analysis

Systematic review

Formulate review questions/
Select health outcomes

Scope of the guidelines

Set up groups (GDG and ERG)
DOI/COI management

Assess certainty of the body of evidence (GRADE)

Formulate recommendations

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# Main steps in the development of WHO AQG

Meta-analysis

Systematic review

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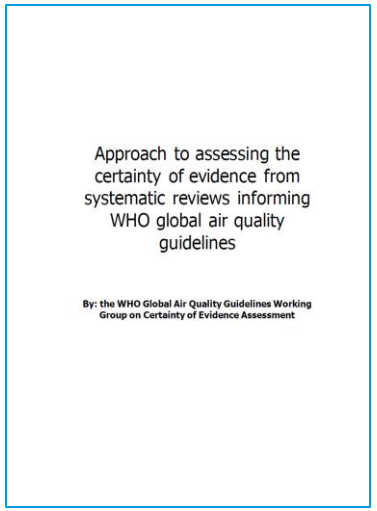
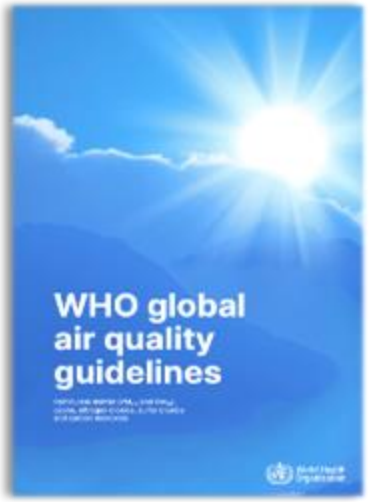
Set up groups (GDG and ERG)
DOI/COI management

Assess certainty of the body of evidence (adapted GRADE)




Formulate recommendations - identify AQG levels

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# Systematic review process

| | |
|---|---|
| Scoping: | 6 pollutants, 11 major outcomes, 6 questions (PECOS) |
| Planning: | 6 protocols, 2 new tools, 3 physical meetings |
| Identification/screening: | 12 databases searched; 20 000 papers screened |
| Eligibility: | 500 eligible papers |
| Data extraction: | up to 60 data items extracted |
| Risk of bias : | 6 domains assessed |
| Synthesis: | 500 papers synthetized |
| Interpretation: | 8 GRADE domains evaluated |

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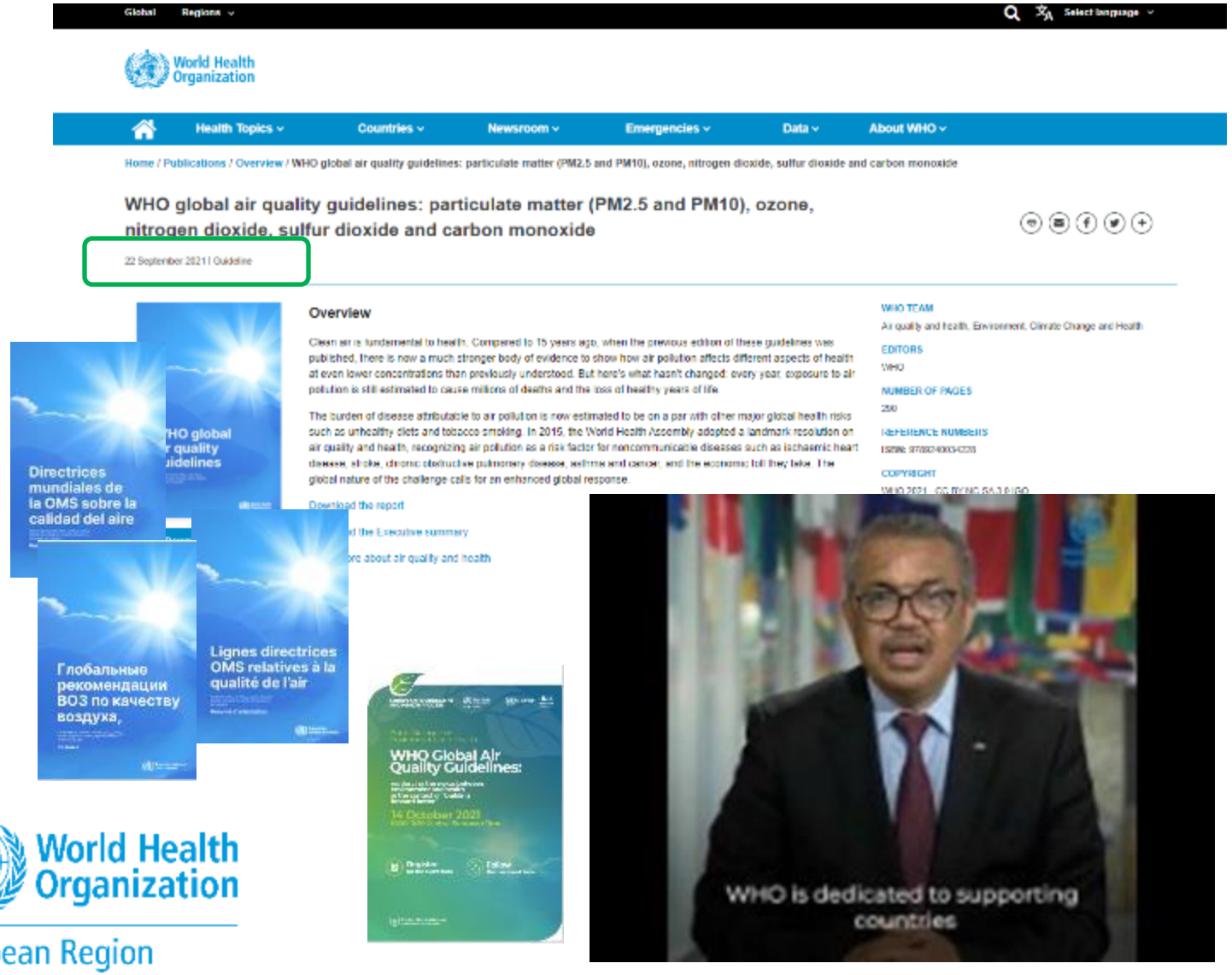
- How can WHO AQG be used?

# A year after the launch …

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## Media:

BBC, EL PAÍS, Frankfurter Allgemeine, CNN, South China Morning Post, Brisbane Times,...

## Science:

- BMJ, Lancet, Int J Public Health, Eur J Public Health, Allergy…
- Guideline >700 citations
- Systematic reviews >600 citations
- 2021 WHO list of 10 key global health moments
- Web downloads: >100 000

# Main uses of WHO AQG

**TO INFORM AIR QUALITY POLICIES**

**To guide the development of legislation and policies to reduce levels of air pollutants,** strengthen intersectoral cooperation, decrease the disease burden and reduce inequities

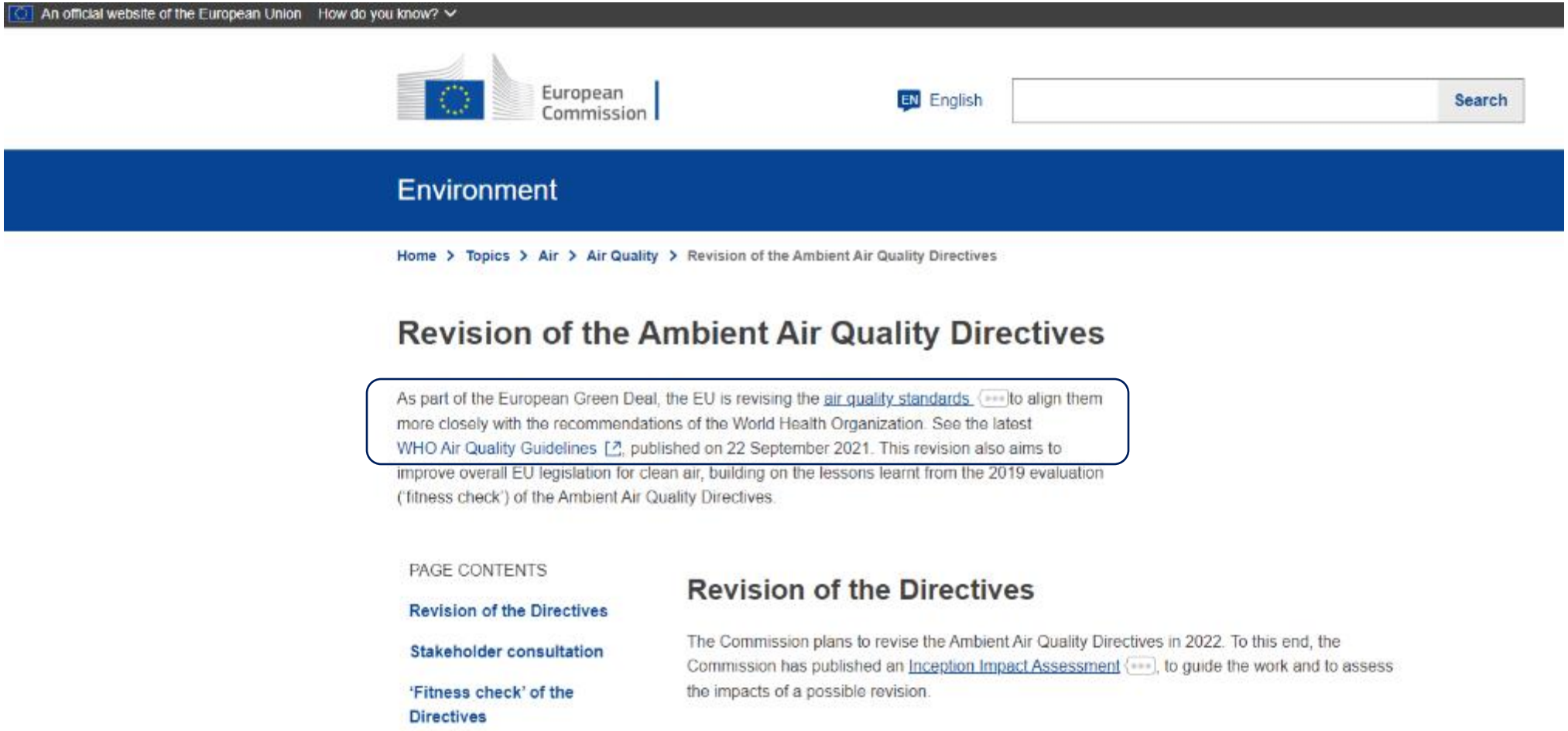

**TO STIMULATE RESEARCH**

**To identify critical data gaps** that could be addressed in the future research agendas

**TO ENHANCE CLIMATE ACTION**

**AQGs are a powerful tool for climate action.**

# An example from the European Union

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Revision of the Ambient Air Quality Directives (europa.eu)

# Implementing the guidelines

## Key enabling factors

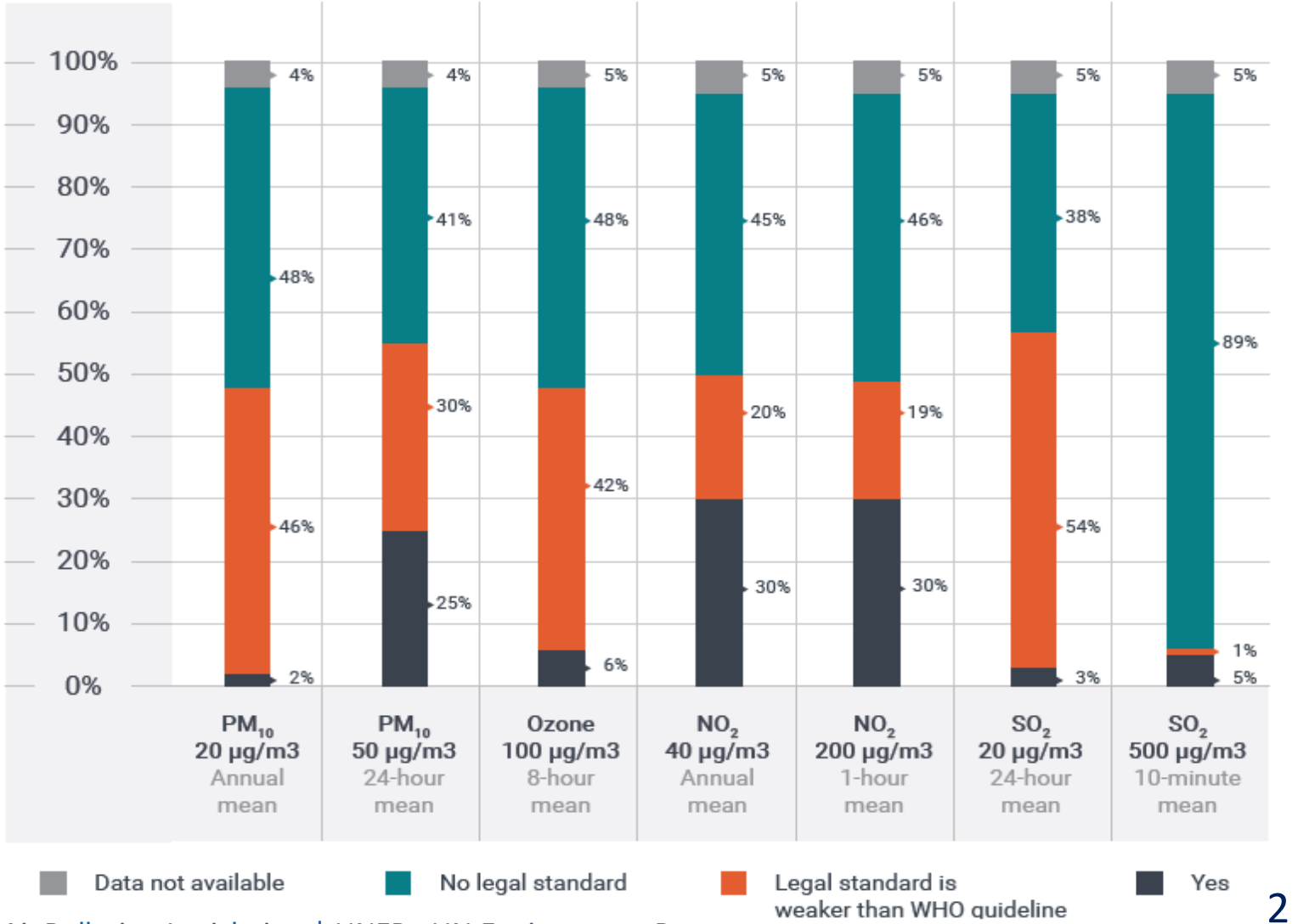
- Core institutional / technical tools and human capacity
- Legally binding air quality standards
- Existence and operation of air quality monitoring system
- Air quality management systems
- Public access to air quality data
- Capacities for health risk assessment to set priorities for action
- Cooperation among sectors and stakeholders, including the health sector

# Uptake of AQG in AAQS across the world

| WHO REGION | COUNTRIES IN THE REGION (N) | COUNTRIES WITH STANDARDS FOR AT LEAST ONE POLLUTANT AND AVERAGING TIME | | COUNTRIES WITHOUT STANDARDS | | COUNTRIES WITH NO INFORMATION | |
|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % |
| African Region | 47 | 17 | 36 | 21 | 45 | 9 | 19 |
| Region of the Americas | 35 | 20 | 57 | 13 | 37 | 2 | 6 |
| South-East Asian Region | 11 | 7 | 64 | 3 | 27 | 1 | 9 |
| European Region | 53 | 50 | 94 | 2 | 4 | 1 | 2 |
| Eastern Mediterranean Region | 21 | 11 | 52 | 1 | 5 | 9 | 43 |
| Western Pacific Region | 27 | 12 | 44 | 13 | 48 | 2 | 7 |
| Total | 194 | 117 | 60 | 53 | 27 | 24 | 12 |

Kutlar Joss et al., 2017

# Legal incorporation of 2005 WHO air quality guidelines in national ambient air quality standards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Regulating Air Quality: the First Global Assessment of Air Pollution Legislation | UNEP - UN Environment Programme

# What can countries do with the AQGs?

Key actions

Countries can **use the AQGs as a tool** to guide, drive and support the selection and adoption of measures to reduce exposure to air pollution:

- Establish or update their legally binding air quality standards and develop policies
- Strengthen multisectoral cooperation at national, regional, and international levels, and advocate for air quality
- Take effective steps to reduce health inequities related to air pollution

Actions to reduce air pollution require cooperation of various sectors and stakeholders.

# Implementing the guidelines

**Air quality standards are the cornerstone of air quality management**

## Moving from guidelines to legally-binding standards

# Solutions require intersectoral cooperation


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# The health sector has a key role

- raising awareness of the impact of air quality on health
- advising the public and patients about how the impact of air pollutants can be mitigated at an individual level
- gathering evidence on health effects
- joining advocacy efforts at the national and international levels to ensure that the health arguments are heard

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# WHO support to Member States

- Dissemination: Executive summaries in 14 languages
- Communication to promote the uptake of AQGs
- Communication about actions people can take to reduce exposure to air pollution
- Compendium of existing tools and materials to support implementation
- Science-policy dialogues in Member States
- Capacity building training in health and other sectors
- Methodological developments and assessments

# The impacts of air pollution: data requirements

- Air pollution
- Population
- Health data
- Risk selection

**From input data to estimates**

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# Air quality: tools available or under development

WHO is producing and testing various tools:

- **AirQ+**: impacts on health of air pollution


- **CaRBonH** (Carbon Reduction Benefits on Health)


**CLIMAQ-H**

Climate Mitigation, Air Quality and Health

- **GreenUr**


- **HEAT** (Health Economic Assessment Tool): online tool that conducts an economic assessment of the health benefits of walking or cycling

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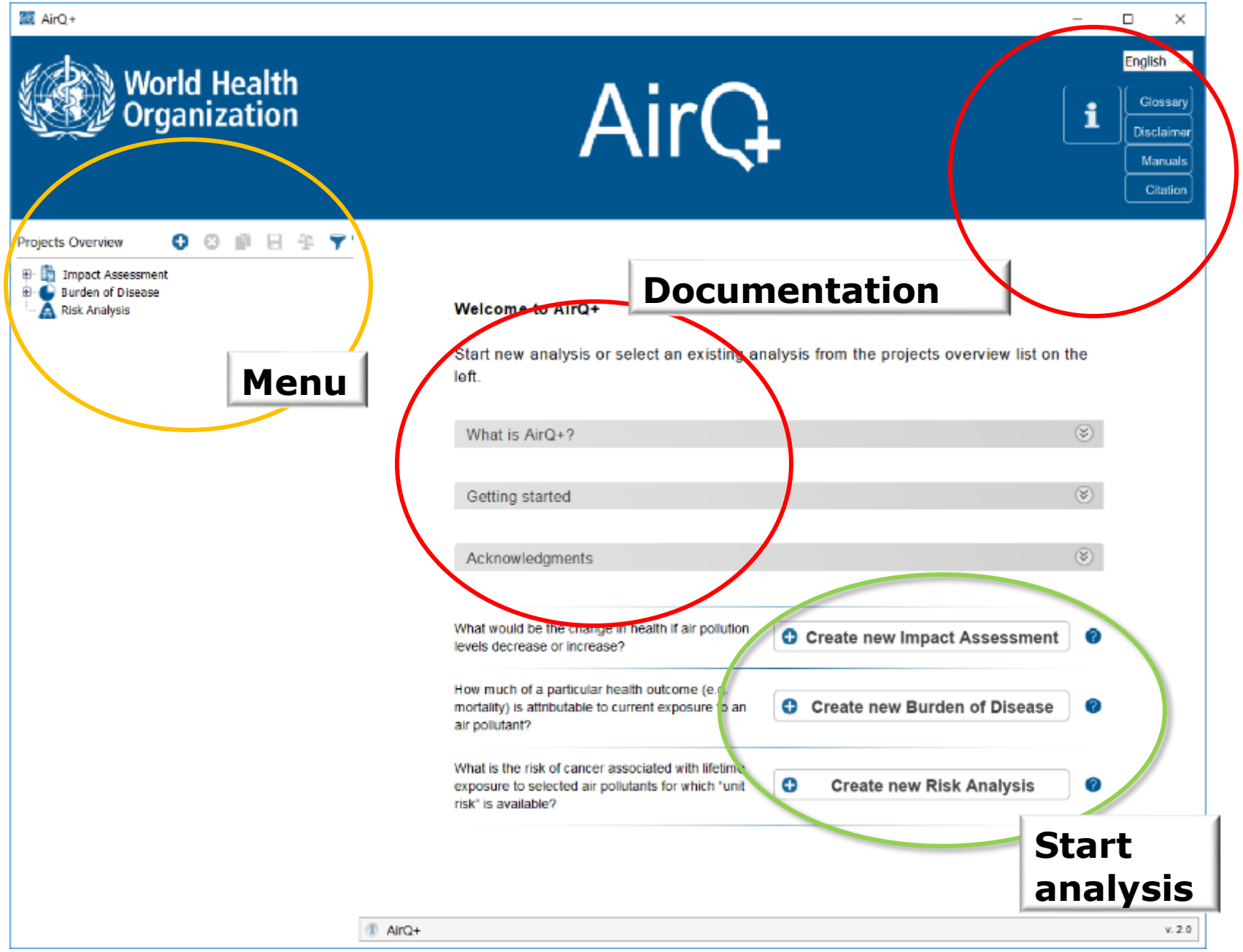
# AirQ+: welcome screen




Current version: AirQ+2.2 (March 2023) link:

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

# AQG: Take home messages


- An increase in the quality and quantity of evidence on air pollution and health
- Clearer insights about global concentrations, sources of emissions, inequities and global burden of disease
- Based on a systematic review of the evidence and a robust guideline development process, several new AQG levels are lower than 15 years ago
- AQGs are not legally binding, but provide recommendations to protect public health through the continuous improvement of air quality
- Implementation of the guidelines requires intersectoral cooperation at different levels
- The health sector has a crucial role to play

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# Conclusions

- AQGs provide recommendations to protect public health through the improvement of air quality and offering information for health risk assessment to set priorities for action
- Implementation of policies that take into account the guidelines requires tools for health risk assessment
- 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 data and tools simple to use to estimates adverse health risks and impacts of air pollution


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