Clean air and energy access for healthier populations and universal health coverage

WHO Strategic Approach for Air Quality, Energy Access and Health
DRAFT - APRIL 2023

Air Quality, Energy & Health Unit

World Health Organization

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Contents

Glossary/Abbreviations 3
WHO Strategic Approach to Air Quality, Energy Access and Health 8
Background: A global environmental health crisis 10
WHO's response 10
Vision: Clean air and energy access for healthier populations and universal health coverage 11
- Overall objective of the strategic approach 11
- A multi-stakeholder approach 12

Action Areas 12
Action Area 1 – Knowledge, Evidence & Measuring Progress 14
- Synthesize evidence to inform policy 14
- Develop normative recommendations & guidance 14
- Establish baseline and measure progress 14
- Outputs 14
- Outcome 14

Action Area 2 – Institutional Capacity-Building & Technical Support 17
- Inform the development of regulatory frameworks 17
- Planning and implementation of interventions 17
- Train and educate health and other sectors 17
- Outputs 17
- Outcome 17

Action Area 3 – Leadership & Coordination 18
- Convene interdisciplinary expert groups 18
- Promote cross-sectoral and interagency collaboration 18
- Leverage 'health argument' for scaling-up actions 18
- Outputs 18
- Outcome 18

Annexes A: Strategic lines of action 20
- Driving change for public health protection: WHO's global leadership and coordination activities on air pollution and energy access 23
- Building the case for air pollution action: assessing health, economic, climate and other impacts of actions for air pollution health risk reduction 29
- Achieving clean air – health impact assessment and other tools to support AQG implementation 33
- Clean Household Energy Solutions Toolkit (CHEST) 34
- Health-care facilities electrification 39
- Health workforce capacity building 43
- Enabling the health sector engagement – tools and resources for action on air pollution and energy access 47
- Desert dust and health 51
- Defining, tracking and reporting data: health beyond SDG 3 52
- Communications and advocacy 55

Annexes B 58
- Overview of WHO Air Quality Guidelines 61
- Index of Repository and Databases 64

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Glossary / Abbreviations

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Vision: Clean air and energy access for healthier populations and universal health coverage

Overall objective: Protect public health through evidence-based actions to improve air quality and ensure access to clean, sustainable energy solutions

Areas	KNOWLEDGE, EVIDENCE & MEASURING PROGRESS	INSTITUTIONAL CAPACITY-BUILDING & TECHNICAL SUPPORT	LEADERSHIP & COORDINATION
Statement	**Provide the evidence base and collect data to inform policies and programmes** *"What we know, what we don't know and where we are"*	**Develop tools and resources, and support their application in countries, to translate the evidence into policies and actions** *"How best to do it"*	**Promote health leadership and facilitate multi-sectoral coordination to accelerate action** *"Lead and steer"*
Actions	1. Synthesize evidence to inform policy 2. Develop normative recommendations and guidance 3. Establish baseline and measure progress	1. Inform the development of regulatory frameworks 2. Planning and implementation of interventions 3. Train and educate health and other sectors	1. Convene interdisciplinary expert groups 2. Promote cross-sectoral and interagency collaboration 3. Leverage health argument for scaling-up actions
Outputs	1. Publicly available databases 2. Technical reports of analyses [5] 3. Synthetized knowledge 4. Norms and guidelines 5. Reports on tracking progress 6. Methods and protocols	1. Health workforce curricula and training 2. Tools and calculators for situational assessment 3. Methods for evaluation of interventions and monitoring 4. Guidance for policy development, regulatory mechanisms and programme implementation	1. WHO-led expert working groups 2. Political commitment via WHO-led high-level coalitions and country engagement 3. Multi-partner initiatives and collaborative efforts 4. Joint technical activities with non-communicable diseases, maternal and child health, water and sanitation, and climate change agendas 5. Science communication and advocacy products
Outcome	**The evidence base on air pollution and lack of energy access is comprehensive, up-to-date and available to inform decision making, and monitor progress**	**Country stakeholders are equipped with knowledge, skills and capacity on energy access and air quality to implement evidence-based actions in policies and healthcare delivery**	**Health, air quality and energy access is recognized and systematically integrated into the global development agenda to drive sectoral planning and actions**

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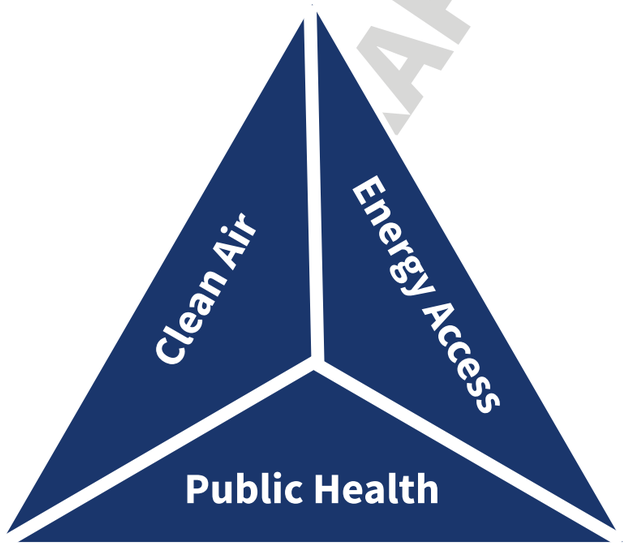
Background: A global environmental health crisis

Air pollution is the greatest environmental risk to public health, through the life course. Unsustainable consumption, inefficient household energy, transport, waste burning, poor land-use planning, industrial pollution and power generation in communities all contribute to toxic air pollution – disproportionately affecting the poorest and most vulnerable populations. Some 7 million deaths are attributed to exposure to air pollution each year from diseases including heart disease, stroke, chronic obstructive disease, lung cancer and pneumonia. Besides years of living with labored breath, punctuated by asthma attacks, or clouded by cataracts, a growing body of evidence suggests important links between air pollution exposure and other health outcomes like low birth weight, diabetes, cognitive impairment, and even mental health.

With 2.4 billion people cooking using polluting fuels and technologies, and 1 billion people worldwide served by health-care facilities without reliable electricity, the lack of access to clean, sustainable energy impedes progress towards healthier populations, universal health coverage and emergency preparedness. The preventable health burden from air pollution and lack of energy access, has substantial economic impacts, straining both national and household budgets with costs to health systems, disease management, loss of income and lower productivity. This leads to further inequities, and negative impacts to well-being and livelihoods. Ultimately, air pollution and a lack of clean, sustainable energy access are important contributors to climate change.



WHO's response

WHO, as the coordinating authority on international health, supports countries in protecting public health through evidence-based policies and actions. Considering the significant health burden and the multiple potential benefits of interventions, the WHO air quality, energy and health team aims to support countries by providing evidence, building institutional capacity and leveraging the 'health argument' to convene sectors to tackle air pollution and accelerate energy access.

Recognising the gravity and urgency of the problem, all member states approved resolution A68.8 "Health and the Environment: addressing the health impact of air pollution[1]," at the World Health Assembly in 2015, complemented by a road map for action the following year[2]. This outlined the role of countries, and commits ministries of health to tackle the health impacts of air pollution and energy access, ultimately leading to healthier populations, universal health coverage and emergency preparedness. The resolution and implementation of the road map were further informed by the WHO global strategy on health, environment and climate change in 2019 and have served as a foundation of the Air quality, energy and health strategic approach at WHO. Air pollution is also recognized by the UN General Assembly as one of the five top risk factors for noncommunicable diseases.

Building on these efforts, this document the "WHO Strategic Approach for Air Quality, Energy Access and Health" (hereafter referred to as the "Strategy") elaborates a framework and related actions for the period 2023-2030 to strengthen WHO's efforts to protect populations from health risks. This strategy identifies concrete actions where the health sector has either a lead or important supporting role to play in promoting health in all policies and ensuring access to quality health services. The actions are organized into three cross-cutting areas:

1. Knowledge, evidence and measuring progress;
2. Institutional capacity building and technical support; and
3. Leadership and coordination.

Member States and sub-national entities are typically responsible for the implementation and monitoring of policies to promote air quality and energy access for health. Successful policies and solid governance depend on coordinated action between a variety of stakeholders and sectors. This strategy articulates the role of the health sector, and WHO's mandate to support them. Cooperation with other UN agencies and non-state actors is essential and has been integrated into the strategy to ensure synergies and maximize impact on the ground. The action areas are interlinked and articulate opportunities for countries with different contexts and needs, with the health sector playing a convening role to drive action.

Vision: Clean air and energy access for healthier populations and universal health coverage

Overall objective of the strategic approach

Protect public health through evidence-based actions to improve air quality and ensure access to clean, sustainable energy solutions.

[1] Resolution WHA68.8. Health and the environment: addressing the health impact of air pollution. Geneva: World Health Organization; 2015. (https://apps.who.int/iris/handle/10665/253237)
[2] Executive Board, 138. Health and the environment: draft road map for an enhanced global response to the adverse health effects of air pollution: report by the Secretariat. In: Sixty-ninth World Health Assembly, Geneva, 23–28 May 2016. Resolutions and decisions, annexes. Geneva: World Health Organization, 2016. (https://apps.who.int/iris/handle/10665/250653)
[3] WHO global strategy on health, environment and climate change: the transformation needed to improve lives and well-being sustainably through healthy environments. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO.(https://apps.who.int/iris/handle/10665/331959)
[4] A/RES/73/2. Political Declaration of the 3rd High-Level Meeting of the General Assembly on the Prevention and Control of Non-Communicable Diseases. New York: UN General Assembly; 2018

A multi-stakeholder approach

Actions to improve air quality and ensure energy access require engagement and coordination of multiple sectors including health, environment, energy, transport and waste. Putting health at the centre of policies ensures multiple benefits for climate, local environment, poverty reduction and sustainable development. This strategic approach positions the health sector to actively contribute to and support policies to tackle air pollution, ensure access to clean and sustainable energy, and leverage the health arguments. It requires the active participation and contributions from a variety of stakeholders.

Countries have a leading role to ensure health is considered in all policies. The primary aim of this strategy is to support countries in meeting this responsibility through direct engagement and active support for the actions articulated in this strategy. WHO's representation at the international, regional and country level, with its network of WHO collaborating centres, provides the Organization with a strategic advantage to bring actors together.

Other UN agencies and programmes provide technical resources and support in tackling air pollution and energy access and hence are well-positioned to facilitate international cooperation and harmonize the actions of countries and other stakeholders. The formulation and implementation of health policies and programmes requires engagement with experts from academia and research institutions, as well as a wide range of civil society actors working at the global and local levels. NGOs, philanthropic organizations, medical societies, and other organizations have a critical role in advocating and influencing local, regional and global policies and programmes, as well as taking action on the ground.

Action Areas

- **ACTION AREA 1 – Knowledge, Evidence & Measuring Progress**
- **ACTION AREA 2 – Institutional Capacity-Building and Technical Support**
- **ACTION AREA 3 – Leadership & coordination**

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KNOWLEDGE, EVIDENCE AND MEASURING PROGRESS

Provide the evidence base and collect data to inform policies and programmes

"What we know, what we don't know and where we are"

SYNTHESIZE EVIDENCE TO INFORM POLICY

WHO synthesizes the current state of the evidence, identify research gaps and priorities, to strengthen our knowledge and better inform policies, by:

- **Compiling emerging evidence** related to health effects from exposure to air pollution and its different sources;
- Integrating expert guidance and new evidence and methods in **health impact assessment;**
- **Reviewing policies** to determine their effectiveness and to evaluate alternatives;
- Developing methodologies to estimate the **burden of disease;**
- Compiling information on **health effects** of ambient and household air pollution;
- Identifying **emerging health and other risks;**
- Developing methodologies for **techno-economic assessment** for health-care facilities; and
- **identifying and set research priorities** based on current gaps and country needs on the health risks from air pollution and the lack of energy access.

DEVELOP OF NORMATIVE RECOMMENDATIONS & GUIDANCE

WHO develops evidence-based guidance supporting effective interventions to protect health from air pollution, building on an up-to-date evidence-base, by:

- Defining **normative recommendations** on the health risks from exposure to different pollutants based on robust synthesis of available evidence
- **Disseminating** WHO Air Quality Guidelines (AQG), WHO guidelines for indoor air quality: household fuel combustion, WHO guidelines for indoor air quality: selected pollutants, WHO guidelines for indoor air quality: selected pollutants and WHO guidelines for indoor air quality: dampness and mould, to inform on safe levels for health of specific pollutants;
- Providing guidance for **WHO AQG implementation;**
- Developing **good practice statements from the WHO AQG** on sand and dust storms, ultrafine particles and black carbon;
- Elaborating guidance on **good practice statements and cost-effective interventions** including for energy access, land-use planning (e.g. green spaces), transport, efficient waste management, industry and health-care facility electrification to mitigate air pollution exposure and health risks in human settlements;
- Developing methods and protocols for **epidemiological monitoring;**
- Providing public health guidance to **reduce personal exposure to air pollution**; and
- Developing specific **clinical guidance** on the management of air pollution as a risk factor.

ESTABLISH BASELINE AND MEASURE PROGRESS

WHO monitors indicators and trends of exposure and health impacts from air pollution and lack of energy access, by:

- Guiding and defining **indicators to measure progress** in air quality and energy access;
- Ensuring **transparent and efficient data collection** processes for the defined indicators;
- Regularly maintaining and updating **WHO databases** on health risks from air pollution and energy access, including databases on exposure and burden of disease, and repositories of policies and interventions;
- Serving as custodial agency for **Sustainable Development Goal (SDG) indicators** (SDG indicators 3.9.1, 7.1.2, 11.6.2)
- Providing **robust and harmonized estimates** of air pollution exposure and access to energy for all Member States to plan and monitor related actions; and
- Engaging with member states and relevant partners to enhance **WHO models of exposure and health impacts.**

OUTPUTS

1. Publicly available databases
2. Technical reports of analysis
3. Knowledge synthesis
4. Norms and guidelines
5. Reports on tracking progress
6. Methods and protocols

OUTCOME

The evidence base on air pollution and lack of energy access is comprehensive, up-to-date and available to inform decision-making, and monitor progress

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INSTITUTIONAL CAPACITY-BUILDING & TECHNICAL SUPPORT

Develop tools and resources, and support their application in countries, to translate the evidence into policies and actions

"How best to do it"

INFORM THE DEVELOPMENT OF REGULATORY FRAMEWORKS

WHO develops tools and guidance to ensure that countries have the capacity to design the scientific and technical content of policies and programmes, and provides direct technical support for:

- **Health-based standards for air quality**, based on WHO guidelines;
- National **policy and regulatory frameworks** to address the health impacts of air pollution;
- National and regional **monitoring systems** to estimate air pollution exposure, lack of clean energy, and attributable burden of disease
- Regional and global level **agreements on air quality**;
- **Standards for cookstoves** and other household energy devices; and
- **Electrification of healthcare facilities.**

PLANNING AND IMPLEMENTATION OF INTERVENTIONS

WHO translates the technical and scientific evidence into implementable policies by providing guidance and tools for:

- **Quantification of related health risks of air pollution** (e.g. AirQ+ for health risk assessment of air pollution, the Mitigation, Air Quality and Health tool (CLIMAQ-H), the Integrated Sustainable Transport and Health Assessment Tool [iSThAT]);
- **Estimation of health damaging emissions** for different interventions (e.g. Household Multiple Emission Sources [HOMES]);
- Selecting **cost-effective interventions** to reduce cooking-related household air pollution and increase access to clean, sustainable energy (e.g. Benefits of Action to Reduce Household Air Pollution [BAR-HAP]);
- The **policy development process** including to map stakeholders and conduct situational analyses (e.g. HEART Tool) and apply tools to develop national action plans to tackle air quality (e.g. CHEST Policy and Planning Guide);
- The **integration of health considerations across policies and sectors**; and
- Piloting projects in polluted areas in selected human settlements to **explore relevant approaches to implement policy changes** (e.g. Urban Health Initiative).

TRAIN AND EDUCATE HEALTH AND OTHER SECTORS

WHO develops and supports the dissemination of training resources for clinical, public health and other stakeholders by:

- **Training health care professionals** to better understand the health risks of air pollution exposure and the lack of access to modern energy services, as well as safe and effective interventions to minimize health risks;
- Promoting the **incorporation of air pollution as a risk into clinical practice**, advising patients and vulnerable individuals on personal measures to mitigate health risks from air pollution;
- Fostering the integration of training on air pollution as a health risk factor into health professional development **curricula and continuous education;**
- Providing information, tools and guidance on **the role of the health sector** to address health impacts of air pollution and communicating the risks;
- **Informing stakeholders from other sectors** about the health risks of different policies and interventions;
- Building the capacity for **estimating Sustainable Development Goals indicators**; and
- Facilitating open **trainings and capacity building for countries.**

OUTPUTS

1. Health workforce curricula and training
2. Tools and calculators for situational assessment
3. Methods for evaluation of interventions and monitoring
4. Guidance for policy development, regulatory mechanisms and programme implementation

OUTCOME

Country stakeholders are equipped with knowledge, skills and capacity on energy access and air quality to implement evidence-based actions in policies and healthcare delivery

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LEADERSHIP & COORDINATION

Promote health leadership and facilitate multi-sectoral coordination to accelerate action

"Lead and steer"

CONVENE INTERDISCIPLINARY EXPERT GROUPS

Leverage WHO mandate to convene and facilitate independent and interdisciplinary expertise by:

- Establishing and providing **coordination and secretariat functions** to the Scientific Advisory Group (SAG), Health and Energy Platform of Action (HEPA), and Global Air Pollution and Health Technical Advisory Group (GAPH-TAG); and
- Mobilising **ad hoc expert consultations** to answer specific and emerging questions

PROMOTE CROSS-SECTORAL AND INTERAGENCY COLLABORATION

WHO facilitates and leads intersectoral initiatives to drive actions by:

- Promoting **regional and international cooperation to tackle trans-boundary air pollution**, such as the Convention on Long-Range Transboundary Air Pollution (CLRTAP);
- Ensuring health impacts from air pollution are **integrated into policies and programmes in different sectors** including energy, transport, environmental management, housing, land-use planning;
- Serving as a **health advocate and expert** in intersectoral discussions and decisions impacting air quality and energy access;
- Serving as the **health lead in political and technical inter-agency and multi-stakeholder efforts** focused on improving air quality, mitigating climate change and accelerating energy access; and
- Supporting facilitation of **concerted action by ministries of health and other ministries** at the global and regional level to address the health impacts of air pollution.

LEVERAGE 'HEALTH ARGUMENT' FOR SCALING-UP ACTIONS

WHO amplifies the health argument for action on the health impacts air pollution and energy access by:

- Steering **initiatives and campaigns** to build awareness about the health risks of air pollution, and showcasing successful actions in communities (e.g. BreatheLife);
- **Convening high-level leaders** to raise awareness, advocate and commit to public health improvement through actions on air pollution and energy access e.g. High-Level Coalition on Health and Energy; and
- Empowering health and other sectors by **providing information resources, advocacy and communications materials** (e.g. policy briefs, flyers, videos, web resources) that can be used by countries and other partners.

OUTPUTS

1. WHO-led expert working groups
2. Political commitment via WHO-led high-level coalitions and country engagement
3. Multi-partner initiatives and collaborative efforts
4. Joint technical activities with non-communicable diseases, maternal & child health, water & sanitation and climate change agendas
5. Science communication & advocacy products

OUTCOME

Health, air quality and energy access is recognized and systematically integrated into the global development agenda to drive sectoral planning and actions

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Annexes A: Strategic lines of action

Lines of Action 1: Driving change for public health protection: WHO's global leadership and coordination activities on air pollution and energy access

Lines of Action 2: Building the case for air pollution action: assessing health, economic, climate and other impacts of actions for air pollution health risk
reduction

Lines of Action 3: Clean household energy solutions toolkit (CHEST)

Lines of Action 4: Health-care facilities electrification

Lines of Action 5: Health workforce capacity building

Lines of Action 6: Enabling the health sector engagement – tools and resources for action on air pollution and energy access

Lines of Action 7: Desert dust and health

Lines of Action 8: Defining, tracking and reporting data: health beyond SDG 3

Lines of Action 9: Communications and advocacy

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Lines of Action 1 - Driving change for public health protection: WHO's global leadership and coordination activities on air pollution and energy access

Why does this matter?

Ensuring clean air and energy access requires a collective voice and cooperation. WHO promotes a multi-disciplinary approach and fosters partnerships to synthesize the science in a robust and independent manner following the highest technical standards. By mobilizing resources, convening partners and leveraging the health argument for action by the health and other sectors. WHO has raised the political ambition to improve health by addressing air pollution and energy access.

WHO as the lead health agency of the world, is well placed to engage with ministries of Health for disseminating the health evidence on air pollution and energy access, and leverage the health argument to drive concerted action on the ground and at national and global level.

Yet, health is not always considered in development decisions and public action in general, leading to conflicting agendas. WHO as the custodial agency for several SDGs, can enable the global community to increase impact in countries across sectors.

Did you know?

- Close to ¼ of total deaths are preventable by modifying the environment, and among them air pollution accounts for the largest
- A very limited amount of financial resources are allocated to tackling air pollution and health impacts, in spite of the large health costs of 8.1 trillion dollars USD each year estimated by the World Bank
- WHO estimated that close to 1 billion people in low- and lower-middle-income countries are served by health-care facilities without reliable electricity access or with no electricity access at all.

Opportunities

With 99% of the world's population breathing polluted air, with billions lacking access to clean energy in the home and health care facilities and considering the importance of reducing air pollution to protect our fragile climate, there is no time to wait to take action to protect the health of people and our planet. Therefore as the world begins to take stock of the progress towards the Sustainable Development Goals, and sets the post 2030 agenda, integrating health, air pollution and climate mitigation targets across policy areas is an important opportunity to drive 'health-wise' sustainable development. With WHO's technical mandate and ability to position the health sector to play a more active role in policy making within and outside of the health sector, WHO is looking to use the trusted voice of health practitioners and leverage the health argument to promote air pollution, energy access and climate mitigation actions to protect public health.

What is WHO's response?

WHO has a number of ongoing leadership and coordination activities aimed at bringing together governments and agencies as well as with technical experts, civil society organizations among others to promote multi-sectoral and interagency collaboration for evidence-based action. Some examples are listed below and more can be found on the unit's website:

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- **BreatheLife** – Since 2016, WHO uses its global convening and advocacy role to mobilize Member States, and municipalities to foster public actions through a strong communications campaigns as well as through several workshops on health risk communications and available technical support for advocacy and awareness raising.
- **Global air pollution and health conference** – In 2018, WHO held the first-ever global conference on air pollution and health, bringing together close to 1000 people representing governments, academia, civil society organizations, UN partners and others to learn about air pollution's health risks and the evidence around how to tackle it as health risk in the community, home and at the national level.
- **Health and Energy Platform of Action (HEPA)** – Co-convened with UNDP, UN DESA and the World Bank and WHO, HEPA brings together over twenty different organizations and country representatives working on health and energy access together to share expertise and resources, identify synergies, and coordinate efforts on the ground to accelerate access to clean cooking and health care facility electrification. With focused thematic working groups,, HEPA meets regularly, UN agencies, civil society and experts to build the political, and financial commitment and as well as strengthen the capacity of the health and energy sectors to work together to ensure universal access to clean and sustainable energy to protect health.
- **High-level Coalition on Health and Energy** - The High-Level Coalition on Health and Energy was convened by the WHO Director-Generals, comprised of government and institutional leaders, to strengthen cooperation between health and energy sectors, increase political momentum, spur investments, mobilize public support and drive practical solutions.
- **Global air pollution and health technical advisory group (GAPH-TAG)** - Shaping the research agenda and coordinating the efforts to advance the knowledge and understanding of air quality and its impact on health is critical to advancing evidence-based decision-making. Consisting of some eighty global experts, the GAPH-TAG meets regularly via expert working groups to outline key research priorities to inform by providing the secretariat and coordination functions of the Global Air Pollution and Health Technical Advisory Group (GAPH-TAG). In addition, WHO works with research centers enabling the Organization and the health community as a whole to promote research to address needs and fill gaps relevant to Member States.
- **WHO Collaborating Centres**- WHO established and engages closely with research and national agencies via around eight WHO collaborating Centres to support a vast range of technical activities related to air pollution, energy access, and climate mitigation.
- **UN interagency engagements** – WHO serves as the health focal point in a number of UN interagency tasks forces like UN Energy, SDG 7 Technical advisory group, Climate and Clean Air Coalition, UN Interagency Task Force on NCDs; the Health, Environment and Climate Change Coalition; Global action plan for women, children and adolescent health, and UN Coalition on Combatting Sand and Dust Storms
- **SDG Monitoring 3, 7, and 11** – WHO serves as the custodial agency for air pollution related indicators of SDG 3, 7 and 11. WHO actively participates in efforts to monitor the Agenda for Sustainable Development.

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Scientific Advisory Group on air pollution and health

Health and Energy Platform of Action – Thematic working groups (clean cooking and healthcare facilities)

Global Air Pollution and Health – Technical Advisory Group

SDG 7 Technical Advisory Group

High-level Coalition on Health and Energy

UN Energy

Climate and Clean Air Coalition

UN Coalition on Sand and Dust storm

United Nations Inter-Agency Task Force – NCD and environment

World Health Statistics

WHO Global Programme Work 13 Monitoring

Breathe Life

Health and Energy Platform of Action

to be included

SDG 3 - Mortality of air pollution

SDG 7 - Access to clean energy (in households and health-care facilities)

SDG 11 – Air quality in cities

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What's next for WHO?

Moving forward, WHO will continue to champion clean air and energy for public health by bringing together the evidence, strengthening partnerships across sectors and provide the knowledge and tools for evidence-based action.

Working together

WHO will strive to further strengthen cooperation politically and technically between different stakeholders in serving as the secretariat for or contributing to cooperative platforms and partnerships internal and external to the health sector, like the Health and Energy Platform of Action. Through further engaging with ministers, mayors and other champions, WHO aims to raise the political profile and ambition for bringing clean air and energy to all. Likewise, the Global Technical Advisory Group on Air Pollution and Health and the Health and Energy Platform of Action for example will convene researchers and technical experts to advance the evidence for policy and implementation on the ground.

Talking clean air and energy access for health

WHO is looking to further strengthen the health voice on air pollution, energy access and climate linkages through its advocacy work via HEPA, BreatheLife and other communication channels. It is enhancing its outreach via web, social media and other outlets to disseminate knowledge, as well as working with journalists on the ground to get the word out.

Driving change

A key focus of WHO's programme has and will continue to support communities of all sizes to build the capacity to implement WHO guidelines for air quality. Like its Clean Household Energy Solutions Toolkit, WHO is developing a similar set of tools to design and evaluate air pollution technological and policy interventions to scale up action in countries. For health care facility electrification, similar efforts are underway to develop tools for selecting and implementing health care facility electrification systems as well ensure proper usage and maintenance.

Monitoring progress

WHO will continue in its custodial role to monitor health-related indicators outside of SDG3 like energy access and air quality in cities, serve as a strong advocate and data source to monitor public health impacts of air pollution and energy access as part of the post-2030 agenda, while at the same time further strengthen country capacity to track their own progress.

Sharing solution

Building upon the success of the first WHO Global Conference on Air pollution and Health, WHO is now making plans for 2nd Global conference on air pollution, and energy access focused on healthy solutions. This 2nd conference anticipated in the end of 2024 aims to share new evidence, drive commitments by countries and other stakeholders, to endorse a road map to tackle air pollution and accelerate energy access to protect public health.

Key Resources:

WHO Air Quality, Energy Access and Health Programme
https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health

BreatheLife
https://breathelife2030.org

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Lines of Action 2: Building the case for air pollution action: assessing health, economic, climate and other impacts of actions for air pollution health risk reduction

Why this matters?

Air pollution is one of the leading risk for noncommunicable diseases (NCDs). In 2018, in response the global NCD epidemic, the United Nations (UN) General Assembly recognized air pollution as one of five key risk factors and called upon countries to scale up action to tackle air pollution. Unlike the other four NCD risk factors, namely tobacco use, salt intake, alcohol consumption and physical activity, all of which are largely linked to behaviours and actions taken by the individual, tackling air pollution requires concerted policy action by different economic sectors and stakeholders at the community, country, regional and international scale.

Policies and investments in actions like cleaner transport and power generation, energy-efficient housing and municipal waste management, among others can reduce key sources of air pollution however the cost and level health impact of each of these interventions individually or in combination will differ based on characteristics of the specific location.

The types and levels of air pollution vary considerably across countries, cities and regions due to factors including local and regional polluting sources, geography, climatic conditions, available infrastructure, financial resources among others but also political will. Furthermore, air pollution interventions often require significant investment by governments and municipalities, often forcing countries to weigh the costs and benefits in comparison to other competing development priorities.

The global agenda for sustainable development, and the drive for net zero emissions by 2050 paired with the demand to produce a set of 'best buys' intervention options on air pollution provides a ripe time for country action on air pollution. Currently there is a paucity in the tools and knowledge resources available for countries to identify and implement 'health-wise' interventions for air pollution. Accordingly, there is an urgent need to provide governments and other stakeholders with robust evidence and a set of sound tools to evaluate and select air pollution interventions based on the overall health, economic, social and environment impacts.

Did you know?

- 85% of air pollution related deaths are caused by noncommunicable disease including stroke, ischemic heart disease, chronic obstructive pulmonary disease, and lung cancer.
- Laboured breaths, impaired physical activity and the other disabilities are often overlooked burden carrying heavy costs for the individual, household, health systems, and local economy.
- $8.1 trillion USD dollars are attributed to air pollution due to loss of productivity and additional health care systems costs in 2019 alone.

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What is WHO's response?

WHO is supporting countries identify cost-effective interventions for to protect health from air pollution and build the business case for action by:

- developing robust methods to systematically assess the health (morbidity & mortality), economic and other impacts of different policy and technological solutions for air pollution mitigation (e.g. EMAPEC)
- reviewing policy and technological interventions to inform the development of guidance for selecting, implementing and monitoring air quality interventions (e.g., Household Energy Policy Repository)
- tracking policies for air pollution mitigation and pairing them with relevant evaluations when available to share lessons learned and encourage cross-country cooperation (e.g., Ghana Policy Tracking Report)
- developing interactive tools allowing countries to quantify the health, social, environmental and economic costs and benefits of interventions (e.g. Benefits of Actions to Reduce Household Air Pollution) to support evidence-based decision-making

What's in store for WHO?

WHO is defining a methodology to produce examples of air pollution interventions that could serve as 'best buys' for protecting health from air pollution and support integrated planning. To do so, WHO is building a knowledge portal with relevant characteristics to better assess the impacts of policies, including expected air pollution reductions, health and climate impacts as well as monetary costs. The portal itself will:

- identify cost-effective intervention strategies based on common factors (e.g. sources of emissions, or pollutant)
- be searchable and facilitate exploration of interventions for a specific location or context based on characteristics or details like sectors, emission source(s), demographics, geography, etc.
- allow user inputs of interventions that achieved specific goals or targets for inclusion in the database
- be regularly updated and maintained
- assess the level of evidence available for a particular type of air pollution intervention

Using the information included in the portal, WHO will compile the synthesize the evidence to derive some overarching guidance on best practices on policy interventions for air pollution as well as provide interactive web-based tools and resources which allow users to select and evaluate the interventions best suited for their specific context or priorities. Such an interactive tool will help to quantity net costs and benefits of interventions in terms of health, government and individual expenditure, climate impacts and other socioeconomic impacts.

Key Resources:

Estimating the morbidity from air pollution and its economic costs (EMAPEC)
https://www.who.int/activities/estimating-the-morbidity-from-air-pollution-and-its-economic-costs

CaRBonH
https://www.who.int/europe/tools-and-toolkits/carbon-reduction-benefits-on-health-CaRBonH

Household energy policy repository
https://www.who.int/tools/household-energy-policy-repository

Benefits of Action to Reduce Household Air Pollution (BAR-HAP) Tool
https://www.who.int/publications/m/item/benefits-of-action-to-reduce-household-air-pollution-(bar-hap)-tool

Tackling NCDs: 'best buys' and other recommended interventions for the prevention and control of non-communicable diseases
https://www.who.int/publications/i/item/WHO-NMH-NVI-17.9

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Lines of Action 3: Achieving clean air – health impact assessment and other tools to support AQG implementation

To be completed

Why does this matter?

To be completed

Did you know?

To be completed

Opportunities

To be completed

What is WHO's response

To be completed

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Lines of Action 4 - Clean Household Energy Solutions Toolkit (CHEST)

Why this matters?

Knowing the level of air pollution all over the world, how many people are using clean cooking, or the latest number of deaths linked to air pollution is critical to enable public action. Such robust data are essential for countries and the global community, to establish a baseline, track progress, draw comparisons, and advocate for actions.

WHO's leadership in monitoring and reporting on air pollution and its health impacts builds on decades of compiling data on household energy for cooking and ambient air quality (GEMM Air and the WHO Database). This data has been feeding and informing policies for decades and fostered cooperation through joint endeavors.

Did you know?

- Sustainable Development Goal (SDG) indicators provide a standardized way to track and report on the implementation of the SDGs and help countries monitor their progress towards achieving the goals. They serve as a tool for governments, organizations, and individuals to hold themselves accountable and support transparency and accountability in reporting.
- Beyond good health and well-being, WHO is the custodial agency of the following air pollution and energy access indicators:
  - ◊ SDG indicator 3.9.1: deaths attributable to both ambient and household air pollution;
  - ◊ SDG indicator 7.1.2: population using clean fuels and technologies, progress towards uni versal access to affordable, reliable, sustainable and modern energy; and
  - ◊ SDG indicator 11.6.2: inclusive, safe, resilient and sustainable cities, air pollution level in cities.
- 40% of countries do not have air pollution ground measurements available, needed to estimate exposure to air pollution.
- Energy use in households and healthcare facilities is not adequately included in national surveys and census to estimate health, climate and economic impacts.
- Data gathered by WHO is based on regular consultations with Member States and is publicly available.

Opportunity

Moving forward, WHO will continue to lead global monitoring efforts, and will work to broadly disseminate quantitative analysis of determinants of health related to air pollution and energy. Such health indicators can be leveraged to monitor the progress toward sustainable development goals, and even beyond the 2030 Agenda for health, climate change and other sectors. The data collected can inform decision-making and guide policy action, and this indicators can further raise awareness and drive action.

WHO's response

WHO compiles and estimates a large range of data and maintains over 10 databases. Many reporting activities below are done in close collaboration with other UN agencies and academic partners.

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Why it matters

Preparing a hot meal, staying warm on a cold night, or turning on a light in the evening, for many around the world, such needs are met by a simple flip of a switch or a turn of a dial. However for about 1/3 of the global population who mainly rely on polluting stoves and fuels, such basic tasks come with costs to health, well-being and the environment.

Household air pollution arising from the use of polluting stove and fuel combinations (e.g. open fire, simple woodstove, kerosene lamp) for cooking, heating and lighting is one of the most important global environmental health risks today in low and middle-income countries.

Widespread use of polluting cookstoves causes some 3.2 million premature deaths, largely from non-communicable disease like stroke, ischemic heart disease, chronic obstructive pulmonary disease, lung cancer, as well as pneumonia. Fuelwood collection and stove preparation can take hours and puts women and children at greater risk of injury and violence.

Did you know?

- The health and well-being of 2.4 billion could be improved by replacing polluting stove and fuel combinations with clean sources of energy at point of use like electricity, LPG, biogas, and solar.
- Kerosene use is the home is one of the largest causes of childhood poisonings, and along with simple stoves, is also an important source of burns and scalds in low- and middle-income households. Women and children spend many hours per week collecting fuel and preparing inefficient cookstoves due to the lack of lack of clean cooking access
- Universal access to clean cooking could cut some 50% of global black carbon emissions attributed to residential biomass use, a climate pollutant with more than 400x the warming potential of CO2.
- Close to a 250,000 pneumonia deaths in children under the age of 5 are due to household air pollution from the lack of clean cooking.

What is WHO's response?

Accelerating access to clean household energy can improve the health of the poorest populations, and improve livelihoods and gender equity, all the while protecting our climate through the reduction of emissions and reducing deforestation.

Acknowledging the large disease burden and equity impacts associated with household air pollution, in 2014 WHO produced the first-ever normative guidance, WHO guidelines for indoor air quality: household fuel combustion. These Guidelines provide technical recommendations on the types of fuels and technologies used in the home considered clean and safe for health at the point of use, as well as provides suggestions for maximizing health benefits during the energy transition. It also provides a good practice recommendation on the important synergies between household energy use and climate change mitigation. Investments in household energy solutions should be made based on understanding the country-specific options available and the actual health risks. The CHEST modules and Policy and Programme Planning Guide provide step-by-step guidance for mapping out current household energy use, related health impacts, and key stakeholders and use an evidence-based approach to select technological and policy solutions.

CHEST also supports the Sustainable Development Goals (SDGs). WHO will be reporting data for two SDG indicators that are closely related to air pollution, health, and the Clean Household Energy Solutions Toolkit:

What is WHO's Clean Household Energy Solutions Toolkit (CHEST)?

The WHO Clean Household Energy Solutions Toolkit (CHEST) provides tools that countries and programmes can use to develop policy action plans for expanding clean household energy access and use. CHEST can be used by governments, policy makers, researchers, and program implementers to help enact clean household energy interventions that can reduce household air pollution and improve health, the environment, livelihoods, and our climate.

Clean Household Energy Policy and Programme Planning Guide

WHO's Clean Household Energy Policy and Programme Planning Guide walks users through a series of steps using the tools and resources in CHEST to create an action plan for implementing and evaluating a clean household energy policy or programme. It describes how to use the tools within CHEST to identify, assess, compare and develop clean household energy policy and technology interventions tailored for specific country settings.

By using the Policy and Programme Planning Guide, users create an action plan for developing, implementing and monitoring new policies and programmes or improving existing ones in order to accelerate the transition to clean household energy at scale. The action plan will list the specific steps and actors necessary for enacting a comprehensive policy to drive wider adoption and sustained use of clean household energy and ultimately improve public health outcomes.

CHEST Modules

Module 1: Stakeholder mapping and situational assessment
Provides guidance on identifying key stakeholders and performing a rapid country-wide assessment of household energy use. Application of the module tools will result in an evidence-based argument and potential paths forward for action in clean household energy.

Module 2: Identification of technological and policy interventions
Provides resources for comparing various options for clean household energy interventions. This module and its associated tools help users explore how different fuels, technologies, and policy designs can impact health, environmental, and other social and economic outcomes (e.g., time loss).

Module 3: Guidance on standards and testing
Includes resources to help planners develop national standards for stoves based on safety, performance, durability and other features

Module 4: Monitoring and evaluation
Provides the tools and resources necessary to effectively monitor and track household energy use, adoption of clean fuels and technologies, and the impacts on health and livelihoods. This module offers guidance on how to collect quantitative and qualitative data on stove use, personal exposure to household air pollution, and health impacts associated with reducing exposure. The tools can be used to assess the impact of interventions and help governments and planners determine the cost-effectiveness and sustainability of different solutions.

Module 5: Engaging the health community
Resources to empower the health sector to tackle household air pollution. The module provides health professionals with the tools to integrate household energy and household air pollution as a risk factor for disease and the knowledge to 'prescribe' clean household energy solutions. It contains resources for the health sector to effectively communicate the health risks from household energy use, including to those working in other sectors.

Module 6: Communication and Awareness Raising
Provides communication materials to educate the public and professionals about the health and livelihood risks associated with household energy use, and household air pollution. It highlights key networks and campaigns like the WHO hosted Breathe Life Network where specialized communication materials on the importance of scaling up clean household energy to protect health and the environment are available for countries to use.

What's next for WHO?

WHO will continue working with countries, providing CHEST training and tools, as well as provide support in their application to develop or adapt policies for clean household energy access. It will further refine tools and develop others based on country needs. It will also work with partners in the Health and Energy Platform of Action, UN Energy, SDG 7 TAG and other groups to share and incorporate the knowledge, tools and information resources into activities on the ground to achieve clean cooking to protect health.

Lines of Action 5: Health-care facilities electrification

Why does this matter?

Reliable energy, particularly electricity, is critical to quality health-care delivery. Without reliable electricity in all health-care facilities, universal health coverage cannot be reached. Electricity is needed to power the most basic services – from lighting operating surgical theaters, to ensuring g clean water supply. Reliable power is also crucial for medical equipment, for example to safely manage childbirth or to ensure immunization as well as for undertaking most of the routine and emergency procedures.

Yet this aspect of health infrastructure is still neglected, and urgently needs more action and attention by all, from governments to development partners, from philanthropic institutions to international organizations.

Did you know?

- WHO estimated that close to 1 billion people in low- and lower-middle-income countries are served by health-care facilities without reliable electricity access or with no electricity access at all. [15]
- In low- and lower-middle-income countries of South Asia and sub-Saharan Africa, approximately 12% and 15% of health-care facilities, respectively, have no access to electricity whatsoever.
- There is a sharp urban–rural divide: urban health-care facilities often report more access to electricity and more reliable electricity than rural facilities in the same country.

Opportunities

Today, several solutions exist to electrify health-care facilities that were not available, or were too expensive, just a few years ago. For example, decentralized sustainable energy solutions based on solar photovoltaics are not only cost-effective and clean but rapidly deployable on site, without the need to wait for the arrival of the central grid.

- On-site renewable energy systems, furthermore, dramatically increase climate resilience of health-care facilities, making them independent from the diesel supply needed for generators, while reducing carbon and polluting emissions.
- Technical solutions and enabling delivery models exist and have demonstrated to be successful. It is essential to scale up investments and accelerate action to ensure reliable electricity to all health centers, including in remote and rural areas.

What is WHO's response

WHO supports countries ensure a reliable supply of electricity for health care facilities by providing the knowledge and tools to a) understand the energy access situation and the energy needs of health care facilities in their country, b) build the institutional capacity to identify the most suitable energy solutions to meet their needs, c) build an enabling framework to accelerate health-care facility electrification, d) support high-level advocacy, coordination and mobilization of adequate resources for impact on the ground.

Data gathering, analysis and harmonization

Establishing baselines and measuring progress is an essential step to identify gaps and priority needs for the allocation of limited resources. Building on the WHO Health care facility electrification database, developed in 2013, WHO collects and analyzes data regarding the energy status of health infrastructure to measure progress on access to electricity as well as on access to reliable electricity, among other indicators.

[15] The assessment is based on representative findings from 27 low-income and lower-middleincome countries that have national survey data on electrification status of health-care facilities, for any year between 2015 and 2022. Source: 'Energizing health: Accelerating electricity access in health-care facilities', WHO, 2023

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Knowledge creation

WHO gathers lessons and good practices on electrification of health-care facilities. It identifies and consolidates **key insights** on successful and innovative policies, regulations, financing instruments, delivery models and support measures with countries as well as to identify priority actions to accelerate health care facility electrification. Guidance and support to countries is provided via direct technical assistance as well as through the dissemination of reports and best practices, like those included in the 'Energizing Health – Accelerating electricity access in health-care facilities' (WHO, 2023)

Technical support & capacity building for country action

WHO provides direct **technical support** to countries, through regional and country offices, on **techno-economic analyses**. This activity includes support for:

- energy needs assessments,
- evaluation of different technical options,
- assessment of economic and environmental benefits,
- identification of the most suitable electrification and design approach,
- preparation of technical documentation,
- guidance on operation and maintenance.

WHO has joined **with GAVI and UNICEF** to build on and expand the scope of the current Cold Chain Equipment Optimization Platform. This new initiative, instead of providing solar energy only for the vaccine cold chain, aims at providing energy for all the needs of the health-care facilities.

WHO provides technical support to **strengthen professional capacity** of health workers at different levels, from central governments to local health centers. This activity will increase the ability of the local health sector to design, implement and maintain health-care electrification programmes. WHO will also work with local stakeholders to strengthen the capacity of health-care facility staff to properly use the energy systems and undertake the basic maintenance.

Building the enabling environment

WHO facilitates multisector cooperation and coordinated action among health and energy stakeholders, to maximize impact and leverage on synergies on the ground. In this framework, WHO serves as Secretariat, the Health and Energy Platform of Action (HEPA), facilitates the activities of the High-Level Coalition on Health and Energy, convened by the WHO Director General and plays a crucial role in multi-stakeholder platforms relevant for health and energy, such as the climate change conferences of parties (COPs), UN Energy, and SDG 7 progress tracking.

Resources:

- Energizing health: accelerating electricity access in health-care facilities. WHO, 2023 https://www.who.int/publications/i/item/9789240066960
- Access to modern energy services for health facilities in resource-constrained settings: a review of status, significance, challenges and measurement, Reprinted in 2015 with changes. WHO and World Bank https://www.who.int/publications/i/item/9789241507646
- WHO Database on electrification of health-care facilities https://www.who.int/data/gho/data/themes/database-on-electrification-of-health-care-facilities

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Lines of Action 6: Health workforce capacity building

Why does this matter?

Imagine you are a family doctor, and a young girl has been seeing you with frequent asthma attacks. Would you consider air pollution as a potential risk factor in your patient assessment? What questions would you ask to further explore this? Which tools might you use to better understand whether air pollution contributes to her symptoms? How would you advise her to reduce her risk?

Health workers are often not aware of the health impacts of air pollution. Yet, air pollution is a major environmental threat and one of the main causes of death among all risk factors, ranking just below high systolic blood pressure, tobacco smoking and high glucose. Globally, air pollution is responsible for about 7 million premature deaths per year due to ischemic heart disease, stroke, chronic obstructive pulmonary disease and lung cancer, but also from acute lower respiratory tract infections. In all countries, reductions in the level of air pollution greatly improve public health.

The international community recently recognized that the health workforce should play a more prominent role in the battle for clean air as endorsed by Ministries of Health in WHO's resolution WHA68.8, "Health and the environment: addressing the health impact of air pollution". [1]

Did you know?

- Air pollution is the only environmental risk factor that has been formally recognized as major risk factor for noncommunicable diseases (NCDs) along with tobacco, alcohol consumption, unhealthy diet and physical inactivity.[2] This represents a paradigm shift from individual risk factors to environmental risk factors for NCDs for which the health sector is currently unequipped to handle.
- At present clinical guidelines frequently do not address air pollution and health issues.[3]
- To date, issues around the health effects of air pollution are not sufficiently addressed in the curricula of health professionals, with only 12% of medical schools having a formal education on air pollution and health.[4]
- Less than 50% of World Heart Federation survey respondents felt that they do not have access to any tools or information on air pollution and cardiovascular health.[5]
- Existing training programs lack geographical diversity and are mainly based in high-income countries.[6]

[1] Health and the environment: addressing the health impact of air pollution (WHA68.8). Geneva: World Health Organization; 2015 https://apps.who.int/gb/ebwha/pdf_files/wha68/a68_r8-en.pdf
[2] Time to deliver: third UN high-level meeting on non-communicable disease. United Nations System Standing Committee on Nutrition; 2018 (https://www.unscn.org/uploads/web/news/NCD-HLM-Brochure-WHO.pdf, accessed 27 July 2022).
[3] Alina Herrmann, Benedikt Lenzer, Beate S Müller, Ina Danquah, Kari C Nadeau, Cathleen Muche-Borowski, Claudia Traidl-Hoffmann, Integrating planetary health into clinical guidelines to sustainably transform health care, The Lancet Planetary Health, Volume 6, Issue 3, 2022, Pages e184-e185, ISSN 2542-5196, https://doi.org/10.1016/S2542-5196(22)00041-9.
[4] Omnia El Omrani, Alaa Dafallah, Blanca Paniello Castillo, Bianca Quintella Ribeiro Corrêa Amaro, Sanjana Taneja, Marouane Amzil, Md. Refat Uz-Zaman Sajib & Tarek Ezzine (2020) Envisioning planetary health in every medical curriculum: An international medical student organization's perspective, Medical Teacher,42:10, 1107-1111, DOI: https://doi.org/10.1080/0142159X.2020.1796949
[5] World Heart Federation, 2021. Clean air, smart cities, healthy hearts: action on air pollution for cardiovascular health. Policy brief. Accessible at: https://world-heart-federation.org/wp-content/uploads/2021/09/WHF-Policy-Brief-Air-Pollution.pdf
[6] World Health Organization. (2021). Mapping opportunities for training in air pollution and health for the health workforce. World Health Organization. https://apps.who.int/iris/handle/10665/351042. License: CC BY-NC-SA 3.0 IGO

Opportunities

The engagement of the health sector and the health community is pivotal to include air pollution as part of clinical and community-level practice, as well as to engage in boosting advocacy and political action for clean air. This requires a strong effort by countries and key stakeholders willing to increase awareness and equip current and future health workers with knowledge and tools to tackle air pollution, communicate its risks and advice on personal and population level interventions for risk reduction.

What is WHO's response?

APHT toolkit

A comprehensive WHO Air Pollution and Health Training toolkit (APHT) is a set of materials designed to provide health workers understand health risks of air pollution, identify risk reduction measures, and promote clean air solutions for individuals and communities. Using a train of the trainers' approach, the APHT toolkit also helps facilitate the organization of in-person workshops, online courses and other learning opportunities.

The APHT toolkit is composed of:

- 12+ training modules
- Training-the-trainer manual
- Case scenarios to develop a clinical approach to air pollution
- Job aids and flipcharts for community engagement

WHO online trainings

WHO offers a series of publicly available online courses on air pollution and health via the WHO learning platforms to make the material accessible to a broader audience and easily replicable.

Activities and actions

Previous efforts put in place by WHO to build the capacity of the health sectors on air pollution and health included the collaboration with more than 50 international experts from government and academic institutions who developed and/or reviewed the training toolkit contents, in country APHT toolkit piloting workshops, as well as joint collaborations with relevant Non-State Actors for implementation and dissemination of the toolkit components.

WHO will continue to build the capacity of the health workforce on air pollution and health via the following activities and actions:

- Development of new training modules and tools for specific target audiences within the health workforce
- On the ground country and regional workshops and trainings
- Online self-paced and global interactive courses delivered through to OpenWHO platform and WHO Academy
- Clinical tools for risk assessment to guide personal interventions
- Enhanced clinical guidance through stakeholders' consultation on air pollution and health
- Advocacy to support air pollution to be included or integrated as part of health education curricula

For more info: https://www.who.int/activities/capacity-building-and-training-materials

[7] WHO trains health workers in Ghana on air pollution and health. WHO News 2022. Accessible at: https://www.who.int/news/item/14-09-2022-who-trains-health-workers-in-ghana-on-air-pollution-and-health
[8] OpenWHO Air Pollution and health training course for health workers. OpenWHO platform. Accessible at: https://openwho.org/courses/air-pollution-health-workers (in development)
[9] WHO Academy website. Accessible at: https://www.who.int/about/who-academy/

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Lines of Action 7: Enabling the health sector engagement – tools and resources for action on air pollution and energy access

Why this matters?

The health sector has an important role to play in addressing air pollution, whether it be prescribing a breath of clean air in clinical practice or serving as the health champion in local policy discussions around transport, or energy access. The 'health argument' is a strong lever of the health sector to drive action by governments and individuals.

Despite the large disease burden attributed to air pollution, and the strong evidence-base linking air pollution to specific health outcomes, many health professionals report feeling ill-equipped and/or lacking the background and resources to effectively integrate air pollution as a risk factor into their clinical, policy or advocacy work for disease prevention and management. Unlike other disease risk factors, many of the causes of air pollution fall outside the responsibility of the health sector, causing health professionals to feel uncertain about their role in taking measures to reduce exposure to air pollution. Such challenges hinder the effective engagement of the health sector, a much-needed champion and leader in protecting the health for 99% of the world's population.

To fully leverage the strength of the health argument, there is an urgent need to ensure that health professionals have the knowledge and tools at their disposal to effectively communicate, educate and protect the health of patients and populations from air pollution.

Did you know?

- Four out of the five leading causes of death, namely stroke, ischemic heart disease, chronic obstructive pulmonary disease, and acute lower respiratory factor are attributable to air pollution.
- Asthma is a commonly overlooked noncommunicable disease (NCD) directly related to air pollution, affecting both children and adults. In 2020, for the first time, the UK declared air pollution the cause of death for a nine-year old girl who suffered regular asthma attacks.
- Only 11% of medical schools include formal education around air pollution as a risk factor for disease
- Few if any questions on household surveys aimed at assessing ambient air pollution as a risk factor for ill health
- Standardized in-take survey for patients or other diagnosis tools for clinicians lack any questions or assessment of air pollution as a risk factor for disease, a missed opportunity for early prevention.

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What is WHO's response?

WHO is supporting countries identify cost-effective interventions for to protect health from air pollution and build the business case for action by:

- developing robust methods to systematically assess the health (morbidity & mortality), economic and other impacts of different policy and technological solutions for air pollution mitigation (e.g. EMAPEC)
- reviewing policy and technological interventions to inform the development of guidance for selecting, implementing and monitoring air quality interventions (e.g., Household Energy Policy Repository)
- tracking policies for air pollution mitigation and pairing them with relevant evaluations when available to share lessons learned and encourage cross-country cooperation (e.g., Ghana Policy Tracking Report)
- developing interactive tools allowing countries to quantify the health, social, environmental and economic costs and benefits of interventions (e.g. Benefits of Actions to Reduce Household Air Pollution) to support evidence-based decision-making

What's in store for WHO?

WHO led a multi-stakeholder process to integrate health related questions to national omnibus surveys like Demographic Health Surveys and censuses to assess health risks from household energy use, as well as those to monitor policy progress for action on NCDs via an household energy module for the STEPs noncommunicable disease risk factor survey.

Building on this know-how and experience with household air pollution along with its World Health Assembly mandate to strengthen the capacity of the health sector to tackle air pollution, WHO is currently working to better assess and monitor air pollution as a risk factor, develop tools to integrate air pollution in clinical and policy practice and strengthen the voice of the health sector in communication around air pollution as a risk factor for ill-health (see Annex XYZ). Some specific ongoing activities include:

- Clinical risk assessment screening tool for pollution related disease
- STEP survey instrument module preparation on ambient air pollution to be adopted by countries in monitoring progress toward tackling NCDs
- Integration of questions assessing ambient air pollution exposure in household census and surveys questions
- Communication tools and evidence base messaging on air pollution and health risk (e.g. air quality and health indexes - AQHI)
- Guidance on personal protection measures for air pollution (e.g., face masks, air purifiers) to support clinicians when advising patients and support public health department messaging

Key Resources:

WHO Air Pollution and Health Training for health care professionals
https://www.who.int/activities/capacity-building-and-training-materials

STEPwise approach to NCD risk factor surveillance (STEPS)
https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/steps/steps-household-energy-use.pdf?sfvrsn=39689065_4

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Lines of Action 8: Desert dust and health

Why does this matter?

Desert dust episodes contribute directly to air pollution by increasing particulate matter concentrations and in some regions is an important – sometimes main – source. Desert dust episodes – or sand and dust storms – constitute a growing public health, mainly for respiratory diseases, and environmental concern for many areas of the world. It also has an important transboundary component, which is important to take into account when addressing it at regional and international level.

It is a challenge for the health sector because of the difficulty in characterizing the exposure[1] , being a global phenomenon while impacting specific areas, and the limited evidence on its long-term health effects. Currently, government's response is based on the knowledge of short terms health effects, limited early warning systems and the provision of information to vulnerable groups in real time, as well as the impact of emergency visits.

The health sector should also address the gaps in knowledge and response on the health impacts of desert dust in the longer term and continue strengthening collaboration with appropriate government entities to provide a timely and effective public health response.

Did you know?

- Someone living in Barbados regularly breathe Sahara dust particles ? Globally, some 2 billion people are exposed daily to particles transported by wind also for thousand kilometers -well away from source areas.
- Climate change contributes to desertification which in turn may increase the frequency and spread of sand and dust storms
- About a third of the Earth's land surface is prone to emit airborne mineral dust, composed of arid and semi-arid regions
- In certain areas, desert dust can dominate the mix of air pollution.
- Evidence indicates that dust has immediate impacts on respiratory and cardiovascular diseases.

Sand and dust storms has gained attention on the international agenda and UN agencies are joining forces to address the issues in a coordinated manner. WHO is following the implications of the health impacts of desert dust outbreaks on air quality.

WHO is advocating for addressing the issue of dust as an important risk to health. A good practice statement on desert dust and sand and dust storms was incorporated for the first time in the latest WHO AQG.[2]

- With the support of a dedicated expert groups, WHO is:
  - > Synthetizing evidence on the short- and long-term health impacts of desert dust
  - > Providing guidance on harmonized exposure assessment of desert dust and monitoring of health effects
  - > Evaluating the implementation of the current good practice statements as provided in the WHO AQG and strengthening future normative recommendations
- Collaborating closely with international organizations such as the World Meteorological Organization (WMO) - Sand and Dust Storm Warning Advisory and Assessment System (Forecast Maps) and leading the working group on health of the United Nations (UN) Coalition to Combat Sand and Dust Storms (SDS)[3] to integrate health arguments and tools in action plans
- Developing training tools for the health and other sectors to share knowledge on the health impacts of desert dust and trigger the implementation of measures to protect health

OUTCOME of the Action Area 1 – Institutional capacity-building and technical support

The evidence based on the health impacts of desert dust is comprehensive, up-to-date and available to inform decision making and monitor progress.

[1] i.e. exposure to dust can be defined in different ways, and there is a lot of heterogeneity in its definition and use in epidemiological studies and for further policy action.

[2] WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization; 2021 (https://apps.who.int/iris/handle/10665/345329).

[3] UN coalition to combat sand and dust storms : https://www.fao.org/land-water/land/sds/sds-coalition/en/

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Lines of Action 9: Defining, tracking and reporting data: health beyond SDG 3

Why this matters?

Knowing the level of air pollution all over the world, how many people are using clean cooking, or the latest number of deaths linked to air pollution is critical to enable public action. Such robust data are essential for countries and the global community, to establish a baseline, track progress, draw comparisons, and advocate for actions.

WHO's leadership in monitoring and reporting on air pollution and its health impacts builds on decades of compiling data on household energy for cooking and ambient air quality (GEMM Air and the WHO Database). This data has been feeding and informing policies for decades and fostered cooperation through joint endeavors.

Did you know?

- Sustainable Development Goal (SDG) indicators provide a standardized way to track and report on the implementation of the SDGs and help countries monitor their progress towards achieving the goals. They serve as a tool for governments, organizations, and individuals to hold themselves accountable and support transparency and accountability in reporting.
- Beyond good health and well-being, WHO is the custodial agency of the following air pollution and energy access indicators:
  - ◊ SDG indicator 3.9.1: deaths attributable to both ambient and household air pollution;
  - ◊ SDG indicator 7.1.2: population using clean fuels and technologies, progress towards uni versal access to affordable, reliable, sustainable and modern energy; and
  - ◊ SDG indicator 11.6.2: inclusive, safe, resilient and sustainable cities, air pollution level in cities.
- 40% of countries do not have air pollution ground measurements available, needed to estimate exposure to air pollution.
- Energy use in households and healthcare facilities is not adequately included in national surveys and census to estimate health, climate and economic impacts.
- Data gathered by WHO is based on regular consultations with Member States and is publicly available.

Opportunity

Moving forward, WHO will continue to lead global monitoring efforts, and will work to broadly disseminate quantitative analysis of determinants of health related to air pollution and energy. Such health indicators can be leveraged to monitor the progress toward sustainable development goals, and even beyond the 2030 Agenda for health, climate change and other sectors. The data collected can inform decision-making and guide policy action, and this indicators can further raise awareness and drive action.

WHO's response

WHO compiles and estimates a large range of data and maintains over 10 databases. Many reporting activities below are done in close collaboration with other UN agencies and academic partners.

From indicators to actions			
Design	**Collect**	**Estimate**	**Inform**
• Lead and cooperate with other UN agencies on SDG indicator methodology updates and reporting • Identify exposure and health data needs and gaps • Integrate air pollution into WHO and SDG portals • Advance estimations and data collection on gender and inequality	• Collect data from Member States, in the literature and from publicly and trusted available data sources • Building capacity and refining tools for enhanced data collection in countries • Advance the collection of more comprehensive and standardized data and promote standardization	• Update regularly the WHO databases • Produce regular estimates for the SDGs • Apply methods and models to improve data coverage and coherence • Consult with Member States regarding estimates and missing data	• Provides informative webinars and trainings on SDG indicators methodologies and results • Regularly update WHO and SDG data portals to enhance dissemination and provide open access data. • Provide better data visualization to present the data in an easily accessible and understandable format • Prepare and disseminate relevant reports, policy briefs and publications

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Lines of Action 10 - Communications and advocacy

Why does this matter?

Communication is vital for implementing WHO's Strategic Approach for Air Quality, Energy Access and Health while informing the general population, policy-makers and the health workforce on the impacts of air pollution, lack of energy access and how to protect health. WHO presents health, climate and economic arguments to incentivize action and promotes evidence-based policies and programs to reduce air pollution and accelerate energy access. Media engagement and tracking also provide useful insights for monitoring the progress of policies to address air pollution and energy access.

Did you know?

WHO has a high level of credibility, leveraged in many successful health communications campaigns. Furthermore, air pollution and lack of clean energy are increasingly recognized as a risk to health, for their impacts on climate change and development challenges such as gender inequality, poverty and food insecurity. However, through the lens of the indicators offered in this Strategy, progress towards clean air and energy access with improved health outcomes has been slow and uneven.

WHO has powerful channels including its official website, social media channels, and relationships with mass media to communicate with multi-sector audiences. The three levels of the Organization, Member States and WHO partners form critical channels for communication and should be engaged to implement WHO strategies. It can be seen both as a big funnel for health promotion, and a series of specialized channels to inform key decision-makers with tailored messages.

Opportunities

WHO aims to support countries in implementing guidance on air quality, energy access, and health, and to promote detailed messages that engage health workers, decision-makers in key sectors, and sector stakeholders to reduce air pollution from particular sources, accelerate energy access, and improve public health while mitigating climate change. While there is rarely a direct correlation between a single communications action or campaign and a particular policy outcome, WHO seeks to build awareness which opens opportunities for action, widens the dialogue, and creates a sense of political urgency. WHO is uniquely positioned to communicate health arguments to drive actions across sectors. WHO strategic communications for air quality and energy access focuses on:

- Data and guidance: Through the WHO website increase the visibility of the health impacts of air pollution and energy access on official channels. Translate evidence into easy to interpret and locally adaptable maps, graphics and visualizations integrated into communications products e.g. Breathe-Life air quality gauge.
- Engage global, regional, and country communications focal points, collaborating centres, researchers, and influencers to reach "outcome-critical" stakeholders, promote local actions and measure progress.
- Capacity building to implement air pollution, energy access and health framework for a Single Overarching Communication Outcome, the main message of the campaign.
- Impactful campaigns and international conferences to communicate impacts of air pollution and energy access on public health, and drive evidence-based solutions on the ground.
- Communications tools that contextualize health risks to the general public, make risks more "visible and detectable locally ," reduce personal exposure, and intensify the demand for action. WHO will conduct analytics to confirm the types of information health workers, decision-makers and media influencers are looking for information on air pollution from WHO.

What is WHO's response?

Communicating the evidence base

Regular news updates on the WHO website, newsletters, social media and other channels

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- Promote newsletters that communicates the latest evidence-based information on air quality, energy access and health to a targeted audience, including health workers, decision-makers, and other stakeholders.
- In cooperation with partners publish new evidence in peer-reviewed scientific journals and reports.
- Preparation of joint topical reports with other UN agencies and partners to provide a state of the evidence and identify priorities for decision-makers working in different sectors to take action.
- Harmonize and disseminate public health messaging around air pollution and energy access throughout the three levels of the Organization, and other programs e.g. maternal and child health, and noncommunicable diseases.

Developing communications channels to support capacity building

Cutting-edge, interactive data visualizations on the WHO website

- Work with WHO's Global Health Observatory and ICT to develop cutting-edge, interactive data visualizations on the who.int website that engages a wide audience, support capacity building and provide practical information to countries.
- Produce data visualizations and integrate them on the WHO website.

Communications training module

- Develop a communications training module and resources including health posters or other training materials for health and other sectors that will be integrated into existing initiatives, guidance, and tools such as:
    - > WHO Air Pollution and Health Training toolkit,
    - > WHO Clean Household Energy Solutions Toolkit, and
    - > WHO Urban Health Initiative, and BreatheLife campaign.

Working and coordinating outreach with partners

Communication through existing networks

- Support efforts to communicate air pollution and energy access through existing networks, such as Health and Energy Platform of Action, Global Air Pollution and Health Technical Advisory Group, Healthy Cities Network, and C40.

Mass and social media analysis

- Conduct mass and social media analysis to identify influencers, channels and audiences to reach health workers, key stakeholders, and sensitive and vulnerable groups and develop targeted messaging and campaigns to engage them.

Interactive tools on the BreatheLife platform

- Harness the BreatheLife platform for greater dissemination of tools and information resources as well promoting country examples to key stakeholders and the general public, by integrating interactive clinical case scenarios as a resource for training, locally adaptable communications assets and infographics, use of geographical information systems to demonstrate actions and tools for policy tracking.

Conference on air pollution, energy and health

- Promote conference activities and develop plan to promote internal and external communication during conference. Host events and exhibits to promote awareness during conference.

Leverage specific days or events throughout the year such as World Environment Day, World Health Day or the International Clean Air Day for Blue Skies to support risk and emergency communication.

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Annexes B:

1. Overview of WHO Air Quality Guidelines

2. Index of Repository and Databases

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Overview: WHO air quality guidelines

What are WHO air quality guidelines?

Air quality guidelines is a series of WHO publications that provide evidence-based, normative recommendations for protecting public health from the adverse effects of air pollution. WHO guidelines take into account the latest body of evidence on the health impacts of different air pollutants, and they are a key step in the global response to improve public health by eliminating or reducing exposure to hazardous air pollutants and by guiding national and local authorities in their risk management decisions.

Available guidelines include:

- WHO global air quality guidelines: particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide (global update in 2021)
- WHO guidelines for indoor air quality: household fuel combustion (2014)
- WHO guidelines for indoor air quality: selected pollutants (released in 2010).
- WHO guidelines for indoor air quality: dampness and mould (released in 2009).

Global group of scientists and experts have derived the recommendations published in the guidelines based on a robust and comprehensive review of the scientific literature and rigorously defined methodologies.

The **WHO global air quality guidelines** provide

- evidence-informed recommendations in the form of AQG levels, including an indication of the shape of the concentration–response function in relation to critical health outcomes, for $PM_{2.5,}$ PM_{10}, ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide for relevant averaging times.
- interim targets to guide reduction efforts towards the ultimate and timely achievement of the AQG levels for countries that substantially exceed these levels.
- qualitative statements on good practices for the management of certain types of PM (i.e. black carbon or elemental carbon (BC/EC),2 ultrafine particles (UFP), and particles originating from sand and dust storms (SDS)) for which the available information is insufficient to derive AQG levels but indicates risk.

The **WHO Guidelines for indoor air quality: Household fuel combustion** aim to help public health policy-makers, as well as specialists working on energy and resource issues, understand and implement best approaches to reducing household air pollution. This extensive scientific assessment identifies which energy systems can be considered clean for health in the home, and specifies the levels of emissions that pose health risks. The guidelines also include recommendations against the use of unprocessed coal as a household fuel, and against the use of kerosene as a household fuel, in the light of health and safety risks. Another recommendation addresses the need for policies that prioritize substantial health benefits during the transition from use of solid, polluting fuels to clean fuels and technologies, especially in low-income and rural households.

The **WHO guidelines for indoor air quality: selected pollutants** address a number of chemicals commonly present in indoor air (i.e. benzene, carbon monoxide, formaldehyde, naphthalene, nitrogen dioxide, polycyclic aromatic hydrocarbons, radon, trichloroethylene and tetrachloroethylene often found indoors in concentrations of health concern. The guidelines are targeted at public health professionals involved in preventing health risks of environmental exposures, as well as specialists and authorities involved in the design and use of buildings, indoor materials and products.

WHO guidelines for indoor air quality: **dampness and mould** address microbial pollution (building moisture and biological agents) that is a key element of indoor air pollution. It is caused by hundreds of species of bacteria and fungi, in particular filamentous fungi (mould), growing indoors when sufficient moisture is available. The most important effects are increased prevalence of respiratory symptoms, allergies and asthma as well as perturbation of the immunological system. The document also summarizes the available information on the conditions that determine the presence of mould and measures to control their growth indoors. The most important means for avoiding adverse health effects is the prevention of persistent dampness and microbial growth on interior surfaces and in building structures.

How are WHO air quality guidelines implemented?

All guidelines provide a scientific basis for legally enforceable standards. The implementation of the guidelines offers several opportunities to take policy decisions to set priorities for action knowing the health risk assessment of air pollution. They provide concentration–response relationships useful to health/environmental impact assessment practitioners to estimate expected health effects at under various scenarios. Researchers and academics also benefit from the guidelines because of the indication of critical data gaps that need to be filled in the future through a structured research agenda.

The implementation of the guidelines on air quality involves actions on:

- existing and operating air pollution monitoring systems;
- public access to air quality data;
- legally binding, globally harmonized air quality standards;
- air quality management systems;
- developing and applying tools to assist with planning and evaluating policies to support effective actions;
- Fostering capacity building, in particular for the health sector, and including content related to the guidelines in curricula for a variety of medical professionals and scientists.

Additionally, the guidelines support in:

- considering the opportunities for synergy between climate policies and health, including financing, governments and other agencies developing and implementing policy on climate change mitigation consider action on household energy and carry out relevant assessments to maximize health and climate gains.
- changing household energy practices through direct interactions between the public and health services.
- encouraging intersectoral collaboration necessary for ensuring access to healthy levels of air quality for everyone.

Key Ressources

WHO Global Air Quality Guidelines (Ambient)

WHO Guidelines for indoor air quality: household fuel combustion

WHO Clean Household Energy Solutions Toolkit

WHO Guidelines for indoor air quality: dampness and mould

WHO Guidelines for indoor air quality: selected pollutants

Index of Repository and Databases

Name	Category	Main Topic	Type	Starting Year	What is in there?	Description
WHO Ambient Air Quality Database	Database	AAP	Real-world/Census data	2011	Published version: annual mean of PM2.5, PM10 and NO2 at city level. Non-published background version: annual mean of PM2.5, PM10 and NO2 at station level.	WHO has been routinely collecting ground measurement of annual mean concentration of 2 key pollutants. This databases is critical to the modelling activities of WHO on exposure to air pollution and subsequently quantifying the number of premature deaths and associated diseases with it. With over 6000 cities/human settlement in 117 countries, it's the largest databases of both official and from high quality data of its kind. More disagregated data are regularly requested by partners in academia and research organizations. The last update (5th Update) was publised in 2022.
Modelled estimates of particulate matter air pollution (DIMAQ Results)	Database	AAP	Modelled Estimates	2014	Published version: gridded concentration	Assessing air pollution level across the global in a consistent way is essential but such levels cannot be measure directly everywhere. WHO current model allows to predict air pollution level all around the global, It uses the data from the WHO Ambient Air Quality Database as well as satellites population grid and topographic information into a complex mathematical model that covers the entire planet. The last update (version 2018) was published in 2018
Database on source apportionment studies for particulate matter	Repository	AAP	Epidemiological repository		Published version: 520 shares of source apportionment (sea salt, traffic, domestic fuel burning, natural sources, industry and other) from 230 studies.	For reducing health impacts from air pollution, it is important to know what sources (e.g. transportation, power generation) contribute to human exposure, and by how much. The source apportionment database is a systematic collection of available source apportionment studies on particulate matter in from cities all over the world. It gathers over 520 shares of source apportionment (sea salt, traffic, domestic fuel burning, natural sources, industry and other), from accross the world, from 230 studies. This database was developed in cooperation with the Joint Research Centre (JRC) of the European Commission in Ispra, Italy. It is based on a 2015 paper published in Amospheric Environment. The last update (V2) was published in 2015.
Air Quality Standards Database	Database	AAP	Other	2018	Published version: air quality standards based on the 6 WHO AQG guidelines pollutants.	WHO developed the ambient air quality guidelines at levels considered to be safe or of acceptable risk for human health. These guidelines are meant to support governments in defining national standards. Tracking such standards is important to assess differences and promote science-based standards. This database was developed in cooperation with Swiss TPH. The first update (V1) was published in 2018.
Global HAP database (or Global database of household air pollution measurements)	Database	HAP	Other	2003	Published version: 196 studies analysis through over 150 dimensions and divided in over 1290 measurements.	A repository of methods and results from studies reporting household air pollution measurements. This database currently contains measurements from 196 studies from 43 countries between 1968 and 2016. This database is useful for understanding the range of household and outdoor air pollution measurements that have been taken in a country or region. The last update (V5) was published in 2018.
Household Energy Database (Exposure)	Database	HAP	Real-world/Census data		Published version: Available upon request Non-published background version: share of different fuels and technologies for cooking, heating and lighting fuels, based on nationally representative data from surveys. It also containsinformation on stove type, time spent collecting fuel, and incidence of acute lower respiratory infection	The database contains nationally representative data from surveys and censuses on cooking, heating and lighting fuels. It serves to estimates with models the use of clean versus polluting fuels and technologies, which allow to estimates the exposure for household air pollution and down the line calculate its burden of disease.
Cooking fuels and technologies	Database	HAP	Modelled Estimates		Published version: global, regional, and country level for 6 specific fuel categories: electricity, gaseous fuels (including liquid petroleum gas, natural gas and biogas), kerosene, biomass (unprocessed biomass includes wood, crop residues and dung), charcoal, and coal, for urban, rural and total, and 170 countries, with data dating back to 1960.	This database contains fuel-specific estimates of the fuels and technologies used for cooking, by countries. It is derivated from the WHO Household energy database through a statistical models to produce the estimates available below at the global, regional, and country level for 6 specific fuel categories: electricity, gaseous fuels, kerosene, biomass, charcoal, and coal. It is used to report for Sustainable Development Goal Indicator 7.1.2.
WHO GHO Air Pollution Data Portal	Database	Both	Other		Various dataset and time series	Our unit provides statistics related to the burden of disease and mortality related to air pollution, both ambient and indoor. This includes Sustainable Development Goal (SDG) indicators such as mortality of air pollution in cities or access to clean energy. This indicators enable countries and the world to assess the gap between the current state of affairs and where we would like to go. Most indicators relies on models developed by WHO with academic partners and feeds with other WHO databases.
Integrating health in urban and territorial planning: the directory	Repository	Urban Health	Other	2022	Published version: 100+ open access resouces tools	The directory is an online repository of more than 100 open access resources and tools that provide information on the importance of planning and designing urban areas from a health perspective, as well as concrete guidance on how to do it. It includes resources that describe the importance of considering health in urban and territorial planning, tools that quantify the health and socioeconomic impact of planning and designing urban areas from a health perspective, the description of successful initiatives, or training materials on urban planning and health, among others. Also, it includes resources in different languages – including all the WHO official languages (i.e., Arabic, Chinese, English, French, Russian, and Spanish) – and from different geographical regions.The directory builds from the resources included in the Integrating health in urban and territorial planning sourcebook (joint publication by WHO and UN-Habitat), and the publication Supporting a healthy planet, healthy people and health equity through urban and territorial planning (Grant et al., 2022).
Household Energy Policy Repository	Repository	HAP	Other	2021	over 120 clean household energy policies or policy statement and more than 30 independent evaluations	The World Health Organization, in partnership with the Stockholm Environment Institute (SEI), developed a Household Energy Policy Repository ("the Repository") to serve as an online clearinghouse for national, regional and local policies, regulations and legislation affecting household energy use. The Repository summarizes policies targeting cooking, heating, and lighting using clean fuels and technologies including electricity, liquefied petroleum gas (LPG), biogas, solar thermal and photovoltaic (PV), ethanol, as well as other options like biomass pellets. The Repository currently includes information on over 120 clean household energy policies or policy statements from more than 30 countries and the European Union (EU), representing all WHO regions. There are also links to more than 30 independent evaluations that assess the impacts of specific policies.
Database on electrification of health-care facilities	Database	HCF-E	Other	2023	summary statistics & estimates	The database includes summary statistics from national health-care facility assessments, surveys and reports on the percentage of facilities reporting no access to any electricity, unreliable access and reliable access to electricity. The data are disaggregated by health-care facility attributes, when available, including facility type (hospital versus non-hospital) and geographic location (urban versus rural).
Health Effects from Liquid and Gaseous Fuels Database	Database	HAP	Other	2022	liquid and gaseous fuels used for household energy	This database was developed through a systematic review of scientific literature and includes a full range of liquid and gaseous fuels used for household energy and associated air pollutants and potential health effects (including symptoms and diagnoses from exposure to household air pollution and burns and poisoning from use of the fuels). The database contains studies conducted between 1980 and 2020, with searches conducted in January 2021. The review protocol was registered with PROSPERO (CRD42021227092).

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https://www.who.int/teams/environment-climate-change-and-health/air-quality-and-health